REGISTRATION REPORT

Part B

Section 8

Environmental Fate

Detailed summary of the risk assessment

Product code: BAS 762 02 F

Product name(s): Revydas

Chemical active substance(s):

Mefentrifluconazole, 100 g/L

Boscalid, 200 g/L

Central Zone

Zonal Rapporteur Member State:

CORE ASSESSMENT

(authorization)

Applicant: BASF

Submission date: March 2021 (updated in October 2021)

MS Finalisation date: November 2021 (initial Core Assessment)

April 2022 (final Core Assessment)

Version history

When	What
03/2021	Initial dRR – BASF DocID 2021/2005102
10/2021	Updated dRR – BASF DocID 2021/2040314
November 2021	Initial zRMS assessment 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 highlighted in grey. Not agreed or not relevant information are ~~struck through and shaded for transparency~~.
April 2022	Final report (Core Assessment after the commenting period) Additional information/assessments included by the zRMS in the report in response to comments recieved from the cMS and the Applicant are highlighted in yellow, while not agreed use pattern is ~~struck through and shaded~~.

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8 Fate and behaviour in the environment (KCP 9)

8.1 Critical GAP and overall conclusions

Table 8.1-1: Critical use pattern of the formulated product

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Use-No. #	Member state(s)	Crop and/or situation (crop destination / purpose of crop)	F, Fn, Fpn G, Gn, Gpn or I ##	Pests or Group of pests controlled (additionally: developmental stages of the pest or pest group)	**Application**				**Application rate**			PHI (days)	Remarks: e.g. g safener/ synergist per ha	**Conclusion**
					Method / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applications (days)	kg or L product/ha a) max. rate per appl. b) max. total rate per crop/season	g or kg as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max			Groundwater
Zonal uses (field or outdoor uses, certain types of protected crops)														
1, 2, 3	Central Zone	Oilseed Rape, winter and spring (BRSNN)	F	See B0 for details	SP	BBCH 57-75	a) 1 b) 1	-	a) 1 b) 1	a) 100* +200** b) 100* + 200**	100-400	F	F is defined by latest application timing. For uses 2 and 3 dose rate range 0.6 - 1.0 L/ha	A
4, 5, 6	Central Zone	Sunflower (HELAN)	F	See B0 for details	SP	BBCH 31-69	a) 2 b) 2	7	a) 1 b) 2	a) 100* +200** b) 200* + 400**	100-400	F	Maximum 2 applications per crop and season. 1st appl. BBCH 31-59 2nd appl. BBCH 61-69. F is defined by latest application timing. For uses 2 and 3 dose rate range 0.6 - 1.0 L/ha	A

7, 8, 9	Central Zone	wheat (winter and spring)	F	See B0 for details	SP	BBCH 30 -49	a) 1 b) 1	-	a) 1 b) 1	a) 100* +200** b) 100* + 200**	100 - 300	56	For eyespot control, only one application at BBCH 30-32 For use 8 dose rate range 0.6 - 1.0 L/ha	A

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

\## 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

* Mefentrifluconazole

** Boscalid

Explanation for column 15 “Conclusion”

A	Safe use
R	Further refinement and/or risk mitigation measures required
C	To be confirmed by cMS
N	No safe use

zRMS comments:

Initially, the GAP table including detailed information on pests in particular cMS has been provided by the Applicant. However, pests are of no relevance for the exposure assessment and GAP table was thus shortened to provide critical GAP, which was considered in the risk assessment covering intended uses of BAS 762 02 F in all concerned Member States.

In addition to that, uses in minor oilseeds (Use No 17) were also included in the GAP table in area of Section 8. However, they were not included in the list of intended uses in area of any other section and were also not indicated in the detailed GAP provided in Section B0. Since GAP considered in area of particular sections must be in line with the list of intended uses provided in Section B0, minor uses listed in area of Section 8 were removed as being not considered in evaluation.

Table 8.1-2: Assessed (critical) uses during approval of mefentrifluconazole concerning the Section Environmental Fate

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Use-No.	**Member state(s)**	**Crop and/or situation (crop destination / purpose of crop)**	**F, Fn, Fpn G, Gn, Gpn or I ***	**Pests or Group of pests controlled** (additionally: developmental stages of the pest or pest group)	**Application**				**Application rate**			**PHI (days)**	**Remarks: e.g. g safener/ synergist per ha**
					Method / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applications (days)	kg or L product/ha a) max. rate per appl. b) max. total rate per crop/season	g or kg as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max		
1	EU28	Cereals	F	Septoria tritici - SEPTTR further control claims are currently under evaluation	Foliar spray	30-69	2	14	a) 1.50 b) 3.00	150 g as/ha 300 g as/ha	100-300	35	

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

** 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

Table 8.1-3: Assessed (critical) uses during approval of boscalid ** concerning the Section Environmental Fate, as stated in the EU Review Report SANCO/3919 /2007-rev. 5

1	2	3	4	5	6	7	8	9	10	11	12	13	14
Use-No.	Member state(s)	Crop and/or situation (crop destination / purpose of crop)	F, Fn, Fpn G, Gn, Gpn or I *	Pests or Group of pests controlled (additionally: developmental stages of the pest or pest group)	**Application**				**Application rate**			PHI (days)	Remarks: e.g. g safener/ synergist per ha
					Method / Kind	Timing / Growth stage of crop & season	Max. number a) per use b) per crop/ season	Min. interval between applications (days)	kg or L product/ha a) max. rate per appl. b) max. total rate per crop/season	g as/ha a) max. rate per appl. b) max. total rate per crop/season	Water L/ha min/max		
1	EU (North&South)	Grape	F	*Botrytis*	Spraying	68–81	a) 1 b) 1	-	-	a) 600 b) 600	1000-1600	28	
2	EU	Oilseed rape	F	*Sclerotinia, Alternaria, Phoma*	Spraying	30, 63–65	a) 2 b) 2	4–6 weeks	-	a) 250 b) 500	200-400	-	
3	EU (North&South)	Peas	F	*Botrytis, Sclerotinia*	Spraying	60–69	a) 2 b) 2	7–10	-	a) 500 b) 1000	400	7	
4	EU (North&South)	Beans	F	*Botrytis, Sclerotinia*	Spraying	60–69	a) 2 b) 2	7–10	-	a) 500 b) 1000	300	7	

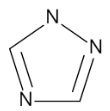
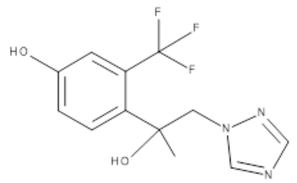
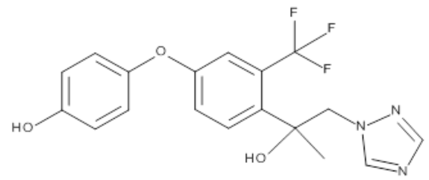
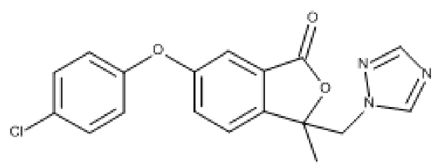
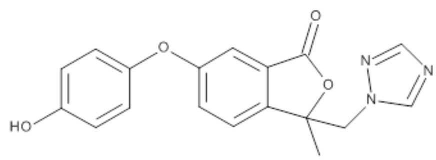
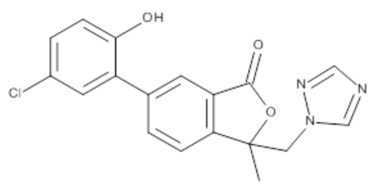
* F: professional field use, Fn: non-professional field use, Fpn: professional and non-professional field use, G: professional greenhouse use, Gn: non-professional greenhouse use, Gpn: professional and non-professional greenhouse use, I: indoor application

** Boscalid in product BAS 510 05 F

8.2 Metabolites considered in the assessment

All information provided in this chapter was previously evaluated in the frame of the EU review of mefentrifluconazole and were summarized from the EFSA Conclusion [*EFSA, 2018: Peer review of the pesticide risk assessment of the active substance BAS 750 F (mefentrifluconazole), EFSA Journal 2018;16(7):5379 32 pp. doi:10.2903/j.efsa.2018.5379*].

Table 8.2-1: Metabolites of mefentrifluconazole potentially relevant for exposure assessment

Metabolite	Molar mass [g mol^{-1}]	Chemical structure	Maximum observed occurrence in compartments	Exposure assessment required due to
M750F001 (1,2,4-triazole)	69.1		Soil: 5.1[a] Water: 10.2 Sediment: 4.9 Total w/s system: 15.1	PEC_{soil}: yes[a] PEC_{gw}: yes[a] PEC_{sw}: yes PEC_{sed}: yes
M750F003	287.2		Soil: 1.8 Water: 3.8 Sediment: 5.4 Total w/s system: 8.5	PEC_{soil}: no PEC_{gw}: no PEC_{sw}: yes PEC_{sed}: yes
M750F005	379.3		Soil: not detected in soil Water: 32.2 (max. in aqueous photolysis study) Sediment: not detected in sediment Total w/s system: not detected in w/s study	PEC_{soil}: no PEC_{gw}: no PEC_{sw}: yes PEC_{sed}: yes
M750F006	355.8		Soil: not detected in soil Water: 30.7 (max. in aqueous photolysis study) Sediment: not detected in sediment Total w/s system: not detected in w/s study	PEC_{soil}: no PEC_{gw}: no PEC_{sw}: yes PEC_{sed}: yes
M750F007	337.3		Soil: not detected in soil Water: 43.9 (max. in aqueous photolysis study) Sediment: not detected in sediment Total w/s system: not detected in w/s study	PEC_{soil}: no PEC_{gw}: no PEC_{sw}: yes PEC_{sed}: yes
M750F008	355.8		Soil: not detected in soil Water: 7.3 (max. in aqueous photolysis study) Sediment: not detected in sediment Total w/s system: not detected in w/s study	PEC_{soil}: no PEC_{gw}: no PEC_{sw}: yes PEC_{sed}: yes

[a] The metabolite was observed at a single time point above 5% in one soil (max. 5.1% at 90 d with subsequent decline – average of two replicates). For precautionary reasons, it was included in the exposure assessment for soil and groundwater

No relevant metabolites were observed in any assessment for boscalid: EU Review Report SANCO/3919/2007–rev.5 (2008) [*Review Report (2008): Review report for the active substance boscalid. SANCO/3919/2007–rev.5. January 2008*], the Draft Assessment Report [*Monograph (2002): Monograph on the active substance nicobifen (boscalid). Report and proposed Decision (DAR) of the Rapporteur Member State Germany*] and its Addenda (2006).

zRMS comments: Information regarding mefentrifluconazole and its metabolites is in line with EU agreed endpoints as reported in EFSA Journal 2018;16(7):5379. According to EU Review Report SANCO/3919/2007-rev.5, no relevant metabolites of boscalid are formed in soil or aquatic systems.

8.3 Rate of degradation in soil (KCP 9.1.1)

Studies on degradation in soil with the formulation were not performed, since it is possible to extrapolate from data obtained with the active substances.

All information on mefentrifluconazole and its metabolite 1,2,4-triazole provided in this chapter was previously evaluated in the frame of the EU review of mefentrifluconazole and were summarized from the EFSA Conclusion (2018).

All information on boscalid provided in this chapter were summarized from the EU review report SANCO/3919/2007-rev. 5 (2008), the Monograph (2002) and its Addenda (2006).

8.3.1 Aerobic degradation in soil (KCP 9.1.1.1)

8.3.1.1 Mefentrifluconazole and its metabolites

Table 8.3-1: Summary of aerobic degradation rates for mefentrifluconazole - laboratory studies

Mefentrifluconazole, laboratory studies, dark aerobic conditions							
Soil Soil type [a]	**pH**	**t. [°C] / MWHC [%]**	**DT_{50} /DT_{90} [d] Trigger endpoints, not normalised**	**DT_{50} [d] Modelling endpoints normalised to 20 °C pF2/10kPa [d]**	**χ^2 error (trigger / modelling)**	**Kinetic model (trigger / modelling)**	**Evaluated on EU level**
Li10 loamy sand (tr)	6.1 [b]	20/40	>1000/>1000 α: 0.0656, β: 8.43	477.1	0.3 / 1.6	FOMC / SFO	Yes, EFSA (2018)
Indiana Loam (tr)	5.8 [b]	20/40	>1000/>1000 α: 0.0762, β: 21.13	366	0.8 / 1.2	FOMC / SFO	Yes, EFSA (2018)
LUFA 5M loamy sand (cp and tr)	7.2 [b]	20/40	525/1870 cp α: 0.0844, β: 12.9 tr k1: $1.2E^{-1}$, k2: $1.2E^{-3}$, g: $6.6E^{-2}$	252	0.3 / 1.4	FOMC cp label, DFOP tr label / SFO	Yes, EFSA (2018)
New Jersey Loam (cp and tr)	6.9 [c]	20/40	488/>1000 cp k1: $1.7E^{-1}$, k2: $2.9E^{-3}$, g: $1.1E^{-1}$ tr α: 0.229, β: 24.2	134	0.8 / 2.6	DFOP cp label, FOMC tr label / SFO	Yes, EFSA (2018)
New Jersey Loam (tf)	6.4 [b]	20/40	434/>1000 α: 0.249, β: 28.5	104	1.2 / 2.4	FOMC / SFO	Yes, EFSA (2018)
Geometric mean New Jersey				118			
Geometric mean all soils (if not pH dependent) [e]				268 [f]			
pH dependence				No			

[a] Label designations: chlorophenyl (cp), triazole (tr), trifluoromethlyphenyl (tf)
[b] Measured in $CaCl_2$ solution
[c] Measured in water
[d] Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7
[e] In the geometric mean calculations, the geometric mean value of the New Jersey soil results was considered (i.e. the ‘geometric mean all soils (if not pH dependent)’ is calculated from the following DT_{50} values: 477.1, 366, 252 and 118)
~~[f] For PEC calculation DT_{50} values from the field study were used~~

Table 8.3-2: Summary of aerobic degradation rates for 1,2,4-triazole - laboratory studies

M750F001 (1,2,4-triazole), laboratory studies, dark aerobic conditions, metabolite applied as parent.									
Soil type	**pH [a]**	**t. [ºC] / MWHC [%]**	**k1/k2/g**	**DT_{50} fast phase/DT_{50} slow phase[d]**	**f. f. k_f / k_{dp}**	**DT_{50} [d] 20 °C pF2/10kPa [b]**	**St. (χ^2)**	**Method of calculation**	**Evaluated on EU level**
Sandy loam	6.4	20ºC / 40 %	0.77 / 0.01 / 0.683	0.9/59.2	-	-	-	DFOP	Yes, EFSA (2018)
Loamy sand	5.8	20ºC / 40 %	0.46 / 2.8E^{-3} / 0.580	1.5/247.6	-	-	-	DFOP	Yes, EFSA (2018)
Silt loam	6.7	20ºC / 40 %	0.87 / 0.03 / 0.443	0.8/20.6	-	-	-	DFOP	Yes, EFSA (2018)
Geometric mean				1.0/67.1 ~~/ 0.569 [c]~~				DFOP	Yes, EFSA (2018)
pH dependence						No			

[a] Measured in $CaCl_2$ solution
[b] Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7
~~[c] For PEC calculation DT_{50} values from the field study were used~~

zRMS comments:

Soil degradation data for mefentrifluconazole and its metabolites presented in Tables 8.3-1 and 8.3-2 are in line with EU agreed endpoints reported in EFSA Journal 2018;16(7):5379.

Information on consideration of field degradation data for PEC calculations has been struck through in tables above, since justification for endpoints considered in exposure assessments should be provided and validated in respective points presenting PEC calculations,

8.3.1.2 Boscalid

Table 8.3-3: Summary of aerobic degradation rates for boscalid - laboratory studies

Boscalid, Standard laboratory studies, aerobic conditions										
Soil name	**Soil type [USDA]**	**pH [$CaCl_2$]**	**T [°C]**	**MWHC [%]**	**DT_{50} [d]**	**DT_{90} [d]**	**DT_{50} [d] 20°C pF2/10kPa**	**r^2**	**Kinetic model**	**Reference**
Bruch West [a]	Sandy loam	7.4	20	40	108	360	-	0.992	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)
Li 35 b [b]	Loamy sand	6.6	20	40	322	n.r.	-	0.87	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)
Lufa 2.2 [b]	Loamy sand	5.6	20	40	384	n.r.	-	0.92	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)
US soil (Dinuba) [b]	Sandy loam	7.0	20	40	376	n.r.	-	0.88	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)
Canadian soil (Minto) [b]	Loam	7.7	20	40	133	442	-	0.84	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)
Lufa 2.2 [b]	Loamy sand	5.6	5	40	stable	-	-	–	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)
Lufa 2.2 [b]	Loamy sand	5.6	30	40	365	n.r.	-	0.98	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)
Lufa 2.2 [b]	Loamy sand	5.6	20	20	stable	-	-	–	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)

Boscalid, Standard laboratory studies, aerobic conditions										
Soil name	**Soil type [USDA]**	**pH [CaCl$_2$]**	**T [°C]**	**MWHC [%]**	**DT$_{50}$ [d]**	**DT$_{90}$ [d]**	**DT$_{50}$ [d] 20°C pF2/10kPa**	**r^2**	**Kinetic model**	**Reference**
Lufa 2.2, sterile [b]	Loamy sand	5.6	20	40	stable	-	-	–	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)
Geometric mean							Not used			
pH-dependency							No			

n.r. Not reported
[a] Aerobic soil metabolism study
[b] Aerobic degradation in soil

Table 8.3-4: Summary of aerobic degradation rates for boscalid - influence of pre-treatment - laboratory studies

Boscalid, influence of pre-treatment, laboratory studies, aerobic conditions									
Soil name	**Soil type [USDA]**	**pH [CaCl$_2$]**	**T [°C]**	**MWHC [%]**	**DT$_{50}$ [d]**	**DT$_{90}$ [d]**	**r^2**	**Kinetic model**	**Reference**
Limburgerhof I, (pre-treated)	Loamy sand	5.9	20	50	> 240	n.r.	0.51	SQR 2nd order [a]	Monograph (2002)
Limburgerhof II, (pre-treated)	Loamy sand	5.9	20	50	> 240	n.r.	0.86	SQR 2nd order [a]	Monograph (2002)
Limburgerhof III, (pre-treated)	Loamy sand	5.9	20	50	> 240	n.r.	0.86	SQR 1st order [a]	Monograph (2002)
Limburgerhof IV, (control)	Loamy sand	5.9	20	50	> 240	n.r.	0.86	SQR 1st order [a]	Monograph (2002)
Edesheim V, (pre-treated)	Loam	6.9	20	50	141	n.r.	0.86	1st order [a]	Monograph (2002)
Edesheim VI, (pre-treated)	Loam	6.9	20	50	155	n.r.	0.97	1st order [a]	Monograph (2002)
Edesheim VII, (control)	Loam	6.9	20	50	201	n.r.	0.93	1st order [a]	Monograph (2002)

n.r. Not reported
[a] Timme and Frehse model

Table 8.3-5: Soil photolysis study for boscalid – laboratory

Boscalid, soil photolysis, laboratory studies, aerobic conditions									
Soil name	**Soil type [USDA]**	**pH [CaCl$_2$]**	**T [°C]**	**MWHC [%]**	**DT$_{50}$ [d]**	**DT$_{90}$ [d]**	**r^2**	**Kinetic model**	**Reference**
Bruch West irradiated	Loamy sand	7.3	22	40	135	n.r.	0.831	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)
Bruch West, dark control	Loamy sand	7.3	22	40	stable	–	–	–	SANCO/3919/ 2007-rev.5, Monograph (2002)

n.r. Not reported

~~A further laboratory study to assess degradation rates of fresh and aged residues of boscalid was performed after Annex I listing and its results are summarized in the table below (the detailed summary of the study is presented in Appendix 2).~~

~~Table 8.3-6: Degradation of aged residues and freshly applied boscalid~~

~~Boscalid, Laboratory study, aerobic conditions, dark~~									
~~Soil name~~	~~Soil type [USDA]~~	~~pH [CaCl$_2$]~~	~~T [°C]~~	~~MWHC [%]~~	~~DT$_{50}$ [d]~~	~~DT$_{90}$ [d]~~	~~χ^2 [%]~~	~~Kinetic model~~	~~Reference~~
~~Studernheim, Aged boscalid residues~~	~~Sandy loam~~	~~7.5~~	~~20~~	~~40~~	~~745.7~~	~~>1000~~	~~4.4~~	~~SFO~~	~~BASF DocID 2008/1013108 (Appendix 2)~~
~~Studernheim, Freshly applied boscalid~~	~~Sandy loam~~	~~7.5~~	~~20~~	~~40~~	~~336.2~~	~~>1000~~	~~7.0~~	~~SFO~~	~~BASF DocID 2008/1013108 (Appendix 2)~~

zRMS comments:

Soil degradation data for boscalid presented in Tables 8.3-3 to 8.3-5 are in line with the EU Review Report SANCO/3919/2007-rev.5. In addition to that, new study on boscalid degradation and long-term sorption was submitted by the Applicant (XXX, 2008, 2008/1013108, Appendix 2, CP 9.1.1.1/1). It is noted that this study was submitted in support of the renewal of boscalid at the EU level and has been already evaluated by the RMS (see DRAR of November 2018). Furthermore, the study was also evaluated by the zRMS for the Southern Zone (France). Nevertheless, generation of new active substance data should be avoided at the zonal level, unless the study is critical for finalisation of the evaluation. As results of the study mentioned were not required for purposes of this zonal evaluation of BAS 762 02 F and were not considered in exposure calculations presented in this report, its results were not validated by the zRMS and are struck through in Table 8.3-6.

8.3.2 Anaerobic degradation in soil (KCP 9.1.1.1)

8.3.2.1 Mefentrifluconazole

Table 8.3-7: Summary of anaerobic degradation rates for mefentrifluconazole - laboratory studies

Mefentrifluconazole, laboratory studies, dark anaerobic conditions							
Soil type	**pH [a]**	**t. [°C] / MWHC [%]**	**DT$_{50}$ / DT$_{90}$ [d]**	**DT$_{50}$ [d] 20 °C [b]**	**St. (χ^2)**	**Kinetic model**	**Evaluated on EU level**
Li10 loamy fine sand (tr)	6.1	20 / flooded	349 / >1000	Not calculated	3.51	SFO	Yes, EFSA (2018)
LUFA 5M sandy loam (tr)	7.2	20 / flooded	- / - [c]	-	-	-	Yes, EFSA (2018)
Indiana loam (tr)	5.6	20 / flooded	390 / >1000	Not calculated	2.8	SFO	Yes, EFSA (2018)
New Jersey loam (cp) (tr) [d]	6.6	20 / flooded	899 / >1000	Not calculated	2.8	SFO	Yes, EFSA (2018)

[a] Measured in $CaCl_2$ solution
[b] Normalised using a Q10 of 2.58
[c] No discernible decline for BAS 750 F was observed, therefore kinetics were not investigated
[d] Data treated as 4 replicates, 2 from each radiolabel

No major metabolites were detected under anaerobic conditions.

zRMS comments:

Anaerobic soil degradation data for mefentrifluconazole presented in Table 8.3-7 are in line with EU agreed endpoints reported in EFSA Journal 2018;16(7):5379. No major metabolites were detected in soil anaerobic studies.

8.3.2.2 Boscalid

Table 8.3-8: Summary of anaerobic degradation rates for boscalid - laboratory studies

Boscalid, Laboratory studies, anaerobic conditions									
Soil name	**Soil type [USDA]**	**pH [$CaCl_2$]**	**T [°C]**	**MWHC [%]**	**DT_{50} [d]**	**DT_{90} [d]**	**r^2**	**Kinetic model**	**Reference**
Bruch West 99/060/01	Sandy loam	7.2	20	flooded	261	n.r.	0.94	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)
Bruch West 98/060/02	Loamy sand	7.5	20	flooded	345	n.r.	0.91	SFO	SANCO/3919/ 2007-rev.5, Monograph (2002)

n.r. Not reported

zRMS comments:

Anaerobic soil degradation data for boscalid are in line with the EU Review Report SANCO/3919/2007-rev.5.

8.4 Field studies (KCP 9.1.1.2)

Studies on degradation in soil with the formulation were not performed, since it is possible to extrapolate from data obtained with the active substances.

All information on mefentrifluconazole and its metabolite 1,2,4-triazole provided in this chapter was previously evaluated in the frame of the EU review of mefentrifluconazole and were summarized from the EFSA Conclusion (2018).

All information on boscalid provided in this chapter were summarized from the EU review report SANCO/3919/2007-rev. 5 (2008), the Monograph (2002) and its Addenda (2006).

8.4.1 Soil dissipation testing on a range of representative soils (KCP 9.1.1.2.1)

8.4.1.1 Mefentrifluconazole and its metabolites

Table 8.4-1: Summary of aerobic degradation rates for mefentrifluconazole - field studies

Mefentrifluconazole, field studies									
Soil type (indicate if bare or cropped soil was used).	**Location (country or USA state).**	**pH [a]**	**Depth [cm]**	**DT_{50} [d] Actual Trigger, k1/k2/g where appropriate**	**DT_{90} [d] Actual Trigger**	**DT_{50} [d] Norm [b]. Modelling**	**St. (χ^2)**	**Method of calculation**	**Evaluated on EU level**
Sandy loam	Bogense, Denmark	6.4	0-50	185.5	616.1	96.5	9.2 / 9.4	SFO / SFO	Yes, EFSA (2018)
Loamy sand	Lentzke, East Germany	5.4	0-50	350.6	>1000	184.0	8.9 / 9.0	SFO / SFO	Yes, EFSA (2018)
Silt loam	Goch-Nierswalde, West Germany	6.5	0-50	267.6	889.1	146.7	16.2 /17.5	SFO / SFO	Yes, EFSA (2018)
Silty clay loam	Stotzheim, France	7.4	0-50	145.4 [c]/ 262.1 [d] $2.027E^{-2}$ / $2.17E^{-3}$ / 0.3389	870.2	128.6	8.4 / 6.2	DFOP / SFO	Yes, EFSA (2018)

Mefentrifluconazole, field studies									
Soil type (indicate if bare or cropped soil was used).	**Location (country or USA state).**	**pH [a]**	**Depth [cm]**	**DT_{50} [d] Actual Trigger, k1/k2/g where appropriate**	**DT_{90} [d] Actual Trigger**	**DT_{50} [d] Norm [b]. Modelling**	**St. (χ^2)**	**Method of calculation**	**Evaluated on EU level**
Silty clay loam	Poggio Renatico, Italy	7.6	0-50	846.6	>1000	610.8	9.4 / 8.5	SFO / SFO	Yes, EFSA (2018)
Loamy sand	Utrera, Spain	7.4	0-50	200.5 [c]/ 292.6 [d] 9.477E-2 / 2.087E-3/0.2401	971.6	313.0	6.3 / 14.2	DFOP / SFO	Yes, EFSA (2018)
Geometric mean (if not pH dependent)						200.0			
pH dependence				No					

[a] Measured in $CaCl_2$ solution
[b] Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7, values are $DegT_{50}$matrix
[c] Overall value
[d] Calculated Value: Overall $DegT_{90}$/3.32

Table 8.4-2: Summary of aerobic degradation rates for 1,2,4-triazole - field studies: trigger endpoints

M750F001 (1,2,4-triazole), Field studies – Trigger endpoints										
Soil type	**Location**	**pH [a]**	**Depth [cm]**	**DT_{50} [d] actual**	**DT_{90} [d] actual**	**St. (χ^2)**	**DT_{50} [d] Norm [b].**	**f. f. k_f / k_{dp}**	**Method of calculation**	**Evaluated on EU level**
Silt loam	Germany	6.4	0-30	7.8	366.7	15.2	See table Table 8.4-3 for normalised endpoints	-	FOMC	Yes, EFSA (2018)
Silty clay loam	Italy	7.6	0-40	21.2	207.4	10.7		-	DFOP	Yes, EFSA (2018)
Sandy loam	UK	7.4	0-40	6.8	109.3	17.8		-	DFOP	Yes, EFSA (2018)
Loam	Spain	5.8	0-30	28.1	717.6	13.3		-	DFOP	Yes, EFSA (2018)
Geometric mean (if not pH dependent)										
Arithmetic mean								-		
pH dependence					No					

[a] Measured in $CaCl_2$ solution
[b] Normalised using a Q10 of 2.58 and Walker equation coefficient of 0.7 values are $DegT_{50}$matrix

Table 8.4-3: Summary of aerobic degradation rates for 1,2,4-triazole - field studies: modelling endpoints

M750F001 (1,2,4-triazole), Field studies – Modelling endpoints									
Soil type	**Location**	**pH [a]**	**Depth [cm]**	**DT_{50} [d] Fast phase (k1)**	**DT_{50} [d] Slow phase (k2)**	**'g'**	**St. ($\chi2$)**	**Method of calculation**	**Evaluated on EU level**
Silt loam	Germany	6.4	0-30	2.5 (0.277)	70.7 (9.8E-3)	0.655	18.8	DFOP	Yes, EFSA (2018)
Silty clay loam	Italy	7.6	0-40	1.4 (0.495)	59.8 (0.116)	0.364	10.6	DFOP	Yes, EFSA (2018)
Sandy loam	UK	7.4	0-40	0.5 (1.386)	25.1 (0.028)	0.458	18.1	DFOP	Yes, EFSA (2018)
Loam	Spain	5.8	0-30	4.6 (0.151)	126.0 (5.5E-3)	0.489	12.7	DFOP	Yes, EFSA (2018)
Geometric mean				1.68	60.5			DFOP	
Arithmetic mean						0.489			

[a] Measured in $CaCl_2$ solution

zRMS comments:

Field degradation data for mefentrifluconazole and its metabolites presented in Tables 8.4-1 to 8.4-3 are in line with EU agreed endpoints reported in EFSA Journal 2018;16(7):5379.

8.4.1.2 Boscalid

Triggering endpoints

Table 8.4-4: Summary of aerobic degradation rates for boscalid - field studies: Triggering endpoints

Boscalid, Field studies – Triggering endpoints									
Soil type [German class.]	**Location**	**Appl. Rate [g a.s ha^{-1}]**	**pH [$CaCl_2$]**	**Depth [cm] [a]**	**$DissT_{50}$ [d] actual**	**DT_{90} [d] actual**	**r^2**	**Method of calculation**	**Reference**
Silty loam	Germany Stetten DU2/15/97	300	7.5	0 – 50	90	– [d]	0.952	Best fit (graph. determination)	SANCO/3919/ 2007-rev.5, Monograph (2002)
Silty loam	Germany Stetten DU2/15/97	600	7.5	0 – 50	49	– [d]	0.968	Best fit (graph. determination)	SANCO/3919/ 2007-rev.5, Monograph (2002)
Silty loam	Germany Stetten DU2/15/97	1200	7.5	0 – 50	28	– [d]	0.988	Best fit (graph. determination)	SANCO/3919/ 2007-rev.5, Monograph (2002)
Silty sand	Germany Schifferstadt DU3/06/07	300	5.4	0 – 50	208	– [d]	0.956	Best fit (graph. determination)	SANCO/3919/ 2007-rev.5, Monograph (2002)
Silty sand	Germany Schifferstadt DU3/06/07	600	5.4	0 – 50	175	– [d]	0.943	Best fit (graph. determination)	SANCO/3919/ 2007-rev.5, Monograph (2002)
Silty sand	Germany Schifferstadt DU3/06/07	1200	5.4	0 – 50	147	– [d]	0.875	Best fit (graph. determination)	SANCO/3919/ 2007-rev.5, Monograph (2002)
Sandy loam	Spain Manzanilla ALO/05/98	750	7.4	0 – 50	27	– [c]	0.88	Best fit (graph. determination)	SANCO/3919/ 2007-rev.5, Monograph (2002)
Sandy loam	Spain Alcala del Rio ALO/06/98	750	7.7	0 – 50	78	– [c]	0.81	Best fit (graph. determination)	SANCO/3919/ 2007-rev.5, Monograph (2002)
Loamy sand	Germany Grossharrie D05/03/98	750	6.1	0 – 50	144	– [c]	0.87	Best fit (graph. determination)	SANCO/3919/ 2007-rev.5, Monograph (2002)
Loamy sand	Sweden Bjärred HUS/10/98	750	5.9	0 – 50	– [b]	–	–	–	SANCO/3919/ 2007-rev.5, Monograph (2002)

[a] Soil samples were taken up to a depth of 50 cm. However, boscalid was only found in the top 25 cm.
[b] Could not be evaluated due to inconclusive results.
[c] Not reached within one year after application.
[d] Degradation behavior could not be described sufficiently by the fitted curve for the 2[nd] year after application.

Modelling endpoints

Table 8.4-5: Summary of aerobic degradation rates boscalid - field studies: Modelling endpoints

Boscalid, Field studies – Modelling endpoints						
Soil type (German class.)	**Location**	**pH [$CaCl_2$]**	**Depth [cm]** [a]	**DT_{50} [d] 20°C** [d]	**Fit/r^2**	**Reference**
Silty loam	Germany, Stetten (3 replicates) DU2/15/97	7.5	0 – 50	106 [c]	SFO/0.64 – 0.94	Monograph (2002)
Silty sand	Germany, Schifferstadt (3 replicates) DU3/06/97	5.4	0 – 50	212 [c]	SFO/0.86 – 0.97	Monograph (2002)
Sandy loam	Spain, Manzanilla ALO/05/98	7.4	0 – 50	– [b]	–	Monograph (2002)
Sandy loam	Spain, Alcala del Rio ALO/06/98	7.7	0 – 50	– [b]	–	Monograph (2002)
Loamy sand	Germany, Grossharrie D05/03/98	6.1	0 – 50	98	SFO/0.79	Monograph (2002)
Geometric mean (n=3)				130		
Maximum (n=3)				212 (Schifferstadt, Germany)		
pH-dependency				No		

[a] Soil samples were taken up to a depth of 50 cm. However, boscalid was only found in the top 25 cm.
[b] Spanish sites were rejected due to scattering of data and a high uncertainty of estimated degradation rates.
[c] Arithmetic mean of 3 replicates for the same soil treated with different application rates.
[d] Q_{10}-factor of 2.2 was used for temperature correction. No moisture normalization.

zRMS comments:

Field degradation data for boscalid are in line with the EU Review Report SANCO/3919/2007-rev.5 and Vol. 3 of the monograph (2002).

8.4.2 Soil accumulation testing (KCP 9.1.1.2.2)

8.4.2.1 Mefentrifluconazole and its metabolites

A terrestrial field accumulation study with mefentrifluconazole is ongoing. Study design and related information are presented in the DAR [*European Commission / RMS UK, Co-RMS AT and FR (2018): Draft Assessment Report prepared according to the Commission Regulation (EU) N° 1107/2009. BAS 750F (Mefentrifluconazole) - Volume 3 – B.8 (AS)*].

zRMS comments:

According to information provided in Vol. 3CA, B.8 of January 2018, at the time of EU review studies on accumulation of mefentrifluconazole were still ongoing and no results were available. For this reason potential for accumulation of this compound in soil will be addressed in respective soil exposure calculations presented in point 8.7 of this report.

8.4.2.2 Boscalid

Two field soil accumulation studies were performed at two sites with different cropping: A vineyard and a field site with a vegetables crop rotation. The studies were evaluated during the Annex I inclusion. The final results of the accumulation study with the vegetables crop rotation that was still ongoing during the Annex I inclusion process are summarized below, and more details are presented in Appendix 2 (BASF DocID 2009/1070939).

(1) Accumulation study in a vineyard

The accumulation behavior of boscalid under field conditions was investigated over a 5-year period from 1998 to 2003 with applications onto grapes in a vineyard in Germany. Applications were three times with 700 g a.s. ha^{-1} each year corresponding to an annual application of 210 g a.s. ha^{-1}. Soil samples (soil cores) were taken down to a depth of 25 cm routinely three times per year, once before the first application, once after the last application in August and once in October. The soil cores were divided into layers and analyzed for boscalid.

The results were evaluated by two different modelling approaches. It was concluded that the steady state (i.e. the accumulation plateau) has been reached within the study period. The plateau level (= the amount prior to the first application per year) and the peak level (= the maximum amount immediately after the last application) were estimated to represent 95 % and 148 % of the annual application rate. Mean measured maximum plateau levels were 2900 g a. s. ha^{-1} (138% of applied rate).

~~**(2) Accumulation study in a vegetable crop rotation**~~

~~The accumulation behavior of boscalid on a field with a vegetable crop rotation was investigated at a site in Germany starting in 1998. The study involved a three-year crop rotation with cumulated applications of 2100 g a. s. ha^{-1} in the first year, 1700 g a. s. ha^{-1} in the second year and no application of boscalid in the third year of each cycle. This application pattern resulted in an average annual application of 1270 g boscalid ha^{-1}. Soil samples (soil cores) were taken down to a depth of 50 cm. The soil cores were divided into layers and analyzed for boscalid. Due to the more complex situation with different application rates in each year, this accumulation study was conducted over an extended time period of eleven years.~~

~~Data from the first six years were available for the Annex I inclusion process. From the first six years, a plateau level of 95 % of the average annual application rate was derived. For this estimation, only the concentration levels after years with actual treatments but not the concentration levels after years without treatments were considered. Furthermore, the RMS proposed a preliminary peak level (maximum amount) of 150 % of the application rate in the preceding year as derived from measured values in the study.~~

~~The accumulation study in vegetables was finalised one year after Annex I inclusion of boscalid and the data for all eleven years of the study are briefly summarized here. The complete results are presented in Appendix 2 (BASF DocID 2008/1013108). The plateau level of residues of boscalid in soil at steady state after multi-year application was predicted in year 8 of the eleven-year accumulation study. The predicted plateau amounted to 1.5 kg ha^{-1} or 118 % of the average yearly application rate of the study. Assuming a soil bulk density of 1500 kg m^{-3} and a soil layer of 0.3 m, the predicted plateau corresponds to 0.333 mg kg^{-1}. The peak level was predicted in year 11 of the study and amounted to 2.06 kg ha^{-1} or 162 % of the average yearly application rate of the study. Assuming a soil bulk density of 1500 kg m^{-3} and a soil layer of 0.3 m, the predicted peak level corresponds to 0.457 mg kg^{-1}.~~

zRMS comments:

Information regarding the accumulation study (1) is in line with the EU Review Report for boscalid, SANCO/3919/2007-rev.5 and Vol. 3 of the monograph (2002).

The study (2) was submitted in support of this evaluation (XXX et al., 2009, 2009/1070939, Appendix 2, CP 9.1.1.2.2/1). It is noted that this study was submitted for purposes of the renewal process of boscalid at the EU level and has been already evaluated by the RMS in the DRAR (version of November 2018). However, this study has been recently not accepted by the zRMS (Germany) for the zonal evaluation of formulation Tessior of the same Applicant, finalised in January 2020. Conclusions recently derived by Germany are also applicable for evaluation of BAS 762 02 F in order to maintain consistent approach within the zone and avoid duplication of the work. This conclusion may be changed once the renewal process for boscalid is finalised and new LoEP becomes available. The text regarding this study is struck through above.

8.5 Mobility in soil (KCP 9.1.2)

Studies on mobility in soil with the formulation were not performed, since it is possible to extrapolate from data obtained with the active substance.

8.5.1 Mefentrifluconazole and its metabolites

All information on mefentrifluconazole and its metabolite 1,2,4-triazole provided in this chapter was previously evaluated in the frame of the EU review of mefentrifluconazole and were summarized from the EFSA Conclusion (2018).

Table 8.5-1: Summary of soil adsorption/desorption for mefentrifluconazole

Mefentrifluconazole								
Soil Type (USDA)	**OC %**	**Soil pH (measured in water)**	**K_d [mL g^{-1}]**	**K_{doc} [mL g^{-1}]**	**K_F [mL g^{-1}]**	**K_{Foc} [mL g^{-1}]**	**1/n**	**Evaluated on EU level**
Indiana loam	1.22	5.7	-	-	48.46	3972.29	0.95	Yes, EFSA (2018)
New Jersey loam	1.00	6.8	-	-	35.61	3560.75	0.96	Yes, EFSA (2018)
Obhiro loam	3.40	6.9	-	-	126.14	3709.90	1.01	Yes, EFSA (2018)
Fiorentino Poggio Renatico 1 loam	1.00	8.2	-	-	31.43	3143.03	0.92	Yes, EFSA (2018)
La Gironda Sandy clay loam	1.22	8.3	-	-	24.53	2010.28	0.94	Yes, EFSA (2018)
Li10 Loamy sand	0.95	6.9	-	-	36.34	3824.78	1.02	Yes, EFSA (2018)
LUFA 5M Sandy loam	1.10	7.4	-	-	35.83	3251.56	1.00	Yes, EFSA (2018)
LUFA 2.1 sand	0.60	6.5	-	-	29.59	4930.94	1.00	Yes, EFSA (2018)
Geometric mean (if not pH dependent)					39.93	3455.59		
Arithmetic mean (if not pH dependent)							0.975	
pH dependence			No					

Table 8.5-2: Summary of soil adsorption/desorption for 1,2,4-triazole

M750F001 (1,2,4-triazole)								
Soil Type	**OC %**	**Soil pH [a]**	**K_d [mL g^{-1}]**	**K_{doc} [mL g^{-1}]**	**K_F [mL g^{-1}]**	**K_{Foc} [mL g^{-1}]**	**1/n**	**Evaluated on EU level**
Silty clay	0.70	8.8	-	-	0.833	120	0.897	Yes, EFSA (2018)
Clay loam	1.74	6.9	-	-	0.748	43	0.827	Yes, EFSA (2018)
Silty clay loam	0.70	7.0	-	-	0.722	104	0.922	Yes, EFSA (2018)
Sandy loam	0.81	6.9	-	-	0.720	89	1.016	Yes, EFSA (2018)
Geometric mean						83		
Arithmetic mean					0.756	89	0.916	
pH dependence			No					

[a] Measured in $CaCl_2$ solution

Table 8.5-3: Summary of soil adsorption/desorption for the aquatic metabolites of mefentrifluconazole

Estimated adsorption coefficients for the aquatic metabolites of mefentrifluconazole [a]								
Metabolite name	**OC %**	**Soil pH**	**K_d [mL g^{-1}]**	**K_{doc} [mL g^{-1}]**	**K_F [mL g^{-1}]**	**K_{oc} [mL g^{-1}]**	**1/n**	**Evaluated on EU level**
M750F003	n.a.	n.a.	-	-	-	597.6	n.a.	Yes, EFSA (2018)
M750F005	n.a.	n.a.	-	-	-	7863	n.a.	Yes, EFSA (2018)
M750F006	n.a.	n.a.	-	-	-	4919	n.a.	Yes, EFSA (2018)
M750F007	n.a.	n.a.	-	-	-	3938	n.a.	Yes, EFSA (2018)
M750F008	n.a.	n.a.	-	-	-	17240	n.a.	Yes, EFSA (2018)
pH dependence			n.a.					

n.a. not available

[a] Adsorption coefficients (K_{oc}) were estimated for metabolites of BAS 750 F that occurred in studies with BAS 750 F in aqueous systems. QSAR method implemented in the KocWIN (EPISuite) tool was used.

zRMS comments:

Soil sorption data for mefetrifluconazole and its metabolites presented in Tables 8.5-1 to 8.5-3 are in line with endpoints reported in EFSA Journal 2018;16(7):5379.

8.5.2 Boscalid

All information on boscalid provided in this chapter were summarized from the EU review report SANCO/3919/2007-rev. 5 (2008), the Monograph (2002) and its Addenda (2006).

Table 8.5-4: Summary of soil adsorption/desorption for boscalid

Boscalid							
Soil name	**Soil type [USDA]**	**OC [%]**	**pH [$CaCl_2$]**	**K_f [mL g^{-1}]**	**K_{foc} [mL g^{-1}]**	**1/n**	**Reference**
LUFA 2.2	sand / loamy sand	2.5	5.8	27.8	1110	0.875	SANCO/3919/ 2007-rev.5, Monograph (2002)
Bruch West	sandy loam	1.5	7.5	7.6	507	0.870	SANCO/3919/ 2007-rev.5, Monograph (2002)
Li 35b	loamy sand	1.1	6.5	6.5	594	0.839	SANCO/3919/ 2007-rev.5, Monograph (2002)
USA 538-30-5	loamy sand	0.4	5.8	3.9	987	0.887	SANCO/3919/ 2007-rev.5, Monograph (2002)
USA 538-31-2	loam	0.5	5.2	3.3	655	0.860	SANCO/3919/ 2007-rev.5, Monograph (2002)
Canada 95024	sandy clay loam	3.4	7.5	26.4	776	0.851	SANCO/3919/ 2007-rev.5, Monograph (2002)
Arithmetic mean (n=6)					772	0.864	
Geometric mean (n=6)					743		
pH-dependence					No		

On the basis of the findings of the adsorption/desorption study, boscalid can be classified as slightly mobile in soil.

~~A further study on mobility in soil performed with boscalid has not previously been reviewed and is provided in support of this assessment. In this study the sorption behavior after a certain incubation time in the laboratory was compared for aged and fresh boscalid residues. The results are summarized in Table 8.5-5 and details of the study are provided in Appendix 2 (BASF DocID 2008/1013108).~~

~~**Table 8.5-5: Soil adsorption/desorption of aged and freshly applied boscalid over time**~~

~~Boscalid, Laboratory study, aerobic conditions, dark~~							
~~Soil name~~	~~Soil type [USDA]~~	~~OC [%]~~	~~pH [CaCl₂]~~	~~Soil incubation time [d]~~	~~K_f [mL g^{-1}]~~	~~K_{foc} [mL g^{-1}]~~	~~Reference~~
~~Studernheim, Aged boscalid residues~~	~~Sandy loam~~	~~2.00~~	~~7.5~~	~~0~~	~~17.3~~	~~864~~	~~DocID 2008/1013108 (Appendix 2)~~
				~~0~~	~~17.7~~	~~883~~	
				~~7~~	~~11.9~~	~~595~~	
				~~14~~	~~16.8~~	~~841~~	
				~~29~~	~~15.0~~	~~749~~	
				~~62~~	~~17.9~~	~~895~~	
				~~91~~	~~18.3~~	~~914~~	
				~~91~~	~~19.0~~	~~948~~	
				~~120~~	~~21.1~~	~~1053~~	
				~~152~~	~~22.6~~	~~1130~~	
				~~182~~	~~18.0~~	~~901~~	
				~~182~~	~~17.9~~	~~896~~	
~~Studernheim, Freshly applied boscalid~~	~~Sandy loam~~	~~2.00~~	~~7.5~~	~~0~~	~~7.9~~	~~393~~	~~DocID 2008/1013108 (Appendix 2)~~
				~~0~~	~~8.4~~	~~420~~	
				~~7~~	~~7.6~~	~~378~~	
				~~15~~	~~11.0~~	~~548~~	
				~~29~~	~~9.9~~	~~495~~	
				~~58~~	~~14.2~~	~~711~~	
				~~87~~	~~16.2~~	~~812~~	
				~~87~~	~~19.3~~	~~964~~	
				~~119~~	~~18.2~~	~~910~~	
				~~149~~	~~15.6~~	~~778~~	
				~~179~~	~~20.2~~	~~1008~~	
				~~179~~	~~19.7~~	~~986~~	

zRMS comments:

Soil mobility data for boscalid presented in Table 8.5-4 are in line with the EU Review Report SANCO/3919/2007-rev.5.
In addition to the arithmetic mean Kfoc, also geometric mean value was calculated on the basis of the EU agreed data. The zRMS confirms that the geometric mean Kfoc reported in Table 8.5-4 is correct.

The new study on boscalid degradation and long-term sorption was submitted by the Applicant in support of this evaluation (XXX, 2008, 2008/1013108, Appendix 2, CP 9.1.1.1/1). It is noted that this study was submitted in support of the renewal of boscalid at the EU level and has been already evaluated by the RMS (see DRAR of November 2018). Furthermore, the study was also evaluated by the zRMS for the Southern Zone (France). Nevertheless, generation of the new active substance data should be avoided at the zonal level, unless the study is critical for finalisation of the evaluation. As results of the study mentioned were not required for purposes of this zonal evaluation of BAS 762 02 F and were not considered in exposure calculations presented in this report, its results were not validated by the zRMS and are struck through in Table 8.5-5.

8.5.3 Column leaching (KCP 9.1.2.1)

8.5.3.1 Mefentrifluconazole and its metabolites

Column leaching studies were not performed for mefentrifluconazole and its metabolites.

zRMS comments:
Column leaching studies for mefentrifluconazole and its metabolites were not required as reliable adsorption coefficients were obtained with the batch equilibrium method and no major metabolites were detected in soil studies, respectively.

8.5.3.2 Boscalid

Column leaching studies of boscalid were evaluated during the Annex I inclusion. No additional studies have been performed. A brief summary of the reviewed data is provided below.

Under the worst-case conditions of laboratory leaching experiments, no residues (<0.05 %TAR) were found in the leachate, neither after ageing nor after immediate simulating rainfall after application of boscalid. Extractable residues from the soil segments showed only unchanged boscalid.

No column leaching studies with metabolites of boscalid were performed since no major metabolites higher than 10 % of the applied radioactivity were observed in any laboratory environmental fate study.

zRMS comments:
Information on column leaching studies for boscalid is in line with conclusions derived at the EU level.

8.5.4 Lysimeter studies (KCP 9.1.2.2)

8.5.4.1 Mefentrifluconazole and its metabolites

Lysimeter studies were not performed for mefentrifluconazole and its metabolites as based on PEC_{gw} calculations no leaching is expected.

zRMS comments:
Information on lysimeter studies for mefentrifluconazole is in line with conclusions derived at the EU level.

8.5.4.2 Boscalid

The mobility in soil of boscalid was evaluated during the Annex I inclusion (SANCO/3919/2007-rev.5). No additional studies have been performed. The active substances did not reveal any risk for groundwater contamination. Lysimeter studies were therefore considered unnecessary.

zRMS comments:
Information on lysimeter studies for boscalid is in line with conclusions derived at the EU level.

8.5.5 Field leaching studies (KCP 9.1.2.3)

8.5.5.1 Mefentrifluconazole and its metabolites

Field leaching studies were not performed for mefentrifluconazole and its metabolites as based on PEC_{gw} calculations no leaching is expected.

zRMS comments:
Information on field leaching studies for mefentrifluconazole is in line with conclusions derived at the EU level.

8.5.5.2 Boscalid

The mobility in soil of boscalid was evaluated during the Annex I inclusion (SANCO/3919/2007-rev.5) and Monograph, 2002. No additional studies have been performed. The active substances did not reveal any risk for groundwater contamination. Field leaching studies were therefore considered to be not necessary.

zRMS comments:
Information on field leaching studies for boscalid is in line with conclusions derived at the EU level.

8.6 Degradation in the water/sediment systems (KCP 9.2, KCP 9.2.1, KCP 9.2.2, KCP 9.2.3)

Studies on degradation in water/sediment systems with the formulation were not performed, since it is possible to extrapolate from data obtained with the active substances.

8.6.1 Mefentrifluconazole and its metabolites

All information on mefentrifluconazole and its metabolite 1,2,4-triazole provided in this chapter was previously evaluated in the frame of the EU review of mefentrifluconazole and were summarized from the EFSA Conclusion (2018).

Table 8.6-1: Summary of degradation in water/sediment of mefentrifluconazole

Mefentrifluconazole distribution (max. sediment 75.7% after 28 days)											
Persistence endpoints											
Water / sediment system	**pH water phase**	**pH sed** [a]	**t. °C**	**DT_{50} /DT_{90} whole system**	**St. (χ^2)**	**DT_{50} /DT_{90} water**	**St. (χ^2)**	**DT_{50} /DT_{90} sediment**	**St. (χ^2)**	**Kinetic model**	**Evaluated on EU level**
Berghäuser Altrhein [c]	7.4, 8.4 [d]	7.1, 7.0 [d]	20	122.2/444.0	2.0	6.6[g]/21.9	6.4	224.8/746.7	4.0	DFOP FOMC SFO	Yes, EFSA (2018)
Ranschgraben [c]	7.3, 7.1 [d]	5.2, 6.0 [d]	20	213.1/785.6	1.3	7.9[g]/26.2	6.7	395.6/>1000	1.0	HS FOMC SFO	Yes, EFSA (2018)
Modelling endpoints											
Water / sediment system	**pH water phase**	**pH sed** [a]	**t. °C**	**Modeling $DegT_{50}$ whole system** [e]	**St. (χ^2)**	**Modelling $DisT_{50}$ water** [f]	**St. (χ^2)**	**Modelling $DisT_{50}$ sediment** [f]	**St. (χ^2)**	**Method of calculation**	**Evaluated on EU level**
Berghäuser Altrhein [c]	7.4, 8.4 [d]	7.1, 7.0 [d]	20	125.5	2.8	6.6 [g]	6.4	224.8	4.0	SFO FOMC	Yes, EFSA (2018)
Ranschgraben [c]	7.3, 7.1[d]	5.2, 6.0[d]	20	212.8	2.7	7.9 [g]	6.7	395.6	1.0	SFO FOMC	Yes, EFSA (2018)
Geometric mean at 20°C [b]				163.4		7.2		298.2			

[a] Measured in $CaCl_2$ solution
[b] Normalised using a Q10 of 2.58
[c] Residues from the three different label experiments (chlorophenyl-, triazole- and trifluoromethylphenyl-label) were considered as replicates
[d] pH at field sampling from two different sampling events
[e] Degradation rate
[f] Dissipation rate
[g] Calculated as $DT_{50} = DT_{90}/3.32$

Table 8.6-2: Summary of observed metabolites

Compound Observed in…	**Maximum observed occurrence in compartments [%]**	**Evaluated on EU level**
M750F001 (1,2,4-triazole) Water/sediment system	Max in total system: 15.1% after 100 days Max in water: 10.2% after 100 days Max in sediment: 4.9% after 100 days kinetic formation fraction (kf/kdp): not calculated No DT_{50} was derived from parent studies	Yes, EFSA (2018)
M750F003 Water/sediment system	Max in total system: 8.5% (mean of replicates) after 100 days Max in water: 3.8% after 100 days Max in sediment: 5.4% after 100 days kinetic formation fraction (kf/kdp): not calculated No DT_{50} was derived from parent studies	Yes, EFSA (2018)
M750F005 Aqueous photolysis study	Max in water: 32.2% after 6 days	Yes, EFSA (2018)

M750F006 Aqueous photolysis study	Max in water: 30.7% after 9 days	Yes, EFSA (2018)
M750F007 Aqueous photolysis study	Max in water: 43.9% after 15 days	Yes, EFSA (2018)
M750F008 Aqueous photolysis study	Max in water: 7.3% after 13 days	Yes, EFSA (2018)

zRMS comments:

Information on degradation of mefentrifluconazole and its metabolites in water/sediment systems presented in Tables 8.6-1 to 8.6-2 is in line with EU agreed endpoints reported in EFSA Journal 2018;16(7):5379.

8.6.2 Boscalid

All information on boscalid provided in this chapter were summarized from the EU review report SANCO/3919/2007-rev. 5 (2008), the Monograph (2002) and its Addenda (2006).

Table 8.6-3: Summary of degradation in water/sediment of boscalid

Boscalid Distribution *Dark system, pond*: max. in sediment 67.7% after 100 d; *river*: max. in sediment 79.9% after 100 d *Irradiated system, outdoors*: max. in sediment 28.2% after 103 d.										
Water/ sediment system	**pH water/ sed.**	**DegT$_{50}$ whole syst. [d]**	**DegT$_{90}$ whole syst. [d]**	**Kinetic, Fit**	**DissT$_{50}$ water [d]**	**DissT$_{90}$ water [d]**	**Kinetic, Fit**	**DissT$_{50}$ sed. [d]**	**Kinetic, Fit**	**Reference**
Kellmet-schweiher (pond system) [a]	8.5 / 6.8	– [c]	–	–	9	133	Graphical best-fit, r^2=0.995	–	–	SANCO/3919/ 2007-rev.5, Monograph (2002)
Berhäuser Altrhein (river system) [a]	8.1 / 7.5	– [c]	–	–	3	43	Graphical best-fit, r^2=0.995	–	–	SANCO/3919/ 2007-rev.5, Monograph (2002)
Kellmet-schweiher (pond system) [b]	8.8 / –	– [c]	–	–	32 ~~21~~	–	SFO, r^2=0.94	66	Best fit, r^2=0.99	Monograph (2002)

[a] Dark water/sediment study.
[b] Study under outdoor conditions.
[c] Values by far exceeding the duration of the experiment, for both systems and both labelling positions.

Table 8.6-4: Accumulation of boscalid in sediment

Plateau in sediment after 8 years: 217% (calculation)	SANCO/3919/2007-rev.5

zRMS comments:

Information on degradation of boscalid in water/sediment systems is in general in line with the EU Review Report SANCO/3919/2007-rev.5 and Vol. 3 of the Monograph (2002). It is noted that according to the Addendum 4 to the boscalid monograph (May 2007) the DissT$_{50water}$ for the outdoor pond system Kellmetschweiher was calculated to be 32 days. The information in Table 8.6-3 has been amended accordingly.

8.7 Predicted Environmental Concentrations in soil (PEC_{soil}) (KCP 9.1.3)

8.7.1 Justification for new endpoints

Mefentrifluconazole

EU agreed endpoints were used for PEC_{soil} calculations for mefentrifluconazole and for its metabolite 1,2,4-triazole [*EFSA (2018): Conclusion on the peer review of the pesticide risk assessment of the active substance BAS 750 F (Mefentrifluconazole). EFSA Journal 2018;16(7):5379, 32 pp. doi:10.2903/j.efsa.2018.5379*].

Boscalid

No deviation from EU endpoints given in the EU Review Report SANCO/3919/2007–rev.5 (2008) [*Review Report (2008): Review report for the active substance boscalid. SANCO/3919/2007–rev.5. January 2008*], the Draft Assessment Report [*Monograph (2002): Monograph on the active substance nicobifen (boscalid). Report and proposed Decision (DAR) of the Rapporteur Member State Germany*] and its Addenda (2006).

8.7.2 Active substance(s) and relevant metabolite(s)

Table 8.7-1: Input parameters related to application for PEC_{soil} calculations

Use No.	3-5, 17	9	14-15
Crop	Oilseed rape (winter and spring)	Sunflower	Cereals (winter and spring)
Growth stage [BBCH]	57 - 75	31 - 69	30 - 49
Application rate [g a.s ha^{-1}]	Mefentrifluconazole: 100 Boscalid: 200	Mefentrifluconazole: 100 Boscalid: 200	Mefentrifluconazole: 100 Boscalid: 200
Number of applications [-] / interval [d]	1 / -	2 / 7	1 / -
Crop Interception [%]	80	50 / 50	80
Depth of soil layer (relevant for plateau concentration) [cm]	5 / 20 (tillage depth for annual crops)		
Models used for calculation	Mefentrifluconazole: Excel Metabolite of mefentrifluconazole: ESCAPE 2.0 Boscalid: Excel for 2 different approaches		

Table 8.7-2: Input parameters for mefentrifluconazole and its metabolite for PEC_{soil} calculation

Compound	**Mefentrifluconazole**	**1,2,4-triazole**	**Value in accordance to EU endpoint y/n** **Reference**
Molecular weight [g mol-1]	397.8	69.1	Yes EFSA (2018)
Max. occurrence [%]	- [a]	5.1 (DAT 90, laboratory dark aerobic conditions)	Yes EFSA (2018)
DT50 [d]	846.6 (SFO, worst case, non-normalized, from field studies, n = 6)	DFOP fast phase: 11.0 DFOP slow phase: 346.6 g: 0.5732 (worst case, non-normalized, from field study, n=4)	Yes EFSA (2018)

DAT = days after treatment
a Not relevant for parent substance

Table 8.7-3: Input parameters for boscalid for PEC_{soil} calculations

Compound	**Boscalid**	**Value in accordance to EU endpoint y/n Reference**
Molecular weight [g mol-1]	343.21	Yes Monograph (2002)
DT50 [d]	340.5 (SFO, maximum of field studies, standardized to 15°C, n = 3)	Yes Monograph (2002)

zRMS comments:

The application pattern presented in Table 8.7-1 and considered in soil exposure assessment is in line with the critical Central Zone GAP and it is thus agreed by the zRMS. Assumed crop interception is in line with the most recent version of the FOCUS Groundwater Guidance (2014) and is adequate for the earliest stages of each crop included in the Central Zone GAP.

Input parameters for mefentrifluconazole and metabolite 1,2,4-triazole presented in Table 8.7-2 are in line with EU agreed parameters reported in EFSA Journal 2018;16(7):5379.

It is noted that DT_{50} value of 340.5 days considered in soil exposure calculation for boscalid was longer than maximum value of 208 days reported in EU Review Report SANCO/3919/2007-rev.5 or 314.5 days calculated at 15°C in Vol. 3 of boscalid monograph (2002). However, this value has been considered acceptable by the zRMS (DE) in the course of the zonal evaluation of BASF formulation Tessior. This value is the maximum EU agreed field DT_{50} of 212 days standardised to 15°C with consideration of Q_{10} of 2.58. As this value is longer than all EU agreed endpoints, it is accepted for PEC_{soil} calculations as representing worst case.

8.7.3 Mefentrifluconazole and its metabolite

Reference:	CP 9.1.3/1
Report	Predicted environmental concentrations of BAS 750 F – mefentrifluconazole and its metabolite in soil following application to various crops in Europe, XXX XXX, E., 2021 report No CALC-2477 2020/2108239 Authority registration No
Guideline(s):	FOCUS Degradation Kinetics (2006) SANCO/10058/2005 version 1.1 of December 2014, FOCUS Groundwater (2014) Generic Guidance for Tier 1 FOCUS Ground Water Assessments v 2.2.
Deviations:	No
GLP:	No, not relevant for this subject type

Mefentrifluconazole

Table 8.7-4: PEC_{soil} for mefentrifluconazole following application of 1 x 100 g a.s. ha^{-1} to oilseed rape (winter and spring)

PEC_{soil} [mg kg^{-1}]		**Single application**	
		Actual	**TWA**
Initial		0.027	-
Short term	24h	0.027	0.027
	2d	0.027	0.027
	4d	0.027	0.027
Long term	7d	0.027	0.027
	14d	0.026	0.027
	21d	0.026	0.026
	28d	0.026	0.026
	50d	0.026	0.026
	100d	0.025	0.026
Plateau concentration (20 cm) after 10 years		0.019	
$PEC_{accumulation}$ (PEC_{act} +$PEC_{soil\ plateau}$)		0.046	

Table 8.7-5: PEC_{soil} for mefentrifluconazole following application of 2 x 100 g a.s. ha^{-1} to sunflower

PEC_{soil} [mg kg^{-1}]		**Multiple application**	
		Actual	**TWA**
Initial		0.133	-
Short term	24h	0.133	0.133
	2d	0.133	0.133
	4d	0.133	0.133
Long term	7d	0.132	0.133
	14d	0.131	0.132
	21d	0.131	0.132
	28d	0.130	0.131
	50d	0.128	0.130
	100d	0.123	0.128
Plateau concentration (20 cm) after 10 years		0.096	
$PEC_{accumulation}$ (PEC_{act} +$PEC_{soil\ plateau}$)		0.229	

Table 8.7-6: PEC_{soil} for mefentrifluconazole following application of 1 x 100 g a.s. ha^{-1} to cereals (winter and spring)

PEC_{soil} [mg kg^{-1}]		**Single application**	
		Actual	**TWA**
Initial		0.027	-
Short term	24h	0.027	0.027
	2d	0.027	0.027
	4d	0.027	0.027
Long term	7d	0.027	0.027
	14d	0.026	0.027
	21d	0.026	0.026
	28d	0.026	0.026
	50d	0.026	0.026
	100d	0.025	0.026
Plateau concentration (20 cm) after 10 years		0.019	
$PEC_{accumulation}$ (PEC_{act} +$PEC_{soil\ plateau}$)		0.046	

PEC_{soil} of 1,2,4-triazole

Only global maximum values are reported, which can be considered as worst-case estimates of short-term and long-term exposure.

Table 8.7-7: PEC_{soil} for metabolite 1,2,4-triazole following application of 1 x 100 g a.s. ha^{-1} to oilseed rape (winter and spring)

PEC_{soil} [mg kg^{-1}]	Single application
Initial	<0.001
Plateau concentration (20 cm) after 10 years	<0.001
$PEC_{accumulation}$ (PEC_{act} +$PEC_{soil\ plateau}$)	<0.001

Table 8.7-8: PECsoil for metabolite 1,2,4-triazole following application of 2 x 100 g a.s. ha-1 to sunflower

PEC_{soil} [mg kg^{-1}]	Multiple application
Initial	0.0015 ~~0.001~~
Plateau concentration (20 cm) after 10 years	0.0019 ~~<0.001~~
$PEC_{accumulation}$ (PEC_{act} +$PEC_{soil\ plateau}$)	0.0034 ~~0.001~~

Table 8.7-9: PECsoil for metabolite 1,2,4-triazole following application of 1 x 100 g a.s. ha-1 to cereals (winter and spring)

PEC_{soil} [mg kg^{-1}]	Single application
Initial	<0.001
Plateau concentration (20 cm) after 10 years	<0.001
$PEC_{accumulation}$ (PEC_{act} +$PEC_{soil\ plateau}$)	<0.001

zRMS comments:

The summary of methods used for calculation of PEC_{SOIL} values for mefentrifluconazole was not provided by the Applicant above. However, calculations were performed using the standard FOCUS approach, so it was not necessary to provide the summary from the modelling report.

Calculation for 1,2,4-triazole was performed using ESCAPE ver. 2 using pseudo-application rate of the metabolite derived with consideration of the parent application rate, molar ratio and maximum occurrence of metabolite observed in soil. It is, however, noted that in case of parent and single metabolite calculations using ESCAPE may be performed simulating the degradation pattern with kinetic formation fraction assumed for the metabolite. In case of 1,2,4-triazole assumption of the maximum kinetic ff (0.65, considered at Tier 3 in the course of the EU review) will represent worst case comparing to peak occurrence of 5.1%. Taking this into account, respective calculations were performed by the zRMS using ESCAPE ver. 2 on the basis of the EU agreed parameters and simulating parent with one metabolite.

Soil exposure calculated by the zRMS for single uses in oilseed rape and cereals were the same as this obtained by the Applicant. In case of multiple uses in sunflower, the same PEC_{SOIL} values were obtained for the parent, but for the metabolite higher soil exposure was calculated by the zRMS and Table 8.7-8 above was amended accordingly.

Boscalid

Reference:	CP 9.1.3/2
Report	Predicted environmental concentrations of BAS 510 F - Boscalid in soil following application to various crops in Europe, XXX XXX, E., 2021 report No CALC-2483 2020/2108245 Authority registration No
Guideline(s):	FOCUS Degradation Kinetics (2006) SANCO/10058/2005 version 1.1 of December 2014, Focus Groundwater (2014) GG for Tier 1 Focus GW Assessments v 2.2
Deviations:	No
GLP:	No, not relevant for this subject type

$PEC_{soil,accu}$ values were calculated following three different approaches. The first one being the standard FOCUS approach, whereas the other two approaches are based on the accumulation behaviour of boscalid observed in a field study with vegetables (BASF DocID 2020/2108245, Appendix 1).

$PEC_{soil,accu}$ based on accumulation behavior observed in field studies

$PEC_{soil,accu}$ was calculated in two ways that consider the accumulation behavior of boscalid as observed during accumulation studies in grapevine and vegetable crops. The first approach is based on measured total boscalid residues in soil of these accumulation studies. The residues are used to derive an accumulation factor, which is then applied to calculate $PEC_{soil,accu}$ in the soil layer of interest (top 5 cm) from the yearly application rate of the use under assessment. The second approach is based on measured concentrations in the top 10 cm soil layer of the accumulation studies that are used to predict concentrations in the soil layer of interest of 5 cm.

The maximum $PEC_{soil,accu}$ values obtained with these two approaches are considered a conservative and adequate estimate to be used in soil risk assessment.

Approach 1

$PEC_{soil,accu}$ was calculated as the sum of the maximum PEC_{soil} resulting from the annual application pattern ($PEC_{soil,max}$) and the plateau PEC_{soil} ($PEC_{soil,plateau}$) reflecting the background level after multi-year use before the beginning of the annual application period:

$$PEC_{soil,accu} = PEC_{soil,max} + PEC_{soil,plateau}$$

with:	$PEC_{soil,accu}$	PEC_{soil} after multi-year application at the end of the annual application period in a soil layer of 5 cm	[mg kg^{-1}]
	$PEC_{soil,max}$	maximum PEC_{soil} due to single-year application in a soil layer of 5 cm	[mg kg^{-1}]
	$PEC_{soil,plateau}$	PEC_{soil} after multi-year application before the beginning of the annual application period	[mg kg^{-1}]

The $PEC_{soil,max}$ for the use under assessment was calculated according to FOCUS recommendations. The respective $PEC_{soil,plateau}$ was calculated considering the accumulation factor (f_{accu}) that was concluded from the ratio of modelled residue plateau to yearly application rate (see table below). $PEC_{soil,plateau}$ is the yearly application rate in the GAP multiplied by f_{accu} and then related to a typical soil cultivation layer of defined depth and bulk density, where the residues are distributed evenly due to ploughing (see equation below). The depth of the soil cultivation layer is 0.2 m for the crops considered.

Equation 7 **Calculation of $PEC_{soil,plateau}$ (approach 1)**

$$PEC_{soil,plateau} = \frac{f_{accu} \cdot A_{GAP} \cdot 1000}{depth \cdot 10000 \cdot bd}$$

with:			
	$PEC_{soil,plateau}$	PEC_{soil} after multi-year application before the beginning of the annual application period	[mg kg^{-1}]
	f_{accu}	accumulation factor concluded from relevant accumulation study (see Table 2)	[-]
	A_{GAP}	total yearly application rate of use under assessment	[g ha^{-1}]
	depth	depth of soil cultivation layer (here 0.2 m for arable crops)	[m]
	bd	bulk density of soil cultivation layer (1500 kg m^{-3})	[kg m^{-3}]

Accumulated fraction (f_{accu}) of boscalid from field studies in grapevine and vegetables

Accumulation study	Modeled minimum residue plateau [kg/ha]	Yearly application rate [kg/ha]	Ratio of residue plateau to application rate (faccu) [-]
Grapevine	2.0	2.10	0.95
Vegetable	1.5	1.27	1.18

In the present study, $PEC_{soil,accu}$ (approach 1) was calculated using the results of the vegetable accumulation study for the relevant crops winter and spring oilseed rape, sunflower and winter and spring cereals..

Approach 2

$PEC_{soil,accu}$ was calculated based on the maximum PEC_{soil} in the soil layer of interest (top 5 cm) from the relevant accumulation study ($PEC_{soil,study,max}$). The approach is considered to be an advanced version of the estimation approach proposed by the Rapporteur Member State in the 2nd addendum to the Draft Assessment Report of boscalid.

The $PEC_{soil,accu}$ for the use under assessment was calculated by rescaling the $PEC_{soil,study,max}$ from the relevant accumulation study with the ratio of the yearly application rate in the GAP and the study as described in equation below.

$$PEC_{soil,accu} = PEC_{soil,study,max} \cdot \frac{A_{GAP}}{A_{study}}$$

with:			
	$PEC_{soil,accu}$	PEC_{soil} after multi-year application at the end of the annual application period	[mg kg^{-1}]
	$PEC_{soil,study,max}$	maximum PEC_{soil} in soil layer of interest (top 5 cm) in relevant accumulation study at the end of the annual application period	[mg kg^{-1}]
	A_{GAP}	total yearly application rate of use under assessment	[g ha^{-1}]
	A_{study}	total yearly application rate of relevant accumulation study related to $PEC_{soil,study,max}$	[g ha^{-1}]

$PEC_{soil,study,max}$ for the top 5 cm was not measured in the accumulation studies, but can be calculated from the reported concentrations in the upper 10 cm soil layer. Table below summarizes $PEC_{soil,study,max}$ values of the two accumulation studies that were calculated for different soil layer depths.

Maximum PECsoil of boscalid in two accumulation studies after the annual application period with regard to different top soil layer depths

Accumulation study	A_{study} [g/ha]	$PEC_{soil,study,max}$ of boscalid [mg/kg]
		5 cm
Grapevine	2100	2.094
Vegetables	1700	1.553

In the present study, $PEC_{soil,accu}$ (approach 2) was calculated using the results of the vegetable accumulation study.

Table 8.7-10: PEC_{soil} for boscalid following application of 1 x 200 g a.s. ha^{-1} to oilseed rape (winter and spring)

PEC_{soil} [mg kg^{-1}]		Single application	
		Actual	**TWA**
Initial		0.053	-
Short term	24h	0.053	0.053
	2d	0.053	0.053
	4d	0.053	0.053
Long term	7d	0.053	0.053
	14d	0.052	0.053
	21d	0.051	0.052
	28d	0.050	0.052
	50d	0.048	0.051
	100d	0.044	0.048
FOCUS approach (using worst-case field DT_{50})	Plateau concentration (20 cm)	0.012	
	$PEC_{accumulation}$	0.065	
Accumulation field data - approach 1	Plateau concentration (20 cm)	0.079 [1)]	
	$PEC_{accumulation}$	0.132 [1)]	
Accumulation field data - approach 2	$PEC_{accumulation}$	0.183 [1)]	

[1)] $PEC_{SOIL,ACCU}$ values based on not agreed study by XXX et al. (2009). Nevertheless, these values are retained in the table as leading to most conservative soil risk assessment. Recalculation will be necessary once boscalid is renewed at the EU level, final decision regarding study by XXX et al. (2009) is taken and EU agreed f_{accu} is determined.

Table 8.7-11: PEC_{soil} for boscalid following application of 2 x 200 g a.s. ha^{-1} to sunflower

PEC_{soil} [mg kg^{-1}]		Multiple application	
		Actual	**TWA**
Initial		0.265	-
Short term	24h	0.264	0.265
	2d	0.264	0.264
	4d	0.263	0.264
Long term	7d	0.261	0.263
	14d	0.257	0.261
	21d	0.254	0.259
	28d	0.250	0.257
	50d	0.239	0.252
	100d	0.216	0.240
FOCUS approach (using worst-case field DT_{50})	Plateau concentration (20 cm)	0.061	
	$PEC_{accumulation}$	0.326	
Accumulation field data - approach 1	Plateau concentration (20 cm)	0.157 [1)]	
	$PEC_{accumulation}$	0.422 [1)]	
Accumulation field data - approach 2	$PEC_{accumulation}$	0.365 [1)]	

[1)] $PEC_{SOIL,ACCU}$ values based on not agreed study by XXX et al. (2009). Nevertheless, these values are retained in the table as leading to most conservative soil risk assessment. Recalculation will be necessary once boscalid is renewed at the EU level, final decision regarding study by XXX et al. (2009) is taken and EU agreed f_{accu} is determined.

Table 8.7-12: PEC_{soil} for boscalid following application of 1 x 200 g a.s. ha^{-1} to cereals (winter and spring)

PEC_{soil} [mg kg^{-1}]		**Single application**	
		Actual	**TWA**
Initial		0.053	-
Short term	24h	0.053	0.053
	2d	0.053	0.053
	4d	0.053	0.053
Long term	7d	0.053	0.053
	14d	0.052	0.053
	21d	0.051	0.052
	28d	0.050	0.052
	50d	0.048	0.051
	100d	0.044	0.048
FOCUS approach (using worst-case field DT_{50})	Plateau concentration (20 cm)	0.012	
	$PEC_{accumulation}$	0.065	
Accumulation field data - approach 1	Plateau concentration (20 cm)	0.079 [1)]	
	$PEC_{accumulation}$	0.132 [1)]	
Accumulation field data - approach 2	$PEC_{accumulation}$	0.183 [1)]	

[1)] $PEC_{SOIL,ACCU}$ values based on not agreed study by XXX et al. (2009). Nevertheless, these values are retained in the table as leading to most conservative soil risk assessment. Recalculation will be necessary once boscalid is renewed at the EU level, final decision regarding study by XXX et al. (2009) is taken and EU agreed f_{accu} is determined.

zRMS comments:

The summary of methods used for calculation of PEC_{SOIL} values for boscalid has been copied by the zRMS from the modelling report, as it was not provided by the Applicant.

Recalculation of PEC_{SOIL} values for boscalid performed by the zRMS using ESCAPE ver. 2 resulted with the same PEC_{SOIL} values (FOCUS approach).

With regard to two other approaches taken by the Applicant in order to calculate accumulated PEC_{SOIL} values, they are correct and were already considered in the course of EU review of boscalid or during zonal evaluations of formulations containing this substance.

The results of the accumulation study performed in vineyards were EU agreed and are thus not questioned by the zRMS. However, the accumulation study performed in vegetables was not accepted (see study evaluation in Appendix 2, CP 9.1.1.2.2/1). Due to invalidation of the study, the zRMS (DE) for BASF formulation Tessior calculated the $PEC_{SOIL,ACCU}$ according to Approach 1 using f_{accu} of 0.907 based on the DT_{50} of 340.5 days. Based on this indication already agreed at the zonal level, the maximum $PEC_{SOIL,ACCU}$ of 0.386 mg a.s./kg dws was calculated by the zRMS using Approach 1 for multiple uses in sunflower. The maximum $PEC_{SOIL,ACCU}$ calculated using Approach 2 for the same crop would be 0.398 mg a.s./kg dws. Bots $PEC_{SOIL,ACCU}$ values calculated using results of agreed soil accumulation study in vineyards are lower comparing to the maximum $PEC_{SOIL,ACCU}$ calculated by the Applicant on the basis of results of the study performed with vegetables (i.e. 0.422 mg a.s./kg dws). Therefore, in opinion of the zRMS, although being based on the results of not accepted study, this value may be used in the soil risk assessment as representing worst case comparing to values calculated using results of agreed study. It should be noted that this zRMS approach has been already agreed in the course of zonal evaluation for BASF formulation BAS 517 01 F (Empartis) finalised in September 2020.

Respective information regarding the accumulated PEC_{SOIL} values has been inserted by the zRMS in Tables 8.7-10 to 8.7-12 above.

PEC_{soil} of formulation BAS 762 02 F

Maximum PEC_{soil} were calculated for the formulation BAS 762 02 F based on worst-case scenarios for oilseed rape and sunflower which lead to the highest effective soil load of the formulation covering all other uses of the GAP. The $PEC_{soil,max}$ was calculated over 5 cm soil depth and assumed a soil bulk density of 1.5 g cm^{-3}.

Table 8.7-13: PEC_{soil} for BAS 762 02 F on oilseed rape and sunflower

Crop	Application rate of formulation [L ha^{-1}]	Formulation density [g L^{-1}]	Crop interception [%]	Effective soil load [g ha^{-1}]	$PEC_{soil,max}$ [mg kg^{-1}] 5 cm soil depth
Oilseed rape	1.00	1136 ~~1130~~	80	226	0.303 ~~0.301~~
Sunflower	1.00	1136 ~~1130~~	50	565	0.757 ~~0.753~~

zRMS comments:

PEC_{SOIL} values for the formulated product were recalculated by the zRMS using the formulation density as reported in the Core Assessment, Part B, Section B1. Difference in density had only minor impact on obtained PEC_{SOIL} values.

8.8 Predicted Environmental Concentrations in groundwater (PEC_{gw}) (KCP 9.2.4)

8.8.1 Justification for new endpoints

Mefentrifluconazole

EU agreed endpoints were used for PEC_{gw} calculations for mefentrifluconazole and for its metabolite 1,2,4-triazole [*EFSA (2018)*].

Boscalid

No deviation from EU endpoints given in the EU Review Report SANCO/3919/2007–rev.5 (2008) [*Review Report (2008)*], the Draft Assessment Report [*Monograph (2002)*] and its Addenda (2006). Degradation in soil were now described by geometric mean, not arithmetic mean as in Monograph (2002).

8.8.2 Active substance(s) and relevant metabolite(s) (KCP 9.2.4.1)

Table 8.8-1: Input parameters related to application for PEC_{gw} calculations

Use No.	1-3 ~~3-5, 17~~	4-6 ~~9~~	7-9 ~~14-15~~
$FOCUS_{gw}$ crop	Oilseed rape (winter and spring)	Sunflower [a]	Cereals (winter and spring)
Growth stage [BBCH]	57 - 75	31 - 69	30 - 49
Frequency of application	Annual	Annual	Annual
Numbers of applications [-] / interval [d]	1 / -	2 / 7	1 / -
Application rate [g a.s ha^{-1}]	Mefentrifluconazole: 100 Boscalid: 200	Mefentrifluconazole: 100 Boscalid: 200	Mefentrifluconazole: 100 Boscalid: 200
Crop interception [%]	80	50 / 50	80
Models used for calculation	FOCUS PEARL v4.4.4, FOCUS PELMO v5.5.3, FOCUS MACRO v5.5.4		

[a] maize was used as surrogate crop for sunflower to perform additional calculations for Châteaudun, Hamburg, Kremsmünster, Okehampton and Porto (relevant for the Central Zone)

Table 8.8-2: Application dates used for groundwater risk assessment for winter oilseed rape

Crop	**Scenario**	**Application dates (absolute)**
Winter oilseed rape	Châteaudun	14th Apr (104) [a]
	Hamburg	02nd May
	Kremsmünster	02nd May
	Okehampton	27th Apr
	Piacenza	09th Apr
	Porto	03rd Apr

[a] Julian day for FOCUS-MACRO calculations

Table 8.8-3: Application dates used for groundwater risk assessment for spring oilseed rape

Crop	**Scenario**	**Application dates (absolute)**
Spring oilseed rape	Jokioinen	02nd Jul
	Okehampton	12th May
	Porto	26th May

Table 8.8-4: Application dates used for groundwater risk assessment for sunflower

Crop	Scenario	Application dates (absolute)	
		1st Application	2nd Application
Maize [a]	Châteaudun	10th Jun (161) [b]	17th Jun (168) [b]
	Hamburg	06th Jun	13th Jun
	Kremsmünster	06th Jun	13th Jun
	Okehampton	13th Jun	20th Jun
	Porto	10th Jun	17th Jun
Sunflower	Piacenza	13th May	20th May
	Sevilla	15th Apr	22nd Apr

[a] maize was used as surrogate crop for sunflower to perform additional calculations for Châteaudun, Hamburg, Kremsmünster, Okehampton and Porto (relevant for the Central Zone)
[b] Julian day for FOCUS-MACRO calculations

Table 8.8-5: Application dates used for groundwater risk assessment for winter cereals

Crop	Scenario	Application dates (absolute)
Winter cereals	Châteaudun	15th Apr (105) [a]
	Hamburg	04th May
	Jokioinen	14th May
	Kremsmünster	24th Apr
	Okehampton	21st Apr
	Piacenza	19th Mar
	Porto	30th Jan
	Sevilla	06th Jan
	Thiva	18th Jan

[a] Julian day for FOCUS-MACRO calculations

Table 8.8-6: Application dates used for groundwater risk assessment for spring cereals

Crop	Scenario	Application dates (absolute)
Spring cereals	Châteaudun	16th Apr (106) [a]
	Hamburg	28th Apr
	Jokioinen	05th Jun
	Kremsmünster	27th Apr
	Okehampton	22nd Apr
	Porto	16th Apr

[a] Julian day for FOCUS-MACRO calculations

zRMS comments:

The application pattern presented in Table 8.7-1 and assumed in groundwater simulations is in line with the critical Central Zone GAP and it is thus agreed. The uses numbers were corrected in order to comply with information available in area of Section B0.

Absolute application dates presented in Tables 8.8-2 to 8.8-6 were checked by the zRMS using AppDate ver. 3.06 tool and are confirmed to be correct for the earliest BBCH stages of the respective crops intended in the Central Zone.

Initially, the groundwater modelling for uses in sunflower was performed only for scenarios defined for this crop. However, as not all scenarios relevant for the Central Zone are available for sunflower, the Applicant was requested to provide additional simulations performed for maize as surrogate crop. These simulations were submitted by the Applicant and included in the Core Assessment.

Potential leaching in Central Zone scenarios not defined for spring oilseed rape is considered to be covered by simulations performed for winter oilseed rape.

8.8.3 Mefentrifluconazole and its metabolites

Reference:	CP 9.2.4.1/1
Report	Predicted environmental concentrations of BAS 750 F – mefentrifluconazole and its metabolite in groundwater following application to various crops in Europe, XXX XXX, T., 2021 report No CALC-2478 2020/2108240 Authority registration No
Guideline(s):	FOCUS Degradation Kinetics (2006) SANCO/10058/2005 version 1.1 of December 2014, FOCUS Ground Water Report SANCO/321/2000 rev. 2, FOCUS groundwater (2014): SANCO/13144/2010 v 3, Focus Groundwater (2014) GG for Tier 1 Focus GW Assessments v 2.2, BAES (2020) in Austria, version 04 (January 2020
Deviations:	No
GLP:	No, not relevant for this subject type

The leaching assessment was conducted at four Tiers. Basic data in combination with standard FOCUS scenarios and modelling approaches with refined parameters were implemented. In order to avoid complicated combinations of tiers, the following designation was used:

- Tier 1: calculations based on a single-compartment degradation model for 1,2,4-triazole. A worst-case formation fraction of 1.0 was used in the assessment.
- Tier 2: the observed biphasic degradation of 1,2,4-triazole (DFOP kinetics) was implemented as recommended by [*FOCUS (2014): Generic Guidance for Estimating Persistence and Degradation Kinetics from Environmental Fate Studies in Pesticides in EU Registration, version 1.1. 440 pp. December 2014*.] A worst-case formation fraction of 1.0 was used.
- Tier 3: the observed biphasic degradation of 1,2,4-triazole (DFOP kinetics) was implemented and a worst-case formation fraction of 0.65 was used [*Szegedi K. (2016): Estimation of the formation fraction of 1,2,4-triazole (M750F001) from BAS 750F using modelling endpoints. BASF DocID 2016/1234478*].
- Tier 4: the observed biphasic degradation of 1,2,4-triazole (DFOP kinetics) was implemented and the arithmetic mean formation fraction of 0.40 from was used [*Szegedi (2016)*].

Implementation biphasic degradation for the metabolite 1,2,4-triazole

The degradation behaviour of 1,2,4-triazole is described with the DFOP kinetic model and was implemented for PEC_{gw} modelling at Tier 2 to Tier 4, as recommended by FOCUS. The fraction of the metabolite formed from the parent was divided into two compartments, i.e. one fast degrading and one slow degrading compartment.

For each compartment, the corresponding rate of the DFOP model was considered as degradation endpoint. The formation fraction of the metabolite was multiplied with the parameter g of the DFOP model for the fast degrading compartment and with (1-g) for the slow degrading compartment. The total PEC_{gw} of the metabolite was calculated by adding the PEC_{gw} of the two compartments. In order to minimize the influence of non-linear sorption for the metabolite, the amount of active substance applied was doubled and the predicted concentrations of parent and metabolite in the leachate were divided by 2.

Table 8.8-7: Input parameters for mefentrifluconazole and its metabolite for PEC_{gw} calculations

Compound	Mefentrifluconazole	1,2,4-triazole	Value in accordance to EU endpoint y/n Reference
Molecular weight [g mol^{-1}]	397.8	69.1	Yes EFSA (2018)
Water solubility [mg L^{-1}] (20°C)	0.81	7.0×10^{5}	Yes EFSA (2018)
Saturated vapor pressure [Pa] (20°C)	3.2×10^{-6}	2.2×10^{-1}	Yes EFSA (2018)
$DT_{50,soil}$ [d]	200 (geometric mean of field studies, normalized, n = 6)	Fast phase (DFOP): 1.68 Slow phase (DFOP): 60.5 (geometric mean of field studies, normalized, n = 4) g (proportion of the fast pool): 0.489 (arithmetic mean, n = 4)	Yes EFSA (2018)
Transformation rate (PELMO)	**Tier 1:** To 1,2,4-triazole: 0.00346574 To sink: 0 **Tier 2:** To 1,2,4-triazole (fast phase): 0.00169474 To 1,2,4-triazole (slow phase): 0.00177099 To sink: 0 **Tier 3:** To 1,2,4-triazole (fast phase): 0.00110158 To 1,2,4-triazole (slow phase): 0.00115114 To sink: 0.00121301 **Tier 4:** To 1,2,4-triazole (fast phase): 0.00067790 To 1,2,4-triazole (slow phase): 0.00070840 To sink: 0.00207944	**Tier 1:** To sink: 0.011457 **Tier 2 - 4:** To sink (fast phase): 0.412588 To sink (slow phase): 0.011457	Calculated
$K_{f,oc}$ [mL g^{-1}]	3455.6 (geometric mean; n = 8)	83 (geometric mean; n = 4)	Yes EFSA (2018)
$K_{f,om}$ [mL g^{-1}]	2004.4 (geometric mean; n = 8)	48 (geometric mean; n = 4)	Yes EFSA (2018)
Freundlich exponent 1/n	0.975 (arithmetic mean; n = 8)	0.916 (arithmetic mean; n = 4)	Yes EFSA (2018)
Plant Uptake [-]	0	0	Yes EFSA (2018)
Formation fraction	- [a]	**Tier 1:** 1.0 (conservative assumption, no biphasic behavior) **Tier 2:** Fast phase: 0.489 Slow phase: 0.511 (conservative assumption, biphasic behavior assuming an overall ff of 1.0) **Tier 3:**	Yes EFSA (2018)

Compound	Mefentrifluconazole	1,2,4-triazole	Value in accordance to EU endpoint y/n Reference
		Fast phase: 0.318 Slow phase: 0.332 (worst case (n = 4), biphasic behavior, assuming an overall ff of 0.65) **Tier 4:** Fast phase: 0.196 Slow phase: 0.204 (geometric mean (n = 4), biphasic behavior, assuming an overall ff of 0.40)	

[a] Not relevant for parent substance

Results of performed simulations are presented below.

<u>Tier 1</u>

Table 8.8-8: PEC_{gw} for mefentrifluconazole and its metabolite on winter oilseed rape – single application (1 x 100 g a.s. ha-1), Tier 1

Model	Crop	Scenario	80th Percentile PEC_{gw} at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	**Winter oilseed rape**	Châteaudun	<0.001	0.006
		Hamburg	<0.001	0.026
		Kremsmünster	<0.001	0.017
		Okehampton	<0.001	0.024
		Piacenza	<0.001	0.011
		Porto	<0.001	0.015
PELMO 5.5.3	**Winter oilseed rape**	Châteaudun	<0.001	0.005
		Hamburg	<0.001	0.025
		Kremsmünster	<0.001	0.017
		Okehampton	<0.001	0.028
		Piacenza	<0.001	0.012
		Porto	<0.001	0.023
MACRO 5.5.4	**Winter oilseed rape**	Châteaudun	<0.001	0.002

Table 8.8-9: PEC_{gw} for mefentrifluconazole and its metabolite on spring oilseed rape – single application (1 x 100 g a.s. ha^{-1}), Tier 1

Model	Crop	Scenario	80th Percentile PEC_{gw} at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	**Spring oilseed rape**	Jokioinen	<0.001	0.007
		Okehampton	<0.001	0.022
		Porto	<0.001	0.013
PELMO 5.5.3	**Spring oilseed rape**	Jokioinen	<0.001	0.007
		Okehampton	<0.001	0.022
		Porto	<0.001	0.019

Table 8.8-10: PEC$_{gw}$ for mefentrifluconazole and its metabolite on sunflower – multiple application (2 x 100 g a.s. ha^{-1}), Tier 1

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	**Maize** [a]	Châteaudun	<0.001	0.091
		Hamburg	<0.001	**0.189**
		Kremsmünster	<0.001	**0.120**
		Okehampton	<0.001	**0.181**
		Porto	<0.001	**0.104**
	Sunflower	Piacenza	<0.001	**0.140**
		Sevilla	<0.001	0.011
PELMO 5.5.3	**Maize** [a]	Châteaudun	<0.001	0.058
		Hamburg	<0.001	**0.164**
		Kremsmünster	<0.001	**0.119**
		Okehampton	<0.001	**0.166**
		Porto	<0.001	**0.114**
	Sunflower	Piacenza	<0.001	**0.150**
		Sevilla	<0.001	0.004
MACRO 5.5.4	**Maize** [a]	Châteaudun	<0.001	0.040

[a] additional calculations performed for Châteaudun, Hamburg, Kremsmünster, Okehampton and Porto (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.8-11: PEC$_{gw}$ for mefentrifluconazole and its metabolite on winter cereals – single application (1 x 100 g a.s. ha^{-1}), Tier 1

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	**Winter cereals**	Châteaudun	<0.001	0.004
		Hamburg	<0.001	0.025
		Jokioinen	<0.001	0.008
		Kremsmünster	<0.001	0.016
		Okehampton	<0.001	0.025
		Piacenza	<0.001	0.014
		Porto	<0.001	0.012
		Sevilla	<0.001	<0.001
		Thiva	<0.001	0.003
PELMO 5.5.3	**Winter cereals**	Châteaudun	<0.001	0.003
		Hamburg	<0.001	0.026
		Jokioinen	<0.001	0.010
		Kremsmünster	<0.001	0.017
		Okehampton	<0.001	0.025
		Piacenza	<0.001	0.016
		Porto	<0.001	0.021
		Sevilla	<0.001	<0.001
		Thiva	<0.001	0.001
MACRO 5.5.4	**Winter cereals**	Châteaudun	<0.001	0.002

Table 8.8-12: PEC$_{gw}$ for mefentrifluconazole and its metabolite on spring cereals – single application (1 x 100 g a.s. ha^{-1}), Tier 1

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	Spring cereals	Châteaudun	<0.001	0.004
		Hamburg	<0.001	0.028
		Jokioinen	<0.001	0.008
		Kremsmünster	<0.001	0.017
		Okehampton	<0.001	0.024
		Porto	<0.001	0.014
PELMO 5.5.3	Spring cereals	Châteaudun	<0.001	0.002
		Hamburg	<0.001	0.023
		Jokioinen	<0.001	0.007
		Kremsmünster	<0.001	0.015
		Okehampton	<0.001	0.021
		Porto	<0.001	0.018
MACRO 5.5.4	Spring cereals	Châteaudun	<0.001	0.002

Tier 2

Table 8.8-13: PEC$_{gw}$ for mefentrifluconazole and its metabolite on winter oilseed rape – single application (1 x 100 g a.s. ha^{-1}), Tier 2

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	Winter oilseed rape	Châteaudun	<0.001	0.003
		Hamburg	<0.001	0.013
		Kremsmünster	<0.001	0.009
		Okehampton	<0.001	0.012
		Piacenza	<0.001	0.006
		Porto	<0.001	0.007
PELMO 5.5.3	Winter oilseed rape	Châteaudun	<0.001	0.003
		Hamburg	<0.001	0.013
		Kremsmünster	<0.001	0.009
		Okehampton	<0.001	0.015
		Piacenza	<0.001	0.007
		Porto	<0.001	0.012
MACRO 5.5.4	Winter oilseed rape	Châteaudun	<0.001	0.001

Table 8.8-14: PEC$_{gw}$ for mefentrifluconazole and its metabolite on spring oilseed rape – single application (1 x 100 g a.s. ha^{-1}), Tier 2

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	Spring oilseed rape	Jokioinen	<0.001	0.004
		Okehampton	<0.001	0.011
		Porto	<0.001	0.007
PELMO 5.5.3	Spring oilseed rape	Jokioinen	<0.001	0.004
		Okehampton	<0.001	0.011
		Porto	<0.001	0.010

Table 8.8-15: PEC$_{gw}$ for mefentrifluconazole and its metabolite on sunflower – multiple application (2 x 100 g a.s. ha^{-1}), Tier 2

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	**1,2,4-triazole**
PEARL 4.4.4	**Maize** [a]	Châteaudun	<0.001	0.047
		Hamburg	<0.001	0.097
		Kremsmünster	<0.001	0.062
		Okehampton	<0.001	0.093
		Porto	<0.001	0.053
	Sunflower	Piacenza	<0.001	0.072
		Sevilla	<0.001	0.005
PELMO 5.5.3	**Maize** [a]	Châteaudun	<0.001	0.030
		Hamburg	<0.001	0.085
		Kremsmünster	<0.001	0.062
		Okehampton	<0.001	0.086
		Porto	<0.001	0.059
	Sunflower	Piacenza	<0.001	0.078
		Sevilla	<0.001	0.002
MACRO 5.5.4	**Maize** [a]	Châteaudun	<0.001	0.021

[a] additional calculations performed for Châteaudun, Hamburg, Kremsmünster, Okehampton and Porto (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.8-16: PEC$_{gw}$ for mefentrifluconazole and its metabolite on winter cereals – single application (1 x 100 g a.s. ha^{-1}), Tier 2

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	**1,2,4-triazole**
PEARL 4.4.4	**Winter cereals**	Châteaudun	<0.001	0.002
		Hamburg	<0.001	0.013
		Jokioinen	<0.001	0.004
		Kremsmünster	<0.001	0.008
		Okehampton	<0.001	0.013
		Piacenza	<0.001	0.007
		Porto	<0.001	0.006
		Sevilla	<0.001	<0.001
		Thiva	<0.001	0.001
PELMO 5.5.3	**Winter cereals**	Châteaudun	<0.001	0.002
		Hamburg	<0.001	0.014
		Jokioinen	<0.001	0.005
		Kremsmünster	<0.001	0.009
		Okehampton	<0.001	0.013
		Piacenza	<0.001	0.009
		Porto	<0.001	0.011
		Sevilla	<0.001	0.000
		Thiva	<0.001	0.001
MACRO 5.5.4	**Winter cereals**	Châteaudun	<0.001	0.001

Table 8.8-17: PEC_{gw} for mefentrifluconazole and its metabolite on spring cereals – single application (1 x 100 g a.s. ha^{-1}), Tier 2

Model	Crop	Scenario	80th Percentile PEC_{gw} at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	**1,2,4-triazole**
PEARL 4.4.4	**Spring cereals**	Châteaudun	<0.001	0.002
		Hamburg	<0.001	0.015
		Jokioinen	<0.001	0.004
		Kremsmünster	<0.001	0.009
		Okehampton	<0.001	0.012
		Porto	<0.001	0.007
PELMO 5.5.3	**Spring cereals**	Châteaudun	<0.001	0.001
		Hamburg	<0.001	0.012
		Jokioinen	<0.001	0.004
		Kremsmünster	<0.001	0.008
		Okehampton	<0.001	0.011
		Porto	<0.001	0.010
MACRO 5.5.4	**Spring cereals**	Châteaudun	<0.001	0.001

Tier 3

Table 8.8-18: PEC_{gw} for mefentrifluconazole and its metabolite on winter oilseed rape – single application (1 x 100 g a.s. ha^{-1}), Tier 3

Model	Crop	Scenario	80th Percentile PEC_{gw} at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	**1,2,4-triazole**
PEARL 4.4.4	**Winter oilseed rape**	Châteaudun	<0.001	0.002
		Hamburg	<0.001	0.008
		Kremsmünster	<0.001	0.005
		Okehampton	<0.001	0.007
		Piacenza	<0.001	0.003
		Porto	<0.001	0.004
PELMO 5.5.3	**Winter oilseed rape**	Châteaudun	<0.001	0.002
		Hamburg	<0.001	0.008
		Kremsmünster	<0.001	0.005
		Okehampton	<0.001	0.009
		Piacenza	<0.001	0.004
		Porto	<0.001	0.007
MACRO 5.5.4	**Winter oilseed rape**	Châteaudun	<0.001	0.001

Table 8.8-19: PEC_{gw} for mefentrifluconazole and its metabolite on spring oilseed rape – single application (1 x 100 g a.s. ha^{-1}), Tier 3

Model	Crop	Scenario	80th Percentile PEC_{gw} at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	**1,2,4-triazole**
PEARL 4.4.4	**Spring oilseed rape**	Jokioinen	<0.001	0.002
		Okehampton	<0.001	0.007
		Porto	<0.001	0.004
PELMO 5.5.3	**Spring oilseed rape**	Jokioinen	<0.001	0.002
		Okehampton	<0.001	0.007
		Porto	<0.001	0.006

Table 8.8-20: PEC$_{gw}$ for mefentrifluconazole and its metabolite on sunflower – multiple application (2 x 100 g a.s. ha^{-1}), Tier 3

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	**1,2,4-triazole**
PEARL 4.4.4	**Maize** [a]	Châteaudun	<0.001	0.027
		Hamburg	<0.001	0.058
		Kremsmünster	<0.001	0.036
		Okehampton	<0.001	0.056
		Porto	<0.001	0.032
	Sunflower	Piacenza	<0.001	0.043
		Sevilla	<0.001	0.003
PELMO 5.5.3	**Maize** [a]	Châteaudun	<0.001	0.017
		Hamburg	<0.001	0.050
		Kremsmünster	<0.001	0.036
		Okehampton	<0.001	0.051
		Porto	<0.001	0.036
	Sunflower	Piacenza	<0.001	0.046
		Sevilla	<0.001	0.001
MACRO 5.5.4	**Maize** [a]	Châteaudun	<0.001	0.012

[a] additional calculations performed for Châteaudun, Hamburg, Kremsmünster, Okehampton and Porto (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.8-21: PEC$_{gw}$ for mefentrifluconazole and its metabolite on winter cereals – single application (1 x 100 g a.s. ha^{-1}), Tier 3

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	**1,2,4-triazole**
PEARL 4.4.4	**Winter cereals**	Châteaudun	<0.001	0.001
		Hamburg	<0.001	0.007
		Jokioinen	<0.001	0.002
		Kremsmünster	<0.001	0.005
		Okehampton	<0.001	0.008
		Piacenza	<0.001	0.004
		Porto	<0.001	0.004
		Sevilla	<0.001	<0.001
		Thiva	<0.001	0.001
PELMO 5.5.3	**Winter cereals**	Châteaudun	<0.001	0.001
		Hamburg	<0.001	0.008
		Jokioinen	<0.001	0.003
		Kremsmünster	<0.001	0.005
		Okehampton	<0.001	0.008
		Piacenza	<0.001	0.005
		Porto	<0.001	0.006
		Sevilla	<0.001	<0.001
		Thiva	<0.001	0.001
MACRO 5.5.4	**Winter cereals**	Châteaudun	<0.001	0.001

Table 8.8-22: PEC_{gw} for mefentrifluconazole and its metabolite on spring cereals – single application (1 x 100 g a.s. ha^{-1}), Tier 3

Model	Crop	Scenario	80th Percentile PEC_{gw} at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	Spring cereals	Châteaudun	<0.001	0.001
		Hamburg	<0.001	0.008
		Jokioinen	<0.001	0.002
		Kremsmünster	<0.001	0.005
		Okehampton	<0.001	0.007
		Porto	<0.001	0.004
PELMO 5.5.3	Spring cereals	Châteaudun	<0.001	0.001
		Hamburg	<0.001	0.007
		Jokioinen	<0.001	0.002
		Kremsmünster	<0.001	0.005
		Okehampton	<0.001	0.007
		Porto	<0.001	0.006
MACRO 5.5.4	Spring cereals	Châteaudun	<0.001	0.001

Tier 4

Table 8.8-23: PEC_{gw} for mefentrifluconazole and its metabolite on winter oilseed rape – single application (1 x 100 g a.s. ha^{-1}), Tier 4

Model	Crop	Scenario	80th Percentile PEC_{gw} at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	Winter oilseed rape	Châteaudun	<0.001	0.001
		Hamburg	<0.001	0.004
		Kremsmünster	<0.001	0.003
		Okehampton	<0.001	0.004
		Piacenza	<0.001	0.002
		Porto	<0.001	0.002
PELMO 5.5.3	Winter oilseed rape	Châteaudun	<0.001	0.001
		Hamburg	<0.001	0.004
		Kremsmünster	<0.001	0.003
		Okehampton	<0.001	0.005
		Piacenza	<0.001	0.002
		Porto	<0.001	0.004
MACRO 5.5.4	Winter oilseed rape	Châteaudun	<0.001	<0.001

Table 8.8-24: PEC_{gw} for mefentrifluconazole and its metabolite on spring oilseed rape – single application (1 x 100 g a.s. ha^{-1}), Tier 4

Model	Crop	Scenario	80th Percentile PEC_{gw} at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	Spring oilseed rape	Jokioinen	<0.001	0.001
		Okehampton	<0.001	0.004
		Porto	<0.001	0.002
PELMO 5.5.3	Spring oilseed rape	Jokioinen	<0.001	0.001
		Okehampton	<0.001	0.004
		Porto	<0.001	0.003

Table 8.8-25: PEC$_{gw}$ for mefentrifluconazole and its metabolite on sunflower – multiple application (2 x 100 g a.s. ha^{-1}), Tier 4

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	Maize [a]	Châteaudun	<0.001	0.015
		Hamburg	<0.001	0.032
		Kremsmünster	<0.001	0.020
		Okehampton	<0.001	0.031
		Porto	<0.001	0.018
	Sunflower	Piacenza	<0.001	0.024
		Sevilla	<0.001	0.001
PELMO 5.5.3	Maize [a]	Châteaudun	<0.001	0.009
		Hamburg	<0.001	0.028
		Kremsmünster	<0.001	0.019
		Okehampton	<0.001	0.028
		Porto	<0.001	0.020
	Sunflower	Piacenza	<0.001	0.026
		Sevilla	<0.001	0.001
MACRO 5.5.4	Maize [a]	Châteaudun	<0.001	0.006

[a] additional calculations performed for Châteaudun, Hamburg, Kremsmünster, Okehampton and Porto (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.8-26: PEC$_{gw}$ for mefentrifluconazole and its metabolite on winter cereals – single application (1 x 100 g a.s. ha^{-1}), Tier 4

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	Winter cereals	Châteaudun	<0.001	0.001
		Hamburg	<0.001	0.004
		Jokioinen	<0.001	0.001
		Kremsmünster	<0.001	0.003
		Okehampton	<0.001	0.004
		Piacenza	<0.001	0.002
		Porto	<0.001	0.002
		Sevilla	<0.001	<0.001
		Thiva	<0.001	<0.001
PELMO 5.5.3	Winter cereals	Châteaudun	<0.001	0.001
		Hamburg	<0.001	0.005
		Jokioinen	<0.001	0.002
		Kremsmünster	<0.001	0.003
		Okehampton	<0.001	0.005
		Piacenza	<0.001	0.003
		Porto	<0.001	0.004
		Sevilla	<0.001	<0.001
		Thiva	<0.001	<0.001
MACRO 5.5.4	Winter cereals	Châteaudun	<0.001	<0.001

Table 8.8-27: PEC$_{gw}$ for mefentrifluconazole and its metabolite on spring cereals – single application (1 x 100 g a.s. ha^{-1}), Tier 4

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]	
			Mefentrifluconazole	1,2,4-triazole
PEARL 4.4.4	Spring cereals	Châteaudun	<0.001	<0.001
		Hamburg	<0.001	0.005
		Jokioinen	<0.001	0.001
		Kremsmünster	<0.001	0.003
		Okehampton	<0.001	0.004
		Porto	<0.001	0.002
PELMO 5.5.3	Spring cereals	Châteaudun	<0.001	0.001
		Hamburg	<0.001	0.004
		Jokioinen	<0.001	0.001
		Kremsmünster	<0.001	0.003
		Okehampton	<0.001	0.004
		Porto	<0.001	0.003
MACRO 5.5.4	Spring cereals	Châteaudun	<0.001	<0.001

The 80th percentiles of the predicted annual leachate concentrations of mefentrifluconazole were clearly below 0.1 µg L^{-1} in all tested scenarios and models.

PEC$_{gw}$ for 1,2,4-triazole were below 0.1 µg L^{-1} for most of the application scenarios and crops at Tier 1 except for the twofold application of 100 g a.s. ha^{-1} to sunflower, while at Tier 2 to Tier 4 PEC$_{gw}$ concentrations of the metabolite were below 0.1 µg L^{-1} for all crops and scenarios.

Hence, the leaching of unacceptable amounts of substances following application of mefentrifluconazole to the various crops defined by the GAP is highly unlikely.

zRMS comments:

The input parameters presented in Table 8.8-7 and considered by the Applicant in groundwater modelling for mefentrifluconazole and metabolite 1,2,4-triazole performed at Tiers 1-4 are fully in line with the EU agreed endpoints. Additional information regarding implementation of the bi-phasic behaviour of 1,2,4-triazole into the simulations has been added in the summary above for clarity.

In simulations PUF value of 0 was assumed, in line with recommendations of the most recent version of the FOCUS Groundwater Guidance.

The performed calculations were independently validated by the zRMS in additional modelling using the same models and input parameters. Obtained PEC$_{GW}$ values were in good agreement with dese derived by the Applicant.

Overall, no unacceptable leaching of mefentrifluconazole and metabolite 1,2,4-triazole is expected following application of BAS 762 02 F according to the intended use pattern.

Please note that additional groundwater modelling may be required by the concerned Member States that do not accept simulations performed according to FOCUS recommendations.

8.8.4 Boscalid

Reference:	CP 9.2.4.1/2
Report	Predicted environmental concentrations of BAS 510 F - Boscalid in groundwater following application to various crops in Central Europe, XXX XXX, T., 2021 report No CALC-2484 2020/2108246 Authority registration No
Guideline(s):	FOCUS Degradation Kinetics (2006) SANCO/10058/2005 version 1.1 of December 2014, FOCUS Ground Water Report SANCO/321/2000 rev. 2, FOCUS groundwater (2009): SANCO/13144/2010 v3 of 2014, Focus Groundwater (2014) GG for Tier 1 Focus GW Assessments v 2.2, BAES (2020) in Austria, version 04 (January 2020
Deviations:	No
GLP:	No, not relevant for this subject type

Input parameters considered in groundwater modelling for boscalid are summarised in table below.

Table 8.8-28: Input parameters related to active substance boscalid for PEC_{gw} calculations

Compound	**Boscalid**	**Value in accordance to EU endpoint y/n Reference**
Molecular weight [g mol^{-1}]	343.21	Yes Monograph (2002)
Water solubility [mg L^{-1}] (20°C)	4.6	Yes Monograph (2002)
Saturated vapor pressure [Pa] (20°C)	7.2 x 10^{-7}	Yes Monograph (2002)
$DT_{50,soil}$ [d]	130 (geometric mean of field studies, normalization to 20°C with Q_{10} of 2.2, n=3)	Yes, single values Monograph (2002)
Transformation rate (PELMO)	0.005332	Calculated
$K_{f,oc}$ [mL g^{-1}]	772 (arithmetic mean; n = 6)	Yes Monograph (2002)
$K_{f,om}$ [mL g^{-1}]	448 (arithmetic mean; n = 6)	Yes Monograph (2002)
Freundlich exponent 1/n	0.864 (arithmetic mean; n = 6)	Yes Monograph (2002)
Plant Uptake [-]	0	Conservative assumption

Results of the performed simulations are presented in tables below.

Table 8.8-29: PEC$_{gw}$ for boscalid on winter oilseed rape – single application (1 x 200 g a.s. ha^{-1})

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]
			Boscalid
PEARL 4.4.4	**Winter oilseed rape**	Châteaudun	<0.001
		Hamburg	<0.001
		Kremsmünster	<0.001
		Okehampton	<0.001
		Piacenza	<0.001
		Porto	<0.001
PELMO 5.5.3	**Winter oilseed rape**	Châteaudun	<0.001
		Hamburg	<0.001
		Kremsmünster	<0.001
		Okehampton	<0.001
		Piacenza	<0.001
		Porto	<0.001
MACRO 5.5.4	**Winter oilseed rape**	Châteaudun	<0.001

Table 8.8-30: PEC$_{gw}$ for boscalid on spring oilseed rape – single application (1 x 200 g a.s. ha^{-1})

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]
			Boscalid
PEARL 4.4.4	**Spring oilseed rape**	Jokioinen	<0.001
		Okehampton	<0.001
		Porto	<0.001
PELMO 5.5.3	**Spring oilseed rape**	Jokioinen	<0.001
		Okehampton	<0.001
		Porto	<0.001

Table 8.8-31: PEC$_{gw}$ for boscalid on sunflower – multiple application (2 x 200 g a.s. ha^{-1})

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]
			Boscalid
PEARL 4.4.4	**Maize** [a]	Châteaudun	<0.001
		Hamburg	<0.001
		Kremsmünster	<0.001
		Okehampton	<0.001
		Porto	<0.001
	Sunflower	Piacenza	<0.001
		Sevilla	<0.001
PELMO 5.5.3	**Maize** [a]	Châteaudun	<0.001
		Hamburg	<0.001
		Kremsmünster	<0.001
		Okehampton	<0.001
		Porto	<0.001
	Sunflower	Piacenza	<0.001
		Sevilla	<0.001
MACRO 5.5.4	**Maize** [a]	Châteaudun	<0.001

[a] additional calculations performed for Châteaudun, Hamburg, Kremsmünster, Okehampton and Porto (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.8-32: PEC$_{gw}$ for boscalid on winter cereals – single application (1 x 200 g a.s. ha^{-1})

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]
			Boscalid
PEARL 4.4.4	**Winter cereals**	Châteaudun	<0.001
		Hamburg	<0.001
		Jokioinen	<0.001
		Kremsmünster	<0.001
		Okehampton	<0.001
		Piacenza	<0.001
		Porto	<0.001
		Sevilla	<0.001
		Thiva	<0.001
PELMO 5.5.3	**Winter cereals**	Châteaudun	<0.001
		Hamburg	<0.001
		Jokioinen	<0.001
		Kremsmünster	<0.001
		Okehampton	<0.001
		Piacenza	<0.001
		Porto	<0.001
		Sevilla	<0.001
		Thiva	<0.001
MACRO 5.5.4	**Winter cereals**	Châteaudun	<0.001

Table 8.8-33: PEC$_{gw}$ for boscalid on spring cereals – single application (1 x 200 g a.s. ha^{-1})

Model	Crop	Scenario	80th Percentile PEC$_{gw}$ at 1 m Soil Depth [µg L^{-1}]
			Boscalid
PEARL 4.4.4	**Spring cereals**	Châteaudun	<0.001
		Hamburg	<0.001
		Jokioinen	<0.001
		Kremsmünster	<0.001
		Okehampton	<0.001
		Porto	<0.001
PELMO 5.5.3	**Spring cereals**	Châteaudun	<0.001
		Hamburg	<0.001
		Jokioinen	<0.001
		Kremsmünster	<0.001
		Okehampton	<0.001
		Porto	<0.001
MACRO 5.5.4	**Spring cereals**	Châteaudun	<0.001

The 80th percentiles of the predicted annual leachate concentrations of boscalid were clearly below 0.1 µg L^{-1} in all tested scenarios and models.

Hence, the leaching of unacceptable amounts of substances following application of boscalid to the various crops defined by the GAP is highly unlikely.

zRMS comments:

The input parameters considered by the Applicant in groundwater modelling for boscalid are in general in line with the currently agreed EU endpoints.

In simulations PUF value of 0 was assumed, in line with recommendations of the most recent version of the FOCUS Groundwater Guidance.

The soil DT_{50} of 130 days was already agreed during zonal evaluations of some formulations belonging to the same Applicant (see e.g. Tessior evaluated in 2020 by zRMS DE or Collis evaluated in 2018 by zRMS FR).

It is, however, noted that in the course of EU evaluation soil DT_{50} of 139 days was used for most groundwater scenarios, while for vulnerable scenarios soil DT_{50} of 212 was considered. Taking this into account the zRMS performed additional simulations using the worst case EU agreed soil DT_{50} of 212 days. All obtained PEC_{GW} values were <0.001 µg/L.

Overall, no unacceptable leaching of boscalid is expected following application of BAS 762 02 F according to the intended use pattern.

Please note that additional groundwater modelling may be required by the concerned Member States that do not accept simulations performed according to FOCUS recommendations.

8.9 Predicted Environmental Concentrations in surface water (PEC_{SW}) (KCP 9.2.5)

8.9.1 Justification for new endpoints

Mefentrifluconazole

EU agreed endpoints were used for $PEC_{sw,sed}$ calculations for mefentrifluconazole and for its metabolites [*EFSA (2018)*].

Boscalid

No deviation from EU endpoints given in the EU Review Report SANCO/3919/2007–rev.5 (2008) [*Review Report (2008)*], the Draft Assessment Report [*Monograph (2002)*] and its Addenda (2006). Degradation in soil were now described by geometric mean, not arithmetic mean as in Monograph (2002).

8.9.2 Active substance(s), relevant metabolite(s) and the formulation (KCP 9.2.5)

Table 8.9-1: Input parameters related to application for $PEC_{sw/sed}$ calculations

Use No.	1-3 ~~3-5, 17~~	1-3 ~~3-5, 17~~	4-6 ~~9~~	7-9 ~~14-15~~
$FOCUS_{sw}$ crop	Winter oilseed rape	Spring oilseed rape	Sunflower [a]	Cereals (winter and spring)
Growth stage [BBCH]	57 - 75	57 - 75	31 - 69	30 - 49
Application rate [g a.s ha^{-1}]	Mefentrifluconazole: 100 Boscalid: 200	Mefentrifluconazole: 100 Boscalid: 200	Mefentrifluconazole: 100 Boscalid: 200	Mefentrifluconazole: 100 Boscalid: 200
Numbers of applications [-] / interval [d]	1 / -	1 / -	2 / 7	1 / -
Application window (relevant for STEP 1 and 2 only)	Mar-May Jun-Sep North and South Europe Full canopy	Mar-May Jun-Sep North and South Europe Full canopy	Mar-May Jun-Sep North and South Europe Average crop cover	Mar-May Jun-Sep North and South Europe Average crop cover
Application method	Ground spray			
CAM (Chemical application method)	Foliar linear			
Soil depth [cm]	4			
Models used for calculation	STEPS 1-2 in FOCUS v3.2 FOCUS SPIN v2.2, FOCUS SWASH v5.3 (FOCUS PRZM v4.3.1, FOCUS MACRO v5.5.4, FOCUS TOXSWA v5.5.3), SWAN v5.0.0 [b]			

[a] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop

~~[b] Step 4 calculations with SWAN were only performed for the active substance mefentrifluconazole and its metabolites M750F005, M750F006, M750F007 and M750F008~~

Table 8.9-2: FOCUS Step 3 Scenario related input parameters for $PEC_{sw/sed}$ calculation

Crop	Scenario	Application window used in modelling	
Winter oilseed rape	D3	11th May	10th Jun
	D4	22th May	21th Jun
	D5	30th Apr	30th May
	R1	19th May	18th Jun
	R3	13th Apr	13th May
Spring oilseed rape	D3	10th Jun	10th Jul
	D4	14th Jun	14th Jul
	D5	20th May	19th Jun
	R1	03th Jun	03th Jul
Sunflower	D3 [a]	10th Jun	17th Jul
	D4 [a]	16th Jun	23rd Jul
	D5	27th May	03th Jul
	R1	25th May	01th Jul
	R3	12th May	18th Jun
	R4	30th Apr	06th Jun
Winter cereals	D3	16th Apr	16th May
	D4	18th Mar	17th Apr
	D5	15th Mar	14th Apr
	R1	24th Apr	24th May
	R3	19th Mar	18th Apr
	R4	24th Jan	23th Feb
Spring cereals	D3	28th Apr	28th May
	D4	18th May	17th Jun
	D5	09th Apr	09th May
	R4	09th Apr	09th May

[a] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop

zRMS comments:

The application pattern assumed in surface water simulations is in line with Central Zone GAP as presented in Table 8.1-1. The uses numbers were corrected in order to comply with information available in area of Section B0.

The application windows presented in Table 8.9-2 were checked by the zRMS using AppDate ver. 3.06 tool and are confirmed to be correct.

Initially, the surface water modelling for uses in sunflower was performed only for scenarios defined for this crop. However, as not all scenarios relevant for the Central Zone are available for sunflower, the Applicant was requested to provide additional simulations performed for maize as surrogate crop. These simulations were submitted by the Applicant and included in the Core Assessment.

Surface water exposure in Central Zone scenarios not defined for spring cereals is considered to be covered by simulations performed for winter cereals.

8.9.2.1 Mefentrifluconazole and its metabolites

Reference:	CP 9.2.5/1
Report	Predicted environmental concentrations of BAS 750 F – mefentrifluconazole and its metabolites in surface water and sediment following application to various crops in Europe, von XXX, M., 2021 report No CALC-2479 2020/2108241 Authority registration No
Guideline(s):	FOCUS (2007): Landscape And Mitigation Factors In Aquatic Risk Assessment. Vol. 1 and 2, FOCUS (2015): Generic guidance for FOCUS surface water scenarios v 1.4, FOCUS Air (2008) SANCO/10553/2006 Rev. 2 June 2008, FOCUS Degradation Kinetics (2006) SANCO/10058/2005 version 1.1 of December 2014, FOCUS Surface Water (2001) SANCO/4802/2001-rev.2 final (May 2003), Guidance document on work-sharing in the Northern Zone (2020) v 9.0, BAES (2020) in Austria, version 04 (January 2020
Deviations:	No
GLP:	No, not relevant for this subject type

Table 8.9-3: Input parameters for mefentrifluconazole and its metabolites for $PEC_{sw/sed}$ calculations

Compound	**Mefen-trifluconazole**	**1,2,4-triazole**	**M750F003**	**M750F005**	**M750F006**	**M750F007**	**M750F008**	**Value in accordance to EU endpoint Reference**
Molecular weight [g mol^{-1}]	397.8	69.1	287.2	379.3	355.8	337.3	355.8	Yes EFSA (2018)
Vapor pressure [Pa] (20°C)	3.2×10^{-6}	-[a]	-[a]	2.3×10^{-09}	4.5×10^{-08}	3.7×10^{-11}	2.7×10^{-13}	Yes EFSA (2018)
Water solubility [mg L^{-1}] (20°C)	0.81	700000	1000 (conservative estimate)	1000 (conservative estimate)	1000 (conservative estimate)	1000 (conservative estimate)	1000 (conservative estimate)	Yes EFSA (2018)
Diffusion coefficient in water [m^2 d^{-1}]	4.3×10^{-5}	-[a]	-[a]	4.3×10^{-5}	4.3×10^{-5}	4.3×10^{-5}	4.3×10^{-5}	Default
Diffusion coefficient in air [m^2 d^{-1}]	0.43	-[a]	-[a]	0.43	0.43	0.43	0.43	Default
$K_{f,oc}$ [mL g^{-1}]	3455.6 (geometric mean; n = 8)	83 (geometric mean; n = 4)	597.6 (QSAR estimate)	7863 (QSAR estimate)	4919 (QSAR estimate)	3938 (QSAR estimate)	17240 (QSAR estimate)	Yes EFSA (2018)
Freundlich exponent 1/n	0.975 (arithmetic mean;	-[a]	-[a]	0.9 (default)	0.9 (default)	0.9 (default)	0.9 (default)	Yes EFSA (2018)

Compound	**Mefen-trifluconazole**	**1,2,4-triazole**	**M750F003**	**M750F005**	**M750F006**	**M750F007**	**M750F008**	**Value in accordance to EU endpoint Reference**
	n = 8)							
Plant Uptake [-]	0	-[a]	-[a]	0	0	0	0	Yes EFSA (2018)
Wash-off factor from crop [1 mm^{-1}]	0.05 (MACRO) 0.50 (PRZM)	-[a]	-[a]	0.05 (MACRO) 0.50 (PRZM)	0.05 (MACRO) 0.50 (PRZM)	0.05 (MACRO) 0.50 (PRZM)	0.05 (MACRO) 0.50 (PRZM)	Default
DT_{50} soil [d]	200 (geometric mean of field trials, normalized, n = 6)	60.5 (geometric mean of field studies, slow phase DFOP, n = 4)	1000 (default)	1000 (default)	1000 (default)	1000 (default)	1000 (default)	Yes EFSA (2018)
DT_{50} water [d]	1000 (default)	1000 (default)	1000 (default)	1000 (default)	1000 (default)	1000 (default)	1000 (default)	Yes EFSA (2018)
DT_{50} sediment [d]	163.4 (geometric mean, whole system level P-1, n = 2)	1000 (default)	1000 (default)	1000 (default)	1000 (default)	1000 (default)	1000 (default)	Yes EFSA (2018)
DT_{50} whole system [d]	163.4 (geometric mean, n = 2	1000 (default)	1000 (default)	1000 (default)	1000 (default)	1000 (default)	1000 (default)	Yes EFSA (2018)
Maximum occurrence observed [%]	-[b]	Soil: 5.1 Total w/s system: 15.1	Soil: 1.8 Total w/s system: 8.5	Soil: 0.001[c] Photolysis study: 32.2	Soil: 0.001[c] Photolysis study: 30.7	Soil: 0.001[c] Photolysis study: 43.9	Soil: 0.001[c] Photolysis study: 7.3	Yes EFSA (2018)
Formation fraction [-]	-[b]	-[a]	-[a]	1 (default)	1 (default)	1 (default)	1 (default)	Yes EFSA (2018)

[a] Not required for Steps 1-2
[b] Not relevant for parent substance
[c] Metabolite not detected in soil, Step1-2 needs value >0

$PEC_{sw/sed}$ of mefentrifluconazole

FOCUS Step 1, 2 and 3

Due to practical considerations, the numerous tables with actual and time-weighted average values are not repeated in the dossier. Please refer for these values to the corresponding PEC report [*BASF DocID 2020/2108241*].

Table 8.9-4: FOCUS Step 1, 2, and 3 PECsw and PECsed for mefentrifluconazole following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	**Period/ Waterbody**	**Max PEC_{sw} [µg L^{-1}][a]**	**Dominant entry route**	**7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]**	**21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]**	**Max PEC_{sed} [µg kg^{-1}][a]**
Step 1						
-	-	6.864 single	-	6.073 single	5.862 single	210.191 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.920 single	-	0.435 single	0.439 single	15.660 single
Southern Europe	Mar-May	0.920 single	-	0.581 single	0.676 single	25.747 single
Southern Europe	Jun-Sep	0.920 single	-	0.508 single	0.558 single	20.703 single
Step 3						
D3	Ditch	0.633 single	Drift	0.129 single	0.044 single	0.510 single
D4	Pond	0.022 single	Drift	0.020 single	0.018 single	0.233 single
D4	Stream	0.532 single	Drift	0.016 single	0.006 single	0.062 single
D5	Pond	0.022 single	Drift	0.021 single	0.019 single	0.175 single
D5	Stream	0.590 single	Drift	0.032 single	0.011 single	0.159 single
R1	Pond	0.044 single	Runoff	0.041 single	0.037 single	0.538 single
R1	Stream	0.417 single	Drift	0.026 single	0.013 single	1.427 single
R3	Stream	0.587 single	Drift	0.041 single	0.022 single	0.954 single

[a] Time as required by ecotox

Table 8.9-5: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for mefentrifluconazole following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	**Period/ Waterbody**	**Max PEC_{sw} [µg L^{-1}][a]**	**Dominant entry route**	**7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]**	**21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]**	**Max PEC_{sed} [µg kg^{-1}][a]**
Step 1						
-	-	6.864 single	-	6.073 single	5.862 single	210.191 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.920 single	-	0.435 single	0.439 single	15.660 single
Southern Europe	Mar-May	0.920 single	-	0.581 single	0.676 single	25.747 single
Southern Europe	Jun-Sep	0.920 single	-	0.508 single	0.558 single	20.703 single
Step 3						
D3	Ditch	0.634 single	Drift	0.145 single	0.050 single	0.560 single
D4	Pond	0.022 single	Drift	0.020 single	0.018 single	0.233 single

D4	Stream	0.546 single	Drift	0.023 single	0.008 single	0.114 single
D5	Pond	0.023 single	Drift	0.021 single	0.019 single	0.179 single
D5	Stream	0.589 single	Drift	0.032 single	0.011 single	0.157 single
R1	Pond	0.076 single	Runoff	0.071 single	0.068 single	1.128 single
R1	Stream	0.418 single	Drift	0.047 single	0.021 single	2.205 single

[a] Time as required by ecotox

Table 8.9-6: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for mefentrifluconazole following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	13.728 multiple	-	12.145 multiple	11.725 multiple	420.381 multiple
Step 2						
Northern Europe	Mar-May / Jun-Sep	1.553 multiple	-	1.435 multiple	1.395 multiple	49.598 multiple
Southern Europe	Mar-May	2.712 multiple	-	2.582 multiple	2.514 multiple	89.461 multiple
Step 3						
D3	Ditch [b]	0.522 single	Drift	0.071 single	0.043 multiple	0.402 multiple
D4	Pond [b]	0.072 multiple	Drainflow	0.067 multiple	0.060 multiple	0.615 multiple
D4	Stream [b]	0.463 single	Drift	0.067 multiple	0.025 multiple	0.246 multiple
D5	Pond	0.033 multiple	Drift	0.031 multiple	0.028 multiple	0.340 multiple
D5	Stream	0.468 single	Drift	0.013 multiple	0.006 multiple	0.075 multiple
R1	Pond	0.151 multiple	Runoff	0.145 multiple	0.137 multiple	2.494 multiple
R1	Stream	0.574 multiple	Runoff	0.101 multiple	0.052 multiple	3.247 multiple
R3	Stream	0.508 single	Drift	0.092 multiple	0.052 multiple	3.250 multiple
R4	Stream	0.648 multiple	Runoff	0.138 multiple	0.075 multiple	2.045 multiple

[a] Time as required by ecotox
[b] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.9-7: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for mefentrifluconazole following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	6.864 single	-	6.073 single	5.862 single	210.191 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	1.166 single	-	1.094 single	1.064 single	37.851 single
Southern Europe	Mar-May	2.104 single	-	2.023 single	1.970 single	70.127 single
Step 3						

D3	Ditch	0.632 single	Drift	0.091 single	0.031 single	0.390 single
D4	Pond	0.034 single	Drainage	0.031 single	0.028 single	0.302 single
D4	Stream	0.467 single	Drift	0.032 single	0.012 single	0.116 single
D5	Pond	0.023 single	Drift	0.021 single	0.019 single	0.193 single
D5	Stream	0.504 single	Drift	0.004 single	0.002 single	0.019 single
R1	Pond	0.044 single	Runoff	0.042 single	0.039 single	0.598 single
R1	Stream	0.416 single	Drift	0.029 single	0.018 single	0.707 single
R3	Stream	0.585 single	Drift	0.036 single	0.018 single	0.895 single
R4	Stream	0.418 single	Drift	0.063 single	0.022 single	0.929 single

[a] Time as required by ecotox

Table 8.9-8: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for mefentrifluconazole following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	6.864 single	-	6.073 single	5.862 single	210.191 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	1.166 single	-	1.094 single	1.064 single	37.851 single
Southern Europe	Mar-May	2.104 single	-	2.023 single	1.970 single	70.127 single
Step 3						
D3	Ditch	0.632 single	Drift	0.102 single	0.035 single	0.427 single
D4	Pond	0.035 single	Drainage	0.032 single	0.029 single	0.325 single
D4	Stream	0.517 single	Drift	0.032 single	0.012 single	0.116 single
D5	Pond	0.023 single	Drift	0.021 single	0.019 single	0.195 single
D5	Stream	0.531 single	Drift	0.004 single	0.002 single	0.024 single
R4	Stream	0.418 single	Drift	0.119 single	0.056 single	1.462 single

[a] Time as required by ecotox

~~FOCUS Step 4~~

~~**Table 8.9-9: FOCUS Step 4 global maximum PEC_{sw} values for mefentrifluconazole following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})**~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~0.633 single~~	~~0.172 single~~	–
~~None~~	~~D4 pond~~	~~0.022 single~~	~~0.019 single~~	–
~~None~~	~~D4 stream~~	~~0.532 single~~	~~0.195 single~~	–
~~None~~	~~D5 pond~~	~~0.022 single~~	~~0.019 single~~	–
~~None~~	~~D5 stream~~	~~0.590 single~~	~~0.215 single~~	–
~~None~~	~~R1 pond~~	~~0.044 single~~	~~0.042 single~~	~~0.022 single~~
~~None~~	~~R1 stream~~	~~0.417 single~~	~~0.222 single~~	~~0.101 single~~
~~None~~	~~R3 stream~~	~~0.587 single~~	~~0.264 single~~	~~0.120 single~~

~~**Table 8.9-10: FOCUS Step 4 global maximum PEC_{sw} values for mefentrifluconazole following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})**~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~0.634 single~~	~~0.172 single~~	–
~~None~~	~~D4 pond~~	~~0.022 single~~	~~0.020 single~~	–
~~None~~	~~D4 stream~~	~~0.546 single~~	~~0.200 single~~	–
~~None~~	~~D5 pond~~	~~0.023 single~~	~~0.020 single~~	–
~~None~~	~~D5 stream~~	~~0.589 single~~	~~0.215 single~~	–
~~None~~	~~R1 pond~~	~~0.076 single~~	~~0.074 single~~	~~0.034 single~~
~~None~~	~~R1 stream~~	~~0.418 single~~	~~0.252 single~~	~~0.115 single~~

~~**Table 8.9-11: FOCUS Step 4 global maximum PEC_{sw} values for mefentrifluconazole following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)**~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~ [a]	~~0.522 single~~	~~0.171 Single~~	–
~~None~~	~~D4 pond~~ [a]	~~0.072 multiple~~	~~0.072 multiple~~	–
~~None~~	~~D4 stream~~ [a]	~~0.463 single~~	~~0.259 multiple~~	–
~~None~~	~~D5 pond~~	~~0.033~~	~~0.029~~	–

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
		~~multiple~~	~~multiple~~	
~~None~~	~~D5 stream~~	~~0.468 single~~	~~0.197 single~~	–
~~None~~	~~R1 pond~~	~~0.151 multiple~~	~~0.151 multiple~~	~~0.064 multiple~~
~~None~~	~~R1 stream~~	~~0.574 multiple~~	~~0.574 multiple~~	~~0.261 multiple~~
~~None~~	~~R3 stream~~	~~0.508 single~~	~~0.483 multiple~~	~~0.220 multiple~~
~~None~~	~~R4 stream~~	~~0.648 multiple~~	~~0.648 multiple~~	~~0.295 multiple~~

~~[a] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop~~

~~Table 8.9-12: FOCUS Step 4 global maximum PEC$_{sw}$ values for mefentrifluconazole following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})~~

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~0.632 single~~	~~0.171 single~~	–
~~None~~	~~D4 pond~~	~~0.034 single~~	~~0.034 single~~	–
~~None~~	~~D4 stream~~	~~0.467 single~~	~~0.171 single~~	–
~~None~~	~~D5 pond~~	~~0.023 single~~	~~0.021 single~~	–
~~None~~	~~D5 stream~~	~~0.504 single~~	~~0.184 single~~	–
~~None~~	~~R1 pond~~	~~0.044 single~~	~~0.043 single~~	~~0.020 single~~
~~None~~	~~R1 stream~~	~~0.416 single~~	~~0.224 single~~	~~0.102 single~~
~~None~~	~~R3 stream~~	~~0.585 single~~	~~0.255 single~~	~~0.116 single~~
~~None~~	~~R4 stream~~	~~0.418 single~~	~~0.380 single~~	~~0.173 single~~

~~Table 8.9-13: FOCUS Step 4 global maximum PEC$_{sw}$ values for mefentrifluconazole following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})~~

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~0.632 single~~	~~0.171 single~~	–
~~None~~	~~D4 pond~~	~~0.035 single~~	~~0.034 single~~	–
~~None~~	~~D4 stream~~	~~0.517 single~~	~~0.189 single~~	–
~~None~~	~~D5 pond~~	~~0.023 single~~	~~0.020 single~~	–
~~None~~	~~D5 stream~~	~~0.531 single~~	~~0.194 single~~	–
~~None~~	~~R4 stream~~	~~0.418 single~~	~~0.363 single~~	~~0.165 single~~

$PEC_{sw/sed}$ of the metabolites of mefentrifluconazole

FOCUS Step 1 and 2

1,2,4-triazole

Table 8.9-14: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for 1,2,4-triazole following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.077 single	-	1.072 single	1.067 single	0.892 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.074 single	-	0.073 single	0.073 single	0.061 single
Southern Europe	Mar-May	0.125 single	-	0.124 single	0.124 single	0.103 single

[a] Time as required by ecotox

Table 8.9-15: FOCUS Step 1 and 2 PECsw and PECsed for 1,2,4-triazole following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.077 single	-	1.072 single	1.067 single	0.892 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.074 single	-	0.073 single	0.073 single	0.061 single
Southern Europe	Mar-May	0.125 single	-	0.124 single	0.124 single	0.103 single

[a] Time as required by ecotox

Table 8.9-16: FOCUS Step 1 and 2 PECsw and PECsed for 1,2,4-triazole following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha-1, with application interval of 7 days)

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	2.154 multiple	-	2.145 multiple	2.134 multiple	1.783 multiple
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.242 multiple	-	0.240 multiple	0.239 multiple	0.199 multiple
Southern Europe	Mar-May	0.444 multiple	-	0.442 multiple	0.440 multiple	0.367 multiple

[a] Time as required by ecotox

Table 8.9-17: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for 1,2,4-triazole following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.077 single	-	1.072 single	1.067 single	0.892 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.187 single	-	0.186 single	0.185 single	0.155 single
Southern Europe	Mar-May	0.352 single	-	0.351 single	0.349 single	0.291 single

[a] Time as required by ecotox

Table 8.9-18: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for 1,2,4-triazole following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.077 single	-	1.072 single	1.067 single	0.892 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.187 single	-	0.186 single	0.185 single	0.155 single
Southern Europe	Mar-May	0.352 single	-	0.351 single	0.349 single	0.291 single

[a] Time as required by ecotox

M750F003

Table 8.9-19: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for M750F003 following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.436 single	-	1.409 single	1.401 single	8.429 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.105 single	-	0.100 single	0.099 single	0.594 single
Southern Europe	Mar-May	0.173 single	-	0.168 single	0.167 single	1.002 single

[a] Time as required by ecotox

Table 8.9-20: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for M750F003 following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.436 single	-	1.409 single	1.401 single	8.429 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.105 single	-	0.100 single	0.099 single	0.594 single
Southern Europe	Mar-May	0.173 single	-	0.168 single	0.167 single	1.002 single

[a] Time as required by ecotox

Table 8.9-21: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for M750F003 following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	2.871 multiple	-	2.818 multiple	2.802 multiple	16.858 multiple
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.335 multiple	-	0.325 multiple	0.323 multiple	1.942 multiple
Southern Europe	Mar-May	0.604 multiple	-	0.594 multiple	0.591 multiple	3.554 multiple

[a] Time as required by ecotox

Table 8.9-22: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for M750F003 following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.436 single	-	1.409 single	1.401 single	8.429 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.255 single	-	0.249 single	0.248 single	1.490 single
Southern Europe	Mar-May	0.473 single	-	0.467 single	0.464 single	2.793 single

[a] Time as required by ecotox

Table 8.9-23: FOCUS Step 1 and 2 PEC_{sw} and PEC_{sed} for M750F003 following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.436 single	-	1.409 single	1.401 single	8.429 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.255 single	-	0.249 single	0.248 single	1.490 single
Southern Europe	Mar-May	0.473 single	-	0.467 single	0.464 single	2.793 single

[a] Time as required by ecotox

FOCUS Step 1, 2 and 3

M750F005

Table 8.9-24: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F005 following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.174 single	-	0.932 single	0.915 single	71.958 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.282 single	-	0.086 single	0.074 single	5.380 single
Southern Europe	Mar-May	0.282 single	-	0.108 single	0.111 single	8.833 single
Southern Europe	Jun-Sep	0.282 single	-	0.097 single	0.092 single	7.106 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.034 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.078 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.004 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.101 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.008 single
R1	Pond	0.001 single	-	0.001 single	0.001 single	0.188 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.425 single
R3	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.315 single

[a] Time as required by ecotox

Table 8.9-25: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F005 following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.174 single	-	0.932 single	0.915 single	71.958 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.282 single	-	0.086 single	0.074 single	5.380 single
Southern Europe	Mar-May	0.282 single	-	0.108 single	0.111 single	8.833 single
Southern Europe	Jun-Sep	0.282 single	-	0.097 single	0.092 single	7.106 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.036 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.066 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.006 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.102 single

D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.008 single
R1	Pond	0.002 single	-	0.002 single	0.002 single	0.391 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.628 single

[a] Time as required by ecotox

Table 8.9-26: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F005 following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	2.347 multiple	-	1.864 multiple	1.831 multiple	143.916 multiple
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.282 single	-	0.171 multiple	0.201 multiple	17.044 multiple
Southern Europe	Mar-May	0.411 multiple	-	0.391 multiple	0.388 multiple	30.691 multiple
Step 3						
D3[b]	Ditch	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.030 multiple
D4[b]	Pond	0.001 multiple	-	0.001 multiple	0.001 multiple	0.129 multiple
D4[b]	Stream	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.010 multiple
D5	Pond	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.172 multiple
D5	Stream	<0.001 single	-	<0.001 multiple	<0.001 multiple	0.006 multiple
R1	Pond	0.003 multiple	-	0.003 multiple	0.003 multiple	0.528 multiple
R1	Stream	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.831 multiple
R3	Stream	0.002 multiple	-	<0.001 multiple	<0.001 multiple	1.213 multiple
R4	Stream	0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.841 multiple

[a] Time as required by ecotox
[b] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.9-27: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F005 following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.174 single	-	0.932 single	0.915 single	71.958 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.282 single	-	0.135 single	0.154 single	12.977 single
Southern Europe	Mar-May	0.319 single	-	0.306 single	0.304 single	24.027 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.023 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.092 single

D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.004 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.118 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.002 single
R1	Pond	0.001 single	-	0.001 single	0.001 single	0.230 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.214 single
R3	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.308 single
R4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.260 single

[a] Time as required by ecotox

Table 8.9-28: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F005 following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.174 single	-	0.932 single	0.915 single	71.958 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.282 single	-	0.135 single	0.154 single	12.977 single
Southern Europe	Mar-May	0.319 single	-	0.306 single	0.304 single	24.027 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.026 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.087 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.005 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.116 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.002 single
R4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.456 single

[a] Time as required by ecotox

M750F006

Table 8.9-29: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F006 following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.464 single	-	1.257 single	1.241 single	61.168 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.253 single	-	0.098 single	0.094 single	4.573 single
Southern Europe	Mar-May	0.253 single	-	0.128 single	0.144 single	7.508 single
Southern Europe	Jun-Sep	0.253 single	-	0.113 single	0.119 single	6.041 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.029 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.068 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.003 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.088 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.007 single
R1	Pond	0.001 single	-	0.001 single	0.001 single	0.163 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.381 single
R3	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.281 single

[a] Time as required by ecotox

Table 8.9-30: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F006 following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.464 single	-	1.257 single	1.241 single	61.168 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.253 single	-	0.098 single	0.094 single	4.573 single
Southern Europe	Mar-May	0.253 single	-	0.128 single	0.144 single	7.508 single
Southern Europe	Jun-Sep	0.253 single	-	0.113 single	0.119 single	6.041 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.031 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.058 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.005 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.089 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.007 single
R1	Pond	0.002 single	-	0.002 single	0.002 single	0.341 single

R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.559 single

[a] Time as required by ecotox

Table 8.9-31: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F006 following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	2.927 multiple	-	2.514 multiple	2.481 multiple	122.336 multiple
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.320 multiple	-	0.296 multiple	0.293 multiple	14.488 multiple
Southern Europe	Mar-May	0.556 multiple	-	0.531 multiple	0.528 multiple	26.088 multiple
Step 3						
D3 [b]	Ditch	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.026 multiple
D4 [b]	Pond	0.001 multiple	-	0.001 multiple	0.001 multiple	0.113 multiple
D4 [b]	Stream	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.009 multiple
D5	Pond	0.001 multiple	-	0.001 multiple	0.001 multiple	0.149 multiple
D5	Stream	<0.001 single	-	<0.001 multiple	<0.001 multiple	0.005 multiple
R1	Pond	0.004 multiple	-	0.004 multiple	0.004 multiple	0.457 multiple
R1	Stream	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.745 multiple
R3	Stream	0.002 multiple	-	<0.001 multiple	<0.001 multiple	1.080 multiple
R4	Stream	0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.743 multiple

[a] Time as required by ecotox
[b] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.9-32: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F006 following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.464 single	-	1.257 single	1.241 single	61.168 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.253 single	-	0.164 single	0.203 single	11.031 single
Southern Europe	Mar-May	0.431 single	-	0.416 single	0.413 single	20.424 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.020 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.081 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.003 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.103 single

D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.002 single
R1	Pond	0.002 single	-	0.002 single	0.002 single	0.199 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.191 single
R3	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.275 single
R4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.236 single

[a] Time as required by ecotox

Table 8.9-33: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F006 following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	1.464 single	-	1.257 single	1.241 single	61.168 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.253 single	-	0.164 single	0.203 single	11.031 single
Southern Europe	Mar-May	0.431 single	-	0.416 single	0.413 single	20.424 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.023 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.076 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.004 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.102 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.002 single
R4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.407 single

[a] Time as required by ecotox

M750F007

Table 8.9-34: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F007 following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	2.327 single	-	2.055 single	2.032 single	80.274 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.342 single	-	0.151 single	0.151 single	6.001 single
Southern Europe	Mar-May	0.342 single	-	0.200 single	0.232 single	9.854 single
Southern Europe	Jun-Sep	0.342 single	-	0.175 single	0.192 single	7.928 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.027 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.062 single

D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.003 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.080 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.006 single
R1	Pond	0.001 single	-	0.001 single	0.001 single	0.149 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.352 single
R3	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.261 single

[a] Time as required by ecotox

Table 8.9-35: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F007 following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	2.327 single	-	2.055 single	2.032 single	80.274 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.342 single	-	0.151 single	0.151 single	6.001 single
Southern Europe	Mar-May	0.342 single	-	0.200 single	0.232 single	9.854 single
Southern Europe	Jun-Sep	0.342 single	-	0.175 single	0.192 single	7.928 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.028 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.052 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.005 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.081 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.006 single
R1	Pond	0.002 single	-	0.002 single	0.002 single	0.311 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.514 single

[a] Time as required by ecotox

Table 8.9-36: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F007 following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	4.655 multiple	-	4.111 multiple	4.064 multiple	160.547 multiple
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.522 multiple	-	0.485 multiple	0.481 multiple	19.013 multiple
Southern Europe	Mar-May	0.909 multiple	-	0.871 multiple	0.865 multiple	34.237 multiple
Step 3						
D3 [b]	Ditch	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.024 multiple

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
D4 [b]	Pond	0.001 multiple	-	0.001 multiple	0.001 multiple	0.102 multiple
D4 [b]	Stream	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.008 multiple
D5	Pond	0.001 multiple	-	0.001 multiple	0.001 multiple	0.136 multiple
D5	Stream	<0.001 single	-	<0.001 multiple	<0.001 multiple	0.005 multiple
R1	Pond	0.004 multiple	-	0.004 multiple	0.004 multiple	0.415 multiple
R1	Stream	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.688 multiple
R3	Stream	0.002 multiple	-	<0.001 multiple	<0.001 multiple	0.992 multiple
R4	Stream	0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.681 multiple

[a] Time as required by ecotox
[b] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.9-37: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F007 following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	2.327 single	-	2.055 single	2.032 single	80.274 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.391 single	-	0.369 single	0.366 single	14.476 single
Southern Europe	Mar-May	0.704 single	-	0.681 single	0.677 single	26.803 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.018 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.073 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.003 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.094 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.001 single
R1	Pond	0.002 single	-	0.002 single	0.002 single	0.181 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.176 single
R3	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.253 single
R4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.219 single

[a] Time as required by ecotox

Table 8.9-38: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F007 following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}]^a	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}]^a	21 d - $PEC_{sw,twa}$ [µg L^{-1}]^a	Max PEC_{sed} [µg kg^{-1}]^a
Step 1						
-	-	2.327 single	-	2.055 single	2.032 single	80.274 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.391 single	-	0.369 single	0.366 single	14.476 single
Southern Europe	Mar-May	0.704 single	-	0.681 single	0.677 single	26.803 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.021 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.069 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.004 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.093 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.002 single
R4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.374 single

[a] Time as required by ecotox

M750F008

Table 8.9-39: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F008 following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}]^a	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}]^a	21 d - $PEC_{sw,twa}$ [µg L^{-1}]^a	Max PEC_{sed} [µg kg^{-1}]^a
Step 1						
-	-	0.151 single	-	0.097 single	0.094 single	16.065 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.060 single	-	0.013 single	0.009 single	1.201 single
Southern Europe	Mar-May	0.060 single	-	0.016 single	0.013 single	1.972 single
Southern Europe	Jun-Sep	0.060 single	-	0.014 single	0.011 single	1.587 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.035 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.081 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.004 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.104 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.009 single
R1	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.195 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.418 single
R3	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.312 single

[a] Time as required by ecotox

Table 8.9-40: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F008 following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	0.151 single	-	0.097 single	0.094 single	16.065 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.060 single	-	0.013 single	0.009 single	1.201 single
Southern Europe	Mar-May	0.060 single	-	0.016 single	0.013 single	1.972 single
Southern Europe	Jun-Sep	0.060 single	-	0.014 single	0.011 single	1.587 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.039 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.068 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.007 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.105 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.009 single
R1	Pond	0.001 single	-	0.001 single	0.001 single	0.402 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.622 single

[a] Time as required by ecotox

Table 8.9-41: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F008 following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	0.302 multiple	-	0.194 multiple	0.188 multiple	32.130 multiple
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.060 single	-	0.021 multiple	0.022 multiple	3.805 multiple
Southern Europe	Mar-May	0.060 single	-	0.030 multiple	0.036 multiple	6.852 multiple
Southern Europe	Jun-Sep	0.060 single	-	0.026 multiple	0.029 multiple	5.328 multiple
Step 3						
D3 [b]	Ditch	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.033 multiple
D4 [b]	Pond	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.133 multiple
D4 [b]	Stream	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.011 multiple
D5	Pond	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.177 multiple
D5	Stream	<0.001 single	-	<0.001 multiple	<0.001 multiple	0.006 multiple
R1	Pond	0.002 multiple	-	0.002 multiple	0.002 multiple	0.549 multiple
R1	Stream	<0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.818 multiple

R3	Stream	0.002 multiple	-	<0.001 multiple	<0.001 multiple	1.206 multiple
R4	Stream	0.001 multiple	-	<0.001 multiple	<0.001 multiple	0.847 multiple

[a] Time as required by ecotox
[b] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.9-42: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for M750F008 following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	0.151 single	-	0.097 single	0.094 single	16.065 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.060 single	-	0.018 single	0.017 single	2.897 single
Southern Europe	Mar-May	0.060 single	-	0.025 single	0.029 single	5.364 single
Southern Europe	Jun-Sep	0.060 single	-	0.022 single	0.023 single	4.131 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.024 single
D4	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.094 single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.004 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.121 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.002 single
R1	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.238 single
R1	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.212 single
R3	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.305 single
R4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.254 single

[a] Time as required by ecotox

Table 8.9-43: FOCUS Step 1, 2, and 3 PECsw and PECsed for M750F008 following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	0.151 single	-	0.097 single	0.094 single	16.065 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	0.060 single	-	0.018 single	0.017 single	2.897 single
Southern Europe	Mar-May	0.060 single	-	0.025 single	0.029 single	5.364 single
Southern Europe	Jun-Sep	0.060 single	-	0.022 single	0.023 single	4.131 single
Step 3						
D3	Ditch	<0.001 single	-	<0.001 single	<0.001 single	0.028 single
D4	Pond	<0.001	-	<0.001	<0.001	0.090

		single		single	single	single
D4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.005 single
D5	Pond	<0.001 single	-	<0.001 single	<0.001 single	0.120 single
D5	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.002 single
R4	Stream	<0.001 single	-	<0.001 single	<0.001 single	0.452 single

[a] Time as required by ecotox

~~FOCUS Step 4~~

~~M750F005~~

~~Table 8.9-44: FOCUS Step 4 global maximum PEC_{sw} values for M750F005 following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R1 pond~~	~~0.001 single~~	~~0.001 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R3 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~Table 8.9-45: FOCUS Step 4 global maximum PEC_{sw} values for M750F005 following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R1 pond~~	~~0.002 single~~	~~0.002 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~**Table 8.9-46: FOCUS Step 4 global maximum PEC$_{sw}$ values for M750F005 following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)**~~

~~**Step 4**~~	~~**Scenario**~~	~~**PEC$_{sw}$ [µg L^{-1}]**~~		
~~**Nozzle reduction**~~	~~**Vegetative strip (m)**~~	~~**None**~~	~~**None**~~	~~**10**~~
	~~**No spray buffer (m)**~~	~~**Default**~~	~~**5**~~	~~**10**~~
~~None~~	~~D3 ditch [a]~~	~~<0.001 multiple~~	~~<0.001 multiple~~	–
~~None~~	~~D4 pond [a]~~	~~0.001 multiple~~	~~0.001 multiple~~	–
~~None~~	~~D4 stream [a]~~	~~<0.001 multiple~~	~~<0.001 multiple~~	–
~~None~~	~~D5 pond~~	~~<0.001 multiple~~	~~<0.001 multiple~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 multiple~~	–
~~None~~	~~R1 pond~~	~~0.003 multiple~~	~~0.003 multiple~~	~~0.001 multiple~~
~~None~~	~~R1 stream~~	~~<0.001 multiple~~	~~<0.001 multiple~~	~~<0.001 multiple~~
~~None~~	~~R3 stream~~	~~0.002 multiple~~	~~0.002 multiple~~	~~<0.001 multiple~~
~~None~~	~~R4 stream~~	~~0.001 multiple~~	~~0.001 multiple~~	~~<0.001 multiple~~

~~[a] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop~~

~~**Table 8.9-47: FOCUS Step 4 global maximum PEC$_{sw}$ values for M750F005 following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})**~~

~~**Step 4**~~	~~**Scenario**~~	~~**PEC$_{sw}$ [µg L^{-1}]**~~		
~~**Nozzle reduction**~~	~~**Vegetative strip (m)**~~	~~**None**~~	~~**None**~~	~~**10**~~
	~~**No spray buffer (m)**~~	~~**Default**~~	~~**5**~~	~~**10**~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R1 pond~~	~~0.001 single~~	~~0.001 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R3 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~**Table 8.9-48: FOCUS Step 4 global maximum PEC_{sw} values for M750F005 following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})**~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~**M750F006**~~

~~**Table 8.9-49: FOCUS Step 4 global maximum PEC_{sw} values for M750F006 following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})**~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R1 pond~~	~~0.001 single~~	~~0.001 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R3 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~**Table 8.9-50: FOCUS Step 4 global maximum PEC_{sw} values for M750F006 following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})**~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001~~	~~<0.001~~	–

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
		~~single~~	~~single~~	
~~None~~	~~R1 pond~~	~~0.002 single~~	~~0.002 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~**Table 8.9-51: FOCUS Step 4 global maximum PEC$_{sw}$ values for M750F006 following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)**~~

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch [a]~~	~~<0.001 multiple~~	~~<0.001 multiple~~	~~–~~
~~None~~	~~D4 pond [a]~~	~~0.001 multiple~~	~~0.001 multiple~~	~~–~~
~~None~~	~~D4 stream [a]~~	~~<0.001 multiple~~	~~<0.001 multiple~~	~~–~~
~~None~~	~~D5 pond~~	~~0.001 multiple~~	~~0.001 multiple~~	~~–~~
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 multiple~~	~~–~~
~~None~~	~~R1 pond~~	~~0.004 multiple~~	~~0.004 multiple~~	~~0.002 multiple~~
~~None~~	~~R1 stream~~	~~<0.001 multiple~~	~~<0.001 multiple~~	~~<0.001 multiple~~
~~None~~	~~R3 stream~~	~~0.002 multiple~~	~~0.002 multiple~~	~~<0.001 multiple~~
~~None~~	~~R4 stream~~	~~0.001 multiple~~	~~0.001 multiple~~	~~<0.001 multiple~~

~~[a] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop~~

~~**Table 8.9-52: FOCUS Step 4 global maximum PEC$_{sw}$ values for M750F006 following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})**~~

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	~~–~~
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	~~–~~
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~–~~
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	~~–~~
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~–~~
~~None~~	~~R1 pond~~	~~0.002 single~~	~~0.001 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R3 stream~~	~~<0.001~~	~~<0.001~~	~~<0.001~~

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
		~~single~~	~~single~~	~~single~~
~~None~~	~~R4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~Table 8.9-53: FOCUS Step 4 global maximum PEC$_{sw}$ values for M750F006 following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})~~

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~M750F007~~

~~Table 8.9-54: FOCUS Step 4 global maximum PEC$_{sw}$ values for M750F007 following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})~~

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D2 ditch~~	~~0.012 single~~	~~0.007 single~~	–
~~None~~	~~D2 stream~~	~~0.008 single~~	~~0.006 single~~	–
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R1 pond~~	~~0.001 single~~	~~0.001 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R3 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~**Table 8.9-55: FOCUS Step 4 global maximum PEC_{sw} values for M750F007 following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})**~~

~~**Step 4**~~	~~**Scenario**~~	~~**PEC_{sw} [µg L^{-1}]**~~		
~~**Nozzle reduction**~~	~~**Vegetative strip (m)**~~	~~**None**~~	~~**None**~~	~~**10**~~
	~~**No spray buffer (m)**~~	~~**Default**~~	~~**5**~~	~~**10**~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R1 pond~~	~~0.002 single~~	~~0.002 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~**Table 8.9-56: FOCUS Step 4 global maximum PEC_{sw} values for M750F007 following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)**~~

~~**Step 4**~~	~~**Scenario**~~	~~**PEC_{sw} [µg L^{-1}]**~~		
~~**Nozzle reduction**~~	~~**Vegetative strip (m)**~~	~~**None**~~	~~**None**~~	~~**10**~~
	~~**No spray buffer (m)**~~	~~**Default**~~	~~**5**~~	~~**10**~~
~~None~~	~~D3 ditch [a]~~	~~<0.001 multiple~~	~~<0.001 multiple~~	–
~~None~~	~~D4 pond [a]~~	~~0.001 multiple~~	~~0.001 multiple~~	–
~~None~~	~~D4 stream [a]~~	~~<0.001 multiple~~	~~<0.001 multiple~~	–
~~None~~	~~D5 pond~~	~~0.001 multiple~~	~~0.001 multiple~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 multiple~~	–
~~None~~	~~R1 pond~~	~~0.004 multiple~~	~~0.004 multiple~~	~~0.002 multiple~~
~~None~~	~~R1 stream~~	~~<0.001 multiple~~	~~<0.001 multiple~~	~~<0.001 multiple~~
~~None~~	~~R3 stream~~	~~0.002 multiple~~	~~0.002 multiple~~	~~<0.001 multiple~~
~~None~~	~~R4 stream~~	~~0.001 multiple~~	~~0.001 multiple~~	~~<0.001 multiple~~

~~[a] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop~~

~~**Table 8.9-57: FOCUS Step 4 global maximum PECsw values for M750F007 following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha-1)**~~

~~**Step 4**~~	~~**Scenario**~~	~~**PEC_{sw} [µg L^{-1}]**~~		
~~**Nozzle reduction**~~	~~**Vegetative strip (m)**~~	~~**None**~~	~~**None**~~	~~**10**~~
	~~**No spray buffer (m)**~~	~~**Default**~~	~~**5**~~	~~**10**~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R1 pond~~	~~0.002 single~~	~~0.002 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R3 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~Table 8.9-58: FOCUS Step 4 global maximum PEC$_{sw}$ values for M750F007 following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})~~

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~M750F008~~

~~Table 8.9-59: FOCUS Step 4 global maximum PEC$_{sw}$ values for M750F008 following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})~~

~~Step 4~~	~~Scenario~~	~~PEC$_{sw}$ [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	–
~~None~~	~~R1 pond~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001~~	~~<0.001~~	~~<0.001~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
		~~single~~	~~single~~	~~single~~
~~None~~	~~R3 stream~~	~~<0.001~~ ~~single~~	~~<0.001~~ ~~single~~	~~<0.001~~ ~~single~~

~~Table 8.9-60: FOCUS Step 4 global maximum PEC_{sw} values for M750F008 following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 100 g a.s. ha^{-1})~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch~~	~~<0.001~~ ~~single~~	~~<0.001~~ ~~single~~	~~–~~
~~None~~	~~D4 pond~~	~~<0.001~~ ~~single~~	~~<0.001~~ ~~single~~	~~–~~
~~None~~	~~D4 stream~~	~~<0.001~~ ~~single~~	~~<0.001~~ ~~single~~	~~–~~
~~None~~	~~D5 pond~~	~~<0.001~~ ~~single~~	~~<0.001~~ ~~single~~	~~–~~
~~None~~	~~D5 stream~~	~~<0.001~~ ~~single~~	~~<0.001~~ ~~single~~	~~–~~
~~None~~	~~R1 pond~~	~~0.001~~ ~~single~~	~~0.001~~ ~~single~~	~~<0.001~~ ~~single~~
~~None~~	~~R1 stream~~	~~<0.001~~ ~~single~~	~~<0.001~~ ~~single~~	~~<0.001~~ ~~single~~

~~Table 8.9-61: FOCUS Step 4 global maximum PEC_{sw} values for M750F008 following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 100 g a.s. ha^{-1}, with application interval of 7 days)~~

~~Step 4~~	~~Scenario~~	~~PEC_{sw} [µg L^{-1}]~~		
~~Nozzle reduction~~	~~Vegetative strip (m)~~	~~None~~	~~None~~	~~10~~
	~~No spray buffer (m)~~	~~Default~~	~~5~~	~~10~~
~~None~~	~~D3 ditch [a]~~	~~<0.001~~ ~~multiple~~	~~<0.001~~ ~~multiple~~	~~–~~
~~None~~	~~D4 pond [a]~~	~~<0.001~~ ~~multiple~~	~~<0.001~~ ~~multiple~~	~~–~~
~~None~~	~~D4 stream [a]~~	~~<0.001~~ ~~multiple~~	~~<0.001~~ ~~multiple~~	~~–~~
~~None~~	~~D5 pond~~	~~<0.001~~ ~~multiple~~	~~<0.001~~ ~~multiple~~	~~–~~
~~None~~	~~D5 stream~~	~~<0.001~~ ~~single~~	~~<0.001~~ ~~multiple~~	~~–~~
~~None~~	~~R1 pond~~	~~0.002~~ ~~multiple~~	~~0.002~~ ~~multiple~~	~~<0.001~~ ~~multiple~~
~~None~~	~~R1 stream~~	~~<0.001~~ ~~multiple~~	~~<0.001~~ ~~multiple~~	~~<0.001~~ ~~multiple~~
~~None~~	~~R3 stream~~	~~0.002~~ ~~multiple~~	~~0.002~~ ~~multiple~~	~~<0.001~~ ~~multiple~~
~~None~~	~~R4 stream~~	~~0.001~~ ~~multiple~~	~~0.001~~ ~~multiple~~	~~<0.001~~ ~~multiple~~

~~[a] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop~~

~~**Table 8.9-62: FOCUS Step 4 global maximum PEC_{sw} values for M750F008 following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})**~~

~~**Step 4**~~	~~**Scenario**~~	~~**PEC_{sw} [µg L^{-1}]**~~		
~~**Nozzle reduction**~~	~~**Vegetative strip (m)**~~	~~**None**~~	~~**None**~~	~~**10**~~
	~~**No spray buffer (m)**~~	~~**Default**~~	~~**5**~~	~~**10**~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	~~-~~
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	~~-~~
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~-~~
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	~~-~~
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~-~~
~~None~~	~~R1 pond~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R1 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R3 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~
~~None~~	~~R4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

~~**Table 8.9-63: FOCUS Step 4 global maximum PEC_{sw} values for M750F008 following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 100 g a.s. ha^{-1})**~~

~~**Step 4**~~	~~**Scenario**~~	~~**PEC_{sw} [µg L^{-1}]**~~		
~~**Nozzle reduction**~~	~~**Vegetative strip (m)**~~	~~**None**~~	~~**None**~~	~~**10**~~
	~~**No spray buffer (m)**~~	~~**Default**~~	~~**5**~~	~~**10**~~
~~None~~	~~D3 ditch~~	~~<0.001 single~~	~~<0.001 single~~	~~-~~
~~None~~	~~D4 pond~~	~~<0.001 single~~	~~<0.001 single~~	~~-~~
~~None~~	~~D4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~-~~
~~None~~	~~D5 pond~~	~~<0.001 single~~	~~<0.001 single~~	~~-~~
~~None~~	~~D5 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~-~~
~~None~~	~~R4 stream~~	~~<0.001 single~~	~~<0.001 single~~	~~<0.001 single~~

zRMS comments:

The input parameters presented in Table 8.9-3 and considered by the Applicant in surface water modelling for mefentrifluconazole and its metabolite are fully in line with the EU agreed endpoints.

At Step 3, PUF value of 0 was assumed in simulations, in line with current recommendations.

The calculations performed at Steps 1-3 for the parent and Steps 1-2 for metabolites were independently validated by the zRMS in additional modelling using the same input parameters. Obtained PEC_{SW} and PEC_{SED} were in good agreement with values calculated by the Applicant.

Following the commenting period the results of Step 3 simulations performed for metabolites M750F005, M750F006, M750F007 and M750F008 were restored in Tables 8.9-24 to 8.9-43 as being necessary for finalisation of the aquatic risk assessment for these compounds. Independent validation performed by the zRMS in additional simulations resulted with the same values as these reported by the Applicant which may be thus used for the risk assessment purposes.

Calculations performed at Step 4 for the parent and ~~Step 3-4 for~~ metabolites were not validated by the zRMS as being not necessary for purposes of the aquatic risk assessment (according to information available in area of ecotox section, for mefentrifluconazole and its metabolites acceptable risk could be concluded with Step 1-3 $PEC_{SW/SED}$ ~~and for metabolites surface water exposure calculated at Step 1-2 was deemed sufficient~~).

Please note that additional surface water modelling may be required by the concerned Member States that do not accept simulations performed according to FOCUS recommendations.

8.9.2.2 Boscalid

Reference:	CP 9.2.5/2
Report	Predicted environmental concentrations of BAS 510 F - Boscalid in surface water and sediment following application to various crops in Central and Northern Europe, XXX XXX, E., 2021 report No CALC-2485 2020/2108247 Authority registration No
Guideline(s):	FOCUS (2007): Landscape And Mitigation Factors In Aquatic Risk Assessment. Vol. 1 and 2, FOCUS Air (2008) SANCO/10553/2006 Rev. 2 June 2008, FOCUS Degradation Kinetics (2006) SANCO/10058/2005 version 1.1 of December 2014, FOCUS Surface Water (2015) Generic Guidance for FOCUS Surface Water Scenarios v1.4, FOCUS Surface Water Report SANCO/4802/2001 rev. 2, Guidance document on work-sharing in the Northern Zone (2020) v 9.0, BAES (2020) in Austria, version 04 (January 2020
Deviations:	No
GLP:	No, not relevant for this subject type
Acceptability:	Yes

Table 8.9-64: Input parameters for boscalid for $PEC_{sw/sed}$ calculations

Compound	**Boscalid**	**Value in accordance to EU endpoint Reference**
Molecular weight [g mol^{-1}]	343.21	Yes Monograph (2002)
Vapor pressure [Pa] (20°C)	7.2 x 10^{-7}	Yes Monograph (2002)
Water solubility [mg L^{-1}] (20°C)	4.6	Yes Monograph (2002)
Diffusion coefficient in water [m^2 d^{-1}]	4.3 x 10^{-5}	Default
Diffusion coefficient in air [m^2 d^{-1}]	0.43	Default
$K_{f,oc}$ [mL g^{-1}]	772 (arithmetic mean; n = 6)	Yes Monograph (2002)
Freundlich exponent 1/n	0.864 (arithmetic mean; n = 6)	Yes Monograph (2002)
Plant Uptake [-]	0	Conservative assumption
Wash-off factor from crop [1 mm^{-1}]	0.05 (MACRO) 0.50 (PRZM)	Default
$DT_{50,soil}$ [d]	130 (geometric mean of field studies, normalization to 20°C with Q_{10} of 2.2, n=3)	Yes, single values Monograph (2002)
DT_{50} water [d]	1000 (default)	Conservative assumption
DT_{50} sediment [d]	1000 (default)	Conservative assumption
DT_{50} whole system [d]	1000 (default)	Conservative assumption

$PEC_{sw/sed}$ of Boscalid

FOCUS Step 1, 2 and 3

Due to practical considerations, the numerous tables with actual and time-weighted average values are not repeated in the dossier. Please refer for these values to the corresponding PEC report [*BASF DocID 2020/2108247*].

Table 8.9-65: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for boscalid following single / multiple application(s) to winter oilseed rape, BBCH 57-75 (1 × 200 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	34.691 single	-	33.743 single	33.536 single	260.430 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	2.696 single	-	2.519 single	2.498 single	19.378 single
Southern Europe	Mar-May	4.304 single	-	4.123 single	4.094 single	31.782 single
Step 3						
D3	Ditch	1.269 single	Drift	0.261 single	0.089 single	0.897 single
D4	Pond	0.101 single	Drainage	0.100 single	0.095 single	1.116 single
D4	Stream	1.067 single	Drift	0.094 single	0.056 single	0.303 single
D5	Pond	0.109 single	Drainage	0.106 single	0.100 single	1.288 single
D5	Stream	1.181 single	Drift	0.065 single	0.032 single	0.330 single
R1	Pond	0.126 single	Runoff	0.118 single	0.107 single	1.368 single
R1	Stream	0.869 single	Runoff	0.099 single	0.046 single	2.315 single
R3	Stream	1.177 single	Drift	0.159 single	0.074 single	1.724 single

[a] Time as required by ecotox

Table 8.9-66: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for boscalid following single / multiple application(s) to spring oilseed rape, BBCH 57-75 (1 × 200 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	34.691 single	-	33.743 single	33.536 single	260.430 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	2.696 single	-	2.519 single	2.498 single	19.378 single
Southern Europe	Mar-May	4.304 single	-	4.123 single	4.094 single	31.782 single
Step 3						
D3	Ditch	1.270 single	Drift	0.296 single	0.101 single	0.976 single
D4	Pond	0.119 single	Drainage	0.117 single	0.114 single	1.218 single
D4	Stream	1.095 single	Drift	0.121 single	0.063 single	0.373 single
D5	Pond	0.241 single	Drainage	0.236 single	0.221 single	2.378 single
D5	Stream	1.181 single	Drift	0.146 single	0.080 single	0.550 single

R1	Pond	0.240 single	Runoff	0.226 single	0.219 single	2.029 single
R1	Stream	0.989 single	Runoff	0.151 single	0.076 single	2.471 single

[a] Time as required by ecotox

Table 8.9-67: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for boscalid following single / multiple application(s) to sunflower, BBCH 31-69 (2 × 200 g a.s. ha^{-1}, with application interval of 7 days)

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	69.382 multiple	-	67.486 multiple	67.071 multiple	520.861 multiple
Step 2						
Northern Europe	Mar-May / Jun-Sep	8.232 multiple	-	7.911 multiple	7.858 multiple	61.003 multiple
Southern Europe	Mar-May	14.546 multiple	-	14.210 multiple	14.126 multiple	109.712 multiple
Step 3						
D3 [b]	Ditch	0.910 multiple	Drift	0.133 multiple	0.086 multiple	0.705 multiple
D4 [b]	Pond	0.717 multiple	Drainage	0.714 multiple	0.694 multiple	6.546 multiple
D4 [b]	Stream	1.393 multiple	Drainage	0.644 multiple	0.439 multiple	2.085 multiple
D5	Pond	0.396 multiple	Drainage	0.387 multiple	0.364 multiple	4.011 multiple
D5	Stream	0.938 single	Drift	0.226 multiple	0.125 multiple	0.872 multiple
R1	Pond	0.380 multiple	Runoff	0.365 multiple	0.354 multiple	4.405 multiple
R1	Stream	2.717 multiple	Runoff	0.323 multiple	0.136 multiple	3.278 multiple
R3	Stream	2.120 multiple	Runoff	0.326 multiple	0.199 multiple	3.218 multiple
R4	Stream	2.405 multiple	Runoff	0.600 single	0.256 multiple	2.830 single

[a] Time as required by ecotox
[b] additional calculations performed for D3 and D4 scenarios (relevant for the Central Zone) for sunflower using maize as surrogate crop

Table 8.9-68: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for boscalid following single / multiple application(s) to winter cereals, BBCH 30-49 (1 × 200 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	34.691 single	-	33.743 single	33.536 single	260.430 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	6.234 single	-	6.048 single	6.010 single	46.667 single
Southern Europe	Mar-May	11.379 single	-	11.181 single	11.118 single	86.362 single
Step 3						
D3	Ditch	1.265 single	Drift	0.185 single	0.062 single	0.704 single
D4	Pond	0.218 single	Drainage	0.215 single	0.206 single	2.161 single
D4	Stream	0.935 single	Drift	0.211 single	0.127 single	0.642 single

D5	Pond	0.169 single	Drainage	0.165 single	0.156 single	2.003 single
D5	Stream	1.011 single	Drift	0.093 single	0.054 single	0.400 single
R1	Pond	0.128 single	Runoff	0.122 single	0.113 single	1.298 single
R1	Stream	0.866 single	Runoff	0.109 single	0.063 single	0.783 single
R3	Stream	1.171 single	Drift	0.162 single	0.061 single	1.359 single
R4	Stream	1.685 single	Runoff	0.250 single	0.083 single	1.151 single

[a] Time as required by ecotox

Table 8.9-69: FOCUS Step 1, 2, and 3 PEC_{sw} and PEC_{sed} for boscalid following single / multiple application(s) to spring cereals, BBCH 30-49 (1 × 200 g a.s. ha^{-1})

Scenario FOCUS	Period/ Waterbody	Max PEC_{sw} [µg L^{-1}][a]	Dominant entry route	7 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	21 d - $PEC_{sw,twa}$ [µg L^{-1}][a]	Max PEC_{sed} [µg kg^{-1}][a]
Step 1						
-	-	34.691 single	-	33.743 single	33.536 single	260.430 single
Step 2						
Northern Europe	Mar-May / Jun-Sep	6.234 single	-	6.048 single	6.010 single	46.667 single
Southern Europe	Mar-May	11.379 single	-	11.181 single	11.118 single	86.362 single
Step 3						
D3	Ditch	1.267 single	Drift	0.207 single	0.070 single	0.765 single
D4	Pond	0.234 single	Drainage	0.233 single	0.226 single	2.361 single
D4	Stream	1.036 single	Drift	0.215 single	0.141 single	0.718 single
D5	Pond	0.174 single	Drainage	0.171 single	0.161 single	2.029 single
D5	Stream	1.064 single	Drift	0.090 single	0.054 single	0.399 single
R4	Stream	1.553 single	Runoff	0.476 single	0.206 single	2.245 single

[a] Time as required by ecotox

zRMS comments:

The input parameters considered by the Applicant in surface water modelling for boscalid are in general in line with the currently agreed EU endpoints.

Soil DT_{50} of 130 days was considered, as indicated in Addendum 4 to the monograph (May 2007). It is noted that in the monograph additional consideration has been made to account for accumulation of boscalid in soil and increased loading in run-off and drainage events. It is, however, noted that soil DT_{50} of 130 days has been already used in surface water modelling performed in the course of the zonal evaluations of some formulations belonging to the same Applicant (see e.g. Tessior evaluated in 2020 by zRMS DE or Collis evaluated in 2018 by zRMS FR). Taking this into account, the soil DT_{50} of 130 days was agreed by the zRMS in order to maintain consistent approach within the Central Zone.

For aquatic systems the worst case DT_{50} values of 1000 days were assumed for each compartment.

In simulations PUF value of 0 was assumed, in line with current recommendations.

The performed calculations were independently validated by the zRMS in additional modelling using the same parameters. Obtained PEC_{SW} and PEC_{SED} were in good agreement with values calculated by the Applicant. Surface water exposure presented in Tables 8.9-65 to 8.9-69 may be used in the aquatic risk assessment.

Please note that additional surface water modelling may be required by the concerned Member States that do not accept simulations performed according to FOCUS recommendations.

In the course of the commenting period it was pointed out that due to potential accumulation of boscalid in sediment, respective calculations of $PEC_{SED,PLATEAU}$ and $PEC_{SED,ACCU}$ should have been performed. In order to address this issue, the Applicant was requested to provide respective calculations which were presented in document by XXX (2022, BASF DocID 2022/2017799).

Calculations were performed with consideration of the maximum PEC_{SED} values calculated at Step 3 for each crop and presented in Tables 8.9-65 to 8.9-69 above using following modified equations available in FOCUS soil persistence guidance[1]:

Equation 1 Calculation of $PEC_{sed,\ plateau}$

$$PEC_{sed,plateau} = \frac{PEC_{sed,max}}{1 - e^{-k \times t}} \times e^{-kt}$$

with:			
	$PEC_{sed,plateau}$	Plateau concentration at steady state	[µg kg^{-1}]
	$PEC_{sed,max}$	Global maximum concentration at Step 3	[µg kg^{-1}]
	k	Degradation rate in sediment (ln(2)/DT_{50})	[d-1]
	t	Time interval between growing seasons (365 days)	[d]

Equation 2 Calculation of $PEC_{sed,\ accu}$

$$PEC_{sed,accu} = PEC_{sed,plateau} + PEC_{sed,max}$$

with:			
	$PEC_{sed,accu}$	Maximum concentration in sediment for the accumulation risk assessment	[µg kg^{-1}]
	$PEC_{sed,plateau}$	Plateau concentration at steady state	[µg kg^{-1}]
	$PEC_{sed,max}$	Global maximum concentration at Step 3	[µg kg^{-1}]

It is however noted by the zRMS that Equation 1 is rather modified equation for calculation of initial PEC_{SOIL} after multiple applications (Equation 2.4 in the FOCUS soil guidance) and not equation for calculation of the maximum plateau concentration. According to FOCUS soil guidance the following equation is used to calculate $PEC_{SOIL,PLATEAU}$ (Equation 2.6 in the FOCUS soil guidance):

$$Maximum\ PECsoil\ plateau = \frac{Initial\ PECsoil\ for\ 1\ application}{(1 - e^{-ki})}$$

After adjustment for calculation of $PEC_{SED,PLATEAU}$ relevant for boscalid, the following equation should have been used:

$$Maximum\ PECsed, plateau = \frac{PECsed, max}{(1 - e^{-ki})}$$

The Equation 2 used for calculation of $PEC_{SED,ACCU}$ is correct.

$PEC_{SED,PLAETAU}$ were recalculated by the zRMS using the modified Equation 2.6 from the FOCUS soil guidance. Obtained values were higher than these derived by the Applicant and are presented in table below. Calculations were based on unrounded values. The Applicants' values are not reported as being lower and thus not relevant for the risk assessment.

Crop scenario	Application scheme	Step	Scenario [1)]	$PEC_{SED,MAX}$ [µg/kg]	$PEC_{SED,PLATEAU}$ [µg/kg]	$PEC_{SED,ACCU}$ [µg/kg]
Winter OSR	BBCH 57-75, 1x200 g a.s./ha	Step 1	-	260.4	1149.7	1410.1
		Step 2	N-Europe	19.4	85.6	104.9
			S-Europe	31.8	140.3	172.1
		Step 3	R1, stream	2.3	10.2	12.5

[1] FOCUS (1997) Soil persistence models and EU Registration - The Final Report of the Soil Mo28,90delling Workgroup of FOCUS (Forum for the Co-ordination of Pesticide Fate Models and their Use) – 29 February 1997

Spring OSR	BBCH 57-75, 1x200 g a.s./ha	Step 1	-	260.43	1149.7	1410.1
		Step 2	N-Europe	19.378	85.6	104.9
			S-Europe	31.782	140.3	172.1
		Step 3	R1, stream	2.5	10.9	13.4
Sunflower [2)]	BBCH 31-69, 2x200 g a.s./ha, 7 d interval	Step 1	-	520.9	2299.4	2820.3
		Step 2	N-Europe	61.0	269.3	330.3
			S-Europe	109.7	484.3	594.1
			D4 pond	6.5	28.9	35.4
Winter cereals	BBCH 30-49, 1x200 g a.s./ha	Step 1	-	260.430	1149.7	1410.1
		Step 2	N-Europe	46.667	206.0	252.7
			S-Europe	86.362	381.3	467.6
		Step 3	D4 pond	2.161	9.5	11.7
Spring cereals	BBCH 30-49, 1x200 g a.s./ha	Step 1	-	260.430	1149.7	1410.1
		Step 2	N-Europe	46.667	206.0	252.7
			S-Europe	86.362	381.3	467.6
		Step 3	D4 pond	2.361	10.4	12.8

[1)] For Step 3 the maximum PEC_{SED} of all scenarios has been considered covering other scenarios

[2)] In order to obtain surface water exposure in scenarios in D3 and D4 scenarios, simulation were performed using maize as the surrogate crop

Values reported in table above may be used in the risk assessment for sediment dwelling organisms exposed via sediment.

8.9.2.3 $PEC_{sw/sed}$ of BAS 762 02 F

Maximum concentrations in surface water for the formulation BAS 762 02 F from entry through spray drift following single application to field crops are provided covering all uses of the GAP. The assessment is based on the FOCUS drift calculator which is implemented in FOCUS SWASH 5.3 using a static water body of 30 cm depth (i.e. FOCUS ditch).

~~Table 8.9-70: Initial PEC_{sw} for BAS 762 02 F following single application to field crops~~

~~Buffer distance [m]~~	~~Application rate of formulation [L ha⁻¹]~~	~~Formulation density [g L⁻¹]~~	~~Application rate of formulation [g ha⁻¹]~~	~~Drift rate [%]~~	~~Formulation $PEC_{sw,max}$ [µg L⁻¹]~~
~~1~~	~~1.00~~	~~1130~~	~~1130~~	~~1.93~~	~~7.260~~
~~3~~	~~1.00~~	~~1130~~	~~1130~~	~~0.82~~	~~3.074~~
~~5~~	~~1.00~~	~~1130~~	~~1130~~	~~0.52~~	~~1.968~~
~~10~~	~~1.00~~	~~1130~~	~~1130~~	~~0.28~~	~~1.044~~
~~20~~	~~1.00~~	~~1130~~	~~1130~~	~~0.14~~	~~0.542~~

zRMS comments:

Since according to the aquatic guidance of EFSA (2013) the combined risk assessment is performed with consideration of the PEC_{MIX} based on PEC_{SW} and PEC_{SED} for individual substances, provided above calculations were not necessary to finalise the aquatic risk assessment at the zonal level. Nevertheless, surface water exposure for the formulated product was checked by the zRMS using Spray Drift Calculator with consideration of relative density 1136 g/L, as indicated in the Core Assessment, Part B, Section 1. The maximum PEC_{SW} was calculated for application to cereals and oilseed rape in ditch scenario (7.2984 µg/L). Surface water exposure with assumption of buffer zones was not calculated as not necessary for the risk assessment purposes.

8.10 Fate and behaviour in air (KCP 9.3, KCP 9.3.1)

8.10.1 Mefentrifluconazole

All information provided in this chapter is available in [*EFSA (2018)*].

Table 8.10-1: Summary of atmospheric degradation and behaviour of mefentrifluconazole

Compound	**Mefentrifluconazole**
Direct photolysis in air	Not studied
Quantum yield of direct phototransformation	3.5 x 10^{-1} mol Einstein^{-1} (in water at > 290 nm)
Photochemical oxidative degradation in air	DT_{50} : 19.995 hours (1.67 days) derived by the Atkinson model (version 1.88), OH (12 h) concentration assumed = 1.5 x10^{6} mol cm^{-3}
Volatilisation	No data generated Saturated vapour pressure [Pa]: 3.2 x 10^{-6} at 20°C Henry's Law Constant [Pa m^{3} mol^{-1}]: 1.6 × 10^{-3}
Metabolites	n.a.

Due to the low vapor pressure of mefentrifluconazole, air is not a relevant exposure pathway for this compound.

zRMS comments:

Provided above information is in line with EU agreed data reported in EFSA Journal 2018;16(7):5379. Taking into account the low vapour pressure (<10^{-5} Pa) and DT_{50} <2 days, mefentrifluconazole is not expected to be subject to volatilisation and the long- or short-range transport.
Taking this into account the contamination of the atmosphere from the intended uses of formulation BAS 762 02 F is considered to be negligible.

8.10.2 Boscalid

Table 8.10-2: Summary of atmospheric degradation and behaviour of boscalid

Compound	**Boscalid**
Direct photolysis in air	Photolytically stable in water. Photolysis in air not expected. Not stable under influence of radicals.
Quantum yield of direct phototransformation	<2.45 × 10^{-4}
Photochemical oxidative degradation in air	DT_{50}: <1.1 d derived by the Atkinson model (AOPWIN v1.88)
Volatilisation	Vapour pressure: 7.2 × 10^{-7} Pa (20 °C) Henry's Law Constant: 5.178 × 10^{-5} Pa m^{3}/mol From plant surfaces: about 1% in 24 hours From soil: about 0.5% in 24 hours
Metabolites	None

The vapor pressure at 20 °C of the active substance boscalid is <10^{-5} Pa. Hence the active substance boscalid is regarded as non-volatile.

zRMS comments:

Provided above information is in line with EU agreed data reported in the EU Review Report SANCO/3919/2007-rev.5 for boscalid. Taking into account the low vapour pressure ($<10^{-5}$ Pa) and DT_{50} <2 days, boscalid is not expected to be subject to volatilisation and the long- or short-range transport.
Taking this into account the contamination of the atmosphere from the intended uses of formulation BAS 762 02 F is considered to be negligible.

Appendix 1 Lists of data considered in support of the evaluation

List of data submitted by the applicant and relied on

Data point	Author(s)	Year	**Title** **Company Report No.** **Source (where different from company)** **GLP or GEP status** **Published or not**	Vertebrate study Y/N	Owner
KCP 9.1.3/1	XXX XXX, E.	2021	Predicted environmental concentrations of BAS 750 F – mefentrifluconazole and its metabolite in soil following application to various crops in Europe 2020/2108239 knoell Germany GmbH, Mannheim, Germany Fed.Rep. no Unpublished	No	BASF
KCP 9.1.3/2	XXX XXX, E.	2021	Predicted environmental concentrations of BAS 510 F - Boscalid in soil following application to various crops in Europe 2020/2108245 knoell Germany GmbH, Mannheim, Germany Fed.Rep. no Unpublished	No	BASF
KCP 9.2.4.1/1	XXX XXX, T.	2021	Predicted environmental concentrations of BAS 750 F – mefentrifluconazole and its metabolite in groundwater following application to various crops in Europe 2020/2108240 knoell Germany GmbH, Mannheim, Germany Fed.Rep. no Unpublished	No	BASF
KCP 9.2.4.1/2	XXX XXX, T.	2021	Predicted environmental concentrations of BAS 510 F - Boscalid in groundwater following application to various crops in Central Europe 2020/2108246 knoell Germany GmbH, Mannheim, Germany Fed.Rep. no Unpublished	No	BASF
KCP 9.2.5/1	XXX, M.	2021	Predicted environmental concentrations of BAS 750 F – mefentrifluconazole and its metabolites in surface water and sediment following application to various crops in Europe 2020/2108241 knoell Germany GmbH, Mannheim, Germany Fed.Rep. no Unpublished	No	BASF

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner
KCP 9.2.5/2	XXX XXX, E.	2021	Predicted environmental concentrations of BAS 510 F - Boscalid in surface water and sediment following application to various crops in Central and Northern Europe 2020/2108247 knoell Germany GmbH, Mannheim, Germany Fed.Rep. no Unpublished	No	BASF
KCP 9.2.5/3	XXX, S.	2022	Accumulation of predicted environmental concentrations of BAS 510 F - boscalid in sediment following application to cereals, oilseed rape and sunflower in Europe 2022/2017799 BASF SE Agricultural Solutions, Ecology and Environmental Analytics, Germany no Unpublished	No	BASF

List of data submitted or referred to by the applicant and relied on, but already evaluated at EU peer review

zRMS comments:

As most of endpoints for mefentrifluconazole, boscalid and relevant metabolites were taken from the EU review, for the list of respective studies please refer to Volume 2 of the RAR for mefentrifluconazole and the monograph for boscalid.

List of data submitted by the applicant and not relied on

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner	Reason for rejection
KCP 9.1.1.1/1	XXX, I.-C.	2008	Boscalid (BAS 510 F): Study on soil degradation and long-term sorption in soil 2008/1013108 PTRL Europe GmbH, Ulm, Germany Fed.Rep. yes Unpublished	No	BASF	Study not evaluated, not used in the presented exposure evaluation for BAS 762 02 F.

Data point	Author(s)	Year	Title Company Report No. Source (where different from company) GLP or GEP status Published or not	Vertebrate study Y/N	Owner	Reason for rejection
KCP 9.1.1.2.2/1	XXX, C., XXX, H., XXX, T.	2009	Accumulation behaviour of BAS 510 F in soil under field conditions over several years after application onto vegetables 2009/1070939 BASF SE, Limburgerhof, Germany Fed.Rep. yes Unpublished	No	BASF	Study not accepted by zRMS (DE) in 2020 during zonal evaluation for BASF formulation Tessior. The same conclusion applies for BAS 762 02 F.

List of data relied on not submitted by the applicant but necessary for evaluation

zRMS comments:

There were no studies relied on and not submitted by the Applicant.

Appendix 2 Detailed evaluation of the new Annex II studies

A 2.1 Study 1 (BASF DocID 2008/1013108)

Comments of zRMS:	The study summarised below was not used in the exposure estimations presented in this report. In consequence its evaluation was deemed not necessary. The summary is thus struck through and shaded.

Reference:	CP 9.1.1.1/1
Report	Boscalid (BAS 510 F): Study on soil degradation and long-term sorption in soil, XXX, I.-C., 2008 report No EU-P/B 1189 G,EU-280072 2008/1013108 Authority registration No
Guideline(s):	BBA IV 4-1, OECD 106 (2000), OECD 307 (2002), SETAC Procedures for assessing the environmental fate and ecotoxicity of pesticides (March 1995)
Deviations:	No
GLP:	yes (certified by Umweltministerium Baden-Wuerttemberg, Stuttgart), (If no, give justification, e.g., state that GLP was not compulsory at the time the study was performed)
Acceptability:	Not evaluated, not used for purposes of exposure estimation for BAS 762 02 F presented in this Core Assessment.

~~**EXECUTIVE SUMMARY**~~

~~The objective of this study was to examine the degradation of boscalid in soil. Two field-fresh charges of one soil (“Studernheim”) were used in this study. One charge of the soil was from a field plot that had received repeated applications of boscalid over several years and thus contained residues that had been in contact with the soil for an extended time period (aged residues). The other charge of the soil was from a nearby area of the same field that had not yet received any boscalid treatments.~~

~~The soils were acclimatised, and soil moisture was adjusted to about 40 % of the maximum water holding capacity. The soil concentration of aged boscalid from the treated plot was determined by residue analysis, and the untreated soil was spiked to a similar concentration with non-radiolabelled boscalid. 100 g aliquots of the soils containing aged residues or freshly applied boscalid, respectively, were incubated at 20 °C in the dark. Samples were taken after 0, 7, 14/15, 29, 58/62, 87/91, 119/120, 149/152 and 179/182 days of incubation. Two soil aliquots were used for desorption with 0.01 M aqueous $CaCl_2$ by shaking for 24 hours. The soil/water phases were separated by centrifugation and the analyte present in the water phase determined by LC/MS/MS. From the remaining soil, another aliquot was extracted with methanol and methanol/water (1/1). The phases were separated by centrifugation and the analyte present in the extract was determined by LC/MS/MS.~~

~~Aged residues of boscalid decreased only by about 10 %, whereas for freshly applied boscalid, a degradation of about 30 % during the incubation of about 180 days was observed. The aerobic degradation behaviour was evaluated using single first-order kinetics (SFO). The estimated degradation time (DT_{50}) of aged residues was 746 days, whereas the DT_{50} of freshly applied boscalid was distinctly shorter with a value of 336 days.~~

~~The amount of boscalid extracted from both soil charges by shaking with aqueous $CaCl_2$ solution (desorption) decreased with incubation time. Aged residues showed only a very slight decline from 10/11 % to 9 % after 182 days of incubation and the corresponding adsorption coefficients (K_d) values remained almost constant with 17.5 mL/g at the beginning and 18.0 mL/g at the end of the incubation. In contrast, the aqueous extractability of freshly applied boscalid decreased more significantly from 21 % to 7 % at the~~

~~end of incubation and the corresponding K_d values increased with incubation time, starting from 8.2 mL/g at the beginning to 20.0 mL/g after about 180 days of incubation.~~

~~The observed increase of the adsorption of boscalid to the soil over time was attributed to the known effect of time-dependent sorption (non-equilibrium sorption). This effect reduces the amount of dissolved residues that is available i.e. for microbial degradation. As a result, the apparent degradation of aged residues is slower than that of fresh residues.~~

~~MATERIALS AND METHODS~~

~~Material~~

~~*Test Material*~~

~~BAS code:~~	~~BAS 510 F~~
~~Reg.No.:~~	~~300355~~
~~CAS-No.:~~	~~188425-85-6~~
~~Chemical name (IUPAC):~~	~~3-chloro-N-(4'-chlorobiphenyl-2-yl)nicotinamide~~
~~Molecular weight:~~	~~343.2 g/mol~~
~~Batch-No.:~~	~~01893-55~~
~~Purity:~~	~~100.0 %~~

~~*Soil*~~

~~Two field-fresh charges of one soil ("Studernheim") were used in this study. One charge of the soil was from a field plot that had received repeated applications of boscalid over several years and thus contained residues that had been in contact with the soil for an extended time period (aged residues). The other charge of the soil was from a nearby area of the same field that had not yet received any boscalid treatments. A summary of the soil characteristics is given in Table A- 1. The soils were acclimatised, and soil moisture was adjusted to about 40 % of the maximum water holding capacity.~~

~~Table A- 1~~ ~~Properties of soil Studernheim used to investigate degradation and long-term sorption of aged and fresh boscalid residues under aerobic conditions~~

~~**Soil designation**~~	~~**Studernheim**~~
~~Origin~~	~~Studernheim, Germany~~
~~DIN Particle size distribution [%]~~	
~~sand 0.063 – 2 mm~~	~~40.6~~
~~silt 0.002 – 0.063 mm~~	~~38.4~~
~~clay < 0.002 mm~~	~~21.0~~
~~textural class~~	~~loam~~
~~USDA Particle size distribution [%]~~	
~~sand 0.050 – 2 mm~~	~~37.9~~
~~silt 0.002 – 0.050 mm~~	~~41.2~~
~~clay < 0.002 mm~~	~~21.0~~
~~textural class~~	~~sandy loam~~
~~Organic C [%]~~	~~2.00~~
~~Organic matter [%][2]~~	~~3.45~~
~~pH [H_2O]~~	~~8.3~~
~~pH [$CaCl_2$]~~	~~7.5~~
~~Cation exchange capacity [$cmol^+$/ kg]~~	~~15.5~~
~~Maximum water holding capacity [g/100 g dry soil][1]~~	~~45.2~~
~~Microbial biomass (start of study) [mg C/100 g dry soil][1]~~	~~11.2[3] / 8.9[4]~~
~~Microbial biomass (end of study) [mg C/100 g dry soil][1]~~	~~4.7[3] / 9.9[4]~~

~~[1] determined at the test facility PTRL Europe~~
~~[2] organic matter = organic carbon x 1.724~~
~~[3] "aged soil"~~
~~[4] "virgin soil"~~

~~**Study Design**~~

~~***Experimental conditions***~~

~~The concentration of aged boscalid in the soil from the treated plot was determined to be about 0.3 mg/kg. The soil from the untreated plot was spiked to a similar concentration with non-radiolabelled boscalid (about 0.21 mg/kg).~~

~~100 g (dry weight) aliquots of both soils containing aged residues or freshly applied boscalid, respectively, were measured into 1 L incubation flasks, septum-sealed, connected by tubes to allow aeration with a continuous flow of humidified air, placed in thermostat-controlled cabinets, and incubated at 20°C in the dark.~~

~~***Sampling***~~

~~Samples were taken after 0, 7, 14/15, 29, 58/62, 87/91, 119/120, 149/152, and 179/182 days of incubation. At each sampling time, two replicate vessels were sampled. One replicate sample was worked up, whereas the other replicate sample was immediately frozen, except for samplings 0, 87/91 and 179/182 DAT, where both replicates were worked up.~~

~~***Analytical procedures – soil degradation***~~

~~A 10 g aliquot of the soil specimen was weighed into a centrifuge bottle, 10 mL of methanol were added, and the bottle shaken at 300 rpm for 30 min. Thereafter the specimens were centrifuged at 3000 rpm for 5 min, the supernatant decanted and filtered through a funnel plugged with glass wool into a 25 mL volumetric flask.~~

~~Subsequently a 15 mL aliquot of solvent mixture (methanol/water 1/1 v/v) was added to the soil pellet and the soil loosened, followed by another 30 min period of shaking and 5 min of centrifugation. The supernatant was again decanted, filtered, and combined with the first extract. The volume was adjusted with methanol to the mark, and an aliquot was further diluted and finally used for LC-MS/MS determination.~~

~~External calibration was used for quantification of the analyte (quantitation ion 307 m/z) by LC/MS/MS using ESI. Calibrations were established with standard solutions prepared in solvent injected interspersed with the soil extracts. Calibrations usually ranged from 0.1 ng/mL to 250 ng/mL.~~

~~Additionally, appropriate samples were set up and analysed for concurrent recovery control and individual recoveries.~~

~~The concentration of boscalid extracted with organic solvent after given incubation times from aliquots of soil containing aged residues or spiked soil was used to evaluate the aerobic degradation of boscalid. The concentration of boscalid extracted with solvent was expressed as a percentage of the total (aged or spiked) residue determined at the beginning of incubation.~~

~~***Kinetic modelling – soil degradation***~~

~~The residue behaviour was evaluated by separately fitting kinetic models to the observed residues of boscalid (aged or freshly spiked) using the software package KinGUI version 1.1 [KinGUI version 1.1 - developed by Bayer Technology Services for Bayer Crop Science (2006). User Interface for Kinetic Evaluations]. The kinetic analysis followed the recommended procedures to derive modelling endpoints for parent compounds outlined by FOCUS [*FOCUS (2006): "Guidance Document on Estimating Persistence and Degradation Kinetics from Environmental Fate Studies on Pesticides in EU Registration" Report of the FOCUS Work Group on Degradation Kinetics, EC Document Reference Sanco/10058/2005 version 2.0, 434 pp.*].~~

~~The Goodness-of-fit was evaluated by visual assessment, $\chi 2$ minimum error, and type-I-error rate (t-test) [for details see Chapter 6.3 in *FOCUS (2006)*].~~

~~Optimisation settings: The error tolerance and the number of iterations of the optimisation tool were set to 0.00001 and 100, respectively. The initial (start) parameters settings employed in the optimisation were M0 = 100 and k = 0.1~~

~~***Analytical procedures – soil sorption***~~

~~To each of two 20 g (dry mass) incubated soil equivalents plus 1 untreated incubated 20 g soil portion, 36 mL of an aqueous 0.01 M $CaCl_2$ were added. The total water volume (V_T =V_{Ex} = 36 mL + soil water of about 4 mL) was thus about 40 mL. The flasks were sealed, and the soil/water mixtures were shaken protected from daylight (wrapped in tin foil) for 24 hours on a horizontal shaker at room temperature. Subsequently, the soil/water mixtures were centrifuged for 5 min at 2000 rpm, then approx. 1.5 mL of the supernatant were transferred into a 2 mL centrifuge vial and centrifuged again for 20 min at 15 000 rpm. An aliquot of the supernatant was taken and diluted with injection solvent (methanol / water) containing 4 mM ammonium formate and 0.1 % formic acid) for LC/MS/MS analysis.~~

~~External calibration was used for quantification of the analyte (quantitation ion 307 m/z) by LC/MS/MS using ESI. Calibrations were established with standard solutions prepared in solvent injected interspersed with the soil extracts. Calibrations usually ranged from 0.1 ng/mL to 250 ng/mL.~~

~~Additionally, appropriate samples were set up and analysed for concurrent recovery control and individual recoveries.~~

~~The concentration of boscalid extracted with aqueous $CaCl_2$ after given incubation times from equivalents of both soil containing aged residues and spiked soil was used to evaluate the long-term sorption behaviour of boscalid.~~
~~The extractability by aqueous $CaCl_2$ was defined as the amount of the substance which was desorbed, related to the quantity of substance initially present (desorption in %).~~

~~***Calculation of apparent distribution coefficients Kd and Koc as functions of incubation time***~~

~~Apparent distribution coefficients K_d and K_{oc} were calculated for each sampling event from the results of the solvent extractions and the aqueous $CaCl_2$ extractions. The apparent distribution coefficient K_d is defined as the ratio between the amount of the substance remaining in the soil phase, and the mass concentration of the substance present in the aqueous solution, when equilibrium is reached. In the present study the adsorption equilibrium was assumed to be the case after 24 hours.~~

~~K_d = C_S^{ads} / C_{Aq}~~

~~Whereby:~~
~~C_S^{ads} is the concentration of boscalid adsorbed on the soil (C_S^{ads} = C_S – C_{Des}).~~
~~C_{Aq} is the concentration of boscalid in the aqueous phase (C_{Aq} here expressed as C_{Des})~~

~~The following detailed equation was used for K_d calculation:~~

~~K_d = $[(C_S - C_{Des}) / C_{Des}] \times (V_T / m_{Soil})$~~

~~Whereby:~~
~~C_S = concentration of boscalid extracted with solvent (in mg/kg)~~
~~C_{Des} = concentration of boscalid desorbed with aqueous solution (in mg/kg)~~
~~V_T = total volume of the aqueous 0.01 M $CaCl_2$ phase (i.e. 36 mL + 4 mL water present in the 20-g equivalent of the wet soil incubated) in contact with the soil during the desorption (cm^3 = mL).~~
~~m_{Soil} = dry weight of the soil used for desorption, i.e. always 20 g~~

~~The organic carbon normalised adsorption coefficient K_{oc} relates the distribution coefficient K_d to the content of organic carbon (% oc) of the soil:~~

~~$K_{oc} = K_d \times 100 / \% oc$~~

~~RESULTS AND DISCUSSION~~

~~Aerobic Soil Degradation~~

~~The amount of boscalid extracted with organic solvent was expressed as a percentage of the total residue determined at the beginning of the incubation (aged: 0.30 mg/kg, freshly applied: 0.21 mg/kg). Table A- 2 shows the aerobic soil degradation for aged and freshly applied residues of boscalid.~~

~~Table A- 2 Degradation of aged and freshly applied residues of boscalid in soil~~

~~Degradation of aged residues~~		~~Degradation of fresh residues~~	
~~Time [Days]~~	~~%TR*~~	~~Time [Days]~~	~~%TAR**~~
~~0~~	~~103~~	~~0~~	~~106~~
~~0~~	~~102~~	~~0~~	~~109~~
~~7~~	~~100~~	~~7~~	~~81~~
~~14~~	~~108~~	~~15~~	~~91~~
~~29~~	~~90~~	~~29~~	~~88~~
~~62~~	~~105~~	~~58~~	~~76~~
~~91~~	~~88~~	~~87~~	~~77~~
~~91~~	~~86~~	~~87~~	~~81~~
~~120~~	~~90~~	~~119~~	~~75~~
~~152~~	~~87~~	~~149~~	~~64~~
~~182~~	~~90~~	~~179~~	~~73~~
~~182~~	~~87~~	~~179~~	~~71~~

~~* % of total initial residues~~
~~** % of total applied residues~~

~~Aged residues of boscalid decreased only for about 10 %, whereas for freshly applied boscalid a degradation of about 30 % during the incubation of about 180 days was observed.~~

~~Kinetic modelling~~

~~The observed residues of boscalid (aged or freshly spiked) were excellently described by the fitted curves based on single first-order (SFO) kinetics. DT_{50} and DT_{90} values based on SFO kinetics are shown in the table below.~~

~~Table A- 3 DT_{50}/DT_{90} values of aged boscalid residues and freshly applied boscalid~~

~~Soil~~	~~Kinetic~~	~~χ^2 error [%]~~	~~DT_{50} [d]~~	~~DT_{90} [d]~~
~~Aged boscalid residues~~	~~SFO~~	~~4.4~~	~~745.7~~	~~>1000~~
~~Freshly applied boscalid~~	~~SFO~~	~~7.0~~	~~336.2~~	~~>1000~~

~~Aqueous Extractability / Desorption as Function of Incubation Time~~

~~The amount of boscalid extracted from soil with $CaCl_2$ solution in 24 hrs (C_{Des}) decreased with time, which is expressed here as a percentage of the total residue determined at the beginning of the incubation (~~

~~**Table A- 4**). The desorption of aged residues of boscalid showed only a very slight decline from 10/11 % to 9 % after 182 days of the incubation. For freshly applied boscalid the aqueous extractability decreased more significantly from 21 % to 7 % at the end of the incubation.~~

~~**Table A- 4 Desorption of aged and freshly applied residues of boscalid from soil**~~

~~Desorption of aged residues~~		~~Desorption of fresh residues~~	
~~Time [Days]~~	~~%TR*~~	~~Time [Days]~~	~~%TAR**~~
~~0~~	~~11~~	~~0~~	~~21~~
~~0~~	~~10~~	~~0~~	~~21~~
~~7~~	~~14~~	~~7~~	~~17~~
~~14~~	~~11~~	~~15~~	~~14~~
~~29~~	~~11~~	~~29~~	~~15~~
~~62~~	~~11~~	~~58~~	~~9~~
~~91~~	~~9~~	~~87~~	~~8~~
~~91~~	~~8~~	~~87~~	~~8~~
~~120~~	~~8~~	~~119~~	~~7~~
~~152~~	~~7~~	~~149~~	~~7~~
~~182~~	~~9~~	~~179~~	~~7~~
~~182~~	~~9~~	~~179~~	~~7~~

~~* % of total initial residues~~
~~** % of total applied residues~~

~~**Time Dependent Sorption of Aged and Freshly Applied Residues of Boscalid**~~

~~The apparent distribution coefficient K_d and the organic carbon normalised adsorption coefficient K_{oc} over time are summarised in Table A- 5.~~

~~**Table A- 5 K_d and K_{OC} values of aged and freshly applied boscalid over time**~~

~~Desorption of aged residues~~					~~Desorption of fresh residues~~				
~~Time~~	~~C_s~~	~~C_{Des}~~	~~K_d~~	~~K_{oc}~~	~~Time~~	~~C_s~~	~~C_{Des}~~	~~K_d~~	~~K_{oc}~~
~~[Days]~~	~~[mg/kg]~~	~~[mg/kg]~~	~~[ml/g]~~	~~[ml/g]~~	~~[Days]~~	~~[mg/kg]~~	~~[mg/kg]~~	~~[ml/g]~~	~~[ml/g]~~
~~0~~	~~0.310~~	~~0.0322~~	~~17.3~~	~~864~~	~~0~~	~~0.222~~	~~0.0451~~	~~7.9~~	~~393~~
~~0~~	~~0.308~~	~~0.0313~~	~~17.7~~	~~883~~	~~0~~	~~0.230~~	~~0.0442~~	~~8.4~~	~~420~~
~~7~~	~~0.304~~	~~0.0437~~	~~11.9~~	~~595~~	~~7~~	~~0.171~~	~~0.0358~~	~~7.6~~	~~378~~
~~14~~	~~0.326~~	~~0.0347~~	~~16.8~~	~~841~~	~~15~~	~~0.191~~	~~0.0295~~	~~11.0~~	~~548~~
~~29~~	~~0.274~~	~~0.0323~~	~~15.0~~	~~749~~	~~29~~	~~0.186~~	~~0.0313~~	~~9.9~~	~~495~~
~~62~~	~~0.316~~	~~0.0318~~	~~17.9~~	~~895~~	~~58~~	~~0.160~~	~~0.0198~~	~~14.2~~	~~711~~
~~91~~	~~0.268~~	~~0.0264~~	~~18.3~~	~~914~~	~~87~~	~~0.161~~	~~0.0177~~	~~16.2~~	~~812~~
~~91~~	~~0.261~~	~~0.0249~~	~~19.0~~	~~948~~	~~87~~	~~0.171~~	~~0.0161~~	~~19.3~~	~~964~~
~~120~~	~~0.272~~	~~0.0236~~	~~21.1~~	~~1053~~	~~119~~	~~0.158~~	~~0.0157~~	~~18.2~~	~~910~~
~~152~~	~~0.264~~	~~0.0215~~	~~22.6~~	~~1130~~	~~149~~	~~0.136~~	~~0.0155~~	~~15.6~~	~~778~~
~~182~~	~~0.271~~	~~0.0271~~	~~18.0~~	~~901~~	~~179~~	~~0.154~~	~~0.0139~~	~~20.2~~	~~1008~~
~~182~~	~~0.264~~	~~0.0266~~	~~17.9~~	~~896~~	~~179~~	~~0.150~~	~~0.0139~~	~~19.7~~	~~986~~

~~Apparent distribution coefficients K_d and carbon normalised adsorption coefficients K_{oc} of aged residues remained almost constant with 17.5 mL/g resp. 874 mL/g at the beginning and 18.0 mL/g resp. 899 mL/g at the end of the incubation. In contrast, apparent distribution coefficients K_d of freshly applied residues increased with incubation time, starting from 8.2 mL/g at the beginning of the incubation to 20.0 mL/g after about 180 days of incubation. The organic carbon normalised adsorption coefficients K_{oc} of freshly applied residues increased from 407 mL/g to 997 mL/g at the end of the incubation.~~

~~The observed increase of the adsorption of boscalid to the soil over time was attributed to the known effect of time-dependent sorption (non-equilibrium sorption).~~

~~**CONCLUSION**~~

~~The evaluation of the aerobic degradation applying single first-order kinetics resulted in a degradation time (DT_{50}) for aged residues of boscalid in soil of 746 days, whereas for boscalid freshly applied to soil a significantly shorter DT_{50} of 336 days could be calculated.~~

~~With increasing incubation time, a decreasing percentage of boscalid was desorbed by shaking with 0.01 M $CaCl_2$ solution. The desorption of freshly applied boscalid decreased more significantly than that of aged residues. Furthermore, the K_d and K_{oc} values increased with prolonged incubation time for freshly applied boscalid. In contrast, K_d and K_{oc} values of aged boscalid residues remained almost constant over the incubation time.~~

~~The observed increase of the adsorption of boscalid to the soil over time was attributed to the known effect of time-dependent sorption (non-equilibrium sorption). This effect reduces the amount of dissolved residues that is available e.g. for microbial degradation. As a result, the apparent degradation of aged residues is slower than that of fresh residues.~~

A 2.2 Study 2 (BASF DocID 2009/1070939)

This report with the BASF DocID 2009/1070939 supersedes the following reports: BASF DocID 2000/1017040, BASF DocID 2000/1017046 and BASF DocID 2005/1013964.

<table>
<tr><td>Comments of zRMS:</td><td>This study is the final report of an accumulation study that had been initiated for Annex I approval.

It is noted that this study has been recently not accepted by zRMS (Germany) in the course of the zonal evaluation of formulation of the same Applicant, Tessior finalised in January 2020. Following conclusions were derived by Germany and agreed by the concerned Member States (text in italics):

Not acceptable.

Soil accumulation studies, which are not conducted on bare soil, cannot provide reliable $DegT_{50matrix}$ values as described in EFSA Journal 2014;12(5):3662.

Regulation (EU) No 283/2013 states for field dissipation studies:
"Individual studies on a range of representative soils (normally at least four different types at different geographical locations)..."
As this soil accumulation study was conducted on only one plot, this also limits its explanatory power. From the study summary:
"A total of eight individual dissipation periods in the course of the study were used to estimate a representative DT50 value for modelling the plateau residue level of boscalid in soil."
These eight values can only be considered as replicates from the same soil.

In the study summary, applications that were not in line with the scheduled application pattern of the study are assumed:
"This coincidence of increases of residues of >100 % of the nominal application rate (despite dissipation processes) in the treated plots and the detection of residues in the control plot strongly implies applications of boscalid that were not in line with the scheduled application pattern of the study and hints to at least three additional applications at high rate between sampling events 15 and 16, 20 and 22, and 23 and 25."

Conclusions recently derived by Germany are also applicable for evaluation of BAS 762 02 F in order to maintain consistent approach within the zone and avoid duplication of the work. This conclusion may be changed once the renewal process for boscalid is finalised, as the study was also submitted for purposes of the EU review.

The summary of the study is struck through below as currently not acceptable.</td></tr>
</table>

Reference:	CP 9.1.1.2.2/1
Report	Accumulation behaviour of BAS 510 F in soil under field conditions over several years after application onto vegetables, XXX, C., XXX, H., XXX, T., 2009 report No DE/FK/053/98 2009/1070939 Authority registration No
Guideline(s):	BBA VI 4-1 (December 1986), IVA Guideline for residue analysis part V (1993), SETAC Procedures for assessing the environmental fate and ecotoxicity of pesticides (March 1995)
Deviations:	No
GLP:	yes (certified by Landesamt fuer Umwelt, Wasserwirtschaft und Gewerbeaufsicht, Mainz, Germany),
Acceptability:	Study considered not acceptable by zRMS (DE) in the course of the zonal evaluation for formulation of the same Applicant, Tessior. In order to have consistent approach within the zone, conclusions derived by DE and accepted by cMS are also applicable for BAS 762 02 F, at least until the EU renewal process is finalised and the LoEP issued.

~~EXECUTIVE SUMMARY~~

~~The accumulation behaviour of boscalid under field conditions was investigated over an eleven-year-period from 1998 to 2009. The aim of the study was to determine the residue level of boscalid in soil at steady state after multi-year application.~~

~~The trial was conducted in a typical vegetable growing area in Rheinland-Pfalz, Germany, on a loamy sand soil with a pH value of 7.8.~~

~~Starting in 1998, the trial site was cultivated with vegetable crops in two consecutive years and cereals in the third year according to Good Agricultural Practice of vegetable growing in Germany. The triennial cultivation scheme was repeated four times until 2009. Boscalid was applied to the vegetable crops, but the cereals that were grown every third year were not treated with boscalid. Nominal application rates of boscalid in the first vegetable year of each cultivation cycle were 2 x 300 g a.i. ha~~$^{-1}$ ~~to lettuce and 3 x 500 g a.i. ha~~$^{-1}$ ~~to green beans. The nominal application rates in the second vegetable year of each cycle were 3 x 300 g a.i. ha~~$^{-1}$ ~~to carrots and 2 x 400 g a.i. ha~~$^{-1}$ ~~to cauliflower. The actual amounts of boscalid applied to the field as determined by spray broth calculations differed only slightly from the nominal rates. The total amount of boscalid applied in the first and second vegetable year of each cultivation cycle was 2100 g and 1700 g, respectively, and represents a reasonable worst-case application scheme of boscalid in crop rotation.~~

~~The trial area was subdivided into four plots or treatments. Treatment 1 was used as untreated control plot, whereas treatments 2, 3 and 4 were identically treated plots. Soil samples were taken from all untreated and treated plots twice a year, once in spring before the first application of the year and once after harvest of the (last) crop. Starting in 2006 an additional sampling per year was performed. In the year of cereal cultivation (2006) the additional sampling was conducted in fall before ploughing (November), in 2007 and 2008 the additional sampling was conducted after harvest of the first culture and before planting/seeding the second one. The last sampling was performed in spring 2009 in summer wheat.~~

~~Samples were analysed for boscalid. The measured concentrations were not corrected, neither for recoveries nor blanks, and all results were referred to dry soil weight.~~

~~Samples from the control plot showed no boscalid residues above the determination limit of 0.01 mg/kg from the first sampling in April 1998 until sampling No. 15 in April 2005. These data demonstrate that no interferences of the sample material with the analytical procedure occurred and that the control plots were free of residues of boscalid during that period. However, boscalid was detected in the control plot beginning in November 2005 and residues were present until the end of the study. Residue levels increased from spring to autumn by about 17 % (2005), 54 % (2007) and 34 % (2008) of the nominal rate of boscalid that~~

~~was applied to the treated plots in those years. In the "cereal year" 2006, the amount of the autumn maximum was similar to 2005, i.e. in the order of magnitude of one regular application. However, it is important to note that in 2006 boscalid was not applied to the treated plots according to the application scheme of the study. Taken all together, the increase of residues on the control plot in the last years of the accumulation study hints to several partly excessive applications of boscalid that were not in line with the application scheme of the study.~~

~~Residues measured in the treated plots showed regular behaviour until sampling No. 15 in April 2005. Concentrations in soil increased after the annual application periods followed by a period of degradation with decreasing residues. After application in the growing season, significant residues of boscalid were detected in soil in the spring of the following year and were distributed also to deeper soil layers. This was caused by soil treatments like tillage or ploughing to a maximum depth of 35 cm. However, the highest amounts of residues were detected from 0 to 30 cm depth. In the treated plots, residue levels after the application period increased compared to residue levels before that period by 106 % to 127 % of the nominal yearly application rate. A comparison showed that the residue development after 2005 became very heterogeneous among the three treated plots (i.e. increase of residue levels in one plot and decrease at the same time in another plot). The extraordinary increase of residues and the variability between the three treated replicates give indication that the residue situation cannot be explained by the regular planned applications, which were verified via Petri dish analysis. From these results and additional investigations, it was concluded that additional irregular applications must be assumed. However, further details of these additional applications could not be elucidated.~~

~~A compartment model was set up to estimate the residue level of boscalid in soil at steady state after multi-year use. The model considered the following processes to describe the residue behaviour of boscalid: Application and crop interception, deposition of intercepted a.i. on the soil surface (e.g. via falling leaves) at any time after application (e.g. during harvest), and dissipation in soil between application events regarding soil temperature and moisture. Dissipation behaviour was described using single first-order kinetics and a site-specific~~ $\cancel{DT_{50}}$ ~~value that was estimated from the residues measured on the treated plots during eight individual dissipation periods over the course of the study. The dissipation periods include data measured from 2005 onward, because the observed residue decline in dissipation periods before and after 2005 did not differ, although residues began to increase unexpectedly in 2005 as described before. The compartment model was fitted to the residues observed in samples up to 2005 only. Observed residues from later samplings were not included, because the irregular increase of residues starting with sampling event 16 was considered not to result from the regular application scheme of the accumulation study and, therefore, not to reflect adequately the accumulation behaviour of boscalid.~~

~~The evaluation of the model results showed that predicted minimum and maximum values in the third and fourth application cycle were comparable, indicating that the model curve approximated steady state conditions in the third application cycle. The plateau level (i.e. the maximum of predicted residue levels before the application period of the second vegetable year, n = 4) was predicted in year 8 of the eleven-year accumulation study. The predicted plateau amounted to 1.50 kg/ha or 118 % of the average yearly application rate of the study. Assuming a soil bulk density of 1500~~ $\cancel{kg/m^3}$ ~~and a soil layer of 0.3 m as a realistic depth of soil cultivation in vegetable crops, the predicted plateau corresponds to 0.333 mg/kg. The peak level (i.e. the maximum of predicted residue levels in autumn of the second vegetable year, n = 4) was predicted in year 11 of the study and amounted to 2.06 kg/ha or 162 % of the average yearly application rate of the study. Assuming a soil bulk density of 1500~~ $\cancel{kg/m^3}$ ~~and a soil layer of 0.3 m, the predicted peak level corresponds to 0.457 mg/kg.~~

~~MATERIAL AND METHODS~~

~~Application data~~

~~The accumulation behaviour of boscalid under field conditions was investigated over an eleven-year-period from 1998 to 2009. The trial was conducted in a typical vegetable growing area in Rheinland-Pfalz, Germany on a loamy sand soil with an organic carbon content of 1.0 %, a pH value of 7.8, cation exchange~~

~~capacity of 13 mVal/100 g dry soil and a maximum water holding capacity of 43 g water/100 g dry soil.~~

~~Starting in 1998, the trial site was cultivated with vegetable crops in two consecutive years and cereals in the third year according to Good Agricultural Practice of vegetable growing in Germany. The triennial cultivation scheme was repeated four times until 2009. Boscalid was applied to the vegetable crops, but the cereals that were grown every third year were not treated with the active ingredient (a.i.). In summary 15200 g boscalid were applied during the study; 8400 g ha-1 boscalid were applied to lettuce/green beans (4 years with 2100 g a.i. ha-1 a-1) and 6800 g ha-1 (4 years with 1700 g a.i. ha-1 a-1) were applied to onto carrots/cauliflower. A summary of the application parameters including dates of applications, formulation, crops, growth stages and product and spray mixture applied is given in Table A- 6.~~

~~Table A- 6~~ ~~Application parameters~~

~~Application No.~~	~~Date~~	~~DAFT~~	~~Formulation~~	~~Crop~~	~~Growth stage [BBCH]~~	~~Spray mixture [l ha^{-1}]~~	~~Product [l ha^{-1} or kg ha^{-1}]~~	~~a.s. nominal [g ha^{-1}]~~
~~1~~	~~14.05.98~~	~~0~~	~~BAS 510 KA F~~	~~Lettuce~~	~~17~~	~~595~~	~~0.595~~	~~298~~
~~2~~	~~03.06.98~~	~~20~~	~~BAS 510 KA F~~	~~Lettuce~~	~~43~~	~~811~~	~~0.608~~	~~304~~
~~3~~	~~25.08.98~~	~~103~~	~~BAS 510 KA F~~	~~Green bean~~	~~61~~	~~589~~	~~0.982~~	~~491~~
~~4~~	~~07.09.98~~	~~116~~	~~BAS 510 KA F~~	~~Green bean~~	~~65~~	~~799~~	~~0.999~~	~~500~~
~~5~~	~~17.09.98~~	~~126~~	~~BAS 510 KA F~~	~~Green bean~~	~~67~~	~~823~~	~~1.029~~	~~515~~
~~6~~	~~20.05.99~~	~~371~~	~~BAS 510 01 F~~	~~Carrot~~	~~14~~	~~395~~	~~0.593~~	~~297~~
~~7~~	~~07.06.99~~	~~389~~	~~BAS 510 01 F~~	~~Carrot~~	~~41~~	~~575~~	~~0.575~~	~~288~~
~~8~~	~~22.06.99~~	~~404~~	~~BAS 510 01 F~~	~~Carrot~~	~~47~~	~~756~~	~~0.567~~	~~284~~
~~9~~	~~02.09.99~~	~~476~~	~~BAS 510 01 F~~	~~Cauliflower~~	~~19~~	~~617~~	~~0.822~~	~~411~~
~~10~~	~~17.09.99~~	~~491~~	~~BAS 510 01 F~~	~~Cauliflower~~	~~41~~	~~781~~	~~0.781~~	~~391~~
~~11~~	~~04.05.01~~	~~1086~~	~~BAS 510 01 F~~	~~Lettuce~~	~~17~~	~~600~~	~~0.60~~	~~300~~
~~12~~	~~23.05.01~~	~~1105~~	~~BAS 510 01 F~~	~~Lettuce~~	~~43~~	~~814~~	~~0.61~~	~~305~~
~~13~~	~~23.07.01~~	~~1166~~	~~BAS 510 01 F~~	~~Green bean~~	~~61~~	~~593~~	~~0.99~~	~~495~~
~~14~~	~~02.08.01~~	~~1176~~	~~BAS 510 01 F~~	~~Green bean~~	~~65~~	~~767~~	~~0.96~~	~~480~~
~~15~~	~~21.08.01~~	~~1195~~	~~BAS 510 01 F~~	~~Green bean~~	~~67~~	~~774~~	~~0.97~~	~~485~~
~~16~~	~~15.05.02~~	~~1462~~	~~BAS 510 01 F~~	~~Carrot~~	~~16~~	~~419~~	~~0.63~~	~~315~~
~~17~~	~~27.05.02~~	~~1474~~	~~BAS 510 01 F~~	~~Carrot~~	~~41~~	~~586~~	~~0.59~~	~~295~~
~~18~~	~~17.06.02~~	~~1495~~	~~BAS 510 01 F~~	~~Carrot~~	~~45~~	~~806~~	~~0.60~~	~~300~~
~~19~~	~~02.09.02~~	~~1572~~	~~BAS 510 01 F~~	~~Cauliflower~~	~~19~~	~~608~~	~~0.81~~	~~405~~
~~20~~	~~13.09.02~~	~~1583~~	~~BAS 510 01 F~~	~~Cauliflower~~	~~41~~	~~784~~	~~0.78~~	~~390~~
~~21~~	~~26.05.04~~	~~2204~~	~~BAS 510 01 F~~	~~Lettuce~~	~~17~~	~~618~~	~~0.62~~	~~310~~
~~22~~	~~08.06.04~~	~~2217~~	~~BAS 510 01 F~~	~~Lettuce~~	~~42~~	~~800~~	~~0.60~~	~~300~~
~~23~~	~~23.08.04~~	~~2293~~	~~BAS 510 01 F~~	~~Green bean~~	~~61~~	~~605~~	~~1.01~~	~~505~~
~~24~~	~~03.09.04~~	~~2304~~	~~BAS 510 01 F~~	~~Green bean~~	~~65~~	~~806~~	~~1.01~~	~~505~~
~~25~~	~~17.09.04~~	~~2318~~	~~BAS 510 01 F~~	~~Green bean~~	~~67~~	~~794~~	~~0.99~~	~~495~~
~~26~~	~~03.06.05~~	~~2577~~	~~BAS 510 01 F~~	~~Carrot~~	~~15~~	~~413~~	~~0.62~~	~~310~~
~~27~~	~~14.06.05~~	~~2588~~	~~BAS 510 01 F~~	~~Carrot~~	~~41~~	~~597~~	~~0.60~~	~~300~~
~~28~~	~~27.06.05~~	~~2601~~	~~BAS 510 01 F~~	~~Carrot~~	~~45~~	~~796~~	~~0.60~~	~~300~~
~~29~~	~~19.09.05~~	~~2685~~	~~BAS 510 01 F~~	~~Cauliflower~~	~~19~~	~~589~~	~~0.79~~	~~395~~
~~30~~	~~17.10.05~~	~~2713~~	~~BAS 510 01 F~~	~~Cauliflower~~	~~41~~	~~786~~	~~0.79~~	~~395~~
~~31~~	~~22.05.07~~	~~3295~~	~~BAS 510 01 F~~	~~Lettuce~~	~~18~~	~~615~~	~~0.62~~	~~310~~
~~32~~	~~05.06.07~~	~~3309~~	~~BAS 510 01 F~~	~~Lettuce~~	~~43~~	~~773~~	~~0.58~~	~~290~~
~~33~~	~~13.09.07~~	~~3409~~	~~BAS 510 01 F~~	~~Green bean~~	~~61~~	~~573~~	~~0.96~~	~~480~~
~~34~~	~~24.09.07~~	~~3420~~	~~BAS 510 01 F~~	~~Green bean~~	~~65~~	~~774~~	~~0.97~~	~~485~~
~~35~~	~~09.10.07~~	~~3435~~	~~BAS 510 01 F~~	~~Green bean~~	~~67~~	~~789~~	~~0.99~~	~~495~~
~~36~~	~~30.06.08~~	~~3700~~	~~BAS 510 01 F~~	~~Carrot~~	~~16~~	~~384~~	~~0.58~~	~~290~~
~~37~~	~~14.07.08~~	~~3714~~	~~BAS 510 01 F~~	~~Carrot~~	~~41~~	~~595~~	~~0.60~~	~~300~~
~~38~~	~~01.08.08~~	~~3732~~	~~BAS 510 01 F~~	~~Carrot~~	~~47~~	~~809~~	~~0.61~~	~~305~~
~~39~~	~~11.09.08~~	~~3773~~	~~BAS 510 01 F~~	~~Cauliflower~~	~~19~~	~~585~~	~~0.78~~	~~390~~
~~40~~	~~14.10.08~~	~~3806~~	~~BAS 510 01 F~~	~~Cauliflower~~	~~41~~	~~781~~	~~0.78~~	~~390~~

~~DAFT = days after first treatment~~

~~Application verification~~

~~To determine the quantity of spray mixture and active ingredient applied to the trial area, the quantity of spray mixture discharged prior to the application and the quantity remaining in the equipment after application were determined and subtracted from the prepared spray mixture. In 2007 and 2008, application was in addition checked by analysing glass made Petri dishes filled with 50 g soil that were laid out on the treated plots during application. On each treated plot, 5 dishes were distributed evenly on the area on the border strip between two subplots. The diameter of each dish was 10.8 cm (area 91.6 cm^2). Right after application, the dishes were closed with the lid, sealed with adhesive tape and dispatched together with the field samples to the specimen management of the test facility.~~

~~Soil sampling and processing~~

~~Soil samples were taken in spring before seeding or planting the first crop and in autumn after harvest of the last crop, before the soil was ploughed. Starting in 2006, an additional sampling per year was performed. In this year the additional sampling was conducted in fall before ploughing (November), in 2007 and 2008 the additional sampling was performed after harvest of the first crop before planting/seeding the second crop.~~

~~The soil cores were divided into 0 – 10, 10 – 25 and 25 – 50 cm core segments in deep frozen state. Beginning with 2001 (April - sampling no. 7), the soil increments for analysis were changed to 0 - 10, 10 – 20, 20 – 30, 30 – 40 and 40 - 50 cm to give a more detailed overview of the distribution of the residues within the soil layers. Beginning with the fall sampling in 2006 (August - sampling no. 18), the segmentation pattern was changed to 0 – 5, 5 – 10, 10 – 20, 20 – 30, 30 – 40 and 40 - 50 cm again to improve residue resolution.~~

~~The core segments of the same soil depth from one field sample were ground up together with dry ice in frozen state by different mills (hammer or stephan mill) producing one homogenised laboratory sample. Starting with 2006 (March - sampling 17), prior to the processing of the soil segments, the weight and the moisture of the soil segments were determined.~~

~~The soil of the Petri dishes was not further processed. Each dish with soil represented one laboratory sample and the soil was directly analysed.~~

~~Boscalid is stable in soil for two years when stored frozen (approx. -18°C) in the dark (BASF DocID 2000/1000136; EU peer-reviewed study, DAR November 8th, 2002).~~

~~Residue analysis~~

~~The soil samples were analysed with BASF method 408/1 for concentrations of the parent compound boscalid. Beginning with 2005, BASF method D0004, which applies LC-MS/MS for quantification, was used for analysis with slight modifications.~~

~~Estimation of the plateau residue level of boscalid in soil after multi-year application~~

~~Conceptual approach~~

~~The conceptual approach to derive the plateau residue level of boscalid in soil that was considered most appropriate to account for the observed accumulation pattern with its marked change in residue development was:~~

- ~~to gain information about the dissipation behaviour over the course of the study period gain observations from all sampling events,~~
- ~~to optimise the model to predict residues of boscalid in soil over time based on observations 2 to 15 only, because the increase in residues of more than 100 % of the nominal application rate from sampling event 16 on implies that including those observation may lead to a biased model fit and~~

~~consequently biased prediction of the residue plateau level of boscalid in soil,~~

- ~~to run the optimised model for the eleven-year period of the study and to derive the plateau residue level from that period of the modelled time series where steady state conditions (equilibrium of application and dissipation) are approximated.~~

~~Model overview~~

~~Residues in soil of boscalid were predicted using a compartment model that considers the following processes:~~

- ~~application of the a.i. at individual events~~
- ~~crop interception of the a.i. at individual application events~~
- ~~deposition of intercepted a.i. on the soil surface (e.g. via falling leaves) at any time after application (e.g. during harvest)~~
- ~~dissipation in soil of the a.i. between application events regarding soil temperature and moisture~~

~~The soil compartment receives input from individual application events that reflect the combined effect of the processes of application, crop interception and deposition of intercepted a.i. on soil surface. Interception and deposition are considered as crop-specific parameters, i.e. individual values of interception and deposition were used for each crop. It is assumed that the process of crop interception and the process of deposition of the intercepted a.i. occur at the same time to avoid over-parameterisation of the model. The dissipation of residues from the soil compartment is described using single-first order (SFO) kinetics.~~

~~Estimating dissipation times~~

~~The dissipation time DT_{50} at reference conditions was calculated from site-specific DT_{50} values that were estimated for individual dissipation periods over the course of the study.~~

~~Dissipation periods extend from the end of one application period to the beginning of the next, i.e. from the last application in autumn to the next application in spring. Regarding the repeated triennial cultivation pattern in the present study (1st year: vegetables; 2nd year vegetables; 3rd year: cereals; repeated), typical dissipation periods extend over about 7 months (two consecutive vegetable cultivation years) or over about 7+12 months (cereals cultivation year before next vegetable cultivation year). Eight individual dissipation periods occurred during the study and the development of residue levels was characterised by two to five soil samples per period. For each dissipation periods, the SFO kinetic model was fitted to the observed residues to estimate the parameters $C_{initial}$ and DT_{50}.~~

~~Model optimisation and modelling endpoints~~

~~The optimisation procedure was based on observed residues from sampling events 2 to 15. Observations from sampling event 16 on were excluded, because increases of the residues of >100 % of the nominal application rate (despite dissipation processes) in the treated plots coincided with residue detection in the control plot. This strongly implies applications of boscalid that were not in line with the scheduled application pattern of the study.~~

~~The fitted model curve was used to estimate the plateau level and the peak level of residues of boscalid in soil at steady state after multi-year application. The plateau level reflects the typical minimum residue level in soil before annual application in spring and the peak level reflects the typical maximum residue level in soil after annual application in autumn.~~

~~In order to obtain representative estimates of the residue level of boscalid in soil at steady state after multi-year application, both the plateau level and the peak level were derived from predicted residues of the second "vegetable year" in each application cycle:~~

- ~~the maximum of the predicted spring residues (n=4) can be considered as adequate estimate of the plateau level of residues of boscalid in soil~~

- ~~the maximum of the predicted autumn residues (n=4) can be considered as adequate estimate of the peak level of residues of boscalid in soil~~

~~RESULTS AND DISCUSSION~~

~~Analytical results~~

~~Residues in the soil samples of the Petri dishes (2007 and 2008)~~

~~The total amount of soil present in each Petri dish was extracted and analysed for boscalid. A correlation of these measured data with the nominal application rate obtained from calculation of spray broth depletion during application confirms the excellent performance of the applications.~~

~~Residue levels in the control plot and the treated plots~~

~~Detailed results of the residue analysis of the soil samples of different depths of the untreated control plot ("treatment 1") and the treated plots (treatments 2, 3, 4) are given in **Table A- 7**.~~

~~**Table A- 7 Analytical results for boscalid in soil from treated plots**~~

Sample information					Analytical data				
Sample No.	Sampling No.	Soil depth [cm]	Treat-ment	Sampling date	SWC# [%]	Boscalid [mg/kg]	Boscalid [kg ha-1] calculated with bulk density of 1.5 g/cm³	Field bulk density [g/cm³]	Boscalid [kg ha-1] calculated with field bulk density
9801728	1	0 – 10	2	30.04.1998	13.8	< 0.01	0	n.a.	n.a.
9801731	1	0 – 10	3	30.04.1998	11.1	< 0.01	0	n.a.	n.a.
9801734	1	0 – 10	4	30.04.1998	15.1	< 0.01	0	n.a.	n.a.
9801729	1	10 – 25	2	30.04.1998	16.8	< 0.01	0	n.a.	n.a.
9801732	1	10 – 25	3	30.04.1998	16.2	< 0.01	0	n.a.	n.a.
9801735	1	10 – 25	4	30.04.1998	17.1	< 0.01	0	n.a.	n.a.
9801730	1	25 – 50	2	30.04.1998	16.7	< 0.01	0	n.a.	n.a.
9801733	1	25 – 50	3	30.04.1998	17.7	< 0.01	0	n.a.	n.a.
9801736	1	25 – 50	4	30.04.1998	17.1	< 0.01	0	n.a.	n.a.
9805854	2	0 – 10	2	12.10.1998	16.9	0.386	0.579	n.a.	n.a.
9805857	2	0 – 10	3	12.10.1998	17.4	0.619	0.929	n.a.	n.a.
9805860	2	0 – 10	4	12.10.1998	18.0	0.904	1.36	n.a.	n.a.
9805855	2	10 – 25	2	12.10.1998	16.7	< 0.01	0	n.a.	n.a.
9805858	2	10 – 25	3	12.10.1998	17.4	< 0.01	0	n.a.	n.a.
9805861	2	10 – 25	4	12.10.1998	15.8	0.079	0.178	n.a.	n.a.
9805856	2	25 – 50	2	12.10.1998	17.3	0.011	0.040	n.a.	n.a.
9805859	2	25 – 50	3	12.10.1998	17.8	0.020	0.077	n.a.	n.a.
9805862	2	25 – 50	4	12.10.1998	17.9	0.253	0.949	n.a.	n.a.
9900965	3	0 – 10	2	08.03.1999	16.5	0.128	0.192	n.a.	n.a.
9900968	3	0 – 10	3	08.03.1999	17.1	0.132	0.198	n.a.	n.a.
9900971	3	0 – 10	4	08.03.1999	18.6	0.081	0.122	n.a.	n.a.
9900966	3	10 – 25	2	08.03.1999	17.3	0.183	0.412	n.a.	n.a.
9900969	3	10 – 25	3	08.03.1999	19.8	0.361	0.812	n.a.	n.a.
9900972	3	10 – 25	4	08.03.1999	18.3	0.115	0.259	n.a.	n.a.
9900967	3	25 – 50	2	08.03.1999	17.6	< 0,01	0	n.a.	n.a.
9900970	3	25 – 50	3	08.03.1999	19.0	< 0,01	0	n.a.	n.a.
9900973	3	25 – 50	4	08.03.1999	18.8	0.029	0.110	n.a.	n.a.
9908546	4	0 – 10	2	03.11.1999	16.7	0.774	1.16	n.a.	n.a.
9908549	4	0 – 10	3	03.11.1999	19.2	0.874	1.31	n.a.	n.a.
9908552	4	0 – 10	4	03.11.1999	16.8	< 0.01	0	n.a.	n.a.
9908547	4	10 – 25	2	03.11.1999	15.7	0.196	0.441	n.a.	n.a.
9908550	4	10 – 25	3	03.11.1999	16.7	0.206	0.464	n.a.	n.a.
9908553	4	10 – 25	4	03.11.1999	15.4	0.401	0.902	n.a.	n.a.
9908548	4	25 – 50	2	03.11.1999	16.5	< 0,01	0	n.a.	n.a.
9908551	4	25 – 50	3	03.11.1999	15.9	0.026	0.096	n.a.	n.a.

~~Sample information~~					~~Analytical data~~				
~~Sample No.~~	~~Sampling No.~~	~~Soil depth [cm]~~	~~Treatment~~	~~Sampling date~~	~~SWC# [%]~~	~~Boscalid [mg/kg]~~	~~Boscalid [kg ha^{-1}] calculated with bulk density of 1.5 g/cm^3~~	~~Field bulk density [g/cm^3]~~	~~Boscalid [kg ha^{-1}] calculated with field bulk density~~
~~9908554~~	~~4~~	~~25 – 50~~	~~4~~	~~03.11.1999~~	~~14.1~~	~~0.047~~	~~0.175~~	~~n.a.~~	~~n.a.~~
~~3208~~	~~5~~	~~0 – 10~~	~~2~~	~~13.03.2000~~	~~14.0~~	~~0.222~~	~~0.333~~	~~n.a.~~	~~n.a.~~
~~3211~~	~~5~~	~~0 – 10~~	~~3~~	~~13.03.2000~~	~~13.3~~	~~0.221~~	~~0.332~~	~~n.a.~~	~~n.a.~~
~~3214~~	~~5~~	~~0 – 10~~	~~4~~	~~13.03.2000~~	~~13.5~~	~~0.239~~	~~0.359~~	~~n.a.~~	~~n.a.~~
~~3209~~	~~5~~	~~10 – 25~~	~~2~~	~~13.03.2000~~	~~17.5~~	~~0.305~~	~~0.686~~	~~n.a.~~	~~n.a.~~
~~3212~~	~~5~~	~~10 – 25~~	~~3~~	~~13.03.2000~~	~~17.7~~	~~0.246~~	~~0.554~~	~~n.a.~~	~~n.a.~~
~~3215~~	~~5~~	~~10 – 25~~	~~4~~	~~13.03.2000~~	~~18.3~~	~~0.197~~	~~0.443~~	~~n.a.~~	~~n.a.~~
~~3210~~	~~5~~	~~25 – 50~~	~~2~~	~~13.03.2000~~	~~18.5~~	~~0.018~~	~~0.069~~	~~n.a.~~	~~n.a.~~
~~3213~~	~~5~~	~~25 – 50~~	~~3~~	~~13.03.2000~~	~~18.7~~	~~0.012~~	~~0.044~~	~~n.a.~~	~~n.a.~~
~~3216~~	~~5~~	~~25 – 50~~	~~4~~	~~13.03.2000~~	~~19.4~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~8892~~	~~6~~	~~0 – 10~~	~~2~~	~~21.08.2000~~	~~17.4~~	~~0.132~~	~~0.198~~	~~n.a.~~	~~n.a.~~
~~8895~~	~~6~~	~~0 – 10~~	~~3~~	~~21.08.2000~~	~~18.5~~	~~0.145~~	~~0.218~~	~~n.a.~~	~~n.a.~~
~~8898~~	~~6~~	~~0 – 10~~	~~4~~	~~21.08.2000~~	~~15.7~~	~~0.139~~	~~0.209~~	~~n.a.~~	~~n.a.~~
~~8893~~	~~6~~	~~10 – 25~~	~~2~~	~~21.08.2000~~	~~17.2~~	~~0.363~~	~~0.817~~	~~n.a.~~	~~n.a.~~
~~8896~~	~~6~~	~~10 – 25~~	~~3~~	~~21.08.2000~~	~~15.4~~	~~0.280~~	~~0.630~~	~~n.a.~~	~~n.a.~~
~~8899~~	~~6~~	~~10 – 25~~	~~4~~	~~21.08.2000~~	~~16.4~~	~~0.238~~	~~0.536~~	~~n.a.~~	~~n.a.~~
~~8894~~	~~6~~	~~25 – 50~~	~~2~~	~~21.08.2000~~	~~16.4~~	~~0.054~~	~~0.204~~	~~n.a.~~	~~n.a.~~
~~8897~~	~~6~~	~~25 – 50~~	~~3~~	~~21.08.2000~~	~~15.8~~	~~0.063~~	~~0.236~~	~~n.a.~~	~~n.a.~~
~~8900~~	~~6~~	~~25 – 50~~	~~4~~	~~21.08.2000~~	~~14.3~~	~~0.052~~	~~0.196~~	~~n.a.~~	~~n.a.~~
~~104732~~	~~7~~	~~0 – 10~~	~~2~~	~~04.04.2001~~	~~13.8~~	~~0.135~~	~~0.203~~	~~n.a.~~	~~n.a.~~
~~104737~~	~~7~~	~~0 – 10~~	~~3~~	~~04.04.2001~~	~~13.0~~	~~0.244~~	~~0.366~~	~~n.a.~~	~~n.a.~~
~~104742~~	~~7~~	~~0 – 10~~	~~4~~	~~04.04.2001~~	~~14.9~~	~~0.224~~	~~0.336~~	~~n.a.~~	~~n.a.~~
~~104733~~	~~7~~	~~10 – 20~~	~~2~~	~~04.04.2001~~	~~17.1~~	~~0.133~~	~~0.200~~	~~n.a.~~	~~n.a.~~
~~104738~~	~~7~~	~~10 – 20~~	~~3~~	~~04.04.2001~~	~~16.4~~	~~0.148~~	~~0.222~~	~~n.a.~~	~~n.a.~~
~~104743~~	~~7~~	~~10 – 20~~	~~4~~	~~04.04.2001~~	~~17.3~~	~~0.111~~	~~0.167~~	~~n.a.~~	~~n.a.~~
~~104734~~	~~7~~	~~20 – 30~~	~~2~~	~~04.04.2001~~	~~17.9~~	~~0.045~~	~~0.068~~	~~n.a.~~	~~n.a.~~
~~104739~~	~~7~~	~~20 – 30~~	~~3~~	~~04.04.2001~~	~~22.2~~	~~0.021~~	~~0.032~~	~~n.a.~~	~~n.a.~~
~~104744~~	~~7~~	~~20 – 30~~	~~4~~	~~04.04.2001~~	~~19.5~~	~~0.029~~	~~0.044~~	~~n.a.~~	~~n.a.~~
~~104735~~	~~7~~	~~30 – 40~~	~~2~~	~~04.04.2001~~	~~18.3~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~104740~~	~~7~~	~~30 – 40~~	~~3~~	~~04.04.2001~~	~~18.3~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~104745~~	~~7~~	~~30 – 40~~	~~4~~	~~04.04.2001~~	~~18.5~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~104736~~	~~7~~	~~40 – 50~~	~~2~~	~~04.04.2001~~	~~18.3~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~104741~~	~~7~~	~~40 – 50~~	~~3~~	~~04.04.2001~~	~~20.5~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~104746~~	~~7~~	~~40 – 50~~	~~4~~	~~04.04.2001~~	~~19.2~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~113976~~	~~8~~	~~0 – 10~~	~~2~~	~~06.11.2001~~	~~14.8~~	~~0.695~~	~~1.043~~	~~n.a.~~	~~n.a.~~
~~113981~~	~~8~~	~~0 – 10~~	~~3~~	~~06.11.2001~~	~~14.6~~	~~0.839~~	~~1.259~~	~~n.a.~~	~~n.a.~~
~~113986~~	~~8~~	~~0 – 10~~	~~4~~	~~06.11.2001~~	~~13.4~~	~~0.717~~	~~1.076~~	~~n.a.~~	~~n.a.~~
~~113977~~	~~8~~	~~10 – 20~~	~~2~~	~~06.11.2001~~	~~17.3~~	~~0.190~~	~~0.285~~	~~n.a.~~	~~n.a.~~
~~113982~~	~~8~~	~~10 – 20~~	~~3~~	~~06.11.2001~~	~~17.3~~	~~0.228~~	~~0.342~~	~~n.a.~~	~~n.a.~~
~~113987~~	~~8~~	~~10 – 20~~	~~4~~	~~06.11.2001~~	~~15.2~~	~~0.200~~	~~0.300~~	~~n.a.~~	~~n.a.~~
~~113978~~	~~8~~	~~20 – 30~~	~~2~~	~~06.11.2001~~	~~17.9~~	~~0.125~~	~~0.188~~	~~n.a.~~	~~n.a.~~
~~113983~~	~~8~~	~~20 – 30~~	~~3~~	~~06.11.2001~~	~~18.0~~	~~0.164~~	~~0.246~~	~~n.a.~~	~~n.a.~~
~~113988~~	~~8~~	~~20 – 30~~	~~4~~	~~06.11.2001~~	~~15.6~~	~~0.159~~	~~0.239~~	~~n.a.~~	~~n.a.~~
~~113979~~	~~8~~	~~30 – 40~~	~~2~~	~~06.11.2001~~	~~17.3~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~113984~~	~~8~~	~~30 – 40~~	~~3~~	~~06.11.2001~~	~~15.6~~	~~0.026~~	~~0.039~~	~~n.a.~~	~~n.a.~~
~~113989~~	~~8~~	~~30 – 40~~	~~4~~	~~06.11.2001~~	~~14.1~~	~~0.011~~	~~0.017~~	~~n.a.~~	~~n.a.~~
~~113980~~	~~8~~	~~40 – 50~~	~~2~~	~~06.11.2001~~	~~15.9~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~113985~~	~~8~~	~~40 – 50~~	~~3~~	~~06.11.2001~~	~~11.0~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~113990~~	~~8~~	~~40 – 50~~	~~4~~	~~06.11.2001~~	~~14.5~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~
~~116226~~	~~9~~	~~0 – 10~~	~~2~~	~~28.02.2002~~	~~17.7~~	~~0.250~~	~~0.375~~	~~n.a.~~	~~n.a.~~
~~116255~~	~~9~~	~~0 – 10~~	~~3~~	~~28.02.2002~~	~~16.6~~	~~0.215~~	~~0.323~~	~~n.a.~~	~~n.a.~~
~~116245~~	~~9~~	~~0 – 10~~	~~4~~	~~28.02.2002~~	~~17.7~~	~~0.251~~	~~0.377~~	~~n.a.~~	~~n.a.~~
~~116227~~	~~9~~	~~10 – 20~~	~~2~~	~~28.02.2002~~	~~18.1~~	~~0.440~~	~~0.660~~	~~n.a.~~	~~n.a.~~
~~116238~~	~~9~~	~~10 – 20~~	~~3~~	~~28.02.2002~~	~~18.2~~	~~0.438~~	~~0.657~~	~~n.a.~~	~~n.a.~~
~~116246~~	~~9~~	~~10 – 20~~	~~4~~	~~28.02.2002~~	~~19.3~~	~~0.439~~	~~0.659~~	~~n.a.~~	~~n.a.~~
~~116228~~	~~9~~	~~20 – 30~~	~~2~~	~~28.02.2002~~	~~20.5~~	~~0.100~~	~~0.150~~	~~n.a.~~	~~n.a.~~
~~116236~~	~~9~~	~~20 – 30~~	~~3~~	~~28.02.2002~~	~~17.6~~	~~0.243~~	~~0.365~~	~~n.a.~~	~~n.a.~~
~~116247~~	~~9~~	~~20 – 30~~	~~4~~	~~28.02.2002~~	~~19.8~~	~~0.154~~	~~0.231~~	~~n.a.~~	~~n.a.~~
~~116229~~	~~9~~	~~30 – 40~~	~~2~~	~~28.02.2002~~	~~19.0~~	~~< 0.01~~	~~0~~	~~n.a.~~	~~n.a.~~

Sample information					Analytical data				
Sample No.	Sampling No.	Soil depth [cm]	Treatment	Sampling date	SWC# [%]	Boscalid [mg/kg]	Boscalid [kg ha^{-1}] calculated with bulk density of 1.5 g/cm^3	Field bulk density [g/cm^3]	Boscalid [kg ha^{-1}] calculated with field bulk density
116237	9	30 – 40	3	28.02.2002	18.9	< 0.01	0	n.a.	n.a.
116248	9	30 – 40	4	28.02.2002	19.9	< 0.01	0	n.a.	n.a.
116230	9	40 – 50	2	28.02.2002	19.2	< 0.01	0	n.a.	n.a.
116239	9	40 – 50	3	28.02.2002	19.5	< 0.01	0	n.a.	n.a.
116249	9	40 – 50	4	28.02.2002	19.3	< 0.01	0	n.a.	n.a.
123492	10	0 – 10	2	19.11.2002	19.4	0.913	1.370	n.a.	n.a.
123502	10	0 – 10	3	19.11.2002	17.7	0.871	1.307	n.a.	n.a.
123512	10	0 – 10	4	19.11.2002	19.8	0.904	1.356	n.a.	n.a.
123494	10	10 – 20	2	19.11.2002	18.6	0.429	0.644	n.a.	n.a.
123504	10	10 – 20	3	19.11.2002	17.1	0.335	0.503	n.a.	n.a.
123514	10	10 – 20	4	19.11.2002	17.6	0.474	0.711	n.a.	n.a.
123496	10	20 – 30	2	19.11.2002	18.6	0.427	0.641	n.a.	n.a.
123506	10	20 – 30	3	19.11.2002	16.7	0.396	0.594	n.a.	n.a.
123516	10	20 – 30	4	19.11.2002	18.4	0.285	0.428	n.a.	n.a.
123498	10	30 – 40	2	19.11.2002	19.9	0.028	0.042	n.a.	n.a.
123508	10	30 – 40	3	19.11.2002	18.7	0.012	0.018	n.a.	n.a.
123518	10	30 – 40	4	19.11.2002	19.0	0.016	0.024	n.a.	n.a.
123500	10	40 – 50	2	19.11.2002	19.1	< 0.01	0	n.a.	n.a.
123510	10	40 – 50	3	19.11.2002	18.0	< 0.01	0	n.a.	n.a.
123520	10	40 – 50	4	19.11.2002	20.2	< 0.01	0	n.a.	n.a.
125725	11	0 – 10	2	17.03.2003	13.9	0.375	0.563	n.a.	n.a.
125730	11	0 – 10	3	17.03.2003	13.7	0.403	0.605	n.a.	n.a.
125735	11	0 – 10	4	17.03.2003	12.4	0.327	0.491	n.a.	n.a.
125726	11	10 – 20	2	17.03.2003	19.9	0.168	0.252	n.a.	n.a.
125731	11	10 – 20	3	17.03.2003	19.3	0.217	0.326	n.a.	n.a.
125736	11	10 – 20	4	17.03.2003	18.0	0.169	0.254	n.a.	n.a.
125727	11	20 – 30	2	17.03.2003	19.1	< 0.01	0	n.a.	n.a.
125732	11	20 – 30	3	17.03.2003	20.8	0.047	0.071	n.a.	n.a.
125737	11	20 – 30	4	17.03.2003	19.6	0.013	0.020	n.a.	n.a.
125728	11	30 – 40	2	17.03.2003	20.0	< 0.01	0	n.a.	n.a.
125733	11	30 – 40	3	17.03.2003	19.3	< 0.01	0	n.a.	n.a.
125738	11	30 – 40	4	17.03.2003	20.1	< 0.01	0	n.a.	n.a.
125729	11	40 – 50	2	17.03.2003	19.9	< 0.01	0	n.a.	n.a.
125734	11	40 – 50	3	17.03.2003	15.4	< 0.01	0	n.a.	n.a.
125739	11	40 – 50	4	17.03.2003	20.9	< 0.01	0	n.a.	n.a.
129905	12	0 – 10	2	21.08.2003	6.0	0.256	0.384	n.a.	n.a.
129910	12	0 – 10	3	21.08.2003	5.8	0.357	0.536	n.a.	n.a.
129915	12	0 – 10	4	21.08.2003	5.9	0.250	0.375	n.a.	n.a.
129906	12	10 – 20	2	21.08.2003	10.3	0.351	0.527	n.a.	n.a.
129911	12	10 – 20	3	21.08.2003	9.7	0.496	0.744	n.a.	n.a.
129916	12	10 – 20	4	21.08.2003	10.0	0.342	0.513	n.a.	n.a.
129907	12	20 – 30	2	21.08.2003	11.8	0.342	0.513	n.a.	n.a.
129912	12	20 – 30	3	21.08.2003	11.6	0.433	0.650	n.a.	n.a.
129917	12	20 – 30	4	21.08.2003	10.5	0.350	0.525	n.a.	n.a.
129908	12	30 – 40	2	21.08.2003	11.8	0.137	0.206	n.a.	n.a.
129913	12	30 – 40	3	21.08.2003	10.7	0.185	0.278	n.a.	n.a.
129918	12	30 – 40	4	21.08.2003	10.2	0.169	0.254	n.a.	n.a.
129909	12	40 – 50	2	21.08.2003	9.3	0.037	0.056	n.a.	n.a.
129914	12	40 – 50	3	21.08.2003	9.2	0.052	0.078	n.a.	n.a.
129919	12	40 – 50	4	21.08.2003	8.6	0.018	0.027	n.a.	n.a.
140721	13	0 – 10	2	15.03.2004	15.9	0.304	0.456	n.a.	n.a.
140726	13	0 – 10	3	15.03.2004	17.5	0.291	0.437	n.a.	n.a.
140731	13	0 – 10	4	15.03.2004	15.2	0.304	0.455	n.a.	n.a.
140722	13	10 – 20	2	15.03.2004	16.8	0.291	0.436	n.a.	n.a.
140727	13	10 – 20	3	15.03.2004	17.0	0.325	0.488	n.a.	n.a.
140732	13	10 – 20	4	15.03.2004	16.0	0.281	0.421	n.a.	n.a.
140723	13	20 – 30	2	15.03.2004	17.0	0.078	0.117	n.a.	n.a.
140728	13	20 – 30	3	15.03.2004	16.6	0.133	0.199	n.a.	n.a.
140733	13	20 – 30	4	15.03.2004	17.8	0.140	0.209	n.a.	n.a.

Sample information					Analytical data				
Sample No.	Sampling No.	Soil depth [cm]	Treatment	Sampling date	SWC# [%]	Boscalid [mg/kg]	Boscalid [kg ha^{-1}] calculated with bulk density of 1.5 g/cm^3	Field bulk density [g/cm^3]	Boscalid [kg ha^{-1}] calculated with field bulk density
140724	13	30 – 40	2	15.03.2004	16.5	0.010	0.015	n.a.	n.a.
140729	13	30 – 40	3	15.03.2004	17.5	< 0.01	0	n.a.	n.a.
140734	13	30 – 40	4	15.03.2004	16.1	0.012	0.018	n.a.	n.a.
140725	13	40 – 50	2	15.03.2004	15.5	< 0.01	0	n.a.	n.a.
140730	13	40 – 50	3	15.03.2004	16.6	0.011	0.017	n.a.	n.a.
140735	13	40 – 50	4	15.03.2004	15.3	0.014	0.020	n.a.	n.a.
156892	14	0 – 10	2	21.10.2004	16.9	0.927	1.391	n.a.	n.a.
156893	14	0 – 10	3	21.10.2004	16.9	0.812	1.218	n.a.	n.a.
156894	14	0 – 10	4	21.10.2004	16.9	0.713	1.070	n.a.	n.a.
156900	14	10 – 20	2	21.10.2004	14.0	0.300	0.450	n.a.	n.a.
156901	14	10 – 20	3	21.10.2004	15.9	0.303	0.455	n.a.	n.a.
156902	14	10 – 20	4	21.10.2004	15.1	0.327	0.490	n.a.	n.a.
156908	14	20 – 30	2	21.10.2004	14.3	0.204	0.307	n.a.	n.a.
156909	14	20 – 30	3	21.10.2004	16.3	0.233	0.349	n.a.	n.a.
156910	14	20 – 30	4	21.10.2004	15.5	0.185	0.277	n.a.	n.a.
156916	14	30 – 40	2	21.10.2004	13.7	<0.01	0	n.a.	n.a.
156917	14	30 – 40	3	21.10.2004	16.8	<0.01	0	n.a.	n.a.
156918	14	30 – 40	4	21.10.2004	17.3	<0.01	0	n.a.	n.a.
156924	14	40 – 50	2	21.10.2004	11.2	<0.01	0	n.a.	n.a.
156925	14	40 – 50	3	21.10.2004	17.0	<0.01	0	n.a.	n.a.
156926	14	40 – 50	4	21.10.2004	17.2	<0.01	0	n.a.	n.a.
156908	14	20 – 30	2	21.10.2004	14.3	0.204	0.307	n.a.	n.a.
156909	14	20 – 30	3	21.10.2004	16.3	0.233	0.349	n.a.	n.a.
156910	14	20 – 30	4	21.10.2004	15.5	0.185	0.277	n.a.	n.a.
156996	15	0 – 10	2	04.04.2005	15.3	0.326	0.489	n.a.	n.a.
156997	15	0 – 10	3	04.04.2005	14.6	0.295	0.442	n.a.	n.a.
156998	15	0 – 10	4	04.04.2005	13.5	0.253	0.379	n.a.	n.a.
157004	15	10 – 20	2	04.04.2005	17.5	0.428	0.642	n.a.	n.a.
157005/ 157033	15	10 – 20	3	04.04.2005	19.1	<0.01$		n.a.	n.a.
157006	15	10 – 20	4	04.04.2005	16.5	0.397	0.596	n.a.	n.a.
157008	15	20 – 30	2	04.04.2005	18.0	0.299	0.449	n.a.	n.a.
157009	15	20 – 30	3	04.04.2005	18.1	0.254	0.381	n.a.	n.a.
157010	15	20 – 30	4	04.04.2005	16.8	0.054	0.081	n.a.	n.a.
157016	15	30 – 40	2	04.04.2005	18.1	<0.01	0	n.a.	n.a.
157017	15	30 – 40	3	04.04.2005	18.9	<0.01	0	n.a.	n.a.
157018	15	30 – 40	4	04.04.2005	17.8	<0.01	0	n.a.	n.a.
157024	15	40 – 50	2	04.04.2005	18.1	<0.01	0	n.a.	n.a.
157025/ 157029	15	40 – 50	3	04.04.2005	17.9	0.453$		n.a.	n.a.
157026	15	40 – 50	4	04.04.2005	17.7	<0.01	0	n.a.	n.a.
158058	16	0 – 10	1	17.11.2005	15.9	0.158	0.237	1.528	0.242
158068	16	0 – 10	2	17.11.2005	20.6	1.307	1.961	1.390	1.817
158078	16	0 – 10	3	17.11.2005	21.0	1.310	1.965	1.500	1.965
158088	16	0 – 10	4	17.11.2005	20.7	1.321	1.981	1.515	2.001
158060	16	10 – 20	1	17.11.2005	11.8	0.027	0.041	1.891	0.052
158070	16	10 – 20	2	17.11.2005	14.9	0.375	0.562	1.676	0.628
158080	16	10 – 20	3	17.11.2005	16.9	0.390	0.584	1.898	0.739
158090	16	10 – 20	4	17.11.2005	16.9	0.396	0.594	1.877	0.743
158062	16	20 – 30	1	17.11.2005	10.3	<0.01	0	1.500	0
158072	16	20 – 30	2	17.11.2005	12.9	0.428	0.642	1.145	0.490
158082	16	20 – 30	3	17.11.2005	14.5	0.347	0.521	1.466	0.509
158092	16	20 – 30	4	17.11.2005	15.4	0.403	0.604	1.474	0.593
158064	16	30 – 40	1	17.11.2005	9.6	<0.01	0	1.585	0
158074	16	30 – 40	2	17.11.2005	12.8	0.061	0.092	1.271	0.078
158084	16	30 – 40	3	17.11.2005	12.8	0.030	0.045	1.493	0.045
158094	16	30 – 40	4	17.11.2005	14.3	0.031	0.046	1.469	0.045
158066	16	40 – 50	1	17.11.2005	12.4	<0.01	0	1.425	0
158076	16	40 – 50	2	17.11.2005	8.3	<0.01	0	1.140	0
158086	16	40 – 50	3	17.11.2005	9.3	<0.01	0	1.370	0

Sample information					Analytical data				
Sample No.	Sampling No.	Soil depth [cm]	Treatment	Sampling date	SWC# [%]	Boscalid [mg/kg]	Boscalid [kg ha-1] calculated with bulk density of 1.5 g/cm³	Field bulk density [g/cm³]	Boscalid [kg ha-1] calculated with field bulk density
158096	16	40 – 50	4	17.11.2005	9.2	<0.01	0	1.316	0
128210	17	0 – 10	1	28.03.2006	9.4	0.019	0.029	1.454	0.028
158220	17	0 – 10	2	28.03.2006	14.5	0.566	0.848	1.343	0.760
158232	17	0 – 10	3	28.03.2006	14.3	0.500	0.749	1.388	0.693
158242	17	0 – 10	4	28.03.2006	14.9	0.418	0.627	1.405	0.587
158212	17	10 – 20	1	28.03.2006	11.9	0.016	0.023	1.936	0.030
158223	17	10 – 20	2	28.03.2006	15.7	0.588	0.881	1.899	1.116
158234	17	10 – 20	3	28.03.2006	16.3	0.534	0.801	1.686	0.900
158244	17	10 – 20	4	28.03.2006	16.2	0.476	0.713	1.897	0.902
158214	17	20 – 30	1	28.03.2006	11.1	0.023	0.035	1.619	0.037
158225	17	20 – 30	2	28.03.2006	17.3	0.211	0.317	1.501	0.317
158236	17	20 – 30	3	28.03.2006	15.8	0.345	0.517	1.525	0.526
158246	17	20 – 30	4	28.03.2006	17.1	0.247	0.371	1.416	0.350
158216	17	30 – 40	1	28.03.2006	12.7	<0.01	0	1.482	0
158227	17	30 – 40	2	28.03.2006	18.0	<0.01	0	1.615	0
158238	17	30 – 40	3	28.03.2006	17.1	<0.01	0	1.679	0
158248	17	30 – 40	4	28.03.2006	18.0	<0.01	0	1.706	0
158218	17	40 – 50	1	28.03.2006	11.4	<0.01	0	1.404	0
158230	17	40 – 50	2	28.03.2006	17.7	<0.01	0	1.519	0
158240	17	40 – 50	3	28.03.2006	16.4	<0.01	0	1.523	0
158250	17	40 – 50	4	28.03.2006	17.5	<0.01	0	1.508	0
158741	18	0 – 5	1	23.08.2006	13.5	0.013	0.010	1.455	0.010
158755	18	0 – 5	2	23.08.2006	16.8	0.376	0.282	1.448	0.272
158767	18	0 – 5	3	23.08.2006	17.3	0.299	0.224	1.379	0.206
158779	18	0 – 5	4	23.08.2006	15.8	0.227	0.170	1.234	0.140
158747	18	5 – 10	1	23.08.2006	10.6	<0.01	0.000	1.744	0
158757	18	5 – 10	2	23.08.2006	15.6	0.346	0.259	1.656	0.286
158769	18	5 – 10	3	23.08.2006	15.1	0.388	0.291	1.664	0.323
158781	18	5 – 10	4	23.08.2006	14.9	0.338	0.254	1.536	0.260
158745	18	10 – 20	1	23.08.2006	10.7	0.059	0.088	1.963	0.115
158759	18	10 – 20	2	23.08.2006	16.1	0.537	0.805	1.820	0.977
158771	18	10 – 20	3	23.08.2006	16.3	0.489	0.733	1.831	0.894
158783	18	10 – 20	4	23.08.2006	14.9	0.459	0.688	1.721	0.789
158749	18	20 – 30	1	23.08.2006	12.6	0.040	0.060	1.714	0.069
158761	18	20 – 30	2	23.08.2006	16.4	0.523	0.784	1.468	0.767
158773	18	20 – 30	3	23.08.2006	15.4	0.483	0.725	1.492	0.721
158785	18	20 – 30	4	23.08.2006	15.6	0.322	0.483	1.341	0.432
158751	18	30 – 40	1	23.08.2006	17.0	<0.01	0	1.569	0
158763	18	30 – 40	2	23.08.2006	17.3	0.046	0.069	1.602	0.074
158775	18	30 – 40	3	23.08.2006	16.0	0.035	0.053	1.516	0.053
158787	18	30 – 40	4	23.08.2006	16.0	0.067	0.100	1.517	0.101
158753	18	40 – 50	1	23.08.2006	16.3	<0.01	0	1.554	0
158765	18	40 – 50	2	23.08.2006	16.5	<0.01	0	1.438	0
158777	18	40 – 50	3	23.08.2006	15.7	<0.01	0	1.414	0
158789	18	40 – 50	4	23.08.2006	14.7	<0.01	0	1.385	0
158791	19	0 – 5	1	08.11.2006	10.3	0.146	0.110	1.053	0.077
158803	19	0 – 5	2	08.11.2006	13.3	0.260	0.195	0.965	0.125
158815	19	0 – 5	3	08.11.2006	12.4	0.355	0.266	1.016	0.180
158827	19	0 – 5	4	08.11.2006	12.3	0.256	0.192	1.078	0.138
158793	19	5 – 10	1	08.11.2006	11.9	0.024	0.018	1.789	0.022
158805	19	5 – 10	2	08.11.2006	15.6	0.285	0.214	1.593	0.227
158817	19	5 – 10	3	08.11.2006	15.6	0.356	0.267	1.668	0.297
158829	19	5 – 10	4	08.11.2006	15.1	0.340	0.255	1.778	0.302
158795	19	10 – 20	1	08.11.2006	11.7	0.055	0.082	1.652	0.091
158807	19	10 – 20	2	08.11.2006	16.3	0.466	0.699	1.556	0.726
158819	19	10 – 20	3	08.11.2006	16.0	0.488	0.732	1.614	0.788
158831	19	10 – 20	4	08.11.2006	15.9	0.541	0.812	1.641	0.888
158797	19	20 – 30	1	08.11.2006	11.7	0.035	0.052	1.665	0.058
158809	19	20 – 30	2	08.11.2006	16.3	0.280	0.420	1.518	0.425
158821	19	20 – 30	3	08.11.2006	16.0	0.367	0.550	1.584	0.581

Sample information					Analytical data				
Sample No.	Sampling No.	Soil depth [cm]	Treat-ment	Sampling date	SWC# [%]	Boscalid [mg/kg]	Boscalid [kg ha^{-1}] calculated with bulk density of 1.5 g/cm^3	Field bulk density [g/cm^3]	Boscalid [kg ha^{-1}] calculated with field bulk density
158833	19	20 – 30	4	08.11.2006	16.8	0.277	0.416	1.557	0.431
158799	19	30 – 40	1	08.11.2006	15.5	<0.01	0	1.401	0
158811	19	30 – 40	2	08.11.2006	18.3	0.026	0.040	1.503	0.040
158823	19	30 – 40	3	08.11.2006	17.6	0.023	0.034	1.553	0.035
158835	19	30 – 40	4	08.11.2006	17.9	0.029	0.043	1.550	0.045
158801	19	40 – 50	1	08.11.2006	12.1	<0.01	0	1.181	0
158813	19	40 – 50	2	08.11.2006	19.3	<0.01	0	1.418	0
158825	19	40 – 50	3	08.11.2006	18.8	<0.01	0	1.514	0
158837	19	40 – 50	4	08.11.2006	17.5	<0.01	0	1.524	0
L0707830001	20	0 – 5	1	02.04.2007	11.6	0.034	0.025	0.893	0.015
L0707830008	20	0 – 5	2	02.04.2007	11.4	0.540	0.405	0.618	0.167
L0707830014	20	0 – 5	3	02.04.2007	12.6	0.279	0.209	0.909	0.127
L0707830020	20	0 – 5	4	02.04.2007	11.5	0.520	0.390	0.843	0.219
L0707830002	20	5 – 10	1	02.04.2007	15.0	0.054	0.040	1.460	0.039
L0707830009	20	5 – 10	2	02.04.2007	14.5	0.537	0.403	0.877	0.236
L0707830015	20	5 – 10	3	02.04.2007	17.4	0.417	0.313	1.090	0.227
L0707830021	20	5 – 10	4	02.04.2007	16.1	0.555	0.416	1.106	0.307
L0707830003	20	10 – 20	1	02.04.2007	16.1	0.022	0.033	1.390	0.030
L0707830010	20	10 – 20	2	02.04.2007	15.6	0.549	0.824	0.895	0.492
L0707830016	20	10 – 20	3	02.04.2007	16.8	0.433	0.649	1.240	0.536
L0707830022	20	10 – 20	4	02.04.2007	16.5	0.532	0.798	1.180	0.627
L0707830004	20	20 – 30	1	02.04.2007	17.5	<0.01	0	1.544	0
L0707830011	20	20 – 30	2	02.04.2007	17.9	0.117	0.176	1.279	0.150
L0707830017	20	20 – 30	3	02.04.2007	19.9	0.127	0.190	1.443	0.183
L0707830023	20	20 – 30	4	02.04.2007	18.3	0.164	0.246	1.502	0.246
L0707830005	20	30 – 40	1	02.04.2007	17.6	<0.01	0	1.508	0
L0707830012	20	30 – 40	2	02.04.2007	17.7	0.011	0.017	1.500	0.017
L0707830018	20	30 – 40	3	02.04.2007	18.4	<0.01	0	1.503	0
L0707830024	20	30 – 40	4	02.04.2007	19.4	<0.01	0	1.525	0
L0707830006	20	40 – 50	1	02.04.2007	18.3	<0.01	0	1.320	0
L0707830013	20	40 – 50	2	02.04.2007	17.7	0.109	0.164	1.295	0.141
L0707830019	20	40 – 50	3	02.04.2007	19.6	0.032	0.048	1.334	0.043
L0707830007	20	40 – 50	4	02.04.2007	18.6	0.172	0.258	1.433	0.247
L0707830411	21	0 – 5	1	26.07.2007	9.6	0.212	0.159	1.116	0.118
L0707830423	21	0 – 5	2	26.07.2007	12.1	0.808	0.606	1.210	0.489
L0707830429	21	0 – 5	3	26.07.2007	11.8	0.916	0.687	1.283	0.588
L0707830435	21	0 – 5	4	26.07.2007	11.7	0.688	0.516	1.283	0.441
L0707830412	21	5 – 10	1	26.07.2007	12.5	0.134	0.100	1.470	0.098
L0707830424	21	5 – 10	2	26.07.2007	14.4	0.537	0.402	1.621	0.435
L0707830430	21	5 – 10	3	26.07.2007	14.8	0.591	0.443	1.710	0.505
L0707830436	21	5 – 10	4	26.07.2007	13.6	0.474	0.355	1.537	0.364
L0707830413	21	10 – 20	1	26.07.2007	13.1	0.056	0.084	1.506	0.084
L0707830425	21	10 – 20	2	26.07.2007	14.8	0.301	0.451	1.543	0.464
L0707830431	21	10 – 20	3	26.07.2007	14.3	0.321	0.481	1.698	0.545
L0707830437	21	10 – 20	4	26.07.2007	14.0	0.289	0.433	1.531	0.442
L0707830414	21	20 – 30	1	26.07.2007	14.1	0.021	0.032	1.571	0.034
L0707830426	21	20 – 30	2	26.07.2007	16.0	0.164	0.246	1.636	0.268
L0707830432	21	20 – 30	3	26.07.2007	16.5	0.294	0.442	1.625	0.479
L0707830438	21	20 – 30	4	26.07.2007	16.7	0.117	0.175	1.550	0.181
L0707830415	21	30 – 40	1	26.07.2007	14.8	<0.01	0	1.461	0
L0707830427	21	30 – 40	2	26.07.2007	17.4	0.015	0.022	1.440	0.021
L0707830433	21	30 – 40	3	26.07.2007	17.2	0.023	0.034	1.525	0.035
L0707830439	21	30 – 40	4	26.07.2007	18.2	<0.01	0	1.380	0
L0707830416	21	40 – 50	1	26.07.2007	15.2	<0.01	0	1.464	0
L0707830428	21	40 – 50	2	26.07.2007	16.3	<0.01	0	1.452	0
L0707830434	21	40 – 50	3	26.07.2007	16.9	<0.01	0	1.458	0
L0707830440	21	40 – 50	4	26.07.2007	18.9	<0.01	0	1.384	0
L0707830417	22	0 – 5	1	28.11.2007	15.1	1.713	1.285	1.075	0.921
L0707830441	22	0 – 5	2	28.11.2007	15.9	4.520	3.390	0.805	1.820
L0707830447	22	0 – 5	3	28.11.2007	15.9	4.686	3.515	1.064	2.493

Sample information					Analytical data				
Sample No.	Sampling No.	Soil depth [cm]	Treatment	Sampling date	SWC# [%]	Boscalid [mg/kg]	Boscalid [kg ha^{-1}] calculated with bulk density of 1.5 g/cm^3	Field bulk density [g/cm^3]	Boscalid [kg ha^{-1}] calculated with field bulk density
L0707830453	22	0 – 5	4	28.11.2007	16.6	3.425	2.569	1.099	1.882
L0707830418	22	5 – 10	1	28.11.2007	14.1	0.146	0.110	1.575	0.115
L0707830442	22	5 – 10	2	28.11.2007	15.1	0.822	0.617	1.544	0.635
L0707830448	22	5 – 10	3	28.11.2007	14.2	0.984	0.738	1.625	0.800
L0707830454	22	5 – 10	4	28.11.2007	14.6	0.692	0.519	1.643	0.568
L0707830419	22	10 – 20	1	28.11.2007	14.3	0.038	0.057	1.852	0.070
L0707830443	22	10 – 20	2	28.11.2007	13.9	0.374	0.561	1.867	0.698
L0707830449	22	10 – 20	3	28.11.2007	14.5	0.499	0.749	1.932	0.964
L0707830455	22	10 – 20	4	28.11.2007	14.0	0.384	0.576	1.854	0.712
L0707830420	22	20 – 30	1	28.11.2007	13.9	0.048	0.072	1.557	0.075
L0707830444	22	20 – 30	2	28.11.2007	14.7	0.290	0.435	1.457	0.423
L0707830450	22	20 – 30	3	28.11.2007	14.6	0.335	0.503	1.507	0.505
L0707830456	22	20 – 30	4	28.11.2007	14.5	0.233	0.350	1.545	0.360
L0707830421	22	30 – 40	1	28.11.2007	16.0	0.027	0.041	1.551	0.042
L0707830445	22	30 – 40	2	28.11.2007	16.2	0.035	0.053	1.497	0.052
L0707830451	22	30 – 40	3	28.11.2007	16.7	0.038	0.057	1.593	0.061
L0707830457	22	30 – 40	4	28.11.2007	16.6	<0.01	0	1.583	0
L0707830422	22	40 – 50	1	28.11.2007	15.2	<0.01	0	n.a.	0
L0707830446	22	40 – 50	2	28.11.2007	17.1	<0.01	0	1.590	0
L0707830452	22	40 – 50	3	28.11.2007	16.9	<0.01	0	1.659	0
L0707830458	22	40 – 50	4	28.11.2007	15.1	<0.01	0	1.600	0
L0707830534	23	0 – 5	1	25.04.2008	10.1	0.037	0.028	0.627	0.012
L0707830552	23	0 – 5	2	25.04.2008	11.4	0.266	0.200	0.891	0.119
L0707830558	23	0 – 5	3	25.04.2008	13.0	0.297	0.223	0.982	0.146
L0707830564	23	0 – 5	4	25.04.2008	13.0	0.237	0.178	1.027	0.122
L0707830535	23	5 – 10	1	25.04.2008	14.7	0.033	0.025	1.093	0.018
L0707830553	23	5 – 10	2	25.04.2008	15.0	0.294	0.220	1.345	0.198
L0707830559	23	5 – 10	3	25.04.2008	15.7	0.352	0.264	1.400	0.247
L0707830565	23	5 – 10	4	25.04.2008	16.7	0.274	0.205	1.534	0.210
L0707830536	23	10 – 20	1	25.04.2008	15.6	0.082	0.123	1.573	0.129
L0707830554	23	10 – 20	2	25.04.2008	15.8	0.507	0.760	1.574	0.798
L0707830560	23	10 – 20	3	25.04.2008	16.7	0.625	0.938	1.583	0.990
L0707830566	23	10 – 20	4	25.04.2008	17.4	0.478	0.717	1.734	0.829
L0707830537	23	20 – 30	1	25.04.2008	15.5	0.130	0.195	1.315	0.171
L0707830555	23	20 – 30	2	25.04.2008	16.4	0.270	0.405	1.186	0.320
L0707830561	23	20 – 30	3	25.04.2008	17.1	0.478	0.717	1.345	0.642
L0707830567	23	20 – 30	4	25.04.2008	18.0	0.584	0.876	1.551	0.905
L0707830538	23	30 – 40	1	25.04.2008	15.0	0.032	0.048	1.422	0.046
L0707830556	23	30 – 40	2	25.04.2008	17.5	0.024	0.036	1.331	0.032
L0707830562	23	30 – 40	3	25.04.2008	18.3	0.048	0.072	1.427	0.068
L0707830568	23	30 – 40	4	25.04.2008	18.9	0.021	0.032	1.495	0.032
L0707830539	23	40 – 50	1	25.04.2008	15.6	<0.01	0	1.233	0
L0707830557	23	40 – 50	2	25.04.2008	18.4	<0.01	0	1.135	0
L0707830563	23	40 – 50	3	25.04.2008	18.3	<0.01	0	1.522	0
L0707830569	23	40 – 50	4	25.04.2008	17.9	0.032	0.048	1.371	0.044
L0707830540	24	0 – 5	1	18.08.2008	10.9	0.167	0.125	0.890	0.074
L0707830570	24	0 – 5	2	18.08.2008	11.8	0.670	0.503	0.873	0.292
L0707830576	24	0 – 5	3	18.08.2008	13.4	0.583	0.437	1.014	0.296
L0707830582	24	0 – 5	4	18.08.2008	11.0	0.745	0.559	0.769	0.286
L0707830541	24	5 – 10	1	18.08.2008	14.5	0.080	0.060	1.262	0.050
L0707830571	24	5 – 10	2	18.08.2008	14.9	0.714	0.536	1.255	0.448
L0707830577	24	5 – 10	3	18.08.2008	15.0	0.512	0.384	1.241	0.317
L0707830583	24	5 – 10	4	18.08.2008	14.4	0.614	0.461	1.207	0.371
L0707830542	24	10 – 20	1	18.08.2008	14.9	0.437	0.656	1.633	0.714
L0707830572	24	10 – 20	2	18.08.2008	13.2	1.128	1.692	1.988	2.243
L0707830578	24	10 – 20	3	18.08.2008	13.9	0.378	0.566	1.864	0.704
L0707830584	24	10 – 20	4	18.08.2008	14.0	0.357	0.536	1.558	0.556
L0707830543	24	20 – 30	1	18.08.2008	15.5	0.212	0.318	1.971	0.417
L0707830573	24	20 – 30	2	18.08.2008	13.5	0.421	0.631	1.572	0.661
L0707830579	24	20 – 30	3	18.08.2008	12.9	0.365	0.548	1.280	0.467

Sample information					Analytical data				
Sample No.	Sampling No.	Soil depth [cm]	Treatment	Sampling date	SWC# [%]	Boscalid [mg/kg]	Boscalid [kg ha^{-1}] calculated with bulk density of 1.5 g/cm^3	Field bulk density [g/cm^3]	Boscalid [kg ha^{-1}] calculated with field bulk density
L0707830585	24	20 – 30	4	18.08.2008	12.0	0.133	0.200	1.416	0.188
L0707830544	24	30 – 40	1	18.08.2008	15.7	<0.01	0	1.267	0
L0707830574	24	30 – 40	2	18.08.2008	13.4	<0.01	0	1.402	0
L0707830580	24	30 – 40	3	18.08.2008	11.4	<0.01	0	1.259	0
L0707830586	24	30 – 40	4	18.08.2008	9.1	<0.01	0	1.202	0
L0707830545	24	40 – 50	1	18.08.2008	12.6	<0.01	0	1.232	0
L0707830575	24	40 – 50	2	18.08.2008	13.2	<0.01	0	1.317	0
L0707830581	24	40 – 50	3	18.08.2008	10.8	<0.01	0	1.109	0
L0707830587	24	40 – 50	4	18.08.2008	7.9	<0.01	0	1.212	0
L0707830546	25	0 – 5	1	27.11.2008	16.6	0.076	0.057	1.246	0.047
L0707830588	25	0 – 5	2	27.11.2008	15.1	1.402	1.051	1.380	0.967
L0707830594	25	0 – 5	3	27.11.2008	16.3	1.840	1.380	1.408	1.295
L0707830600	25	0 – 5	4	27.11.2008	12.2	1.538	1.153	1.406	1.081
L0707830547	25	5 – 10	1	27.11.2008	16.1	0.148	0.111	1.537	0.114
L0707830589	25	5 – 10	2	27.11.2008	15.3	0.525	0.394	1.688	0.444
L0707830595	25	5 – 10	3	27.11.2008	14.1	0.704	0.528	1.704	0.600
L0707830601	25	5 – 10	4	27.11.2008	13.0	0.530	0.397	1.681	0.445
L0707830548	25	10 – 20	1	27.11.2008	10.7	0.160	0.240	1.957	0.313
L0707830590	25	10 – 20	2	27.11.2008	13.7	0.527	0.791	1.825	0.962
L0707830596	25	10 – 20	3	27.11.2008	14.1	0.619	0.929	1.856	1.150
L0707830602	25	10 – 20	4	27.11.2008	12.3	0.558	0.836	1.809	1.009
L0707830549	25	20 – 30	1	27.11.2008	14.8	0.270	0.405	1.650	0.446
L0707830591	25	20 – 30	2	27.11.2008	12.2	0.498	0.746	1.609	0.800
L0707830597	25	20 – 30	3	27.11.2008	12.2	0.734	1.100	1.649	1.209
L0707830603	25	20 – 30	4	27.11.2008	10.3	0.425	0.637	1.401	0.595
L0707830550	25	30 – 40	1	27.11.2008	16.5	0.024	0.036	1.482	0.036
L0707830592	25	30 – 40	2	27.11.2008	12.8	0.086	0.129	1.609	0.138
L0707830598	25	30 – 40	3	27.11.2008	13.6	0.197	0.295	1.647	0.324
L0707830604	25	30 – 40	4	27.11.2008	11.1	0.033	0.050	1.335	0.044
L0707830551	25	40 – 50	1	27.11.2008	12.5	0.888	1.332	1.494	1.327
L0707830593	25	40 – 50	2	27.11.2008	13.4	0.010	0.014	1.435	0.014
L0707830599	25	40 – 50	3	27.11.2008	15.6	0.022	0.033	1.544	0.034
L0707830605	25	40 – 50	4	27.11.2008	9.9	<0.01	0	1.296	0
L0707830633	26	0 – 5	1	02.04.2009	9.8	0.103	0.077	0.871	0.045
L0707830639	26	0 – 5	2	02.04.2009	9.6	0.195	0.146	1.041	0.101
L0707830645	26	0 – 5	3	02.04.2009	10.3	0.466	0.349	0.952	0.222
L0707830651	26	0 – 5	4	02.04.2009	9.8	0.318	0.239	0.794	0.126
L0707830634	26	5 – 10	1	02.04.2009	12.5	0.208	0.156	1.399	0.145
L0707830640	26	5 – 10	2	02.04.2009	12.5	0.384	0.288	1.475	0.283
L0707830646	26	5 – 10	3	02.04.2009	12.9	0.385	0.288	1.486	0.286
L0707830652	26	5 – 10	4	02.04.2009	12.5	0.307	0.231	1.188	0.183
L0707830635	26	10 – 20	1	02.04.2009	13.9	0.134	0.200	1.705	0.228
L0707830641	26	10 – 20	2	02.04.2009	13.5	0.606	0.909	1.757	1.064
L0707830647	26	10 – 20	3	02.04.2009	14.8	0.466	0.699	1.673	0.780
L0707830653	26	10 – 20	4	02.04.2009	13.1	0.832	1.248	1.899	1.580
L0707830636	26	20 – 30	1	02.04.2009	13.0	0.099	0.148	1.510	0.149
L0707830642	26	20 – 30	2	02.04.2009	15.0	0.425	0.637	1.629	0.692
L0707830648	26	20 – 30	3	02.04.2009	14.2	0.362	0.544	1.581	0.573
L0707830654	26	20 – 30	4	02.04.2009	16.7	0.211	0.317	1.560	0.330
L0707830637	26	30 – 40	1	02.04.2009	13.2	0.034	0.051	1.440	0.049
L0707830643	26	30 – 40	2	02.04.2009	17.2	<0.01	0	1.548	0
L0707830649	26	30 – 40	3	02.04.2009	14.7	0.025	0.037	1.627	0.040
L0707830655	26	30 – 40	4	02.04.2009	17.5	<0.01	0	1.468	0
L0707830638	26	40 – 50	1	02.04.2009	11.8	<0.01	0	1.360	0
L0707830644	26	40 – 50	2	02.04.2009	16.7	<0.01	0	1.518	0
L0707830650	26	40 – 50	3	02.04.2009	15.7	0.016	0.024	1.540	0.025
L0707830656	26	40 – 50	4	02.04.2009	16.9	<0.01	0	1.353	0

soil water content
§ value is not in line with the concentration pattern and site history, and is therefore not used for evaluation
n.a. not available

~~**Control plot**~~

~~Starting with sampling No. 1, control samples from the untreated plot were analysed at each sampling event during background determination for procedural recoveries. Residues of boscalid were not detectable (< 0.01 mg/kg) until sampling no. 15, which demonstrates that no interferences of the sample material with the analytical procedure occurred and that the control plots were free of residues of boscalid.~~

~~From sampling no. 16 onward, quantifiable (> 0.01 mg/kg) amounts of boscalid were found in control samples. Converting the residues of all layers to kg ha^{-1} using the actual field bulk density and summarising them up, a periodic alteration of the residues is observed with maxima at the last sampling (autumn) of the years 2005 to 2008 (this includes year 2006, when cereals were grown and boscalid was not applied during the study). Residues in the control samples decreased from those autumn samplings to the subsequent samplings in spring of the next year but increased again towards the summer samplings.~~

~~In the "vegetable year" 2005, the increase from the spring to the autumn residue level was about 17 % of the nominal rate of boscalid that was applied to the treated plots in that year, which is about the amount of one regular application.~~

~~In the "cereal year" 2006, the amount of the autumn maximum was similar to 2005, i.e. in the order of magnitude of one regular application. However, it is important to note that in 2006 boscalid was not applied to the cereals on the treated plots according to the application scheme of the study.~~

~~In the "vegetable years" 2007 and 2008, the increase from the spring to the autumn residue level was about 54 % and 34 % of the nominal rate that was applied to the treated plots in these years.~~

~~Taken all together, the increase of residues on the control plot in the last years of the accumulation study hints to several applications of boscalid that were not in line with the application scheme of the study. A summary of the residue data is given in Table A- 8.~~

~~**Treated plots**~~

~~Residues measured in the treated plots showed regular behaviour until sampling No. 15 in April 2005. Concentrations in soil increased after each annual application period followed by a period of degradation with decreasing residues. After application in the growing season, significant residues of boscalid were detected in soil in the spring of the following year and were distributed also to deeper soil layers. This was caused by soil treatments like tillage or ploughing to a maximum depth of 35 cm. However, the highest amounts of residues were detected from 0 to 30 cm depth.~~

~~From sampling no. 16 on, an unexpected development of the soil residues was observed that coincided with the beginning of residue detection in the control plot.~~

~~In the treated plots, residue levels after the application period increased compared to residue levels before that period by 106 % to 127 % of the nominal yearly application rate of boscalid. An increase in residues of 127 % of the yearly application rate was observed at sampling event 22 in 2007 when also extraordinary high residues were detected in the control plot. Assuming treatment of the plots according to the application scheme of the study, an increase in residues of more than 100 % of the nominal yearly application rate is not possible, especially since dissipation processes reduce the amount of residues over the year.~~

~~A comparison showed that the residue behaviour was very heterogeneous among the three treated plots. In autumn 2007 (sampling 22) residue levels increased compared to the preceding spring (sampling 21) by about 2 kg ha^{-1} to 2.7 kg ha^{-1} to 2.1 kg ha^{-1} for plots 2, 3 and 4 with applied amounts of only 1.5 kg ha^{-1} (3 x 0.5 kg ha^{-1}) in between.~~

~~Between April and August 2008 (samplings 23 and 24), amounts of 0.9 kg boscalid ha^{-1} (3 x 0.3 kg ha^{-1}) were applied to plot 2, 3 and 4. Despite this, boscalid residues in plot 3 and 4 decreased, while in plot 2 an increase by 2.2 kg ha^{-1} was observed. In November 2008 (sampling 25), after application of 0.8 kg ha^{-1} (2 x 400 g ha^{-1}) in between, amounts in plot 2 decreased, while in plot 3 and 4 the residue levels increased by 2.8 and 1.7 kg ha^{-1}, respectively.~~

~~As a result, the variability between the three treated replicates is very high at sampling 22, 24 and 25 which is a further indication that the residue situation cannot be explained by the regular planned applications, which were verified via Petri dish analysis.~~

~~From these results and additional investigations, it was concluded that additional irregular applications must be assumed. Further details of these additional applications could not be elucidated. A summary of the residue data is given in Table A- 8.~~

~~**Table A- 8 Measured residues of boscalid in the plots of the vegetable accumulation study**~~

Sampling event			Crop cultivation year	Residues measured in 0 – 50 cm # [kg ha^{-1}]						
No.	Date	Days after first treatment [d]		Control plot		Treated plots				
				Treatment 1	Increase* [%]	Treatment 2	Treatment 3	Treatment 4	Mean	Increase* (Mean) [%]
1	30.04.1998	-14	Vegetables		n.c.	<0.01	<0.01	<0.01	<0.01	66
2	12.10.1998	151		–		0.630	1.017	2.483	1.377	
3	08.03.1999	298	Vegetables	–		0.623	1.029	0.491	0.714	48
4	03.11.1999	538		–		1.621	1.871	1.085	1.526	
5	13.03.2000	669	Cereals	–		1.088	0.930	0.821	0.946	n.c.
6	21.08.2000	830		–		1.219	1.084	0.941	1.081	
7	04.04.2001	1056	Vegetables	–		0.479	0.628	0.555	0.554	54
8	06.11.2001	1272		–		1.523	1.893	1.638	1.685	
9	28.02.2002	1386	Vegetables	–		1.193	1.352	1.274	1.273	75
10	19.11.2002	1650		–		2.703	2.429	2.526	2.553	
11	17.03.2003	1768	Cereals	–		0.822	1.008	0.771	0.867	n.c.
12	21.08.2003	1925		–		1.685	2.285	1.694	1.888	
13	15.03.2004	2135	Vegetables	–		1.025	1.147	1.124	1.099	43
14	21.10.2004	2352		–		2.155	2.030	1.844	2.010	
15	04.04.2005	2517	Vegetables	–	17	1.588	–	1.063	1.326	112
16	17.11.2005	2744		0.294		3.018	3.265	3.388	3.224	
17	28.03.2006	2875	Cereals	0.095	n.c.	2.201	2.128	1.848	2.059	n.c.
18	23.08.2006	3023		0.194		2.383	2.204	1.728	2.105	
19	08.11.2006	3100		0.248		1.675	2.069	1.949	1.898	
20	02.04.2007	3245	Vegetables	0.084	54	1.202	1.123	1.654	1.326	127
21	26.07.2007	3360		0.334		1.684	2.158	1.435	1.759	
22	28.11.2007	3485		1.223		3.635	4.830	3.530	3.998	
23	25.04.2008	3634	Vegetables	0.376	34**	1.472	2.100	2.141	1.904	106
24	18.08.2008	3749		1.255		3.652	1.791	1.408	2.284	
25	27.11.2008	3850		0.956**		3.326	4.612	3.181	3.706	
26	02.04.2009	3976	Cereals	0.616		2.149	1.926	2.226	2.100	

~~# The sum of residues in kg/ha that is calculated from concentrations measured in 0 - 50 cm with a default bulk density of 1.5 g cm^{-3} for samplings 1 to 15 and individual field bulk density values for samplings 16 to 26.~~
~~* Difference between measured residue level in spring and subsequent autumn sample expressed as percentage of nominal application rate of the respective application season [%].~~
~~** additional high residue detected in one layer but not considered for summarised residue~~
~~– no detection of boscalid~~
~~n.c. not calculated~~

~~Summary of analytical results~~

~~From the analysis of control and procedural recovery samples it can be concluded that the analytical methods used are appropriate to correctly determine residues of boscalid in soil taken from the field site and in Petri dish soil. Application verification by means of Petri dish analysis demonstrated, that the~~

~~application rates calculated from measured concentrations agree with the target rates confirming excellent performance of all scheduled applications. Until sampling No. 15, the residues in the control plot and the treated plots showed regular behaviour. Starting with sampling 16 and lasting until the end of the study, residues in the control plot were observed at varying concentrations. At the same time, unexpected high and varying concentrations in all three treated plots were observed. In addition, the variability between the treated plots increased. Investigations were undertaken to explain this development. As a result, additional irregular applications on both, the control and treated plots must be assumed.~~

~~Estimated plateau amount of boscalid in soil after multi-year application~~

~~Dissipation time~~

~~A total of eight individual dissipation periods during the study were used to estimate a representative DT50 value for modelling the plateau residue level of boscalid in soil. The dissipation periods include data measured from 2005 onward, because the observed residue decline in dissipation periods before and after 2005 did not differ (see Table A- 9), although residues began to increase unexpectedly in 2005 as described before. The estimated DT50 values ranged from 23 to 264 d and were in the same order of magnitude as DT50 values obtained from various dissipation trials in the field. As a conservative approach, the maximum DT50 value of 264 d was used to model the residue level in soil of boscalid.~~

~~Table A- 9~~ ~~Residue levels in the treated plots over the course of the study~~

~~Sampling event~~	~~Sampling date~~	~~Days after first treatment [d]~~	~~Crop cultivation year~~	~~Average sum of residues measured in 0-50 cm [kg a.i. ha^{-1}]~~	~~Residues in spring*~~ ~~[% of residues in autumn]~~	~~Dissipation periods~~
~~1~~	~~30.04.1998~~	~~–14~~	~~Vege-tables~~	~~0.000~~	~~N/A~~	~~N/A~~
~~2~~	~~12.10.1998~~	~~151~~		~~1.377~~	~~52~~	~~1~~
~~3~~	~~08.03.1999~~	~~298~~	~~Vege-tables~~	~~0.714~~		
~~4~~	~~03.11.1999~~	~~538~~		~~1.526~~	~~62~~	~~2~~
~~5~~	~~13.03.2000~~	~~669~~	~~Cereals~~	~~0.946~~		
~~6~~	~~21.08.2000~~	~~830~~		~~1.081~~	~~51~~	
~~7~~	~~04.04.2001~~	~~1056~~	~~Vege-tables~~	~~0.554~~		
~~8~~	~~06.11.2001~~	~~1272~~		~~1.685~~	~~76~~	~~3~~
~~9~~	~~28.02.2002~~	~~1386~~	~~Vege-tables~~	~~1.273~~		
~~10~~	~~19.11.2002~~	~~1650~~		~~2.553~~	~~34~~	~~4~~
~~11~~	~~17.03.2003~~	~~1768~~	~~Cereals~~	~~0.867~~		
~~12~~	~~21.08.2003~~	~~1925~~		~~1.888~~	~~58~~	
~~13~~	~~15.03.2004~~	~~2135~~	~~Vege-tables~~	~~1.099~~		
~~14~~	~~21.10.2004~~	~~2352~~		~~2.010~~	~~66~~	~~5~~
~~15~~	~~04.04.2005~~	~~2517~~	~~Vege-tables~~	~~1.326~~		
~~16~~	~~17.11.2005~~	~~2744~~		~~3.224~~	~~64~~	~~6~~
~~17~~	~~28.03.2006~~	~~2875~~	~~Cereals~~	~~2.059~~		
~~18~~	~~23.08.2006~~	~~3023~~		~~2.105~~	~~–~~	
~~19~~	~~08.11.2006~~	~~3100~~		~~1.898~~	~~70~~	
~~20~~	~~02.04.2007~~	~~3245~~	~~Vege-tables~~	~~1.327~~		
~~21~~	~~26.07.2007~~	~~3360~~		~~1.759~~	~~–~~	
~~22~~	~~28.11.2007~~	~~3485~~		~~4.000~~	~~47~~	~~7~~
~~23~~	~~25.04.2008~~	~~3634~~	~~Vege-tables~~	~~1.897~~		
~~24~~	~~18.08.2008~~	~~3749~~		~~2.284~~	~~–~~	
~~25~~	~~27.11.2008~~	~~3850~~		~~3.706~~	~~57~~	~~8~~
~~26~~	~~02.04.2009~~	~~3976~~	~~Cereals~~	~~2.100~~		
~~Mean value~~					~~58~~	

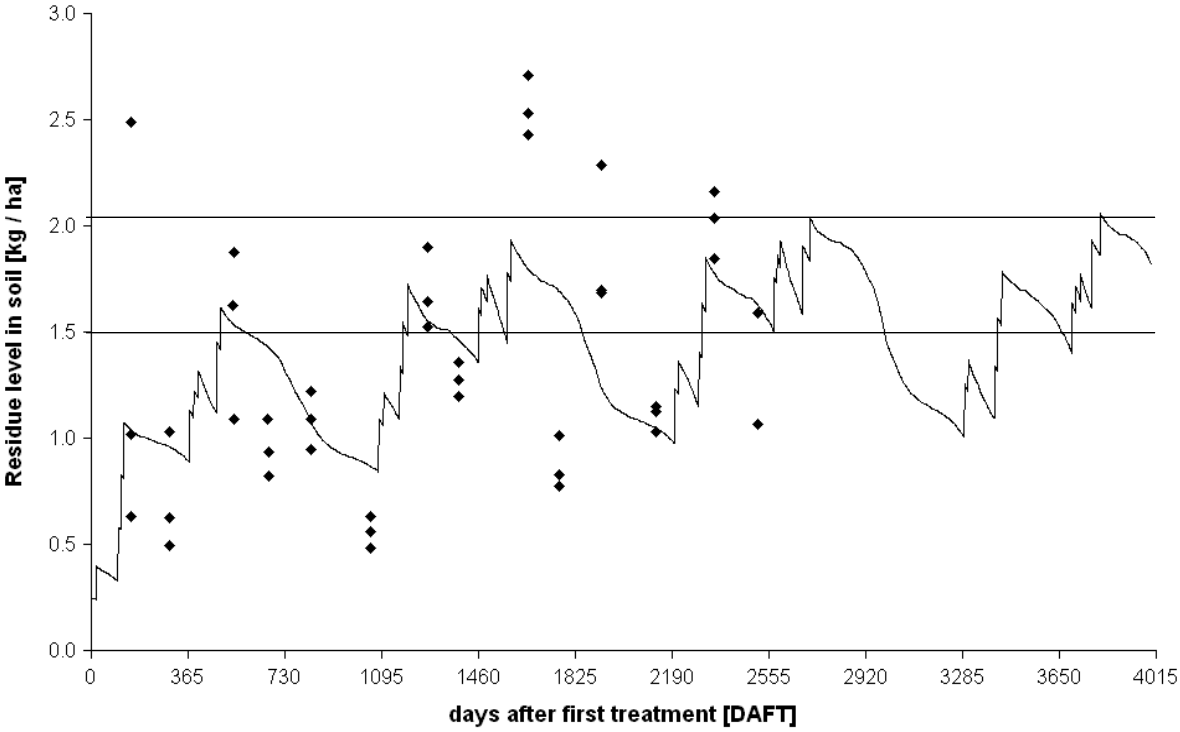
~~* residue level measured in spring sample expressed as percentage of residue level measured in previous autumn sample~~

~~Model fit~~

~~Residue levels of boscalid in soil were modelled using a DT50 value of 264 d. The model was fitted to field observations from sampling events 2 to 15 by optimising the deposition parameter fdeposit. Observations~~

~~from sampling event 16 on were not considered for fitting, because increasing residues of >100 % of the nominal application rate in the treated plots coincided with residue detection in the control plot indication applications of boscalid out of the scheduled application pattern of the study.~~

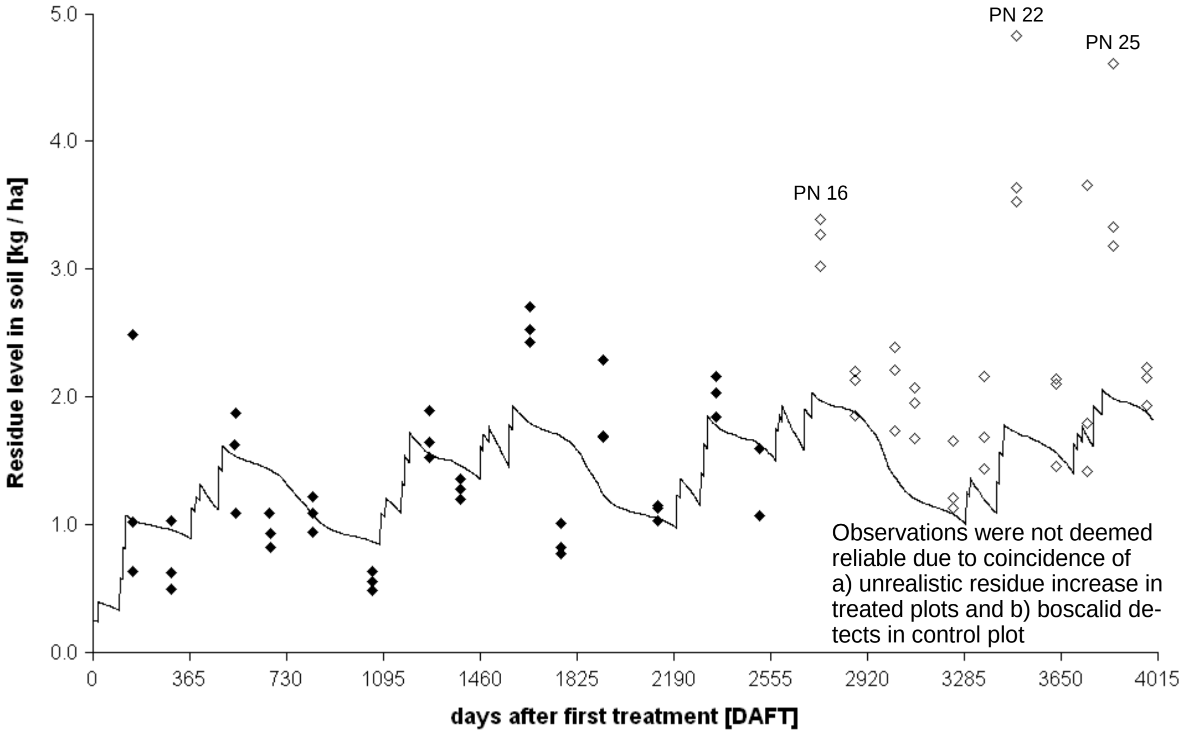
~~The model curve obtained by the optimisation procedure is given in Figure A 1.~~



~~**Figure A 1** **Observed soil residues of boscalid during multi-year application [sampling events 2 to 15] and fitted model curve (optimised fdeposit)**~~

~~Figure A 1 presents measured residue levels during the first three application cycles of the study (sampling events 2 to 15, black dots) and the curve of the modelled residues. In each of the four triennial application cycles, predictions oscillate between minimum and maximum values. Both minimum and maximum values in the third and fourth application cycle are comparable, indicating that the model curve approximates steady state conditions in the third application cycle. Visual assessment shows that modelled residues match observations fairly well given the variability in replicate samples.~~

~~In Figure A 2, modelled residue levels are plotted a) with field observations from sampling events 2 to 15 that were used to fit the model and b) with field observations from sampling events 16 to 26. The latter were not used for fitting because of the quantifiable contamination of control samples and the observed increase in average residue level on the treated plots from spring to autumn that was 106 % to 127 % of the nominal yearly application rate despite dissipation processes. This coincidence of increases of residues of >100 % of the nominal application rate (despite dissipation processes) in the treated plots and the detection of residues in the control plot strongly implies applications of boscalid that were not in line with the scheduled application pattern of the study and hints to at least three additional applications at high rate between sampling events 15 and 16, 20 and 22, and 23 and 25.~~



~~**Figure A 2** **Observed soil residues of boscalid during multi-year application and fitted model curve (deposition parameter optimised using sampling events 2 to 15)**~~

~~**Plateau level and peak level in soil at steady state**~~

~~Plateau level and peak level in soil at steady state, i.e. typical minimum and maximum residues after multi-year use, were derived from the modelled residue data presented in Figure A 1.~~

~~The residue plateau (i.e. the maximum of predicted residue levels in spring of the second vegetable year, n = 4) was predicted in year 8 of the study and amounted to 1.50 kg ha^{-1}. The peak level (i.e. the maximum of predicted residue levels in autumn of second vegetable year, n = 4) was predicted in year 11 of the study and amounted to 2.06 kg ha^{-1}. These values correspond to 0.333 mg kg^{-1} and 0.457 mg kg^{-1} assuming a soil bulk density of 1500 kg m^{3} and a soil layer of 0.3 m that is deemed a realistic depth of soil cultivation in vegetable crops.~~

~~The predicted plateau and peak level correspond to an average yearly application rate of boscalid of 1.27 kg ha^{-1} onto vegetable crops (average rate considering application and no application years) and can be expressed as 118 % and 162 % of the average yearly application rate.~~

~~**CONCLUSION**~~

~~The plateau level of residues of boscalid in soil at steady state after multi-year application was predicted in year 8 of the eleven-year accumulation study. The predicted plateau amounted to 1.5 kg ha^{-1} or 118 % of the average yearly application rate of the study. Assuming a soil bulk density of 1500 kg m^{-3} and a soil layer of 0.3 m, the predicted plateau corresponds to 0.333 mg kg^{-1}.~~

~~The peak level was predicted in year 11 of the study and amounted to 2.06 kg ha^{-1} or 162 % of the average yearly application rate of the study. Assuming a soil bulk density of 1500 kg m^{-3} and a soil layer of 0.3 m, the predicted peak level corresponds to 0.457 mg kg^{-1}.~~

~~Predictions were based on a field DT_{50} that was derived from residues observed during the entire course of the study. The model to estimate peak and plateau level was fitted to observed residues in samples from the first eight years of the study (sampling events 1 to 15) only, because observed residues from sampling event~~

~~16 on were not considered reliable. Increases of residues of >100 % of the nominal application rate (despite dissipation processes) in the treated plots coincided with residue detection in the control plot. This strongly implies applications of boscalid that were not in line with the scheduled application pattern of the study and hints to at least three additional applications at high rate between sampling events 15 and 16, 20 and 22, and 23 and 25.~~