

**REGISTRATION REPORT**  
**Part B**  
**Section 3**  
**Efficacy Data and Information**

Concise summary

Product code: GF-4021

Product name(s): LaDiva

Chemical active substance(s):

Halauxifen-methyl + Picloram +Aminopyralid  
10 + 48 + 32 g/L

Zonal Rapporteur Member State: Poland  
(Central registration zone)

**CORE ASSESSMENT**  
(authorisation)

Applicant: Corteva

Submission date: Updated January 2022

MS Finalisation date: March 2022 (initial Core Assessment)

December 2022 (final Core Assessment), updated June 2023

## Version history

| When          | What   |
|---------------|--|
| August 2021   | Initial dRR – Corteva  |
| January 2022  | Update of dRR – Corteva  |
| March 2022    | Initial zRMS assessment<br><br>The report in the dRR format has been prepared by the Applicant, therefore all comments, additional evaluations and conclusions of the zRMS are presented in grey commenting boxes. Minor changes are introduced directly in the text and <b>highlighted in grey</b> . Not agreed or not relevant information are <del>struck through and shaded for transparency</del> . |
| December 2022 | Final report (Core Assessment updated following the commenting period).<br><br>Additional information/assessments included by the zRMS in the report in response to comments received from the cMS and the Applicant are <b>highlighted in yellow</b> . Information no longer relevant <del>is struck through and shaded</del> .   |
| June 2023     | zRMS autocorrect on PAPRH sensitivity assessment (all changes are <b>highlighted in turquoise</b> ).   |

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### 3 Efficacy Data and Information (including Value Data) on the Plant Protection Product (KCP 6)

#### Transformation of the dRR (applicant version) into the RR (zRMS version)

##### Comments of zRMS:

Conclusions from the assessment were prepared using grey commenting boxes placed at the end of each chapter. Textual changes were done using grey highlights in the text. The parts of the text amended or added by the zRMS evaluator are highlighted in grey, whereas the parts struck off are ~~visibly marked with the grey font~~.

#### 3.1 Summary and conclusions of zRMS on Section 3: Efficacy (KCP 6)

##### Abstract

##### Abstract of the evaluation, by the zRMS PL:

This application has been submitted for the authorization of new product GF-4021 (LaDiva) in Poland, Germany, Czech Republic, United Kingdom, Slovakia, Hungary, Romania and Slovenia. GF-4021 contains three active substances: halauxifen-methyl (10 g/l), picloram (48 g/l) and aminopyralid (32 g/l). This product is intended to use as a herbicide for dicotyledonous weeds control in winter oilseed rape.

##### MED

Taking into account the results from all EPPO climatic zones, the dose rate of 0,25 l/ha can be considered the minimum effective dose to control of dicotyledonous weeds in winter oilseed rape, either in early and later timing of application.

##### Efficacy

Data shows that GF-4021 applied at 0,25 l/ha at BBCH 12-19 is an effective product for the control of *Capsella bursa-pastoris* (CAPBP), *Centaurea cyanus* (CENCY), *Chenopodium album* (CHEAL), *Descuarinia sophia* (DESSO), *Fumaria officinalis* (FUMOF), *Galium aparine* (GALAP), *Geranium dissectum* (GERDI), *Geranium molle* (GERMO), *Geranium pusillum* (GERPU), *Lamium purpureum* (LAMPU), *Matricaria chamomilla* (MATCH), *Tripleurospermum inodorum* (MATIN), *Myosotis arvensis* (MYOAR), *Papaver rhoeas* (PAPRH), *Stellaria media* (STEME), *Thlaspi arvense* (THLAR), *Veronica persica* (VERPE) and *Viola arvensis* (VIOAR).

##### Selectivity

Based on the trial results (either efficacy and selectivity trials), it can be concluded that GF-4021 at 0,25 l/ha caused transient phytotoxicity symptoms. However, it did not affect on the quality and quantity parameters of the yield.

##### Resistance risk

~~Although~~ The overall risk resistance developing is low to medium. The unmodified use is unacceptable for *P. rhoeas* population's resistance to ALS and group 4 (legacy O) herbicides. Hence, to the opinion of the zRMS, the anti-resistance recommendations are necessary to the product label. The Synthetic Auxin Working Group propose to use diversity in weed control practises which are presented in the chapter 3.3. The cMSs should consider these recommendations on the national level.

**Table 3.1 - 1: Acceptability of intended uses (and respective fall - back GAPs, if applicable)**

|                          |                                   |                       |                         |
|--------------------------|-----------------------------------|-----------------------|-------------------------|
| PPP (product name/code): | LaDiva /GF-4021                   | Formulation type:     | NeoEC <sup>(a, b)</sup> |
| Active substance 1:      | Halauxifen-methyl (Arylex Active) | Conc. of as 1:        | 10 g/l <sup>(c)</sup>   |
| Active substance 2:      | Picloram                          | Conc. of as 2:        | 48 g/l <sup>(c)</sup>   |
| Active substance 3:      | Aminopyralid                      | Conc. of as 3:        | 32 g/l <sup>(c)</sup>   |
| Synergist:               | Not Applicable                    | Conc. of synergist:   | NA <sup>(c)</sup>       |
| Applicant:               | Dow AgroSciences                  | Professional use:     | Yes                     |
| Zone(s):                 | Central zone                      | Non professional use: | No                      |
| Verified by MS:          | No                                |                       |                         |
| Field of use:            | Herbicide                         |                       |                         |
| PPP (product name/code): | GF-4021/3788                      | Formulation type:     | NeoEC <sup>(a, b)</sup> |
| Active substance 1:      | Halauxifen-methyl (Arylex Active) | Conc. of as 1:        | 10 g/l <sup>(c)</sup>   |
| Active substance 2:      | Picloram                          | Conc. of as 2:        | 48 g/l <sup>(c)</sup>   |
| Active substance 3:      | Aminopyralid                      | Conc. of as 3:        | 32 g/l <sup>(c)</sup>   |
| Synergist:               | Not Applicable                    | Conc. of synergist:   | NA <sup>(c)</sup>       |
| Applicant:               | Dow AgroSciences                  | Professional use:     | Yes                     |
| Zone(s):                 | Central and Southern zone         | Non professional use: | No                      |
| Field of use:            | Herbicide                         |                       |                         |

| 1  | 2                  | 3  | 4                                     | 5  | 6                                     | 7  | 8   | 9  | 10  | 11   | 12                            | 13            | 14   | 15                          |
|--|--------------------|--|---------------------------------------|--|---------------------------------------|--|---|--|---|--|-------------------------------|---------------|--|-----------------------------|
| Use-<br>No. <sup>(e)</sup>   | Member<br>state(s) | Crop and/<br>or situation<br><br>(crop desti-<br>nation /<br>purpose of<br>crop) | F, Fn,<br>G,<br>Gn,<br>Gpn<br>or<br>I | Pests or Group of pests<br>controlled<br><br>(additionally: developmen-<br>tal stages of the pest or pest<br>group)  | Application                           |  |   |  | Application rate  |  |                               | PHI<br>(days) | Remarks:<br><br>e.g. g saf-<br>ener/synergist<br>per ha<br>(i) | Overall<br>conclu-<br>sions |
|  |                    |  |                                       |  | Method<br>Kind                        | Timing<br>/<br>Growth stage<br>of crop & sea-<br>son | Max. number<br>a) per use<br>b) per crop/<br>season | Min. interval<br>between ap-<br>plications<br>(days) | g product / ha<br>a) max. rate<br>per appl.<br>b) max. total<br>rate per<br>crop/season | g as / ha<br>a) max. rate<br>per appl.<br>b) max. total<br>rate per<br>crop/season | Water<br>L/ha<br>min /<br>max |               |  |                             |
| Zonal uses (field or outdoor uses, certain types of protected crops) |                    |  |                                       |  |                                       |  |   |  |   |  |                               |               |  |                             |
| 1  | Poland             | Winter oil<br>seed rape  | F                                     | Broadleaf weeds (post-em)<br><i>Capsella bursa-pastoris</i><br><i>Centaurea cyanus</i><br><i>Chenopodium album</i><br><i>Descuranina sophia</i><br><i>Fumaria officinalis</i><br><i>Galium aparine</i><br><i>Geranium-dissectum</i><br><i>Geranium-molle</i><br><i>Geranium pusillum</i> | Overall,<br>Broadcast<br>foliar spray | BBCH<br>12 to 19<br>Autumn use                       | a) 1<br>b) 1  | NA   | a) 0.25 l pr/ha<br>b) 0.25 l pr/ha  | a) b)<br>2.5+12+8  | 100-<br>300                   |               | Timing: 90% of<br>crop has to be in<br>BBCH 12                 | A                           |



|   |                |                      |   |   |                                 |                             |              |    |                                    |                   |         |  |  |   |
|---|----------------|----------------------|---|---|---------------------------------|-----------------------------|--------------|----|------------------------------------|-------------------|---------|--|--|---|
|   |                |                      |   | <i>Lamium purpureum</i><br><i>Matricaria chamomilla</i><br><i>Myosotis arvensis</i><br><i>Papaver rhoeas</i><br><i>Stellaria media</i><br><i>Tripleurospermum perforatum</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i>  |                                 |                             |              |    |                                    |                   |         |  |  |   |
| 2 | Germany        | Winter oil seed rape | F | Broadleaf weeds (post-em)<br><i>Capsella bursa-pastoris</i><br><i>Centaurea cyanus</i><br><i>Chenopodium album</i><br><i>Descurainia sophia</i><br><i>Fumaria officinalis</i><br><i>Galium aparine</i><br><i>Geranium dissectum</i><br><i>Geranium molle</i><br><i>Geranium pusillum</i><br><i>Lamium purpureum</i><br><i>Matricaria chamomilla</i><br><i>Myosotis arvensis</i><br><i>Papaver rhoeas</i><br><i>Stelaria media</i><br><i>Tripleurospermum perforatum</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i> | Overall, Broadcast foliar spray | BBCH 12 to 19<br>Autumn use | a) 1<br>b) 1 | NA | a) 0.25 l pr/ha<br>b) 0.25 l pr/ha | a) b)<br>2.5+12+8 | 100-300 |  | Timing: 90% of crop has to be in BBCH 12 | <div>A<br/>MATIN,<br/>PAPRH,<br/>STEME,<br/>VIOAR</div> <div>C<br/>CAPBP,<br/>CENCY,<br/>CHEAL,<br/>DESSO,<br/>FUMOF,<br/>GALAP,<br/>GERDI,<br/>GERMO,<br/>GERPU,<br/>LAMPU,<br/>MATCH,<br/>MYOAR,<br/>THLAR,<br/>VERPE</div> |
| 3 | Czech Republic | Winter oil seed rape | F | Broadleaf weeds (post-em)<br><i>Capsella bursa-pastoris</i><br><i>Centaurea cyanus</i><br><i>Chenopodium album</i><br><i>Descurainia sophia</i><br><i>Fumaria officinalis</i><br><i>Galium aparine</i><br><i>Geranium dissectum</i>   | Overall, Broadcast foliar spray | BBCH 12 to 19<br>Autumn use | a) 1<br>b) 1 | NA | a) 0.25 l pr/ha<br>b) 0.25 l pr/ha | a) b)<br>2.5+12+8 | 100-300 |  | Timing: 90% of crop has to be in BBCH 12 | <div>A<br/>MATIN,<br/>PAPRH,<br/>STEME,<br/>VIOAR</div>   |

|   |                |                      |   |   |                                 |                          |              |    |                                    |                   |         |  |  |  |
|---|----------------|----------------------|---|---|---------------------------------|--------------------------|--------------|----|------------------------------------|-------------------|---------|--|--|--|
|   |                |                      |   | <i>Geranium molle</i><br><i>Geranium pusillum</i><br><i>Lamium purpureum</i><br><i>Matricaria chamomilla</i><br><i>Myosotis arvensis</i><br><i>Papaver rhoeas</i><br><i>Stelaria media</i><br><i>Tripleurospermum perforatum</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i>  |                                 |                          |              |    |                                    |                   |         |  |  | C<br>CAPBP,<br>CENCY,<br>CHEAL,<br>DESSO,<br>FUMOF,<br>GALAP,<br>GERDI,<br>GERMO,<br>GERPU,<br>LAMP<br>U,<br>MATCH,<br>MYOAR,<br>THLAR,<br>VERPE |
| 4 | United Kingdom | Winter oil seed rape | F | Broadleaf weeds (post-em)<br><i>Capsella bursa-pastoris</i><br><i>Centaurea cyanus</i><br><i>Chenopodium album</i><br><i>Descuranina sophia</i><br><i>Fumaria officinalis</i><br><i>Galium aparine</i><br><i>Geranium dissectum</i><br><i>Geranium molle</i><br><i>Geranium pusillum</i><br><i>Lamium purpureum</i><br><i>Matricaria chamomilla</i><br><i>Myosotis arvensis</i><br><i>Papaver rhoeas</i><br><i>Stelaria media</i><br><i>Tripleurospermum perforatum</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i> | Overall, Broadcast foliar spray | BBCH 12 to 19 Autumn use | a) 1<br>b) 1 | NA | a) 0.25 l pr/ha<br>b) 0.25 l pr/ha | a) b)<br>2.5+12+8 | 100-300 |  | Timing: 90% of crop has to be in BBCH 12 | A<br>MATIN,<br>PAPRH,<br>STEME,<br>VIOAR   |
|   |                |                      |   | <i>Geranium molle</i><br><i>Geranium pusillum</i><br><i>Lamium purpureum</i><br><i>Matricaria chamomilla</i><br><i>Myosotis arvensis</i><br><i>Papaver rhoeas</i><br><i>Stelaria media</i><br><i>Tripleurospermum perforatum</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i>  |                                 |                          |              |    |                                    |                   |         |  |  | C<br>CAPBP,<br>CENCY,<br>CHEAL,<br>DESSO,<br>FUMOF,<br>GALAP,<br>GERDI,<br>GERMO,<br>GERPU,<br>LAMP<br>U,<br>MATCH,<br>MYOAR,<br>THLAR,<br>VERPE |
| 5 | Slovakia       | Winter oil seed rape | F | Broadleaf weeds (post-em)<br><i>Capsella bursa-pastoris</i><br><i>Centaurea cyanus</i><br><i>Chenopodium album</i><br><i>Descuranina sophia</i><br><i>Fumaria officinalis</i><br><i>Galium aparine</i><br><i>Geranium dissectum</i>   | Overall, Broadcast foliar spray | BBCH 12 to 19 Autumn use | a) 1<br>b) 1 | NA | a) 0.25 l pr/ha<br>b) 0.25 l pr/ha | a) b)<br>2.5+12+8 | 100-300 |  | Timing: 90% of crop has to be in BBCH 12 | C  |

|   |         |                      |   |   |                                 |                          |              |    |                                    |                   |         |  |  |   |
|---|---------|----------------------|---|---|---------------------------------|--------------------------|--------------|----|------------------------------------|-------------------|---------|--|--|---|
|   |         |                      |   | <i>Geranium molle</i><br><i>Geranium pusillum</i><br><i>Lamium purpureum</i><br><i>Matricaria chamomilla</i><br><i>Myosotis arvensis</i><br><i>Papaver rhoeas</i><br><i>Stelaria media</i><br><i>Tripleurospermum perforatum</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i>  |                                 |                          |              |    |                                    |                   |         |  |  |   |
| 6 | Hungary | Winter oil seed rape | F | Broadleaf weeds (post-em)<br><i>Capsella bursa-pastoris</i><br><i>Centaurea cyanus</i><br><i>Chenopodium album</i><br><i>Descurainia sophia</i><br><i>Fumaria officinalis</i><br><i>Galium aparine</i><br><i>Geranium dissectum</i><br><i>Geranium molle</i><br><i>Geranium pusillum</i><br><i>Lamium purpureum</i><br><i>Matricaria chamomilla</i><br><i>Myosotis arvensis</i><br><i>Papaver rhoeas</i><br><i>Stelaria media</i><br><i>Tripleurospermum perforatum</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i> | Overall, Broadcast foliar spray | BBCH 12 to 19 Autumn use | a) 1<br>b) 1 | NA | a) 0.25 l pr/ha<br>b) 0.25 l pr/ha | a) b)<br>2.5+12+8 | 100-300 |  | Timing: 90% of crop has to be in BBCH 12 | C |
| 7 | Romania | Winter oil seed rape | F | Broadleaf weeds (post-em)<br><i>Capsella bursa-pastoris</i><br><i>Centaurea cyanus</i><br><i>Chenopodium album</i><br><i>Descurainia sophia</i><br><i>Fumaria officinalis</i><br><i>Galium aparine</i><br><i>Geranium dissectum</i><br><i>Geranium molle</i><br><i>Geranium pusillum</i><br><i>Lamium purpureum</i><br><i>Matricaria chamomilla</i><br><i>Myosotis arvensis</i><br><i>Papaver rhoeas</i>  | Overall, Broadcast foliar spray | BBCH 12 to 19 Autumn use | a) 1<br>b) 1 | NA | a) 0.25 l pr/ha<br>b) 0.25 l pr/ha | a) b)<br>2.5+12+8 | 100-300 |  | Timing: 90% of crop has to be in BBCH 12 | C |

|   |          |                             |   |  |                                       |                                |              |    |                                    |                   |             |  |  |   |
|---|----------|-----------------------------|---|--|---------------------------------------|--------------------------------|--------------|----|------------------------------------|-------------------|-------------|--|--|---|
|   |          |                             |   | <i>Stelaria media</i><br><i>Tripleurospermum perforatum</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i>  |                                       |                                |              |    |                                    |                   |             |  |  |   |
| 8 | Slovenia | <u>Winter oil seed rape</u> | F | <u>Broadleaf weeds (post-em)</u><br><i>Capsella bursa-pastoris</i><br><i>Centaurea cyanus</i><br><i>Chenopodium album</i><br><i>Descuranina sophia</i><br><i>Fumaria officinalis</i><br><i>Galium aparine</i><br><i>Geranium dissectum</i><br><i>Geranium molle</i><br><i>Geranium pusillum</i><br><i>Lamium purpureum</i><br><i>Matricaria chamomilla</i><br><i>Myosotis arvensis</i><br><i>Papaver rhoeas</i><br><i>Stelaria media</i><br><i>Tripleurospermum perforatum</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i> | Overall,<br>Broadcast<br>foliar spray | BBCH<br>12 to 19<br>Autumn use | a) 1<br>b) 1 | NA | a) 0.25 l pr/ha<br>b) 0.25 l pr/ha | a) b)<br>2.5+12+8 | 100-<br>300 |  | Timing: 90% of<br>crop has to be in<br>BBCH 12 | C |

**Remarks table heading:**

(a) e.g. wettable powder (WP), emulsifiable concentrate (EC), granule (GR)

(b) Catalogue of pesticide formulation types and international coding system CropLife International Technical Monograph n°2, 6th Edition Revised May 2008

(c) g/kg or g/l

(d) Select relevant

(e) Use number(s) in accordance with the list of all intended GAPs in Part B, Section 0 should be given in column 1

(f) No authorization possible for uses where the line is highlighted in grey, Use should be crossed out when the notifier no longer supports this use.

|                         |   |  |    |  |
|-------------------------|---|--|----|--|
| <b>Remarks columns:</b> | 1 | Numeration necessary to allow references   | 7  | Growth stage at first and last treatment (BBCH Monograph, Growth Stages of Plants, 1997, Blackwell, ISBN 3-8263-3152-4), including where relevant, information on season at time of application        |
|                         | 2 | Use official codes/nomenclatures of EU Member States   | 8  | The maximum number of application possible under practical conditions of use must be provided.   |
|                         | 3 | For crops, the EU and Codex classifications (both) should be used; when relevant, the use situation should be described (e.g. fumigation of a structure)   | 9  | Minimum interval (in days) between applications of the same product  |
|                         | 4 | F: professional field use, Fn: non-professional field use, Fpn: professional and non-professional field use, G: professional greenhouse use, Gn: non-professional greenhouse use, Gpn: professional and non-professional greenhouse use, I: indoor application   | 10 | For specific uses other specifications might be possible, e.g.: g/m <sup>3</sup> in case of fumigation of empty rooms. See also EPPO-Guideline PP 1/239 Dose expression for plant protection products. |
|                         | 5 | Scientific names and EPPO-Codes of target pests/diseases/ weeds or, when relevant, the common names of the pest groups (e.g. biting and sucking insects, soil born insects, foliar fungi, weeds) and the developmental stages of the pests and pest groups at the moment of application must be named. | 11 | The dimension (g, kg) must be clearly specified. (Maximum) dose of a.s. per treatment (usually g, kg or L product / ha).   |
|                         | 6 | Method, e.g. high volume spraying, low volume spraying, spreading, dusting, drench   | 12 | If water volume range depends on application equipments (e.g. ULVA or LVA) it should be mentioned under “application: method/kind”.  |
|                         |   | Kind, e.g. overall, broadcast, aerial spraying, row, individual plant, between the plants  | 13 | PHI - minimum pre-harvest interval   |
|                         |   | - type of equipment used must be indicated.  | 14 | Remarks may include: Extent of use/economic importance/restrictions  |
|                         |   |  | 15 | zRMS conclusion.   |
|                         |   |  |    |  |
|                         |   |  |    |  |
|                         |   |  |    |  |
|                         |   |  |    |  |
|                         |   |  |    |  |
|                         |   |  |    |  |

Column 15: cMS conclusion.

|   |  |
|---|--|
| A | Acceptable                               |
| R | Acceptable with further restriction      |
| C | To be confirmed by cMS                   |
| N | Not acceptable / evaluation not possible |

## 3.2 Efficacy data (KCP 6)

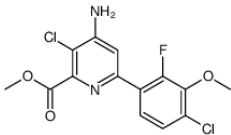
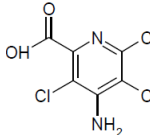
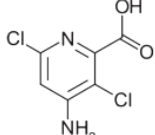
This document summarises the information related to the efficacy of the plant protection product GF-4021 containing halauxifen-methyl (10 g/L), picloram (48 g/L) and aminopyralid (32 g/L). In fact, this detailed summary supports submission for authorisation of the new product GF-4021 as a emulsifiable concentrate formulation (EC) for use as a selective herbicide applied in post-emergence of winter oilseed rape in the Central Zone (Poland, Germany, Czech Republic, Slovakia, Hungary, Romania, Slovenia, United Kingdom)

zRMS in charge of the evaluation for this preparation is Poland. The Member States concerned by the authorization (cMS = concerned Member State) are other mentioned countries.

### Description of active substances

Active substances properties are summarised in Table 3.2 - 1

**Table 3.2 - 1: Details of the active substances**

| Active substance                     | Halauxifen-methyl   | Picloram   | Aminopyralid  |
|--------------------------------------|---|--|---|
| Concentration (Unit: g/kg or g/L...) | 10 g/L  | 48 g/L   | 32 g/L  |
| Chemical name (IUPAC)                | methyl 4-amino-3-chloro-6-(4-chloro-2-fluoro-3-methoxyphenyl)pyridine-2-carboxylate | 4-amino-3,5,6-trichloropyridine-2-carboxylic acid                                    | 4-amino-,3, 6-dichloropyridine-2-carboxylic acid                                      |
| CAS No                               | 943831-98-9   | 1918-02-1  | 150114-71-9   |
| Molecular formula                    | C <sub>14</sub> H <sub>11</sub> Cl <sub>2</sub> FN <sub>2</sub> O <sub>3</sub>      | C <sub>6</sub> H <sub>3</sub> Cl <sub>3</sub> N <sub>2</sub> O <sub>2</sub>          | C <sub>6</sub> H <sub>4</sub> Cl <sub>2</sub> N <sub>2</sub> O <sub>2</sub>           |
| Molecular mass                       | 345.17 g/mol  | 241.46 g/mol   | 207.03 g/mol  |
| Structural formula                   |  |  |  |
| Chemical group                       | Pyridine carboxylate  | Pyridine carboxylate   | Pyridine carboxylate  |
| HRAC Group                           | 4 (legacy O) (Action like indole acetic acid) (synthetic auxins))                   | 4 (legacy O) (Action like indole acetic acid) (synthetic auxins))                    | 4 (legacy O) (Action like indole acetic acid) (synthetic auxins))                     |
| Biological action                    | Post-emergence herbicide  | Post-emergence herbicide   | Pre-emergence and post-emergence of weeds   |
| Plant translocation                  | Systemic (absorbed by roots and leaves)   | Systemic (absorbed by roots and leaves)  | Systemic (absorbed by roots and leaves)   |

### Mode of action

#### Halauxifen-methyl

Halauxifen-methyl Annex I was granted in accordance with Regulation 1107/2009 on 15 July 2015 under the Annex I inclusion directive 2015/1165.

Halauxifen-methyl is a new active substance discovered by Dow AgroSciences and belongs to the new family of 6-aryl-picolinate herbicides. This new herbicide offers several unique attribute that will differentiate it from other molecules in the market today.

Halauxifen-methyl is an active that, when applied to sensitive species, will present auxin-like properties. Natural auxins are used by the plant to regulate minute amount of hormones which bind to specific receptor proteins turning on and off vital plant processes. Halauxifen-methyl moves systemically throughout the target weed binding to receptor sites normally used by these plant hormones. This causes a disruption of normal plant growth processes via the binding of halauxifen-methyl to the receptors. This

binding results in the deregulation of plant growth metabolic pathways and thus causes uneven cell division and growth, culminating in plant death.

It is a flexible post-emergence herbicide which can be used in winter oilseed rape from early autumn; it can also be used on winter and spring cereals, from early autumn through late spring, and efficacy is expressed independent of variable weather conditions.

Halauxifen-methyl has a mode of action which allows the control of several key cereal weeds species which are resistant to the ALS mode of action and belongs to the Synthetic Auxins group-HRAC group ~~0, WSSA group 4~~ 4 (legacy O).

### **Picloram**

Picloram is included on Annex 1 of Directive 91/414. Since the replacement of Directive 91/414/EEC by Regulation (EC) N° 1107/2009 picloram has been approved by that regulation on 01/01/2009.

Picloram belongs to the same auxin type of herbicides as halauxifen-methyl, so it has the same mode of action as halauxifen-methyl.

It is a systemic herbicide that deregulate plant growth. The molecule is absorbed into the plant leaves and roots; it is translocated both acropetally and basipetally and accumulates in the meristematic tissue.

Picloram belongs to the Synthetic Auxins group-HRAC group ~~0, WSSA group 4~~ 4 (legacy O).

### **Aminopyralid**

Aminopyralid is a synthetic auxin herbicide active ingredient that acts through a synthetic auxin mechanism (HRAC group ~~0, WSSA group 4~~ 4 (legacy O)).

Aminopyralid is a systemic, phloem and xylem mobile herbicide that is readily absorbed through leaves, shoots and roots. When foliar applied it will be symplastically translocated throughout the plant and will accumulate in meristematic tissue.

Aminopyralid is a member of the synthetic auxin class of herbicides. Treatment with aminopyralid mimics the effect of a persistent high-dose of the natural plant hormone auxin causing over-stimulation of specific auxin-regulated genes. This leads to profound long-lasting physiological and morphological effects on susceptible weeds that stop plant growth and result in cell death. Tissues that are undergoing active cell division and growth are particularly susceptible to injury.

### **Description of the plant protection product**

GF-4021 is an ~~association~~ **composition** of 3 active substances: halauxifen-methyl (10 g/L), picloram (48 g/L) and aminopyralid (32 g/L). It is a selective herbicide applied in post-emergence in winter oilseed rape to control ~~of~~ broadleaf weeds. Halauxifen-methyl, picloram and aminopyralid are existing active substances and their spectrum of activity at the required dose are well known and well documented. The ~~interest of this association~~ **target of this mixture** is to broaden the spectrum of activity of halauxifen-methyl and picloram and the level of efficacy (cf. Table 3.2 - 2).

**Table 3.2 - 2: Summary of spectrum for halauxifen-methyl and/or picloram and/or aminopyralid on oilseed rape**

| Broadleaf weeds                  | Aminopyralid<br>8 g a.s./ha | Picloram<br>12 g a.s./ha | Halauxifen-methyl<br>2.5 g a.s./ha | Halauxifen-methyl +<br>Picloram<br>2.5 + 12 g a.s./ha | Halauxifen-methyl +<br>Picloram +<br>Aminopyralid<br>2.5 + 12 + 8<br>Expected spectrum |
|----------------------------------|-----------------------------|--------------------------|------------------------------------|---|--|
| <i>Galium aparine</i>            | *                           | ***                      | **                                 | ****  | *****  |
| <i>Fumaria officinalis</i>       |                             |                          |                                    | ****  |  |
| <i>Lamium purpureum</i>          |                             | *                        | ****                               | ****  |  |
| <i>Matricaria chamomilla</i>     | *****                       |                          |                                    | ****  | *****  |
| <i>Geranium pusillum</i>         |                             |                          |                                    | ****  | ***  |
| <i>Papaver rhoeas</i>            | *****                       | *                        | ****                               | ***   | *****  |
| <i>Thlaspi arvense</i>           |                             | *                        | **                                 | ***   |  |
| <i>Tripleurospermum inodorum</i> | ****                        | *                        | *                                  | ***   |  |
| <i>Capsella bursa-pastoris</i>   | *                           | *                        | **                                 | ***   | ****   |
| <i>Descurainia sophia</i>        |                             | *                        | **                                 | ***   |  |
| <i>Stellaria media</i>           | *                           | *                        | **                                 | **  | ***  |
| <i>Cyanus segetum</i>            | ****                        | ***                      | ***                                | ***   | *****  |

| Weed sensitivity                                |                  |       |
|---|------------------|-------|
| <del>Very sensitive</del> High susceptible      | <del>VS</del> HS | ***** |
| <del>Sensitive</del> Susceptible                | S                | ****  |
| Moderately <del>sensitive</del> susceptible     | MS               | ***   |
| <del>Poorly sensitive</del> Moderately tolerant | <del>PS</del> MT | **    |
| <del>Very poorly sensitive</del> Tolerant       | <del>VPS</del> T | *     |



## Interest of this association The target of this compound

The following Table 3.2 - 3 summarises the interest of this association target of this compound.

**Table 3.2 - 3:** Interest Description of each active substance

| Active substance            | Halauxifen-methyl   | Picloram  | Aminopyralid   |
|-----------------------------|---|---|--|
| Penetration                 | Roots and leaves  | Roots and leaves  | Roots and leaves   |
| Plant translocation         | Systemic  | Systemic  | Systemic   |
| Mode of action (HRAC Group) | 4 (legacy O) (Action like indole acetic acid (synthetic auxins))  | 4 (legacy O) (Action like indole acetic acid (synthetic auxins))  | 4 (legacy O) (Action like indole acetic acid (synthetic auxins))   |
| Targets                     | Mainly broadleaf weeds: <i>Centaurea cyanus</i> ,<br><i>Papaver rhoeas</i> ,<br><i>Galium aparine</i> ,<br><i>Chenopodium album</i> ,<br><i>Geranium pusillum</i> ,<br><i>Geranium dissectum</i> ,<br><i>Lamium amplexicaule</i> ,<br><i>Lamium purpureum</i> | Mainly broadleaf weeds:<br><i>Stellaria media</i> ,<br><i>Matricaria chamomilla</i> ,<br><i>Matricaria inodora</i> ,<br><i>Myosotis arvensis</i> ,<br><i>Galium aparine</i> . | Mainly broadleaf weeds:<br><i>Papaver rhoeas</i> ,<br><i>Sylbium marianum</i> ,<br><i>Polygonum aviculare</i> ,<br><i>Polygonum convolvulus</i> ,<br><i>Lactuca serriola</i> ,<br><i>Vicia sativa</i> ,<br><i>Matricaria inodora</i> ,<br><i>Matricaria chamomille</i> |
| Resistance Risk             | Low   | Low   | Low  |

The association mixture of these 3 active substances provides:

1. A broad spectrum of different target broadleaf weeds
2. Additional efficacy with the addition of aminopyralid.

GF-4021 is a new association product containing with halauxifen-methyl, picloram and aminopyralid. Currently in Oil seed rape in Poland Belkar (halauxifen-methyl with picloram) and Runway (aminopyralid) straight (Runway) are registered in oilseed rape in Poland.

## Requested uses

The simplified recommendations proposed for GF-4021 are presented in Table 3.2 - 4.

The product is a post-emergence herbicide applied once in the autumn in oilseed rape at the dose of 0.25 L/ha in Poland, Germany, Czech Republic, Slovakia, Hungary, Romania, Slovenia and United Kingdom application will occur. The product is used once every three years, in the autumn, to fit with the e-fate mitigation measures (see part B8).

In this dossier, synthesis of results from trials are presented with the full dose at 0.25 L/ha.

**Table 3.2 - 4:** Simplified table of requested uses for GF-4021

| Crop                | Target          | Member state                   | Requested dose(s) per application | Application number | Application crop stage | Comments / other relevant details on GAPs |
|---------------------|-----------------|--------------------------------|-----------------------------------|--------------------|------------------------|---|
| Winter oilseed rape | Broadleaf weeds | PL, DE, CZ, SL, HU, RO, SK, UK | 0.25 L/ha                         | 1                  | BBCH 12 - 19           | 1 application every 3 years               |

## Description of the target pests

The list of target weeds (EPPO code and scientific name) presented in this dossier, is available in Table 3.2 - 5

**Table 3.2 - 5:** Glossary mentioned in the dossier

| EPPO code | Latin name                     | Botanical characteristic | EPPO code | Latin name                      | Botanical characteristic |
|-----------|--------------------------------|--------------------------|-----------|---------------------------------|--------------------------|
| Weeds     |                                |                          |           |                                 |                          |
| AMARE     | <i>Amaranthus retroflexus</i>  | ABW                      | LEBAU     | <i>Scorzoneroide autumnalis</i> | PBW                      |
| ANTAR     | <i>Anthemis arvensis</i>       | ABW                      | LITAR     | <i>Buglossoides arvensis</i>    | ABW                      |
| CAPBP     | <i>Capsella bursa-pastoris</i> | ABW                      | LOLMU     | <i>Lolium multiflorum</i>       | AG                       |
| CENCY     | <i>Centaurea cyanus</i>        | ABW                      | LYCAR     | <i>Anchusa arvensis</i>         | PBW                      |

| EPPO code   | Latin name                    | Botanical characteristic | EPPO code | Latin name  | Botanical characteristic |
|-------------|-------------------------------|--------------------------|-----------|---|--------------------------|
| CERGL       | <i>Cerastium glomeratum</i>   | ABW                      | MATCH     | <i>Matricaria chamomilla</i>                            | ABW                      |
| CHEAL       | <i>Chenopodium album</i>      | ABW                      | MATIN     | <i>Tripleurospermum inodorum</i>                        | ABW                      |
| CIRAR       | <i>Cirsium arvense</i>        | PBW                      | MATSS     | <i>Matricaria</i> sp.                                   | ABW                      |
| CNSRE       | <i>Consolida regalis</i>      | ABW                      | MYOAR     | <i>Myosotis arvensis</i>                                | ABW                      |
| CONAR       | <i>Convolvulus arvensis</i>   | ABW                      | PAPRH     | <i>Papaver rhoeas</i>                                   | ABW                      |
| DESSO       | <i>Descurainia sophia</i>     | ABW                      | RUMOB     | <i>Rumex obtusifolius</i>                               | PBW                      |
| EPHHE       | <i>Euphorbia helioscopia</i>  | ABW                      | SENVU     | <i>Senecio vulgaris</i>                                 | ABW                      |
| EROCI       | <i>Erodium cicutarium</i>     | ABW                      | SINAR     | <i>Sinapis arvensis</i>                                 | ABW                      |
| FUMOF       | <i>Fumaria officinalis</i>    | ABW                      | SONAR     | <i>Sonchus arvensis</i>                                 | PBW                      |
| GAETE       | <i>Galeopsis tetrahit</i>     | ABW                      | SSYOF     | <i>Sisymbrium officinale</i>                            | ABW                      |
| GALAP       | <i>Galium aparine</i>         | ABW                      | STEME     | <i>Stellaria media</i>                                  | ABW                      |
| GERDI       | <i>Geranium dissectum</i>     | ABW                      | THLAR     | <i>Thlaspi arvense</i>                                  | ABW                      |
| GERMO       | <i>Geranium molle</i>         | ABW                      | TRFIN     | <i>Trifolium incarnatum</i>                             | ABW                      |
| GERPU       | <i>Geranium pusillum</i>      | ABW                      | TTLWI     | Triticale (winter)                                      |                          |
| GERRT       | <i>Geranium rotundifolium</i> | ABW                      | VERHE     | <i>Veronica hederifolia</i>                             | ABW                      |
| GERSS       | <i>Geranium</i> sp.           | ABW                      | VERPE     | <i>Veronica persica</i>                                 | ABW                      |
| LAMAM       | <i>Lamium amplexicaule</i>    | ABW                      | VICFM     | <i>Vicia faba</i> subsp. <i>faba</i> var. <i>equina</i> |                          |
| LAMPU       | <i>Lamium purpureum</i>       | ABW                      | VIOAR     | <i>Viola arvensis</i>                                   | PBW                      |
| <b>Crop</b> |                               |                          |           |   |                          |
| AVESA       | <i>Avena sativa</i>           |                          | HORVW     | Barley (winter)   |                          |
| BRNN        | <i>Brassica napus</i>         |                          | SINAL     | <i>Sinapis alba</i>                                     |                          |
| BRNNW       | Rape (winter)                 |                          | TRFIN     | <i>Trifolium incarnatum</i>                             |                          |
| GLXMA       | <i>Glycine max</i> (soybean)  |                          | TRZAW     | Soft wheat (winter)                                     |                          |
| HORVS       | Barley (spring)               |                          | TTLWI     | Triticale (winter) (triticale)                          |                          |

AG: Annual grass weed - ABW: Annual broadleaf weed - PBW: Perennial broadleaf weed

**Table 3.2 - 6: Surface area used for winter rape and turnip rape in each country in 2019<sup>(1)</sup>**

| Crop | Country | Surface area        |
|------|---------|---------------------|
| Rape | PL      | Around 900 000 ha   |
|      | DE      | Around 1 000 000 ha |

**Table 3.2 - 7: Major / minor status of intended uses**

| Crop and/or situation | Crop status             |       | Pests or group of pests controlled | Pest status             |       |
|-----------------------|-------------------------|-------|------------------------------------|-------------------------|-------|
|                       | Major                   | Minor |                                    | Major                   | Minor |
| Winter oilseed rape   | All requested countries | -     | Weeds                              | All requested countries |       |

## Compliance with the Uniform Principles

The overall assessment was performed according to the uniform principles.

### Information on trials submitted (3.1 Efficacy data)

Data to confirm the efficacy claims for the application of GF-4021 were taken from a set of 77 98 trials.

All trials were undertaken by contractors test facilities, all of which follow the EPPO guidelines and have Official Recognition status for undertaking efficacy trials in accordance with the principles of Good Experimental Practice (GEP).

To cover the largest spectrum of climatic, soil conditions and crop varieties, trials in oilseed rape were located in Maritime, North East and South East EPPO climatic zones on the main regions of the crop production in Czech Republic, France, Germany, United Kingdom, Poland, Bulgaria, Hungary and Romania. Table 3.2 – 8 presents the efficacy trials repartition.

<sup>1</sup> Source: <http://ec.europa.eu/eurostat/data/database>

To cover the largest spectrum of climatic, soil conditions and crop varieties, trials in oilseed rape were located in Maritime, North-East and South-East EPPO climatic zones on the main regions of the crop production in Czech Republic, France, Germany, United Kingdom, Poland, Bulgaria, Hungary and Romania . Table 3.2 - 8 presents the efficacy trials repartition.

**Table 3.2 - 8: Efficacy trials repartition in winter oilseed rape**

| Crop                         | Year | EPPO climatic zone |        |         |                |            |            |         |         | Total |
|------------------------------|------|--------------------|--------|---------|----------------|------------|------------|---------|---------|-------|
|                              |      | Maritime           |        |         |                | North-East | South-East |         |         |       |
|                              |      | Czech Republic     | France | Germany | United Kingdom | Poland     | Bulgaria   | Hungary | Romania |       |
| Winter oilseed rape<br>BRSNW | 2017 | 2                  | 5      | 7       | 4              | 5          | -          | -       | -       | 20 19 |
|                              | 2018 | 7                  | 8      | 9 10    | 7 8            | 16         | 2          | 6       | 6       | 61 63 |
|                              | 2019 | 1                  | 4      | 2       | 2 3            | 3          | -          | 1       | 2       | 15 16 |
| Total                        | -    | 10                 | 17     | 18 19   | 10 11          | 24         | 2          | 7       | 8       | 96 98 |

An overview of available trials is provided in Table 3.2 - 9. Figure 3.2 - 1 presents the efficacy trials repartition respectively in Europe.

**Table 3.2 - 9: Presentation of trials - Efficacy trials - Winter oilseed rape**

| Crop(s) <sup>(1)</sup> | Target(s) <sup>(1)</sup> | EPPO climatic zone <sup>(2)</sup> | Country        | Year      | Number of trials | Type of trial <sup>(3)</sup> | GEP, non-GEP, official <sup>(4)</sup> |
|------------------------|--------------------------|-----------------------------------|----------------|-----------|------------------|------------------------------|---------------------------------------|
| Winter rape            | Weeds                    | Maritime                          | Czech Republic | 2017-2018 | 10               | P                            | GEP                                   |
|                        |                          |                                   | France         | 2017-2019 | 2                | MED                          | GEP                                   |
|                        |                          |                                   |                |           | 2                | P + MED                      |                                       |
|                        |                          |                                   |                |           | 13               | P + MED+ E                   |                                       |
|                        |                          |                                   | Germany        | 2017-2019 | 18               | P + MED+ E                   | GEP                                   |
|                        |                          |                                   | United Kingdom | 2017-2019 | 11               | P + MED+ E                   | GEP                                   |
|                        |                          | South-East                        | Bulgaria       | 2018      | 2                | P + MED+ E                   | GEP                                   |
|                        |                          |                                   | Hungary        | 2018      | 2                | P + MED                      | GEP                                   |
|                        |                          |                                   |                |           | 5                | P + MED+ E                   |                                       |
|                        |                          |                                   | Romania        | 2018-2019 | 8                | P + MED+ E                   | GEP                                   |
|                        |                          | North-East                        | Poland         | 2017-2019 | 24               | P + MED+ E                   | GEP                                   |
|                        |                          | All zones                         | -              | 2017-2019 | 96               | P + MED+ E                   | GEP                                   |

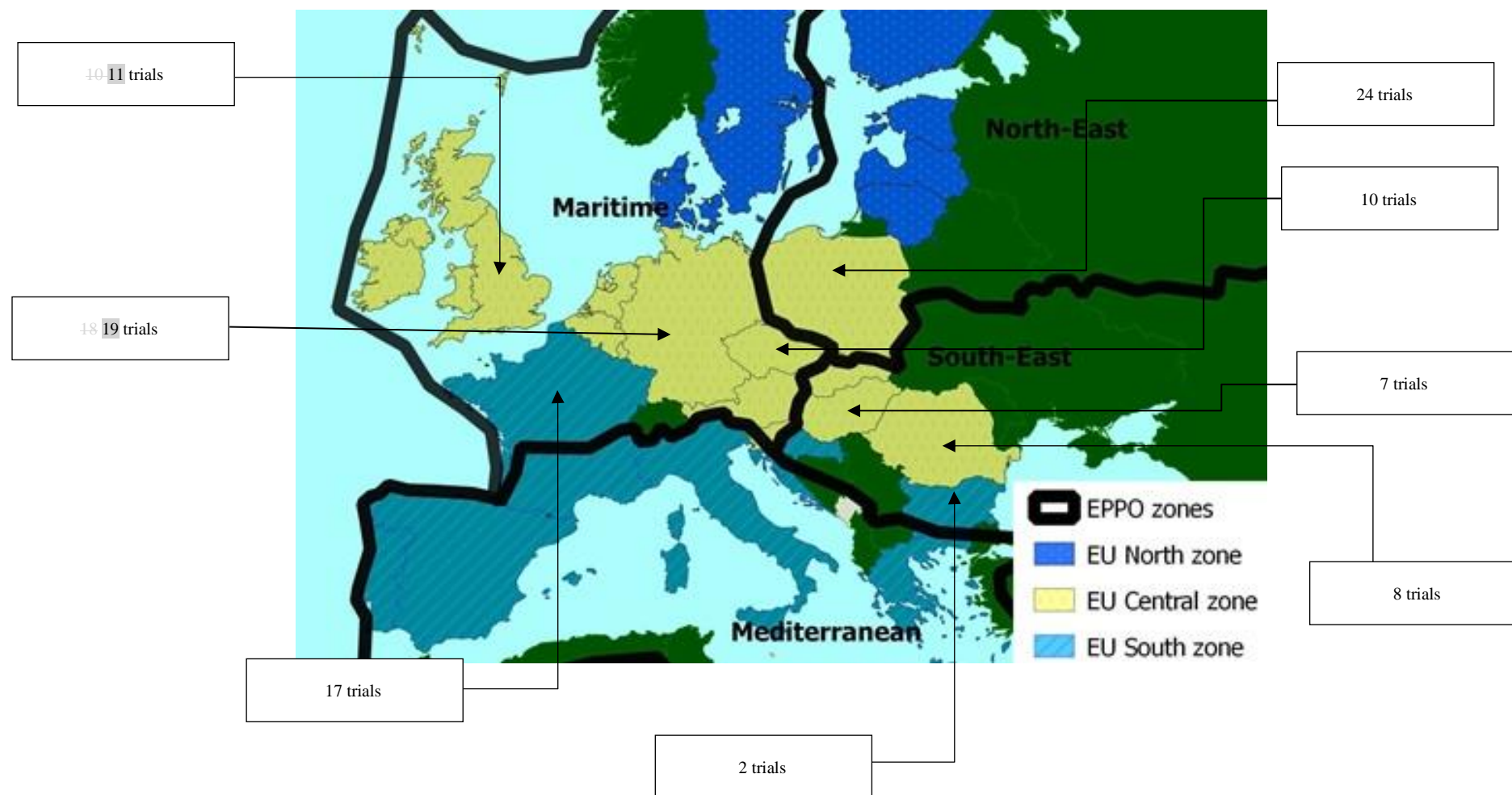
<sup>(1)</sup> According to the GAP table.

<sup>(2)</sup> According to EPPO guideline PP 1/241(1) "Guidance on comparable climates".

<sup>(3)</sup> P= Preliminary trial - MED= Minimum effective dose trial - E = efficacy trial

<sup>(4)</sup> GEP: Good Experimental Practices. Official: carried out by a national official organisation.

**Figure 3.2 - 1**      **Location of the trial sites - Efficacy trials - Winter oilseed rape**



**Table 3.2 - 10: Presentation of products used in preliminary, minimum effective dose and efficacy trials**

| Crop(s) *<br>Target(s)               | Product name             | Country(ies)<br>where the product<br>is registered <sup>(1)</sup> | Registration<br>number | Active<br>substance(s)                        | Formulation         |                            | Registered<br>application<br>dose <sup>(3)</sup> | Application<br>dose in trials<br>(per treatment) | Rate of g active<br>substance per<br>ha       | Remark                                   |
|--------------------------------------|--------------------------|---|------------------------|---|---------------------|----------------------------|--|--|---|--|
|                                      |                          |   |                        |   | Type <sup>(2)</sup> | Concentration<br>of a.s.   |  |  |   |  |
| Winter<br>Oilseed rape<br>*<br>Weeds | GF-4021                  | Not registered  | Not registered         | Halauxifen-methyl<br>Picloram<br>Aminopyralid | EC                  | 10 g/L<br>48 g/L<br>32 g/L | Not<br>registered                                | 0.125 L/ha<br>0.1875 L/ha<br>0.25 L/ha           | 1.25 + 6 + 4<br>1.875 + 9 + 6<br>2.5 + 12 + 8 | Named also in<br>the document<br>LaDiva  |
|                                      | GF-4021 GPS1             | Not registered  | Not registered         | Halauxifen-methyl<br>Picloram<br>Aminopyralid | EC                  | 10 g/L<br>48 g/L<br>32 g/L | Not<br>registered                                | 0.125 L/ha<br>0.1875 L/ha<br>0.25 L/ha           | 1.25 + 6 + 4<br>1.875 + 9 + 6<br>2.5 + 12 + 8 | Named also in<br>the document<br>GF-4021 |
|                                      | GF-3788                  | Not registered  | Not registered         | Halauxifen-methyl<br>Picloram<br>Aminopyralid | EC                  | 10 g/L<br>48 g/L<br>32 g/L | Not<br>registered                                | 0.125 L/ha<br>0.1875 L/ha<br>0.25 L/ha           | 1.25 + 6 + 4<br>1.875 + 9 + 6<br>2.5 + 12 + 8 | Named also in<br>the document<br>GF-4021 |
|                                      | BELKAR®<br>MOZZAR®       | CZ  | 5452-0                 | Halauxifen-methyl<br>Picloram                 | EC                  | 10 g/L<br>48 g/L           | 2x 0.25 L/ha<br>0.50 L/ha                        | 0.25 L/ha  | 2.5 + 12<br>5 + 24                            | Named also in<br>trials<br>GF-3447       |
|                                      |                          | DE  | 008778-00              |   |                     |                            |  |  |   |  |
|                                      |                          | DK  | 831-19                 |   |                     |                            |  |  |   |  |
|                                      |                          | FR  | 2190062                |   |                     |                            |  |  |   |  |
|                                      |                          | HU  | 6300/13248             |   |                     |                            |  |  |   |  |
|                                      |                          | SE  | 5352                   |   |                     |                            |  |  |   |  |
|                                      |                          | SK  | 18-00283-AU            |   |                     |                            |  |  |   |  |
|                                      |                          | UK  | 18615                  |   |                     |                            |  |  |   |  |
|                                      | RUNWAY VA<br>SYNERO 30SL | DE  | 008330-00<br>008330-60 | Aminopyralid                                  | SL                  | 30 g/L                     | 0.2 L/ha   | 0.267 L/ha                                       | 8   | Named also in<br>trials<br>GF-1601       |
|                                      | GF-1601                  | BG<br>FR<br>HU<br>RO  | Not registered         | Aminopyralid                                  | SL                  | 30 g/L                     | 0.2 L/ha   | 0.267 L/ha                                       | 8   | -  |
|                                      | RUNWAY                   | PL  | R-30/2018              | Aminopyralid                                  | SL                  | 30 g/L                     | 0.2 L/ha   | 0.267 L/ha                                       | 8   | Named also in<br>trials<br>GF-1601       |

<sup>(1)</sup> Only on use(s) applied for (with the test product).

<sup>(2)</sup> EC: emulsifiable concentrate - SL: soluble (liquid) concentrate

<sup>(3)</sup> Dose(s) / dose range authorized on that use in the country.

For the ease of the reading only BELKAR name will be used for GF-3447 in the whole document.

### 3.2.1 Preliminary tests (KCP 6.1)

GF-4021 is a product with 3 active substances, halauxifen-methyl (10 g/L), picloram (48 g/L) and aminopyralid (32 g/L) which have been already approved alone or in mix with other active for uses on winter oilseed rape.

Regarding the efficacy, the interest of this association is to extend the spectrum of activity (cf. Table 3.2 - 2). Thus, 59 valid efficacy trials were conducted in winter oilseed rape to confirm the interest of the addition of aminopyralid (GF-1601) to the existing mixture GF-3447 (halauxifen-methyl + picloram), already registered in several countries over Europe (under BELKAR<sup>®</sup>). The tank mix GF-3447 + GF-1601 (= ready mix of GF-4021) was compared to GF-3447 (halauxifen-methyl + picloram) and GF-1601 (aminopyralid).

In addition, over the years 3 different formulations of GF-4021 have been used in the trials for this dossier, with minor changes in the co-formulant having no impact on the inner content of the active substances. In 51 trials the bridging of formulations have been demonstrated. GF-4021 was compared to GF-3788 and GF-4021 GPS1.

#### 3.2.1.1 Material and Methods

A total of 75 trials were carried out in the preliminary part. 30 trials out of those 75 include modalities applied also at a late timing (B). This is to cover the efficacy within the range of BBCH stages indicated in the GAP table (from BBCH12 to BBCH 19 and before the 31<sup>st</sup> December). Most of these late applications were done within a BBCH 16-19 (27 out of 30 trials) and in all cases the application was done before the end of December. While most of the early applications (timing A) were done within a BBCH 12-16 (52 out of 75 trials). However, for the preliminary part and to be focus on the ratio justification and on the bridging of formulations it will be presented only modalities applied at an early timing.

On the one hand, trials were carried out to demonstrate the interest of the addition of GF-1601 (aminopyralid) to the readymix GF-3447 (halauxifen-methyl + picloram), registered under BELKAR<sup>®</sup> trademark in several European countries (ratio justification).

On the other hand, in 51 trials the bioequivalence between the different formulations of GF-4021 (GF-4021, GF-3788 and GF-4021 GPS1) used in these trials was also demonstrated (bridging of formulations).

- 33 out of 75 trials were used in this preliminary part (ratio justification and bridging of formulations) the 10 trials in Czech Republic, 18 trials in Germany (Maritime but neighbouring country for PL) and 5 in Poland (North-East EPPO climatic zone)
- 42 other trials were used in this preliminary part. These were established in Maritime (15 trials in France, and 10 trials in United Kingdom) and South-East zone (2 trials in Bulgaria, 7 trials in Hungary and 8 trials in Romania) EPPO climatic zone they are relevant for this preliminary part.

Material and Methods about these 15 exclusively preliminary trials is presented hereafter (and the Material and Methods of the 60 trials will be detailed in the efficacy part (Section 3.2.3.1)).

#### Experimental details

All the trials were carried out by officially recognised organisations in accordance with the Principles of Good Experimental Practice (GEP). These trials were performed followed EPPO guidelines.

Main characteristics are summarised in Table 3.2 - 11. Details per trial (trial location, crop cultivar, experimental design, number of blocks, plot size and application(s)) are presented in Annexe 1.

**Table 3.2 - 11: Details on trial methodology – Preliminary trials**

|                               |                        |  |
|-------------------------------|------------------------|--|
| <b>Guidelines</b>             | General guidelines     | PP1/135(3)/(4): “ <i>Phytotoxicity assessment</i> ”.<br>PP1/152(4): “ <i>Design and analysis of efficacy evaluation trials</i> ”.<br>PP1/181(4): “ <i>Conduct and reporting of efficacy evaluation trials, including good experimental practice</i> ”. |
|                               | Specific guidelines    | PP1/49 (3): “ <i>Weeds in brassica oil crops</i> ”.  |
| <b>Experimental design</b>    | Plot design            | Randomized Complete Block (RACOB).   |
|                               | Plot size              | Plot area: from 12 to 26.4 m <sup>2</sup> .  |
|                               | Number of replications | 4 replications   |
| <b>Crop</b>                   | Number of trials       | BRSNW: 15 trials.  |
|                               | Varieties              | <i>Bonanza (1), CL Veritas (1), DK Exquisite (1), DK Sequel (2), Ivan 106 (2), Konkret (1), Mercury (1), PT225 (1), Rohan (3), Sidney (1), SY Florida (1)</i>  |
| <b>Application</b>            | Application timing     | BBCH 12-15: 14 trials<br>BBCH 16: 1 trial  |
|                               | Number of applications | 1 application.   |
|                               | Spray volumes          | 200-300 L/ha. 1 trial not communicated.  |
| <b>Assessment</b>             | Assessment dates       | Winter assessment (28-85 DA-A) - Spring assessment (121-220 DA-A)  |
|                               | Assessment types       | % of weed coverage, number of weeds/m <sup>2</sup> , % control weeds (visual).   |
| <b>Results &amp; Analysis</b> | Statistical analysis   | ANOVA - Newman - Keuls test (5%), Duncan's New MRT, Levene's test, Tukey's test  |

About efficacy trials with post-emergence application, growth stage and density of weeds were recorded at application date (number of plants/m<sup>2</sup> and/or cover percentage) for each species at least in the untreated plots. The growth stages were indicated according to BBCH stage scale.

## Treatments and reference standards

### ► Tested product

To study the interest of the product, GF-4021 (halauxifen-methyl + picloram + aminopyralid) was compared to GF-3447 (halauxifen-methyl + picloram) and GF-1601 (aminopyralid).

GF-4021 applied at 0.25 L/ha provides 2.5 g/ha halauxifen-methyl, 12 g/ha picloram and 8 g/ha aminopyralid equivalent to the tank mix.

Also, the product GF-4021 applied at 0.25 L/ha will be demonstrated in the bridging of formulations section that it is equivalent to two other recipes: GF-3788 and GF-4021 GPS1.

### ► Reference standards

In these trials, the reference standard BELKAR<sup>®</sup> applied at 0.25 L/ha was used to validate the trials. BELKAR<sup>®</sup> is the only available product on the European market containing halauxifen-methyl + picloram widely registered on oilseed rape.

## Assessment methods

In all trials, the weed pressure was reported for the untreated plots in ground cover percentage or in terms of number of weeds per area (plants per m<sup>2</sup>). To evaluate the efficacy, the weed control (% efficacy) was reported as a visual assessment compared to the untreated (according to a scale 0-100% where 0% represents the absence of efficacy and 100% total control of the considered weed).



## Statistical analyses

Observed or calculated variables are subjected to an analysis of variance (ANOVA) after or not a transformation depending of the variability of the raw data.

When the result of the analysis is significant, a multiple comparison of treatments is performed. The averages are classified using either a Newman and Keuls tests, Tukey's tests, Duncan's tests or Levene's tests and divided into homogeneous groups (a, b, c, ...). Treatment means with no letter in common are significantly different in accordance with the test conducted at a 95% confidence level.

## Results layout

In terms of weed names, the EPPO codes have been used to refer to the individual weed. Glossary is provided in Table 3.2 - 5.

The tabulated data presented in this section 3 only represent the means of efficacies of selected treatments, without raw data. However, the statistics presented in conjunction with these data are derived from all data points of all treatments resulting from the assessment. Tables of data comprising all treatments mean are presented in the individual trial report summaries.

Only the trials and assessments with a sufficient infestation level in the untreated plot are considered: only assessments where density for each weed in the untreated reached at least 5 plants/m<sup>2</sup> or 5% ground cover were summarised. The assessments with data below this threshold were not taken into account in the calculation of means.

Data presented in the summary tables correspond to the mean efficacy obtained against each weed for each product. In accordance with the EPPO guideline PP1/49(3), 2 assessments timing are considered in order to calculate the mean:

| Post-emergence application |   |
|----------------------------|---|
| <b>Autumn assessment:</b>  | Last assessment done in autumn (from 28 DA-A until 85 DA-A).      |
| <b>Spring assessment:</b>  | Spring assessment in March -April (from 120 DA-A until 220 DA-A). |

If in one trial, the last assessment in autumn was before 28 DA-A, it is not taken into account.

Spring assessment showed the evolution of product at long-term. In fact, these assessment dates were chosen according to the most representative interval (maximum competition between crop and weeds) and presented the greatest number of available efficacy data. Indeed, autumn assessments are too early to show reliable efficacy results.

The impact of products on weed control is determined in result tables by using the scale below (according to SANCO/10055/2014 Rev.4).

**Table 3.2 - 12: Sensitivity scale**

| Percentage efficacy       | Efficacy level                   | Weed sensitivity                                |
|---------------------------|----------------------------------|---|
| 95 to 100%                | Very good <del>high</del>        | <del>Very sensitive</del> Highly susceptible    |
| 85 to 94,9%               | Good <del>High</del>             | <del>Sensitive</del> Susceptible                |
| 70 to 84,9%               | Moderate                         | Moderately <del>sensitive</del> susceptible     |
| 50 to 69,9%               | <del>Weak</del> Low              | <del>Poorly sensitive</del> Moderately tolerant |
| <del>&lt;50</del> 0-49,9% | <del>Insufficient</del> Very low | <del>Very poorly sensitive</del> Tolerant       |

### **3.2.1.2 Results on benefit of the association of halauxifen-methyl, picloram and aminopyralid for the control of weeds in winter oilseed rape**

To study the interest of the association compound of halauxifen-methyl, picloram and aminopyralid for the control of weeds in winter oilseed rape, a total of 65 trials including the mix of GF-3447 + GF-1601 (= ready mix of GF-4021) compared to GF-3447 (=BELKAR<sup>®</sup>) (halauxifen-methyl + picloram) at 0.25L/ha) and to GF-1601 (aminopyralid) are presented. These trials were carried out in 2017 and 2018.

The following tables present the summaries of efficacy trial results (Table 3.2 - 13) at autumn assessment and summaries of efficacy trial results (

Table 3.2 - 14) at spring assessment.

**Table 3.2 - 13: Efficacy of GF-3447 + GF-1601 compared to GF-3447 (halauxifen-methyl + picloram) and GF-1601 (aminopyralid) - Autumn assessment**

| Weeds | EPPO climatic zone | No. of trials | Weed infestation at assessment |     |      |                  |      |     | GF-3447+GF-1601<br>(2.5+12+8)<br>0.25 L/ha |      |      | GF-3447<br>(2.5+12)<br>0.25 L/ha |      |      | GF-1601<br>(8)<br>0.267 L/ha |      |      | No. of assessments significantly > , = , < GF-3447+GF-1601 (2.5+12+8) 0.25 L/ha vs. |                        |
|-------|--------------------|---------------|--------------------------------|-----|------|------------------|------|-----|--|------|------|----------------------------------|------|------|------------------------------|------|------|---|------------------------|
|       |                    |               | Plants/m²                      |     |      | Ground cover (%) |      |     |  |      |      |                                  |      |      |                              |      |      |   |                        |
|       |                    |               | Mean                           | Min | Max  | Mean             | Min  | Max | Mean                                       | Min  | Max  | Mean                             | Min  | Max  | Mean                         | Min  | Max  | GF-3447 (2.5+12) 0.25 L/ha  | GF-1601 (8) 0.267 L/ha |
| ANTAR | All zones          | 2             | 137                            | 134 | 140  | -                | -    | -   | 90.3                                       | 89.3 | 91.3 | 84.3                             | 83.5 | 85   | 70                           | 70   | 70   | 1> ; 1= ; 0<  | 2> ; 0= ; 0<           |
| CAPBP | All zones          | 7             | 45.7                           | 5.5 | 127  | -                | -    | -   | 88.3                                       | 65   | 99   | 86.4                             | 77.5 | 99   | 45.4                         | 0    | 68   | 3> ; 3= ; 1<  | 7> ; 0= ; 0<           |
| CENCY | All zones          | 11            | 19.8                           | 5   | 42   | 8                | 8    | 8   | 95.4                                       | 85   | 100  | 91.4                             | 75   | 99.5 | 88.7                         | 67.5 | 99   | 2> ; 9= ; 0<  | 4> ; 7= ; 0<           |
| CHEAL | All zones          | 8             | 7.8                            | 5   | 11   | -                | -    | -   | 86.9                                       | 67.5 | 100  | 86                               | 60   | 100  | 31.9<br>33.0                 | 0    | 67.5 | 1> ; 6= ; 1<  | 8> ; 0= ; 0<           |
| FUMOF | All zones          | 6             | 11.9                           | 5.3 | 33   | -                | -    | -   | 92.5                                       | 80   | 100  | 85.4                             | 72.5 | 100  | 42.3                         | 0    | 90   | 2> ; 4= ; 0<  | 6> ; 0= ; 0<           |
| GAETE | All zones          | 4             | 8.3                            | 7.5 | 10   | -                | -    | -   | 89.2                                       | 85   | 96   | 91.5                             | 87.5 | 95.8 | 25<br>27.0                   | 0    | 50   | 0> ; 4= ; 0<  | 4> ; 0= ; 0<           |
| GALAP | All zones          | 5             | 6.8                            | 5.5 | 8    | -                | -    | -   | 91   | 80   | 99   | 84.2                             | 65   | 99   | 41.3                         | 0    | 77.5 | 2> ; 3= ; 0<  | 5> ; 0= ; 0<           |
| GERDI | All zones          | 3             | 49.8                           | 8   | 71.5 | -                | -    | -   | 95.9                                       | 93.8 | 99   | 92.6                             | 83.8 | 99   | 66.1                         | 48.8 | 90.8 | 1> ; 2= ; 0<  | 2> ; 1= ; 0<           |
| GERPU | All zones          | 7             | 54.5                           | 23  | 117  | 20               | 20   | 20  | 91.7                                       | 66.3 | 99.8 | 85.5                             | 40   | 99   | 48                           | 0    | 82.5 | 2> ; 5= ; 0<  | 7> ; 0= ; 0<           |
| GERRT | All zones          | 3             | 87.7                           | 51  | 145  | -                | -    | -   | 79.8                                       | 66.3 | 88   | 63.3                             | 40   | 80   | 46.3                         | 40   | 52.5 | 2> ; 1= ; 0<  | 3> ; 0= ; 0<           |
| GERSS | All zones          | 12            | 74                             | 8   | 145  | 15.9             | 11.8 | 20  | 92.6                                       | 66.3 | 99.8 | 87.8                             | 40   | 99   | 55.4                         | 0    | 90.8 | 3> ; 9= ; 0<  | 10> ; 2= ; 0<          |
| LAMPU | All zones          | 5             | 15.1                           | 12  | 17   | -                | -    | -   | 93.8                                       | 82.5 | 100  | 87.8                             | 70   | 100  | 76.5                         | 63.8 | 100  | 2> ; 3= ; 0<  | 4> ; 1= ; 0<           |
| LITAR | All zones          | 2             | 9.5                            | 9   | 10   | -                | -    | -   | 77.5                                       | 75   | 80   | 80                               | 80   | 80   | 0                            | 0    | 0    | 0> ; 2= ; 0<  | 2> ; 0= ; 0<           |
| MATCH | All zones          | 7             | 28                             | 4.7 | 75   | -                | -    | -   | 94.4                                       | 91.3 | 99   | 62.7                             | 45   | 86.7 | 78.6                         | 37.5 | 99   | 6> ; 1= ; 0<  | 3> ; 4= ; 0<           |
| MATIN | All zones          | 14            | 21.4                           | 6.5 | 96   | 8.8              | 8.8  | 8.8 | 87.5                                       | 70   | 100  | 74.6                             | 42.5 | 95.5 | 57.9<br>58.5                 | 0    | 100  | 10> ; 3= ; 1<   | 8> ; 6= ; 0<           |
| MATSS | All zones          | 21            | 23.7                           | 4.7 | 96   | 8.8              | 8.8  | 8.8 | 89.8                                       | 70   | 100  | 70.6                             | 42.5 | 95.5 | 64.8                         | 0    | 100  | 16> ; 4= ; 1<   | 11> ; 10= ; 0<         |
| PAPRH | All zones          | 15            | 65.1                           | 8   | 168  | -                | -    | -   | 92.1                                       | 77.5 | 99.5 | 84.8                             | 70   | 99   | 70.8                         | 15   | 97.7 | 4> ; 11= ; 0<   | 9> ; 6= ; 0<           |
| STEME | All zones          | 19            | 19.8                           | 7   | 90   | -                | -    | -   | 80.6                                       | 35   | 99   | 62                               | 0    | 98   | 39.6                         | 0    | 83.8 | 15> ; 4= ; 0<   | 19> ; 0= ; 0<          |
| THLAR | All zones          | 4             | 9.8                            | 5   | 16   | -                | -    | -   | 76.3                                       | 58.8 | 95   | 68.8                             | 52.5 | 82.5 | 24.1                         | 10   | 30   | 2> ; 2= ; 0<  | 4> ; 0= ; 0<           |
| TRFIN | All zones          | 2             | 12.5                           | 11  | 14   | -                | -    | -   | 90   | 90   | 90   | 90                               | 90   | 90   | 86.3                         | 85   | 87.5 | 0> ; 2= ; 0<  | 0> ; 2= ; 0<           |
| VERHE | All zones          | 4             | 23.3                           | 6   | 41   | -                | -    | -   | 67.8                                       | 60   | 76   | 61.3                             | 47.5 | 70   | 38.8                         | 20   | 60   | 2> ; 2= ; 0<  | 4> ; 0= ; 0<           |
| VERPE | All zones          | 12            | 22.2                           | 7   | 54   | -                | -    | -   | 72.3                                       | 40   | 86.7 | 65.9                             | 22.5 | 90   | 34.9                         | 0    | 61.3 | 5> ; 5= ; 2<  | 11> ; 1= ; 0<          |
| VIOAR | All zones          | 25            | 24.8                           | 5   | 165  | 6.9              | 5.3  | 9.3 | 77.4                                       | 6.3  | 99   | 63.3                             | 5.3  | 98   | 63.1                         | 5    | 99.8 | 12> ; 13= ; 0<  | 12> ; 12= ; 1<         |
| CERGL | All zones          | 1             | 22                             | -   | -    | -                | -    | -   | 89.8                                       | -    | -    | 55                               | -    | -    | 65                           | -    | -    | 1> ; 0= ; 0<  | 1> ; 0= ; 0<           |
| CNSRE | All zones          | 1             | 5                              | -   | -    | -                | -    | -   | 98   | -    | -    | 96.8                             | -    | -    | 93                           | -    | -    | 1> ; 0= ; 0<  | 1> ; 0= ; 0<           |
| DESSO | All zones          | 1             | 19                             | -   | -    | -                | -    | -   | 65   | -    | -    | 60                               | -    | -    | 37.5                         | -    | -    | 0> ; 1= ; 0<  | 1> ; 0= ; 0<           |

| Weeds | EPPO climatic zone | No. of trials | Weed infestation at assessment |     |     |                  |     |     | GF-3447+GF-1601<br>(2.5+12+8)<br>0.25 L/ha |     |     | GF-3447<br>(2.5+12)<br>0.25 L/ha |     |     | GF-1601<br>(8)<br>0.267 L/ha |     |     | No. of assessments significantly > , = , < GF-3447+GF-1601 (2.5+12+8) 0.25 L/ha vs. |                        |
|-------|--------------------|---------------|--------------------------------|-----|-----|------------------|-----|-----|--|-----|-----|----------------------------------|-----|-----|------------------------------|-----|-----|---|------------------------|
|       |                    |               | Plants/m²                      |     |     | Ground cover (%) |     |     |  |     |     |                                  |     |     |                              |     |     |   |                        |
|       |                    |               | Mean                           | Min | Max | Mean             | Min | Max | Mean                                       | Min | Max | Mean                             | Min | Max | Mean                         | Min | Max | GF-3447 (2.5+12) 0.25 L/ha  | GF-1601 (8) 0.267 L/ha |
| GERMO | All zones          | 1             | -                              | -   | -   | 11.8             | -   | -   | 97   | -   | -   | 97.5                             | -   | -   | 84.5                         | -   | -   | 0> ; 1= ; 0<  | 0> ; 1= ; 0<           |
| LYCAR | All zones          | 1             | 8                              | -   | -   | -                | -   | -   | 65   | -   | -   | 65                               | -   | -   | 0                            | -   | -   | 0> ; 1= ; 0<  | 1> ; 0= ; 0<           |
| MYOAR | All zones          | 1             | 9                              | -   | -   | -                | -   | -   | 100  | -   | -   | 100                              | -   | -   | 100                          | -   | -   | 0> ; 1= ; 0<  | 0> ; 1= ; 0<           |

**Table 3.2 - 14: Efficacy of GF-3447 + GF-1601 compared to GF-3447 (halauxifen-methyl + picloram) and GF-1601 (aminopyralid) - Spring assessment**

| Weeds | EPPO climatic zone | No. of trials | Weed infestation at assessment |      |      |                  |      |      | GF-3447+GF-1601<br>(2.5+12+8)<br>0.25 L/ha |      |      | GF-3447<br>(2.5+12)<br>0.25 L/ha |      |      | GF-1601<br>(8)<br>0.267 L/ha |      |      | No. of assessments significantly > , = , < GF-3447+GF-1601 (2.5+12+8) (0.25 L/ha) vs. |               |
|-------|--------------------|---------------|--------------------------------|------|------|------------------|------|------|--|------|------|----------------------------------|------|------|------------------------------|------|------|---|---------------|
|       |                    |               | Plants/m²                      |      |      | Ground cover (%) |      |      |  |      |      |                                  |      |      |                              |      |      |   |               |
|       |                    |               | Mean                           | Min  | Max  | Mean             | Min  | Max  | Mean                                       | Min  | Max  | Mean                             | Min  | Max  | Mean                         | Min  | Max  | Mean  | Min           |
| ANTAR | All zones          | 2             | 143                            | 141  | 145  | -                | -    | -    | 88.2                                       | 86   | 90.3 | 72.8                             | 70.5 | 75   | 62.5                         | 60   | 65   | 2> ; 0= ; 0<  | 2> ; 0= ; 0<  |
| CAPBP | All zones          | 7             | 42.4                           | 5.5  | 132  | -                | -    | -    | 84.5                                       | 60   | 95   | 81.4                             | 67.5 | 95.8 | 51.4                         | 0    | 66.3 | 3> ; 3= ; 1<  | 7> ; 0= ; 0<  |
| CENCY | All zones          | 12            | 16.6                           | 5    | 42   | 8                | 8    | 8    | 96.9                                       | 85   | 100  | 93.8                             | 77.5 | 100  | 89.6                         | 60   | 100  | 2> ; 10= ; 0<   | 4> ; 8= ; 0<  |
| CHEAL | All zones          | 2             | 6.4                            | 6.3  | 6.5  | -                | -    | -    | 92.4                                       | 91.8 | 93   | 81.5                             | 81.3 | 81.8 | 3.3                          | 0    | 6.6  | 2> ; 0= ; 0<  | 2> ; 0= ; 0<  |
| CNSRE | All zones          | 2             | 5                              | 5    | 5    | -                | -    | -    | 98   | 98   | 98   | 96.4                             | 96   | 96.8 | 88.9                         | 87.8 | 90   | 1> ; 1= ; 0<  | 2> ; 0= ; 0<  |
| DESSO | All zones          | 2             | 19                             | 19   | 19   | -                | -    | -    | 81.5                                       | 75   | 88   | 79                               | 70   | 88   | 48.8                         | 37.5 | 60   | 0> ; 2= ; 0<  | 2> ; 0= ; 0<  |
| FUMOF | All zones          | 6             | 9.5                            | 7    | 15   | -                | -    | -    | 100  | 100  | 100  | 94.1                             | 65   | 100  | 27.1                         | 0    | 67.5 | 2> ; 4= ; 0<  | 6> ; 0= ; 0<  |
| GAETE | All zones          | 2             | 11.4                           | 10.8 | 12   | -                | -    | -    | 91.3                                       | 86   | 96.5 | 85.9                             | 84.8 | 87   | 5.4                          | 0    | 0    | 1> ; 1= ; 0<  | 2> ; 0= ; 0<  |
| GALAP | All zones          | 4             | 7.6                            | 6.8  | 8    | -                | -    | -    | 97.3                                       | 94.5 | 100  | 93.5                             | 81.3 | 100  | 27.2                         | 0    | 57.5 | 1> ; 3= ; 0<  | 4> ; 0= ; 0<  |
| GERDI | All zones          | 3             | 49.8                           | 8    | 71.5 | -                | -    | -    | 93.4                                       | 88.8 | 99   | 91.7                             | 81.3 | 99   | 61.1                         | 35   | 90.8 | 1> ; 2= ; 0<  | 3> ; 0= ; 0<  |
| GERPU | All zones          | 10            | 30.3                           | 5    | 70   | 20               | 20   | 20   | 90.6                                       | 48.8 | 100  | 88.2                             | 37.5 | 100  | 25.9                         | 0    | 62.5 | 2> ; 8= ; 0<  | 10> ; 0= ; 0< |
| GERRT | All zones          | 3             | 87.7                           | 51   | 145  | -                | -    | -    | 68.7                                       | 48.8 | 92.3 | 59.4                             | 37.5 | 83.3 | 18.3                         | 10   | 35   | 1> ; 2= ; 0<  | 3> ; 0= ; 0<  |
| GERSS | All zones          | 16            | 52.2                           | 5    | 145  | 17.5             | 15   | 20   | 92.3                                       | 48.8 | 100  | 90                               | 37.5 | 100  | 33.3                         | 0    | 90.8 | 3> ; 13= ; 0<   | 16> ; 0= ; 0< |
| LAMPU | All zones          | 5             | 15.1                           | 10   | 18   | -                | -    | -    | 100  | 100  | 100  | 100                              | 100  | 100  | 79.3                         | 61.3 | 100  | 0> ; 5= ; 0<  | 3> ; 2= ; 0<  |
| LITAR | All zones          | 2             | 9.5                            | 9    | 10   | -                | -    | -    | 72.5                                       | 70   | 75   | 65                               | 60   | 70   | 31.3                         | 0    | 62.5 | 1> ; 1= ; 0<  | 2> ; 0= ; 0<  |
| MATCH | All zones          | 7             | 32.8                           | 4.7  | 75   | -                | -    | -    | 97.6                                       | 96   | 99   | 67.2                             | 47.5 | 97   | 88.5                         | 50   | 98.8 | 5> ; 2= ; 0<  | 1> ; 6= ; 0<  |
| MATIN | All zones          | 18            | 16.1                           | 6    | 28   | 13.5             | 13.5 | 13.5 | 97.8                                       | 90   | 100  | 82.3                             | 45   | 100  | 60.2                         | 0    | 100  | 11> ; 7= ; 0<   | 13> ; 5= ; 0< |

| Weeds | EPPO climatic zone | No. of trials | Weed infestation at assessment |     |     |                  |      |      | GF-3447+GF-1601<br>(2.5+12+8)<br>0.25 L/ha |      |      | GF-3447<br>(2.5+12)<br>0.25 L/ha |      |      | GF-1601<br>(8)<br>0.267 L/ha |     |      | No. of assessments significantly > , = , < GF-3447+GF-1601 (2.5+12+8) (0.25 L/ha) vs. |                |
|-------|--------------------|---------------|--------------------------------|-----|-----|------------------|------|------|--|------|------|----------------------------------|------|------|------------------------------|-----|------|---|----------------|
|       |                    |               | Plants/m²                      |     |     | Ground cover (%) |      |      |  |      |      |                                  |      |      |                              |     |      |   |                |
|       |                    |               | Mean                           | Min | Max | Mean             | Min  | Max  | Mean                                       | Min  | Max  | Mean                             | Min  | Max  | Mean                         | Min | Max  | Mean  | Min            |
| MATSS | All zones          | 25            | 20.9                           | 4.7 | 75  | 13.5             | 13.5 | 13.5 | 97.7                                       | 90   | 100  | 78.1                             | 45   | 100  | 68.1                         | 0   | 100  | 16> ; 9= ; 0<   | 14> ; 11= ; 0< |
| PAPRH | All zones          | 20            | 49.2                           | 8   | 140 | -                | -    | -    | 96.6                                       | 76.3 | 100  | 92.5                             | 72.5 | 100  | 73.9                         | 10  | 100  | 5> ; 15= ; 0<   | 14> ; 6= ; 0<  |
| STEME | All zones          | 18            | 17.4                           | 7   | 50  | -                | -    | -    | 77.7                                       | 53.8 | 100  | 66.2                             | 37.5 | 99.8 | 45.6                         | 0   | 100  | 8> ; 10= ; 0<   | 14> ; 4= ; 0<  |
| THLAR | All zones          | 3             | 7.7                            | 5   | 13  | -                | -    | -    | 92.9                                       | 78.8 | 100  | 89.2                             | 77.5 | 100  | 41.7                         | 30  | 60   | 1> ; 2= ; 0<  | 3> ; 0= ; 0<   |
| TRFIN | All zones          | 2             | 12.5                           | 11  | 14  | -                | -    | -    | 96.9                                       | 95   | 98.8 | 96.9                             | 95   | 98.8 | 96.3                         | 95  | 97.5 | 0> ; 2= ; 0<  | 0> ; 2= ; 0<   |
| VERHE | All zones          | 4             | 27.5                           | 6   | 52  | -                | -    | -    | 36.3                                       | 30   | 50   | 32.9                             | 30   | 35   | 26.9                         | 15  | 35   | 1> ; 3= ; 0<  | 1> ; 3= ; 0<   |
| VERPE | All zones          | 12            | 24.6                           | 9   | 52  | -                | -    | -    | 71.2                                       | 41.8 | 90   | 57.3                             | 27.5 | 82.5 | 30.6                         | 0   | 66.3 | 5> ; 7= ; 0<  | 12> ; 0= ; 0<  |
| VIOAR | All zones          | 26            | 18.5                           | 5   | 41  | 8.1              | 7.5  | 8.8  | 79   | 1.3  | 100  | 58.4                             | 1.3  | 98.8 | 59.2                         | 0   | 98.3 | 13> ; 13= ; 0<  | 16> ; 10= ; 0< |
|       |                    |               |                                |     |     |                  |      |      |  |      |      |                                  |      |      |                              |     |      |   |                |
| EPHHE | All zones          | 1             | 50                             | -   | -   | -                | -    | -    | 75   | -    | -    | 70                               | -    | -    | 20                           | -   | -    | 0> ; 1= ; 0<  | 0> ; 1= ; 0<   |
| GERMO | All zones          | 1             | -                              | -   | -   | 15               | -    | -    | 100  | -    | -    | 100                              | -    | -    | 35                           | -   | -    | 0> ; 1= ; 0<  | 1> ; 0= ; 0<   |
| LYCAR | All zones          | 1             | 8                              | -   | -   | -                | -    | -    | 72.5                                       | -    | -    | 82.5                             | -    | -    | 57.5                         | -   | -    | 0> ; 0= ; 1<  | 1> ; 0= ; 0<   |
| SONAR | All zones          | 1             | 7                              | -   | -   | -                | -    | -    | 78.8                                       | -    | -    | 66.3                             | -    | -    | 15                           | -   | -    | 0> ; 1= ; 0<  | 1> ; 0= ; 0<   |

As expected, aminopyralid completes the efficacy of the mixture halauxifen-methyl+picloram, reaching an efficacy very superior to the aminopyralid applied alone.

Against all the weeds the association of GF-3447 + GF-1601 reached higher or equivalent efficacies compared to the other two products in autumn and spring.

#### Autumn assessment

The improvement of the efficacy with the addition of aminopyralid is very remarkable with the weeds:

- CENCY: 95.4% control with the mixture GF-3447+GF-1601, higher than GF-3447 (91.4% control) and significantly better in 2 trials out of 11. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (88.7% control).
- GERSS: 92.6% control with the mixture GF-3447+GF-1601, higher than GF-3447 (87.8% control) and significantly better in 3 trials out of 12. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (55.4 % control).
- FUMOF: 92.5% control with the mixture GF-3447+GF-1601, higher than GF-3447 (85.4% control) and significantly better in 2 trials out of 6. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (42.3 % control).
- PAPRH: 92.1% control with the mixture GF-3447+GF-1601, higher than GF-3447 (84.8% control) and significantly better in 4 trials out of 15. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (70.8 % control).
- GALAP: 91.0% control with the mixture GF-3447+GF-1601, higher than GF-3447 (84.2% control) and significantly better in 2 trials out of 5. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (41.3 % control).
- MATSS: 89.8% control with the mixture GF-3447+GF-1601, higher than GF-3447 (70.6% control) and significantly better in 16 trials out of 21. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (64.8% control).
- CHEAL: 86.9% control with the mixture GF-3447+GF-1601, similar than GF-3447 (86% control) and significantly better in 1 trial out of 8. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (31.9 33.0 % control).
- STEME: 80.6% control with the mixture GF-3447+GF-1601, higher than GF-3447 (62% control) and significantly better in 15 trials out of 19. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (39.6 % control).
- VIOAR: 77.4% control with the mixture GF-3447+GF-1601, higher than GF-3447 (63.3% control) and significantly better in 12 trials out of 25. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (63.1 % control).

#### Spring assessment

The impact of the addition of aminopyralid to halauxifen-methyl + picloram is very remarkable in the spring with the weeds:

- FUMOF: 100% control with the mixture GF-3447+GF-1601, higher than GF-3447 (94.1% control) and significantly better in 2 trials out of 6. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (27.1 % control).
- MATSS: 97.7% control with the mixture GF-3447+GF-1601, higher than GF-3447 (78.1% control) and significantly better in 16 trials out of 25. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (68.1% control).
- CENCY: 96.9% control with the mixture GF-3447+GF-1601, slightly higher than GF-3447 (93.8% control) and significantly better in 2 trials out of 12. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (89.6 % control).

- CHEAL: 92.4% control with the mixture GF-3447+GF-1601, higher than GF-3447 (81.5% control) and significantly better in 2 trials out of 2. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (93.3 % control).
- PAPRH: 96.6% control with the mixture GF-3447+GF-1601, higher than GF-3447 (92.5% control) and significantly better in 5 trials out of 20. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (73.9 % control).
- VIOAR: 79% control with the mixture GF-3447+GF-1601, higher than GF-3447 (58.4% control) and significantly better in 13 trials out of 26. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (59.2 % control).
- STEME: 77.7% control with the mixture GF-3447+GF-1601, higher than GF-3447 (66.2% control) and significantly better in 8 trials out of 18. Efficacy of GF-3447+GF-1601 was also superior to GF-1601 (45.6 % control).

### 3.2.1.2.1 Conclusion

To study the interest of the association of halauxifen-methyl, picloram and aminopyralid for the control of weeds in oilseed rape a total of 65 trials were carried out in Bulgaria, Czech Republic, France, Germany, Hungary, Poland, Romania and United Kingdom, between 2017 and 2018. Amongst the 65 trials, the association of the 3 actives allow to gain from 4% to 15% of efficacy in comparison to the readymix halauxifen-methyl + picloram (BELKAR®).

**In these 65 trials, the interest to associate the 3 active substances (halauxifen-methyl, picloram and aminopyralid) containing in LaDiva (GF-4021) was clearly shown notably on weeds like, FUMOF, PAPRH, MATSS, CHEAL, STEME and VIOAR.**

#### Comments of zRMS:

The submitted trial results show that the mixture of three active substances controlled most of weeds in winter oilseed rape significantly better in compare to product containing two actives or product with one active.

The mixture of GF-3447 and GF-1601 was the most effective to control of ANTAR (90,3%), GALAP (91%), MATCH (94,4%), MATIN (87,5%) and PAPRH (92,1%) in autumn assessment. The trials show also significant better results for GERRT (79,8%), STEME (80,6%), THLAR (76,3%), VERPE (72,3%) and VIOAR (77,4%) in compare to the products with one or two actives.

The mixture of halauxifen-methyl, picloram and aminopyralid was the most effective to control of ANTAR (88,2%), CHEAL (92,4%), MATCH (97,6%) and MATIN (97,8%) in spring assessment. The trials show also significant better results for LITAR (72,5%), STEME (77,7%), VERPE (71,2%) and VIOAR (79%) in compare to the products with one or two actives.

Aminopyralid (GF-1601) solo provided significant less control of weeds than mixture of halauxifen-methyl and picloram in all terms of observations. The optimum level of weed control was achieved using combination of 2,5 g a.s./ha halauxifen-methyl+12 g a.s./ha picloram. In autumn as well as spring assessment the effectiveness was >70%. The clear dose response was visible in case of mixture of halauxifen-methyl, picloram and aminopyralid for MATSS, STEME and VIOAR.

### 3.2.1.3 Results on bridging of formulations

A total of 51 efficacy trials were carried out from 2017 to 2019 to demonstrate the bioequivalence of the different formulations of the product GF-4021 used in the trials, at the same target rate of 0.25 L/ha. GF-4021 was compared to GF-3788 and GF-4021 GPS1, all three formulations strictly containing the same amount of the three active substances: 2.5 g/ha halauxifen-methyl, 12 g/ha picloram and 8 g/ha aminopyralid.

**The following tables present the summaries of efficacy trial results (Table 3.2 - 15: Efficacy of GF-4021 compared to GF-3788 and GF-4021 GPS1 - Autumn assessment ) at autumn assessment and efficacy trial results (Table 3.2 - 16) at spring assessment.**



**Table 3.2 - 15: Efficacy of GF-4021 compared to GF-3788 and GF-4021 GPS1 - Autumn assessment**

| Weeds | EPPO climatic zone | No. of trials | Weed infestation at assessment |      |      |                  |     |     | GF-4021 (2.5+12+8) 0.25 L/ha |      |      | GF-3788 (2.5+12+8) 0.25 L/ha |      |      | GF-4021 GPS1 (2.5+12+8) 0.25 L/ha |      |      | No. of assessments significantly > , = , < GF-4021 (2.5+12+8) (0.25 L/ha) vs. |                                     |
|-------|--------------------|---------------|--------------------------------|------|------|------------------|-----|-----|------------------------------|------|------|------------------------------|------|------|-----------------------------------|------|------|---|-------------------------------------|
|       |                    |               | Plants/m²                      |      |      | Ground cover (%) |     |     |                              |      |      |                              |      |      |                                   |      |      | GF-3788 (2.5+12+8) (0.25 L/ha)  | GF-4021 GPS1 (2.5+12+8) (0.25 L/ha) |
|       |                    |               | Mean                           | Min  | Max  | Mean             | Min | Max | Mean                         | Min  | Max  | Mean                         | Min  | Max  | Mean                              | Min  | Max  |   |                                     |
| ANTAR | All zones          | 2             | 137                            | 134  | 140  | -                | -   | -   | 91.8                         | 91.5 | 92   | 90.4                         | 89.8 | 91   | -                                 | -    | -    | 0> ; 2= ; 0<  | -                                   |
| CAPBP | All zones          | 5             | 56.3                           | 5.5  | 127  | -                | -   | -   | 88.2                         | 80   | 93   | 88.2                         | 80   | 93.8 | -                                 | -    | -    | 0> ; 5= ; 0<  | -                                   |
| CENCY | All zones          | 5             | 19                             | 5    | 37   | -                | -   | -   | 90.6                         | 80   | 98   | 87.6                         | 70   | 98   | -                                 | -    | -    | 0> ; 4= ; 1<  | -                                   |
| CHEAL | All zones          | 4             | 7.2                            | 5    | 9.2  | -                | -   | -   | 91                           | 83   | 100  | 89.3                         | 81.8 | 100  | -                                 | -    | -    | 1> ; 3= ; 0<  | -                                   |
|       | All zones          | 3             | 14.9                           | 11   | 18.8 | 12               | 12  | 12  | 96.4                         | 91   | 100  | -                            | -    | -    | 97.2                              | 93.3 | 100  | -   | 0> ; 3= ; 0<                        |
| FUMOF | All zones          | 3             | 6.7                            | 5    | 8    | -                | -   | -   | 97.5                         | 92.5 | 100  | 91.7                         | 75   | 100  | -                                 | -    | -    | 1> ; 2= ; 0<  | -                                   |
| GAETE | All zones          | 4             | 8.3                            | 7.5  | 10   | -                | -   | -   | 91.7                         | 85   | 96.3 | 88.9                         | 80   | 95.3 | -                                 | -    | -    | 2> ; 2= ; 0<  | -                                   |
| GALAP | All zones          | 4             | 6.8                            | 5.5  | 8    | -                | -   | -   | 91.7                         | 83.8 | 96   | 87.1                         | 78.8 | 96.3 | -                                 | -    | -    | 3> ; 1= ; 0<  | -                                   |
|       | All zones          | 1             | 17.8                           | -    | -    | -                | -   | -   | 95                           | -    | -    | -                            | -    | -    | 100                               | -    | -    | -   | 0> ; 0= ; 1<                        |
| GERDI | All zones          | 1             | 71.5                           | -    | -    | -                | -   | -   | 93.8                         | -    | -    | 92.5                         | -    | -    | -                                 | -    | -    | 0> ; 1= ; 0<  | -                                   |
|       | All zones          | 1             | 8.3                            | -    | -    | -                | -   | -   | 100                          | -    | -    | -                            | -    | -    | 100                               | -    | -    | -   | 0> ; 1= ; 0<                        |
| GERPU | All zones          | 4             | 44.3                           | 23   | 70   | -                | -   | -   | 89.7                         | 70   | 99   | 88.5                         | 67.5 | 99   | -                                 | -    | -    | 0> ; 4= ; 0<  | -                                   |
|       | All zones          | 1             | 14                             | -    | -    | -                | -   | -   | 57.5                         | -    | -    | -                            | -    | -    | 55                                | -    | -    | -   | 0> ; 1= ; 0<                        |
| GERRT | All zones          | 3             | 87.7                           | 51   | 145  | -                | -   | -   | 83.1                         | 70   | 91.3 | 81.7                         | 67.5 | 89   | -                                 | -    | -    | 0> ; 3= ; 0<  | -                                   |
| GERSS | All zones          | 8             | 68.6                           | 5    | 145  | -                | -   | -   | 91.4                         | 70   | 99   | 90.7                         | 67.5 | 99   | -                                 | -    | -    | 0> ; 8= ; 0<  | -                                   |
|       | All zones          | 2             | 11.2                           | 8.3  | 14   | -                | -   | -   | 78.8                         | 57.5 | 100  | -                            | -    | -    | 77.5                              | 55   | 100  | -   | 0> ; 2= ; 0<                        |
| LAMPU | All zones          | 5             | 14.3                           | 8    | 17   | -                | -   | -   | 95                           | 86.3 | 100  | 91.5                         | 80   | 100  | -                                 | -    | -    | 2> ; 3= ; 0<  | -                                   |
| LITAR | All zones          | 2             | 9.5                            | 9    | 10   | -                | -   | -   | 78.8                         | 77.5 | 80   | 75                           | 75   | 75   | -                                 | -    | -    | 0> ; 2= ; 0<  | -                                   |
| MATCH | All zones          | 7             | 17.3                           | 4.7  | 29   | -                | -   | -   | 88.8                         | 57.5 | 98.8 | 92.6                         | 81.3 | 100  | -                                 | -    | -    | 0> ; 6= ; 1<  | -                                   |
|       | All zones          | 2             | 72                             | 10   | 134  | -                | -   | -   | 37.5                         | 27.5 | 47.5 | -                            | -    | -    | 58.8                              | 55   | 62.5 | -   | 0> ; 1= ; 1<                        |
| MATIN | All zones          | 8             | 13.1                           | 6.5  | 23   | -                | -   | -   | 86.2                         | 68.8 | 96.5 | 83.8                         | 62.5 | 96.3 | -                                 | -    | -    | 1> ; 7= ; 0<  | -                                   |
|       | All zones          | 4             | 65.1                           | 11.3 | 167  | 7.3              | 7.3 | 7.3 | 85                           | 52.5 | 100  | -                            | -    | -    | 87.9                              | 62.5 | 100  | -   | 0> ; 4= ; 0<                        |
| MATSS | All zones          | 15            | 15.1                           | 4.7  | 29   | -                | -   | -   | 87.4                         | 57.5 | 98.8 | 87.9                         | 62.5 | 100  | -                                 | -    | -    | 1> ; 13= ; 1<   | -                                   |
|       | All zones          | 5             | 84.8                           | 11.3 | 177  | 7.3              | 7.3 | 7.3 | 73                           | 27.5 | 100  | -                            | -    | -    | 82.1                              | 58.8 | 100  | -   | 0> ; 3= ; 1<                        |
| PAPRH | All zones          | 8             | 62.5                           | 15   | 140  | -                | -   | -   | 93.5                         | 82.5 | 100  | 91.8                         | 78.8 | 99   | -                                 | -    | -    | 1> ; 6= ; 1<  | -                                   |
|       | All zones          | 2             | 41.3                           | 13   | 69.5 | -                | -   | -   | 99.9                         | 99.8 | 100  | -                            | -    | -    | 100                               | 100  | 100  | -   | 0> ; 2= ; 0<                        |
| STEME | All zones          | 13            | 12.2                           | 7    | 23.1 | -                | -   | -   | 75.8                         | 37.5 | 95   | 72.9                         | 45   | 92.5 | -                                 | -    | -    | 2> ; 10= ; 1<   | -                                   |
| THLAR | All zones          | 2             | 5                              | 5    | 5    | -                | -   | -   | 68.8                         | 67.5 | 70   | 64.4                         | 58.8 | 70   | -                                 | -    | -    | 1> ; 1= ; 0<  | -                                   |
| TRFIN | All zones          | 2             | 12.5                           | 11   | 14   | -                | -   | -   | 90                           | 90   | 90   | 85                           | 80   | 90   | -                                 | -    | -    | 1> ; 1= ; 0<  | -                                   |
| VERHE | All zones          | 5             | 22.2                           | 6    | 41   | -                | -   | -   | 65.5                         | 55   | 75   | 62.9                         | 35   | 75   | -                                 | -    | -    | 1> ; 4= ; 0<  | -                                   |
| VERPE | All zones          | 7             | 19.1                           | 5    | 27   | -                | -   | -   | 74.2                         | 50   | 88.8 | 72                           | 50   | 81.3 | -                                 | -    | -    | 2> ; 5= ; 0<  | -                                   |

| Weeds | EPPO climatic zone | No. of trials | Weed infestation at assessment |     |      |                  |     |     | GF-4021<br>(2.5+12+8)<br>0.25 L/ha |      |     | GF-3788<br>(2.5+12+8)<br>0.25 L/ha |      |     | GF-4021 GPS1<br>(2.5+12+8)<br>0.25 L/ha |     |     | No. of assessments significantly > , = , <<br>GF-4021 (2.5+12+8)<br>(0.25 L/ha) vs. |  |
|-------|--------------------|---------------|--------------------------------|-----|------|------------------|-----|-----|------------------------------------|------|-----|------------------------------------|------|-----|---|-----|-----|---|--|
|       |                    |               | Plants/m²                      |     |      | Ground cover (%) |     |     |                                    |      |     |                                    |      |     |   |     |     |   |  |
|       |                    |               | Mean                           | Min | Max  | Mean             | Min | Max | Mean                               | Min  | Max | Mean                               | Min  | Max | Mean                                    | Min | Max | GF-3788<br>(2.5+12+8)<br>(0.25 L/ha)  | GF-4021<br>GPS1<br>(2.5+12+8)<br>(0.25 L/ha) |
| VIOAR | All zones          | 14            | 16.6                           | 5   | 56.8 | 5.8              | 5.3 | 6.3 | 75                                 | 15   | 100 | 71.7                               | 12.5 | 100 | -                                       | -   | -   | 5> ; 8= ; 1<  | -  |
|       | All zones          | 2             | -                              | -   | -    | 5.5              | 5   | 6   | 78.2                               | 66.3 | 90  | -                                  | -    | -   | 80                                      | 70  | 90  | -   | 0> ; 2= ; 0<                                 |
|       |                    |               |                                |     |      |                  |     |     |                                    |      |     |                                    |      |     |   |     |     |   |  |
| AMARE | All zones          | 1             | 9.5                            | -   | -    | -                | -   | -   | 100                                | -    | -   | -                                  | -    | -   | 100                                     | -   | -   | -   | 0> ; 1= ; 0<                                 |
| CIRAR | All zones          | 1             | 7                              | -   | -    | -                | -   | -   | 93                                 | -    | -   | 77.5                               | -    | -   | -                                       | -   | -   | 1> ; 0= ; 0<  | -  |
| CNSRE | All zones          | 1             | 5                              | -   | -    | -                | -   | -   | 97                                 | -    | -   | 98                                 | -    | -   | -                                       | -   | -   | 0> ; 0= ; 1<  | -  |
| CONAR | All zones          | 1             | 11.5                           | -   | -    | -                | -   | -   | 100                                | -    | -   | -                                  | -    | -   | 100                                     | -   | -   | -   | 0> ; 1= ; 0<                                 |
| DESSO | All zones          | 1             | 19                             | -   | -    | -                | -   | -   | 62.5                               | -    | -   | 67.5                               | -    | -   | -                                       | -   | -   | 0> ; 1= ; 0<  | -  |
| EPHHE | All zones          | 1             | 5                              | -   | -    | -                | -   | -   | 85                                 | -    | -   | 85                                 | -    | -   | -                                       | -   | -   | 0> ; 1= ; 0<  | -  |
| GERMO | All zones          | 1             | 32                             | -   | -    | -                | -   | -   | 95.8                               | -    | -   | 95.3                               | -    | -   | -                                       | -   | -   | 0> ; 1= ; 0<  | -  |
| LAMAM | All zones          | 1             | 15                             | -   | -    | -                | -   | -   | 99.5                               | -    | -   | 91.3                               | -    | -   | -                                       | -   | -   | 0> ; 1= ; 0<  | -  |
| LEBAU | All zones          | 1             | 23                             | -   | -    | -                | -   | -   | 96.3                               | -    | -   | -                                  | -    | -   | 97.5                                    | -   | -   | -   | 0> ; 1= ; 0<                                 |
| LYCAR | All zones          | 1             | 8                              | -   | -    | -                | -   | -   | 75                                 | -    | -   | 50                                 | -    | -   | -                                       | -   | -   | 1> ; 0= ; 0<  | -  |
| SINAR | All zones          | 1             | 23                             | -   | -    | -                | -   | -   | 91.3                               | -    | -   | -                                  | -    | -   | 93.8                                    | -   | -   | -   | 0> ; 1= ; 0<                                 |
| SONAR | All zones          | 1             | -                              | -   | -    | 6                | -   | -   | 97.5                               | -    | -   | -                                  | -    | -   | 97.5                                    | -   | -   | -   | 0> ; 1= ; 0<                                 |

**Table 3.2 - 16: Efficacy of GF-4021 compared to GF-3788 and GF-4021 GPS1 - Spring assessment**

| Weeds | EPPO climatic zone | No. of trials | Weed infestation at assessment |      |     |                  |     |     | GF-4021 (2.5+12+8) 0.25 L/ha |      |      | GF-3788 (2.5+12+8) 0.25 L/ha |      |      | GF-4021 GPS1 (2.5+12+8) 0.25 L/ha |      |     | No. of assessments significantly > , = , < GF-4021 (0.25 L/ha) vs. |                                     |
|-------|--------------------|---------------|--------------------------------|------|-----|------------------|-----|-----|------------------------------|------|------|------------------------------|------|------|-----------------------------------|------|-----|--|-------------------------------------|
|       |                    |               | Plants/m²                      |      |     | Ground cover (%) |     |     | Mean                         | Min  | Max  | Mean                         | Min  | Max  | Mean                              | Min  | Max | GF-3788 (2.5+12+8) (0.25 L/ha)                                     | GF-4021 GPS1 (2.5+12+8) (0.25 L/ha) |
|       |                    |               | Mean                           | Min  | Max | Mean             | Min | Max |                              |      |      |                              |      |      |                                   |      |     |  |                                     |
| ANTAR | All zones          | 2             | 143                            | 141  | 145 | -                | -   | -   | 88.5                         | 87   | 90   | 86.5                         | 84   | 89   | -                                 | -    | -   | 0> ; 2= ; 0<   | -                                   |
| CAPBP | All zones          | 6             | 47.3                           | 5.5  | 132 | -                | -   | -   | 84.4                         | 67.5 | 96.5 | 84.3                         | 65   | 100  | -                                 | -    | -   | 0> ; 6= ; 0<   | -                                   |
| CENCY | All zones          | 7             | 15.6                           | 5    | 37  | -                | -   | -   | 94.5                         | 80   | 100  | 93.9                         | 85   | 100  | -                                 | -    | -   | 2> ; 5= ; 0<   | -                                   |
| CHEAL | All zones          | 2             | 6.4                            | 6.3  | 6.5 | -                | -   | -   | 92.7                         | 92.5 | 92.8 | 95                           | 94   | 96   | -                                 | -    | -   | 0> ; 2= ; 0<   | -                                   |
|       | All zones          | 1             | 18.8                           | -    | -   | -                | -   | -   | 100                          | -    | -    | -                            | -    | -    | 100                               | -    | -   | -  | 0> ; 1= ; 0<                        |
| CNSRE | All zones          | 2             | 5                              | 5    | 5   | -                | -   | -   | 97.5                         | 97   | 98   | 98                           | 98   | 98   | -                                 | -    | -   | 0> ; 1= ; 1<   | -                                   |
| DESSO | All zones          | 2             | 19                             | 19   | 19  | -                | -   | -   | 80.3                         | 72.5 | 88   | 82.8                         | 77.5 | 88   | -                                 | -    | -   | 0> ; 2= ; 0<   | -                                   |
|       | All zones          | 1             | -                              | -    | -   | 8                | -   | -   | 99.8                         | -    | -    | -                            | -    | -    | 100                               | -    | -   | -  | 0> ; 1= ; 0<                        |
| EPHHE | All zones          | 2             | 27.5                           | 5    | 50  | -                | -   | -   | 88.2                         | 80   | 96.3 | 83.1                         | 80   | 86.3 | -                                 | -    | -   | 0> ; 2= ; 0<   | -                                   |
|       | All zones          | 1             | -                              | -    | -   | 5.5              | -   | -   | 75                           | -    | -    | -                            | -    | -    | 77.5                              | -    | -   | -  | 0> ; 1= ; 0<                        |
| FUMOF | All zones          | 5             | 8.8                            | 5    | 15  | -                | -   | -   | 99.5                         | 97.5 | 100  | 88                           | 70   | 100  | -                                 | -    | -   | 3> ; 2= ; 0<   | -                                   |
| GAETE | All zones          | 2             | 11.4                           | 10.8 | 12  | -                | -   | -   | 90.5                         | 87   | 94   | 88.9                         | 84.8 | 93   | -                                 | -    | -   | 0> ; 2= ; 0<   | -                                   |
| GALAP | All zones          | 4             | 7.6                            | 6.8  | 8   | -                | -   | -   | 98                           | 95.3 | 100  | 97.4                         | 94.5 | 100  | -                                 | -    | -   | 0> ; 4= ; 0<   | -                                   |
|       | All zones          | 1             | -                              | -    | -   | 12               | -   | -   | 99.5                         | -    | -    | -                            | -    | -    | 99.3                              | -    | -   | -  | 0> ; 1= ; 0<                        |
| GERPU | All zones          | 6             | 37.8                           | 14   | 70  | -                | -   | -   | 87.8                         | 57.5 | 100  | 83.1                         | 53.8 | 100  | -                                 | -    | -   | 1> ; 5= ; 0<   | -                                   |
|       | All zones          | 1             | 19                             | -    | -   | -                | -   | -   | 78.8                         | -    | -    | -                            | -    | -    | 71.3                              | -    | -   | -  | 0> ; 1= ; 0<                        |
| GERRT | All zones          | 3             | 87.7                           | 51   | 145 | -                | -   | -   | 72.6                         | 57.5 | 91.3 | 67.7                         | 53.8 | 93   | -                                 | -    | -   | 0> ; 3= ; 0<   | -                                   |
| GERSS | All zones          | 10            | 59.2                           | 5    | 145 | -                | -   | -   | 90.5                         | 57.5 | 100  | 87.2                         | 53.8 | 100  | -                                 | -    | -   | 1> ; 9= ; 0<   | -                                   |
|       | All zones          | 1             | 19                             | -    | -   | -                | -   | -   | 78.8                         | -    | -    | -                            | -    | -    | 71.3                              | -    | -   | -  | 0> ; 1= ; 0<                        |
| LAMPU | All zones          | 5             | 14.7                           | 8    | 18  | -                | -   | -   | 100                          | 100  | 100  | 100                          | 100  | 100  | -                                 | -    | -   | 0> ; 5= ; 0<   | -                                   |
| LITAR | All zones          | 2             | 9.5                            | 9    | 10  | -                | -   | -   | 66.3                         | 60   | 72.5 | 67.5                         | 65   | 70   | -                                 | -    | -   | 0> ; 2= ; 0<   | -                                   |
| MATCH | All zones          | 7             | 16.3                           | 4.7  | 25  | -                | -   | -   | 97.4                         | 92.5 | 99.4 | 97.9                         | 95.5 | 100  | -                                 | -    | -   | 0> ; 7= ; 0<   | -                                   |
|       | All zones          | 2             | 72                             | 10   | 134 | -                | -   | -   | 97                           | 95   | 99   | -                            | -    | -    | 99.5                              | 99   | 100 | -  | 0> ; 2= ; 0<                        |
| MATIN | All zones          | 12            | 21.1                           | 8.5  | 72  | -                | -   | -   | 95.1                         | 67.5 | 100  | 93.6                         | 67.5 | 100  | -                                 | -    | -   | 2> ; 9= ; 1<   | -                                   |
|       | All zones          | 3             | 92                             | 17   | 167 | 18               | 18  | 18  | 96.9                         | 95   | 99.5 | -                            | -    | -    | 98.8                              | 96.5 | 100 | -  | 0> ; 3= ; 0<                        |
| MATSS | All zones          | 19            | 19.3                           | 4.7  | 72  | -                | -   | -   | 95.9                         | 67.5 | 100  | 95.2                         | 67.5 | 100  | -                                 | -    | -   | 2> ; 16= ; 1<  | -                                   |
|       | All zones          | 4             | 109.3                          | 17   | 177 | 18               | 18  | 18  | 97.5                         | 95   | 99.5 | -                            | -    | -    | 98.8                              | 96.5 | 100 | -  | 0> ; 4= ; 0<                        |
| PAPRH | All zones          | 13            | 56.1                           | 12   | 140 | -                | -   | -   | 96.2                         | 75   | 100  | 96.1                         | 81.3 | 100  | -                                 | -    | -   | 1> ; 12= ; 0<  | -                                   |
|       | All zones          | 3             | 13                             | 13   | 13  | 5.5              | 5   | 6   | 99.9                         | 99.8 | 100  | -                            | -    | -    | 100                               | 100  | 100 | -  | 0> ; 3= ; 0<                        |
| SONAR | All zones          | 1             | 7                              | -    | -   | -                | -   | -   | 77.5                         | -    | -    | 75                           | -    | -    | -                                 | -    | -   | 0> ; 1= ; 0<   | -                                   |
|       | All zones          | 1             | -                              | -    | -   | 6                | -   | -   | 100                          | -    | -    | -                            | -    | -    | 100                               | -    | -   | -  | 0> ; 1= ; 0<                        |
| STEME | All zones          | 14            | 14.1                           | 7    | 26  | -                | -   | -   | 72.7                         | 35   | 100  | 72.8                         | 40   | 93.8 | -                                 | -    | -   | 4> ; 8= ; 2<   | -                                   |
| THLAR | All zones          | 2             | 5                              | 5    | 5   | -                | -   | -   | 83.8                         | 80   | 87.5 | 85                           | 80   | 90   | -                                 | -    | -   | 1> ; 0= ; 1<   | -                                   |

| Weeds | EPPO climatic zone | No. of trials | Weed infestation at assessment |     |      |                  |     |     | GF-4021<br>(2.5+12+8)<br>0.25 L/ha |      |      | GF-3788<br>(2.5+12+8)<br>0.25 L/ha |      |      | GF-4021 GPS1<br>(2.5+12+8)<br>0.25 L/ha |     |      | No. of assessments significantly<br>> , = , <<br>GF-4021 (0.25 L/ha) vs. |  |
|-------|--------------------|---------------|--------------------------------|-----|------|------------------|-----|-----|------------------------------------|------|------|------------------------------------|------|------|---|-----|------|--|--|
|       |                    |               | Plants/m <sup>2</sup>          |     |      | Ground cover (%) |     |     | Mean                               | Min  | Max  | Mean                               | Min  | Max  | Mean                                    | Min | Max  | GF-3788<br>(2.5+12+8)<br>(0.25 L/ha)                                     | GF-4021<br>GPS1<br>(2.5+12+8)<br>(0.25 L/ha) |
|       |                    |               | Mean                           | Min | Max  | Mean             | Min | Max |                                    |      |      |                                    |      |      |   |     |      |  |  |
| TRFIN | All zones          | 2             | 12.5                           | 11  | 14   | -                | -   | -   | 97.5                               | 95   | 100  | 97.5                               | 95   | 100  | -                                       | -   | -    | 0> ; 2= ; 0<   | -  |
| VERHE | All zones          | 5             | 26.4                           | 6   | 52   | -                | -   | -   | 43                                 | 29.5 | 55   | 45.9                               | 35   | 57.5 | -                                       | -   | -    | 1> ; 2= ; 2<   | -  |
| VERPE | All zones          | 9             | 22.2                           | 5   | 50   | -                | -   | -   | 73.9                               | 46.3 | 91.3 | 70.1                               | 47.5 | 92.5 | -                                       | -   | -    | 2> ; 7= ; 0<   | -  |
| VIOAR | All zones          | 20            | 19.7                           | 5   | 56.8 | 8.4              | 8   | 8.8 | 81                                 | 10   | 100  | 79.7                               | 10   | 100  | -                                       | -   | -    | 2> ; 18= ; 0<  | -  |
|       | All zones          | 2             | -                              | -   | -    | 6.5              | 5   | 8   | 75                                 | 65   | 85   | -                                  | -    | -    | 74.7                                    | 63  | 86.3 | -  | 0> ; 2= ; 0<                                 |
|       |                    |               |                                |     |      |                  |     |     |                                    |      |      |                                    |      |      |   |     |      |  |  |
| CIRAR | All zones          | 1             | 11                             | -   | -    | -                | -   | -   | 91.3                               | -    | -    | 85                                 | -    | -    | -                                       | -   | -    | 0> ; 1= ; 0<   | -  |
| GERDI | All zones          | 1             | 71.5                           | -   | -    | -                | -   | -   | 88.8                               | -    | -    | 87.5                               | -    | -    | -                                       | -   | -    | 0> ; 1= ; 0<   | -  |
| GERMO | All zones          | 1             | 25                             | -   | -    | -                | -   | -   | 98                                 | -    | -    | 97.8                               | -    | -    | -                                       | -   | -    | 0> ; 1= ; 0<   | -  |
| LAMAM | All zones          | 1             | 19                             | -   | -    | -                | -   | -   | 99.5                               | -    | -    | 95.8                               | -    | -    | -                                       | -   | -    | 0> ; 1= ; 0<   | -  |
| LEBAU | All zones          | 1             | 23                             | -   | -    | -                | -   | -   | 97.6                               | -    | -    | -                                  | -    | -    | 98.3                                    | -   | -    | -  | 0> ; 1= ; 0<                                 |
| LYCAR | All zones          | 1             | 8                              | -   | -    | -                | -   | -   | 95                                 | -    | -    | 62.5                               | -    | -    | -                                       | -   | -    | 1> ; 0= ; 0<   | -  |

### Autumn assessment

The bioequivalence between the formulations is well demonstrated:

- On PAPRH: 93.5% of control with GF-4021, equivalent to GF-3788 (91.8%) and significantly equivalent in 6 trials out of 8. When compared to GF-4021 GPS1, GF-4021 showed 99.9% control in 2 trials, significantly equivalent in 2 trials out of 2 to GF-4021 GPS1 with 100% control .
- On GERSS: 91.4% of control with GF-4021, equivalent to GF-3788 (90.7 %) and significantly equivalent in 8 trials out of 8. When compared to GF-4021 GPS1 , GF-4021 showed 78.8% control in 2 trials, significantly equivalent in 2 trials out of 2 to GF-4021 GPS1 with 77.5% control .
- On CHEAL: 91% of control with GF-4021, equivalent to GF-3788 (89.3%) and significantly equivalent in 3 trials out of 4. When compared to GF-4021 GPS1 , GF-4021 showed 96.4% control in 3 trials, significantly equivalent in 3 trials out of 3 to GF-4021 GPS1 with 97.2% control
- On MATSS: 87.4% of control with GF-4021, equivalent to GF-3788 (87.9 %) and significantly equivalent in 13 trials out of 15. When compared to GF-4021 GPS1 , GF-4021 showed 73% control in 5 trials, significantly equivalent in 3 trials out of 4. to GF-4021 GPS1 with 82.1% control
- On STEME: 75.8% of control with GF-4021, equivalent to GF-3788 (72.9 %) and significantly equivalent in 10 trials out of 13.
- On VIOAR: 75% of control with GF-4021, equivalent to GF-3788 (71.7 %) and significantly equivalent in 8 trials out of 14. When compared to GF-4021 GPS1 , GF-4021 showed 78.2% control in 2 trials, significantly equivalent in these 2 trials. to GF-4021 GPS1 with 80% control

### Spring assessment

- On PAPRH: 96.2% control with GF-4021, equivalent to GF-3788 (96.1%) and significantly equivalent in 12 trials out of 13. When compared to GF-4021 GPS1, GF-4021 showed 99.9% control in 3 trials, significantly equivalent in 3 trials out of 3 to GF-4021 GPS1 with 100% control.
- On MATSS: 95.9% control with GF-4021, equivalent to GF-3788 (95.2 %) and significantly equivalent in 16 trials out of 19. When compared to GF-4021 GPS1 , GF-4021 showed 97.5% control in 4 trials, significantly equivalent in 4 trials out of 4 to GF-4021 GPS1 with 98.8% control.
- On CENCY: 94.5% of control with GF-4021, equivalent to GF-3788 (93.9 %) and significantly equivalent in 5 trials out of 7.
- On GERSS: 90.5% of control with GF-4021, equivalent to GF-3788 (87.2 %) and significantly equivalent in 9 trials out of 10. When compared to GF-4021 GPS1, GF-4021 showed 78.8% control in 1 trial, significantly equivalent to GF-4021 GPS1 with 71.3% control.
- On VIOAR: 81% control with GF-4021, equivalent to GF-3788 (79.7%) and significantly equivalent in 18 trials out of 20. When compared to GF-4021 GPS1, GF-4021 showed 75% control in 2 trials, significantly equivalent in these 2 trials to GF-4021 GPS1 with 74.7% control.
- On STEME: 72.7% of control with GF-4021, equivalent to GF-3788 (72.8 %) and significantly equivalent in 8 trials out of 14.

### 3.2.1.3.1 Conclusion

To study the bioequivalence of the three formulations of GF-4021, for the control of weeds in oilseed rape a total of 51 trials were carried out in Czech Republic, France, Germany, Hungary, Romania and United Kingdom, between 2017 and 2019.

**In these trials, the bridging or bioequivalence of the three different formulations: GF-4021, GF-3788 and GF-4021 GPS1 (halauxifen-methyl + picloram + aminopyralid) was clearly demonstrated notably on weeds like PAPRH, GERSS, CHEAL, MATSS, CENCY, STEME and VIOAR.**

#### Comments of zRMS:

According to the efficacy results from bridging trials it can be concluded that all three formulations (GF-4021, GF-3788 and GF-4021 GPS1) are comparatively effective in the control of claimed weeds, wherein the tested herbicide GF-4021 showed slight better efficacy in the control of some weeds (e.g. CIRAR, LYCAR, GERRT). The trials show the bioequivalence of the different formulations of the test product GF-4021 at dose rate of 0,25 l/ha.

### 3.2.2 Minimum effective dose tests (KCP 6.2))

#### 3.2.2.1 Material and methods

Data proving minimum effective dose tests have been divided for 2 applications. First one for application timing with application between BBCH 12-14 of the winter oil seed rape, called early application timing and second section for an application made between BBCH 14-19 the crop.

Minimum effective dose test have been made in Maritime, North-East, South- East EPPO Climatic Zone, and results are coming from the following countries:

Central Administrative Zone: Czech Republic, Germany, United Kingdom, Poland, Hungary, Romania. For Minimum effective dose sections the weeds selected are key weeds across all the mentioned geographies.

5 weeds were selected to proving minimum effective dose : CAPBP *Capsella bursa-pastoris*, CHEAL ~~Cheopodium~~ *Chenopodium album*, MATIN *Tripleurospermum inodorum*, STEME *Stellaria media* and VIOAR *Viola arvensis*. Importance of the weeds is explained at the beginning of Efficacy section 3.2.3, as all of the trials presented in this section, are presented also in the Efficacy part of the dossier to describe the effectiveness of the proposed label rates.

56 reliable trials results are presented in this section.

- Timing A – Early application: BBCH 12-14
- Timing B – Late application: BBCH 14-19
- As the bridging of formulations have been demonstrated, henceforth the product GF-4021 is considered as a unique formulation (GF-4021, GF-3788 or GF-4021 GPS1).

Results are presented for Maritime (CZ, DE and UK), South-East (HU and RO) and North- East (PL)

All the tests were carried out according to GEP, and followed the EPPO guidelines.

Trials were carried out during 3 seasons 2017/2018, 2019/2019, 2019/2020. For this section (MED for BBCH 12-19 growth stage) data are presented only for the last assessment.

Results can be found in Tables 3.2.17- 3.2.

### 3.2.2.2 Results of minimum effective dose tests

#### **GF-4021 Minimum effective dose test on *Capsella bursa-pastoris***

For the earlier application timing- rate 0.25 L/ha of GF-4021 provided a superior control of CAPBP than the dose rate 0.1875 L/ha of GF-4021 in 6 trials out of 11 trials. In 5 trial results of the both mentioned rates gave similar level of control.

Provided control was superior to standard product Belkar at tested dose rate 0.25 L/ha .

For the later application timing- rate 0.25 L/ha of GF-4021 provided a superior control of CAPBP than the dose rate 0.1875 L/ha of GF-4021 in 7 trials out of 9 trials. In 2 trials results of the both mentioned rates gave similar level of control.

Provided control was superior to standard product Belkar at tested dose rate 0.25 L/ha .

Results can be found in Table 3.2.-17.

#### **GF-4021 Minimum effective dose test on CHEAL *Chenopodium album***

For the earlier application timing- rate 0.25 L/ha of GF-4021 provided a superior control of CHEAL than the dose rate 0.1875 L/ha of GF-4021 in 8 trials out of 8 trials.

Provided control was superior to standard product Belkar at tested dose rate 0.25 L/ha

For the later application timing- rate 0.25 L/ha of GF-4021 provided a superior control of CHEAL than the dose rate 0.1875 L/ha of GF-4021 in 6 trials out of 6 trials.

Provided control was superior to standard product Belkar at tested dose rate 0.25 L/ha

Results can be found in Table 3.2.-18.

#### **GF-4021 Minimum effective dose test on MATIN *Tripleurospermum inodorum***

For the earlier application timing- rate 0.25 L/ha of GF-4021 provided a superior control of MATIN than the dose rate 0.1875 L/ha of GF-4021 in 14 trials out of 18 trials. In 4 trial results of the both mentioned rates gave the same level of control.

Provided control was superior to standard product Belkar at tested dose rate 0.25 L/ha .

For the later application timing- rate 0.25 L/ha of GF-4021 provided a superior control of MATIN than the dose rate 0.1875 L/ha of GF-4021 in 14 trials out of 17 trials. In 3 trial results of the both mentioned rates gave the same level of control.

Provided control was superior standard product Belkar at tested dose rate 0.25 L/ha .

Results can be found in Table 3.2.-19.

#### **GF-4021 Minimum effective dose test on STEME *Stellaria media***

For the earlier application timing- rate 0.25 L/ha of GF-4021 provided a superior control of STEME than the dose rate 0.1875 L/ha of GF-4021 in 19 trials out of 19 trials.

Provided control was superior to standard product Belkar at tested dose rate 0.25 L/ha .

For the later application timing- rate 0.25 L/ha of GF-4021 provided a superior control of STEME than the dose rate 0.1875 L/ha of GF-4021 in 17 trials out of 19 trials.

Provided control was superior to standard product Belkar at tested dose rate 0.25 L/ha

Results can be found in Table 3.2.-20.

#### **GF-4021 Minimum effective dose test on VIOAR *Viola arvensis***

For the earlier application timing- rate 0.25 L/ha of GF-4021 provided a superior control of VIOAR than the dose rate 0.1875 L/ha of GF-4021 in 22 trials out of 23 trials. In 1 trial results of the both mentioned rates gave the same level of control.

Provided control was superior to standard product Belkar at tested dose rate 0.25 L/ha .

For the later application timing- rate 0.25 L/ha of GF-4021 provided a superior control of VIOAR than the dose rate 0.1875 L/ha of GF-4021 in 18 trials out of 19 trials. In 1 trial results of the both mentioned

rates gave the same level of control.

Provided control was superior to standard product Belkar at tested dose rate 0.25 L/ha .

Results can be found in Table 3.2.-21.



**Table 3.2.-17 Minimum effective dose. Efficacy of GF-4021 applied at timing A and B at proposed label rate 0.25 L/ha and at 50%, and 75% of the registration rate in WOSR at last autumn assessment against CAPBP**

| EPPO Zone   | Density/m2 | GF-4021 0.125 |       |       | GF-4021 0.1875 |       |       | GF-4021 0.25 |       |       | Belkar 0.25 |       |       |
|---|------------|---------------|-------|-------|----------------|-------|-------|--------------|-------|-------|-------------|-------|-------|
|   |            | Means         | Min   | Max   | Means          | Min   | Max   | Means        | Min   | Max   | Means       | Min   | Max   |
| Timing A  |            |               |       |       |                |       |       |              |       |       |             |       |       |
| Maritime  | 13.1       | 77.6          | 75.8  | 81.3  | 85.0           | 83.8  | 86.3  | 88.5         | 83.8  | 90.8  | 87.8        | 83.8  | 89.8  |
| North-East  | 14.3       | 67.9          | 64.2  | 70.8  | 77.1           | 70.0  | 84.2  | 87.1         | 85.0  | 89.2  | 79.0        | 74.2  | 84.2  |
| South East  | 114.0      | 0.0           | 0.0   | 0.0   | 40.0           | 38.0  | 42.0  | 87.5         | 78.0  | 93.0  | 78.0        | 76.0  | 80.0  |
| Orthogonal comparison GF-4021 with reference prduct | Mean       | 66.4          | 63.7  | 69.4  | 77.3           | 72.8  | 81.7  | 87.7         | 84.0  | 90.1  | 82.3        | 78.0  | 86.0  |
|   | Min        | 0.0           | 0.0   | 0.0   | 40.0           | 10.0  | 42.0  | 51.3         | 50.0  | 55.0  | 53.8        | 30.0  | 60.0  |
|   | Max        | 100.0         | 100.0 | 100.0 | 100.0          | 100.0 | 100.0 | 100.0        | 100.0 | 100.0 | 100.0       | 100.0 | 100.0 |
| Timing B  |            |               |       |       |                |       |       |              |       |       |             |       |       |
| Maritime  | 11.1       | 57.4          | 56.3  | 60.0  | 74.6           | 68.8  | 81.3  | 83.0         | 78.8  | 86.3  | 70.6        | 65.0  | 75.0  |
| North East  | 19.0       | 69.8          | 66.8  | 72.5  | 72.8           | 68.8  | 76.3  | 86.3         | 82.5  | 88.8  | 83.4        | 80.0  | 86.3  |
| South East  | 125.0      | 0.0           | 0.0   | 0.0   | 41.0           | 39.0  | 43.0  | 90.0         | 88.0  | 92.0  | 80.0        | 78.0  | 82.0  |
| Orthogonal comparison GF-4021 with reference prduct | Mean       | 57.8          | 55.9  | 60.2  | 70.7           | 66.0  | 75.5  | 85.1         | 81.3  | 87.9  | 77.3        | 73.0  | 80.8  |
|   | Min        | 0.0           | 0.0   | 0.0   | 23.8           | 15.0  | 30.0  | 70.0         | 60.0  | 75.0  | 56.3        | 50.0  | 65.0  |
|   | Max        | 100.0         | 100.0 | 100.0 | 100.0          | 100.0 | 100.0 | 100.0        | 100.0 | 100.0 | 100.0       | 100.0 | 100.0 |

| EPPO Zone                            | Number of trials | Density/m <sup>2</sup> |          | GF-4021    |           |             |           |           |           | Belkar    |           |
|--------------------------------------|------------------|------------------------|----------|------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|
|                                      |                  |                        |          | 0.125 l/ha |           | 0.1875 l/ha |           | 0.25 l/ha |           | 0.25 l/ha |           |
|                                      |                  | Mean                   | Min&Max  | Mean       | Min&Max   | Mean        | Min&Max   | Mean      | Min&Max   | Mean      | Min&Max   |
| Timing A (at last autumn assessment) |                  |                        |          |            |           |             |           |           |           |           |           |
| Maritime                             | 3                | 17                     | 6.0-33.0 | 72.9       | 50.0-86.3 | 81.7        | 60.0-93.8 | 86.3      | 67.5-98.0 | 86.1      | 67.5-95.8 |
| North-East                           | 6                | 14.3                   | 5.0-27.0 | 67.9       | 20.0-100  | 77.1        | 43.8-100  | 87.1      | 51.3-100  | 79.0      | 53.8-100  |
| South-East                           | 1                | 114.0                  | -        | 0.0        | -         | 40.0        | -         | 87.5      | -         | 78.0      | -         |
| Timing B (at last autumn assessment) |                  |                        |          |            |           |             |           |           |           |           |           |
| Maritime                             | 3                | 14.3                   | 5.0-33.0 | 48.8       | 0.0-76.3  | 71.7        | 62.5-77.5 | 80.0      | 75.0-87.5 | 72.1      | 62.5-77.5 |
| North-East                           | 4                | 19.0                   | 6.0-53.0 | 69.8       | 17.5-100  | 72.8        | 23.8-100  | 86.3      | 70.0-100  | 83.4      | 56.3-100  |
| South-East                           | 1                | 125.0                  | -        | 0.0        | -         | 41.0        | -         | 90.0      | -         | 80.0      | -         |

**Table 3.2.-18 Minimum effective dose. Efficacy of GF-4021 applied at timing A and B at proposed label rate 0.25 L/ha and at 50%, and 75% of the registration rate in WOSR at last autumn assessment against CHEAL**

| EPPO Zone  | Density/m2 | GF-4021 0.125 |      |       | GF-4021 0.1875 |      |       | GF-4021 0.25 |       |       | Belkar 0.25 |       |       |
|--|------------|---------------|------|-------|----------------|------|-------|--------------|-------|-------|-------------|-------|-------|
|  |            | Means         | Min  | Max   | Means          | Min  | Max   | Means        | Min   | Max   | Means       | Min   | Max   |
| Timing A   |            |               |      |       |                |      |       |              |       |       |             |       |       |
| Maritime   | 17.0       | 10.0          | 10.0 | 10.0  | 50.0           | 50.0 | 50.0  | 100.0        | 100.0 | 100.0 | 100.0       | 100.0 | 100.0 |
| North-East   | 8.1        | 60.5          | 53.0 | 68.0  | 70.5           | 62.0 | 75.0  | 79.9         | 74.0  | 82.8  | 73.1        | 67.0  | 78.8  |
| South East   | 8.5        | 76.8          | 75.0 | 79.0  | 87.8           | 85.0 | 89.0  | 95.4         | 94.0  | 97.0  | 87.8        | 86.5  | 90.0  |
| Orthogonal comparison GF-4021 with reference product | Mean       | 58.5          | 53.1 | 64.0  | 72.1           | 65.8 | 75.3  | 85.5         | 81.3  | 87.9  | 79.3        | 75.0  | 83.6  |
|  | Min        | 10.0          | 10.0 | 10.0  | 43.8           | 40.0 | 45.0  | 62.5         | 60.0  | 65.0  | 41.3        | 40.0  | 45.0  |
|  | Max        | 85.8          | 85.0 | 100.0 | 91.5           | 90.0 | 100.0 | 100.0        | 100.0 | 100.0 | 100.0       | 100.0 | 100.0 |
| Timing B   |            |               |      |       |                |      |       |              |       |       |             |       |       |
| Maritime   | 90.0       | 90.0          | 90.0 | 90.0  | 90.0           | 90.0 | 95.0  | 95.0         | 95.0  | 95.0  | 95.0        | 95.0  |       |
| North East   | 6.5        | 65.9          | 57.5 | 80.0  | 73.2           | 68.8 | 82.0  | 83.6         | 77.0  | 92.0  | 71.9        | 65.0  | 76.3  |
| South East   | 8.0        | 72.5          | 70.0 | 75.0  | 84.5           | 80.0 | 88.0  | 92.8         | 90.0  | 96.0  | 81.3        | 75.0  | 85.0  |
| Orthogonal comparison GF-4021 with reference product | Mean       | 70.3          | 63.9 | 80.7  | 77.2           | 73.4 | 84.0  | 86.5         | 81.4  | 93.0  | 76.5        | 70.7  | 80.2  |
|  | Min        | 45.0          | 30.0 | 50.0  | 50.0           | 50.0 | 50.0  | 71.3         | 50.0  | 85.0  | 57.5        | 50.0  | 60.0  |
|  | Max        | 90.0          | 90.0 | 100.0 | 96.5           | 95.0 | 100.0 | 98.0         | 98.0  | 100.0 | 95.0        | 95.0  | 95.0  |

| EPPO Zone                            | Number of trials | Density/m² |          | GF-4021    |           |             |           |           |           | Belkar    |           |
|--------------------------------------|------------------|------------|----------|------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|
|                                      |                  |            |          | 0.125 l/ha |           | 0.1875 l/ha |           | 0.25 l/ha |           | 0.25 l/ha |           |
|                                      |                  | Mean       | Min&Max  | Mean       | Min&Max   | Mean        | Min&Max   | Mean      | Min&Max   | Mean      | Min&Max   |
| Timing A (at last autumn assessment) |                  |            |          |            |           |             |           |           |           |           |           |
| Maritime                             | 1                | 17.0       | -        | 10.0       | -         | 50.0        | -         | 100       | -         | 100       | -         |
| North-East                           | 5                | 8.1        | 4.0-17.0 | 60.5       | 36.3-81.3 | 70.5        | 43.8-91.3 | 79.9      | 62.5-98.0 | 73.1      | 41.3-98.0 |
| South-East                           | 2                | 8.5        | 6.0-11.0 | 76.8       | 67.8-85.8 | 87.8        | 84.0-91.5 | 95.4      | 92.5-98.3 | 87.8      | 81.8-93.8 |
| Timing B (at last autumn assessment) |                  |            |          |            |           |             |           |           |           |           |           |
| Maritime                             | 1                | 4.0        | -        | 90.0       | -         | 90.0        | -         | 95.0      | -         | 95.0      | -         |
| North-East                           | 4                | 6.5        | 4.0-10.0 | 65.9       | 45.0-86.3 | 73.2        | 50.0-96.5 | 83.6      | 71.3-98.0 | 71.9      | 57.5-85.0 |
| South-East                           | 1                | 8.0        | -        | 72.5       | -         | 84.5        | -         | 92.8      | -         | 81.3      | -         |

**Table 3.2.-19 Minimum effective dose. Efficacy of GF-4021 applied at timing A and B at proposed label rate 0.25 L/ha and at 50%, and 75% of the registration rate in WOSR at last autumn assessment against MATIN**

| EPPO Zone  | Density/m2 | GF-4021 0.125 |       |       | GF-4021 0.1875 |       |       | GF-4021 0.25 |       |       | Belkar 0.25 |       |       |
|--|------------|---------------|-------|-------|----------------|-------|-------|--------------|-------|-------|-------------|-------|-------|
|  |            | Means         | Min   | Max   | Means          | Min   | Max   | Means        | Min   | Max   | Means       | Min   | Max   |
| Timing A   |            |               |       |       |                |       |       |              |       |       |             |       |       |
| Maritime   | 9.0        | 73.3          | 67.6  | 75.7  | 83.2           | 78.9  | 86.9  | 92.8         | 90.7  | 94.6  | 80.0        | 74.0  | 83.0  |
| North-East   | 10.0       | 63.8          | 55.0  | 70.0  | 76.3           | 69.8  | 81.0  | 89.3         | 86.0  | 94.5  | 60.9        | 58.8  | 63.8  |
| South East   | 11.6       | 82.4          | 81.7  | 84.0  | 91.7           | 90.0  | 93.3  | 97.0         | 95.7  | 98.0  | 89.6        | 88.3  | 91.3  |
| Ortogonal comparison GF-4021 with reference prduct | Mean       | 81.7          | 73.8  | 86.6  | 89.1           | 86.3  | 91.4  | 95.4         | 93.3  | 97.5  | 74.7        | 67.5  | 81.8  |
|  | Min        | 48.8          | 20.0  | 60.0  | 42.5           | 30.0  | 50.0  | 68.8         | 60.0  | 85.0  | 47.5        | 0.0   | 60.0  |
|  | Max        | 97.8          | 96.0  | 100.0 | 100.0          | 100.0 | 100.0 | 100.0        | 100.0 | 100.0 | 97.0        | 95.0  | 100.0 |
| Timing B   |            |               |       |       |                |       |       |              |       |       |             |       |       |
| Maritime   | 29.4       | 88.8          | 88.1  | 89.4  | 94.0           | 92.3  | 95.6  | 98.6         | 98.0  | 98.8  | 83.3        | 78.8  | 86.5  |
| North East   | 14.1       | 68.8          | 61.3  | 73.1  | 78.0           | 72.4  | 83.0  | 91.5         | 87.4  | 94.3  | 75.4        | 69.3  | 82.9  |
| South East   | 7.0        | 72.5          | 70.0  | 75.0  | 85.0           | 80.0  | 90.0  | 95.3         | 90.0  | 98.0  | 87.5        | 85.0  | 90.0  |
| Ortogonal comparison GF-4021 with reference prduct | Mean       | 78.4          | 74.4  | 80.9  | 85.9           | 82.2  | 89.3  | 95.0         | 92.5  | 96.6  | 79.8        | 74.6  | 85.0  |
|  | Min        | 37.5          | 20.0  | 40.0  | 51.3           | 40.0  | 60.0  | 76.3         | 75.0  | 80.0  | 50.0        | 30.0  | 50.0  |
|  | Max        | 100.0         | 100.0 | 100.0 | 100.0          | 100.0 | 100.0 | 100.0        | 100.0 | 100.0 | 100.0       | 100.0 | 100.0 |

| EPPO Zone                            | Number of trials | Density/m² |           | GF-4021    |           |             |           |           |           | Belkar    |           |
|--------------------------------------|------------------|------------|-----------|------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|
|                                      |                  |            |           | 0.125 l/ha |           | 0.1875 l/ha |           | 0.25 l/ha |           | 0.25 l/ha |           |
|                                      |                  | Mean       | Min&Max   | Mean       | Min&Max   | Mean        | Min&Max   | Mean      | Min&Max   | Mean      | Min&Max   |
| Timing A (at last autumn assessment) |                  |            |           |            |           |             |           |           |           |           |           |
| Maritime                             | 11               | 9.0        | 5.0-167.0 | 73.3       | 80.0-97.8 | 83.2        | 85.0-100  | 92.8      | 88.8-100  | 80.0      | 47.5-     |
| North-East                           | 4                | 10.0       | 5.0-23.0  | 63.8       | 48.8-75.0 | 76.3        | 42.5-99.0 | 89.3      | 68.8-99.0 | 60.9      | 52.5-75.0 |
| South-East                           | 3                | 11.6       | 6.5-17.0  | 82.4       | 71.8-95.0 | 91.7        | 85.5-100  | 97.0      | 94.5-100  | 89.6      | 82.3-95.0 |
| Timing B (at last autumn assessment) |                  |            |           |            |           |             |           |           |           |           |           |
| Maritime                             | 8                | 29.4       | 6.0-96.0  | 88.8       | 70.0-100  | 94.0        | 80.0-100  | 98.6      | 90.0-100  | 83.3      | 50.0-100  |
| North-East                           | 8                | 14.1       | 6.0-39.0  | 68.8       | 37.5-85.8 | 78.0        | 51.3-99.0 | 91.5      | 76.3-99.0 | 75.4      | 53.8-90.0 |
| South-East                           | 1                | 7.0        | -         | 72.5       | -         | 85.0        | -         | 95.3      | -         | 87.5      | -         |

**Table 3.2.-19 Minimum effective dose. Efficacy of GF-4021 applied at timing A and B at proposed label rate 0.25 L/ha and at 50%, and 75% of the registration rate in WOSR at last autumn assessment against STEME**

| EPPO Zone   | Density/m2 | GF-4021 0.125 |      |      | GF-4021 0.1875 |      |       | GF-4021 0.25 |       |       | Belkar 0.25 |      |       |
|---|------------|---------------|------|------|----------------|------|-------|--------------|-------|-------|-------------|------|-------|
|   |            | Means         | Min  | Max  | Means          | Min  | Max   | Means        | Min   | Max   | Means       | Min  | Max   |
| Timing A  |            |               |      |      |                |      |       |              |       |       |             |      |       |
| Maritime  | 17.0       | 49.3          | 44.3 | 55.4 | 67.4           | 63.6 | 70.7  | 77.2         | 73.9  | 80.0  | 64.7        | 61.1 | 69.7  |
| North-East  | 14.1       | 55.0          | 52.0 | 58.3 | 65.3           | 61.5 | 69.8  | 74.5         | 67.7  | 78.7  | 47.2        | 45.2 | 50.2  |
| South East  | 8.8        | 65.0          | 60.0 | 70.0 | 71.9           | 62.5 | 80.0  | 81.3         | 80.0  | 85.0  | 71.3        | 62.5 | 75.0  |
| Orthogonal comparison GF-4021 with reference prduct | Mean       | 53.8          | 49.8 | 58.3 | 66.7           | 62.4 | 71.1  | 76.1         | 71.2  | 79.8  | 56.1        | 52.9 | 60.0  |
|   | Min        | 0.0           | 0.0  | 0.0  | 31.3           | 20.0 | 35.0  | 37.5         | 30.0  | 40.0  | 31.3        | 30.0 | 35.0  |
|   | Max        | 90.0          | 90.0 | 90.0 | 98.8           | 95.0 | 100.0 | 100.0        | 100.0 | 100.0 | 97.5        | 95.0 | 100.0 |
| Timing B  |            |               |      |      |                |      |       |              |       |       |             |      |       |
| Maritime  | 15.2       | 49.9          | 45.0 | 56.0 | 70.3           | 66.6 | 73.8  | 79.4         | 75.9  | 82.1  | 67.2        | 63.5 | 72.0  |
| North East  | 13.7       | 51.8          | 48.7 | 55.4 | 67.4           | 61.7 | 71.5  | 75.1         | 71.2  | 77.9  | 62.2        | 58.6 | 66.0  |
| South East  | 8.8        | 65.0          | 60.0 | 70.0 | 71.9           | 62.5 | 80.0  | 81.3         | 80.0  | 85.0  | 71.3        | 62.5 | 75.0  |
| Orthogonal comparison GF-4021 with reference prduct | Mean       | 53.8          | 49.9 | 58.4 | 67.9           | 63.7 | 72.3  | 77.1         | 72.2  | 80.7  | 57.5        | 54.3 | 61.4  |
|   | Min        | 0.0           | 0.0  | 0.0  | 31.3           | 20.0 | 35.0  | 37.5         | 30.0  | 40.0  | 31.3        | 30.0 | 35.0  |
|   | Max        | 90.0          | 90.0 | 90.0 | 98.8           | 95.0 | 100.0 | 100.0        | 100.0 | 100.0 | 97.5        | 95.0 | 100.0 |

| EPPO Zone                            | Number of trials | Density/m² |          | GF-4021    |           |             |           |           |           | Belkar    |           |
|--------------------------------------|------------------|------------|----------|------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|
|                                      |                  |            |          | 0.125 l/ha |           | 0.1875 l/ha |           | 0.25 l/ha |           | 0.25 l/ha |           |
|                                      |                  | Mean       | Min&Max  | Mean       | Min&Max   | Mean        | Min&Max   | Mean      | Min&Max   | Mean      | Min&Max   |
| Timing A (at last autumn assessment) |                  |            |          |            |           |             |           |           |           |           |           |
| Maritime                             | 7                | 17.0       | 7.0-41.0 | 49.3       | 0.0-86.5  | 67.4        | 45.0-87.8 | 77.2      | 50.0-97.0 | 64.7      | 48.8-90.3 |
| North-East                           | 10               | 14.1       | 6.0-37.0 | 55.0       | 0.0-88.8  | 65.3        | 31.3-90.0 | 74.5      | 37.5-98.0 | 47.2      | 31.3-70.0 |
| South-East                           | 2                | 8.8        | 7.5-10.0 | 65.0       | 40.0-90.0 | 71.9        | 45.0-98.8 | 81.3      | 62.5-100  | 71.3      | 45.0-97.5 |
| Timing B (at last autumn assessment) |                  |            |          |            |           |             |           |           |           |           |           |
| Maritime                             | 7                | 26.8       | 6.5-87.0 | 68.8       | 43.8-90.3 | 71.1        | 48.8-99.8 | 75.0      | 52.5-100  | 66.2      | 41.3-95.0 |
| North-East                           | 9                | 10.0       | 5.3-18.0 | 53.4       | 32.5-76.3 | 61.1        | 35.0-83.8 | 70.2      | 48.8-88.8 | 45.2      | 31.3-60.0 |
| South-East                           | 2                | 10.2       | 8.3-12.0 | 55.8       | 30.0-87.5 | 65.0        | 37.5-92.5 | 78.8      | 57.5-100  | 70.7      | 50.0-91.3 |

**Table 3.2.-19 Minimum effective dose. Efficacy of GF-4021 applied at timing A and B at proposed label rate 0.25 L/ha and at 50%, and 75% of the registration rate in WOSR at last autumn assessment against VIOAR**

| EPPO                                  | Density/m2 | GF-4021 0.125 |      |       | GF-4021 0.1875 |      |       | GF-4021 0.25 |       |       | Belkar 0.25 |      |       |
|---------------------------------------|------------|---------------|------|-------|----------------|------|-------|--------------|-------|-------|-------------|------|-------|
|                                       |            | Means         | Min  | Max   | Means          | Min  | Max   | Means        | Min   | Max   | Means       | Min  | Max   |
| Maritime                              | 24.8       | 60.2          | 52.1 | 67.5  | 74.4           | 70.2 | 78.3  | 83.4         | 80.0  | 85.8  | 61.6        | 53.3 | 70.6  |
| North-East                            | 38.6       | 64.7          | 60.9 | 68.2  | 73.3           | 69.5 | 76.4  | 84.7         | 80.3  | 88.1  | 46.4        | 40.3 | 52.5  |
| nal comparison GF-4021 with reference | Mean       | 62.3          | 56.3 | 67.8  | 73.9           | 69.9 | 77.3  | 84.0         | 80.1  | 86.9  | 54.3        | 47.1 | 62.0  |
|                                       | Min        | 20.0          | 20.0 | 20.0  | 37.5           | 30.0 | 40.0  | 60.0         | 50.0  | 64.0  | 27.5        | 10.0 | 30.0  |
|                                       | Max        | 83.8          | 80.0 | 100.0 | 95.8           | 90.0 | 100.0 | 99.3         | 98.0  | 100.0 | 81.3        | 78.0 | 97.0  |
| Maritime                              | 34.3       | 67.0          | 62.0 | 71.0  | 84.6           | 79.1 | 88.7  | 90.1         | 85.6  | 93.6  | 57.2        | 43.9 | 67.8  |
| North East                            | 34.3       | 67.0          | 62.0 | 71.0  | 84.6           | 79.1 | 88.7  | 90.1         | 85.6  | 93.6  | 57.2        | 43.9 | 67.8  |
| South East                            | 9.5        | 43.8          | 40.0 | 45.0  | 57.5           | 55.0 | 60.0  | 60.6         | 60.0  | 62.5  | 52.5        | 50.0 | 55.0  |
| nal comparison GF-4021 with reference | Mean       | 58.3          | 53.1 | 62.6  | 74.6           | 69.6 | 78.8  | 83.2         | 79.2  | 87.4  | 47.1        | 37.4 | 54.2  |
|                                       | Min        | 10.0          | 10.0 | 10.0  | 48.8           | 30.0 | 50.0  | 50.0         | 40.0  | 50.0  | 0.0         | 0.0  | 0.0   |
|                                       | Max        | 98.0          | 98.0 | 100.0 | 98.5           | 97.0 | 100.0 | 100.0        | 100.0 | 100.0 | 95.0        | 80.0 | 100.0 |

| EPPO Zone                            | Number of trials | Density/m <sup>2</sup> |           | GF-4021    |           |             |           |           |           | Belkar    |           |
|--------------------------------------|------------------|------------------------|-----------|------------|-----------|-------------|-----------|-----------|-----------|-----------|-----------|
|                                      |                  |                        |           | 0.125 l/ha |           | 0.1875 l/ha |           | 0.25 l/ha |           | 0.25 l/ha |           |
|                                      |                  | Mean                   | Min&Max   | Mean       | Min&Max   | Mean        | Min&Max   | Mean      | Min&Max   | Mean      | Min&Max   |
| Timing A (at last autumn assessment) |                  |                        |           |            |           |             |           |           |           |           |           |
| Maritime                             | 12               | 24.8                   | 5.0-41.0  | 60.2       | 20.0-83.8 | 74.4        | 50.0-95.8 | 83.4      | 60.0-99.3 | 61.6      | 40.0-81.3 |
| North-East                           | 11               | 38.6                   | 5.0-124.0 | 64.7       | 35.0-81.3 | 73.3        | 37.5-91.0 | 84.7      | 70.0-98.0 | 46.4      | 27.5-78.5 |
| Timing B (at last autumn assessment) |                  |                        |           |            |           |             |           |           |           |           |           |
| Maritime                             | 9                | 34.3                   | 5.0-88.5  | 67.0       | 10.0-98.0 | 84.6        | 48.8-98.5 | 90.1      | 60.0-100  | 57.2      | 10.0-95.0 |
| North-East                           | 8                | 42.3                   | 7.0-137.8 | 52.2       | 26.3-73.8 | 67.7        | 51.3-81.3 | 81.1      | 67.8-88.8 | 34.5      | 0.0-72.5  |
| South-East                           | 2                | 9.5                    | 7.0-12.0  | 43.8       | 40.0-47.5 | 57.5        | 50.0-65.0 | 60.7      | 50.0-71.3 | 52.5      | 40.0-65.0 |

### 3.2.2.3 Conclusion on ~~minimum~~ minimum effective dose

According to the presented results in chapter 3.2.2 dose rates of:

0.25 L/ha of GF-4021 applied at 2 to 9 leaves stage of the oil seed rape.

provided the optimum overall control of selected important weeds under a wide range of environmental conditions, and should be considered as effective against major weeds, for which activity of GF-4021 is claimed.

#### Comments of zRMS:

The Applicant has submitted a range of efficacy trials to determine the minimum effective dose for GF-4021 against weeds in winter oilseed rape. Because the tables with results were uneditable, the zRMS has included new corrected tables. The clear dose response between dose rates of 0,25 l/ha (1N), 0,187 l/ha (0,75N) and 0,125 l/ha (0,5N) was recorded in all three EPPO climatic zones on important weed species (CAPBP, CHEAL, MATIN, STEME, VIOAR).

In the Maritime EPPPO zone, GF-4021 at dose rate of 0,25 l/ha achieved significant higher effectiveness compare to lower dose rates. The visible effect was noted in case of MATIN (in timing A), STEME (in timing A) and VIOAR (in timing A). The dose reduction from 0,25 l/ha to 0,187 l/ha caused a decrease of weed control by >9%.

In the North-East EPPO zone, GF-4021 at dose rate of 0,25 l/ha achieved higher effectiveness compare to lower dose rates. The visible effect was noted in case of CAPBP (either in timing A and B), CHEAL (in timing B), MATIN and VIOAR (either in timing A and B). The dose reduction from 0,25 l/ha to 0,187 l/ha caused a decrease of weed control by >10%.

In the South-East EPPO zone, GF-4021 at dose rate of 0,25 l/ha achieved higher effectiveness compare to lower dose rates. The visible effect was noted in case of STEME (either in timing A and B) and CHEAL (in timing A). The dose reduction from 0,25 l/ha to 0,187 l/ha caused a decrease of weed control by >7%.

The dose rate of 0,125 l/ha was insufficient to control of most target weeds in all EPPO zones.

Taking into account the results from all EPPO zones, the dose rate of 0,25 l/ha can be considered the minimum effective dose to control of major dicotyledonous weed species in winter oilseed rape.

### 3.2.3 Efficacy tests (KCP 6.2)

A total of ~~77~~ 71 efficacy trials were carried out in 2017 to 2020 to study the efficacy of GF-4021 applied at 0.25 L/ha for the control of weeds in winter oilseed rape. 56 out of this ~~77~~ 71 trials were included also in the minimum effective section.

To ensure the efficacy within the range of BBCH stages indicated in the GAP table (from BBCH 12 to BBCH 19 and applied before the 31<sup>st</sup> December), the early application (timing A) was done in most of the cases within a BBCH 12-14, while the late application (timing B) was done within BBCH 14-19. In all cases the application was done before the end of December.

Trials were carried out in the Maritime EPPO zone: Czech Republic (~~9~~ 8), Germany (~~20~~ 19), United Kingdom (11), North-East EPPO zone: Poland (~~24~~ 22), South- East EPPO Zone: Hungary (~~5~~ 3) and Romania (8).

#### 3.2.3.1 Material and Methods

Details about material and methods of these trials is presented in Table 3.2.36.

In some of the trials there are two applications timinigs- timing A where the target was BBCH 12-14, and timing B with targeted growth stage of the oil seed rape BBCH 14-16, but there also trials with application up to BBCH 19, and trials with only single application (BBCH 12-14 or above BBCH 14)- so to properly present minimum effective dose and the performance of the product during entire application period, the data will be presented in two different timings:

- Timing A – Early application: BBCH 12-14

- Timing B – Late application: BBCH 14-19
- As the bridging of formulations have been demonstrated, henceforth the product GF-4021 is considered as a unique formulation (GF-4021, GF-3788 or GF-4021 GPS1).

Results are presented for Maritime (CZ, DE and UK), South-East (HU and RO) and North- East (PL)

All the tests were carried out according to GEP, and followed the EPPO guidelines.

Trials were carried out during 3 seasons 2017/2018, 2019/2019, 2019/2020. For this section data are presented only for the last autumn assessment.

### Experimental details

All the trials were carried out by officially recognised organisations in accordance with the Principles of Good Experimental Practice (GEP). These trials were performed followed EPPO guidelines.

Main characteristics are summarised in Table 3.2-20 Details per trial (trial location, crop cultivar, experimental design, number of blocks, plot size and application(s)) are presented in Annex 1.

**Table 3.2 -20: Details on trial methodology - Efficacy trials**

|                               |                        |   |
|-------------------------------|------------------------|---|
| <b>Guidelines</b>             | General guidelines     | PP1/135(2)/(3)/(4): “Phytotoxicity assessment”.<br>PP1/152(4): “Design and analysis of efficacy evaluation trials”.<br>PP1/181(4): “Conduct and reporting of efficacy evaluation trials, including good experimental practice”.   |
|                               | Specific guidelines    | PP1/49 (3): “Weeds in brassica oil crops”.  |
| <b>Experimental design</b>    | Plot design            | Randomized Complete Block (RACOB).  |
|                               | Plot size              | Plot area: from 12 to 36 m².  |
|                               | Number of replications | 4 replications.   |
| <b>Crop</b>                   | Number of trials       | BRSNW: 71 trials.   |
|                               | Varieties              | Absolut, Aquilla, Architect, Avatar, Barbados, Bellevue, Bender, Bonanza, Butterfly, Chrobry, CL Imperial, CL Veritas, Dariot, Django, DK Exception, DK Exquisite, DK Ex-storm, DK Sequel, Elgar, Exception, Exodus, Harry, Hattrick, Hybridrok, Ivan 106, Konkret, LG Anniston, LG Arsenal, Mercury, Phoenix CL, Pioneer, PX113, PR40W20, PT225, PT264-I831, PX113Rohan, Sidney, Sy Florida, SY Ilona, Visby |
| <b>Application</b>            | Application timing     | BBCH 12-19<br>*for this summary spilted by BBCH 12-14; BBCH 14-19   |
|                               | Number of applications | 1 application.  |
|                               | Spray volumes          | 150-300 L/ha.   |
| <b>Assessment</b>             | Assessment dates       | Last autumn assessment  |
|                               | Assessment types       | number of weeds/m², % control weeds (visual).   |
| <b>Results &amp; Analysis</b> | Statistical analysis   | ANOVA - Newman - Keuls test (5%), Levene’s test, Tukey’s test.  |

About efficacy trials with post-emergence application, growth stage and density of weeds were recorded at application date (number of plants/m² or cover percentage) for each species at least in the untreated plots. The growth stages were indicated according to BBCH scale.

Details about material and methods of these trials is presented in Table 3.2.21.

In some of the trials there are two applications timinigs – timing A where the target was BBCH 12-14, and timing B with targeted growth stage of the oil seed rape BBCH 14-16, but there also trials with application up to BBCH 19, and trials with only single application (BBCH 12-14 or above BBCH 14) – so to properly present minimum effective dose and the performance of the product during entire application period, the data will be presented in two different timings:

- Timing A – Early application: BBCH 12-14
- Timing B – Late application: BBCH 14-19

—As the bridging of formulations have been demonstrated, henceforth the product GF 4021 is considered as a unique formulation (GF 4021, GF 3788 or GF 4021 GPS1).

Results are presented for Maritime (CZ, DE and UK), South East (HU and RO) and North East (PL)

All the tests were carried out according to GEP, and followed the EPPO guidelines.

Trials were carried out during 3 seasons 2017/2018, 2019/2019, 2019/2020. For this section data are presented only for the last autumn assessment.

### Experimental details

All the trials were carried out by officially recognised organisations in accordance with the Principles of Good Experimental Practice (GEP). These trials were performed followed EPPO guidelines.

Main characteristics are summarised in Table 3.2 36 Details per trial (trial location, crop cultivar, experimental design, number of blocks, plot size and application(s)) are presented in Annex 1.

**Table 3.2 21: Details on trial methodology – Efficacy trials**

|                     |                        |  |
|---------------------|------------------------|--|
| Guidelines          | General guidelines     | PP1/135(2)/(3)/(4): “Phytotoxicity assessment”.<br>PP1/152(4): “Design and analysis of efficacy evaluation trials”.<br>PP1/181(4): “Conduct and reporting of efficacy evaluation trials, including good experimental practice”.  |
|                     | Specific guidelines    | PP1/49 (3): “Weeds in brassica oil crops”.   |
| Experimental design | Plot design            | Randomized Complete Block (RACOB).   |
|                     | Plot size              | Plot area: from 12 to 36 m <sup>2</sup> .  |
|                     | Number of replications | 4 replications.  |
| Crop                | Number of trials       | BRSNW: 77 trials.  |
|                     | Varieties              | Absolut, Aquilla, Architect, Avatar, Barbados, Bellevue, Bender, Bonanza, Butterfly, Chrobry, CL Imperial, CL Veritas, Dariot, Django, DK Exception, DK Exquisite, DK Ex-storm, DK Sequel, Elgar, Exception, Exodus, Harry, Hattrick, Hybridrok, Ivan 106, Konkret, LG Anniston, LG Arsenal, Mercury, Phoenix CL, Pioneer, PX113, PR40W20, PT225, PT264 I831, Rohan, Sidney, Sy Florida, SY Ilona, Visby |
| Application         | Application timing     | BBCH 12-19<br>*for this summary spilted by BBCH 12-14; BBCH 14-19  |
|                     | Number of applications | 1 application.   |
|                     | Spray volumes          | 150-300 L/ha.  |
| Assessment          | Assessment dates       | Last assessment  |
|                     | Assessment types       | number of weeds/m <sup>2</sup> , % control weeds (visual).   |
| Results & Analysis  | Statistical analysis   | ANOVA – Newman – Keuls test (5%), Levene’s test, Tukey’s test.   |

About efficacy trials with post-emergence application, growth stage and density of weeds were recorded at application date (number of plants/m<sup>2</sup> or cover percentage) for each species at least in the untreated plots. The growth stages were indicated according to BBCH scale. Density (plants/m<sup>2</sup>) are available in all the efficacy tables. Only trials with weeds density of  $\geq 4$  plants/m<sup>2</sup> were included to the general calculation.

### 3.2.3.2 Efficacy trials results

The following tables (after below conclusions) present the summaries of efficacy trial results for all weeds (Table 3.2- 22a- Table 3.2.-22b - Table 3.2.23)

#### Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against *Capsella bursa-pastoris* CAPBP

#### EARLY APPLICATION



Data to support the label claims to control CAPBP in winter oil seed rape were generated from ~~11~~ 10 trials in Maritime EPPO Zone (~~4~~ 3 trials), North-East EPPO Zone (6 trials) and South East EPPO Zone (1 trial) with average density of 23 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control ~~87.6~~ 86.9 % - which is susceptible level (S) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control CAPBP in winter oil seed rape were generated from ~~9~~ 8 trials in Maritime EPPO Zone (~~4~~ 3 trials), North-East EPPO Zone (4 trials) and South East EPPO Zone (1 trial) with average density of 27 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control ~~85.2~~ 84.4 % - which is susceptible level (S) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against Centaurea cyanus CENCY**

#### EARLY APPLICATION

Data to support the label claims to control CENCY in winter oil seed rape were generated from 18 trials in Maritime EPPO Zone (5 trials), North-East EPPO Zone (12 trials) and South East EPPO Zone (1 trial) with average density of 21 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 96.8 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control CENCY in winter oil seed rape were generated from 17 trials in Maritime EPPO Zone (5 trials), North-East EPPO Zone (11 trials) and South East EPPO Zone (1 trial) with average density of 18 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 95.1 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against Chenopodium album CHEAL**

#### EARLY APPLICATION

Data to support the label claims to control CHEAL in winter oil seed rape were generated from 13 trials in Maritime EPPO Zone (3 trials), North-East EPPO Zone (7 trials) and South East EPPO Zone (3 trials) with average density of 9 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 91.2 % - which is susceptible level (S) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control CHEAL in winter oil seed rape were generated from 9 trials in Maritime EPPO Zone (3 trials), North-East EPPO Zone (4 trials) and South East EPPO Zone (1 trial) with average density of 7 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017-2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 85.7 % - which is moderately susceptible level (MS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against *Descurainia sophia* DESSO**

#### EARLY APPLICATION

Data to support the label claims to control DESSO in winter oil seed rape were generated from 5 trials in Maritime EPPO Zone (4 trials), and South East EPPO Zone (1 trial) with average density of 13 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 93.0 % - which is susceptible level (S) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control DESSO in winter oil seed rape were generated from 3 trials in Maritime EPPO Zone (2 trials) and South East EPPO Zone (1) with average density of 11 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 93.8 % - which is susceptible level (S) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provided average control 95.7%.

#### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against *Fumaria officinalis* FUMOF**

#### EARLY APPLICATION

Data to support the label claims to control FUMOF in winter oil seed rape were generated from 5 trials in Maritime EPPO Zone (5 trials) with average density of 18 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017 - 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 98.5 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provided the average 92% control.

#### LATER APPLICATION

Data to support the label claims to control FUMOF in winter oil seed rape were generated from 5 trials in Maritime EPPO Zone (4 trials) and North- East EPPO Zone (1 trial) with average density of 18 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 96.2 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provided average control 92.9%.

### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against *Gallium aparine* GALAP**

#### **EARLY APPLICATION**

Data to support the label claims to control GALAP in winter oil seed rape were generated from 9 trials in Maritime EPPO Zone (2 trials), North-East EPPO Zone (4 trials) and South East EPPO Zone (3 trials) with average density of 8 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### **Results**

Single application of GF-4021 at 0.25 L pr/ha provides average control 96.8 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### **LATER APPLICATION**

Data to support the label claims to control GALAP in winter oil seed rape were generated from 6 trials in North-East EPPO Zone (4 trials) and South East EPPO Zone (2 trials) with average density of 7 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### **Results**

Single application of GF-4021 at 0.25 L pr/ha provides average control 94.7 % - which is susceptible level (S) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against *Geranium dissectum* GERDI**

#### **EARLY APPLICATION**

Data to support the label claims to control GERDI in winter oil seed rape were generated from 4 trials in Maritime EPPO Zone (3 trials) South East EPPO Zone (1 trial) with average density of 17 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### **Results**

Single application of GF-4021 at 0.25 L pr/ha provides average control 94.7 % - which is susceptible level (S) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### **LATER APPLICATION**

Data to support the label claims to control GERDI in winter oil seed rape were generated from 2 trials in Maritime EPPO Zone (2 trials) with average density of 39 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### **Results**

Single application of GF-4021 at 0.25 L pr/ha provides average control 94.9 93.9 % - which is susceptible level (S) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provides average 97.9 90.1% control.

### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against *Geranium molle* GERMO**

#### **EARLY APPLICATION**

Data to support the label claims to control GERDI in winter oil seed rape were generated from 3 2 trials in Maritime EPPO Zone (3 trials) with average density of 12 16.5 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020 2018.

#### **Results**

Single application of GF-4021 at 0.25 L pr/ha provides average control 98.8 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provides average control 99.3%.

#### LATER APPLICATION

Data to support the label claims to control GERMO in winter oil seed rape were generated from 3 trials in Maritime EPPO Zone (3 trials) with average density of 14 37.5 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017–2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 97.8 95.0 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provides average 98.4 97.3% control.

#### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against Geranium pusillum GERPU**

#### EARLY APPLICATION

Data to support the label claims to control GERPU in winter oil seed rape were generated from 13 trials in Maritime EPPO Zone (5 trials) and North-East EPPO Zone (8 trials) with average density of 31 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 86.3 94.6 % - which is susceptible level (S) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provides average control 89.3 88.8%.

#### LATER APPLICATION

Data to support the label claims to control GERPU in winter oil seed rape were generated from 10 trials in Maritime EPPO Zone (4 trials) and North-East EPPO (6 trials) with average density of 40 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 95.4 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provides average 92.6 92.7% control.

#### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against Lamium purpureum LAMPU**

#### EARLY APPLICATION

Data to support the label claims to control LAMPU in winter oil seed rape were generated from 6 trials in Maritime EPPO Zone (2 trials) and North-East EPPO Zone (3 trials) and South-East EPPO Zone (1 trial) with average density of 10 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 96.3 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control LAMPU in winter oil seed rape were generated from 7 trials in Maritime EPPO Zone (2 trials) and North-East EPPO Zone (4 trials) and South-East EPPO Zone (1 trial) with average density of 9 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

## Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 94.5 % - which is susceptible level (S) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provides average 93.2% control.

### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against Matricaria chamomilla MATCH**

#### EARLY APPLICATION

Data to support the label claims to control MATCH in winter oil seed rape were generated from ~~6~~ 5 trials in Maritime EPPO Zone (~~3~~ 2 trials) and North-East EPPO Zone (3 trials) with average density of 12 weeds per m2. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control ~~96.4~~ 96.0 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control MATCH in winter oil seed rape were generated from ~~5~~ 4 trials in Maritime EPPO Zone (~~2~~ 1 trial) and North-East EPPO (3 trials) with average density of 12 weeds per m2. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control ~~91.5~~ 89.7 % - which is susceptible level (S) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provides average ~~82.9~~ 78.8% control.

### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against Matricaria inodora MATIN**

#### EARLY APPLICATION

Data to support the label claims to control MATIN in winter oil seed rape were generated from 18 trials in Maritime EPPO Zone (11 trials), North-East EPPO Zone (4 trials) and South East EPPO Zone (3 trials) with average density of 25 weeds per m2. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 95.6 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control MATIN in winter oil seed rape were generated from 17 trials in Maritime EPPO Zone (8 trials), North-East EPPO Zone (8 trials) and South East EPPO Zone (1 trial) with average density of 21 weeds per m2. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 95.0 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against Myosotis arvensis MYOAR**

#### EARLY APPLICATION

Data to support the label claims to control MYOAR in winter oil seed rape were generated from 3 trials in Maritime EPPO Zone (1 trial) and North-East EPPO Zone (2 trials) with average density of 11 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 99.9 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control MYOAR in winter oil seed rape were generated from 3 trials in Maritime EPPO Zone (1 trial) and North-East EPPO Zone (2 trials) with average density of 16 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 98.3 % - which is highly susceptible level (HS) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provides average control 99.2%.

### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against Papaver rhoeas PAPRH**

#### EARLY APPLICATION

Data to support the label claims to control PARPH in winter oil seed rape were generated from 19 trials in Maritime EPPO Zone (7 trials), North-East EPPO Zone (10 trials) and South East EPPO Zone (2 trials) with average density of 35 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### Results.

Single application of GF-4021 at 0.25 L pr/ha provides average control 98.3 76.2 98.3 % - which is highly moderately highly susceptible level (HM HS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control PAPRH n winter oil seed rape were generated from 20 trials in Maritime EPPO Zone (8 trials) , North-East EPPO Zone (10 trials) and South East EPPO Zone (2 trials) with average density of 44 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 93.2 77.1 93.2 % - which is highly moderately susceptible level (HM S) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against Stellaria media STEME**

#### EARLY APPLICATION

Data to support the label claims to control STEME in winter oil seed rape were generated from 19 trials in Maritime EPPO Zone (7 trials), North-East EPPO Zone (10 trials) and South East EPPO Zone (2 trials) with average density of 14.6 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

#### Results.

Single application of GF-4021 at 0.25 L pr/ha provides average control 76.2 % - which is moderately susceptible level (MS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control STEME n winter oil seed rape were generated from 20 19 trials in Maritime EPPO Zone (8-7 trials), North-East EPPO Zone (10 trials) and South East EPPO Zone (2 trials) with average density of 16.1 weeds per m2. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 74.9 77.1 % - which is moderately susceptible level (MS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against *Thlaspi arvense* THLAR**

#### EARLY APPLICATION

Data to support the label claims to control THLAR in winter oil seed rape were generated from 7 6 trials in Maritime EPPO Zone (5 4 trials), North-East EPPO Zone (2 trials) with average density of 8 weeds per m2. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 85.6 % - which is susceptible level (S) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control THLAR n winter oil seed rape were generated from 5 4 trials in Maritime EPPO Zone (4 3 trials), North-East EPPO Zone (1 trials) with average density of 9 weeds per m2. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 63.2 56.6 % - which is ~~partially susceptible~~ moderately tolerant level (PS MT) of weed susceptibility.

Efficacy of the main reference product Belkar (GF-3447) at the application timings evaluated provides average control 66.5%.

#### **Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against *Veronica persica* VERPE**

#### EARLY APPLICATION

Data to support the label claims to control VERPE in winter oil seed rape were generated from 13 trials in Maritime EPPO Zone (7 trials), North-East EPPO Zone (5 trials) and South-East EPPO Zone (1 trial) with average density of 25 weeds per m2. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 79.3 % - which is moderately susceptible level (MS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

#### LATER APPLICATION

Data to support the label claims to control VERPE n winter oil seed rape were generated from 9 trials in Maritime EPPO Zone (5 trials), North-East EPPO Zone (3 trials) and South- EPPO Zone (1 trial) with average density of 24 weeds per m2. The trials presented have been conducted in period 2017- 2020.

##### Results

Single application of GF-4021 at 0.25 L pr/ha provides average control 63.1 % - which is ~~partially susceptible~~ moderately tolerant level (PS MT) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

**Efficacy of GF-4021 at 0.25 L pr/ha at single appl. against *Viola arvensis* VIOAR**

**EARLY APPLICATION**

Data to support the label claims to control VIOAR in winter oil seed rape were generated from 23 trials in Maritime EPPO Zone (12 trials) and North-East EPPO Zone (11 trials) with average density of 31 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

**Results.**

Single application of GF-4021 at 0.25 L pr/ha provides average control 84.0 % - which is moderately susceptible level (MS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.

**LATER APPLICATION**

Data to support the label claims to control VIOAR in winter oil seed rape were generated from 19 trials in Maritime EPPO Zone (9 trials), North-East EPPO Zone (8 trials) and South- EPPO Zone (2 trials) with average density of 35 weeds per m<sup>2</sup>. The trials presented have been conducted in period 2017- 2020.

**Results**

Single application of GF-4021 at 0.25 L pr/ha provides average control 83.2 % - which is moderately susceptible level (MS) of weed susceptibility.

Efficacy of GF-4021 was superior to the main reference product Belkar (GF-3447) at the application timings evaluated.



**Table 3.2 – 22a: Weed control of GF-4021 at timing A– Early application at 0.25 L/ha in winter oilseed rape**

| Weeds | Administrative Zone,<br>All EPPO Zones | Number of<br>trials | Density/m2         | GF-4021 0.25                     |                                  |                      | Belkar 0.25                      |                                  |                                  |
|-------|--|---------------------|--------------------|----------------------------------|----------------------------------|----------------------|----------------------------------|----------------------------------|----------------------------------|
|       |  |                     |                    | Means                            | Min                              | Max                  | Means                            | Min                              | Max                              |
| CAPBP | Central                                | <del>11</del> 10    | 23                 | <del>87.6</del> 86.9             | <del>83.9</del> 51.3             | <del>90.1</del> 100  | <del>82.1</del> 81.0             | <del>77.8</del> 53.8             | <del>85.8</del> 100              |
| CENCY | Central                                | 18                  | 21                 | 96.8                             | <del>96.2</del> 80.0             | <del>97.0</del> 100  | <del>92.2</del> 92.3             | <del>89.9</del> 72.5             | <del>94.2</del> 100              |
| CHEAL | Central                                | 13                  | 9                  | 91.2                             | <del>88.2</del> 62.5             | <del>92.8</del> 100  | 87.6                             | <del>85.1</del> 41.3             | <del>90.2</del> 100              |
| DESSO | Central                                | 5                   | 13                 | 93.0                             | <del>88.4</del> 72.5             | <del>95.8</del> 100  | 91.0                             | <del>89.0</del> 70.0             | <del>92.6</del> 99.3             |
| FUMOF | Central                                | 5                   | 18                 | 98.5                             | <del>98.0</del> 95.0             | <del>99.0</del> 100  | 92.0                             | <del>91.0</del> 65.0             | <del>93.0</del> 100              |
| GALAP | Central                                | 9                   | 8                  | 96.8                             | <del>95.2</del> 88.8             | <del>97.4</del> 100  | 94.4                             | <del>92.7</del> 83.8             | <del>95.6</del> 100              |
| GERDI | Central                                | 4                   | 17                 | 94.7                             | <del>93.5</del> 83.8             | <del>95.8</del> 100  | 89.4                             | <del>87.2</del> 63.8             | <del>92.0</del> 100              |
| GERMO | Central                                | <del>3</del> 2      | <del>12</del> 16.5 | 98.8                             | <del>96.0</del> 97.5             | 100.0                | <del>99.3</del>                  | <del>98.3</del>                  | 100.0                            |
| GERPU | Central                                | 13                  | 31                 | <del>86.2</del> 94.6             | <del>87.3</del> 71.3             | <del>88.3</del> 100  | <del>89.3</del> 88.8             | <del>90.2</del> 40.0             | <del>91.3</del> 100              |
| LAMPU | Central                                | 6                   | 10                 | 96.3                             | <del>95.8</del> 77.5             | <del>96.7</del> 100  | 95.4                             | <del>95.0</del> 72.5             | <del>95.8</del> 100              |
| MATCH | Central                                | <del>6</del> 5      | 12                 | <del>95.2</del> 96.0             | <del>94.3</del> 91.3             | <del>96.2</del> 100  | <del>93.3</del> 73.5             | <del>92.4</del> 47.5             | <del>94.6</del> 96.8             |
| MATIN | Central                                | 18                  | 25                 | 95.6                             | <del>93.6</del> 68.8             | <del>97.6</del> 100  | 75.4                             | <del>68.1</del> 47.5             | <del>82.6</del> 97.0             |
| MYOAR | Central                                | 3                   | 11                 | 99.9                             | <del>99.0</del> 99.8             | 100.0                | 99.0                             | <del>90.0</del> 97.0             | 100.0                            |
| PAPRH | Central                                | <del>18</del> 19    | 35                 | <del>98.3</del> 76.2 <b>98.3</b> | <del>97.2</del> 37.5 <b>96.1</b> | <del>99.0</del> 100  | <del>94.2</del> 56.2 <b>94.2</b> | <del>90.8</del> 31.2 <b>84.1</b> | <del>97.1</del> 97.8 <b>99.7</b> |
| STEME | Central                                | 19                  | 15                 | 76.2                             | <del>71.3</del> 37.5             | <del>79.8</del> 100  | 56.2                             | <del>52.9</del> 31.3             | <del>60.0</del> 97.5             |
| THLAR | Central                                | <del>7</del> 6      | 8                  | 85.6                             | <del>84.3</del> 61.3             | <del>87.1</del> 100  | 79.4                             | <del>77.1</del> 56.3             | <del>81.4</del> 100              |
| VERPE | Central                                | 13                  | 25                 | 79.3                             | <del>73.8</del> 41.8             | <del>84.5</del> 94.5 | 67.3                             | <del>61.9</del> 41.8             | <del>72.3</del> 90.0             |
| VIOAR | Central                                | 23                  | 31                 | 84.0                             | <del>80.1</del> 60.0             | <del>86.9</del> 99.3 | 54.3                             | <del>47.1</del> 27.5             | <del>62.0</del> 81.3             |

**Table 3.2 – 22b: Weed control of GF-4021 at timing B– Later application at 0.25 L/ha in winter oilseed rape**

| Weeds | Administrative Zone,<br>All Eppo Zones | Number of<br>trials | Density/m2 | GF-4021 0.25   |                |           | Belkar 0.25    |                |                |
|-------|--|---------------------|------------|----------------|----------------|-----------|----------------|----------------|----------------|
|       |  |                     |            | Means          | Min            | Max       | Means          | Min            | Max            |
| CAPBP | Central                                | 9 8                 | 27         | 85.2 84.4      | 81.4 70.0      | 88.0 100  | 77.3 78.7      | 73.1 56.3      | 80.8 100       |
| CENCY | Central                                | 17                  | 18         | 95.1           | 93.6 80.0      | 96.4 100  | 91.5           | 89.6 67.5      | 93.5 100       |
| CHEAL | Central                                | 9 8                 | 9          | 93.8 84.5      | 91.0 53.8      | 95.7 100  | 95.7 73.8      | 95.7 51.3      | 95.7 95.0      |
| DESSO | Central                                | 3                   | 11         | 91.4 93.8      | 88.7           | 93.3 100  | 88.2 95.7      | 86.1 88.0      | 90.0 100       |
| FUMOF | Central                                | 5                   | 18         | 96.2           | 95.0 87.5      | 97.0 100  | 92.9           | 91.8 77.5      | 94.0 100       |
| GALAP | Central                                | 6                   | 7          | 94.7           | 93.3 88.8      | 95.5 100  | 90.3           | 87.8 81.3      | 91.7 100       |
| GERDI | Central                                | 2                   | 39         | 94.9 93.9      | 95.9 88.8      | 96.9 99.0 | 97.9 90.1      | 98.9 81.3      | 99.9           |
| GERMO | Central                                | 3 1                 | 14 37.5    | 97.8 95.0      | 80.0           | 100.0     | 98.4 97.3      | 95.0           | 100.0          |
| GERPU | Central                                | 10                  | 40         | 95.4           | 93.4 67.8      | 97.2 100  | 92.6 92.7      | 88.2 68.3      | 96.4 100       |
| LAMPU | Central                                | 7                   | 9          | 94.5           | 93.6 63.8      | 95.0 100  | 93.2           | 91.9 55.0      | 94.3 100       |
| MATCH | Central                                | 5 4                 | 12         | 95.4 89.7      | 91.2 78.3      | 96.9 99.0 | 94.5 78.8      | 92.4 57.5      | 96.4 99.0      |
| MATIN | Central                                | 17                  | 21         | 91.8 95.0      | 88.7 76.3      | 93.7 100  | 85.5 79.8      | 82.1 50.0      | 88.2 100       |
| MYOAR | Central                                | 3                   | 16         | 98.3           | 90.0 95.0      | 100.0     | 99.2           | 90.0 97.5      | 100.0          |
| PAPRH | Central                                | 13 20               | 44         | 93.2 77.1 93.2 | 88.9 37.5 88.0 | 95.6 100  | 91.3 57.6 91.3 | 86.8 31.2 84.4 | 94.9 97.8 94.9 |
| STEME | Central                                | 20 19               | 14         | 77.1           | 72.2 37.5      | 80.7 100  | 57.6           | 54.3 31.3      | 61.4 97.5      |
| THLAR | Central                                | 5 4                 | 9          | 63.2 56.6      | 62.0 40.0      | 64.6 80.0 | 66.5 61.3      | 64.0 40.0      | 68.0 90.0      |
| VERPE | Central                                | 9                   | 24         | 63.1           | 60.6 46.3      | 67.2 85.0 | 59.9           | 55.6 40.0      | 63.9 80.0      |
| VIOAR | Central                                | 19                  | 35         | 83.2           | 79.2 50.0      | 87.4 100  | 47.1           | 37.4 0.0       | 54.2 95.0      |

**Table 3.2 – 23: Weed control of GF-4021 at 0.25 L/ha in winter oilseed rape, means table by EPPO Zone**

| CAPBP  |       | Number of trials | Density/m2 | GF-4021 0.25 |           |           | Belkar 0.25 |           |  |
|--|-------|------------------|------------|--------------|-----------|-----------|-------------|-----------|--|
| EPPO Zone  | Means |                  |            | Min          | Max       | Means     | Min         | Max       |  |
|  |       |                  |            |              |           |           |             |           |  |
| Timing A   |       |                  |            |              |           |           |             |           |  |
| Maritime   | 3     | 13.1 16.7        | 88.5 86.3  | 83.8 67.5    | 90.8 98.0 | 87.8 86.1 | 83.8 67.5   | 89.8 95.8 |  |
| North East   | 6     | 14.3             | 87.1       | 85.0 51.3    | 89.2 100  | 79.0      | 74.2 53.8   | 84.2 100  |  |
| South East   | 1     | 114.0            | 87.5       | 78.0         | 93.0      | 78.0      | 76.0        | 80.0      |  |
| Orthogonal comparison GF-4021 with reference product | 10    | Mean             | 87.7 86.9  | 84.0         | 90.1      | 82.3 81.0 | 78.0        | 86.0      |  |
|  |       | Min              | 51.3       | 50.0         | 55.0      | 53.8      | 30.0        | 60.0      |  |
|  |       | Max              | 100.0      | 100.0        | 100.0     | 100.0     | 100.0       | 100.0     |  |
| Timing B   |       |                  |            |              |           |           |             |           |  |
| Maritime   | 3     | 11.1 14.3        | 83.0 80.0  | 78.8 75.0    | 86.3 87.5 | 70.6 72.1 | 65.0 62.5   | 75.0 77.5 |  |
| North East   | 4     | 19.0             | 86.3       | 82.5 70.0    | 88.8 100  | 83.4      | 80.0 56.3   | 86.3 100  |  |
| South East   | 1     | 125.0            | 90.0       | 88.0         | 92.0      | 80.0      | 78.0        | 82.0      |  |
| Orthogonal comparison GF-4021 with reference product | 8     | Mean             | 85.1 84.4  | 81.3         | 87.9      | 77.3 78.7 | 73.0        | 80.8      |  |
|  |       | Min              | 70.0       | 60.0         | 75.0      | 56.3      | 50.0        | 65.0      |  |
|  |       | Max              | 100.0      | 100.0        | 100.0     | 100.0     | 100.0       | 100.0     |  |
| CENCY  |       |                  |            |              |           |           |             |           |  |
| Timing A   |       |                  |            |              |           |           |             |           |  |
| Maritime   | 5     | 16.2             | 96.0       | 96.0 80.0    | 96.0 100  | 93.8      | 91.0 77.5   | 96.0 100  |  |
| North East   | 12    | 25.0             | 97.7       | 96.8 88.8    | 98.0 100  | 92.6      | 90.3 72.5   | 94.7 100  |  |
| South East   | 1     | 5.0              | 90.0       | 90.0         | 90.0      | 80.0      | 80.0        | 80.0      |  |
| Orthogonal comparison GF-4021 with reference product | 18    | Mean             | 96.8       | 96.2         | 97.0      | 92.3      | 90.0        | 94.3      |  |
|  |       | Min              | 80.0       | 80.0         | 80.0      | 72.5      | 70.0        | 75.0      |  |
|  |       | Max              | 100.0      | 100.0        | 100.0     | 100.0     | 100.0       | 100.0     |  |
| Timing B   |       |                  |            |              |           |           |             |           |  |
| Maritime   | 5     | 16.0             | 99.5       | 99.0 97.5    | 100.0     | 97.9 97.7 | 97.0 90.0   | 98.0 100  |  |
| North East   | 11    | 40.0 19.4        | 93.2       | 91.2 80.0    | 94.9 100  | 88.9      | 86.3 67.5   | 91.7 100  |  |

|  |    |  |           |           |           |           |           |           |
|--|----|--|-----------|-----------|-----------|-----------|-----------|-----------|
| South East   | 1  | 18.0   | 94.0      | 94.0      | 94.6      | 90.0      | 90.0      | 90.0      |
| Orthogonal comparison GF-4021 with reference product | 17 | Mean   | 91.3 95.1 | 89.6      | 92.4      | 86.1 91.5 | 84.0      | 88.1      |
|  |    | Min  | 70.0 80.0 | 60.0      | 75.0      | 56.3 67.5 | 50.0      | 65.0      |
|  |    | Max  | 100.0     | 100.0     | 100.0     | 100.0     | 100.0     | 100.0     |
| CHEAL  |    |  |           |           |           |           |           |           |
| Timing A   |    |  |           |           |           |           |           |           |
| Maritime   | 3  | 9.2  | 99.7      | 99.7 99.0 | 99.7 100  | 99.7      | 99.7 99.0 | 99.7 100  |
| North East   | 7  | 7.4  | 85.1      | 79.7 62.5 | 87.6 99.0 | 80.6      | 76.3 41.3 | 84.7 100  |
| South East   | 3  | 11.9   | 96.9      | 96.0 92.5 | 98.0 100  | 91.8      | 91.0 81.8 | 93.3 100  |
| Orthogonal comparison GF-4021 with reference product | 13 | Mean   | 91.2      | 88.2      | 92.8      | 87.6      | 85.1      | 90.2      |
|  |    | Min  | 62.5      | 60.0      | 65.0      | 41.3      | 40.0      | 45.0      |
|  |    | Max  | 100.0     | 100.0     | 100.0     | 100.0     | 100.0     | 100.0     |
| Timing B   |    |  |           |           |           |           |           |           |
| Maritime   | 3  | 6.9 8.7  | 85.8 82.9 | 83.8 53.8 | 88.5 100  | 78.4 73.8 | 58.8 51.3 | 87.3 95.0 |
| North East   | 4  | 6.5  | 83.6      | 77.0 71.3 | 92.0 98.0 | 71.9      | 65.0 57.5 | 76.3 85.0 |
| South East   | 1  | 8.0  | 92.8      | 90.0      | 96.0      | 81.3      | 75.0      | 85.0      |
| Orthogonal comparison GF-4021 with reference product | 8  | Mean   | 85.6 84.5 | 81.4      | 90.9      | 75.8 73.8 | 63.3      | 82.1      |
|  |    | Min  | 53.8      | 50.0      | 60.0      | 51.3      | 0.0       | 55.0      |
|  |    | Max  | 100.0     | 100.0     | 100.0     | 95.0      | 95.0      | 100.0     |
| DESSO  |    |  |           |           |           |           |           |           |
| Timing A   |    |  |           |           |           |           |           |           |
| Maritime   | 4  | 11.9 15.1 pla/m <sup>2</sup> and 3.75% of cover (in 1 trial) | 98.1      | 95.5 94.5 | 99.8 100  | 96.3      | 93.8 92.8 | 98.3 99.3 |
| South East   | 1  | 19.0   | 72.5      | 60.0      | 80.0      | 70.0      | 70.0      | 70.0      |
| Orthogonal comparison GF-4021 with reference product | 5  | Mean   | 93.0      | 88.4      | 95.8      | 91.0      | 89.0      | 92.6      |
|  |    | Min  | 72.5      | 60.0      | 80.0      | 70.0      | 70.0      | 70.0      |
|  |    | Max  | 100.0     | 100.0     | 100.0     | 99.3      | 99.0      | 100.0     |
| Timing B   |    |  |           |           |           |           |           |           |
| Maritime   | 2  | 10.5   | 96.9 96.7 | 92.5 93.3 | 99.5 100  | 99.5      | 99.5 99.0 | 99.5 100  |

|  |   |                    |       |                      |                     |                      |                      |                      |
|--|---|--------------------|-------|----------------------|---------------------|----------------------|----------------------|----------------------|
| South East   | 1 | 12.0               | 88.0  | <del>88.0</del>      | <del>88.0</del>     | 88.0                 | <del>88.0</del>      | <del>88.0</del>      |
| Orthogonal comparison GF-4021 with reference product | 3 | Mean               | 93.8  | <del>91.0</del>      | <del>95.7</del>     | 95.7                 | <del>95.7</del>      | <del>95.7</del>      |
|  |   | Min                | 88.0  | <del>85.0</del>      | <del>88.0</del>     | 88.0                 | <del>88.0</del>      | <del>88.0</del>      |
|  |   | Max                | 100.0 | <del>100.0</del>     | <del>100.0</del>    | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>FUMOF</b>   |   |                    |       |                      |                     |                      |                      |                      |
| <b>Timing A</b>                                      |   |                    |       |                      |                     |                      |                      |                      |
| Maritime   | 5 | 18.0               | 98.5  | <del>98.0</del> 95.0 | <del>99.0</del> 100 | 92.0                 | <del>91.0</del> 65.0 | <del>93.0</del> 100  |
| Orthogonal comparison GF-4021 with reference product | 5 | Mean               | 98.5  | <del>98.0</del>      | <del>99.0</del>     | 92.0                 | <del>91.0</del>      | <del>93.0</del>      |
|  |   | Min                | 95.0  | <del>95.0</del>      | <del>95.0</del>     | 65.0                 | <del>60.0</del>      | <del>70.0</del>      |
|  |   | Max                | 100.0 | <del>100.0</del>     | <del>100.0</del>    | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>Timing B</b>                                      |   |                    |       |                      |                     |                      |                      |                      |
| Maritime   | 4 | 21.0               | 98.3  | <del>97.5</del> 93.3 | <del>98.8</del> 100 | 96.8                 | <del>96.0</del> 87.8 | <del>97.5</del> 100  |
| North East   | 1 | 5.0                | 87.5  | <del>85.0</del>      | <del>90.0</del>     | 77.5                 | <del>75.0</del>      | <del>80.0</del>      |
| Orthogonal comparison GF-4021 with reference product | 5 | Mean               | 96.2  | <del>95.0</del>      | <del>97.0</del>     | 92.9                 | <del>91.8</del>      | <del>94.0</del>      |
|  |   | Min                | 87.5  | <del>85.0</del>      | <del>90.0</del>     | 77.5                 | <del>75.0</del>      | <del>80.0</del>      |
|  |   | Max                | 100.0 | <del>100.0</del>     | <del>100.0</del>    | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>GALAP</b>   |   |                    |       |                      |                     |                      |                      |                      |
| <b>Timing A</b>                                      |   |                    |       |                      |                     |                      |                      |                      |
| Maritime   | 2 | 7.5                | 99.6  | <del>99.0</del> 99.3 | 100.0               | 100.0                | 100.0                | 100.0                |
| North East   | 4 | <del>6.0</del> 6.1 | 94.1  | <del>92.3</del> 88.8 | <del>94.8</del> 100 | 91.6                 | <del>88.5</del> 83.8 | <del>93.5</del> 99.0 |
| South East   | 3 | 9.8                | 98.4  | <del>96.7</del> 95.3 | <del>99.3</del> 100 | 94.3                 | <del>93.3</del> 90.0 | <del>95.3</del> 100  |
| Orthogonal comparison GF-4021 with reference product | 9 | Mean               | 96.8  | <del>95.2</del>      | <del>97.4</del>     | 94.4                 | <del>92.7</del>      | <del>95.6</del>      |
|  |   | Min                | 88.8  | <del>85.0</del>      | <del>90.0</del>     | 83.8                 | <del>80.0</del>      | <del>85.0</del>      |
|  |   | Max                | 100.0 | <del>100.0</del>     | <del>100.0</del>    | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>Timing B</b>                                      |   |                    |       |                      |                     |                      |                      |                      |
| North East   | 4 | 6.5                | 92.8  | <del>91.3</del> 88.8 | <del>93.8</del> 100 | <del>90.1</del> 90.2 | 86.8                 | 91.3                 |
| South East   | 2 | 7.0                | 98.4  | <del>97.5</del> 96.8 | <del>99.0</del> 100 | 90.6                 | <del>90.0</del> 81.3 | <del>92.5</del> 100  |
| Orthogonal comparison GF-4021 with reference product | 6 | Mean               | 94.7  | <del>93.3</del>      | <del>95.5</del>     | 90.3                 | <del>87.8</del>      | <del>91.7</del>      |
|  |   | Min                | 88.8  | <del>85.0</del>      | <del>90.0</del>     | 81.3                 | <del>80.0</del>      | <del>85.0</del>      |

|  |    |                      |                      |                      |                      |                      |                      |                      |
|--|----|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>GERDI</b>   |    |                      |                      |                      |                      |                      |                      |                      |
| <b>Timing A</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 3  | 19.5                 | 92.9                 | <del>91.3</del> 83.8 | <del>94.3</del> 99.0 | 85.8                 | <del>83.0</del> 63.8 | <del>89.3</del> 99.0 |
| South East   | 1  | 8.3                  | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| Orthogonal comparison GF-4021 with reference product | 4  | <b>Mean</b>          | 94.7                 | <del>93.5</del>      | <del>95.8</del>      | 89.4                 | <del>87.3</del>      | <del>92.0</del>      |
|  |    | <b>Min</b>           | 83.8                 | <del>80.0</del>      | <del>85.0</del>      | 63.8                 | <del>60.0</del>      | <del>70.0</del>      |
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>Timing B</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 2  | 39.0                 | 93.9                 | <del>92.0</del> 88.8 | <del>94.5</del> 99.0 | 90.1                 | <del>89.5</del> 81.3 | <del>92.0</del> 99.0 |
| Orthogonal comparison GF-4021 with reference product | 2  | <b>Mean</b>          | <del>94.9</del> 93.9 | <del>95.9</del>      | <del>96.9</del>      | <del>97.9</del> 90.1 | <del>98.9</del>      | <del>99.9</del>      |
|  |    | <b>Min</b>           | 88.8                 | <del>85.0</del>      | <del>90.0</del>      | 81.3                 | <del>80.0</del>      | <del>85.0</del>      |
|  |    | <b>Max</b>           | 99.0                 | <del>99.0</del>      | <del>99.0</del>      | 99.0                 | <del>99.0</del>      | <del>99.0</del>      |
| <b>GERMO</b>   |    |                      |                      |                      |                      |                      |                      |                      |
| <b>Timing A</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 2  | <del>12.0</del> 16.5 | 98.8                 | <del>96.0</del> 97.5 | 100.0                | 99.3                 | <del>98.3</del> 98.0 | 100.0                |
| Orthogonal comparison GF-4021 with reference product | 2  | <b>Mean</b>          | <del>98.9</del> 98.8 | <del>96.0</del>      | <del>100.0</del>     | 99.3                 | <del>98.3</del>      | <del>100.0</del>     |
|  |    | <b>Min</b>           | <del>90.0</del> 97.5 | <del>90.0</del>      | <del>100.0</del>     | 98.0                 | <del>95.0</del>      | <del>100.0</del>     |
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>Timing B</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 1  | <del>13.6</del> 37.5 | <del>97.8</del> 95.0 | <del>92.0</del>      | <del>99.7</del>      | <del>98.5</del> 97.3 | <del>97.0</del>      | <del>99.7</del>      |
| Orthogonal comparison GF-4021 with reference product | 1  | <b>Mean</b>          | <del>97.8</del> 95.0 | <del>80.0</del>      | <del>100.0</del>     | <del>98.4</del> 97.3 | <del>95.0</del>      | <del>100.0</del>     |
|  |    | <b>Min</b>           | <del>95.0</del>      | <del>80.0</del>      | <del>99.0</del>      | <del>97.3</del>      | <del>95.0</del>      | <del>99.0</del>      |
|  |    | <b>Max</b>           | <del>99.3</del>      | <del>99.0</del>      | <del>100.0</del>     | <del>99.3</del>      | <del>99.0</del>      | <del>100.0</del>     |
| <b>GERPU</b>   |    |                      |                      |                      |                      |                      |                      |                      |
| <b>Timing A</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 5  | 61.2                 | 93.7                 | <del>91.0</del> 71.3 | <del>95.8</del> 100  | 92.0                 | <del>89.4</del> 63.8 | <del>94.0</del> 100  |
| North East   | 8  | <del>11.8</del> 11.9 | 96.9                 | <del>93.0</del> 82.5 | <del>96.1</del> 100  | 86.8                 | <del>81.8</del> 40.0 | <del>89.0</del> 99.0 |
|  | 13 | <b>Mean</b>          | <del>86.3</del> 94.6 | <del>87.3</del>      | <del>88.3</del>      | <del>89.3</del> 88.8 | <del>90.3</del>      | <del>91.3</del>      |

|  |    |                      |                      |                      |                      |                      |                      |                      |
|--|----|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
| Orthogonal comparison GF-4021 with reference product |    | <b>Min</b>           | 71.3                 | <del>60.0</del>      | <del>80.0</del>      | 40.0                 | <del>40.0</del>      | <del>40.0</del>      |
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>Timing B</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 4  | 76.5                 | 100.0                | 100.0                | 100.0                | 99.9                 | <del>99.5</del> 99.8 | 100.0                |
| North East   | 6  | <del>15.5</del> 15.6 | 92.4                 | <del>89.0</del> 67.8 | <del>95.3</del> 100  | 87.8                 | <del>80.7</del> 68.3 | <del>94.0</del> 100  |
| Orthogonal comparison GF-4021 with reference product | 10 | <b>Mean</b>          | 95.4                 | <del>93.4</del>      | <del>97.2</del>      | <del>93.6</del> 92.7 | <del>88.2</del>      | <del>96.4</del>      |
|  |    | <b>Min</b>           | 67.8                 | <del>50.0</del>      | <del>83.0</del>      | 68.3                 | <del>55.0</del>      | <del>80.0</del>      |
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>LAMPU</b>   |    |                      |                      |                      |                      |                      |                      |                      |
| <b>Timing A</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 2  | 13.0                 | 100.0                | 100.0                | 100.0                | 100.0                | 100.0                | 100.0                |
| North-East   | 3  | 5.4                  | 92.5                 | <del>91.7</del> 77.5 | <del>93.3</del> 100  | 90.8                 | <del>90.0</del> 72.5 | <del>91.7</del> 100  |
| South East   | 1  | 15.0                 | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| Orthogonal comparison GF-4021 with reference product | 6  | <b>Mean</b>          | 96.3                 | <del>95.8</del>      | <del>96.7</del>      | 95.4                 | <del>95.0</del>      | <del>95.8</del>      |
|  |    | <b>Min</b>           | 77.5                 | <del>75.0</del>      | <del>80.5</del>      | 72.5                 | <del>70.0</del>      | <del>75.0</del>      |
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>Timing B</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 2  | 13                   | 100.0                | 100.0                | 100.0                | 100.0                | 100.0                | 100.0                |
| North East   | 4  | 5.5                  | 90.3                 | <del>88.8</del> 63.8 | <del>91.3</del> 100  | 88.1                 | <del>85.8</del> 55.0 | <del>90.0</del> 100  |
| South East   | 1  | 16.3                 | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| Orthogonal comparison GF-4021 with reference product | 7  | <b>Mean</b>          | 94.5                 | <del>93.6</del>      | <del>95.0</del>      | 93.2                 | <del>91.9</del>      | <del>94.3</del>      |
|  |    | <b>Min</b>           | 63.8                 | <del>60.0</del>      | <del>65.0</del>      | 55.0                 | <del>50.0</del>      | <del>60.0</del>      |
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>MATCH</b>   |    |                      |                      |                      |                      |                      |                      |                      |
| <b>Timing A</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 2  | <del>12.7</del> 17.5 | 98.9                 | <del>98.0</del> 97.8 | <del>99.7</del> 100  | <del>64.3</del> 51.9 | <del>43.3</del> 47.5 | <del>86.0</del> 56.3 |
| North East   | 3  | 10.6                 | 94.0                 | <del>93.0</del> 91.3 | <del>96.3</del> 99.0 | 87.8                 | <del>83.3</del> 80.0 | <del>91.0</del> 96.8 |
| Orthogonal comparison GF-4021 with reference product | 5  | <b>Mean</b>          | <del>96.4</del> 96.0 | <del>95.5</del>      | <del>98.0</del>      | <del>76.0</del> 73.5 | <del>63.3</del>      | <del>88.7</del>      |
|  |    | <b>Min</b>           | 91.3                 | <del>90.0</del>      | <del>95.0</del>      | 47.5                 | <del>0.0</del>       | <del>65.0</del>      |

|  |    |                      |                      |                      |                      |                      |                      |                      |
|--|----|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 96.8                 | <del>90.0</del>      | <del>100.0</del>     |
| <b>Timing B</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 1  | <del>11.6</del> 20.0 | <del>95.8</del> 92.5 | <del>94.5</del>      | <del>97.0</del>      | <del>78.3</del> 57.5 | <del>74.5</del>      | <del>82.0</del>      |
| North East   | 3  | <del>12.6</del> 12.7 | 88.7                 | <del>86.3</del> 78.3 | <del>89.7</del> 99.0 | 85.9                 | <del>84.7</del> 75.0 | <del>86.3</del> 99.0 |
| Orthogonal comparison GF-4021 with reference product | 4  | <b>Mean</b>          | <del>91.5</del> 89.7 | <del>89.6</del>      | <del>92.6</del>      | <del>82.9</del> 78.8 | <del>80.6</del>      | <del>84.6</del>      |
|  |    | <b>Min</b>           | 78.3                 | <del>75.0</del>      | <del>80.0</del>      | 57.5                 | <del>50.0</del>      | <del>65.0</del>      |
|  |    | <b>Max</b>           | 99.0                 | <del>99.0</del>      | <del>99.0</del>      | 99.0                 | <del>99.0</del>      | <del>99.0</del>      |
| <b>MATIN</b>   |    |                      |                      |                      |                      |                      |                      |                      |
| <b>Timing A</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 11 | 34.8                 | 97.5                 | <del>95.7</del> 88.8 | <del>98.6</del> 100  | 76.7                 | <del>65.0</del> 47.5 | <del>87.0</del> 97.0 |
| North-East   | 4  | 10.0                 | 89.3                 | <del>86.0</del> 68.8 | <del>94.5</del> 99.0 | 60.9                 | <del>58.8</del> 52.5 | <del>63.8</del> 75.0 |
| South East   | 3  | 11.6                 | 97.0                 | <del>95.7</del> 94.5 | <del>98.0</del> 100  | 89.6                 | <del>88.3</del> 82.3 | <del>91.3</del> 95.0 |
| Orthogonal comparison GF-4021 with reference product | 18 | <b>Mean</b>          | 95.6                 | <del>93.6</del>      | <del>97.6</del>      | 75.4                 | <del>68.1</del>      | <del>82.6</del>      |
|  |    | <b>Min</b>           | 68.8                 | <del>60.0</del>      | <del>85.0</del>      | 47.5                 | <del>0.0</del>       | <del>60.0</del>      |
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 97.0                 | <del>95.0</del>      | <del>100.0</del>     |
| <b>Timing B</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 8  | 29.4                 | 98.6                 | <del>98.0</del> 90.0 | <del>98.8</del> 100  | 83.8                 | <del>78.8</del> 50.0 | <del>86.5</del> 100  |
| North East   | 8  | 14.1                 | 91.5                 | <del>87.4</del> 76.3 | <del>94.3</del> 99.0 | 75.3                 | <del>69.3</del> 53.8 | <del>82.0</del> 90.0 |
| South East   | 1  | 7.0                  | 95.3                 | <del>90.0</del>      | <del>98.0</del>      | 87.5                 | <del>85.0</del>      | <del>90.0</del>      |
| Orthogonal comparison GF-4021 with reference product | 17 | <b>Mean</b>          | 95.0                 | <del>92.5</del>      | <del>96.6</del>      | 79.8                 | <del>74.6</del>      | <del>85.0</del>      |
|  |    | <b>Min</b>           | 76.3                 | <del>75.0</del>      | <del>80.0</del>      | 50.0                 | <del>30.0</del>      | <del>50.0</del>      |
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| <b>MYOAR</b>   |    |                      |                      |                      |                      |                      |                      |                      |
| <b>Timing A</b>                                      |    |                      |                      |                      |                      |                      |                      |                      |
| Maritime   | 1  | 9.0                  | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |
| North East   | 2  | 11.5                 | 99.9                 | <del>99.5</del> 99.8 | 100.0                | 98.5                 | <del>95.0</del> 97.0 | 100.0                |
| Orthogonal comparison GF-4021 with reference product | 3  | <b>Mean</b>          | 99.9                 | <del>99.0</del>      | <del>100.0</del>     | 99.0                 | <del>90.0</del>      | <del>100.0</del>     |
|  |    | <b>Min</b>           | 99.8                 | <del>99.0</del>      | <del>100.0</del>     | 97.0                 | <del>90.0</del>      | <del>100.0</del>     |
|  |    | <b>Max</b>           | 100.0                | <del>100.0</del>     | <del>100.0</del>     | 100.0                | <del>100.0</del>     | <del>100.0</del>     |



|  |    |                |                |                |                |                 |                |                |  |
|--|----|----------------|----------------|----------------|----------------|-----------------|----------------|----------------|--|
| <b>Timing B</b>                                      |    |                |                |                |                |                 |                |                |  |
| Maritime   | 1  | 9.0            | 100.0          | 100.0          | 100.0          | 100.0           | 100.0          | 100.0          |  |
| North East   | 2  | 18.7           | 97.5           | 95.0           | 100.0          | 98.8            | 95.0 97.5      | 100.0          |  |
| Orthogonal comparison GF-4021 with reference product | 3  | <b>Mean</b>    | 98.3           | 90.0           | 100.0          | 99.2            | 90.0           | 100.0          |  |
|  |    | <b>Min</b>     | 95.0           | 90.0           | 100.0          | 97.5            | 90.0           | 100.0          |  |
|  |    | <b>Max</b>     | 100.0          | 100.0          | 100.0          | 100.0           | 100.0          | 100.0          |  |
| <b>PAPRH</b>   |    |                |                |                |                |                 |                |                |  |
| <b>Timing A</b>                                      |    |                |                |                |                |                 |                |                |  |
| Maritime   | 7  | 27.3 17.0 27.3 | 97.6 77.2 97.6 | 97.1 50.0 97.1 | 98.1 97.0 98.1 | 96.1 64.7 96.1  | 93.5 48.8 93.5 | 98.4 90.3 98.4 |  |
| North-East   | 10 | 26.0 14.1 26.0 | 98.3 74.5 98.3 | 96.1 37.5 96.1 | 99.6 98.0 99.6 | 89.9 47.2 89.9  | 84.1 31.3 84.1 | 94.6 64.3 94.6 |  |
| South East   | 2  | 74.1 8.8 76.5  | 100.0 81.3 100 | 100.0 62.5 100 | 100.0          | 99.5 71.3 99.4  | 99.0 45.0 99.0 | 99.7 97.5 99.7 |  |
| Orthogonal comparison GF-4021 with reference product | 19 | <b>Mean</b>    | 98.3 76.2 98.3 | 97.2           | 99.0           | 94.2 56.2 94.2  | 90.8           | 97.1           |  |
|  |    | <b>Min</b>     | 82.5 37.5 96.1 | 80.0           | 85.0           | 73.8 31.3 84.1  | 60.0           | 85.0           |  |
|  |    | <b>Max</b>     | 100.0          | 100.0          | 100.0          | 100.0 97.5 99.7 | 100.0          | 100.0          |  |
| <b>Timing B</b>                                      |    |                |                |                |                |                 |                |                |  |
| Maritime   | 8  | 45.5 15.2 45.5 | 91.9 79.4 91.9 | 88.0 50.0 88.0 | 94.0 97.0 94.0 | 89.6 67.2 89.6  | 84.4 48.8 84.4 | 94.4 90.3 94.4 |  |
| North East   | 10 | 38.4 14.1 38.4 | 93.3 74.5 93.3 | 88.1 37.5 88.1 | 96.3 98.0 96.3 | 91.6 47.2 91.6  | 87.0 31.3 87.0 | 94.9 64.3 94.9 |  |
| South East   | 2  | 75.0 8.8 72.3  | 99.0 81.3 99.5 | 99.0 62.5 99.0 | 99.0 100       | 98.0 71.3 98.0  | 98.0 45.0 98.0 | 98.0 97.5 98.0 |  |
| Orthogonal comparison GF-4021 with reference product | 20 | <b>Mean</b>    | 93.2 77.1 93.2 | 88.9           | 95.6           | 91.3 57.6 91.3  | 86.8           | 94.9           |  |
|  |    | <b>Min</b>     | 75.0 37.5 88.0 | 70.0           | 80.0           | 73.8 31.3 84.4  | 60.0           | 80.0           |  |
|  |    | <b>Max</b>     | 100.0          | 100.0          | 100.0          | 100.0 97.5 94.9 | 100.0          | 100.0          |  |
| <b>STEME</b>   |    |                |                |                |                |                 |                |                |  |
| <b>Timing A</b>                                      |    |                |                |                |                |                 |                |                |  |
| Maritime   | 7  | 17.0           | 77.2           | 73.9 50.0      | 80.0 97.0      | 64.7            | 61.1 48.8      | 69.7 90.3      |  |
| North-East   | 10 | 14.1           | 74.5           | 67.7 37.5      | 78.7 98.0      | 47.2            | 45.2 31.3      | 50.2 70.0      |  |
| South East   | 2  | 8.8            | 81.3           | 80.0 62.5      | 85.0 100       | 71.3            | 62.5 45.0      | 75.0 97.5      |  |

|  |    |           |           |           |           |           |           |           |
|--|----|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Orthogonal comparison GF-4021 with reference product | 19 | Mean      | 76.2      | 71.3      | 79.8      | 56.2      | 52.9      | 60.0      |
|  |    | Min       | 37.5      | 30.0      | 40.0      | 31.3      | 30.0      | 35.0      |
|  |    | Max       | 100.0     | 100.0     | 100.0     | 97.5      | 95.0      | 100.0     |
| Timing B   |    |           |           |           |           |           |           |           |
| Maritime   | 7  | 23.6 17.0 | 78.8 77.2 | 75.0 50.0 | 82.0 97.0 | 68.1 64.7 | 66.4 48.8 | 70.6 90.3 |
| North East   | 10 | 10.0 14.1 | 70.2 74.5 | 63.3 37.5 | 78.7 98.0 | 45.1      | 38.3 31.3 | 54.1 70.0 |
| South East   | 2  | 10.1 8.8  | 78.8 81.3 | 75.0 62.5 | 80.0 100  | 70.6      | 70.0 45.0 | 72.5 97.5 |
| Orthogonal comparison GF-4021 with reference product | 19 | Mean      | 74.9 77.1 | 69.8      | 80.3      | 58.0 57.6 | 54.2      | 63.4      |
|  |    | Min       | 48.8 37.5 | 30.0      | 55.0      | 31.3      | 30.0      | 35.0      |
|  |    | Max       | 100.0     | 100.0     | 100.0     | 95.0 97.5 | 95.0      | 95.0      |
| THLAR  |    |           |           |           |           |           |           |           |
| Timing A   |    |           |           |           |           |           |           |           |
| Maritime   | 4  | 8.6 10.3  | 87.6 86.3 | 86.0 80.0 | 89.0 90.0 | 79.9 76.6 | 77.0 70.0 | 82.0 82.5 |
| North East   | 2  | 6.5       | 80.6      | 80.0 61.3 | 82.5 100  | 78.1      | 77.5 56.3 | 80.0 100  |
| Orthogonal comparison GF-4021 with reference product | 6  | Mean      | 85.6      | 84.3      | 87.1      | 79.4      | 77.1      | 81.4      |
|  |    | Min       | 61.3      | 60.0      | 65.0      | 56.3      | 55.0      | 60.0      |
|  |    | Max       | 100.0     | 100.0     | 100.0     | 97.5 100  | 95.0      | 100.0     |
| Timing B   |    |           |           |           |           |           |           |           |
| Maritime   | 3  | 9.2 11.3  | 67.4 60.0 | 66.3 40.0 | 68.3 80.0 | 71.3 65.8 | 68.8 40.0 | 72.5 90.0 |
| North East   | 1  | 6.0       | 46.3      | 45.0      | 50.0      | 47.5      | 45.0      | 50.0      |
| Orthogonal comparison GF-4021 with reference product | 4  | Mean      | 63.2 56.6 | 62.0      | 64.6      | 66.5 61.3 | 64.0      | 68.0      |
|  |    | Min       | 40.0      | 40.0      | 40.0      | 40.0      | 40.0      | 40.0      |
|  |    | Max       | 89.5 80.0 | 85.0      | 93.0      | 90.0      | 90.0      | 90.0      |
| VERPE  |    |           |           |           |           |           |           |           |
| Timing A   |    |           |           |           |           |           |           |           |
| Maritime   | 7  | 25.0 25.6 | 73.3      | 68.6 41.8 | 78.6 85.0 | 64.7      | 60.0 41.8 | 69.3 90.0 |
| North-East   | 5  | 25.4      | 85.2      | 78.0 69.5 | 90.6 94.5 | 72.8      | 66.0 55.0 | 79.0 82.5 |
| South East   | 1  | 17.0      | 91.3      | 90.0      | 95.0      | 58.8      | 55.0      | 60.0      |
|  | 13 | Mean      | 79.3      | 73.8      | 84.5      | 67.3      | 61.9      | 72.3      |

|  |    |             |       |                      |                      |      |                      |                      |
|--|----|-------------|-------|----------------------|----------------------|------|----------------------|----------------------|
| Orthogonal comparison GF-4021 with reference product |    | <b>Min</b>  | 41.8  | <del>40.0</del>      | <del>45.0</del>      | 41.8 | <del>35.0</del>      | <del>50.0</del>      |
|  |    | <b>Max</b>  | 94.5  | <del>90.0</del>      | <del>100.0</del>     | 90.0 | <del>90.0</del>      | <del>90.0</del>      |
| <b>Timing B</b>                                      |    |             |       |                      |                      |      |                      |                      |
| Maritime   | 5  | 30.0        | 61.5  | <del>60.0</del> 50.0 | <del>64.0</del> 75.0 | 62.3 | <del>60.0</del> 40.0 | <del>66.0</del> 80.0 |
| North East   | 3  | 14.6        | 58.6  | <del>53.3</del> 46.3 | <del>66.7</del> 76.3 | 59.2 | 50.0                 | 65.0                 |
| South East   | 1  | 18.25       | 85.0  | <del>85.0</del>      | <del>85.0</del>      | 50.0 | <del>50.0</del>      | <del>50.0</del>      |
| Orthogonal comparison GF-4021 with reference product | 9  | <b>Mean</b> | 63.1  | <del>60.6</del>      | <del>67.2</del>      | 59.9 | <del>55.6</del>      | <del>63.9</del>      |
|  |    | <b>Min</b>  | 46.3  | <del>40.0</del>      | <del>50.0</del>      | 40.0 | <del>40.0</del>      | <del>40.0</del>      |
|  |    | <b>Max</b>  | 85.0  | <del>85.0</del>      | <del>90.0</del>      | 80.0 | <del>80.0</del>      | <del>80.0</del>      |
| <b>VIOAR</b>   |    |             |       |                      |                      |      |                      |                      |
| <b>Timing A</b>                                      |    |             |       |                      |                      |      |                      |                      |
| Maritime   | 12 | 24.8        | 83.4  | <del>80.0</del> 60.0 | <del>85.8</del> 99.3 | 61.6 | <del>53.3</del> 40.0 | <del>70.6</del> 81.3 |
| North-East   | 11 | 38.6        | 84.7  | <del>80.3</del> 70.0 | <del>88.1</del> 98.0 | 46.4 | <del>40.3</del> 27.5 | <del>52.5</del> 78.5 |
| Orthogonal comparison GF-4021 with reference product | 23 | <b>Mean</b> | 84.0  | <del>80.1</del>      | <del>86.9</del>      | 54.3 | <del>47.1</del>      | <del>62.0</del>      |
|  |    | <b>Min</b>  | 60.0  | <del>50.0</del>      | <del>64.0</del>      | 27.5 | <del>10.0</del>      | <del>30.0</del>      |
|  |    | <b>Max</b>  | 99.3  | <del>98.0</del>      | <del>100.0</del>     | 81.3 | <del>78.0</del>      | <del>97.0</del>      |
| <b>Timing B</b>                                      |    |             |       |                      |                      |      |                      |                      |
| Maritime   | 9  | 34.3        | 90.1  | <del>85.6</del> 60.0 | <del>93.6</del> 100  | 57.2 | <del>43.9</del> 10.0 | <del>67.8</del> 95.0 |
| North East   | 8  | 42.3        | 81.1  | <del>76.9</del> 67.8 | <del>86.6</del> 88.8 | 34.5 | <del>26.9</del> 0.0  | <del>38.8</del> 72.5 |
| South East   | 2  | 9.5         | 60.6  | <del>60.0</del> 50.0 | <del>62.5</del> 71.3 | 52.5 | <del>50.0</del> 40.0 | <del>55.0</del> 65.0 |
| Orthogonal comparison GF-4021 with reference product | 19 | <b>Mean</b> | 83.2  | <del>79.2</del>      | <del>87.4</del>      | 47.1 | <del>37.4</del>      | <del>54.2</del>      |
|  |    | <b>Min</b>  | 50.0  | <del>40.0</del>      | <del>50.0</del>      | 0.0  | <del>0.0</del>       | <del>0.0</del>       |
|  |    | <b>Max</b>  | 100.0 | <del>100.0</del>     | <del>100.0</del>     | 95.0 | <del>80.0</del>      | <del>100.0</del>     |

### 3.2.3.3 Conclusion on efficacy on GF-4021

In summary, GF-4021 both with an early or late application at the dose of 0.25 L/ha provided a very good control on weeds present in winter oilseed rape. When applied at 0.25 L/ha, the test product gave a weed protection, globally, equivalent or better to the reference standard BELKAR® applied at the rate 0.25 L/ha.

The efficacy spectrum of GF-4021 applied at 0.25 L/ha on winter oilseed rape is represented in the table bellow (Table 3.2-24), using the scale according to SANCO/10055/2014 Rev.4. For some weeds there are slight differences in the efficacy levels if we compare early and later application timing, however taking in to consideration means from all trials we would like to propose below split. Second table present split according to Polish regulations (Table 3.2-25)

**Table 3.2 -24: Efficacy spectrum of GF-4021 applied 0.25 L/ha**

| Percentage efficacy | Efficacy level | Weed sensitivity            |
|---------------------|----------------|-----------------------------|
| 95 to 100%          | Very good      | Highly susceptible (HS)     |
| 85 to 94%           | Good           | Susceptible (S)             |
| 70 to 84%           | Moderate       | Moderately Susceptible (MS) |
| 50 to 69%           | Weak           | Partially Susceptible (PS)  |
| < 50%               | Insufficient   | Not susceptible (NS)        |

| Percentage efficacy | Efficacy level | Weed sensitivity            |
|---------------------|----------------|-----------------------------|
| 95-100%             | Very high      | Highly Susceptible (HS)     |
| 85-94.9%            | High           | Susceptible (S)             |
| 70-84.9%            | Moderate       | Moderately Susceptible (MS) |
| 50-69.9%            | Low            | Moderately Tolerant (MT)    |
| 0-49.9%             | Very low       | Tolerant (T)                |

| Susceptibility                          | 0,25 L pr/ha  |
|---|---|
| Highly Susceptible (HS)<br>(95-100%)    | <i>Centaurea cyanus</i> ,<br><i>Fumaria officinalis</i><br><i>Galium aparine</i><br><i>Geranium molle</i><br><i>Geranium pusillum</i><br><i>Lamium purpureum</i><br><i>Matricaria chamomilla</i> ,<br><i>Papaver rhoeas</i><br><i>Tripleurospermum perforatum</i><br><i>Myosotis arvensis</i> |
| Susceptible (S)<br>(85-94.9%)           | <i>Capsella bursa-pastori</i> ,<br><i>Chenopodium album</i><br><i>Descurainia sophia</i><br><i>Geranium dissectum</i><br><i>Matricaria chamomilla</i> ,<br><i>Myosotis arvensis</i>   |
| Moderately Susceptible (MS) (70- 84.9%) | <i>Stellaria media</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i><br><i>Papaver rhoeas</i>   |

**Table 3.2 -25: Efficacy spectrum of GF-4021 applied 0.25 L/ha – POLISH SENSITIVITY SCALE**

| Percentage efficacy | Weed sensitivity     |
|---------------------|----------------------|
| 85 to 100%          | Sensitive            |
| 70 to 84%           | Moderately sensitive |
| 50- 69%             | Moderately resistant |
| < 50%               | Resistant            |

| Percentage efficacy | Weed sensitivity     |
|---------------------|----------------------|
| 85-100%             | Sensitive            |
| 70-84.9%            | Moderately sensitive |
| 60-69.9%            | Moderately resistant |
| 0-59.9%             | Resistant            |

| Susceptibility                               | 0,25 L pr/ha  |
|--|---|
| Sensitive<br>(85-100%)                       | <i>Centaurea cyanus</i> ,<br><i>Fumaria officinalis</i><br><i>Galium aparine</i><br><i>Geranium molle</i><br><i>Geranium pusillum</i><br><i>Lamium purpureum</i><br><i>Matricaria chamomilla</i> ,<br><b><i>Papaver rhoeas</i></b><br><i>Tripleurospermum perforatum</i><br><i>Capsella bursa-pastori</i> ,<br><i>Chenopodium album</i><br><i>Descurainia sophia</i><br><i>Geranium dissectum</i><br><i>Myosotis arvensis</i> |
| Moderately Sensitive (70- 84.9%)             | <i>Stellaria media</i><br><i>Thlaspi arvense</i><br><i>Veronica persica</i><br><i>Viola arvensis</i><br><i>Papaver rhoeas</i>   |
| Moderately Tolerant resistant (44- 60-69.9%) | -   |
| Resistant (0-59.9%)                          | -   |

#### Comments of zRMS:

71 field efficacy trials have been conducted in the three EPPO climatic zones: Maritime, South-East and North-East. GF-4021 was tested at dose rate of 0,25 l/ha, once in growing season, in early (BBCH 12-14) or later application timing (BBCH 14-19). The cMSs (especially from the South-East zone) are asked to use of the trials from other EPPO climatic zones in case of weeds noted in the limited number of trials.

- A total of 38 efficacy trials were carried out in **the Maritime EPPO climatic zone** in the following countries: Czech Republic (8 trials), Germany (19 trials) and United Kingdom (11 trials). The classification of weed susceptibility for each weed species, which have been located in the Maritime zone is presented below.

| Target     | Crop                | No of trials | Efficacy of<br>FFA SC 508.8 G<br>0,24 l/ha<br><b>GF-4021</b><br><b>0,25 l/ha</b> | Susceptibility |
|------------|---------------------|--------------|--|----------------|
| BBCH 12-14 |                     |              |  |                |
| CAPBP      | Winter oilseed rape | 3            | 86,3%  | S              |
| CENCY      |                     | 5            | 96%  | HS             |
| CHEAL      |                     | 3            | 99,7%  | HS             |
| DESSO      |                     | 4            | 98,1%  | HS             |
| FUMOF      |                     | 5            | 98,5%  | HS             |
| GALAP      |                     | 2            | 99,6%  | HS             |
| GERDI      |                     | 3            | 92,9%  | S              |
| GERMO      |                     | 2            | 98,8%  | HS             |
| GERPU      |                     | 5            | 93,7%  | S              |
| LAMPU      |                     | 2            | 100%   | HS             |
| MATCH      |                     | 2            | 98,9%  | HS             |

|                   |  |    |            |       |
|-------------------|--|----|------------|-------|
| MATIN             |  | 11 | 97,5%      | HS    |
| MYOAR             |  | 1  | 100%       | HS    |
| PAPRH             |  | 7  | 77,2 97,6% | MS HS |
| STEME             |  | 7  | 77,2%      | MS    |
| THLAR             |  | 4  | 86,3%      | S     |
| VERPE             |  | 7  | 73,3%      | MS    |
| VIOAR             |  | 12 | 83,4%      | MS    |
| <b>BBCH 14-19</b> |  |    |            |       |
| CAPBP             |  | 3  | 80%        | MS    |
| CENCY             |  | 5  | 99,5%      | HS    |
| CHEAL             |  | 3  | 82,9%      | MS    |
| DESSO             |  | 2  | 96,7%      | HS    |
| FUMOF             |  | 4  | 98,3%      | HS    |
| GALAP             |  | -  | -          | -     |
| GERDI             |  | 2  | 93,9%      | S     |
| GERMO             |  | 1  | 95%        | HS    |
| GERPU             |  | 4  | 100%       | HS    |
| LAMPU             |  | 2  | 100%       | HS    |
| MATCH             |  | 1  | 92,5%      | S     |
| MATIN             |  | 8  | 98,6%      | HS    |
| MYOAR             |  | 1  | 100%       | HS    |
| PAPRH             |  | 8  | 79,4 91,9% | MS S  |
| STEME             |  | 7  | 77,2%      | MS    |
| THLAR             |  | 3  | 60%        | MT    |
| VERPE             |  | 5  | 61,5%      | MT    |
| VIOAR             |  | 9  | 90,1%      | S     |

- A total of 22 efficacy trials were carried out in **the North-East EPPO climatic zone**, all in Poland. The classification of weed susceptibility for each weed species, which have been located in the North-East zone is presented below. The zRMS decided to use for general calculation also trials conducted in neighbour countries (Germany, Czech Republic) in case of the weed species noted in limited number of trials in Poland.

| Target            | Crop | No of trials | Efficacy of<br>FFA SC 508.8 G<br>0,24 l/ha<br>GF-4021<br>0,25 l/ha | Susceptibility |
|-------------------|------|--------------|--|----------------|
| <b>BBCH 12-14</b> |      |              |  |                |
| CAPBP             |      | 6            | 87,1%  | S              |
| CENCY             |      | 12           | 97,7%  | HS             |
| CHEAL             |      | 7            | 85,1%  | S              |
| DESSO             |      | 4            | 98,1%  | HS             |
| FUMOF             |      | 5            | 98,5%  | HS             |
| GALAP             |      | 6            | 96%  | HS             |
| GERDI             |      | 1            | 99%  | HS             |
| GERMO             |      | 2            | 98,8%  | HS             |
| GERPU             |      | 8            | 96,9%  | HS             |
| LAMPU             |      | 3            | 92,5%  | S              |
| MATCH             |      | 3            | 94%  | S              |
| MATIN             |      | 10           | 95%  | HS             |
| MYOAR             |      | 3            | 99,9%  | HS             |
| PAPRH             |      | 10           | 74,5 98,3%   | MS HS          |
| STEME             |      | 10           | 74,5%  | MS             |
| THLAR             |      | 6            | 84,4%  | MS             |
| VERPE             |      | 5            | 85,2%  | S              |
| VIOAR             |      | 11           | 84,7%  | MS             |
| <b>BBCH 14-19</b> |      |              |  |                |
| CAPBP             |      | 4            | 86,3%  | S              |
| CENCY             |      | 11           | 93,2%  | S              |
| CHEAL             |      | 4            | 83,6%  | MS             |
| DESSO             |      | 2            | 96,7%  | HS             |
| FUMOF             |      | 5            | 96,2%  | HS             |
| GALAP             |      | 4            | 92,8%  | S              |
| GERDI             |      | 1            | 99%  | HS             |

|       |  |    |             |      |
|-------|--|----|-------------|------|
| GERMO |  | 1  | 95%         | HS   |
| GERPU |  | 6  | 92,4%       | S    |
| LAMPU |  | 4  | 90,3%       | S    |
| MATCH |  | 3  | 88,7%       | S    |
| MATIN |  | 8  | 91,5%       | S    |
| MYOAR |  | 3  | 98,3%       | HS   |
| PAPRH |  | 10 | 74,5% 93,3% | MS S |
| STEME |  | 10 | 74,5%       | MS   |
| THLAR |  | 4  | 56,6%       | MT   |
| VERPE |  | 3  | 58,6%       | MT   |
| VIOAR |  | 8  | 81,1%       | MS   |

• A total of 11 efficacy trials were carried out in **the South-East EPPO climatic zone**, in the following countries: Hungary (3 trials) and Romania (8 trials). The classification of weed susceptibility for each weed species, which have been located in the South-East zone is presented below.

| Target     | Crop                | No of trials | Efficacy of<br>FFA SC 508.8 G<br>0,24 l/ha<br>GF-4021<br>0,25 l/ha | Susceptibility |
|------------|---------------------|--------------|--|----------------|
| BBCH 12-14 |                     |              |  |                |
| CAPBP      | Winter oilseed rape | 1            | 87,5%  | S              |
| CENCY      |                     | 1            | 90%  | S              |
| CHEAL      |                     | 3            | 96,9%  | HS             |
| DESSO      |                     | 1            | 72,5%  | MS             |
| FUMOF      |                     | -            | -  | -              |
| GALAP      |                     | 3            | 98,4%  | HS             |
| GERDI      |                     | 1            | 100%   | HS             |
| GERMO      |                     | -            | -  | -              |
| GERPU      |                     | -            | -  | -              |
| LAMPU      |                     | 1            | 100%   | HS             |
| MATCH      |                     | -            | -  | -              |
| MATIN      |                     | 3            | 97%  | HS             |
| MYOAR      |                     | -            | -  | -              |
| PAPRH      |                     | 2            | 81,3% 100%   | MS HS          |
| STEME      |                     | 2            | 81,3%  | MS             |
| THLAR      |                     | -            | -  | -              |
| VERPE      |                     | 1            | 91,3%  | S              |
| VIOAR      | -                   | -            | -  |                |
| BBCH 14-19 |                     |              |  |                |
| CAPBP      | Winter oilseed rape | 1            | 90%  | S              |
| CENCY      |                     | 1            | 94%  | S              |
| CHEAL      |                     | 1            | 92,8%  | S              |
| DESSO      |                     | 1            | 88%  | S              |
| FUMOF      |                     | -            | -  | -              |
| GALAP      |                     | 2            | 98,4%  | HS             |
| GERDI      |                     | -            | -  | -              |
| GERMO      |                     | -            | -  | -              |
| GERPU      |                     | -            | -  | -              |
| LAMPU      |                     | 1            | 100%   | HS             |
| MATCH      |                     | -            | -  | -              |
| MATIN      |                     | 1            | 95,3%  | HS             |
| MYOAR      |                     | -            | -  | -              |
| PAPRH      |                     | 2            | 81,3% 99,5%  | MS HS          |
| STEME      |                     | 2            | 81,3%  | MS             |
| THLAR      |                     | -            | -  | -              |
| VERPE      |                     | 1            | 85%  | S              |
| VIOAR      |                     | 2            | 60,6%  | MT             |

### 3.3 Information on the occurrence or possible occurrence of the development

## of resistance (KCP 6.3)

LaDiva (GF-4021) is a herbicide for the control of broadleaved weeds in winter oilseed rape. The formulation contains 10 g a.e/L halauxifen-methyl, 48 g a.e/L picloram and 32 g a.e/L aminopyralid as active substances. A resistance risk analysis has been conducted in accordance to EPPO guideline PP1/213(3) ‘Resistance risk analysis’.

### 3.3.1 Mode of Action

According to “Herbicide Resistance Action Committee” (HRAC), halauxifen-methyl, picloram and aminopyralid belong to the chemical class pyridine-carboxylates (HRAC Group O, WSSA Group 4 (legacy O)). They are synthetic auxins, which have been most commonly used to control broadleaf weeds in a variety of crops since the first synthetic auxin herbicide (SAH), 2,4-D, was introduced to the market in the mid-1940s.

Halauxifen-methyl, aminopyralid and picloram are actives that, when applied to sensitive species, will present auxin-like properties. Natural auxins, like indole-3-acetic acid (IAA), are used by the plant to regulate minute amounts of hormones which bind to specific receptor proteins turning on and off vital plant processes. These actives move systemically throughout the target weed binding to receptor sites normally used by these plant hormones. This causes a disruption of normal plant growth processes via the binding of these actives to the receptors. This binding results in the deregulation of plant growth metabolic pathways and thus causes uneven cell division and growth, culminating in plant death.

Symptoms of herbicide damage to sensitive species normally occur within a couple of hours. Symptoms of herbicide damage include: cessation of growth, epinasty, leaf cupping, chlorosis, swelling/thickening of stems, callus tissue and distortion of the meristems and eventually plant death.

### 3.3.2 Mechanism of Resistance

Resistance to herbicides in broadleaf weed species is conveyed by both target site (TSR) and non-target site mechanisms (NTSR). TSR is the primary mechanism for resistance in broad leaf weeds to the ALS chemistry with evidence of NRTS emerging. To date there is no evidence of TSR in the auxin herbicides in broad leaved weed species. Several mechanisms for NTSR to the auxinic herbicides have been identified and include reduced translocation and increased herbicide degradation. However, the primary mechanism is not widely known.

### 3.3.3 Occurrence and spreading of resistant weeds to the active substances of GF-4021

In Europe, no resistance cases have been confirmed to halauxifen-methyl, picloram or aminopyralid, all of which are synthetic auxins. However, some broad leaf weed species have developed resistance to other auxinic herbicides:

- *Stellaria media* to mecoprop in the UK.
- *Papaver rhoeas* to 2,4-D and tribenuron-methyl in Spain, to 2,4-D, iodosulfuron-methyl-sodium, and tribenuron-methyl in Italy; to 2,4-D, iodosulfuron-methyl-sodium, and mesosulfuron-methyl in Greece; to 2,4-D, iodosulfuron-methyl-sodium, MCPA, mesosulfuron-methyl, and metsulfuron-methyl in France.
- *Cirsium arvense* to MCPA in Sweden and to 2,4-D, and MCPA in Hungary.
- *Centaurea cyanus* to dicamba in Poland



Worldwide, some resistance cases have been confirmed to picloram on *Amaranthus tuberculatus* (=A. *rudis*) and on *Centaurea solstitialis* in the United States, on *Centaurea stoebe ssp. micranthos* and *Sinapsis arvensis* in Canada, on *Soliva sessilis*, in New Zealand; and to aminopyralid on *Amaranthus tuberculatus* (=A. *rudis*) in the United States and on *Chenopodium album* in New Zealand.

**Table 3.3 - 1: List of target weeds resistance to 3 actives substances containing in GF-4021**

| Weed species  | Year | Country        | Active substance                  | Multiple resistance <sup>(1)</sup>     |
|---|------|----------------|-----------------------------------|--|
| <b>Halauxifen-methyl</b>                                    |      |                |                                   |  |
| <b>Resistant case in Europe</b>                             |      |                |                                   |  |
| No case   |      |                |                                   |  |
| <b>Resistant case in the rest of the world</b>              |      |                |                                   |  |
| No case   |      |                |                                   |  |
| <b>Picloram</b>   |      |                |                                   |  |
| <b>Resistant case in Europe</b>                             |      |                |                                   |  |
| No case   |      |                |                                   |  |
| <b>Resistant case in the rest of the world</b>              |      |                |                                   |  |
| AMATU   | 2009 | United States  | <b>Picloram</b>                   | 3 MoAs: B/2; C1/5; O/4                 |
|   | 2016 | United States  | <b>Picloram</b>                   | 5 MoAs: B/2; C1/5; E/14; F2/27; O/4    |
| CENBB   | 2013 | Canada         | <b>Picloram</b>                   | -                                      |
| CENSO   | 1988 | United States  | <b>Picloram</b>                   | -                                      |
| SINAR   | 1990 | Canada         | <b>Picloram</b>                   | -                                      |
|   | 2008 | Turkey         | <b>Picloram</b>                   | 2 different MoAs: B/2; O/4             |
| SOVSE   | 1999 | New Zealand    | <b>Picloram</b>                   | -                                      |
| <b>Aminopyralid</b>   |      |                |                                   |  |
| <b>Resistant case in Europe</b>                             |      |                |                                   |  |
| No case <b>PAPRH: 2015 and 2016, France</b>                 |      |                |                                   |  |
| <b>Resistant case in the rest of the world</b>              |      |                |                                   |  |
| AMATU   | 2009 | United States  | <b>Aminopyralid</b>               | 3 MoAs: B/2; C1/5; O/4                 |
| CHEAL   | 2005 | New Zealand    | <b>Aminopyralid</b>               | -                                      |
| <b>Resistant case to other herbicides of HRAC group O/4</b> |      |                |                                   |  |
| <b>Resistant case in Europe</b>                             |      |                |                                   |  |
| CENCY   | 2012 | Poland         | Dicamba                           | -                                      |
| CIRAR   | 1979 | Sweden         | MCPA                              | -                                      |
|   | 1985 | Hungary        | 2,4-D, MCPA                       | -                                      |
| PAPRH   | 1993 | Spain          | 2,4-D                             | 2 MoAs: O/4; B/2                       |
|   | 1998 | Italy          | 2,4-D                             | 2 MoAs: O/4; B/2                       |
|   | 1998 | Italy          | 2,4-D                             | -                                      |
|   | 2016 | France         | 2,4-D, MCPA                       | 2 MoAs: O/4; B/2                       |
| STEME   | 1985 | United Kingdom | Mecoprop                          | -                                      |
| <b>Resistant case in the rest of the world</b>              |      |                |                                   |  |
| AMAHY   | 2016 | Argentina      | 2,4-D, dicamba                    | 2 MoAs: O/4; G/9                       |
|   | 2016 | Argentina      | 2,4-D, dicamba                    | -                                      |
| AMAPA   | 2015 | USA            | 2,4-D                             | 5 MoAs: O/4B/2; C1/5; F2/27; G/9       |
|   | 2018 | USA            | 2,4-D                             | -                                      |
| AMATU   | 2016 | USA            | 2,4-D                             | 5 MoAs: O/4 and B/2; C1/5; E/14; F2/27 |
| AROCA   | 2015 | Australia      | 2,4-D                             | -                                      |
| BRSRR   | 2015 | Argentina      | 2,4-D                             | -                                      |
| CHEAL   | 2005 | New Zealand    | Aminopyralid, clopyralid, dicamba | -                                      |
| CRUAC   | 2019 | Argentina      | 2,4-D                             | 2 MoAs: O/4; G/9                       |
| CRUNU   | 1981 | New Zealand    | 2,4-D                             | -                                      |
| CRUPY   | 1997 | New Zealand    | 2,4-D, MCPA, MCPB                 | -                                      |
| COMDI   | 1957 | USA            | 2,4-D                             | -                                      |
| ERISU   | 2017 | Brazil         | 2,4-D                             | 5 MoAs: O/4; C2/7; D/22; E/14; G/9     |
| DAUCA   | 1957 | Canada         | 2,4-D                             | -                                      |
|   | 1993 | United States  | 2,4-D                             | -                                      |
|   | 1994 | United States  | 2,4-D                             | -                                      |
| DESSO   | 2011 | China          | MCPA                              | -                                      |
| DIGIS   | 2002 | USA            | Quinclorac                        | -                                      |
| ECHCO   | 2000 | Colombia       | Quinclorac                        | -                                      |

| Weed species | Year | Country       | Active substance                                      | Multiple resistance <sup>(1)</sup> |
|--------------|------|---------------|---|------------------------------------|
| ECHCG        | 1998 | USA           | Quinclorac  | -                                  |
|              | 1999 | Brazil        | Quinclorac  | -                                  |
|              | 1999 | USA           | Quinclorac  | 2 MoAs: O/4; C2/7                  |
|              | 2000 | China         | Quinclorac  | -                                  |
|              | 2009 | Brazil        | Quinclorac  | 2 MoAs: O/4; B/2                   |
|              | 2013 | Uruguay       | Quinclorac  | -                                  |
|              | 2013 | China         | Quinclorac  | -                                  |
| ECHCV        | 1999 | Brazil        | Quinclorac  | -                                  |
| FIMLI        | 1989 | Malaysia      | 2,4-D   | -                                  |
| GAETE        | 1998 | Canada        | Dicamba, fluroxypyr, MCPA                             | -                                  |
| GALAP        | 2014 | China         | Fluroxypyr  | -                                  |
|              | 2016 | Iran          | 2,4-D, MCPA   | -                                  |
|              | 2017 | Iran          | 2,4-D, MCPA   | 2 MoAs: O/4; B/2                   |
| GALSP        | 1996 | Canada        | Quinclorac  | 2 MoAs: O/4; B/2                   |
| HISIN        | 2016 | Argentina     | 2,4-D   | 2 MoAs: O/4; B/2                   |
| KCHSC        | 1994 | USA           | Dicamba, fluroxypyr                                   | -                                  |
|              | 1995 | USA           | Dicamba   | -                                  |
|              | 1997 | USA           | Dicamba   | -                                  |
|              | 1999 | USA           | Dicamba   | -                                  |
|              | 2009 | USA           | Dicamba   | -                                  |
|              | 2013 | USA           | Dicamba   | 4 MoAs: O/4; B/2; C1/5; G/9        |
|              | 2013 | USA           | Dicamba, fluroxypyr                                   | 2 MoAs: O/4; G/9                   |
|              | 2015 | Canada        | Dicamba, fluroxypyr                                   | 2 MoAs: O/4; B/2                   |
|              | 2017 | Canada        | Dicamba   | 3 MoAs: O/4; B/2; G/9              |
| LACSE        | 2007 | United States | 2,4-D, dicamba, MCPA                                  | -                                  |
| LMNFL        | 1995 | Indonesia     | 2,4-D   | -                                  |
|              | 1998 | Malaysia      | 2,4-D   | 2 MoAs: O/4; B/2                   |
| LIOER        | 2002 | Malaysia      | 2,4-D   | 2 MoAs: O/4; B/2                   |
| PLALA        | 2016 | United States | 2,4-D   | -                                  |
| RANAC        | 1988 | New Zealand   | MCPA  | -                                  |
|              | 2010 | New Zealand   | MCPA  | 2 MoAs: O/4; B/2                   |
| RAPRA        | 1999 | Australia     | 2,4-D   | -                                  |
|              | 2006 | Australia     | 2,4-D, MCPA   | 3 MoAs: O/4; B/2; F1/12            |
|              | 2009 | Australia     | 2,4-D   | 2 MoAs: O/4; B/2                   |
|              | 2010 | Australia     | 2,4-D, MCPA   | 4 MoAs: O/4; B/2; F1/12; G/9       |
|              | 2011 | Australia     | 2,4-D   | -                                  |
|              | 2013 | Australia     | 2,4-D   | -                                  |
| SINAR        | 1990 | Canada        | 2,4-D, dicamba, dichlorprop, MCPA, mecoprop, picloram | -                                  |
|              | 2008 | Turkey        | Dicamba   | 2 MoAs: O/4; B/2                   |
| SONOL        | 2015 | Australia     | 2,4-D   | -                                  |
|              | 2015 | Australia     | 2,4-D   | -                                  |
| SPDZE        | 1983 | Philippines   | 2,4-D   | -                                  |
|              | 1995 | Malaysia      | 2,4-D   | -                                  |
|              | 2000 | Thailand      | 2,4-D   | -                                  |
| SSYOR        | 2005 | Australia     | 2,4-D, MCPA   | 2 MoAs: O/4; B/2                   |
| STEME        | 2010 | China         | Fluroxypyr, MCPA                                      | -                                  |

(1) B/2: ALS inhibitors, C1/5: Photosystem II inhibitors, C2/7: PSII inhibitor (Ureas and amides), D/22: PSI Electron Diverter, E/14: PPO inhibitors, F1/12: Carotenoid biosynthesis inhibitors, F2/27: HPPD inhibitors, G/9: EPSP synthase inhibitors.

MoA: Mode of action

### 3.3.4 Cross-resistance

Cross resistance refers to a weed that has evolved mechanisms of resistance to one herbicide that also allows it to be resistant to other herbicides. Cross resistance can occur to herbicides within the same or in different herbicide families and with the same or different sites of action.

*Papaver rhoeas* has shown cross-resistance to some of the active ingredients in the synthetic auxin family of herbicides. However, whilst cross-resistance between 2,4-D and MCPA has been demonstrated, no resistance to either picloram or aminopyralid has been reported. It is therefore, considered that the risk of resistance to these herbicide is low.

### 3.3.5 Resistance risk assessment of unrestricted use pattern

This analysis is conducted according to the EPPO guidance document PP/213 “Resistance risk analysis”. The actual risk for the evolution of resistance towards each of the components in the mixture halauxifen-methyl/picloram/aminopyralid depends on three different parameters: mechanism of resistance against the compound (intrinsic herbicide risk), biology of the target weeds (pathogen risk) and on agronomical factors (agronomic risk). Additionally, to the risk of resistance development towards the individual actives, also the combined risk towards the formulation needs to be considered.

#### Inherent active substance associated risk

In 2020, no resistant biotypes to halauxifen-methyl, picloram or aminopyralid are reported in Europe. However, 7 single cases on 5 weed species were confirmed for picloram (HRAC group O/4) and 2 single cases on 2 weed species for aminopyralid (HRAC group O/4) globally. In conclusion, the inherent risk can be considered as medium to low.

#### Inherent weed associated risk

The analysis of inherent risk of weeds to develop resistance to herbicides is done according to the EPPO guideline 1/213 (2) - Resistance Risk Analysis - Appendix II<sup>2</sup>, focussing on a historical analysis of the occurrence of weed resistance of the target species and a historical analysis of the occurrence of weed resistance to the chemical (mode of action) group(s) of the product.

Table 3.2 - 2. displays target weed species of GF-4021 according to their inherent risk to develop resistance to herbicides across HRAC groups and countries. This classification is based on the frequency of the recorded resistance occurrence to all herbicides. These data are from <http://www.weedscience.com/>

The inherent risk is determined according to the number of resistant biotypes already recorded in the weed science database:

- HIGH: number >5.
- MEDIUM: number between 1 and 4.
- LOW: number =0.

**Table 3.3 - 2: List of target weeds according to their inherent risk to develop resistance to herbicides (listed according to the weeds found in the trials and according to the efficacy spectrum)<sup>4</sup>**

| according to the weeds found in the trials and according to the efficacy spectrum) |                                      |                          |               |       |                                 |
|--|--------------------------------------|--------------------------|---------------|-------|---------------------------------|
| Weed species   | Frequency of the occurrence recorded |                          |               |       | Mode of action concerned (HRAC) |
|  | SEU*                                 | Other European countries | Rest of World | Total |                                 |
| High inherent risk to develop resistance to herbicides                             |                                      |                          |               |       |                                 |
| CAPBP  |                                      | 3                        | 5             | 8     | 2: B/2: C1/5                    |

<sup>2</sup> EPPO: Standard of the efficacy evaluation of plant protection products [PP 1/213 (4)], Resistance Risk Analysis – Appendix II, Specific details on different types of plant protection products.

| Weed species  | Frequency of the occurrence recorded |                          |               |       | Mode of action concerned (HRAC) |
|---|--------------------------------------|--------------------------|---------------|-------|---------------------------------|
|   | SEU*                                 | Other European countries | Rest of World | Total |                                 |
| CHEAL   | 6                                    | 12                       | 31            | 49    | 4: B/2; C1/5; C2/7; <b>O/4</b>  |
| MATCH   |                                      | 5                        | 0             | 5     | 1: B/2                          |
| MATIN   | 1                                    | 6                        | 0             | 7     | 1: B/2                          |
| PAPRH   | 9                                    | 6                        | 0             | 15    | 2: B/2; <b>O/4</b>              |
| STEME   | 1                                    | 11                       | 11            | 23    | 3: B/2; C1/5; <b>O/4</b>        |
| <b>Medium inherent risk to develop resistance to herbicides</b> |                                      |                          |               |       |                                 |
| CENCY   | 0                                    | 2                        | 0             | 2     | 2: B/2; <b>O/4</b>              |
| <b>Low inherent risk to develop resistance to herbicides</b>    |                                      |                          |               |       |                                 |
| GERDI   | 0                                    | 0                        | 0             | 0     | -                               |
| GERPU   | 0                                    | 0                        | 0             | 0     | -                               |
| GERRT   | 0                                    | 0                        | 0             | 0     | -                               |

\* SEU: Southern registration zone

In the case of STEME resistance to the group 4 (legacy O) herbicides a single case was reported in 1985 and since that date no further cases have been reported in Europe.

In case of CHEAL resistance to the group 4 (legacy O) herbicides has only been found in New Zealand no cases have been reported in the EU .

In case of PAPRH resistance to this group herbicides has been found in 4 EU countries Greece (2,4-D), Italy (2,4-D), France (2,4-D) Spain (2, 4-D) no case have been confirmed to halauxifen-methyl, aminopyralid or picloram.

According to Table 3.3-2 above, 6 weeds species targeted by GF-4021 show a high inherent risk to develop resistance to herbicides, 1 a medium risk and 3 a low risk.

### Inherent combined risk

GF-4021 is a product containing 3 active substances, each with a low to medium risk to develop resistant biotypes.

Such as *Chenopodium album* and *Stellaria media* are identified as high risk to develop resistance to the ALS herbicides. However, the risk to group 4 (legacy O) herbicides, to which the 3 active substances of GF-4021 belong, is still considered to be low. (The risk of resistance developing in *P. rhoeas* is higher and should be considered as medium ). Therefore, taking into account all species the inherent risk of GF-4021 can be considered as medium.

### 3.3.6 Determination of agronomic risk for resistance development

The intended uses for GF-4021 are:

| Crop                | Timing         | Number of applications |
|---------------------|----------------|------------------------|
| Winter oilseed rape | Post-emergence | 1                      |

Generally, resistance may become a problem because of high selection pressure exerted on weed populations over several years. Agronomic factors with implications on selection pressure and impact on the development of resistance are mainly the crop rotation, the method and the frequency of applications, the cultural practices, alternation or mixtures of active substances with different MOA and the efficacy of herbicides...

The risk of resistance to GF-4021 is considered as low for the following reasons and should thus be acceptable without any restrictions at the proposed use, except for *P. rhoeas*:

- A high level of control is achieved when GF-4021 is applied at the recommended rate.
- There is a maximum of one application every 3 years or every 2 years in France.

- There is a diversity of available control measures for all the major target weeds including various modes of action.
- The major use is in oil seed rapewhich is normally grown in rotation with cereal crops allowing a range of cultural and chemical methods to be employed.
- Often GF-4021 will be used in herbicide programs for the control of target weeds.

### **3.3.7 Conclusions on inherent and agronomic risk analysis and management strategy**

With only one application of LaDiva (GF-4021) per season and the availability of many products with different modes of action on the market for weed control in winter oilseed rape, it can be concluded that there is a low agronomic risk for target weeds to become resistant to GF-4021.

Based on the information presented, the risk of GF-4021 developing weed resistance can be considered as low. The resistance management strategy for halauxifen-methyl, picloram and aminopyralid is therefore based upon Good Agricultural Practices (GAP) whereby users are advised to correctly identify the problem for which a herbicide is required; select the correct rate to be applied at the correct time of year and to the weed at the correct stage of growth; to use alternative methods of controlling the problem dependent upon the situation; to correctly apply the crop protection agent through a well maintained and correctly calibrated sprayer, to use other herbicides belonging to a different mode of action whenever possible, and, to routinely check the performance of the crop protection agent to ensure adequate efficacy is achieved.

#### **Unmodified risk**

Halauxifen-methyl is a member of a new structural class of chemistry, known as the arylpicolinates, developed for combinable crops. It and the actives aminopyralid and picloram are members of the pyridine carboxylic (picolinate) family of synthetic auxin (Group 4 (legacy O)). As a member of the Group O herbicides they are considered to be a low to medium risk herbicides in terms of resistance developing and the unmodified for all label species is considered acceptable except for *P. rhoeas*.

Taking into account the inherent risk of resistance developing to these actives it is considered that the unmodified use is unacceptable for *P. rhoeas* population's resistance to ALS and group 4 (legacy O) herbicides. Therefore, specific resistant management strategies will be required and Corteva Agriscience will continue to monitor weed populations and relevance of this active. It is also sensible to take precautions to minimise the risk of resistance building. Therefore the following resistance risk management strategy will be ~~recomeneded~~ recommended:

- 1) Use recommended label rates to maximise control and minimise seed return
- 2) Use mixtures of herbicides with different modes of action at full-recommended dose rates.
- 3). Apply herbicides at optimum timing and environmental conditions.
- 4) In countries/areas where resistance to group 4 (legacy O) herbicides in *P. rhoeas* has developed apply GF-4021 as part of program, following an autumn application of an herbicide with a non auxinic mode of action

The resistance management strategy will be regularly reviewed in light of experience of the commercial use of the product and any changes in advice from local Herbicide Resistance Working Groups.

#### **Proposed label statement**

| Product | Type      | Active            | HRAC code    | Risk of resistance developing |
|---------|-----------|-------------------|--------------|-------------------------------|
| GF-4021 | Herbicide | Halauxifen-methyl | 4 (legacy O) | Low                           |
| GF-4021 | Herbicide | Aminopyralid      | 4 (legacy O) | Low                           |
| GF-4201 | Herbicide | Picloram          | 4 (legacy O) | Low                           |

#### WEED RESISTANCE

**GF-4201 contains three active ingredients: halauxifen-methyl, aminopyralid and picloram. Aminopyralid and picloram are picolinate and halauxifen-methyl is an aryloxyphenoxyacetate (Group 4 (legacy O), HRAC classification) and the risk of resistance developing to these actives is considered to be low.**

### 3.3.8 Sensitivity data

The main target species for the actives halauxifen-methyl, aminopyralid and picloram are broad-leaved weeds.

For establishing the Baseline Sensitivity on the active halauxifen methyl three key species were chosen; the common cleaver GALAP (*Galium aparine*), common chickweed STEME (*Stellaria media*) and poppy PAPRH (*Papaver rhoeas*). Though the trial data presented to set this Baseline Sensitivity are in winter cereals, those weeds are also important weeds in winter oilseed rape.

#### *Galium aparine*

*Galium aparine* is a common annual weed in winter cereals and in winter oilseed rape. It can germinate throughout the year but mainly autumn, winter and early spring. It tends to flower and set seed in the spring die and shed seed long before the crop is harvested.

#### *Stellaria media*

*Stellaria media* is an annual weed in winter cereals and winter oilseed rape. It can germinate throughout the year. Except in the earliest drilled crops, it tends to flower and set seed in the spring die and shed seed long before the crop is harvested. ALS resistance to *Stellaria media* has been reported in Denmark, Sweden, Ireland, UK, Norway, Germany and France. These countries belong to the Northern, Central and Southern zones and the Maritime and Mediterranean EPPO climatic zones.

#### *Papaver rhoeas*

*Papaver rhoeas* is an annual weed in winter cereals and in winter oilseed rape. It can germinate throughout the year. It tends to flower and set seed in the spring, die and shed seed long before the crop is harvested. ALS resistance to this species has been reported in Spain, Greece, Italy, UK, Denmark, Sweden, and France. These countries belong to the Northern, Central and Southern zones and the Maritime and Mediterranean EPPO climatic zones.

#### Reference reports:

Satchivi, N. *et al.* Response of herbicide resistant corn poppy (*Papaver rhoeas*) to application of XDE-729 methyl ester. Unpublished Dow AgroSciences report number DAI 1072, 1 Nov 2011 (see technical appendix #163).

Riches, C. XDE-729 *Papaver Rhoeas* baseline monitoring –Europe 2010. Dow AgroSciences study Id EA10D2C071, AgHerba Consultants. Data is presented from 4 glasshouse trials by Satchivi, N, *et al* (DAI 1072) and EA10D2C071, EA11D2C085 and EA11D2C086 to establish the baseline sensitivity of halauxifen-methyl to *Papaver rhoeas*, *Stellaria media* and *Galium aparine*. These studies namely: EA10D2C071, EA11D2C085 and EA11D2C086 were conducted by AgHerba to GEP standards. The fourth trial was conducted by Dow AgroSciences, scientist located in the weed management group in the company's headquarters in Indianapolis. In all trials applications were made post-emergence using a laboratory track sprayer calibrated to deliver 187 or 200 L/ha. Replication was four pots in

EA10D2C071, EA11D2C085 EA11D2C086. Treatment detail and a description of the accessions used are described in the Tables below.

- UK, July 2011 (see technical appendices #164-166).

A total of 14 auxinic herbicides are currently registered in the European Union for the control of weeds species in a range of crops including cereals and grasslands. Many of these herbicides have been on the market for decades. For example, fluroxypyr was discovered in the early 1980's and has been sold in Europe since 1984. 2,4-D was one of the first herbicides discovered during the second war and has been in use for over fifty years.

Despite the length of time these herbicides have been on the EU market, resistance to this class of herbicide is still relatively low. Especially when compared to high risk groups such as the ALS herbicides.

In Europe, two annual broad leaf weed species have developed significant resistance to auxinic herbicides: *Stellaria media* to mecoprop in the UK and *Papaver rhoeas* to 2,4-D (and MCPA) in Spain and Italy.

Considering the length of time these auxinic herbicides have been on the market, their wide geographic spread of use and a relatively low number of confirmed cases of resistance, this chemistry can be considered to be a low risk in terms of resistance developing. As a member of the Group 4 (legacy O) herbicides,

Halauxifen-methyl is considered to be a low risk herbicide in terms of resistance risk.

## **Materials and Methods**

### **Details of glasshouse baseline sensitivity studies**

| Trial               | Test type  | species | Application volume | replication | Day length | Temperature range ° C | Pest growth stage @ application |
|---------------------|------------|---------|--------------------|-------------|------------|-----------------------|---------------------------------|
| Satchivi, N, et al. | Glasshouse | PAPRH   | 187                | n/a         | 14 h       | 17-18                 | BBCH 16-18                      |
| EA10D2C071.         | Glasshouse | PAPRH   | 209                | 4           | 14 h       | 17-21                 | BBCH14-16                       |
| EA11D2C085          | Glasshouse | GALAP   | 195                | 4           | Ambient    | 14-22                 | BBCH 13-14                      |
| EA11D2C086          | Glasshouse | STEME   | 192                | 4           | Ambient    | 14-26                 | BBCH 13-14                      |

### **Details of the formulations tested in the baseline sensitivity studies (glasshouse and field studies)**

| Study Number   | Test products    | Formulation type | Active Substance                  | Rates g a.s./ha or g a.e/ha | Rates g pr/ha or L pr/ha |
|--|------------------|------------------|-----------------------------------|-----------------------------|--------------------------|
| EA10D2C071<br>EA11D2C085<br>EA11D2C086                       | GF-2573          | EC               | Halauxifen-methyl                 | 0.48 -15                    |                          |
| Satchivi, N, et al   | GF-2353          | SC               | Halauxifen-methyl                 | 5-10                        |                          |
| Satchivi, N, et al<br>EA10D2C071<br>EA11D2C085<br>EA11D2C086 | Boxer<br>EF-1343 | SC               | Florasulam                        | 5-20                        |                          |
| Satchivi, N, et al<br>EA11D2C085<br>EA11D2C086               | GF-1784          | EC               | Fluroxypyr-methyl                 | 140-800                     |                          |
| Satchivi, N, et al<br>EA11D2C086                             | Express          | WG               | Tribenuron-methyl                 | 15-60                       |                          |
| EA10D2C071   | Pionter          | WG               | Tribenuron-methyl                 | 15                          |                          |
| Satchivi, N, et al   | Harmony          | WG               | Thifensulfuron-methyl             | 15-60                       |                          |
| Satchivi, N, et al   | Duplosan KV      | SL               | Mecoprop-p                        | 800-3200                    |                          |
| Satchivi, N, et al   | Weeder 64        | SL               | 2, 4-D dimethyl amine             | 800-3200                    |                          |
| EA10D2C071   | GF-1387          | EC               | 2, 4-D ethyl hexyl                | 600                         |                          |
| Satchivi, N, et al   | Milstone         | SL               | Aminopyralid triisopropan olamine | 5-20                        |                          |
| Satchivi, N, et al   | Agritox 50       | SL               | MCPA                              | 800-3200                    |                          |

| Study Number   | Test products | Formulation type | Active Substance           | Rates g a.s./ha or g a.e/ha | Rates g pr/ha or L pr/ha |
|----------------|---------------|------------------|----------------------------|-----------------------------|--------------------------|
| ES11D2C139FR01 | Alliance      | WG               | Diflufenican + metsulfuron |                             | 100                      |

### Summary and evaluation of individual trial results for *Papaver rhoeas* Satchivi, N, *et al.* (DA1 -1072) and EA10D2C071

In the study conducted by Satchivi *et al*, seven *Papaver rhoeas* biotypes from locations in Northern Spain, with reported poor efficacy to either 2, 4-D or tribenuron-methyl (sulfonylurea, ALS mode of action) were tested with Halauxifen-methyl formulated as GF-2353 (XDE-729 methyl, 95.94 g a.e./L SC). Other treatments in this study included 2.4-D amine, mecoprop-P amine, MCPA amine, florasulam, thifensulfuron-methyl and tribenuron-methyl. Data presented below demonstrated resistance to 2.4-D applied at 1,600 g a.e./ha, MCPA applied at 1,600 g a.e./ha and mecoprop-P applied at 1,600 g a.e./ha in four Spanish biotypes.

**Table 3.3 - 3: Satchivi, N, *et al.* (DA1 -1072) visual control (%) of *Papaver rhoeas* at final assessment 21 days after application**

| PAPRH accession                  | Florasulam<br>5 g ai/ha | Tribenuron-<br>methyl<br>15 g ai/ha | Thifensulfuron-<br>methyl<br>30 g ai/ha | 2, 4-D<br>1,600<br>g ae/ha | MCPA<br>1,600<br>g ae/ha | Mecoprop-<br>P<br>1,600<br>g ae/ha | GF-<br>2353<br>7.5 g<br>ae/ha |
|----------------------------------|-------------------------|-------------------------------------|---|----------------------------|--------------------------|------------------------------------|-------------------------------|
| Wild type                        | 97.3                    | 99                                  | 100                                     | 95.9                       | 97.2                     | 96.4                               | 96.2                          |
| S4F00101 – ALS & Auxin resistant | 93.3                    | 43.8                                | 80                                      | 28.3                       | 36.7                     | 57.9                               | 88.5                          |
| S4F00103 – ALS & Auxin resistant | 97.3                    | 50                                  | 53.3                                    | 36.7                       | 40.8                     | 62.2                               | 81.7                          |
| S2F01502 – ALS & Auxin resistant | 95                      | 55                                  | 43.3                                    | 26.7                       | 17.5                     | 63.3                               | 90.3                          |
| S4F00104 – ALS resistant         | 97                      | 60                                  | 46.7                                    | .                          | .                        | .                                  | 100                           |
| S1F00103 – ALS resistant         | 85                      | 66.7                                | 62.3                                    | 90.2                       | 88.8                     | 84.6                               | 96.7                          |
| S2F01503 – ALS resistant         | 92                      | 43.3                                | 43.3                                    | .                          | .                        | .                                  | 96.7                          |
| S2F01505 – ALS resistant         | 96.7                    | 33.3                                | 40                                      | .                          | .                        | .                                  | 96.7                          |
| S1F00101 – auxin resistant       | 99                      | 99                                  | 95                                      | 48.3                       | 30.7                     | 66                                 | 89.5                          |

When applied at the proposed maximum registered rate in winter cereals of 7.5 g a.e./ha to the same populations halauxifen-methyl achieved between 82 and 90 % control. The absence of cross-resistance between 2.4-D and halauxifen methyl can be explained by the difference of the perception of both types of auxinic herbicides at the molecular level.

### Summary and evaluation of individual trial results for *Papaver rhoeas* baseline sensitivity - EA10D2C071

In the second study conducted by Riches C. of Agherba, twenty-one biotypes of *Papaver rhoeas* collected from winter cereal sites throughout Europe (Belgium, France, Germany, Greece, Hungary, Italy, Spain and the UK) were used to establish the baseline sensitivity of halauxifen-methyl to *Papaver rhoeas*. These countries compass the Central and Southern administrative zones and the EPPO Maritime, South-East and Mediterranean zones. The study also evaluated the potential cross-resistance between 2.4-D and ALS resistant biotypes.

**Table 3.3 - 4: EA10D2C071: % visual control of *Papaver rhoeas* at final assessment 28 DAA**

| PAPRH Accession  | GF-2573<br>6 g ae/ha | Boxer<br>6.25 g ai/ha | Pointer<br>15 g ai/ha | GF-1387 (2.4-D)<br>600 g ae/ha |
|------------------|----------------------|-----------------------|-----------------------|--------------------------------|
| Belgium – B10P01 | 91                   | 92                    | 80                    | 90                             |
| Belgium – B10P02 | 99                   | 92                    | 87                    | 81                             |
| Germany – G10P01 | 82                   | 94                    | 82                    | 82                             |
| Germany – G10P02 | 95                   | 96                    | 85                    | 83                             |
| Hungary – H10P01 | 86                   | 95                    | 90                    | 76                             |



| PAPRH<br>Accession    | GF-2573<br>6 g ae/ha | Boxer<br>6.25 g ai/ha | Pointer<br>15 g ai/ha | GF-1387 (2.4-D)<br>600 g ae/ha |
|-----------------------|----------------------|-----------------------|-----------------------|--------------------------------|
| UK – U10P02           | 85                   | 100                   | 92                    | 93                             |
| UK –U10P04            | 92                   | 90                    | 28                    | 78                             |
| France – F10P01       | 90                   | 92                    | 75                    | 65                             |
| France – F10P02       | 84                   | 86                    | 15                    | 80                             |
| France – F10P03       | 91                   | 86                    | 89                    | 90                             |
| Greece GR10P01        | 95                   | 96                    | 69                    | 89                             |
| Italy- IP03           | 86                   | 99                    | 58                    | 88                             |
| Italy- IP04           | 81                   | 91                    | 71                    | 72                             |
| Italy- IP06           | 92                   | 94                    | 86                    | 76                             |
| Italy- IP07           | 88                   | 96                    | 81                    | 82                             |
| Spain – SP0P02        | 94                   | 96                    | 92                    | 92                             |
| Spain – SP0P03        | 78                   | 76                    | 28                    | 54                             |
| Spain – SP0P05        | 94                   | 85                    | 39                    | 92                             |
| Spain – SP0P07        | 90                   | 82                    | 10                    | 94                             |
| Spain – SP0P08        | 82                   | 96                    | 35                    | 80                             |
| Spain – SP0P10        | 90                   | 92                    | 17                    | 66                             |
| Herbiseed – wild type | 89                   | 98                    | 90                    | 82                             |

Data from this study demonstrated consistent control of all 21 biotypes by halauxifen-methyl, with a maximum of a 2 X variation in ER<sub>80</sub> values calculated from the 28 day % control data. The study also demonstrated no cross-resistance between halauxifen-methyl and the ALS herbicide tribenuron-methyl and auxinic herbicide 2.4-D, with good control (> 78 %) of all 2.4-D and ALS resistant biotypes by Halauxifen methyl applied at 6 g a.e./ha, 28 days after application.

**Table 3.3 - 5: Summary of GF-2573 ER<sub>50</sub> and ER<sub>80</sub> values for % visual control of *Papaver rhoeas* 28 days after application – EA10D2C071**

| Accession | % Visual control |                  |      |                  |
|-----------|------------------|------------------|------|------------------|
|           | ER <sub>50</sub> | ER <sub>80</sub> | R-sq | Resistance index |
| B10P01    | 0.964            | 4.73             | 0.95 | 0.87             |
| B10P02    | 0.75             | 2.92             | 0.88 | 0.54             |
| G10P01    | 1.31             | 6.63             | 0.95 | 1.23             |
| G10P02    | 0.97             | 4.55             | 0.95 | 0.84             |
| H10P01    | 1.24             | 5.77             | 0.94 | 1.07             |
| U10P02    | 1.13             | 5.43             | 0.94 | 1.00             |
| U10P04    | 0.85             | 4.23             | 0.92 | 0.73             |
| F10P01    | 0.92             | 3.88             | 0.94 | 0.71             |
| F10P02    | 1.03             | 5.02             | 0.95 | 0.93             |
| F10P03    | 0.64             | 3.24             | 0.91 | 0.60             |
| GR10P01   | 0.77             | 3.7              | 0.89 | 0.68             |
| I10P03    | 1.07             | 5.54             | 0.92 | 1.02             |
| I10P04    | 1.15             | 5.7              | 0.94 | 1.05             |
| I10P06    | 1.05             | 4.14             | 0.95 | 0.76             |
| I10P07    | 1.31             | 5.89             | 0.94 | 1.09             |
| SP10P02   | 1.08             | 5.11             | 0.94 | 0.94             |
| SP10P03   | 2.03             | 9.93             | 0.88 | 1.84             |
| SP10P05   | 1.01             | 4.94             | 0.93 | 0.91             |
| SP10P07   | 1.15             | 5.42             | 0.94 | 1.00             |
| SP10P08   | 1.11             | 5.52             | 0.95 | 1.02             |
| SP10P10   | 1.21             | 5.69             | 0.96 | 1.05             |
| Herbiseed | 1.16             | 5.39             | 0.93 | 1                |

**Summary and evaluation of individual trial results for *Stellaria media* baseline sensitivity - EA11D2C086**

In this study conducted by Riches C. of Agherba, twelve biotypes of *Stellaria media* collected from cereal sites throughout Europe (Denmark, Germany, Hungary, UK, Poland and France) were used to establish the baseline sensitivity of halauxifen-methyl to *Stellaria media*. These countries compass the Northern, Central and Southern administrative zones and the EPPO Maritime, South East, North East and Mediterranean zones.

**Table 3.3 - 6: EA11D2C086: visual control (%) of *Stellaria media* at final assessment 21 days after application**

| STEME<br>Accession             | GF-2573<br>6 g ae/ha | Boxer<br>6.25 g ai/ha | Express<br>15 g ai/ha | GF-1784<br>140 g ae/ha |
|--------------------------------|----------------------|-----------------------|-----------------------|------------------------|
| Denmark – D11S01               | 69                   | 99                    | 95                    | 70                     |
| Denmark – D11S02               | 60                   | 89                    | 54                    | 88                     |
| Denmark – D11S03               | 65                   | 91                    | 54                    | 89                     |
| Denmark – D11S04               | 64                   | 96                    | 46                    | 77                     |
| Germany – G11S01               | 60                   | 95                    | 86                    | 85                     |
| Hungary – H11S01               | 65                   | 100                   | 100                   | 76                     |
| UK – U11S01                    | 60                   | 98                    | 75                    | 70                     |
| UK – U11S02                    | 65                   | 94                    | 96                    | 66                     |
| Poland – P11S01                | 70                   | 100                   | 96                    | 95                     |
| France – F11S01                | 79                   | 98                    | 99                    | 90                     |
| France – F11S02                | 79                   | 100                   | 95                    | 75                     |
| Czech Republic – Kromeric 2004 | 79                   | 100                   | 100                   | 81                     |

Data from this study demonstrated consistent control of all 12 biotypes by halauxifen-methyl, with a maximum of a 2 X variation in the ER<sub>50</sub> values calculated from the 21 day % control data. Despite only a moderate level of control of *Stellaria media*, achieved by GF-2573 at 6 g a.e./ha in this study. The study also demonstrated no cross-resistance between halauxifen-methyl and the ALS herbicide tribenuron-methyl, with consistent control across the susceptible and resistance accessions. For example the Danish accession D11S01 was susceptible to express with 95 % control, with GF-2573 providing 69 % control of this accession. However, the Danish accession D11S04 was resistant to express with only 46 % recorded for this accession, GF-2573 provided 64 % control of this accession. Clearly demonstrating a lack of cross-resistance between halauxifen-methyl and the Sulfonyleurea herbicide Express (tribenuron-methyl).

**Table 3.3 - 7: Summary of GF-2573 ER<sub>50</sub> values (L pr/ha) for % visual control of *Stellaria media* 21 days after application – EA11D2C086**

| Accession       | % Visual injury |                  |                  |
|-----------------|-----------------|------------------|------------------|
|                 | R-sq            | ER <sub>50</sub> | Resistance Index |
| D11S01          | 0.77            | 0.4              | 1.54             |
| D11S02          | 0.69            | 0.43             | 1.65             |
| D11S03          | 0.72            | 0.39             | 1.5              |
| D11S04          | 0.62            | 0.43             | 1.65             |
| F11S01          | 0.90            | 0.36             | 1.38             |
| F11S02          | 0.78            | 0.29             | 1.5              |
| H11S01          | 0.42            | 0.29             | 1.5              |
| G11S01          | 0.75            | 0.57             | 2.19             |
| U11S01          | 0.76            | 0.54             | 2.07             |
| U11S02          | 0.71            | 0.44             | 1.69             |
| P11S01          | 0.80            | 0.36             | 1.38             |
| Czech Republic* | 0.74            | 0.26             | 1                |

\*Used as susceptible standard in the calculation of the resistant index's

### Summary and evaluation of individual trial results for *Galium aparine* baseline sensitivity - EA11D2C085

In this study conducted by Riches C. of Agherba, thirteen biotypes of *Galium aparine* collected from cereal sites throughout Europe (Denmark, Czech Republic, Germany, UK, Poland, France and Italy)

were used to establish the baseline sensitivity of halauxifen-methyl to *Galium aparine*. These countries compass the Northern, Central and Southern political zones and the EPPO Maritime, South East, North East and Mediterranean zones.

**Table 3.3 - 8: EA11D2C085: % visual control of *Galium aparine* at final assessment 21 days after application**

| GALAP<br>Accession      | GF-2573<br>6 g ae/ha | Boxer<br>6.25 g ai/ha | GF-1784<br>140 g ae/ha |
|-------------------------|----------------------|-----------------------|------------------------|
| Czech Republic – C11G01 | 96                   | 71                    | 79                     |
| Denmark – D11G01        | 92                   | 71                    | 79                     |
| Germany – G11G01        | 99                   | 70                    | 81                     |
| Germany – G11G02        | 81                   | 75                    | 76                     |
| Germany – G11G03        | 90                   | 70                    | 76                     |
| UK – U11G01             | 95                   | 75                    | 85                     |
| UK – U11G02             | 91                   | 74                    | 79                     |
| UK – U11G03             | 90                   | 60                    | 77                     |
| Poland – P11G01         | 100                  | 75                    | 81                     |
| Poland – P11G01         | 100                  | 66                    | 81                     |
| France – F11G01         | 94                   | 77                    | 80                     |
| France – F11G01         | 100                  | 80                    | 79                     |
| Italy – I11G01          | 91                   | 71                    | 77                     |
| Herbiseed wild type     | 100                  | 72                    | 82                     |

Data from this study demonstrated consistent control of 12 of the biotypes by halauxifen-methyl, with the purposed label rate of 6 g a.e./ha (for cereal spring uses), GF-2573 provided > 90 % control of *Galium aparine*, 28 days after application. The level of control was slightly lower for one of the German accession, however this thought to be due to experimental variation rather than resistance because the level of controlled achieved with fluroxypyr (GF-1784) was consistent across all accessions.

### **Conclusion for halauxifen baseline sensitivity**

Halauxifen-methyl is the first member of a new structural class of chemistry, known as the arylpicolinate, developed for the European cereal and oilseed rape markets. It is a member of the pyridine carboxylic (picolinate) family of synthetic auxin (Group 4 (legacy O)). As a member of the HRAC Group 4 (legacy O) herbicides, Halauxifen-methyl is considered to be a low risk herbicide in terms of resistance risk.

From the data presented from the glasshouse screening/baseline monitoring studies, it can be concluded that there is no resistance or cross-resistance issue for Halauxifen-methyl to any tested biotype of the weed species (*Papaver rhoeas*, *Stellaria media*, *Galium aparine*...). Halauxifen-methyl can be used for controlling all biotypes including those which are resistant to other modes of action (Eg. *Papaver rhoeas*, *Stellaria media*, *Gaeopis tetrahit*, etc...).

Although the risk for halauxifen-methyl is considered to be low, the following resistance risk strategies will be advised:

- use rates allowing an efficient control of the weed species,
- follow label statements concerning rates and timing of application; and
- consider the use of cultural control and crop rotation to help control resistant biotypes

To date no resistance to halauxifen-methyl, aminopyralid and picloram has been reported for target weed species in OSR and Corteva Agriscience hasn't conducted any resistance monitoring studies in OSR. However, Corteva Agriscience will continue monitor the situation and studies will be conducted if performance on these species changes.

### Comments of zRMS:

GF-4021 (LaDiva) contains three active substances: halauxifen-methyl, picloram and aminopyralid. These actives belong to the chemical group of pyridine-carboxylates. Accordance with the HRAC MoA, they are classified to the synthetic auxins (group 4 (legacy HRAC O)). The applicant has conducted the resistance risk analysis in accordance to EPPO guideline PP1/213(3) 'Resistance risk analysis'.

No resistance cases have been confirmed to halauxifen-methyl and picloram or aminopyralid in Europe. Two cases of resistance to aminopyralid were detected in France (2015 and 2016). However, Furthermore, some resistance cases have been noted to picloram and aminopyralid in the other part of the world (i.a. United States, Canada, New Zealand). Also some broadleaf weed species (CENCY, CIRAR, PAPRH, STEME) have developed resistance to other auxinic herbicides (i.a. MCPA, 2,4-D, dicamba) in Europe. *Papaver rhoeas* has shown cross-resistance to some of the active ingredients in the synthetic auxin family of herbicides but no resistance to either picloram or aminopyralid has been reported. Based on the glasshouse screening /baseline monitoring studies, it can be concluded that there is also no cross-resistance issue for halauxifen-methyl to any tested biotype of the weed species. The inherent risk of active substances can be considered as medium to low. In common European crop rotations, oil seed rape is rotated with cereal crops. Several HRAC group 4 actives including halauxifen are registered to control dicotyledonous weed species in cereal crops. Hence, repeated applications of auxin herbicides in consecutive years are likely to increase the selection pressure for resistance evolution. Moreover, 6 weeds species targeted by the test product show a high inherent risk to develop resistance to herbicides, 1 weed shows a medium risk and 3 weeds show a low risk. Taking into account all species the inherent risk of GF-4021 can be considered as medium.

Although The overall risk of resistance developing is low to medium. The unmodified use is unacceptable for *P. rhoeas* population's resistance to ALS and group 4 (legacy HRAC O) herbicides. Hence, to the opinion of the zRMS, the anti-resistance recommendations are necessary to the product label. The Synthetic Auxin Working Group propose to use diversity in weed control practices:

1. Rotation or mixtures of herbicide mechanisms of action.
2. Using at least two herbicides a year from different herbicide mechanisms of action that are still effective on the particular population of the target weed. This may include use of pre-emergence herbicides.
3. Using cultural/mechanical weed control methods including shallow tillage in the spring, crop rotation, and cleaning equipment.
4. Using full herbicide rates applied at the correct weed size and to carefully monitor results.
5. Scouting fields after herbicide application and controlling escapes.

Moreover, the general anti-resistance recommendation should be included to the product label:

GF-4021 should be applied according to the label directions, including time and number of applications and the recommended dose rate.

Based on the rules of crop rotation, the below statement is proposed to include to the product label:

*"Repeated applications of auxin herbicides in consecutive years in cereal crops are likely to increase the selection pressure for resistance evolution. To avoid of that, it is recommended to use of chemical groups other than auxin herbicides to control of weeds in cereals growing as succeeding crops after oilseed rape".*

The cMSs should consider above recommendations on the national level.

## 3.4 Adverse effects on treated crops (KCP 6.4)

### Information on trials submitted (3.4: Adverse effects on treated crops)

The crop sensitivity of GF-4021 at 0.25 L/ha was studied in presence of weeds from a set of 77 68 efficacy trials in oilseed rape implemented between 2017 and 2020 2019 in the Maritime EPPO zone: Czech Republic (9), Germany (20 18), United Kingdom (11 10), France (4), North-East EPPO zone: Poland (24 23), South- East EPPO Zone: Hungary (5) and Romania (8).

In addition, the crop sensitivity was also studied from a set of 44 selectivity trials implemented in oilseed rape between 2017 and 2019 in the Maritime (7 trials in France, 10 trials in Germany, 4 trials in Czech Republic and 3 trials in United Kingdom), Mediterranean (3 trial in France) and South-East (5 trials in Hungary and 4 trials in Romania), and in North-East (8 trials in Poland) EPPO climatic zones.

The trials were undertaken by contractors test facilities, all of which follow the EPPO guidelines and have Official Recognition status for undertaking selectivity trials in accordance with the principles of Good Experimental Practice (GEP).

Table 3.4-1 presents the selectivity trials repartition. The detail of available trials is provided in **Table 3.4-1**.

**Table 3.4 - 1: Selectivity trials repartition**

| Crop                        | Year | EPPO climatic zone |           |          |                |               |            |          |            | Total     |
|-----------------------------|------|--------------------|-----------|----------|----------------|---------------|------------|----------|------------|-----------|
|                             |      | Maritime           |           |          |                | Mediterranean | South-East |          | North-East |           |
|                             |      | Czech Rep          | Germany   | France   | United Kingdom | France        | Hungary    | Romania  | Poland     |           |
| Winter oilseed rape (BRSNW) | 2017 | 2                  | 4         | 4        | -              | 1             | -          | -        | 4          | 15        |
|                             | 2018 | 2                  | 4         | -        | 2              | 2             | 4          | 2        | 3          | 19        |
|                             | 2019 | 2                  | 2         | 3        | 1              | 1             | 1          | 2        | 1          | 10        |
| <b>Total</b>                | -    | <b>4</b>           | <b>10</b> | <b>7</b> | <b>3</b>       | <b>3</b>      | <b>5</b>   | <b>4</b> | <b>8</b>   | <b>44</b> |

**Figure 3.4 - 1 Location of the trial sites - Selectivity trials - Winter oilseed rape**



Table 3.4-2 presents the plant protection products and the doses applied in the selectivity trials.

**Table 3.4 - 2: Presentation of products used in selectivity trials in winter oilseed rape**

| Product name | Country(ies) where the product is registered <sup>(1)</sup> | Registration number | Active substance(s)                           | Formulation         |                            | Registered application dose <sup>(3)</sup> | Application dose in trials (per treatment)    | Rate of active substance per ha              | Remark <sup>(4)</sup>        |
|--------------|---|---------------------|---|---------------------|----------------------------|--|---|--|------------------------------|
|              |   |                     |   | Type <sup>(2)</sup> | Concentration of a.s.      |  |   |  |                              |
| GF-3788      | Not registered  | Not registered      | Halauxifen-methyl<br>Picloram<br>Aminopyralid | EC                  | 10 g/L<br>48 g/L<br>32 g/L | Not registered                             | <b>0.25 L/ha (N)</b><br><b>0.5 L/ha (2N)</b>  | <b>2.5+12+8</b><br><b>5+24+16</b>            |                              |
| GF-4021      | Not registered  | Not registered      | Halauxifen-methyl<br>Picloram<br>Aminopyralid | EC                  | 10 g/L<br>48 g/L<br>32 g/L | Not registered                             | <b>0.25 L/ha (N)</b><br><b>0.5 L/ha (2N)</b>  | <b>2.5+12+8</b><br><b>5+24+16</b>            |                              |
| BELKAR®      | DE  | 008778-00           | Halauxifen-methyl<br>Picloram                 | EC                  | 10 g/L<br>48 g/L           | 0.25 L/ha<br>0.5 l/ha                      | 0.25 L/ha (N)<br>0.5 L/ha (2N)<br>1 L/ha (4N) | <b>2.5+12</b><br><b>5+24</b><br><b>10+48</b> | Named also in trials GF-3447 |
|              | DK  | 831-19              |   |                     |                            |  |   |  |                              |
|              | FR  | 2190062             |   |                     |                            |  |   |  |                              |
|              | HU  | 6300/13248          |   |                     |                            |  |   |  |                              |
|              | SE  | 5352                |   |                     |                            |  |   |  |                              |
|              | SK  | 18-00283-AU         |   |                     |                            |  |   |  |                              |
|              | UK  | 18615               |   |                     |                            |  |   |  |                              |

<sup>(1)</sup> Only on use(s) applied for (with the test product).

<sup>(2)</sup> EC: Emulsifiable Concentrate.

<sup>(3)</sup> Dose(s) / dose range authorized on that use in the country.

<sup>(4)</sup> Other relevant information.

### 3.4.1 Phytotoxicity to host crop (KCP 6.4.1)

#### 3.4.1.1 Material and Methods

Material and Methods used in efficacy trials are given within Section 3.2.3.1 and is not repeated here. Material and Methods used in selectivity trials are given below.

#### Experimental details

All the trials were carried out by officially recognised organisations in accordance with the Principles of Good Experimental Practice (GEP). These trials were performed followed EPPO guidelines.

Main characteristics are summarised in Table 3.4-3 Details per trial (trial location, crop cultivar, experimental design, number of blocks, plot size and application(s)) are presented in Annexes.

**Table 3.4 -3: Details on trial methodology - Selectivity trials**

|                     |                        |  |
|---------------------|------------------------|--|
| Guidelines          | General guidelines     | PP1/135(3)/(4): “Phytotoxicity assessment”.<br>PP1/152(4): “Design and analysis of efficacy evaluation trials”.<br>PP1/181(4): “Conduct and reporting of efficacy evaluation trials, including good experimental practice”.  |
|                     | Specific guidelines    | PP1/49 (3): “Weeds in brassica oil crops”.   |
| Experimental design | Plot design            | Randomized Complete Block (RACOB)  |
|                     | Plot size              | Plot area: from 20 to 42 m².   |
|                     | Number of replications | 4 replications.  |
| Crop                | Number of trials       | 44 selectivity trials.   |
|                     | Varieties              | Alison (1), Alvaro (2), Amazon (1), Architect (2), Atora(2), Avatar (3), Bender (2), DK Exalte (1), DK Exception (3), DK Expansion (1), DK Explorati (1), DK Exstorm (4), Exalte (1), Exception (1), Exstorm (1), Gaelis (1), Hat trick (1), Hybridock (1), KWS Feliciano (1), |



|                               |                        |   |
|-------------------------------|------------------------|---|
|                               |                        | <i>Marathon (2), Mercedes (1), PR44W29 (1), PT264-I831 (1), PT275 (1), PX 126 (1), Umberto KWS (1), Veritas CL (2), Windozz (2), Xenon (1), Visby (1)</i>   |
| <b>Application</b>            | Application timing     | BBCH 13-15: 16 trials.<br>BBCH 16-17: 16 trials.  |
|                               | Number of applications | 1 application.  |
|                               | Spray volumes          | 150-300 L/ha.   |
| <b>Assessment</b>             | Assessment dates       | 1 week, 2 weeks, 4 weeks and 8 weeks after application.<br>Beginning of the growth in spring (around BBCH 50)<br>Flowering.<br>Harvest.   |
|                               | Assessment types       | Chlorosis, color, deformation, delay maturity, growth inhibition, injury, leaf margin roll or curl, stand reduction, yield, moisture content, thousand grain weight, oil content, protein content, germination. |
| <b>Results &amp; Analysis</b> | Statistical analysis   | ANOVA – Tukey’s test (5%), Levene’s test, Student-Newman-Keuls test.  |

## Treatments and reference standards

GF-4021 was tested at 0.25 L/ha (N dose) and 0.5 L/ha (2N dose) and compared with the reference standard presented in Table 3.4 - 2: **Presentation of products used in selectivity trials in winter oilseed rape**. The following Table 3.4 - 4 presents the main characteristics of protocols used in selectivity trials.

**Table 3.4 - 4: Main characteristics of protocols used in selectivity trials**

| Trial code           | Application timing | GF-4021       |               | GF-3788       |               | BELKAR®       |               |             |
|----------------------|--------------------|---------------|---------------|---------------|---------------|---------------|---------------|-------------|
|                      |                    | 0.25 L/ha (N) | 0.5 L/ha (2N) | 0.25 L/ha (N) | 0.5 L/ha (2N) | 0.25 L/ha (N) | 0.5 L/ha (2N) | 1 L/ha (4N) |
| DE17D2C315UB01C      | BBCH15             |               |               | x             | x             | x             | x             |             |
| DE17D2C315UB02C      | BBCH13             |               |               | x             | x             | x             | x             |             |
| DE17D2C315UB03C      | BBCH13             |               |               | x             | x             | x             | x             |             |
| DE17D2C315UB04C      | BBCH14             |               |               | x             | x             | x             | x             |             |
| DE18D2C330UB01C      | BBCH13             | x             |               | x             | x             | x             | x             |             |
| DE18D2C330UB02C      | BBCH13             | x             |               | x             | x             | x             | x             |             |
| DE18D2C331UB01C      | BBCH17             | x             |               | x             | x             | x             | x             |             |
| DE18D2C331UB02C      | BBCH17             | x             |               | x             | x             | x             | x             |             |
| EA18D2C330AP01C      | BBCH14             | x             |               | x             | x             | x             | x             |             |
| EA19D2C241H-AMT01    | BBCH19             | x             | x             |               |               |               | x             | x           |
| EA19D2C241H-AMT02    | BBCH19             | x             | x             |               |               |               | x             | x           |
| EA19D2C241H-DAV01    | BBCH19             | x             | x             |               |               | x             | x             |             |
| EA19D2C241H-DMI01    | BBCH18             | x             | x             |               |               |               | x             | x           |
| EA19D2C241H-DMI02    | BBCH19             | x             | x             |               |               |               | x             | x           |
| EA19D2C241H-DMI03    | BBCH19             | x             | x             |               |               |               | x             | x           |
| EA19D2C241H-DPE01    | BBCH19             | x             | x             |               |               |               | x             | x           |
| EA19D2C241H-DQZ01    | BBCH19             | x             | x             |               |               |               | x             | x           |
| EA19D2C295H-HET012_3 | BBCH19             | x             | x             |               |               | x             | x             |             |
| FR17D2C315YL01C      | BBCH14             |               |               | x             | x             | x             | x             |             |
| FR17D2C315YL02C      | BBCH14             |               |               | x             | x             | x             | x             |             |
| FR17D2C315YL03C      | BBCH14             |               |               | x             | x             | x             | x             |             |
| FR17D2C315YL04C      | BBCH13             |               |               | x             | x             | x             | x             |             |
| FR17D2C315YL05C      | BBCH14             |               |               | x             | x             | x             | x             |             |
| FR18D2C330YL01C      | BBCH13             | x             |               | x             | x             | x             | x             |             |
| FR18D2C331YL01C      | BBCH16             | x             |               | x             | x             | x             | x             |             |
| GB18D2C330EB01C      | BBCH14             | x             | x             | x             | x             | x             | x             |             |
| GB18D2C331EB01C      | BBCH16             | x             |               | x             | x             | x             | x             |             |
| HU18D2C330GK01C      | BBCH14             | x             |               | x             | x             | x             | x             |             |
| HU18D2C330GK02C      | BBCH14             | x             |               | x             | x             | x             | x             |             |
| HU18D2C331GK01C      | BBCH17             | x             |               | x             | x             | x             | x             |             |
| HU18D2C331GK02C      | BBCH16             | x             |               | x             | x             | x             | x             |             |
| PL17D2C315AS01C      | BBCH12-13          |               |               | x             | x             | x             | x             |             |
| PL17D2C315AS02C      | BBCH12-13          |               |               | x             | x             | x             | x             |             |
| PL17D2C315AS03C      | BBCH12-13          |               |               | x             | x             | x             | x             |             |
| PL17D2C315AS04C      | BBCH12-13          |               |               | x             | x             | x             | x             |             |

|                   |           |   |   |   |   |   |   |  |
|-------------------|-----------|---|---|---|---|---|---|--|
| EA19D2C098H-DPF02 | BBCH12-13 | x | X | x | x | x | x |  |
| EA19D2C100H-DPF01 | BBCH15-16 | x | X | x | x | x | x |  |
| EA19D2C100H-DPF02 | BBCH14-16 | x | X | x | x | x | x |  |
| EA19D2C295H-DPF09 | BBCH17-18 | x | X |   |   | x | x |  |
| CZ17D2C315KS01C   | BBCH11-19 |   |   | x | x | x | x |  |
| CZ18D2C330KS01C   | BBCH11-13 |   |   | x | x | x | x |  |
| CZ17D2C315KS02C   | BBCH11-19 | x | X | x | x | x | x |  |
| CZ18D2C331KS01C   | BBCH14-16 | x | X | x | x | x | x |  |

## Assessment methods

Phytotoxicity assessments were carried out in accordance with EPPO guideline PP1/135 (“*Phytotoxicity assessment*”). Assessments were carried out at various post application intervals. The following Table 3.4-20 presents the main characteristics of assessments carried out in selectivity trials.

Assessments were carried out at various intervals post application by recording visual percentage injury (0% = no injury, 100% = complete expression of injury symptom). For visual phytotoxicity assessments, a threshold of 15% visual damage is the maximum value that is considered acceptable

At harvest, yield and quality parameters (moist content, thousand grain weight, oil content, according to trials) were measured. These results are presented in Section 3.4.2 (yield results) and Section 0 (quality results).

In order to facilitate the interpretation of some results (such as YIELD, MOIST, TGW, OIL...) it was interesting to know the behaviour (gain or loss) of treated plots compared to untreated (percent of untreated check or %UTC). Overall, these calculations were calculated in each trial by contractors. However, when these results were not available, the %UTC was calculated for this dossier according to the following formula:

$$\% \text{ relative UTC} = \frac{\text{value intreated plot}}{\text{value in UTC}} \times 100$$

For all trials, visual phytotoxicity assessments and harvest results were categorized according to the following scales.

**Table 3.4 - 2: Risk scale - Selectivity trials**

|                          |                     |   |
|--------------------------|---------------------|---|
| Phytotoxicity assessment | Acceptable risk     | Assessment showed a % phytotoxicity ≤ 15%.                  |
|                          | Non-acceptable risk | Assessment showed a % phytotoxicity > 15%.                  |
| Harvest results          | Acceptable risk     | Compared to untreated plot: loss ≤ 10% and not statistical. |
|                          | Non-acceptable risk | Compared to untreated plot: loss >10% or statistical.       |

## Statistical analyses

Observed or calculated variables are subjected to an analysis of variance (ANOVA) after or not a transformation depending of the variability of the raw data.

When the result of the analysis is significant, a multiple comparison of treatments is performed. The averages are classified using Tukey’s and Levene’s tests and divided into homogeneous groups (a, b, c, ...). Treatment means with no letter in common are significantly different in accordance with the test conducted at a 95% confidence level.

### 3.4.1.2 Crop safety results

#### 3.4.1.2.1 Results in efficacy trials

The crop safety was assessed in 77 68 efficacy trials performed in Bulgaria, France, Germany, Hungary, Romania, United Kingdom, Czech Republic and Poland between 2017 and 2020-2019. All trials were carried out by testing facilities officially recognised according to Good Experimental Practice (GEP).

Summary of the injury per symptoms in the 77 68 efficacy trials is presented in Table 3.4 - 3.

Results are summarised in tables Table 3.4 - 4 and Table 3.4 - 5.

**Table 3.4 - 3: Summary of the injury per symptoms in the 60 68 efficacy trials**

|                               | Timing A             |                      | Timing B             |                      |
|-------------------------------|----------------------|----------------------|----------------------|----------------------|
|                               | GF-4021<br>0.25 L/ha | BELKAR®<br>0.25 L/ha | GF-4021<br>0.25 L/ha | BELKAR®<br>0.25 L/ha |
| <b>Deformation (%)</b>        |                      |                      |                      |                      |
| Number of trials              | 60                   | 60                   | 24 31                | 13 22                |
| Number of trials with injury  | 14                   | 12                   | 3                    | 3                    |
| % of trials with injury       | 23.3                 | 20                   | 12.5 9.7             | 23.1 13.6            |
| <b>Growth inhibition (%)</b>  |                      |                      |                      |                      |
| Number of trials              | 60                   | 60                   | -                    | -                    |
| Number of trials with injury  | 1                    | 0                    | -                    | -                    |
| % of trials with injury       | 1.7                  | 0                    | -                    | -                    |
| <b>Unspecified Injury (%)</b> |                      |                      |                      |                      |
| Number of trials              | 60                   | 60                   | 24 31                | 13 22                |
| Number of trials with injury  | 8                    | 7                    | 3                    | 1                    |
| % of trials with injury       | 13.3                 | 11.7                 | 12.5 9.7             | 7.7 4.5              |
| <b>Stand reduction(%)</b>     |                      |                      |                      |                      |
| Number of trials              | 60                   | 60                   | 24 31                | 13 22                |
| Number of trials with injury  | 2                    | 1                    | 1                    | 0                    |
| % of trials with injury       | 3.3                  | 1.7                  | 4.2 3.2              | 0.0                  |
| <b>Vigor (%)</b>              |                      |                      |                      |                      |
| Number of trials              | 60                   | 60                   | 24 31                | 13 22                |
| Number of trials with injury  | 4                    | 2                    | 2                    | 1                    |
| % of trials with injury       | 6.7                  | 3.3                  | 8.3 6.5              | 7.7 4.5              |

**Table 3.4 - 4: Summarised phytotoxicity results in affected efficacy trials**

| Trial code        | EPPO zone | Early application (timing A) |          |  |        |          | Late application (timing B) |          |  |       |          |
|-------------------|-----------|------------------------------|----------|--|--------|----------|-----------------------------|----------|--|-------|----------|
|                   |           | GF-4021at 0.25 L/ha          |          |  |        |          | GF-4021 at 0.25 L/ha        |          |  |       |          |
|                   |           | Phytotoxicity                |          |  |        |          | Phytotoxicity               |          |  |       |          |
|                   |           | Max                          | Symptoms | Transitory<br>(if no: phyto. at the last assessment) |        |          | Max                         | Symptoms | Transitory<br>(if no: phyto. at the last assessment) |       |          |
|                   |           |                              |          | Yes/No   | %      | Symptoms |                             |          | Yes/No   | %     | Symptoms |
| DE17D2C314UB05C   | MAR       | 1.25%                        | STANDRED | No   | 1.25%  | STANDRED | 1.25%                       | STANDRED | No   | 1.25% | STANDRED |
|                   |           | 96.25%                       | VIGOR    | No   | 96.25% | VIGOR    | 97.5%                       | VIGOR    | No   | 97.5% | VIGOR    |
| DE17D2C314UB06C   | MAR       | 0.25%                        | INJURY - | Yes  | -      | -        | 0.0%                        | -        | -  | -     | -        |
|                   |           | 99.75%                       | VIGOR    | Yes  | -      | -        | 0.0%                        | -        | -  | -     | -        |
| DE17D2C314WD01    | MAR       | 5%                           | DEFORM   | Yes  | -      | -        | 0.0%                        | -        | -  | -     | -        |
|                   |           | 5%                           | INJURY   | Yes  | -      | -        | 0.0%                        | -        | -  | -     | -        |
| DE17D2C314WD02    | MAR       | 12.5%                        | DEFORM   | Yes  | -      | -        | 6%                          | DEFORM   | Yes  | -     | -        |
|                   |           | 12.5%                        | INJURY   | Yes  | -      | -        | 6%                          | INJURY   | Yes  | -     | -        |
| DE18D2C326AS01    | MAR       | 4%                           | DEFORM   | Yes  | -      | -        | -                           | -        | -  | -     | -        |
| DE18D2C326TS01    | MAR       | 8.75%                        | DEFORM   | Yes  | -      | -        | -                           | -        | -  | -     | -        |
| DE18D2C326UB01C   | MAR       | 63.75%                       | DEFORM   | Yes  | -      | -        | -                           | -        | -  | -     | -        |
|                   |           | 17.5%                        | GROINHIB | Yes  | -      | -        | -                           | -        | -  | -     | -        |
|                   |           | 90%                          | VIGOR    | No   | 99.25% | VIGOR    | -                           | -        | -  | -     | -        |
| DE18D2C326UB03C   | MAR       | 15.75%                       | DEFORM   | Yes  | -      | -        | -                           | -        | -  | -     | -        |
| DE18D2C327TS01    | MAR       | 5%                           | DEFORM   | Yes  | -      | -        | -                           | -        | -  | -     | -        |
| EA19D2C242H-HET01 | SE        | 1.5%                         | DEFORM   | No   | 0.4%   | DEFORM   | 1.5%                        | DEFORM   | No   | 1.5%  | DEFORM   |
|                   |           | 1.5%                         | INJURY   | No   | 1.5%   | INJURY   | 1.5%                        | INJURY   | No   | 1.5%  | INJURY   |
| GB18D2C326MF01    | MAR       | 2.4%                         | DEFORM   | Yes  | -      | -        | -                           | -        | -  | -     | -        |
|                   |           | 2.4%                         | INJURY   | Yes  | -      | -        | -                           | -        | -  | -     | -        |
| GB18D2C327MF01    | MAR       | 1.75%                        | DEFORM   | Yes  | -      | -        | -                           | -        | -  | -     | -        |
| HU18D2C326GK03C   | SE        | 12.5%                        | DEFORM   | No   | 4%     | DEFORM   | -                           | -        | -  | -     | -        |
|                   |           | 1.5%                         | INJURY   | No   | 1%     | INJURY   | -                           | -        | -  | -     | -        |
| HU18D2C327GK03C   | SE        | 30%                          | DEFORM   | No   | 30%    | DEFORM   | -                           | -        | -  | -     | -        |
|                   |           | 3%                           | INJURY   | No   | 3%     | INJURY   | -                           | -        | -  | -     | -        |
| RO18D2C326AP01C   | SE        | 24.25%                       | DEFORM   | Yes  | -      | DEFORM   | -                           | -        | -  | -     | -        |
|                   |           | 95.75%                       | VIGOR    | No   | 95.75% | VIGOR    | -                           | -        | -  | -     | -        |
| RO18D2C326AP03C   | SE        | 12.5%                        | INJURY   | Yes  | -      | -        | -                           | -        | -  | -     | -        |
|                   |           | 12.5%                        | STANDRED | Yes  | -      | -        | -                           | -        | -  | -     | -        |

| Trial code      | EPPO<br>zone | Early application (timing A) |          |  |   |          | Late application (timing B) |          |  |   |          |
|-----------------|--------------|------------------------------|----------|--|---|----------|-----------------------------|----------|--|---|----------|
|                 |              | GF-4021at 0.25 L/ha          |          |  |   |          | GF-4021 at 0.25 L/ha        |          |  |   |          |
|                 |              | Phytotoxicity                |          |  |   |          | Phytotoxicity               |          |  |   |          |
|                 |              | Max                          | Symptoms | Transitory<br>(if no: phyto. at the last assessment) |   |          | Max                         | Symptoms | Transitory<br>(if no: phyto. at the last assessment) |   |          |
|                 |              |                              |          | Yes/No   | % | Symptoms |                             |          | Yes/No   | % | Symptoms |
| RO18D2C327AP02C | SE           | 10%                          | DEFORM   | Yes  | - | -        | -                           | -        | -  | - | -        |

**Table 3.4 - 5: Summarised results: phytotoxicity assessments from efficacy trials**

| Number of trials with...                            |             | Early application (timing A) - 60 trials |               | Late application (timing B) – 24 31 trials |               |               |
|---|-------------|--|---------------|--|---------------|---------------|
|   |             | GF-4021                                  | BELKAR®       | GF-4021                                    | BELKAR®       |               |
|   |             | 0.25 L/ha (N)                            | 0.25 L/ha (N) | 0.25 L/ha (N)                              | 0.25 L/ha (N) | 0.5 L/ha (2N) |
| Maximum of phytotoxicity recorded during the trials | 0%          | 43                                       | 45*           | 23   | 16            | 10            |
|   | >0% to 5%   | 8  | 6             | 2  | 2             | 1             |
|   | >5% to 10%  | 2  | 4             | 1  | -             | -             |
|   | >10% to 15% | 3  | 1             | -  | -             | -             |
|   | >15%        | 4  | 4             | -  | -             | -             |
| Level of symptoms at the last assessments           | 0%          | 54                                       | 48            | 22   | 12            | 10            |
|   | >0% to 5%   | 5  | 6             | 2  | 1             | 1             |
|   | >5% to 10%  | -  | 2             | -  | -             | -             |
|   | >10% to 15% | -  | 1             | -  | -             | -             |
|   | >15%        | 1  | 3             | -  | -             | -             |

\*It includes 2 trials with BELKAR® applied at 0.5 L/ha instead of 0.25 L/ha.

In the 77 68 efficacy trials, 20 36 cultivars were assessed: *Absolut*, *Architect*, *Architect- memori*, *Attletik*, *Aquila*, *Avatar*, *Barbados*, *Bellevue*, *Bender*, *Bonanza*, *Butterfly*, *Christiane*, *Chrobry*, *Dariot*, *DK Exstorm*, *Django*, *DK Imperial*, *CL Imperial*, *Elgar*, *ES Mambo*, *Exception*, *Exodus*, *Hybrirock*, *Konkret*, *Harry*, *Hattrick*, *LG Arsenal*, *LG Anniston*, *Mercury*, *Phoenix CL*, *PR40W20*, *PT225*, *PT264-I831*, *PX113*, *SY ILONA*, *Sy Florida*, *Sidney*, *Temptation*, *Trezor*, and *Visby* and in 1 trial a mixture of 3 varieties (*Architek*, *memory* and *tresor*).

In 24 31 out of 77 68 efficacy trials, some modalities were also tested at a late (application timing B) (BBCH 14-16: 8 trials and 17-19: 16 trials).

#### - Early application (timing A)

In 17 out of 77 60 efficacy trials with an early application, phytotoxicity symptoms caused by LaDiva (GF-4021) at 0.25 L/ha were recorded. In 10 trials phytotoxicity symptoms (DEFORM, INJURY, STANDRED) were acceptable, lower than 10% and in 2 out of these 10 trials the symptoms were transitory.

In 7 out of 10 trials with symptoms, these were unacceptable (higher than 10%), however, the symptoms were transitory or with values at the last assessment lower than 4%, except in one trial (HU18D2C327GK03C). In this trial, at the last assessment 30% DEFORM was observed, and the standard product BELKAR® applied at 0.25 L/ha showed the same level of symptom at the same assessment date.

#### - Late application (timing B)

In 3 out of 24 31 efficacy trials where some modalities were applied later, phytotoxicity symptoms caused by LaDiva (GF-4021) at 0.25 L/ha were recorded. All of these symptoms (DEFORM, STANRED, INJURY) were transitory and fully acceptable, lower than 10%, reaching maximum 1.5% of phytotoxicity.

#### Comments of zRMS:

The submitted results from efficacy trials show that GF-4021 at 0,25 l/ha can caused transitory phytotoxicity symptoms, i.a. deformation, growth inhibition, stand reduction or weakening of vigor. The negative impact on the unacceptable level (>10%) were noted after early application (timing A) in the Maritime and South-East EPPO climatic zones.

### 3.4.1.2.1 Results in selectivity trials

In addition to the efficacy trials, 44 selectivity trials were carried out also in France, Germany, Hungary, Romania, United Kingdom, Czech Republic and Poland between 2017 and 2020. All trials were carried out by testing facilities officially recognised according to Good Experimental Practice (GEP).

Injury symptoms in the selectivity trials overview are presented in Table 3.4 - 6. Summary of the injury per symptoms in the selectivity trials is presented in Table 3.4 - 7 **Table 3.4 - 3.**

Results are summarised in tables Table 3.4 - 8.

**Table 3.4 - 6: Injury symptoms in the selectivity trials overview**

| Trial code/ Country              | EPP0 climatic zone | Year | Crop variety          | GF-4021       |               | BELKAR®          |              |             |
|----------------------------------|--------------------|------|-----------------------|---------------|---------------|------------------|--------------|-------------|
|                                  |                    |      |                       | 0.25 L/ha (N) | 0.5 L/ha (2N) | 0.25 L/ha (0.5N) | 0.5 L/ha (N) | 1 L/ha (2N) |
| DE17D2C315UB01C Germany          | Maritime           | 2017 | <i>Avatar</i>         | No            | No            | No               | No           | -           |
| DE17D2C315UB02C Germany          | Maritime           | 2017 | <i>Xenon</i>          | No            | Yes           | No               | Yes          | -           |
| DE17D2C315UB03C Germany          | Maritime           | 2017 | <i>PX 126</i>         | No            | No            | No               | Yes          | -           |
| DE17D2C315UB04C Germany          | Maritime           | 2017 | <i>Hattrick</i>       | No            | Yes           | No               | Yes          | -           |
| DE18D2C330UB01C Germany          | Maritime           | 2018 | <i>Alvaro</i>         | Yes           | Yes           | Yes              | Yes          | -           |
| DE18D2C330UB02C Germany          | Maritime           | 2018 | <i>Alvaro</i>         | Yes           | Yes           | Yes              | Yes          | -           |
| DE18D2C331UB01C Germany          | Maritime           | 2018 | <i>Alvaro</i>         | Yes           | Yes           | Yes              | Yes          | -           |
| DE18D2C331UB02C Germany          | Maritime           | 2018 | <i>Avatar</i>         | Yes           | Yes           | Yes              | Yes          | -           |
| EA18D2C330AP01C Romania          | South-East         | 2018 | <i>PR44W29</i>        | No            | Yes           | No               | Yes          | -           |
| EA19D2C241H-AMT01 Romania        | South-East         | 2019 | <i>Extorm</i>         | No            | No            | -                | No           | No          |
| EA19D2C241H-AMT02 Romania        | South-East         | 2019 | <i>Exception</i>      | No            | No            | -                | No           | No          |
| EA19D2C241H-DAV01 United Kingdom | Maritime           | 2019 | <i>Exalte</i>         | No            | No            | No               | No           | -           |
| EA19D2C241H-DMI01 France         | Maritime           | 2019 | <i>KWS Feliciano</i>  | Yes           | Yes           | -                | Yes          | Yes         |
| EA19D2C241H-DMI02 France         | Maritime           | 2019 | <i>Architect</i>      | Yes           | Yes           | -                | Yes          | Yes         |
| EA19D2C241H-DMI03 France         | Maritime           | 2019 | <i>DK Exploration</i> | Yes           | Yes           | -                | Yes          | Yes         |
| EA19D2C241H-DPE01 Germany        | Maritime           | 2019 | <i>Bender</i>         | No            | No            | -                | No           | Yes         |
| EA19D2C241H-DQZ01 Germany        | Maritime           | 2019 | <i>Bender</i>         | No            | No            | -                | No           | Yes         |
| EA19D2C295H-HET012_3 Hungary     | South-East         | 2019 | <i>Umberto KWS</i>    | No            | No            | No               | No           | -           |
| FR17D2C315YL01C France           | Maritime           | 2017 | <i>DK Extorm</i>      | Yes           | Yes           | Yes              | Yes          | -           |
| FR17D2C315YL02C France           | Maritime           | 2017 | <i>DK Exception</i>   | Yes           | Yes           | Yes              | Yes          | -           |
| FR17D2C315YL03C France           | Maritime           | 2017 | <i>DK Exception</i>   | No            | Yes           | Yes              | Yes          | -           |
| FR17D2C315YL04C France           | Maritime           | 2017 | <i>DK Expansion</i>   | No            | No            | No               | No           | -           |
| FR17D2C315YL05C France           | Mediterranean      | 2017 | <i>Gaelis</i>         | No            | No            | No               | No           | -           |
| FR18D2C330YL01C France           | Mediterranean      | 2018 | <i>DK Exception</i>   | Yes           | Yes           | No               | Yes          | -           |
| FR18D2C331YL01C France           | Mediterranean      | 2018 | <i>DK Exception</i>   | No            | Yes           | No               | Yes          | -           |
| GB18D2C330EB01C United Kingdom   | Maritime           | 2018 | <i>Windozz</i>        | Yes           | Yes           | Yes              | Yes          | -           |
| GB18D2C331EB01C United Kingdom   | Maritime           | 2018 | <i>Windozz</i>        | Yes           | Yes           | Yes              | Yes          | -           |
| HU18D2C330GK01C Hungary          | South-East         | 2018 | <i>DK Extorm</i>      | Yes           | Yes           | Yes              | Yes          | -           |
| HU18D2C330GK02C                  | South-East         | 2018 | <i>Veritas CL</i>     | Yes           | Yes           | Yes              | Yes          | -           |

|                            |            |      |                    |     |     |     |     |   |
|----------------------------|------------|------|--------------------|-----|-----|-----|-----|---|
| Hungary                    |            |      |                    |     |     |     |     |   |
| HU18D2C331GK01C Hungary    | South-East | 2018 | <i>DK Ex-storm</i> | Yes | Yes | Yes | Yes | - |
| HU18D2C331GK02C Hungary    | South-East | 2018 | <i>Veritas CL</i>  | No  | Yes | No  | Yes | - |
| RO18D2C331AP01C Romania    | South-East | 2018 | <i>PT264-I831</i>  | Yes | Yes | Yes | Yes | - |
| PL17D2C315AS01C Poland     | North-East | 2017 | Hybrirock F1       | Yes | Yes | Yes | Yes |   |
| PL17D2C315AS02C Poland     | North-East | 2017 | Mercedes           | No  | No  | No  | No  | - |
| PL17D2C315AS03C Poland     | North-East | 2017 | Amazon             | No  | No  | No  | No  | - |
| PL17D2C315AS04C Poland     | North-East | 2017 | DK Exalte          | Yes | Yes | Yes | Yes | - |
| EA19D2C098H-DPF02 Poland   | North-East | 2018 | Atora              | Yes | Yes | Yes | Yes | - |
| EA19D2C100H-DPF01 Poland   | North-East | 2018 | Visby              | Yes | Yes | Yes | Yes | - |
| EA19D2C100H-DPF02 Poland   | North-East | 2018 | Atora              | Yes | Yes | Yes | Yes | - |
| EA19D2C295H-DPF09 Poland   | North-East | 2018 | PT275              | No  | No  | No  | No  | - |
| CZ17D2C315KS01C Czech Rep. | Maritime   | 2017 | Allison            | No  | Yes | No  | Yes | - |
| CZ18D2C330KS01C Czech Rep. | Maritime   | 2018 | Marathon           | No  | Yes | No  | No  | - |
| CZ17D2C315KS02C Czech Rep. | Maritime   | 2017 | DK Ex-storm        | No  | No  | No  | No  | - |
| CZ18D2C331KS01C Czech Rep. | Maritime   | 2018 | Marathon           | No  | No  | No  | No  | - |

**Table 3.4 - 7: Summary of the injury per symptoms in the 44 selectivity trials**

|                              | GF-4021                      |               | BELKAR®       |               |             |
|------------------------------|------------------------------|---------------|---------------|---------------|-------------|
|                              | 0.25 L/ha (N)                | 0.5 L/ha (2N) | 0.25 L/ha (N) | 0.5 L/ha (2N) | 1 L/ha (4N) |
|                              | <b>Color (%)</b>             |               |               |               |             |
| Number of trials             | 32                           | 32            | 25            | 32            | 7           |
| Number of trials with injury | 2                            | 2             | 1             | 1             | 2           |
| % of trials with injury      | 6.25                         | 6.25          | 4             | 3.125         | 28.6        |
|                              | <b>Deformation (%)</b>       |               |               |               |             |
| Number of trials             | 44                           | 44            | 37            | 44            | 7           |
| Number of trials with injury | 16                           | 22            | 14            | 23            | -           |
| % of trials with injury      | 36.3                         | 50.0          | 37.8          | 52.3          | -           |
|                              | <b>Delay maturity(%)</b>     |               |               |               |             |
| Number of trials             | 32                           | 32            | 25            | 32            | 7           |
| Number of trials with injury | 2                            | 3             | 2             | 3             | 1           |
| % of trials with injury      | 6.3                          | 9.4           | 8.0           | 9.4           | 14.3        |
|                              | <b>Growth inhibition (%)</b> |               |               |               |             |
| Number of trials             | 32                           | 32            | 25            | 32            | 7           |
| Number of trials with injury | 2                            | 6             | 3             | 5             | 2           |
| % of trials with injury      | 6.3                          | 18.8          | 12.0          | 15.6          | 28.6        |
|                              | <b>Injury (%)</b>            |               |               |               |             |
| Number of trials             | 44                           | 44            | 37            | 44            | 7           |
| Number of trials with injury | 9                            | 14            | 9             | 13            | 2           |
| % of trials with injury      | 20.5                         | 31.8          | 24.3          | 25.0          | 28.6        |
|                              | <b>Leaf roll (%)</b>         |               |               |               |             |
| Number of trials             | 32                           | 32            | 25            | 32            | 7           |
| Number of trials with injury | 2                            | 2             | 2             | 2             | 0           |
| % of trials with injury      | 6.3                          | 6.3           | 8.0           | 6.3           | 0.0         |
|                              | <b>Stand reduction (%)</b>   |               |               |               |             |
| Number of trials             | 32                           | 32            | 25            | 32            | 7           |
| Number of trials with injury | 0                            | 1             | 0             | 1             | 0           |
| % of trials with injury      | 0.0                          | 3.1           | 0.0           | 3.1           | 0.0         |
|                              | <b>Vigor (%)</b>             |               |               |               |             |
| Number of trials             | 32                           | 32            | 25            | 32            | 7           |



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|                              |      |      |      |      |      |
|------------------------------|------|------|------|------|------|
| Number of trials with injury | 7    | 10   | 4    | 11   | 3    |
| % of trials with injury      | 21.9 | 31.3 | 16.0 | 34.4 | 42.9 |

**Table 3.4 - 8: Summarised phytotoxicity results - Selectivity trials**

| Trial code (country code) | GF-4021 at 0.25 L/ha |          |   |      |          |                              |  |       |            | GF-4021 at 0.5 L/ha |          |   |       |            |                              |  |            |    |
|---------------------------|----------------------|----------|---|------|----------|------------------------------|--|-------|------------|---------------------|----------|---|-------|------------|------------------------------|--|------------|----|
|                           | Phytotoxicity        |          |   |      |          | vigour vs. UTC (UTC =100.0%) |  |       | Yied loss* | Phytotoxicity       |          |   |       |            | vigour vs. UTC (UTC =100.0%) |  | Yied loss* |    |
|                           | Max                  | Symptoms | Transitory (if no: phyto. at the last assessment) |      |          | Min (%)                      | Transitory (if no: vigour. at the last assessment) |       |            | Max                 | Symptoms | Transitory (if no: phyto. at last assessment) |       |            | Min (%)                      | Transitory (if no: vigour. at the last assessment) |            |    |
|                           |                      |          | Y/N   | %    | Symptoms |                              | Y/N  | %     |            |                     |          | Y/N   | %     | Symptoms   |                              | Y/N  |            | %  |
| DE17D2C315UB02C (DE)      | 0.0%                 | -        | -   | -    | -        | NC                           | -  | -     | No         | 2.25%               | GROINHIB | Yes   |       | -          | NC                           | -  | -          | No |
| DE17D2C315UB04C (DE)      | 0.0%                 | -        | -   | -    | -        | 100%                         | -  | -     | No         | 1.25%               | DEFORM - | No  | 0.25% | DEFORM     | 99.8%                        | Yes  | -          | No |
| DE18D2C330UB01C (DE)      | 38.75%               | DEFORM   | Yes   | -    | -        | 95.3%                        | Yes  | -     | No         | 77.5%               | DEFORM   | No  | 3.5%  | DEFORM     | 91.5%                        | Yes  | -          | No |
|                           | 6.25%                | GROINHIB | Yes   | -    | -        | -                            | -  | -     | No         | 10%                 | GROINHIB | Yes   | -     | -          | -                            | -  | -          | No |
|                           | 0.0%                 | -        | -   | -    | -        | -                            | -  | -     | No         | 3.5%                | STANDRED | No  | 3.5%  | STANDRED   | -                            | -  | -          | No |
| DE18D2C330UB02C (DE)      | 6.5%                 | DEFORM   | Yes   | -    | -        | 93.5%                        | No   | 94%   | No         | 11.8%               | DEFORM   | Yes   | -     | -          | 87%                          | No   | 90%        | No |
| DE18D2C331UB01C (DE)      | 31.25%               | DEFORM   | Yes   | -    | -        | 97%                          | Yes  | -     | No         | 58.75%              | DEFORM   | Yes   | -     | -          | 95.3%                        | Yes  | -          | No |
| DE18D2C331UB02C (DE)      | 3.75%                | DEFORM   | Yes   | -    | -        | 100%                         | -  | -     | No         | 18.5%               | DEFORM   | No  | 2.5%  | -          | 82.5%                        | No   | 82.5%      | No |
| EA18D2C330AP01C (RO)      | 0.0%                 | -        | -   | -    | -        | 100%                         | -  | -     | No         | 21.25%              | DEFORM   | Yes   | -     | -          | 92.5%                        | No   | 97.5%      | No |
|                           | 0.0%                 | -        | -   | -    | -        | -                            | -  | -     | -          | 27.5%               | INJURY   | Yes   | -     | -          | -                            | -  | -          | -  |
|                           | 0.0%                 | -        | -   | -    | -        | -                            | -  | -     | -          | 5%                  | GROINHIB | Yes   | -     | -          | -                            | -  | -          | -  |
|                           | 0.0%                 | -        | -   | -    | -        | -                            | -  | -     | -          | 5%                  | DELAYMAT | No  | 5%-   | DELAYMAT-  | -                            | -  | -          | -  |
| EA19D2C241H-DMI01 (FR)    | 3.3%                 | DEFORM   | No  | 0.3% | DEFORM   | NC                           | -  | -     | No         | 8.5%                | DEFORM   | No  | 6%    | DEFORM     | NC                           | -  | -          | No |
| EA19D2C241H-DMI02 (FR)    | 4%                   | COLOR    | Yes   | -    | -        | 100%                         | -  | -     | No         | 4.5%                | COLOR    | Yes   | -     | -          | 100%                         | -  | -          | No |
|                           | 4%                   | INJURY   | Yes   | -    | -        | -                            | -  | -     | -          | 4.5%                | INJURY   | Yes   | -     | -          | -                            | -  | -          | -  |
|                           | 0.0%                 | -        | -   | -    | -        | -                            | -  | -     | -          | 2.8%                | DEFORM   | Yes   | -     | -          | -                            | -  | -          | -  |
|                           | 0.0%                 | -        | -   | -    | -        | -                            | -  | -     | -          | 1.7%                | DELAYMAT | No  | 1%-   | DELAYMAT - | -                            | -  | -          | -  |
| EA19D2C241H-DMI03 (FR)    | 5%                   | DELAYMAT | Yes   | -    | -        | 92.5%                        | No   | 92.5% | No         | 0.7%                | DELAYMAT | Yes   | -     | -          | 92%                          | No   | 92%        | No |
| FR17D2C315YL01C (FR)      | 1.75%                | COLOR    | Yes   |      |          | 99%                          | Yes  |       | No         | 2.25%               | COLOR    | Yes   | -     | -          | 94.5                         | Yes  | -          | No |
|                           | 0.5%                 | DEFORM   | Yes   | -    | -        | -                            | -  | -     | -          | 5.75%               | DEFORM   | No  | 0.5%  | DEFORM     | -                            | -  | -          | -  |
|                           | 0.0%                 | -        | -   | -    | -        | -                            | -  | -     | -          | 2.25%               | GROINHIB | Yes   | -     | -          | -                            | -  | -          | -  |
|                           | 0.0%                 | -        | -   | -    | -        | -                            | -  | -     | -          | 6.25%               | INJURY   | No  | 3%    | INJURY     | -                            | -  | -          | -  |

| Trial code (country code) | GF-4021 at 0.25 L/ha |          |   |       |          |                              |  |   |            | GF-4021 at 0.5 L/ha |          |   |       |          |                              |  |   |            |
|---------------------------|----------------------|----------|---|-------|----------|------------------------------|--|---|------------|---------------------|----------|---|-------|----------|------------------------------|--|---|------------|
|                           | Phytotoxicity        |          |   |       |          | vigour vs. UTC (UTC =100.0%) |  |   | Yied loss* | Phytotoxicity       |          |   |       |          | vigour vs. UTC (UTC =100.0%) |  |   | Yied loss* |
|                           | Max                  | Symptoms | Transitory (if no: phyto. at the last assessment) |       |          | Min (%)                      | Transitory (if no: vigour. at the last assessment) |   |            | Max                 | Symptoms | Transitory (if no: phyto. at last assessment) |       |          | Min (%)                      | Transitory (if no: vigour. at the last assessment) |   |            |
|                           |                      |          | Y/N   | %     | Symptoms |                              | Y/N  | % |            |                     |          | Y/N   | %     | Symptoms |                              | Y/N  | % |            |
| FR17D2C315YL02C (FR)      | 15%                  | DEFORM   | Yes   |       |          | NC                           | -  | - | NC         | 30%                 | DEFORM   | Yes   | -     | -        | NC                           | -  | - | NC         |
| FR17D2C315YL03C (FR)      | 0.0%                 | -        | -   | -     | -        | NC                           | -  | - | No         | 2%                  | GROINHIB | Yes   | -     | -        | NC                           | -  | - | No         |
|                           | 0.0%                 | -        | -   | -     | -        | -                            | -  | - | -          | 2%                  | INJURY   | Yes   | -     | -        | -                            | -  | - | -          |
| FR18D2C330YL01C (FR)      | 3.75%                | DEFORM   | Yes   | -     | -        | NC                           | -  | - | NC         | 8%                  | DEFORM   | Yes   | -     | -        | NC                           | -  | - | NC         |
| FR18D2C331YL01C (FR)      | 0.0%                 | -        | -   | -     | -        | NC                           | -  | - | NC         | 5%                  | DEFORM   | Yes   | -     | -        | NC                           | -  | - | NC         |
| GB18D2C330EB01C (GB)      | 6.25%                | DELAYMAT | No  | 2.25% | -        | 80.5%                        | Yes  | - | No         | 10%                 | DELAYMAT | No  | 5%    | -        | 66.7%                        | Yes  | - | No         |
|                           | 0.25%                | GROINHIB | Yes   | -     | -        | -                            | -  | - | -          | 2%                  | GROINHIB | Yes   | -     | -        | -                            | -  | - | -          |
|                           | 2%                   | LEAFROLL | No  | 2%    | LEAFROLL | -                            | -  | - | -          | 2%                  | LEAFROLL | No  | 2%    | LEAFROLL | -                            | -  | - | -          |
| GB18D2C331EB01C (GB)      | 7.5%                 | DELAYMAT | No-   | 3.75% | -        | 91.7%                        | Yes  | - | No         | 6.25%               | DELAYMAT | No  | 3.75% | -        | 94.4%                        | Yes  | - | No         |
|                           | 2.25%                | LEAFROLL | Yes   | -     | -        | -                            | -  | - | -          | 1.5%                | LEAFROLL | Yes   | -     | -        | -                            | -  | - | -          |
| HU18D2C330GK01C (HU)      | 2%                   | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         | 20%                 | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         |
|                           | 1.25%                | INJURY   | Yes   | -     | -        |                              | -  | - | -          | 12%                 | INJURY   | Yes   | -     | -        |                              | -  | - | -          |
| HU18D2C330GK02C (HU)      | 10%                  | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         | 27.5%               | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         |
|                           | 1%                   | INJURY   | Yes   | -     | -        |                              | -  | - | -          | 1%                  | INJURY   | Yes   | -     | -        |                              | -  | - |            |
| HU18D2C331GK01C           | 0.5%                 | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         | 2%                  | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         |
|                           | 0.25%                | INJURY   | Yes   | -     | -        |                              | -  | - | -          | 2.5%                | INJURY   | Yes   | -     | -        | -                            | -  | - | -          |
| HU18D2C331GK02C (HU)      | -                    | -        | -   | -     | -        | 100%                         | -  | - | No         | 8.75%               | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         |
|                           | -                    | -        | -   | -     | -        |                              | -  | - | -          | 1%                  | INJURY   | Yes   | -     | -        | -                            | -  | - | -          |
| RO18D2C331AP01C (RO)      | 9.5%                 | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         | 13%                 | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         |
| CZ17D2C315KS01C (CZ)      | -                    | -        | -   | -     | -        | -                            | -  | - | -          | 0.2%                | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         |
| CZ18D2C330KS01C (CZ)      | -                    | -        | -   | -     | -        | -                            | -  | - | -          | 5%                  | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         |
| CZ18D2C330KS01C (CZ)      | -                    | -        | -   | -     | -        | -                            | -  | - | -          | 6%                  | INJURY   | Yes   | -     | -        | 100%                         | -  | - | No         |
| PL17D2C315AS01C           | 2.3%                 | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         | 9.8%                | DEFORM   | Yes   | -     | -        | 100%                         | -  | - | No         |

| Trial code (country code) | GF-4021 at 0.25 L/ha |          |   |   |          |                              |  |            |         | GF-4021 at 0.5 L/ha |          |   |   |          |                              |  |            |         |
|---------------------------|----------------------|----------|---|---|----------|------------------------------|--|------------|---------|---------------------|----------|---|---|----------|------------------------------|--|------------|---------|
|                           | Phytotoxicity        |          |   |   |          | vigour vs. UTC (UTC =100.0%) |  | Yied loss* |         | Phytotoxicity       |          |   |   |          | vigour vs. UTC (UTC =100.0%) |  | Yied loss* |         |
|                           | Max                  | Symptoms | Transitory (if no: phyto. at the last assessment) |   |          | Min (%)                      | Transitory (if no: vigour. at the last assessment) |            | Yes /No | Max                 | Symptoms | Transitory (if no: phyto. at last assessment) |   |          | Min (%)                      | Transitory (if no: vigour. at the last assessment) |            | Yes /No |
|                           |                      |          | Y/N   | % | Symptoms |                              | Y/N  | %          |         |                     |          | Y/N   | % | Symptoms |                              | Y/N  | %          |         |
| (PL)                      |                      |          |   |   |          |                              |  |            |         |                     |          |   |   |          |                              |  |            |         |
| PL17D2C315AS01C (PL)      | 3.3%                 | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      | 8.8%                | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      |
| PL17D2C315AS04C (PL)      | 0.5%                 | DEFORM   | Yes   | - | -        | 100%                         | -  | -          | No      | 1.8%                | DEFORM   | Yes   | - | -        | 100%                         | -  | -          | No      |
| PL17D2C315AS04C (PL)      | 0.5%                 | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      | 1.8%                | DEFORM   | Yes   | - | -        | 100%                         | -  | -          | No      |
| EA19D2C098H-DPF02 (PL)    | 2%                   | DEFORM   | Yes   | - | -        | 100%                         | -  | -          | No      | 3.9%                | DEFORM   | Yes   | - | -        | 100%                         | -  | -          | No      |
| EA19D2C098H-DPF02 (PL)    | 2.5%                 | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      | 5.0%                | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      |
| EA19D2C100H-DPF01 ( (PL)  | 7.3%                 | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      | 20.5%               | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      |
| EA19D2C100H-DPF01 (PL)    | 7.3%                 | DEFORM   | Yes   | - | -        | 100%                         | -  | -          | No      | 20.5%               | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      |
| EA19D2C100H-DPF02 (PL)    | 2.3%                 | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      | 13.8%               | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      |
| EA19D2C100H-DPF02 (PL)    | 2.3%                 | CHLORO   | Yes   | - | -        | 100%                         | -  | -          | No      | 13.8%               | INJURY   | Yes   | - | -        | 100%                         | -  | -          | No      |

\* According to the harvest conclusions presented in section 3.4.2.

COLOR: Color rate, DEFORM: Deformed, DELAYMAT: Delayed maturity, GROINHIB: Growth inhibition, INJURY: Injury, LEAFROLL: Leaf margin roll or curl, STANDRED: Stand reducti

**Table 3.4 - 9: Summarised results: phytotoxicity assessments from selectivity trials**

| Number of trials with...                                  |             | 44 trials        |                  |                  |                  |                |
|---|-------------|------------------|------------------|------------------|------------------|----------------|
|   |             | GF-4021          |                  | BELKAR®          |                  |                |
|   |             | 0.25 L/ha<br>(N) | 0.5 L/ha<br>(2N) | 0.25 L/ha<br>(N) | 0.5 L/ha<br>(2N) | 1 L/ha<br>(4N) |
| Maximum of<br>phytotoxicity recorded<br>during the trials | 0%          | 16               | 10               | 12               | 10               | 2              |
|   | >0% to 5%   | 8                | 7                | 7                | 9                | 2              |
|   | >5% to 10%  | 4                | 6                | 2                | 5                | 1              |
|   | >10% to 15% | 1                | 2                | 1                | 3                | -              |
|   | >15%        | 3                | 7                | 3                | 5                | -              |
| Level of symptoms at<br>the last assessments              | 0%          | 27               | 20               | 23               | 23               | 4              |
|   | >0% to 5%   | 4                | 9                | 2                | 8                | 1              |
|   | >5% to 10%  | 1                | 2                | -                | 1                | -              |
|   | >10% to 15% | -                | -                | -                | -                | -              |
|   | >15%        | -                | 1                | -                | -                | -              |

In the 44 selectivity trials 30 cultivars were assessed Alison (1), Alvaro (2), Amazon (1), Architect (2), Atora(2), Avatar (3), Bender (2), DK Exalte (1) DK Exception (3), DK Expansion (1), DK Explorati (1), DK Exstorm (4), Exalte (1), Exception (1), Exstorm (1), Gaelis (1), Hattrick (1), Hybridock (1), KWS Feliciano (1), Marathon (2), Mercedes (1), PR44W29 (1), PT264-I831 (1), PT275 (1), PX 126 (1), Umberto KWS (1), Veritas CL (2), Windozz (2), Xenon (1), Visby (1)

In these 44 selectivity trials only one application timing was tested from BBCH 13 to BBCH 17.

In 22 out of 44 selectivity trials, phytotoxicity symptoms caused by GF-4021 at 0.25 L/ha were recorded. In 18 trials phytotoxicity symptoms (COLOR, DEFORM, INJURY, DELAYMAT) were acceptable, lower than 10% and in 13 out of these 22 trials the symptoms were transitory.

In 4 out of 22 trials with symptoms, these were unacceptable (higher than 10%) on assessments like DEFORM or VIGOR, however the symptoms were all transitory.

#### Comments of zRMS:

The Applicant has submitted the results from 44 selectivity trials. However, 3 trials were conducted in region of France belonging to the Mediterranean EPPO climatic zones and these trials were excluded from an evaluation. 24 selectivity trials were carried out in **the Maritime EPPO climatic zone** (BBCH 11-19). No phytotoxicity symptoms have been observed in 5 trials. GF-4021 at 0,25 l/ha (1N) and 0,5 l/ha (2N) caused negative impacts i.a. growth inhibition, deformation and delayed maturity on unacceptable level (>10%) in 3 out of 19 selectivity trials. These symptoms were transitory.

8 selectivity trials were carried out in **the North-East EPPO climatic zone** (BBCH 12-18). No phytotoxicity symptoms have been observed in 3 trials. In the other trials, GF-4021 at 0,25 l/ha caused negative impacts on low level (<5%) and deformation of 7,3% in 1 trial. GF-4021 at 0,5 l/ha caused phytotoxicity symptoms (deformation and chlorosis) on unacceptable level (>10%) in 2 trials. However, the most symptoms were transitory.

9 selectivity trials were carried out in **the South-East EPPO climatic zone** (BBCH 12-19). No phytotoxicity symptoms have been observed in 3 trials. GF-4021 at 0,25 l/ha caused deformation on unacceptable level (10%) in 1 trial. Also deformation and injury on unacceptable level have been noted after an application of higher dose rate of 0,5 l/ha in 4 trials. All symptoms were transitory.

Based on the results from three EPPO climatic zone, it can be concluded that GF-4021 at 0,25 l/ha is safe for winter oilseed rape. However, the transient phytotoxicity symptoms are possible and this information should be included to the product label.

## **3.4.2 Effect on the yield of treated plants or plant product (KCP 6.4.2)**

### **3.4.2.1 Material and Methods**

Material and Methods used in selectivity trials are given within Section 3.4.1.1 and is not repeated here.

### **3.4.2.2 Effect on the yield of winter oilseed rape**

The possible impact of LaDiva (GF-4021) on the yield of winter oilseed rape was studied in 29 selectivity trials carried out between 2017 and 2019 in Maritime, North-East and South East EPPO climatic zones. All trials were carried out by testing facilities officially recognised according to Good Experimental Practice (GEP). The relationship between yield and phytotoxicity symptoms were analysed in **Table 3.4 - 10: Relationship between phytotoxicity (maximum observed) and yield - Selectivity trials** Table 3.4 - 10. Table

Table 3.4 - 11 presents the comparison of the yield with the reference standard.

**Table 3.4 - 10: Relationship between phytotoxicity (maximum observed) and yield - Selectivity trials**

| Trial code           | Crop Variety   | Maximum phyto |      |           |      |          |      |          |      | Un-treated T/ha | Yield     |           |          |          |
|----------------------|----------------|---------------|------|-----------|------|----------|------|----------|------|-----------------|-----------|-----------|----------|----------|
|                      |                | GF-4021       |      | BELKAR    |      | GF-4021  |      | BELKAR   |      |                 | GF-4021   | BEL-KAR   | GF-4021  | BELKAR   |
|                      |                | 0.25 L/ha     |      | 0.25 L/ha |      | 0.5 L/ha |      | 0.5 L/ha |      |                 | 0.25 L/ha | 0.25 L/ha | 0.5 L/ha | 0.5 L/ha |
|                      |                | Phyto         | DA-A | Phyto     | DA-A | Phyto    | DA-A | Phyto    | DA-A |                 | %UTC      | %UTC      | %UTC     | %UTC     |
| DE17D2C315UB01C      | Avatar         | 0%            | -    | 0%        | -    | 0%       |      | 0%       |      | 4.83            | 99.0      | 102.5     | 97.9     | 98.8     |
| DE17D2C315UB02C      | Xenon          | 0%            | -    | 0%        | -    | 2.25%    | 56   | 1.5%     | 56   | 4.65            | 99.3      | 95.3      | 99.1     | 102.8    |
| DE17D2C315UB03C      | PX 126         | 0%            | -    | 0%        | -    | 0%       |      | 0.5%     | 16   | 3.04            | 102.0     | 106.9     | 102.1    | 101.8    |
| DE17D2C315UB04C      | Hattrick       | 0%            | -    | 0%        | -    | 1.25%    | 30   | 5%       | 30   | 4.10            | 105.9     | 100.3     | 105.5    | 99.8     |
| DE18D2C330UB01C      | Alvaro         | 38.75%        | 30   | 31.25%    | 30   | 77.5%    | 30   | 53.75%   | 30   | 3.45            | 103.0     | 95.5      | 102.9    | 99.6     |
| DE18D2C330UB02C      | Avatar         | 6.5%          | 56   | 3.5%      | 27   | 11.75%   | 27   | 7.75%    | 27   | 5.04            | 99.5      | 105.4     | 103.2    | 102.6    |
| DE18D2C331UB01C      | Alvaro         | 31.25%        | 10   | 46.25%    | 10   | 58.75%   | 10   | 53.75%   | 10   | 3.25            | 109.6     | 114.8     | 110.2    | 116.9    |
| DE18D2C331UB02C      | Avatar         | 3.75%         | 184  | 3.5%      | 184  | 18.5%    | 153  | 3%       | 210  | 5.03            | 97.6      | -         | 97.7     | 97.0     |
| EA18D2C330AP01C      | PR44W29        | 0%            |      |           | -    |          |      |          |      | 1.61            | 99.4      | -         | 98.8     | 98.1     |
| EA19D2C241H-AMT01    | Extorm         | 0%            | -    | 0%        | -    | 0%       |      | 0%       |      | 3.06            | 99.7      | -         | 99.0     | 99.3     |
| EA19D2C241H-AMT02    | Exception      | 0%            | -    | 0%        | -    | 0%       |      | 0%       |      | 3.26            | 98.8      | -         | 98.8     | 100.0    |
| EA19D2C241H-DAV01    | Exalte         | 0%            | -    | 0%        | -    | 0%       |      | 0%       |      | 3.02            | 113.6     | 108.6     | 112.6    | 108.3    |
| EA19D2C241H-DMI01    | KWS Feliciano  | 3.3%          | 129  | -         | -    | 8%       | 59   | 4%       | 129  | 2.96            | 103.0     | -         | 98.3     | 101.7    |
| EA19D2C241H-DMI02    | Architect      | 4%            | 59   | -         | -    | 4.5%     | 59   | 3.3%     | 59   | 4.53            | 103.1     | -         | 100.0    | 102.2    |
| EA19D2C241H-DMI03    | DK Exploration |               |      |           |      |          |      |          |      | 3.46            | 102.0     | -         | 105.2    | 105.8    |
| EA19D2C241H-DPE01    | Bender         | 0%            | -    | -         | -    | 0%       | -    | 0%       | -    | 4.90            | 98.0      | -         | 98.0     | 100.0    |
| EA19D2C241H-DQZ01    | Bender         | 0%            | -    | -         | -    | 0%       | -    | 0%       | -    | 6.77            | 100.5     | -         | 100.9    | 100.2    |
| EA19D2C295H-HET012_3 | Umberto KWS    | 0%            | -    | 0%        | -    | 0%       | -    | 0%       | -    | 2.63            | 101.1     | -         | 101.0    | 102.8    |
| FR17D2C315YL01C      | DK Extorm      | 1.75%         | 12   | 1.25%     | 12   | 6.75%    | 12   | 5.5%     | 12   | 4.17            | 101.1     | -         | 102.6    | 102.3    |
| FR17D2C315YL03C      | Architect      | 0%            | -    | 0.75%     | 189  | 2%       | 189  | 9%       | 189  | 5.20            | 102.7     | -         | 103.5    | 102.6    |
| FR17D2C315YL04C      | DK Expansion   | 0%            | -    | 0%        | -    | 0%       | -    | 0%       | -    | 6.20            | 96.6      | -         | 98.9     | 100.6    |
| FR17D2C315YL05C      | Gaelis         | 0%            | -    | 0%        | -    | 0%       | -    | 0%       | -    | 3.51            | 104.4     | -         | 99.5     | 102.7    |
| GB18D2C330EB01C      | Windozz        | 11.75%        | 14   | 12%       | 14   | 28.75%   | 14   | 21%      | 14   | 2.82            | 97.0      | -         | 99.1     | 101.8    |
| GB18D2C331EB01C      | Windozz        | 7.5%          | 191  | 3.75%     | 191  | 6.25%    | 191  | 2.5%     | 191  | 2.76            | 106.9     | -         | 94.5     | 106.1    |
| HU18D2C330GK01C      | DK Extorm      | 2%            | 31   | 2.5%      | 14   | 20%      | 14   | 11.25%   | 7    | 4.12            | 97.7      | -         | 99.9     | 93.6     |
| HU18D2C330GK02C      | Veritas CL     | 80%           | 14   | 80%       | 14   | 90%      | 14   | 90%      | 14   | 2.50            | 108.0     | -         | 104.0    | 112.0    |

| Trial code      | Crop Variety       | Maximum phyto |      |           |      |          |      |          |      | Yield           |           |           |          |          |
|-----------------|--------------------|---------------|------|-----------|------|----------|------|----------|------|-----------------|-----------|-----------|----------|----------|
|                 |                    | GF-4021       |      | BELKAR    |      | GF-4021  |      | BELKAR   |      | Un-treated T/ha | GF-4021   | BEL-KAR   | GF-4021  | BELKAR   |
|                 |                    | 0.25 L/ha     |      | 0.25 L/ha |      | 0.5 L/ha |      | 0.5 L/ha |      |                 | 0.25 L/ha | 0.25 L/ha | 0.5 L/ha | 0.5 L/ha |
|                 |                    | Phyto         | DA-A | Phyto     | DA-A | Phyto    | DA-A | Phyto    | DA-A |                 | %UTC      | %UTC      | %UTC     | %UTC     |
| HU18D2C331GK01C | <i>DK Ex-storm</i> | 0.5%          | 27   | 0.75%     | 27   | 5%       | 18   | 1.25%    | 18   | 4.04            | 97.8      | -         | 100.9    | 104.0    |
| HU18D2C331GK02C | <i>Veritas CL</i>  | 0%            | -    | 0%        |      | 15%      | 28   | 15%      | 28   | 2.71            | 106.7     | -         | 100.4    | 100.4    |
| RO18D2C331AP01C | <i>PT264-I831</i>  | 9.5%          | 14   | 10%       | 14   | 13%      | 14   | 12.5%    | 14   | 2.16            | 97.6      | -         | 97.0     | 92.9     |

**Table 3.4 - 11: Effect on the yield of GF-4021 compared to the reference standard**

| No. of trials | Untreated  |     |     | Percentage of untreated control |      |       |                   |      |       |                  |      |       |                  |      |       | Number of trials significantly <sup>(1)</sup> > ; = ; < GF-4021 vs |           |                  |           |
|---------------|------------|-----|-----|---------------------------------|------|-------|-------------------|------|-------|------------------|------|-------|------------------|------|-------|--|-----------|------------------|-----------|
|               |            |     |     | GF-4021 0.25 L/ha               |      |       | BELKAR® 0.25 L/ha |      |       | GF-4021 0.5 L/ha |      |       | BELKAR® 0.5 L/ha |      |       | BELKAR® 0.25 L/ha  |           | BELKAR® 0.5 L/ha |           |
|               | Mean       | min | max | Mean                            | min  | max   | Mean              | min  | max   | Mean             | min  | max   | Mean             | min  | max   | UTC  | 0.5N      | UTC              | 2N        |
| <b>22</b>     | <b>3.7</b> | 1.6 | 6.2 | <b>102.1</b>                    | 96.6 | 113.6 | <b>102.8</b>      | 95.3 | 114.8 | <b>101.4</b>     | 94.5 | 112.6 | 102.2            | 92.9 | 116.9 | 0>;19=;0<  | 0>;19=;0< | 0>;19=;0<        | 0>;19=;0< |
| <b>7</b>      | <b>4.1</b> | 3.0 | 6.8 | <b>100.7</b>                    | 98.0 | 103.1 | -                 | -    | -     | <b>100.0</b>     | 98.0 | 105.2 | 101.3            | 99.3 | 105.8 | 0>;7=;0<   | -         | 0>;7=;0<         | 0>;7=;0<  |

<sup>(1)</sup> Statistical comparison.



GF-4021 applied at 0.25 L/ha showed no negative impact on the yield compared to untreated plot and reference standard applied in the same conditions in the 29 selectivity trials. Phytotoxicity symptoms were observed in 13 out of 29 trials but were at a very low level and most of them transitory, so no relationship between the phytotoxicity symptoms observed and the final yield have been identified in these trials.

GF-4021 applied at 0.5 L/ha showed no negative impact on the yield compared to untreated plot and reference standard applied in the same conditions in the 29 selectivity trials. Phytotoxicity symptoms observed in 17 out of 29 trials were at a very low level and most of them transitory, so no relationship between phytotoxicity symptoms observed and yield have been identified in these trials.

**Therefore, no negative effect on the yield of winter oilseed rape is expected if LaDiva (GF-4021) is applied at the requested dose of 0.25 L/ha according to the Good Agricultural Practices and label recommendations. However, LaDiva (GF-4021) could cause transitional phytotoxicity symptoms without any impact on the yield of winter oilseed rape.**

**Comments of zRMS:**

The effect on the yield of winter oilseed rape has been presented in 29 selectivity trials from the North-East, Maritime and South-East EPPO climatic zones. The trial FR17D2C315YL05C was excluded because it has been conducted in the southern part of France belonging to the Mediterranean EPPO climatic zone. No negative adverse effect on the yield have been observed in all selectivity trials. Furthermore, no significant differences between test and reference product have been detected. The phytotoxicity symptoms on level >10% were noted in 4 selectivity trials, although it did not affect the yield. Based on the trial results, it can be concluded that GF-4021 at dose rates of 0,25 l/ha is safe for the yield of winter oilseed rape.

### **3.4.3 Effects on the quality of plants or plant products (KCP 6.4.3)**

#### **3.4.3.1 Material and Methods**

Material and Methods used in selectivity trials are given within Section 3.4.1.1 and is not repeated here.

#### **3.4.3.2 Effects on the quality of winter wheat**

##### **3.4.3.2.1 Results in selectivity trials**

Different quality parameters (moisture content, specific weight, thousand grain weight, oil content or protein content) were measured in the 29 selectivity trials performed between 2017 and 2019.

All quality results are summarised in Table 3.4 - 12.

**Table 3.4 - 12: Effect on the quality parameters of GF-4021 compared to the reference standard**

| Quality parameters | No. of trials | Untreated |      |      |      | Percentage of untreated control |      |       |                   |      |       |                  |      |       |                  |      |       | Number of trials significantly <sup>(1)</sup> > ; = ; < GF-4021 vs |           |           |           |
|--------------------|---------------|-----------|------|------|------|---------------------------------|------|-------|-------------------|------|-------|------------------|------|-------|------------------|------|-------|--|-----------|-----------|-----------|
|                    |               |           |      |      |      | GF-4021 0.25 L/ha               |      |       | BELKAR® 0.25 L/ha |      |       | GF-4021 0.5 L/ha |      |       | BELKAR® 0.5 L/ha |      |       | BELKAR®  |           |           |           |
|                    |               | Unit      | Mean | min  | max  | Mean                            | min  | max   | Mean              | min  | max   | Mean             | min  | max   | Mean             | min  | max   | UTC  | 0.25 L/ha | UTC       | 0.5 L/ha  |
| Moist.             | 21            | %         | 6.9  | 4.8  | 9.5  | <b>100.2</b>                    | 94.3 | 108.0 | <b>99.4</b>       | 94.5 | 103.1 | <b>100.1</b>     | 95.5 | 111.9 | <b>99.5</b>      | 94.7 | 102.3 | 0>;19=,0<  | 0>;19=,0< | 0>;19=,0< | 0>;19=,0< |
|                    | 7             | %         | 7.5  | 6.2  | 8.8  | <b>100.1</b>                    | 95.8 | 104.0 | -                 | -    | -     | <b>101.0</b>     | 97.7 | 108.8 | <b>100.6</b>     | 95.8 | 109.1 | 0>;7=,0<   | -         | 0>;7=,0<  | 0>;7=,0<  |
| TGW                | 21            | g         | 4.4  | 3.7  | 5.1  | <b>100.8</b>                    | 94.6 | 108.2 | <b>101.9</b>      | 98.2 | 111.0 | <b>102.8</b>     | 92.7 | 119.3 | <b>101.0</b>     | 88.8 | 118.3 | 0>;19=,0<  | 0>;19=,0< | 2>;17=,0< | 0>;19=,0< |
|                    | 7             | g         | 4.3  | 3.9  | 4.7  | <b>100.8</b>                    | 97.0 | 105.2 | -                 | --   | -     | <b>102.6</b>     | 98.1 | 107.4 | <b>101.0</b>     | 97.3 | 103.6 | 0>;7=,0<   | -         | 0>;7=,0<  | 0>;7=,0<  |
| Oil                | 22            | %         | 43.3 | 34.6 | 48.4 | <b>99.6</b>                     | 97.1 | 101.7 | <b>99.5</b>       | 97.0 | 101.4 | <b>99.4</b>      | 95.7 | 101.1 | <b>99.5</b>      | 98.1 | 101.6 | 0>;20=,0<  | 0>;20=,0< | 0>;19=,1< | 0>;20=,0< |
|                    | 7             | %         | 43.5 | 39.7 | 48.4 | <b>100.1</b>                    | 99.4 | 100.9 | -                 | -    | -     | <b>97.0</b>      | 77.0 | 101.5 | <b>100.3</b>     | 99.4 | 102.0 | 0>;7=,0<   | -         | 0>;7=,0<  | 0>;6=,1<  |
| Protein            | 1             | %         | 21.0 | -    | -    | <b>20.9</b>                     | -    | -     | -                 | -    | -     | <b>20.8</b>      | -    | -     | <b>20.9</b>      | -    | -     | =  | -         | =         | =         |

<sup>(1)</sup> Statistical comparison. Moist: moisture content, TGW: thousand grain weight, Oil: oil content, Protein: protein content.

**Table 3.4 - 13a: Effect on the quality parameters of GF-4021 compared to the reference standard - Maritime EPPO zone**

| Quality parameters | No. of trials | Untreated |      |      |      | Percentage of untreated control |      |       |                   |      |       |                  |      |       |                  |      |       |
|--------------------|---------------|-----------|------|------|------|---------------------------------|------|-------|-------------------|------|-------|------------------|------|-------|------------------|------|-------|
|                    |               |           |      |      |      | GF-4021 0.25 L/ha               |      |       | BELKAR® 0.25 L/ha |      |       | GF-4021 0.5 L/ha |      |       | BELKAR® 0.5 L/ha |      |       |
|                    |               | Unit      | Mean | min  | max  | Mean                            | min  | max   | Mean              | min  | max   | Mean             | min  | max   | Mean             | min  | max   |
| Moist.             | 17            | %         | 6.9  | 4.8  | 9.8  | <b>100.7</b>                    | 94.3 | 107.3 | <b>100.2</b>      | 94.6 | 104.6 | <b>100.1</b>     | 91.5 | 105.0 | <b>99.1</b>      | 93.9 | 102.3 |
|                    | 6             | %         | 7.3  | 6.2  | 8.7  | <b>100.8</b>                    | 97.2 | 106.9 | -                 | -    | -     | <b>99.5</b>      | 95.5 | 102.5 | <b>100.8</b>     | 94.5 | 109.1 |
| TGW                | 17            | g         | 4.3  | 3.5  | 4.6  | <b>101.6</b>                    | 98.2 | 103.6 | <b>101.1</b>      | 97.7 | 105.2 | <b>102.4</b>     | 98.4 | 107.4 | <b>101.2</b>     | 96.6 | 105.1 |
|                    | 6             | g         | 4.5  | 4.0  | 4.9  | <b>102.6</b>                    | 96.9 | 108.2 | -                 | -    | -     | <b>106.5</b>     | 99.6 | 119.0 | <b>103.4</b>     | 98.5 | 110.8 |
| Oil                | 17            | %         | 43.7 | 41.0 | 48.4 | <b>99.7</b>                     | 98.5 | 101.5 | <b>99.7</b>       | 98.2 | 101.4 | <b>99.5</b>      | 97.8 | 100.5 | <b>99.5</b>      | 98.1 | 100.2 |
|                    | 6             | %         | 44.8 | 42.2 | 48.4 | <b>100.2</b>                    | 99.4 | 100.9 | -                 | -    | -     | <b>100.1</b>     | 98.7 | 101.6 | <b>100.4</b>     | 99.6 | 102.0 |
| Protein            | 1             | %         | 21.0 | -    | -    | <b>99.7</b>                     | -    | -     | -                 | -    | -     | <b>99.2</b>      | -    | -     | <b>99.7</b>      | -    | -     |

**Table 3.4 - 14b: Effect on the quality parameters of GF-4021 compared to the reference standard - North-East EPPO zone**

| Quality parameters | No. of trials | Untreated |      |      |      | Percentage of untreated control |      |       |                   |      |       |                  |      |       |                  |      |       |
|--------------------|---------------|-----------|------|------|------|---------------------------------|------|-------|-------------------|------|-------|------------------|------|-------|------------------|------|-------|
|                    |               |           |      |      |      | GF-4021 0.25 L/ha               |      |       | BELKAR® 0.25 L/ha |      |       | GF-4021 0.5 L/ha |      |       | BELKAR® 0.5 L/ha |      |       |
|                    |               | Unit      | Mean | min  | max  | Mean                            | min  | max   | Mean              | min  | max   | Mean             | min  | max   | Mean             | min  | max   |
| Moist.             | 7             | %         | 6.9  | 4.0  | 9.2  | <b>103.4</b>                    | 95.9 | 117.3 | <b>101.3</b>      | 97.5 | 104.3 | <b>101.2</b>     | 97.2 | 108.5 | <b>99.9</b>      | 92.8 | 104.9 |
|                    | 1             | %         | 8.6  | -    | -    | <b>108.3</b>                    | -    | -     | -                 | -    | -     | <b>106.6</b>     | -    | -     | <b>103.7</b>     | -    | -     |
| TGW                | 7             | g         | 6.1  | 4.6  | 13.2 | <b>99.9</b>                     | 97.0 | 102.1 | <b>100.3</b>      | 98.0 | 102.5 | <b>103.3</b>     | 95.1 | 117.8 | <b>101.2</b>     | 94.9 | 107.8 |
|                    | 1             | g         | 4.1  | -    | -    | <b>101.2</b>                    | -    | -     | -                 | -    | -     | <b>99.7</b>      | -    | -     | <b>100.9</b>     | -    | -     |
| Oil                | 7             | %         | 43.9 | 39.4 | 47.5 | <b>100.0</b>                    | 99.1 | 100.9 | <b>99.8</b>       | 99.1 | 100.4 | <b>99.9</b>      | 99.1 | 100.5 | <b>100.3</b>     | 99.6 | 101.5 |
|                    | 1             | %         | 40.8 | -    | -    | <b>100.2</b>                    | -    | -     | -                 | -    | -     | <b>101.8</b>     | -    | -     | <b>101.5</b>     | -    | -     |

**Table 3.4 - 15c: Effect on the quality parameters of GF-4021 compared to the reference standard - South-East EPPO zone**

| Quality parameters | No. of trials | <i>Untreated</i> |             |            |            | Percentage of untreated control |      |       |                      |      |       |                     |      |       |                     |      |       |
|--------------------|---------------|------------------|-------------|------------|------------|---------------------------------|------|-------|----------------------|------|-------|---------------------|------|-------|---------------------|------|-------|
|                    |               |                  |             |            |            | GF-4021<br>0.25 L/ha            |      |       | BELKAR®<br>0.25 L/ha |      |       | GF-4021<br>0.5 L/ha |      |       | BELKAR®<br>0.5 L/ha |      |       |
|                    |               | <i>Unit</i>      | <i>Mean</i> | <i>min</i> | <i>max</i> | <b>Mean</b>                     | min  | max   | <b>Mean</b>          | min  | max   | <b>Mean</b>         | min  | max   | <b>Mean</b>         | min  | max   |
| <b>Moist.</b>      | 6             | %                | 7.7         | 5.5        | 9.5        | <b>100.1</b>                    | 97.5 | 104.9 | <b>99.5</b>          | 97.4 | 101.2 | <b>99.2</b>         | 97.3 | 101.2 | <b>99.8</b>         | 98.2 | 101.6 |
|                    | 2             | %                | 8.2         | 7.6        | 8.8        | <b>97.8</b>                     | 95.8 | 99.7  | -                    | -    | -     | <b>99.5</b>         | 97.7 | 101.3 | <b>96.8</b>         | 95.8 | 97.7  |
| <b>TGW</b>         | 6             | g                | 4.1         | 3.7        | 4.5        | <b>99.6</b>                     | 95.0 | 103.5 | <b>101.0</b>         | 96.0 | 107.1 | <b>100.6</b>        | 95.3 | 110.5 | <b>99.4</b>         | 94.3 | 106.9 |
|                    | 2             | g                | 4.0         | 3.9        | 4.1        | <b>99.1</b>                     | 98.5 | 99.7  | -                    | -    | -     | <b>98.9</b>         | 98.1 | 99.7  | <b>98.7</b>         | 97.3 | 100.0 |
| <b>Oil</b>         | 6             | %                | 40.2        | 34.6       | 46.7       | <b>99.5</b>                     | 97.1 | 100.6 | <b>99.6</b>          | 98.4 | 101.2 | <b>99.1</b>         | 95.7 | 101.1 | <b>99.9</b>         | 98.4 | 101.6 |
|                    | 2             | %                | 40.3        | 39.7       | 40.9       | <b>99.8</b>                     | 99.6 | 100.0 | -                    | -    | -     | <b>88.5</b>         | 76.8 | 100.1 | <b>99.4</b>         | 99.2 | 99.5  |

### **Moisture content**

No negative effect on moist content was noted after an application of GF-4021 at 0.25 L/ha and 0.5 L/ha compared to the untreated plot. Moreover, no significant difference was noted between GF-4021 and the reference standard BELKAR<sup>®</sup> whatever the rate.

### **Thousand grain weight**

No negative effect on thousand grain weight was noted after an application of GF-4021 at 0.25 L/ha and 0.5 L/ha compared to the untreated plot. The only significant differences with untreated were showed in 2 out of 19 trials when GF-4021 applied at 0.5 L/ha showed a significant higher thousand grain. Moreover, no significant difference was noted between GF-4021 and the reference standard BELKAR<sup>®</sup>.

### **Oil content**

No negative effect on oil content was noted after an application of GF-4021 at 0.25 L/ha and 0.5 L/ha compared to untreated plot. Only 1 out of 20 trials showed a significant difference, GF-4021 at 0.5 L/ha compared to untreated, got a significant lower oil content. Also, compared to the standard BELKAR<sup>®</sup>, GF-4021 at 0.5 L/ha showed a significant lower oil content in only 1 out of 7 trials.

### **Protein content**

No negative effect on protein content was noted after an application of GF-4021 at 0.25 L/ha and 0.5 L/ha compared to the untreated plot. Moreover, no significant difference was noted between GF-4021 with reference standard BELKAR<sup>®</sup> in the only trial where this parameter was measured.

**Therefore, no negative effect on the quality of winter oilseed rape is expected if LaDiva (GF-4021) is applied at the requested dose of 0.25 L/ha according to the Good Agricultural Practices and label recommendations.**

#### **Comments of zRMS:**

Because the applicant has not included the results from all submitted selectivity trials, the zRMS summarised new tables for the all EPPO climatic zone separate. 23 selectivity trials has been presented to measure of four quality parameters of yield in the Maritime EPPO zone. The reference product Belkar was tested at dose rates 0,5 and 1,0 l/ha in 6 trials. 8 selectivity trials has been presented to measure of the quality parameters of yield in the North-East EPPO zone. The reference product Belkar was tested at dose rates 0,5 and 1,0 l/ha only in 1 trial. 8 selectivity trials has been presented to measure of the quality parameters of yield in the South-East EPPO zone. The reference product Belkar was tested at dose rates 0,5 and 1,0 l/ha only in 2 trials.

No negative effect on protein, oil and moisture content, and thousand grain weight was noted after an application of GF-4021 at 1N and 2N compared to the untreated plot. No significant differences was detected between the test and reference products.

It can be concluded that GF-4021 is safe for the yield of winter oilseed rape, either at dose rate 0,25 l/ha and even higher.

### **3.4.4 Effects on transformation processes (KCP 6.4.4)**

There is no transformation process for oilseed rape grains. Therefore this chapter is not relevant for this dossier.

### **3.4.5 Impact on treated plants or plant products to be used for propagation (KCP 6.4.5)**

According to the EPPO guideline ~~PP1-135~~ PP 1/135(4) (4) no germination test is required for an oilseed rape herbicide applied before stem elongation (BBCH-30). However some tests were done in 15 of the 32 selectivity trials presented in chapter (see 3.4.3) for GF-4021 applied at N and 2N rate. These 15 studies conducted between 2017 and 2019 in France (1), Germany (7), Hungary (3), Romania (2) and United Kingdom (2) revealed no negative impact of GF-4021 on propagation material oilseed rape seeds.

For all the information on material and methods, testing facility and organization, sites, locations, soil types, application methods and trials application details refer to the yield data chapter (see 0).

### Assessment methods

Germination tests were performed with a sample of 100 seeds in laboratory.

### Statistical analysis

Statistical analysis were performed using Tukey's and Levene's mean tests to determine if the means are the same or different from each other.

### Presentation of the data and synthesis

The below table present single trial results for % of germination and the mean, minimum and maximum values across trials.

**Table 3.4 - 16: Detailed results: Impact on the germination on seeds from plants treated with GF-4021**

| Trial code            | EPPO climatic zone | Year | Crop Variety | Untreated    | GF-4021      |              | BELKAR®      |              |
|-----------------------|--------------------|------|--------------|--------------|--------------|--------------|--------------|--------------|
|                       |                    |      |              |              | 0.25 L/ha    | 0.5 L/ha     | 0.25 L/ha    | 0.5 L/ha     |
| % relative to control |                    |      |              | 90.6         | 101.6        | 101.7        | 101.9        | 102.62       |
| (min-max)             |                    |      |              | (45.5-100.0) | (98.2-111.0) | (98.2-107.8) | (96.4-110.8) | (96.2-112.3) |
| Number of trials      |                    |      |              | 15           | 15           | 14           | 13           | 14           |

No negative effect on germination was noted in seeds from plants treated with GF-4021 at 0.25 L/ha and 0.5 L/ha compared to the untreated plot. Moreover, no significant difference was noted between seeds issued from plants treated with GF-4021 and seeds issued from plants treated with the reference standard BELKAR<sup>®</sup> whatever the rate.

**Therefore, no negative impact on seeds to be used for germination of winter oilseed rape is expected if LaDiva (GF-4021) is applied at the requested dose of 0.25 L/ha according to the Good Agricultural Practices and label recommendations.**

#### Comments of zRMS:

Based on the above trial results, it can be concluded that the test product GF-4021 is safe for the oilseed rape seeds. No adverse effects have been noted during the germination tests.

### 3.5 Observations on other undesirable or unintended side - effects (KCP 6.5)

#### 3.5.1 Impact on succeeding crops (KCP 6.5.1)

To estimate the impact on succeeding crops, 3 trials were carried out in 2019 in France (2) and Hungary (1), to confirm the different crops that can be sown after an application of GF-4021 in case of crop failure.

The trials were undertaken by contractors test facilities, all of which follow the EPPO guidelines and have Official Recognition status for undertaking trials in accordance with the principles of Good Experimental Practice (GEP).

The available trials are provided in

. A summary of data on trial sites and application details is provided in Annexes.

Figure 3.5 - 1 presents the succeeding crop trials repartition in Europe.

**Table 3.5 - 1: Presentation of trials - Succeeding crop trials**

| Crop(s) <sup>(1)</sup> | Target(s) <sup>(1)</sup> | EPPO climatic zone <sup>(2)</sup>    | Country | Year | Number of trials | Type of trial <sup>(3)</sup> |
|------------------------|--------------------------|--------------------------------------|---------|------|------------------|------------------------------|
| Winter rape            | Weeds                    | All-zones<br>Maritime,<br>South-East | -       | 2019 | 3                | Succeeding                   |

<sup>(1)</sup> According to the GAP table.

<sup>(2)</sup> According to EPPO guideline PP 1/241(1) "Guidance on comparable climates".

<sup>(3)</sup> GEP: Good Experimental Practices. Official: carried out by a national official organisation.

**Figure 3.5 - 1 Location of the trial sites in Europe - Succeeding crops trials**



### 3.5.1.1 Material and Methods

#### Experimental details

All the succeeding trials were carried out by officially recognized organisations in accordance with the Principles of Good Experimental Practice (GEP) and were performed in accordance with EPPO guidelines

Main characteristics are summarised in following Table 3.5 - 2 and details per trial (trial location, crop cultivar, experimental design, number of blocks, plot size and application(s)) are presented in Annexes.

**Table 3.5 - 2: Details on trial methodology - Succeeding crops trials**

|                               |                        |  |
|-------------------------------|------------------------|--|
| <b>Guidelines</b>             | General guidelines     | PP1/135(3)/(4): “ <i>Phytotoxicity assessment</i> ”.<br>PP1/152(4): “ <i>Design and analysis of efficacy evaluation trials</i> ”.<br>PP1/181(4): “ <i>Conduct and reporting of efficacy evaluation trials, including good experimental practice</i> ”. |
|                               | Specific guidelines    | PP1/207 (2): “ <i>Effects on succeeding crops</i> ”.   |
| <b>Experimental design</b>    | Plot design            | Randomized Complete Block (RACOB).   |
|                               | Plot size              | Plot area: from 20 to 24 m².   |
|                               | Number of replications | 3 replications   |
| <b>Crop</b>                   | Number of trials       | HELAN: 3 trials.   |
|                               | Varieties              | <i>RGT Sitting Bull (1), Rialto (1), Talento (1)</i> .   |
| <b>Application</b>            | Application timing     | A: at BBCH13 of winter oilseed rape in the area<br>B: 1 month after A<br>C: 1 month after B  |
|                               | Number of applications | 3 applications   |
|                               | Spray volumes          | 200-343 L/ha   |
| <b>Assessment</b>             | Assessment dates       | At BBCH12, BBCH16, BBCH52 and BBCH65 of HELAN.   |
|                               | Assessment types       | Phytotoxicity symptoms   |
| <b>Results &amp; Analysis</b> | Statistical analysis   | ANOVA - Tukey’s test   |

#### Treatments and reference standards

GF-4021 was tested at 0.25 L/ha (N dose), at 0.5 L/ha (2N dose) and at 1 L/ha (4N) at 3 different application timings (A, B and C) and was compared to untreated and the reference BELKAR® at 0.5 L/ha (2N dose), except in 1 trial (EA19D2C236H-HET011) where no local or standard reference was applied.

#### Assessment methods

Phytotoxicity was assessed in percentage compared to untreated in accordance with EPPO guideline PP1/135 (“Phytotoxicity assessment”). Assessments were carried out at various intervals post application.

The risk was categorized according to the following scale:

**Table 3.5 - 3: Risk scale**

| Risk                |          | Phytotoxicity assessment in %  |
|---------------------|----------|--|
| Acceptable risk     | No risk  | No phytotoxicity: no symptom assessed  |
|                     | Slight   | Slight risk of phytotoxicity: phytotoxicity between 1 and 5% or vigour between 95 and 99%    |
|                     | Moderate | Moderate risk of phytotoxicity: phytotoxicity between 6 and 14% or vigour between 85 and 94% |
| Non-acceptable risk | High     | High risk of phytotoxicity-limit of acceptability: phytotoxicity > 15% or vigour <85%        |

### Statistical analyses

Observed or calculated variables are subjected to an analysis of variance (ANOVA) after or not a transformation depending of the variability of the raw data.

When the result of the analysis is significant, a multiple comparison of treatments is performed. The averages are classified using Tukey's test and divided into homogeneous groups (a, b, c, ...). Treatment means with no letter in common are significantly different in accordance with the test conducted at a 95% confidence level.

#### 3.5.1.2 Results on succeeding crops trials

Summarised results are presented for application at timing A on Table 3.5 - 4, for application at timing B on Table 3.5 - 5 and for application at timing C on Table 3.5 - 6.



**Table 3.5 - 4: Summarised phytotoxicity results by trial from succeeding crop trials at application timing A**

| Trial code         | Application at timing A |               |  |      |          |                     |               |  |     |               |                   |               |  |        |               |
|--------------------|-------------------------|---------------|--|------|----------|---------------------|---------------|--|-----|---------------|-------------------|---------------|--|--------|---------------|
|                    | GF-4021 at 0.25 L/ha    |               |  |      |          | GF-4021 at 0.5 L/ha |               |  |     |               | GF-4021 at 1 L/ha |               |  |        |               |
|                    | Phytotoxicity           |               |  |      |          | Phytotoxicity       |               |  |     |               | Phytotoxicity     |               |  |        |               |
|                    | Max                     | Symptoms      | Transitory<br>(if no: phyto. at the last assessment) |      |          | Max                 | Symptoms      | Transitory<br>(if no: phyto. at the last assessment) |     |               | Max               | Symptoms      | Transitory<br>(if no: phyto. at the last assessment) |        |               |
|                    |                         |               | Yes/No   | %    | Symptoms |                     |               | Yes/No   | %   | Symptoms      |                   |               | Yes/No   | %      | Symptoms      |
| EA19D2C236H-DMI01  | 0%                      | -             | -  | -    | -        | 0%                  | -             | -  | -   | -             | 0%                | -             | -  | -      | -             |
| EA19D2C236H-DMI02  | 0%                      | -             | -  | -    | -        | 0%                  | -             | -  | -   | -             | 0%                | -             | -  | -      | -             |
| EA19D2C236H-HET011 | 5.7 %                   | INJURY        | No   | 3.3% | INJURY   | 9.3 %               | INJURY        | No   | 5 % | INJURY        | 31%               | INJURY        | No   | 31%    | INJURY        |
|                    | 1.3 %                   | CHLORO        | Yes  | -    | -        | 1.7 %               | CHLORO        | Yes  | -   | -             | 2.3%              | CHLORO        | Yes  | -      | -             |
|                    | 3.3 %                   | DEFORM (leaf) | No   | 3.3% | DEFORM   | 5%                  | DEFORM        | No   | 4 % | DEFORM        | 18.3 %            | DEFORM        | No   | 18.3 % | DEFORM        |
|                    | 2%                      | DEFORM (stem) | Yes  | -    | -        | 2%                  | DEFORM (stem) | Yes  | -   | -             | 3%                | DEFORM (stem) | Yes  | -      | -             |
|                    | 0%                      | -             | -  | -    | -        | 1%                  | DEFORM (head) | No   | 1 % | DEFORM (head) | 4.7%              | DEFORM (head) | No   | 4.7%   | DEFORM (head) |
|                    | 3.7 %                   | PLTSTUN T     | Yes  | -    | -        | 4%                  | PLTSTUN T     | Yes  | -   | -             | 8%                | PLTSTUN T     | No   | 8%     | -             |

**Table 3.5 - 5: Summarised phytotoxicity results by trial from succeeding crop trials at application timing B**

| Trial code         | Application at timing B |               |  |       |               |                     |               |  |       |               |                   |               |  |         |               |
|--------------------|-------------------------|---------------|--|-------|---------------|---------------------|---------------|--|-------|---------------|-------------------|---------------|--|---------|---------------|
|                    | GF-4021 at 0.25 L/ha    |               |  |       |               | GF-4021 at 0.5 L/ha |               |  |       |               | GF-4021 at 1 L/ha |               |  |         |               |
|                    | Phytotoxicity           |               |  |       |               | Phytotoxicity       |               |  |       |               | Phytotoxicity     |               |  |         |               |
|                    | Max                     | Symptoms      | Transitory<br>(if no: phyto. at the last assessment) |       |               | Max                 | Symptoms      | Transitory<br>(if no: phyto. at the last assessment) |       |               | Max               | Symptoms      | Transitory<br>(if no: phyto. at the last assessment) |         |               |
|                    |                         |               | Yes/No   | %     | Symptoms      |                     |               | Yes/No   | %     | Symptoms      |                   |               | Yes/No   | %       | Symptoms      |
| EA19D2C236H-DMI01  | 0%                      | -             | -  | -     | -             | 0%                  | -             | -  | -     | -             | 0%                | -             | -  | -       | -             |
| EA19D2C236H-DMI02  | 0%                      | -             | -  | -     | -             | 0%                  | -             | -  | -     | -             | 0%                | -             | -  | -       | -             |
| EA19D2C236H-HET011 | 5.7 %                   | INJURY        | No   | 5.7 % | INJURY        | 8.3 %               | INJURY        | No   | 8.3 % | INJURY        | 47.7 %            | INJURY        | No   | 46.7%   | INJURY        |
|                    | 1%                      | CHLORO        | Yes  | -     | -             | 1.7 %               | CHLORO        | Yes  | -     | -             | 2.7%              | CHLORO        | Yes  | -       | -             |
|                    | 4.3 %                   | DEFORM (leaf) | No   | 2.7 % | DEFORM        | 6.3 %               | DEFORM (leaf) | No   | 6.3 % | DEFORM (leaf) | 26.7 %            | DEFORM (leaf) | No   | 23..3 % | DEFORM (leaf) |
|                    | 1.3 %                   | DEFORM (stem) | Yes  | -     | -             | 1.3 %               | DEFORM (stem) | Yes  | -     | -             | 3.7%              | DEFORM (stem) | Yes  | -       | -             |
|                    | 1.3 %                   | DEFORM (head) | No   | 1.3 % | DEFORM (head) | 2%                  | DEFORM (head) | No   | 2%    | DEFORM (head) | 10%               | DEFORM (head) | No   | 10%     | DEFORM (head) |
|                    | 2.7 %                   | PLTSTUNT      | Yes  | -     | -             | 1.7 %               | PLTSTUNT      | Yes  | -     | -             | 18.3 %            | PLTSTUNT      | No   | 16.7%   | PLTSTUNT      |

**Table 3.5 - 6: Summarised phytotoxicity results by trial from succeeding crop trials at application timing C**

| Trial code         | Application at timing B |               |  |     |               |                     |               |  |        |               |                   |               |  |        |               |
|--------------------|-------------------------|---------------|--|-----|---------------|---------------------|---------------|--|--------|---------------|-------------------|---------------|--|--------|---------------|
|                    | GF-4021 at 0.25 L/ha    |               |  |     |               | GF-4021 at 0.5 L/ha |               |  |        |               | GF-4021 at 1 L/ha |               |  |        |               |
|                    | Phytotoxicity           |               |  |     |               | Phytotoxicity       |               |  |        |               | Phytotoxicity     |               |  |        |               |
|                    | Max                     | Symptoms      | Transitory<br>(if no: phyto. at the last assessment) |     |               | Max                 | Symptoms      | Transitory<br>(if no: phyto. at the last assessment) |        |               | Max               | Symptoms      | Transitory<br>(if no: phyto. at the last assessment) |        |               |
|                    |                         |               | Yes/No   | %   | Symptoms      |                     |               | Yes/No   | %      | Symptoms      |                   |               | Yes/No   | %      | Symptoms      |
| EA19D2C236H-DMI01  | 0%                      | -             | -  | -   | -             | 0%                  | -             | -  | -      | -             | 0%                | -             | -  | -      | -             |
| EA19D2C236H-DMI02  | 0%                      | -             | -  | -   | -             | 0%                  | -             | -  | -      | -             | 0%                | -             | -  | -      | -             |
| EA19D2C236H-HET011 | 4.3 %                   | INJURY        | No   | 4 % | INJURY        | 25.3 %              | INJURY        | No   | 12.3 % | INJURY        | 51.7 %            | INJURY        | No   | 51.7 % | INJURY        |
|                    | 1.3 %                   | CHLORO        | Yes  |     |               | 2.7%                | CHLORO        | Yes  |        |               | 3%                | CHLORO        | Yes  |        |               |
|                    | 3%                      | DEFORM (leaf) | No   | 3 % | DEFORM        | 15%                 | DEFORM (leaf) | No   | 7.7%   | DEFORM (leaf) | 21.7 %            | DEFORM (leaf) | No   | 21.7 % | DEFORM (leaf) |
|                    | 1.7 %                   | DEFORM (stem) | Yes  | -   | -             | 3.7%                | DEFORM (stem) | Yes  | -      | -             | 12.3 %            | DEFORM (stem) | Yes  | -      | -             |
|                    | 1%                      | DEFORM (head) | No   | 1 % | DEFORM (head) | 2.3%                | DEFORM (head) | No   | 2.3%   | DEFORM (head) | 13.3 %            | DEFORM (head) | No   | 13.3 % | DEFORM (head) |
|                    | 1.7 %                   | PLTSTUNT      | Yes  | -   | -             | 7.7%                | PLTSTUNT      | No   | 2.3%   | -             | 16.7 %            | PLTSTUNT      | No   | 16.7 % | PLTSTUNT      |

### Application at timing A

Only 1 out of the 3 trials showed **phytotoxicity** symptoms (EA19D2C236H-HET011). GF-4021 applied at 0.25 L/ha showed symptoms that were acceptable, lower than 6%. All of these symptoms were transitory except on INJURY/DEFORM but were very low (3.3%) at the last assessment.

GF-4021 applied at 0.5 L/ha showed symptoms that were acceptable, lower than 10%. All of these symptoms were transitory excepting the assessment on INJURY/DEFORM but was very low (5%).

GF-4021 applied at 1 L/ha showed symptoms which some of them (CHLORO, PLTSTUNT) were acceptable, lower than 10%. However, it showed levels of INJURY at 31% which is not acceptable. Nevertheless, since the rate established in the Good Agricultural Practices is 0.25 L/ha, the dose of 1 L/ha (4N) is not expected to be used or to happen in the fields.

### Application at timing B

Only 1 out of 3 trials showed **phytotoxicity** symptoms (EA19D2C236H-HET011). GF-4021 applied at 0.25 L/ha showed symptoms that were acceptable, lower than 6%. All of these symptoms were transitory except the assessment on INJURY/DEFORM which became acceptable (5.7%) at the last assessment timing.

GF-4021 applied at 0.5 L/ha showed symptoms that were acceptable, lower than 10%. All of these symptoms were transitory excepting the assessment on INJURY/DEFORM but was quite low and acceptable (8.3%).

GF-4021 applied at 1 L/ha showed symptoms which were not acceptable, excepting CHLORO at 2.7% and transitory. INJURY reached the level of 46.7%, DEFORM 23.3% and PLTSTUNT 16.7% at last assessments. Nevertheless, since the rate established in the Good Agricultural Practices is 0.25 L/ha, the dose of 1 L/ha (4N) is not expected to be used or happen in the real practice.

### Application at timing C

Only 1 out of 3 trials showed **phytotoxicity** symptoms (EA19D2C236H-HET011). GF-4021 applied at 0.25 L/ha showed symptoms that were acceptable, lower than 5%. All of these symptoms were transitory except the assessment on INJURY/DEFORM which remain at a low and fully acceptable (4%) at the last assessment timing.

GF-4021 applied at 0.5 L/ha showed symptoms on INJURY/DEFORM that were acceptable, lower than 15% at the last assessment timing.

GF-4021 applied at 1 L/ha showed symptoms which were not acceptable. INJURY/DEFORM reached the level of 51.7% and PLTSTUNT 16.7% at last assessments. Nevertheless, since the rate established in the Good Agricultural Practices is 0.25 L/ha, the dose of 1 L/ha (4N) is not expected to be used.

|  |
|--|
| <p><b>Therefore, according to trials results, sunflower can be sown after an application of LaDiva (GF-4021) whatever the timing of application following the label recommendations and the Good Agricultural Practices.</b></p> |
|--|

### 3.5.1.3 Additional argumentation on succeeding crops

As GF-4021 contains halauxifen-methyl and picloram applied at the same rates as Belkar (0.25 L/ha), the conclusions of the succeeding crop section accepted for BELKAR (COP 2016 01258) are relevant and justified to be applied to GF-4021 also. Succeeding crop statements from the proposed C zone Master BELKAR label:

*Following application of BELKAR the following intervals must be observed before planting following crops in normal rotation and in cases of a crop failure: Wheat, barley, oats, maize, oilseed rape mustard and grasses: 4 months (120 days) All other crops: 12 months (1 year) Ploughing or thorough cultivation should be undertaken prior to planting leguminous crops (e.g. field beans and peas).*

GF-1601 (aminopyralid) at 6 g ai/ha is registered in winter oilseed rape in Germany (RUNWAY VA – registration number 008330-00) and Poland (RUNWAY - registration number R-30/2018). Succeeding crop statements from the dossier as submitted to Germany (as a maritime climate country also) are relevant for GF-4021 in the UK:

*Based on the results of the lab studies in terms of early replacement crops all monocotyledoneous crops can be used to replace the failed treated crop.*

*In normal rotation in the autumn winter cereals and winter oil seed rape can be planted. In the following spring there is no need to restrict the potential following crops except for legumes that should not be planted in spring after the harvest of a treated crop.*

GF-4021 also delivers 8 g ai/ha aminopyralid which is the same amount applied with GF-2540 (ASTROKERB – propyzamide + aminopyralid). In the GF-2540 dossier, data for aminopyralid at higher rates than 8 g ai/ha was considered (taken from grassland dossiers) and added to statements from straight propyzamide. Aminopyralid has contact broad-leaved weed activity (no residual activity) but no grassweed activity hence the summary included in COP 2011 1100289 is relevant for GF-4021 and justified to be applied. The summary states:

*A range of potential following crops has been tested, and clearly show that at aminopyralid doses up to 6 times those delivered by GF-2540 were safe to oilseed rape, cereals, sugar beet, maize, grass when planted as following crops. Even clover and potatoes where some sensitivity was noted could be safely planted after 4 months.*

It is therefore reasonable and justified to have the following label statements for GF-4021 pertaining to crop failure / following crops:

**After 4 months (120 days) maize, wheat, barley, oats, oilseed rape, mustard and grasses can be planted.**

**All other crops can be planted after 1 year from application.**

**Legumes: peas, beans etc can be grown from the autumn in the year following normal harvest of the oilseed rape.**

#### Comments of zRMS:

3 trials were carried out to estimate the impact on succeeding crops (however 1 out of 3 trials was carried out in the Southern part of France belonging to the Mediterranean EEPO climatic zone). Only sunflower was tested in these trials. The product GF-4021 was applied at three dose rates of 0,25 l/ha (N), 0,5 l/ha (2N) and 1 l/ha (4N) at three application timings (at BBCH 13, 1 month after application A and 1 month after application B). In 1 out of 3 succeeding trials GF-4021 at 0,25 l/ha caused phytotoxicity symptoms, but on the acceptable level (<6%) in case of all application terms. All of these symptoms were transient except INJURY and DEFORM (leaf or head) in one trial. GF-4021 applied at higher dose rates 2N and 4N caused transitory symptoms of CHLORO and DEFORM (stem) but other symptoms were on the significant higher level in compare to the dose rate of 0,25 l/ha. Especially, GF-4021 applied at 1 l/ha showed symptoms of INJURY which were not acceptable (>30%).

Based on the trial results it can be concluded that sunflower can be sown after application of GF-4021 (LaDiva) at 0,25 l/ha.

The applicant has updated this chapter in the commenting period. The final conclusion are based on the trials conducted with other two plant protection products: Belkar and Runway. These products contain the same active substances in comparable amount as GF-4021. Taking into account impact these actives on other crops, it can be accepted these trial results as support of currently registration. In opinion of zRMS, the below statements are justified:

- after 4 months (120 days) maize, wheat, barley, oats, oilseed rape, mustard and grasses can be planted.
- all other crops can be planted after 1 year from application.
- legumes: peas, beans etc can be grown from the autumn in the year following normal harvest of the oilseed rape.

However, the cMSs are kindly asked to consider the applicant's recommendations on the national level.

### 3.5.2 Impact on other plants including adjacent crops (KCP 6.5.2)

3 trials were carried out in 2019 in France (2) and United Kingdom (1), to study, in the field, the potential incidence on adjacent crops of an application of GF-4021.

These trials were undertaken by contractors test facilities, all of which followed the EPPO guidelines and have Official Recognition status for undertaking trials in accordance with the principles of Good Experimental Practice (GEP). These 3 trials were not officially recognised.

The available trials are provided in Table 3.5 - 7. A summary of data on trial sites and application details is provided in Annexes. Figure 3.5 - 2 presents the adjacent crop trials repartition.

**Table 3.5 - 7: Presentation of trials - Adjacent crop trials**

| Crop(s) <sup>(1)</sup> | Target(s) <sup>(1)</sup> | EPPO climatic zone <sup>(2)</sup> | Country | Year | Number of trials | Type of trial <sup>(3)</sup> |
|------------------------|--------------------------|-----------------------------------|---------|------|------------------|------------------------------|
| Winter rape            | Weeds                    | Maritime                          | -       | 2019 | 3                | Adjacent                     |

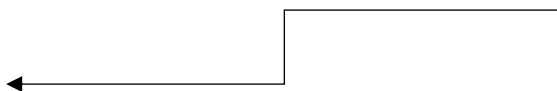
<sup>(1)</sup> According to the GAP table.

<sup>(2)</sup> According to EPPO guideline PP 1/241(1) "Guidance on comparable climates".

<sup>(3)</sup> GEP: Good Experimental Practices. Official: carried out by a national official organisation.

**Figure 3.5 - 2 Location of the trial sites in Europe - Adjacent crop trials**





### 3.5.2.1 Material and methods

#### Experimental details

All the trials were carried out by officially recognized organisations.

Main characteristics are summarised in following Table 3.5 - 8 and details per trial (trial location, crop cultivar, experimental design, number of blocks, plot size and application(s)) are presented in Annexes.

**Table 3.5 - 8: Details on trial methodology - Adjacent crops trials**

|                               |                        |  |
|-------------------------------|------------------------|--|
| <b>Guidelines</b>             | General guidelines     | -  |
|                               | Specific guidelines    | PP1/256 (1): “Effects on adjacent crops”.  |
| <b>Experimental design</b>    | Plot design            | Randomized Complete Block (RACOB).   |
|                               | Plot size              | Plot area: from 20 to 28 m <sup>2</sup> .  |
|                               | Number of replications | 3 replications   |
| <b>Crop</b>                   | Number of trials       | MEDSA: 1 trial<br>LIUUT: 1 trial<br>VICFX: 1 trial   |
|                               | Varieties              | MEDSA: <i>Galaxie (1)</i><br>LIUUT: <i>Angora (1)</i><br><del>CICEX</del> VICFX: <i>Tundra (1)</i>                   |
| <b>Application</b>            | Application timing     | A: Pre-emergence, just after drilling<br>B: Between BBCH10 and BBCH12 of the crops                                   |
|                               | Number of applications | 1 application  |
|                               | Spray volumes          | 200 L/ha.  |
| <b>Assessment</b>             | Assessment dates       | A: First assessment at crops emergence then at the timing as application B except 2 DAA.<br>B: 2DAB, 7DAB and 14DAB. |
|                               | Assessment types       | Phytotoxicity symptoms.  |
| <b>Results &amp; Analysis</b> | Statistical analysis   | ANOVA - Tukey’s and Levene’s tests.  |

#### Treatments and reference standards

GF-4021 was tested at doses calculated using the Table 3.5 - 9. This table presents the correlation between the distance from the sprayed crop winter oilseed rape and the drift that can damage neighbouring crops by herbicides, independent of the crop used with a calculation based on 0.25 L/ha of GF-4021.

**Table 3.5 - 9: Correlation between distance and % drift for herbicide and calculated doses**

| Distance from the treated crops | % Drift | GF-4021 rate in L/ha |
|---------------------------------|---------|----------------------|
| <1 m                            | 8%      | 0.02                 |
| 1 m                             | 4 %     | 0.01                 |
| 3 m                             | 1 %     | 0.025                |
| 5 m                             | 0.6%    | 0.0015               |
| 10 m                            | 0.3%    | 0.00075              |
| 15 m                            | 0.2%    | 0.0005               |

No reference standard was used for this trials type.



## Assessment methods

Phytotoxicity assessments were usually performed at 2-3 days and then 1, 2 and 3 weeks after application (and more if necessary to follow the evolution of phytotoxicity). In all trials, the phytotoxicity was expressed in % compared to untreated.

## Statistical analyses

Statistical analysis were performed using Tukey's and Levene's mean tests to determine if the means are the same or different from each other.

## Results layout

In the trial EA19D2C238H-DMI01 (alfafa trial) only the application at timing B was done on the alfafa.

### 3.5.2.2 Results on adjacent crops trials

The level of phytotoxicity is summarised in

Table 3.5 - 11.

The risk was categorized according to the following scale:

**Table 3.5 - 10: Risk scale**

| Type of risk | Phytotoxicity assessment in %  |
|--------------|--|
| No risk      | No phytotoxicity: no symptom assessed                                  |
| Slight       | Slight risk of phytotoxicity: phytotoxicity between 1 and 5%           |
| Moderate     | Moderate risk of phytotoxicity: phytotoxicity between 6 and 14%        |
| High         | High risk of phytotoxicity-limit of acceptability: phytotoxicity > 15% |

**Table 3.5 - 11: Summary results of adjacent crop trials**

| Trial             | Crop  | GF-4021 (0.0005 -0.02 L/ha)* |         |         |         |             |           |
|-------------------|-------|------------------------------|---------|---------|---------|-------------|-----------|
|                   |       | 0.2%                         | 0.3%    | 0.6%    | 1.0%    | 4.0%        | 8.0%      |
|                   |       | 15 m                         | 10 m    | 5 m     | 3 m     | 1 m         | < 1 m     |
| Timing A          |       |                              |         |         |         |             |           |
| EA19D2C238H-DAV01 | VICFX | No risk                      | No risk | No risk | No risk | No risk     | No risk   |
| EA19D2C238H-DMI01 | MEDSA | -                            | -       | -       | -       | -           | -         |
| EA19D2C238H-DMI02 | LIUUT | No risk                      | No risk | No risk | No risk | No risk     | No risk   |
| Timing B          |       |                              |         |         |         |             |           |
| EA19D2C238H-DAV01 | VICFX | No risk                      | No risk | No risk | No risk | No risk     | No risk   |
| EA19D2C238H-DMI01 | MEDSA | No risk                      | No risk | No risk | No risk | Slight risk | High risk |
| EA19D2C238H-DMI02 | LIUUT | No risk                      | No risk | No risk | No risk | No risk     | No risk   |

In 2 out of 3 trials, GF-4021 was totally selective on faba broad bean and linseed at both timings of application. However, in the alfalfa trial, at the tested timing B, it showed symptoms on STANDRED. Therefore, GF-4021 it is considered as slight risk on adjacent alfalfa crops at 1m distance and high risk for lower distance.

Table 3.5 - 12 summarises acceptable distance for adjacent crops during 1 application of GF-4021 drift targeted.

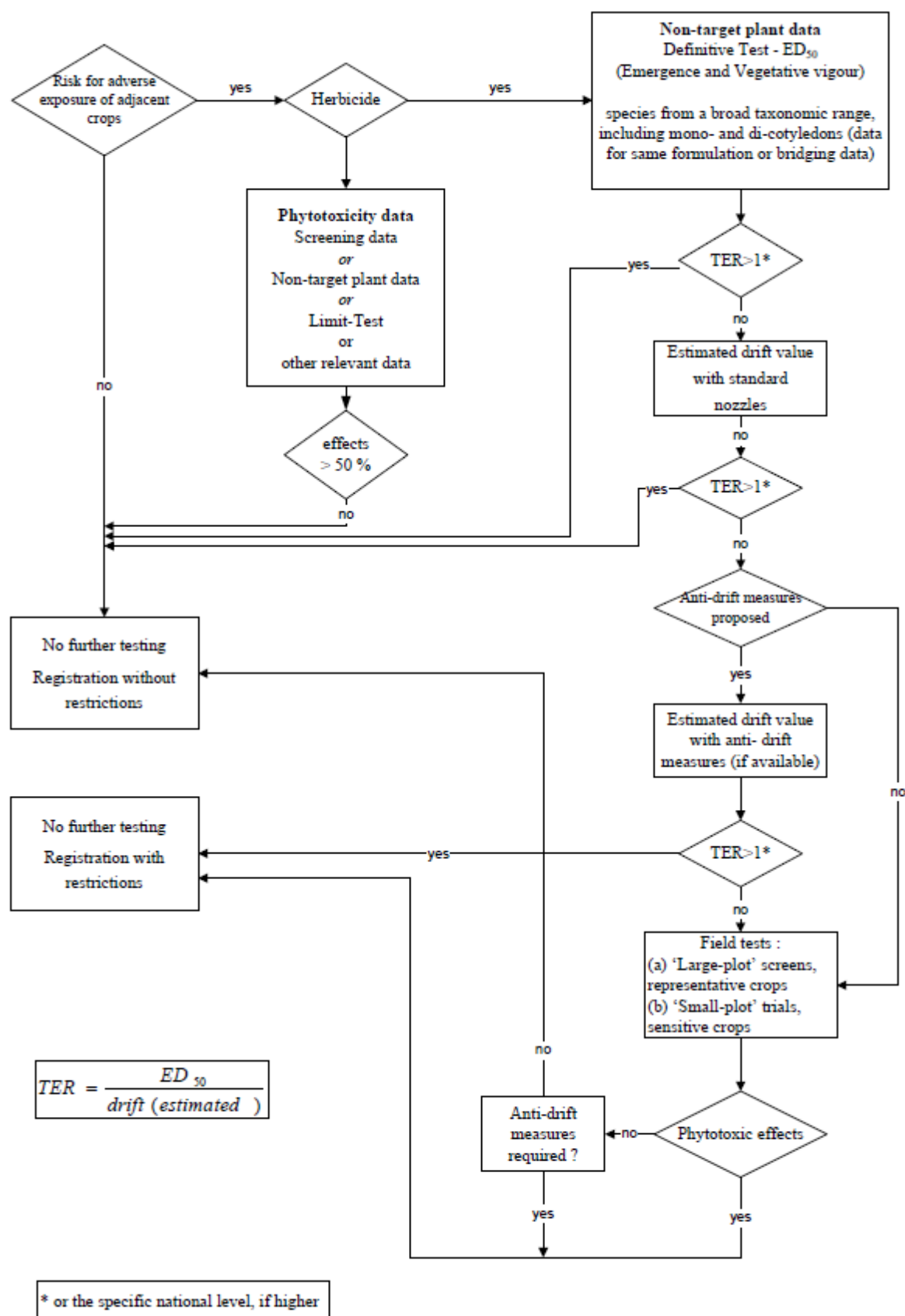
**Table 3.5 - 12: Acceptable distance for adjacent crops during 1 application of GF-4021 drift targeted**

| Adjacent crops     | Number of trials | Acceptable distance       |
|--------------------|------------------|---------------------------|
| Broad bean (VICFX) | 1                | No limitation             |
| Alfalfa (MEDSA)    | 1                | Recommended at least 3 m. |
| Linseed (LIUT)     | 1                | No limitation             |

**Therefore, no impact is always expected on adjacent crops if LaDiva (GF-4021) is used according to the Good Agricultural Practices and label recommendations, except on Alfalfa, where the recommendation should be to keep at least 3 m distance and never less than 1 m.**

**However, users must be watchful when spraying LaDiva (GF-4021) close to sensitive crops; they are expected to apply treatment as per the good agricultural practices (no wind during spraying, avoid thin droplets formation, etc.).**

A theoretical risk assessment is presented here, according to EPPO guideline 1/256 (1) “Effects on adjacent crops”, based on the outcome of the Non-Target Plant studies, as presented in Part B Section 9, chapter 9-10 Effects on non-target terrestrial plants. The scheme follows a sequential or tiered approach. Toxicity values are compared with predicted environmental concentrations to develop a Toxicity: Exposure-Ratio (TER is calculated as the ER50-value divided by the estimated drift value). If the TER-value of the most sensitive crop is greater than 1 no further testing is necessary. If it is likely that damage will occur when a sensitive adjacent crop is planted, then a refined calculation or field testing will be necessary to examine the extent of effects (see scheme on next page).



## Toxicity data

A seedling emergence and vegetative vigour study have been conducted for GF-4021 (see dRR Section B.9 point 9.10/KCP 10.6) for further information). Based on emergence, survival, fresh weight and phytotoxicity for the seedling emergence test the lowest ER50 values for the tested species are given in the table below. Based on the study, for emergence, the most sensitive species tested was soybean with an ER50 values of 150 mL GF-4021/ha and based on survival the most sensitive species tested was onion with an ER50 values of 76.1 mL GF-4021/ha. Based on phytotoxicity and fresh weight the most sensitive species tested was tomato with an ER50 value of 17.2 and 14.1 mL GF-4021/ha respectively. Regarding the vegetative vigour study, which assessed fresh weight, phytotoxicity, and survival, the following results were obtained; for fresh weight and phytotoxicity the most sensitive species tested was tomato with an ER50 value of 2.68 and 4.07 mL GF-4021/ha respectively; for survival most sensitive species tested was soybean with an ER50 values of 95.6 ml GF-4021/ha.

**Table 3.5-13: Endpoints and effect values relevant for the risk assessment for non-target terrestrial plants**

| Species   | Sub-stance | Exposure System            | Results   | Reference   |
|---|------------|----------------------------|---|---|
| <sup>1)</sup> <i>Allium cepa</i> (Onion) <sub>m</sub><br><sup>2)</sup> <i>Avena fatua</i> (oat) <sub>m</sub><br><sup>3)</sup> <i>Lolium perenne</i> (Perennial ryegrass) <sub>m</sub><br><sup>4)</sup> <i>Beta vulgaris</i> (Sugar beet) <sub>d</sub><br><sup>5)</sup> <i>Brassica napus</i> (Oilseed rape) <sub>d</sub><br><sup>6)</sup> <i>Cucumis sativus</i> (Cucumber) <sub>d</sub><br><sup>7)</sup> <i>Daucus carota</i> (Carrot) <sub>d</sub><br><sup>8)</sup> <i>Glycine max</i> (Soybean) <sub>d</sub><br><sup>9)</sup> <i>Helianthus annuus</i> (Sunflower) <sub>d</sub><br><sup>10)</sup> <i>Lycopersicon esculentum</i> (Tomato) <sub>d</sub><br><sup>11)</sup> <i>Vicia faba</i> (Field bean) <sub>d</sub> | GF-4021    | 21 d<br>Seedling emergence | <sup>1)</sup> ER <sub>50</sub> shoot fresh weight = 61.3 ml/ha<br><sup>2)</sup> ER <sub>50</sub> shoot fresh weight = >500 ml/ha<br><sup>3)</sup> ER <sub>50</sub> shoot fresh weight = >500 ml/ha<br><sup>4)</sup> ER <sub>50</sub> shoot fresh weight = 32.4 ml/ha<br><sup>5)</sup> ER <sub>50</sub> shoot phytotoxicity = 381 ml/ha<br><sup>6)</sup> ER <sub>50</sub> shoot phytotoxicity = 217 ml/ha<br><sup>7)</sup> ER <sub>50</sub> shoot phytotoxicity = 126 ml/ha<br><sup>8)</sup> ER <sub>50</sub> shoot phytotoxicity = 19.1 ml/ha<br><sup>9)</sup> ER <sub>50</sub> shoot phytotoxicity = 126 ml/ha<br><sup>10)</sup> ER <sub>50</sub> shoot fresh weight = 14.1 ml/ha<br><sup>11)</sup> ER <sub>50</sub> shoot phytotoxicity = 73.0 ml/ha  | Bramby-Gunary, J. 2020<br>Study ID 190546<br>(see KCP 10.6) |
| <sup>1)</sup> <i>Allium cepa</i> (Onion) <sub>m</sub><br><sup>2)</sup> <i>Avena fatua</i> (oat) <sub>m</sub><br><sup>3)</sup> <i>Lolium perenne</i> (Perennial ryegrass) <sub>m</sub><br><sup>4)</sup> <i>Beta vulgaris</i> (Sugar beet) <sub>d</sub><br><sup>5)</sup> <i>Brassica napus</i> (Oilseed rape) <sub>d</sub><br><sup>6)</sup> <i>Cucumis sativus</i> (Cucumber) <sub>d</sub><br><sup>7)</sup> <i>Daucus carota</i> (Carrot) <sub>d</sub><br><sup>8)</sup> <i>Glycine max</i> (Soybean) <sub>d</sub><br><sup>9)</sup> <i>Helianthus annuus</i> (Sunflower) <sub>d</sub><br><sup>10)</sup> <i>Lycopersicon esculentum</i> (Tomato) <sub>d</sub><br><sup>11)</sup> <i>Vicia faba</i> (Field bean) <sub>d</sub> | GF-4021    | 21 d<br>Vegetative vigour  | <sup>1)</sup> ER <sub>50</sub> shoot fresh weight = 93.0 ml/ha<br><sup>2)</sup> ER <sub>50</sub> shoot fresh weight = >500 ml/ha<br><sup>3)</sup> ER <sub>50</sub> shoot phytotoxicity = 499 ml/ha<br><sup>4)</sup> ER <sub>50</sub> shoot phytotoxicity = 35 ml/ha<br><sup>5)</sup> ER <sub>50</sub> shoot phytotoxicity = 463 ml/ha<br><sup>6)</sup> ER <sub>50</sub> shoot phytotoxicity = 16.9 ml/ha<br><sup>7)</sup> ER <sub>50</sub> shoot phytotoxicity = 13.5 ml/ha<br><sup>8)</sup> ER <sub>50</sub> shoot phytotoxicity = 7.47 ml/ha<br><sup>9)</sup> ER <sub>50</sub> shoot phytotoxicity = 81.8 ml/ha<br><sup>10)</sup> ER <sub>50</sub> shoot fresh weight = 2.68 ml/ha<br><sup>11)</sup> ER <sub>50</sub> shoot phytotoxicity = 5.3 ml/ha | Bramby-Gunary, J. 2020<br>Study ID 190545<br>(see KCP 10.6) |

m: monocotyledonous; d: dicotyledonous

## Risk assessment for adjacent crops

For the estimation of predicted environmental rate (PER) an application rate 250 ml/ha of GF-4021 has been considered. The TER calculations are presented in the Table 3.5-14 below.

**Table 3.5-14: TER calculation for the risk assessment for adjacent crops due to the use of GF-3231 GF-4021 in pasture (seedling emergence)**

|   |                                   |                   |   |   |
|---|-----------------------------------|-------------------|---|---|
| <b>Intended use</b>                         |                                   |                   |   |   |
| <b>Active substance/product</b>             | <b>GF-4021</b>                    |                   |   |   |
| <b>Application rate</b>                     | <b>1 × 250 ml/ha</b>              |                   |   |   |
| <b>MAF</b>                                  | <b>1</b>                          |                   |   |   |
| <b>Test species</b><br>(Seedling emergence) | <b>ER<sub>50</sub></b><br>(ml/ha) | <b>Drift rate</b> | <b>PER<sub>off-field</sub></b><br>(ml/ha) | <b>TER</b><br>criterion: TER ≥ 1<br>(TER=ER <sub>50</sub> /PER) |
| <i>Avena fatua</i> (oat)                    | >500                              | 2.77%*            | 6.93                                      | 72.15   |
| <i>Lolium perenne</i> (Perennial ryegrass)  | >500                              | 2.77%*            | 6.93                                      | 72,15   |
| <i>Allium cepa</i> (Onion)                  | 61.3                              | 2.77%*            | 6.93                                      | 8.85  |
| <i>Vicia faba</i> (Field bean)              | 73.0                              | 2.77%*            | 6.93                                      | 10.53   |
| <i>Brassica napus</i> (Oilseed rape)        | 381                               | 2.77%*            | 6.93                                      | 54.98   |
| <i>Helianthus annuus</i> (Sunflower)        | 126                               | 2.77%*            | 6.93                                      | 18.18   |
| <i>Daucus carota</i> (Carrot)               | 126                               | 2.77%*            | 6.93                                      | 18.18   |
| <i>Cucumis sativus</i> (Cucumber)           | 217                               | 2.77%*            | 6.93                                      | 31.31   |
| <i>Beta vulgaris</i> (Sugar beet)           | 32.4                              | 2.77%*            | 6.93                                      | 4.68  |
| <i>Glycine max</i> (Soybean)                | 19.1                              | 2.77%*            | 6.93                                      | 2.76  |
| <i>Lycopersicon esculentum</i> (Tomato)     | 14.1                              | 2.77%*            | 6.93                                      | 2.03  |

MAF: Multiple application factor; PER: Predicted environmental rate; TER: toxicity to exposure ratio. TER values shown in bold fall below the relevant trigger.

\* 90<sup>th</sup> percentile of the 'in-field' rate, at a given distance from the treated area. The drift listed for "field crops" in Rautmann et al. (2001)<sup>3</sup> (i.e. 2.77% at 1 m) can be used.

<sup>3</sup> Rautmann, D., Streloke, M., Winkler, R. (2001). New basic drift values in the authorisation procedure for plant protection products. In Forster, R., Streloke, M. Workshop on Risk Assessment and Risk Mitigation Measures in the Context of the Authorization of Plant Protection Products (WORMM). Mitt. Biol. Bundesanst. Land-Forstwirtschaft. Berlin-Dahlem, Heft 381.

**Table 3.5-15: TER calculation for the risk assessment for adjacent crops due to the use of GF-4021 in pasture (seedling emergence)**

|   |                                   |                   |   |   |
|---|-----------------------------------|-------------------|---|---|
| <b>Intended use</b>                         |                                   |                   |   |   |
| <b>Active substance/product</b>             | <b>GF-4021</b>                    |                   |   |   |
| <b>Application rate</b>                     | <b>1 × 250 ml/ha</b>              |                   |   |   |
| <b>MAF</b>                                  | <b>1</b>                          |                   |   |   |
| <b>Test species</b><br>(Seedling emergence) | <b>ER<sub>50</sub></b><br>(ml/ha) | <b>Drift rate</b> | <b>PER<sub>off-field</sub></b><br>(ml/ha) | <b>TER</b><br>criterion: TER ≥ 1<br>(TER=ER <sub>50</sub> /PER) |
| <i>Avena fatua</i> (oat)                    | >500                              | 2.77%*            | 6.93                                      | 72.15   |
| <i>Lolium perenne</i> (Perennial ryegrass)  | 499                               | 2.77%*            | 6.93                                      | 72.0  |
| <i>Allium cepa</i> (Onion)                  | 93.0                              | 2.77%*            | 6.93                                      | 13.42   |
| <i>Vicia faba</i> (Field bean)              | 5.3                               | 2.77%*            | 6.93                                      | 0.76  |
| <i>Brassica napus</i> (Oilseed rape)        | 463                               | 2.77%*            | 6.93                                      | 66.81   |
| <i>Helianthus annuus</i> (Sunflower)        | 81.8                              | 2.77%*            | 6.93                                      | 11.8  |
| <i>Daucus carota</i> (Carrot)               | 13.5                              | 2.77%*            | 6.93                                      | 1.95  |
| <i>Cucumis sativus</i> (Cucumber)           | 16.9                              | 2.77%*            | 6.93                                      | 2.44  |
| <i>Beta vulgaris</i> (Sugar beet)           | 35.0                              | 2.77%*            | 6.93                                      | 5.05  |
| <i>Glycine max</i> (Soybean)                | 7.47                              | 2.77%*            | 6.93                                      | 1.08  |
| <i>Lycopersicon esculentum</i> (Tomato)     | 2.68                              | 2.77%*            | 6.93                                      | 0.39  |

MAF: Multiple application factor; PER: Predicted environmental rate; TER: toxicity to exposure ratio. TER values shown in bold fall below the relevant trigger.

\* 90<sup>th</sup> percentile of the 'in-field' rate, at a given distance from the treated area. The drift listed for "field crops" in Rautmann et al. (2001)<sup>4</sup> (i.e. 2.77% at 1 m) can be used.

#### According to the EPPO guideline 1/256 (1)

"If the TER-value of the most sensitive crop is greater than 1 (or the specific national level, if higher), no further testing is necessary. If it is likely that damage will occur when a sensitive adjacent crop is planted, then a refined calculation or field testing will be necessary to examine the extent of effects. In countries where the use of low-drift nozzles or other anti-drift measures and/or buffer zones are common agricultural practice a refined risk assessment can be done. The calculation of the drift value is repeated considering any low-drift application techniques and/or distances from the treated field. If the TER-value of the most sensitive crop is greater than 1 (or the specific national level, if higher), no further testing is necessary. On the label of the plant protection product, appropriate risk mitigation measures should be added according to the national requirements"

The TER values for *Vicia faba* (field bean) and *Lycopersicon esculentum* (Tomato) calculated using the ER<sub>50</sub> value (0.76 & 0.39 respectively) determined based on vegetative vigour data for GF-4021 are less than the trigger of 1; therefore risk mitigation measures must be considered in order to refine the risk assessment for adjacent crops.

<sup>4</sup> Rautmann, D., Streloke, M., Winkler, R. (2001). New basic drift values in the authorisation procedure for plant protection products. In Forster, R., Streloke, M. Workshop on Risk Assessment and Risk Mitigation Measures in the Context of the Authorization of Plant Protection Products (WORMM). Mitt. Biol. Bundesanst. Land-Forstwirtschaft. Berlin-Dahlem, Heft 381.

## Refined risk assessment for adjacent crops

In order to reduce the off-field exposure, risk mitigation measures can be implemented. The results of the risk assessment are summarised in the following table.

**Table 3.5-16: Refined risk assessment for adjacent crops due to the use of GF-4021 in oilseed rape considering risk mitigation (off-field no-spray buffer zones and drift reduction nozzles)**

| Intended use –<br>Pasture Product – GF-4021<br>Application rate (mL/ha) - 250<br>MAF - 1 |                |                        |                       |  |  |   |   |
|--|----------------|------------------------|-----------------------|--|--|---|---|
| Buffer strip (m)   | Drift rate (%) | Drift reducing nozzles | PER off-field (mL/ha) | Toxicity value (vegetative vigour) ER <sub>50</sub> mL/ha Field bean | Toxicity value (vegetative vigour) ER <sub>50</sub> mL/ha Tomato | TER criterion: TER ≥ 1 (TER=ER <sub>50</sub> /PER) Tomato | TER criterion: TER ≥ 1 (TER=ER <sub>50</sub> /PER) Field bean |
| 1  | 2.77*          | 0%                     | 6.93                  | 5.3  | 2.68   | 0.76  | 0.39  |
| 1  | 2.77*          | 50%                    | 3.46                  | 5.3  | 2.68   | 1.53  | 0.77  |
| 1  | 2.77*          | 75%                    | 1.73                  | 5.3  | 2.68   | 3.06  | 1.55  |
| 1  | 2.77*          | 90%                    | 0.69                  | 5.3  | 2.68   | 7.68  | 3.88  |
| 5  | 0.57%*         | 0%                     | 0.04                  | 5.3  | 2.68   | 132.5   | 67  |
| 5  | 0.57%*         | 50%                    | 0.02                  | 5.3  | 2.68   | 265   | 134   |
| 10   | 0.29*          | 0%                     | 0.02                  | 5.3  | 2.68   | 265   | 134   |

MAF: Multiple application factor; PER: Predicted environmental rates; TER: toxicity to exposure ratio. Criteria values shown in bold breach the relevant trigger.

\* Based on Rautmann et al. (2001)<sup>5</sup>

Considering *V. faba*, the TER values identified in the vegetative vigour study for GF-4021 are higher than the trigger of 1 at a distance of 1 m from the treated field when 50% drift reducing nozzles are used during applications or at a distance of 5 m without drift reducing nozzles. These mitigations will be sufficient to protect adjacent crops after application of GF-4021. The most sensitive species was *L. esculentum*; a TER value greater than 1 was calculated at a distance of 1m from the treated crop when 75% drift reducing nozzles were used, or at 5m distance without drift reducing nozzles.

### 3.5.2.2.1 Overall conclusions

The risk to adjacent crops following the intended uses of GF-4021 can be considered acceptable with a 5 m unsprayed buffer zone OR 1 m from the treated area when at least 75% drift reducing nozzles is applied.

As a result, a warning sentence will be placed on the label to take care to avoid drift to adjacent crops, but with good agriculture practice during the application, no effects on adjacent crops are expected.

### Overall conclusion

<sup>5</sup> Rautmann, D., Streloke, M., Winkler, R. (2001). New basic drift values in the authorisation procedure for plant protection products. In Forster, R., Streloke, M. Workshop on Risk Assessment and Risk Mitigation Measures in the Context of the Authorization of Plant Protection Products (WORMM). Mitt. Biol. Bundesanst. Land-Forstwirtschaft. Berlin-Dahlem, Heft 381.

The risk to adjacent crops following the intended uses of GF-4021 can be considered acceptable with a 1 m unsprayed buffer zone.

However, a warning sentence will be placed on the label to take care to avoid drift to adjacent crops, but with good agriculture practice during the application, no effects on adjacent crops are expected.

**Comments of zRMS:**

3 trials have been carried out to estimate the impact on adjacent crops. Only broad bean, alfalfa and linseed were tested in these trials. Based on the correlation between distance and % drift for herbicide and calculated dose, the risk of crops damage has been estimated. No risk was noted for the broad bean and linseed what means that the product GF-4021 is selective for these crops regardless on application timing. A slight risk at 1 m distance and a high risk at <1 m distance during application were estimated in case of alfalfa.

The below recommendation can be included to the product label:

*“No negative impact on the adjacent crops is expected during application of product GF-4021, except on alfalfa where should be to keep at least 3 m distance. However, it is recommended to apply treatment as per the good agricultural practices (no wind during spraying, avoid thin droplets formation), especially close to sensitive crops.”*

The applicant has updated this chapter in the commenting period. Based on the final conclusion, it can be recommended to use of 5 m unsprayed buffer zone or 1 m from the treated area when at least 75% drift reducing nozzles is applied for all adjacent crops. However, the earlier statement about alfalfa should be left on the product label.

### 3.5.3 Effects on beneficial and other non - target organisms (KCP 6.5.3)

It has been established that GF-4021 poses an acceptable risk for bees and other non-target organisms. Information on beneficial organisms' studies can be found in Part B Section 9 (“Ecotoxicological studies”) of the Registration Report.

Therefore, no effect is expected on beneficial or other non - target organisms if GF-4021 is used according to the Good Agricultural Practices and label recommendations.

**From these results it can be concluded that the proposed use pattern of LaDiva (GF-4021) will not pose any significant risk to beneficial organisms.**

**Comments of zRMS:**

Accepted.

### 3.6 Other/special studies

No further information is available.

#### 3.6.1 Tank Cleaning

A study was conducted in Drusenheim, France by Corteva Agriscience (study number 200857- AT-20-006) to establish a tank cleaning procedure for GF-4021 (aminopyralid 32 g/L + halauxifen-methyl 10 g/L + picloram 48 g/L, EC). The assessment was done following the tiered approach described in the EPPO standard PP 1/292 (EPPO, 2016) (1). This allows comparison of ED50 values (obtained from seedling emergence and vegetative vigour studies conducted according to the OECD Guidelines 208 and 227 respectively) against measured residue in jars after a cleanout procedure to determine the TER (toxicity exposure ratio).



According to these studies tomato was the most sensitive species with an ED50 of 2.68 ml.cp GF4021/ha. This equates to an ED50 of the actives of 80 mg as/ha aminopyralid, 30 mg as/ha halauxifen-methyl & 120 mg as/ha picloram.

Residue in the jars was measure as follows:

An amount (2.5 ml , 0.25 Lcp\*/ha in 100L/ha) of GF-4021 (aminopyralid 32 gas\*\*/l + halauxifen-methyl 10 gas/L + picloram 48 gas/L, EC), batch nb ENBK-170903-021, dilution was prepared and put under agitation in 997.5ml of Cipac D water at room temperature. The mixture is stirred for 2 min, then 4 x 120 ml aliquots were poured off into four 150 ml squared High Density Poly Ethylene (HDPE) jars, immediately capped, then left overnight to stand at room temperature.

Each HDPE bottle was subjected to a cleanout procedure:

1. The bottle was inverted twice then shaken to suspend any settled material.
2. The liquid in each individual bottle was poured out and discarded
3. 12-mL tap water were added, the bottle was inverted twice, and the rinsate was discarded.
4. 12 ml tap water were added. A commercial cleaning agent (0.06 ml) (composition is described in annex 3 of the study report) at its use rate recommended on the label (0.5 % v/v) was added to water. The bottle was inverted twice and let stand for 15 min on the bench at ambient temperature. Then the bottle was inverted twice and the rinsate was discarded.
5. Step 3 was repeated.
6. 6-mL acetonitrile (ACN) and 6-mL water were added to extract any residual herbicide and the bottle was shaken well to solubilize any residue on the inside wall of jar.
7. The solution was filtered through PTFE 0.45 filters to remove solids before analysis.
8. The acetonitrile/water solution was analyzed. 12 ml will be used for the calculation of the amount of active substance /jar according to the concentration in ppm found by chemical analysis.

\*cp= commercial product \*\*as= active substance

The results of the analysis of residues in the jar after cleaning process are presented in Table 1

**Table 3.6-1: Measured concentrations of active substance contained in GF-4021 after cleaning process**

| Sample description                                     | Aminopyralid (ppm)                    | Halauxifen-methyl (ppm)               | Picloram (ppm)                        |
|--|---------------------------------------|---------------------------------------|---------------------------------------|
| Vial A1  | Nd                                    | Nd                                    | Nd                                    |
| Vial A2  | Nd                                    | Nd                                    | Nd                                    |
| Vial A3  | Nd                                    | Nd                                    | Nd                                    |
| Vial A4  | Nd                                    | Nd                                    | Nd                                    |
| Average  | Nd                                    | Nd                                    | Nd                                    |
| Quantity of active substance found in jars (as mg a.s) | $0.1 * 12 \text{ ml} / 1000 = 0.0012$ | $0.1 * 12 \text{ ml} / 1000 = 0.0012$ | $0.1 * 12 \text{ ml} / 1000 = 0.0012$ |
| LOQ  | 0.1                                   | 0.1                                   | 0.1                                   |
| LOD  | 0.06                                  | 0.02                                  | 0.05                                  |

Nd = not detected

LOQ = limit of quantification

LOD = limit of detection

To get a numerical value for the TER calculations the LOQ values are used as amount of residue.

The ED50 values of the actives (in mg as/ha) are then divided by the residue found in the jars after the cleanout procedure to provide the TER value.

The results show that the TER (Toxicity Exposure Ratio), comparing the ED50 values (obtained from non-target terrestrial plants (NTTP) studies) against the analysed residue after cleaning, is superior to 1 even on the most sensitive crop: tomato. This validates the tank cleaning procedure proposed which involves three times rinsing, at minimum 10% tank capacity, with clear water; the intermediate rinse being done with a commercial cleaning agent used at the recommended rate.

As such, the proposed label advice is:

To avoid subsequent injury to crops other than grassland and cereals, all spraying equipment must be thoroughly cleaned both inside and out, using proprietary tank cleaner as follows (or following tank cleaner manufacturers advice):

1. Immediately after spraying, drain tank completely. Any contamination on the outside of the spraying equipment should be removed by washing with clean water.
2. Rinse inside of tank with clean water and flush through booms and hoses using at least one tenth of the spray tank volume. Drain tank completely.
3. Half fill tank with clean water and add proprietary tank cleaner at the recommended rate. Agitate and then briefly flush the boom and hoses with the cleaning solution. Top up with water making sure the tank is completely full and allow to stand for 15 minutes with agitation. Flush the boom and hoses and drain tank completely.
4. Nozzles and filters should be removed and cleaned separately with proprietary tank cleaner solution at the recommended rate.
5. Rinse the tank with clean water and flush through the boom and hoses using at least one tenth of the spray tank volume. Drain tank completely.
6. For disposal of washings, follow Code of Practice for Using Plant Protection Products. Do not spray onto sensitive crop or land intended for cropping with sensitive crop.

**Note:** If it is not possible to drain the tank completely, step 3 must be repeated before going onto step 4.

#### Comments of zRMS:

In accordance with the submitted trial results, it can be accepted the proposed label advice. The tank cleaning procedure proposes three times rinsing, at minimum 10% tank capacity, with clear water and commercial cleaning agent used at the recommended rate. This cleaning procedure allows to remove the remains of the plant protection product to a level that is safe for the next crops.

### 3.7 List of test facilities including the corresponding certificates

The majority of corresponding certificates, confirming that all the test facilities mentioned have been officially recognized as organizations for efficacy testing of plant protection products according to the Directive 93/71/EC, are available in the GEP certibase (www.gepcertibase.eu).

**Table 3.7 - 1: List of test facilities**

| Testing facilities  | Address   | Years of trials | GEP Statues | Link of GEP Certibase       |
|---|---|-----------------|-------------|-----------------------------|
| Agrartest GmbH  | Palmbachstraße 37<br>D-65328 Aarbergen<br>Germany                   | 2017            | GEP         | <a href="#">1d5db8867fd</a> |
| Agrartest GmbH  | Palmbachstraße 37<br>D-65328 Aarbergen<br>Germany                   | 2018            | GEP         | <a href="#">1d5db8867fd</a> |
| Agro-Check Dr. Teresiak & Erdmann<br>GbRLandwirtschaftliche Forschung,<br>Entwicklung undBeratung | Dorfstrasse 15<br>D-16833 Lenzke<br>Germany                         | 2017            | GEP         | <a href="#">1d656df6ab1</a> |
| Agro-Check Dr. Teresiak & Erdmann<br>GbRLandwirtschaftliche Forschung,<br>Entwicklung undBeratung | Dorfstrasse 15<br>D-16833 Lenzke<br>Germany                         | 2018            | GEP         | <a href="#">1d656df6ab1</a> |
| Agro-Check Dr. Teresiak & Erdmann<br>GbRLandwirtschaftliche Forschung,<br>Entwicklung undBeratung | Dorfstrasse 15<br>D-16833 Lenzke<br>Germany                         | 2019            | GEP         | <a href="#">1d656df6ca4</a> |
| Agrofil - SZMI  | Felszabadulas st.<br>H-9234 Kisbodak<br>Hungary                     | 2018            | GEP         | <a href="#">1d5db8868af</a> |
| AgroProspect S.R.L.   | Fantana Village, no.1, Brasov<br>county<br>507099 Hoghiz<br>Romania | 2018            | GEP         | <a href="#">1d656e0f2c2</a> |

| Testing facilities                     | Address  | Years of trials | GEP Statues | Link of GEP Certibase              |
|--|--|-----------------|-------------|------------------------------------|
| Anadiag Bulgaria Ltd                   | 244, V.Levski str.<br>Plovdiv<br>Bulgaria  | 2018            | GEP         | <a href="#"><u>1d5a3642493</u></a> |
| Antedis                                | 48 Rue de la Madeleine<br>60000 Beauvais<br>France                                     | 2017            | GEP         | <a href="#"><u>1d5db8868cb</u></a> |
| Antedis                                | 48 Rue de la Madeleine<br>60000 Beauvais<br>France                                     | 2018            | GEP         | <a href="#"><u>1d5db8868cb</u></a> |
| Antedis                                | 48 Rue de la Madeleine<br>60000 Beauvais<br>France                                     | 2019            | GEP         | <a href="#"><u>1d5db8868cb</u></a> |
| Armstrong Fisher Ltd                   | Hill Crest, Main street<br>PE9 3BH Ufford Stamford -<br>Lincolnshire<br>United Kingdom | 2018            | GEP         | <a href="#"><u>1d6576bcc4e</u></a> |
| Armstrong Fisher Ltd                   | Hill Crest, Main street<br>PE9 3BH Ufford Stamford -<br>Lincolnshire<br>United Kingdom | 2019            | GEP         | <a href="#"><u>1d65774f6de</u></a> |
| Biotek Agriculture                     | Route de Viélaines<br>10120 Saint Pouange<br>France                                    | 2017            | Not GEP     | <a href="#"><u>1d5db83d4ea</u></a> |
| Biotek Agriculture                     | Route de Viélaines<br>10120 Saint Pouange<br>France                                    | 2018            | GEP         | <a href="#"><u>1d5db83d4ea</u></a> |
| Biotek Agriculture                     | Route de Viélaines<br>10120 Saint Pouange<br>France                                    | 2019            | GEP         | <a href="#"><u>1d5db83d4ea</u></a> |
| Biotek Agriculture Hungary Kft.        | Martirok utja 1-3<br>2013 Pomaz<br>Hungary   | 2018            | GEP         | <a href="#"><u>1d6576bcf13</u></a> |
| Ceska zemedelska univerzita v Praze    | Kamýcká 129<br>165 00 Praha-Suchdol<br>Czech Republic                                  | 2019            | GEP         | <a href="#"><u>1d656df6bbb</u></a> |
| Dow AgroSciences GmbH                  | Truderinger Strasse 15<br>81677 München<br>Germany                                     | 2017            | GEP         | <a href="#"><u>1d6576bcf0e</u></a> |
| Dow AgroSciences GmbH                  | Truderinger Strasse 15<br>81677 München<br>Germany                                     | 2018            | GEP         | <a href="#"><u>1d6576bcf0e</u></a> |
| Dow Agrosciences GmbH                  | Truderinger Strasse 15<br>81677 München<br>Germany                                     | 2019            | GEP         | <a href="#"><u>1d6576bcf0f</u></a> |
| Dow AgroSciences Limited               | Wellesbourne<br>United Kingdom   | 2018            | GEP         | <a href="#"><u>1d65774f6d9</u></a> |
| Dow AgroSciences Limited               | Wellesbourne<br>United Kingdom   | 2019            | GEP         | <a href="#"><u>1d65774f6d9</u></a> |
| Dow AgroSciences Polska Sp. Z o.o.     | Krasickiego 53<br>02-608 Warszawa<br>Poland  | 2017            | GEP         | <a href="#"><u>1d6577fa53f</u></a> |
| Dow AgroSciences S.A.                  | 371 rue Ludwig Van<br>Beethoven<br>06560 Valbonne<br>France                            | 2017            | GEP         | <a href="#"><u>1d656df6aa4</u></a> |
| Eurofins Agroscience Services Ltd (UK) | Slade Lane, Wilson, Mel-<br>bourne<br>DE73 8AG Derby<br>United Kingdom                 | 2018            | GEP         | <a href="#"><u>1d656e0f2fc</u></a> |
| Eurofins Agroscience Services Ltd (UK) | Slade Lane, Wilson, Mel-<br>bourne<br>DE73 8AG Derby<br>United Kingdom                 | 2019            | GEP         | <a href="#"><u>1d656e0f2fc</u></a> |

| Testing facilities   | Address   | Years of trials | GEP Statues | Link of GEP Certibase       |
|--|---|-----------------|-------------|-----------------------------|
| Eurofins Agroscience Services Srl (Romania)  | Strada Academician Petre P. Negulescu, nr. 1<br>30263 Timisoara<br>Romania            | 2018            | GEP         | <a href="#">1d5dae82faa</a> |
| Eurofins Agroscience Services Srl (Romania)  | Strada Academician Petre P. Negulescu, nr. 1<br>30263 Timisoara<br>Romania            | 2019            | GEP         | <a href="#">1d5dae82faa</a> |
| Fundulea National Institute for Agricultural Research and Development                            | Str. Nicolae Titulescu, nr.1<br>915200 Fundulea<br>Romania                            | 2018            | GEP         | <a href="#">1d656df6bfd</a> |
| Institute of Plant Protection - National Research Institute Badawczy w Poznaniu Sosnowice Branch | Gliwicka 29 St.<br>44-153 Sosnowice<br>Poland   | 2017            | GEP         | <a href="#">1d5dd415def</a> |
| Neutex Beteti Tarsasag   | Blaháné u. 50<br>2100 Godollo<br>Hungary  | 2019            | GEP         | <a href="#">1d656df6b16</a> |
| Növénypathyka Kft  | Damjanich u. 47<br>7400 Kaposvár<br>Hungary   | 2018            | GEP         | <a href="#">1d656df69f5</a> |
| Növénypathyka Kft.   | Damjanich u. 47<br>7400 Kaposvár<br>Hungary   | 2019            | GEP         | <a href="#">1d656df69f5</a> |
| OSEVA PRO s.r.o., odstepny zavod Vyzkumny ustav olejnin Opava                                    | Purkynova 1653/10<br>746 01 Opava<br>Czech Republic                                   | 2018            | GEP         | <a href="#">1d656df6b31</a> |
| Oxford Agricultural Trials Ltd   | West Farm Barn, Launton Rd,<br>Stratton Audley<br>OX27 9AS Bicester<br>United Kingdom | 2017            | GEP         | <a href="#">1d5dd41601d</a> |
| Oxford Agricultural Trials Ltd   | West Farm Barn, Launton Rd,<br>Stratton Audley<br>OX27 9AS Bicester<br>United Kingdom | 2018            | GEP         | <a href="#">1d656d02a4b</a> |
| Plant-Art Research   | Ebner György köz 4<br>H-2040 Budaörs<br>Hungary                                       | 2018            | GEP         | <a href="#">1d6576bcf12</a> |
| Plant-Art Research   | Ebner György köz 4<br>H-2040 Budaörs<br>Hungary                                       | 2019            | GEP         | <a href="#">1d6576bcf12</a> |
| Saaten Union GmbH  | Grünseiboldsdorf 6<br>85368 Moosburg<br>Germany                                       | 2019            | GEP         | <a href="#">1d656df6cbf</a> |
| SGS Polska Sp. z o.o.  | Ul. Bema 85<br>01-235 Warszawa<br>Poland  | 2017            | GEP         | <a href="#">1d5dae8307d</a> |
| Staphyt Ltd  | Lower Farm Barns Unit 3,<br>Bainton Rd,<br>OX27 7LT Bicester<br>United Kingdom        | 2019            | GEP         | <a href="#">1d656e0f362</a> |
| Staphyt Sp. z o.o.   | Ziębicka 2,<br>60-164 Poznan<br>Poland  | 2017            | GEP         | <a href="#">1d61962745e</a> |
| Trial-Tec  | Kampenredder 5<br>24363 Haby<br>Germany   | 2019            | GEP         | <a href="#">1d656d02b0b</a> |
| Vas County Agricultural Office, Plant Protection and Soil Conservation Directorate               | Ambrózy sétány 2<br>9762 Tanakajd<br>Hungary  | 2018            | GEP         | <a href="#">1d657780253</a> |
| Zkusebni stanice Krasne Udoli, s.r.o   | Krasne Udoli 141<br>CZ- 36401 Touzím<br>Czech Republic                                | 2018            | GEP         | <a href="#">1d5dd415c52</a> |

| Testing facilities                                | Address  | Years of trials | GEP Statues | Link of GEP Certibase              |
|---|--|-----------------|-------------|------------------------------------|
| Zkusebni Stanice Trutnov. s.r.o.                  | Volanovská 409<br>541 01 Trutnov<br>Czech Republic                       | 2017            | GEP         | <a href="#"><u>1d6172024f6</u></a> |
| Zkusebni Stanice Trutnov. s.r.o.                  | Volanovská 409<br>541 01 Trutnov<br>Czech Republic                       | 2018            | GEP         | <a href="#"><u>1d6172024f6</u></a> |
| Zemservis zkusebni stanice Domani-<br>nek, s.r.o. | K Záměčku 1231<br>593 01 Bystrice nad Pernstěj-<br>nem<br>Czech Republic | 2017            | GEP         | <a href="#"><u>1d61b33d86c</u></a> |
| Zemservis zkusebni stanice Domani-<br>nek, s.r.o. | K Záměčku 1231<br>593 01 Bystrice nad Pernstěj-<br>nem<br>Czech Republic | 2018            | GEP         | <a href="#"><u>1d61b33d86c</u></a> |

## Appendix 1 Lists of data considered in support of the evaluation

| Annex point/reference number (OECD-Format) | Author      | Year | Title Source (where different from company) Company, Report No. Published or Unpublished   | Vertebrate study Y/N | Data protection claimed Y/N | Justification if data protection is claimed | Owner                   |
|--|-------------|------|--|----------------------|-----------------------------|---|-------------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#001    | Trojan, Z.  | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>ZZS Domaninek, Kromeriz, Czech Republic, Report No. CZ17D2C314KS01C<br>Dow Agrosciences<br>GEP<br>Unpublished | N                    | Y                           | New study                                   | Dow Agrosciences<br>SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#002    | Kopecka, P. | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>ZS Trutnov, Trutnov, Czech Republic, Report No. CZ17D2C314KS02C<br>Dow Agrosciences<br>GEP<br>Unpublished     | N                    | Y                           | New study                                   | Dow Agrosciences<br>SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#003    | Trojan, Z.  | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>ZZS Domaninek, Kromeriz, Czech Republic, Report No. CZ18D2C326KS01C<br>Dow Agrosciences<br>GEP<br>Unpublished                            | N                    | Y                           | New study                                   | Dow Agrosciences<br>SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#004    | Subr, J.    | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>ZS Trutnov, Trutnov, Czech Republic.<br>Report No. CZ18D2C326KS02C<br>Dow Agrosciences<br>GEP<br>Unpublished                             | N                    | Y                           | New study                                   | Dow Agrosciences<br>SAS |

| Annex point/reference number (OECD-Format) | Author        | Year | Title<br>Source (where different from company)<br>Company, Report No.<br>Published or Unpublished   | Vertebrate study<br>Y/N | Data protection claimed<br>Y/N | Justification if data protection is claimed | Owner                |
|--|---------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#005    | Mareckova, J. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>ZS Krasne Udoli, Touzim, Czech Republic.<br>Report No. <b>CZ18D2C326KS03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                         | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#006    | Trojan, Z.    | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>ZZS Domaninek, Kromeriz, Czech Republic.<br>Report No. <b>CZ18D2C327KS01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                         | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#007    | Subr, J.      | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>ZS Trutnov, Trutnov, Czech Republic.<br>Report No. <b>CZ18D2C327KS02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                             | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#008    | Mareckova, J. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>ZS Krasne Udoli, Touzim, Czech Republic.<br>Report No. <b>CZ18D2C327KS03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                         | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#009    | Hvel, J.      | 2018 | The efficacy of GF-3788 vs GF-4021, GF-4022, GF-4023, GF-4024 and GF-4025 vs GF-3447+GF-1601 tank mix to control BLWs, WOSR at B12-14, 2018, EU.<br>Oseva, Touzim, Czech Republic.<br>Report No. <b>CZ18D2C328KS01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1            | Kolářová, M.  | 2019 | Efficacy and selectivity of GF-4021 GPS1 vs. GF-4021 on key BLWS in WOSR.<br>CULS Prague, Praha-Suchdol, Czech Republic.  | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

| Annex point/reference number (OECD-Format) | Author       | Year | Title<br>Source (where different from company)<br>Company, Report No.<br>Published or Unpublished  | Vertebrate study<br>Y/N | Data protection claimed<br>Y/N | Justification if data protection is claimed | Owner                |
|--|--------------|------|--|-------------------------|--------------------------------|---|----------------------|
| #010                                       |              |      | Report No. EA19D2C242H-TQS01<br>Dow Agrosciences<br>GEP<br>Unpublished   |                         |                                |   |                      |
| KCP 6.1<br>#011                            | Lieveaux, G. | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Antedis, Beauvais, France, Report No. DAS-HE18CO-00019-SV<br>Report No. FR17D2C314YL01C<br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>#012                            | Lieveaux, G. | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Antedis, Beauvais, France, Report No. DAS-HE18CO-00020-CA<br>Report No. FR17D2C314YL02C<br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>#013                            | Lieveaux, G. | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Antedis, Beauvais, France, Report No. DAS-HE18CO-00021-SV<br>Report No. FR17D2C314YL03C<br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |



| Annex point/reference number (OECD-Format) | Author       | Year | Title<br>Source (where different from company)<br>Company, Report No.<br>Published or Unpublished  | Vertebrate study<br>Y/N | Data protection claimed<br>Y/N | Justification if data protection is claimed | Owner                |
|--|--------------|------|--|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>#014                            | Lourdet, Y.  | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Dow AgroSciences, France.<br>Report No. <b>FR17D2C314YL04</b><br>Dow Agrosciences<br>GEP<br>Unpublished       | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>#015                            | Lourdet, Y.  | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Dow AgroSciences, France.<br>Report No. <b>FR17D2C314YL05</b><br>Dow Agrosciences<br>GEP<br>Unpublished       | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>#016                            | Lieveaux, G. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Antedis, Beauvais, France, Report No. DAS-HE19CO-00137-SV<br>Report No. <b>FR18D2C326YL01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>#017                            | Lieveaux, G. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Antedis, Beauvais, France, Report No. DAS-HE19CO-00138-CO<br>Report No. <b>FR18D2C326YL02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>#018                            | Lieveaux, G. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Antedis, Beauvais, France, Report No. DAS-HE19CO-00139-CA<br>Report No. <b>FR18D2C326YL03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>#019                            | Lieveaux, G. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

| Annex point/reference number (OECD-Format) | Author       | Year | Title<br>Source (where different from company)<br>Company, Report No.<br>Published or Unpublished  | Vertebrate study<br>Y/N | Data protection claimed<br>Y/N | Justification if data protection is claimed | Owner                   |
|--|--------------|------|--|-------------------------|--------------------------------|---|-------------------------|
|  |              |      | Antedis, Beauvais, France, Report No. DAS-HE19CO-00140-SV<br>Report No. <b>FR18D2C327YL01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished   |                         |                                |   |                         |
| KCP 6.1<br>#020                            | Lieveaux, G. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Antedis, Beauvais, France, Report No. DAS-HE19CO-00141-CO<br>Report No. <b>FR18D2C327YL02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                                   | N                       | Y                              | New study                                   | Dow Agrosciences<br>SAS |
| KCP 6.1<br>#021                            | Lieveaux, G. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Antedis, Beauvais, France, Report No. DAS-HE19CO-00142-CA<br>Report No. <b>FR18D2C327YL03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                                   | N                       | Y                              | New study                                   | Dow Agrosciences<br>SAS |
| KCP 6.1<br>#022                            | Lieveaux, G. | 2018 | The efficacy of GF-3788 vs GF-4021, GF-4022, GF-4023, GF-4024 and GF-4025 vs GF-3447+GF-1601 tank mix to control BLWs, WOSR at B12-14, 2018, EU.<br>Antedis, Beauvais, France, Report No. DAS-HE19CO-00121-SV<br>Report No. <b>FR18D2C328YL01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences<br>SAS |
| KCP 6.1<br>#023                            | Lieveaux, G. | 2018 | The efficacy of GF-3788 vs GF-4021, GF-4022, GF-4023, GF-4024 and GF-4025 vs GF-3447+GF-1601 tank mix to control BLWs, WOSR at B12-14, 2018, EU.<br>Antedis, Beauvais, France, Report No.<br>Report No. <b>FR18D2C328YL02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                     | N                       | Y                              | New study                                   | Dow Agrosciences<br>SAS |

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|--|--------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>#024                            | Lieveaux, G. | 2019 | Efficacy and selectivity of GF-4021 GPS1 vs. GF-4021 on key BLWS in WOSR.<br>Antedis, Beauvais, France, Report No. DAS-HE20CO-00159-SV<br>Report No. <b>EA19D2C242H-DMI04</b><br>Dow Agrosciences<br>GEP<br>Unpublished           | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>#025                            | Lieveaux, G. | 2019 | Efficacy and selectivity of GF-4021 GPS1 vs. GF-4021 on key BLWS in WOSR.<br>Antedis, Beauvais, France, Report No. DAS-HE20CO-00161-SV<br>Report No. <b>EA19D2C242H-DMI06</b><br>Dow Agrosciences<br>GEP<br>Unpublished           | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.2<br>#026                            | Lieveaux, G. | 2019 | Efficacy study of GF-4021/GF-4021 GPS1 on BLWS in OSR applied at crop stage BBCH 19<br>Antedis, Beauvais, France, Report No. DAS-HE20CO-00158-PR<br>Report No. <b>EA19D2C294H-DMI08</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>#027                            | Lieveaux, G. | 2019 | Efficacy study of GF-4021/GF-4021 GPS1 on BLWS in OSR applied at crop stage BBCH 19<br>Antedis, Beauvais, France, Report No. DAS-HE20CO-00160-PR<br>Report No. <b>EA19D2C294H-DMI09</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|--|------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#028</b> | Schulz, T. | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Dow AgroSciences GmbH, München, Germany.<br>Report No. <b>DE17D2C314TS01</b><br>Dow Agrosciences<br>GEP<br>Unpublished           | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#029</b> | Rohr, J.   | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Agrartest, Aarbergen, Germany.<br>Report No. <b>DE17D2C314UB03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                    | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#030</b> | Rohr, J.   | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Agrartest, Aarbergen, Germany.<br>Report No. <b>DE17D2C314UB04C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                    | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#031</b> | Kunze, T.  | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Agro-check, Lenzke, Germany, Report No. AC/17/145<br>Report No. <b>DE17D2C314UB05C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|--|---------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#032    | Kunze, T.     | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Agro-check, Lenzke, Germany, Report No. AC/17/146<br>Report No. <b>DE17D2C314UB06C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#033    | Dietrichs, W. | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Dow AgroSciences GmbH, München, Germany.<br>Report No. <b>DE17D2C314WD01</b><br>Dow Agrosciences<br>GEP<br>Unpublished           | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#034    | Dietrichs, W. | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Dow AgroSciences GmbH, München, Germany.<br>Report No. <b>DE17D2C314WD02</b><br>Dow Agrosciences<br>GEP<br>Unpublished           | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#035    | Stephan, A.   | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Dow AgroSciences GmbH, München, Germany.<br>Report No. <b>DE18D2C326AS01</b><br>Dow Agrosciences<br>GEP<br>Unpublished                                      | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#036    | Schulz, T.    | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Dow AgroSciences GmbH, München, Germany.<br>Report No. <b>DE18D2C326TS01</b><br>Dow Agrosciences<br>GEP<br>Unpublished                                      | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|--|-------------|------|--|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#037    | Kunze, T.   | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Agro-check, Lenzke, Germany, Report No. AC/18/190<br>Report No. <b>DE18D2C326UB01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#038    | Kunze, T.   | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Agro-check, Lenzke, Germany, Report No. AC/18/191<br>Report No. <b>DE18D2C326UB02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#039    | Ziegler, K. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Agrartest, Aarbergen, Germany.<br>Report No. <b>DE18D2C326UB03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                    | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#040    | Stephan, A. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Dow AgroSciences GmbH, München, Germany.<br>Report No. <b>DE18D2C327AS01</b><br>Dow Agrosciences<br>GEP<br>Unpublished           | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#041    | Schulz, T.  | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Dow AgroSciences GmbH, München, Germany.<br>Report No. <b>DE18D2C327TS01</b><br>Dow Agrosciences<br>GEP<br>Unpublished           | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|--|-------------|------|--|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#042    | Kunze, T.   | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Agro-check, Lenzke, Germany, Report No. AC/18/193<br>Report No. <b>DE18D2C327UB02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#043    | Ziegler, K. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Agrartest, Aarbergen, Germany.<br>Report No. <b>DE18D2C327UB03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                    | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#044    | Kunze, T.   | 2019 | Efficacy and selectivity of GF-4021 GPS1 vs. GF-4021 on key BLWS in WOSR.<br>Agro-check, Lenzke, Germany, Report No. AC/19/232<br>Report No. <b>EA19D2C242H-DQZ01</b><br>Dow Agrosciences<br>GEP<br>Unpublished                                    | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#045    | Weiher, R.  | 2019 | Efficacy and selectivity of GF-4021 GPS1 vs. GF-4021 on key BLWS in WOSR.<br>Saaten Union GmbH, Moosburg, Germany.<br>Report No. <b>EA19D2C242H-DQZ02</b><br>Dow Agrosciences<br>GEP<br>Unpublished  | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#046    | Scholey, J. | 2017 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>OAT, Bicester, United Kingdom.<br>Report No. <b>GB18D2C326EB01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                    | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|--|--------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#047    | Pumffrey, S. | 2018 | The efficacy of GF-XXXX vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Eurofins, Derby, United Kingdom, Report No. S18-06260-01<br>Report No. <b>GB18D2C326EB02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#048    | Fairfax, M.  | 2018 | The efficacy of GF-XXXX vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Dow AgroSciences, United Kingdom.<br>Report No. <b>GB18D2C326MF01</b><br>Dow Agrosciences<br>GEP<br>Unpublished                         | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#049    | Downey, S.   | 2018 | The efficacy of GF-XXXX vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Dow AgroSciences, United Kingdom.<br>Report No. <b>GB18D2C326SD01</b><br>Dow Agrosciences<br>GEP<br>Unpublished                         | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#050    | Scholey, J.  | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>OAT, Bicester, United Kingdom.<br>Report No. <b>GB18D2C327EB01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                           | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#051    | Pumffrey, S. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Eurofins, Derby, United Kingdom, Report No. S18-06261-01<br>Report No. <b>GB18D2C327EB02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |



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|--|--------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#052    | Fairfax, M.  | 2018 | The efficacy of GF-XXXX vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Dow AgroSciences, United Kingdom.<br>Report No. <b>GB18D2C327MF01</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#053    | Downey, S.   | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Dow AgroSciences, United Kingdom.<br>Report No. <b>GB18D2C327SD01</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#054    | Pumffrey, S. | 2019 | Determination of Efficacy / Crop Safety of A.I. against Target Pest in Crop OUTDOOR / INEfficacy and selectivity of GF-4021 GPS1 vs. GF-4021 on key BLWS in WOSR<br>Eurofins, Derby, United Kingdom, Report No. S19-21284-01<br>Report No. <b>EA19D2C242H-DAV01</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#055    | Hilton, R.   | 2019 | Efficacy and selectivity of GF-4021 GPS1 vs. GF-4021 on key BLWS in WOSR.<br>Dow AgroSciences, United Kingdom.<br>Report No. <b>EA19D2C242H-DJW01</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#056    | Vourkos, F.  | 2018 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Anadiag Bulgaria Ltd, Plovdiv, Bulgaria.<br>Report No. <b>BG18D2C326VA01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>#057                            | Vourkos, F.  | 2018 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Anadiag Bulgaria Ltd, Plovdiv, Bulgaria.  | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|--|---------------------|------|--|-------------------------|--------------------------------|---|-------------------------|
|  |                     |      | Report No. <b>BG18D2C327VA01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished  |                         |                                |   |                         |
| <del>KCP 6.4</del><br><del>KCP 6.4.1</del><br><del>KCP 6.4.2</del> |                     |      |  |                         |                                |   |                         |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#058</b>                     | Lang, B.            | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Plant-Art Research, Budaörs, Hungary.<br>Report No. <b>HU18D2C326GK02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences<br>SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#059</b>                     | Fejes, A.           | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Biotek Agriculture, Pomaz, Hungary.<br>Report No. <b>HU18D2C326GK03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences<br>SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#060</b>                     | Lang, B.            | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Plant-Art Research, Budaörs, Hungary.<br>Report No. <b>HU18D2C327GK02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences<br>SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#061</b>                     | Fejes, A.           | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Biotek Agriculture, Pomaz, Hungary.<br>Report No. <b>HU18D2C327GK03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences<br>SAS |
| KCP 6.1  | Labant-Hoffmann, E. | 2018 | The efficacy of GF-3788 vs GF-4021, GF-4022, GF-4023, GF-4024 and GF-4025 vs GF-3447+GF-1601 tank mix to control BLWs, WOSR at   | N                       | Y                              | New study                                   | Dow Agrosciences<br>SAS |

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|--|----------|------|---|-------------------------|--------------------------------|---|------------------------|
| #062                                       |          |      | B12-14, 2018, EU.<br>Növénypathyka Kft, Kaposvár, Hungary.<br>Report No. <b>HU18D2C3286K02C</b><br>Dow Agrosiences<br>GEP<br>Unpublished  |                         |                                |   |                        |
| KCP 6.1<br>#063                            | Ughy, P. | 2018 | The efficacy of GF-3788 vs GF-4021, GF-4022, GF-4023, GF-4024 and GF-4025 vs GF-3447+GF-1601 tank mix to control BLWs, WOSR at B12-14, 2018, EU.<br>Vas Megyei KH, Tanakajd, Hungary.<br>Report No. <b>HU18D2C328GK01C</b><br>Dow Agrosiences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosiences<br>SAS |

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|--|--------------------|------|--|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#064</b> | Benécsné Bárdi, G. | 2019 | Efficacy and selectivity of GF-4021 GPS1 vs. GF-4021 on key BLWS in WOSR.<br>Neutex BT, Godollo, Hungary, Report No. H019-CORT-2019/2020<br>Report No. <b>EA19D2C242H-HET01</b><br>Dow Agrosciences<br>GEP<br>Unpublished  | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#065</b> | Cana, L.           | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Fundulea National Agricultural Research Development Institute, Fundulea, Romania.<br>Report No. <b>RO18D2C326AP01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#066</b> | Tuna, V.           | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>Eurofins, Timisoara, Romania, Report No. S18-06626-01<br>Report No. <b>RO18D2C326AP02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                             | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#067</b> | Botoman, C.        | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>AgroProspect, Hoghiz, Romania.<br>Report No. <b>RO18D2C326AP03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished  | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br><b>#068</b>                         | Botoman, C.        | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>AgroProspect, Hoghiz, Romania.<br>Report No. <b>RO18D2C327AP01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished  | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|--|-------------|------|--|----------------------|-----------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><br><b>#069</b> | Cana, L.    | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Fundulea National Agricultural Research Development Institute, Fundulea, Romania.<br>Report No. <b>RO18D2C327AP02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                    | Y                           | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><br><b>#070</b> | Pet, I.     | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Eurofins, Timisoara, Romania, Report No. S18-06627-01<br>Report No. <b>RO18D2C327AP03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                             | N                    | Y                           | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><br><b>#071</b> | Lunca, A.M. | 2019 | Efficacy and selectivity of GF-4021 GPS1vs.GF-4021 on key BLWS in WOSR<br>Eurofins, Timisoara, Romania, Report No. S19-20997-01<br>Report No. <b>EA19D2C242H-AMT01</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                    | Y                           | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br><br><b>#072</b>                         | Lunca, A.M. | 2019 | Efficacy and selectivity of GF-4021 GPS1vs.GF-4021 on key BLWS in WOSR<br>Eurofins, Timisoara, Romania, Report No. S19-20997-02<br>Report No. <b>EA19D2C242H-AMT04</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                    | Y                           | New study                                   | Dow Agrosciences SAS |

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|--|--------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#073    | Pietryga, J. | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>IPP Sosnicowice, Sosnicowice, Poland.<br>Report No. <b>PL17D2C314AS01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#074    | Pawlak, A.   | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Staphyt, Poznan, Poland.<br>Report No. <b>PL17D2C314AS02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished              | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#075    | Krawczuk, J. | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>SGS, Warszawa, Poland.<br>Report No. <b>PL17D2C314AS03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#076    | Tomczak, B.  | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Dow AgroSciences, Poland.<br>Report No. <b>PL17D2C314BT04</b><br>Dow Agrosciences<br>GEP<br>Unpublished              | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|---|-------------|------|--|-------------------------|--------------------------------|---|----------------------|
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br>#077     | Tomczak, B. | 2017 | The efficacy of GF-3788 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-13 and 2 weeks later (B14-16), 2017, EU.<br>Dow AgroSciences, Poland.<br>Report No. <b>PL17D2C314BT05</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#078 | Rohr, J.    | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13. EU, autumn 2017.<br>Agrartest, Aarbergen, Germany.<br>Report No. <b>DE17D2C315UB01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                     | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#079 | Rohr, J.    | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13. EU, autumn 2017.<br>Agrartest, Aarbergen, Germany.<br>Report No. <b>DE17D2C315UB02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                     | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#080 | Kunze, T.   | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13. EU, autumn 2017.<br>Agro-check, Lenzke, Germany, Report No. AC/17/147<br>Report No. <b>DE17D2C315UB03C</b><br>Dow Agrosciences<br>GEP<br>Unpublished  | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#081 | Kunze, T.   | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13. EU, autumn 2017.<br>Agro-check, Lenzke, Germany, Report No. AC/17/148<br>Report No. <b>DE17D2C315UB04C</b><br>Dow Agrosciences<br>GEP<br>Unpublished  | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|---|---------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#082 | Ziegler, K.   | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 12-14, EU, autumn 2018.<br>Agrartest, Aarbergen, Germany.<br>Report No. <b>DE18D2C330UB02C</b><br>Dow Agrosciences<br>GEP<br>Published                        | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#083 | Kunze, T.     | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 14-16, EU, autumn 2018.<br>Agro-check, Lenzke, Germany, Report No. AC/18/196<br>Report No. <b>DE18D2C331UB01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#084 | Ziegler, K.   | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 14-16, EU, autumn 2018.<br>Agrartest, Aarbergen, Germany.<br>Report No. <b>DE18D2C331UB02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                      | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#085 | Stephan, A.   | 2019 | Comparison selectivity of GF-4021 GPS1 vs. GF-4021 on WOSR<br>Dow Agrosciences GmbH, München, Germany.<br>Report No. <b>EA19D2C241H-DPE01</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#086 | Armstrong, A. | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 12-14, EU, autumn 2018.<br>Armstrong Fisher Ltd, Lincolnshire, United Kingdom.<br>Report No. <b>GB18D2C330EB01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |



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|---|---------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#087 | Armstrong, A. | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 14-16, EU, autumn 2018.<br>Armstrong Fisher Ltd, Lincolnshire, United Kingdom.<br>Report No. <b>GB18D2C331EB01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#088 | Rose-Gray, S. | 2019 | Comparison selectivity of GF-4021 GPS1 vs. GF-4021 on WOSR Staphyt Ltd., Bicester, United Kingdom, Report No. SRY-19-42183-GB01<br>Report No. <b>EA19D2C241H-DAV01</b><br>Dow Agrosciences<br>GEP<br>Unpublished                                      | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#89  | Fejes, A.     | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 12-14, EU, autumn 2018.<br>Biotek Agriculture, Pomaz, Hungary.<br>Report No. <b>HU18D2C330GK02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                 | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#90  | Kasztner, G.  | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 14-16, EU, autumn 2018.<br>Agrofil, Kisbodak, Hungary.<br>Report No. <b>HU18D2C331GK01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                         | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#91  | Fejes, A.     | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 14-16, EU, autumn 2018.<br>Biotek Agriculture, Pomaz, Hungary.<br>Report No. <b>HU18D2C331GK02C</b><br>Dow Agrosciences<br>GEP<br>Unpublished                 | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|--|--------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#92 | Lang, B.     | 2019 | Selectivity study of GF-4021 on WOSR at late application at BBCH 18-19 Plant-Art Research, Budaörs, Hungary.<br>Report No. <b>EA19D2C295H-HET012</b><br>Dow Agrosciences<br>GEP<br>Unpublished  | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#93 | Tuna, V.     | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 12-14, EU, autumn 2018.<br>Eurofins, Timisoara, Romania, Report No. S18-06628-01<br>Report No. <b>EA18D2C330AP01C</b><br>Dow Agrosciences<br>GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#94 | Lunca, A.M.  | 2019 | Comparison selectivity of GF-4021 GPS1 vs. GF-4021 on WOSR Eurofins, Timisoara, Romania, Report No. S19-20998-01<br>Report No. <b>EA19D2C241H-AMT01</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#95 | Lunca, A.M.  | 2019 | Comparison selectivity of GF-4021 GPS1 vs. GF-4021 on WOSR Eurofins, Timisoara, Romania, Report No. S19-20998-02<br>Report No. <b>EA19D2C241H-AMT02</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.5.2<br>#96                           | Lieveaux, G. | 2019 | Crop failure test of GF-4021 GPS1 on sunflower, EU 2019. Antedis, Beauvais, France, Report No. DAS-HC20CO-00171-BR<br>Report No. <b>EA19D2C236H-DMI02</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP 6.5.2<br>#97                           | Lieveaux, G. | 2019 | Crop failure test of GF-4021 GPS1 on sunflower, EU 2019 se, Beauvais, France, Report No. DAS-HC20CO-00170-SV<br>Report No. <b>EA19D2C236H-DMI01</b><br>Dow Agrosciences<br>GEP<br>Unpublished   | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|--|---------------------|------|---|-------------------------|--------------------------------|---|----------------------|
| KCP 6.5.2<br>#98                           | Labant-Hoffmann, E. | 2019 | Crop failure test of GF-4021 GPS1 on sunflower EU 2019<br>Nővénypathyka Kft., Kaposvár, Hungary.<br>Report No. <b>EA19D2C236H-HET011</b><br>Dow Agrosciences<br>GEP<br>Unpublished                              | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP <del>6.5.1</del> 6.5.2<br>#99          | Lieveaux, G.        | 2019 | GF-4021 safe distance on neighboring crop.EU 2019<br>Antedis, Beauvais, France, Report No. DAS-HS20LU-00172-JA<br>Report No. <b>EA19D2C238H-DMI01</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished             | N                       | Y                              | New study                                   | Dow Agrosciences SAS |
| KCP <del>6.5.1</del> 6.5.2<br>#100         | Dubois, P.          | 2019 | GF-4021 safe distance on neighboring crop.EU 2019<br>Biotek Agriculture, Saint Pouange, France, Report No. BPE20/014/HGC01<br>Report No. <b>EA19D2C238H-DMI02</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences SAS |

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|---|---------------|------|---|----------------------|-----------------------------|---|----------------------|
| KCP 6.5.1 6.5.2<br>#101                           | Armstrong, A. | 2019 | What is the safe distance of an application of GF-4021GPS1 to the neighboring crops in pre emergence or early post?<br>Armstrong Fisher Ltd, Lincolnshire, United Kingdom.<br>Report No. <b>EA19D2C238H-DAV01</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished | N                    | Y                           | New study                                   | Dow Agrosciences SAS |
| KCP 6.5.1 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#102 | Lourdets, Y.  | 2019 | Comparison selectivity of GF-4021 GPS1 vs. GF-4021 on WOSR.<br>Antedis, Beauvais, France<br>Report No. <b>EA19D2C241H-DMI01</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished   | N                    | Y                           | New study                                   | Dow Agrosciences SAS |
| KCP 6.5.1 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#103 | Lourdets, Y.  | 2019 | Comparison selectivity of GF-4021 GPS1 vs. GF-4021 on WOSR.<br>Biotek, Saint-Pouange, France<br>Report No. <b>EA19D2C241H-DMI02</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished   | N                    | Y                           | New study                                   | Dow Agrosciences SAS |
| KCP 6.5.1 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#104 | Lourdets, Y.  | 2019 | Comparison selectivity of GF-4021 GPS1 vs. GF-4021 on WOSR.<br>Biotek, Saint-Pouange, France<br>Report No. <b>EA19D2C241H-DMI03</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished   | N                    | Y                           | New study                                   | Dow Agrosciences SAS |

| Annex point/reference number (OECD-Format)        | Author     | Year | Title<br>Source (where different from company)<br>Company, Report No.<br>Published or Unpublished   | Vertebrate study<br>Y/N | Data protection claimed<br>Y/N | Justification if data protection is claimed | Owner                   |
|---|------------|------|---|-------------------------|--------------------------------|---|-------------------------|
| KCP 6.5.1 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#105 | Holger, T. | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 12-14.<br>Agro-check, Lentzke, Germany<br>Report No. <b>DE18D2C330UB01C</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished | N                       | Y                              | New study                                   | Dow Agrosciences<br>SAS |

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| KCP 6.5.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#106 | Krawczuk, M       | 2019 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 14-16.<br>SGS, Ogorzeliny, Poland<br>Report No. <b>EA19D2C100H-DPF02</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.5.1<br>#107                           | Lourdret, Y.      | 2019 | GF 4021 safe distance on neighboring crop.<br>Biotek, Thurageau, France<br>Report No. <b>EA19D2C238HDMI02</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished  | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.5.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#108 | Rost, A.          | 2019 | Comparison selectivity of GF-4021 GPS1 vs. GF-4021 on WOSR.<br>Trial tec, Villmar, Germany<br>Report No. <b>EA19D2C241H-DQZ01</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                                | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.5.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#109 | Pszczółkowski, M. | 2019 | Selectivity study of GF-4021 on WOSR at late application at BBCH 18-19.<br>Staphyt, Łobez, Poland<br>Report No. <b>EA19D2C295H-DPF09</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                         | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.5.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#110 | Lourdret, Y.      | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13.<br>Biotek, Mercurey, France<br>Report No. <b>FR17D2C315YL01C</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished  | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.5.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#111 | Couturier, L.     | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13.<br>Biotek, Saint Lye, France<br>Report No. <b>FR17D2C315YL02C</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished | N | Y | New study | Dow Agrosciences<br>SAS |

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| KCP 6.5.1 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#112 | Lourdets, Y. | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13.<br>Biotek, Merouville, France<br>Report No. <b>FR17D2C315YL03C</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                            | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.5.1 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#113 | Lourdets, Y. | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13.<br>Biotek, Warloy Baillon, France<br>Report No. <b>FR17D2C315YL04C</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                        | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.5.1 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#114 | Lourdets, Y. | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13.<br>Biotek, Saux, France<br>Report No. <b>FR17D2C315YL05C</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                                  | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.5.1 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#115 | Lourdets, Y. | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 12-14.<br>Biotek, Saint Porquier, France<br>Report No. <b>FR18D2C330YL01C</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                        | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.5.1<br>#116                                 | Lourdets, Y. | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 12-14.<br>Biotek, Saint Porquier, France<br>Report No. <b>FR18D2C330YL01C</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                        | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.5.1 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#117 | Kerekes, G.  | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 12-14.<br>Agrofil-SZMI Kft., Hodmezovasarhely Soshalom, Hungary<br>Report No. <b>HU18D2C330GK01C</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished | N | Y | New study | Dow Agrosciences<br>SAS |

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| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#118 | Głazek, M.  | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 14-16.<br>IOR-PIB Sośnicowice, Łany Wielkie, Poland<br>Report No. <b>PL18D2C331AS01C</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished               | N | Y | New study | Dow Agrosiences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#119 | Krawczuk, M | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 12-14.<br>SGS, Ogorzeliny, Poland<br>Report No. <b>PL18D2C330AS02C</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished                                 | N | Y | New study | Dow Agrosiences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#120 | Głazek, M.  | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>IOR SOSNICOWICE, Łany Wielkie, Poland<br>Report No. <b>EA19D2C094H-DPF01</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished | N | Y | New study | Dow Agrosiences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#121 | Głazek, M.  | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>IOR SOSNICOWICE, Łany Wielkie, Poland<br>Report No. <b>EA19D2C094H-DPF02</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished | N | Y | New study | Dow Agrosiences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#122 | Głazek, M.  | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>IOR SOSNICOWICE, Sosnicowice, Poland<br>Report No. <b>EA19D2C094H-DPF03</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished  | N | Y | New study | Dow Agrosiences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br>#123 | Pawlak, A.  | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>STAPHYT, Rogozno, Poland<br>Report No. <b>EA19D2C094H-DPF04</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished              | N | Y | New study | Dow Agrosiences<br>SAS |



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|--|---------------------------------------|------|--|---|---|-----------|-------------------------|
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#124</b> | Pawlak, A.                            | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>STAPHYT, Jaraczewo, Poland<br>Report No. <b>EA19D2C094H-DPF05</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                    | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#125</b> | <del>Sawinska, Z.</del><br>Sobiech Ł. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>UP Poznan, Przybroda, Poland<br>Report No. <b>EA19D2C094H-DPF06</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                  | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#126</b> | <del>Sawinska, Z.</del><br>Sobiech Ł. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>UP Poznan, Zlotniki, Poland<br>Report No. <b>EA19D2C094H-DPF07</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                   | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#127</b> | Krawczuk, J.                          | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B12-14, 2018, EU.<br>SGS Polska Sp. z o.o., Kamien Krajski, Poland<br>Report No. <b>EA19D2C094H-DPF08</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#128</b> | Głazek, M.                            | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>IOR SOSNICOWICE, Lany Wielkie, Poland<br>Report No. <b>EA19D2C095H-DPF01</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished         | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#129</b> | Głazek, M.                            | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>IOR SOSNICOWICE, Lany Wielkie, Poland<br>Report No. <b>EA19D2C095H-DPF02</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished         | N | Y | New study | Dow Agrosciences<br>SAS |

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| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#130</b> | Głazek, M.   | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>IOR SOSNICOWICE, Sosnicowice, Poland<br>Report No. <b>EA19D2C095H-DPF03</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished            | N | Y | New study | Dow Agrosiences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#131</b> | Pawlak, A.   | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>STAPHYT, Rogozno, Poland<br>Report No. <b>EA19D2C095H-DPF04</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished                        | N | Y | New study | Dow Agrosiences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#132</b> | Pawlak, A.   | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>STAPHYT, Jaraczewo, Poland<br>Report No. <b>EA19D2C095H-DPF05</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished                      | N | Y | New study | Dow Agrosiences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#133</b> | Sawinska, Z. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>UP Poznan, Zlotniki, Poland<br>Report No. <b>EA19D2C095H-DPF06</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished                     | N | Y | New study | Dow Agrosiences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#134</b> | Sawinska, Z. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>UP Poznan, Brody Poland<br>Report No. <b>EA19D2C095H-DPF07</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished                         | N | Y | New study | Dow Agrosiences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#135</b> | Krawczuk, J. | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>SGS Polska Sp. z o.o., Kamien Krajenski, Poland<br>Report No. <b>EA19D2C095H-DPF08</b><br>Dow Agrosiences<br>Not GEP<br>Unpublished | N | Y | New study | Dow Agrosiences<br>SAS |

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| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#136</b> | Pszczolkowski, M. | 2019 | Efficacy and selectivity of GF-4021 GPS1vs.GF-4021 on key BLWS in WOSR.<br>STAPHYT Sp. z o.o., Bazyny, Poland<br>Report No. <b>EA19D2C242H-DPF01</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished  | N | Y | New study | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#137</b> | Pszczolkowski, M. | 2019 | Efficacy and selectivity of GF-4021 GPS1vs.GF-4021 on key BLWS in WOSR.<br>STAPHYT Sp. z o.o., Krajno, Poland<br>Report No. <b>EA19D2C242H-DPF02</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished  | N | Y | New study | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#138</b> | Pszczolkowski, M. | 2019 | Efficacy and selectivity of GF-4021 GPS1vs.GF-4021 on key BLWS in WOSR.<br>STAPHYT Sp. z o.o., Zimnowoda, Poland<br>Report No. <b>EA19D2C242H-DPF03</b><br>Dow Agrosciences<br>Not GEP<br>Unpublished                                     | N | Y | New study | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#139</b> | Tartier J.        | 2018 | The selectivity of GF-4021 compared to reference treat-ment, GF-3788 and GF-3447 at BBCH 14-16, EU, au-tumn 2018.<br>Report No. FR18D2C331YL01C<br>Source: BIOTEK Agriculture<br>GLP No<br>GEP Yes<br>not published                       | N | Y | New study | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#140</b> | Daňa P.           | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 12-14, EU, autumn 2018.<br>Report No. CZ18D2C330KS01C<br>Source: Zemědělská zkušební stanice KUJAVy, s.r.o.<br>GLP No<br>GEP Yes<br>not published | N | Y | New study | Dow Agrosciences SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#141</b> | Daňa P.           | 2018 | The selectivity of GF-4021 compared to reference treatment, GF-3788 and GF-3447 at BBCH 14-16, EU, autumn 2018<br>Report No. CZ18D2C331KS01C<br>Source: Zemědělská zkušební stanice KUJAVy, s.r.o.<br>GLP No<br>GEP Yes<br>not published  | N | Y | New study | Dow Agrosciences SAS |

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| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#142</b> | Cap J.      | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13, EU, autumn 2017.<br>Report No. CZ17D2C315KS01C<br>Source: ZKUSEBNI STANICE NECHANICE, S.R.O., CZ<br>GLP No<br>GEP Yes<br>not published     | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#143</b> | Daňa P.     | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13, EU, autumn 2017.<br>Report No. CZ17D2C315KS02C<br>Source: Zemědělská zkušební stanice KUJAVY, s.r.o.<br>GLP No<br>GEP Yes<br>not published | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#144</b> | Pietryga J. | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13, EU, autumn 2017.<br>Report No. PL17D2C315AS01C<br>Source: Dow AgroSciences, Poland<br>GLP No<br>GEP Yes<br>not published                   | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#145</b> | Pawlak A.   | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13, EU, autumn 2017.<br>Report No. PL17D2C315AS02C<br>Source: STAPHYT Sp. z o.o.<br>GLP No<br>GEP Yes<br>not published                         | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#146</b> | Krawczuk J. | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13, EU, autumn 2017.<br>Report No. PL17D2C315AS03C<br>Source: SGS POLSKA SP. Z O.O.<br>GLP No<br>GEP Yes<br>not published                      | N | Y | New study | Dow Agrosciences<br>SAS |
| KCP 6.4.1<br>KCP 6.4.2<br>KCP 6.4.3<br><b>#147</b> | Krawczuk J. | 2017 | The selectivity of GF-3788 and GF-3789 compared to reference treatment, GF-3447 at BBCH 12-13, EU, autumn 2017.<br>Report No. PL17D2C315AS04C<br>Source: SGS POLSKA SP. Z O.O.<br>GLP No<br>GEP Yes<br>not published                      | N | Y | New study | Dow Agrosciences<br>SAS |

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| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#148</b> | Downey S.         | 2019 | Efficacy and selectivity of GF-4021 GPS1 vs. GF-4021 on key BLWS in WOSR<br>Report No. EA19D2C242H-DDS01<br>Source: Dow AgroSciences, UK<br>GLP No<br>GEP Yes<br>not published   | N | Y | New study | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#149</b> | Botoman G.        | 2018 | The efficacy of GF-4021 vs. GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16<br>GEP Trial, ROMANIA, 2019<br>Report No. EA18D2C327-RO01<br>Source: AgroProspect SRL<br>GLP No<br>GEP Yes<br>not published | N | Y | New study | Dow Agrosciences SAS |
| KCP 6.1<br>KCP 6.2<br>KCP 6.4.1<br><b>#150</b> | Kunze T.          | 2018 | The efficacy of GF-4021 vs GF-3447+GF-1601 tank mix to control BLWs, when applied to WOSR at B14-16, 2018, EU.<br>Report No. DE18D2C327UB01C<br>Source: agro-check, DE<br>GLP No<br>GEP Yes<br>not published                     | N | Y | New study | Dow Agrosciences SAS |
| KCP 6.5.4<br><b>#151</b>                       | Huby, J.P         | 2021 | GF-4021 tank clean out study following EPPO 1/292 guidance<br>Corteva Agriscience, Drusenheim, France<br>Report No. <b>200857</b><br>Corteva Agriscience<br>Not GEP<br>Unpublished   | N | Y | New study | Corteva Agriscience  |
| KCP 6.5.2<br><b>#152</b>                       | Bramby-Gunary, J  | 2020 | Seedling emergence and seedling growth terrestrial non target plants<br>AgroChemex, Essex, UK<br>Report No. <b>190546</b><br>Corteva Agriscience<br>Not GEP<br>Unpublished   | N | Y | New study | Corteva Agriscience  |
| KCP 6.5.2<br><b>#153</b>                       | Bramby-Gunary, J. | 2020 | GF-4021 Vegetative Vigour Terrestrial Non Target Plants.<br>DAS Report No.: <b>190545</b> .<br>AgroChemex Ltd.<br>GLP (Y/N): Y<br>Published (Y/N): N   | N | Y | New study | Corteva Agriscience  |