Cyantraniliprole (263)

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EXPLANATION

Cyantraniliprole was first evaluated for toxicology and residues by the JMPR in 2013 and an ADI of 0–0.03 mg/kg bw was established. An ARfD was considered to be unnecessary. Additional use patterns were evaluated by the 2015 JMPR. The established residue definitions are:

Definition of the residue for compliance with the MRL for both plant and animal commodities: *cyantraniliprole*.

Definition of the residue for dietary risk assessment for unprocessed plant commodities: *cyantraniliprole*.

Definition of the residue for dietary risk assessment for processed plant commodities: *sum of cyantraniliprole and IN-J9Z38, expressed as cyantraniliprole.*

Definition of the residue for dietary risk assessment for animal commodities: sum of cyantraniliprole, 2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-3,4-dihydro-3,8-dimethyl-4-oxo-6-quinazolinecarbonitrile [IN-J9Z38], 2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-1,4-dihydro-8-methyl-4-oxo-6-quinazolinecarbonitrile [IN-MLA84], 3-Bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2-(hydroxymethyl)-6-[(methylamino)carbonyl]phenyl]-1H-pyrazole-5-carboxamide [IN- N7B69] and3-Bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2[[(hydroxymethyl)amino]carbonyl]-6-methylphenyl]-1H-pyrazole-5-carboxamide [IN-MYX98], expressed a cyantraniliprole.

The residue is not fat-soluble.

At the Forty-ninth Session of the CCPR (2017), cyantraniliprole was scheduled for evaluation of additional use patterns by the 2018 JMPR.

The Meeting received a soil degradation study in rice, various supervised residue trial data for foliar and soil applications of cyantraniliprole on grapes, strawberries (outdoor), cranberries (outdoor), mango (outdoor), cucumber (glasshouse), and paddy rice and information on registered uses of cyantraniliprole on corresponding crops. In addition a processing study on grapes was resubmitted. Some of the submitted studies were evaluated by previous Meetings (2013 and 2015).

METABOLISM AND ENVIRONMENTAL FATE

Environmental fate

Degradation in soil and water systems

In a supervised residue study in rice [Qing, HX., Report CL02010-026] the degradation of cyantraniliprole and its metabolite IN-J9Z38 was investigated. Though this study was submitted to the 2013 JMPR, the data on degradation in water, soil and plants of rice fields was not summarised previously.

A single application of 150 g ai/ha was sprayed into the rice paddies. Soil, plant and field water samples were taken at 1 hour and 3, 5, 7, 14, 28, 35, 42 and 60 days after application. Plant samples of at least 1.0 kg were taken randomly from across the plots. Water was sampled by glass from at least 10 sampling points per plot and mixed evenly. Soil samples (0–10 cm) weighing 1.0 kg were quartered and debris was removed. The results are summarised in Table 1.

Soil and plant samples were extracted with acetonitrile and water (30:10 %v/v) and acetonitrile, filtered and cleaned up via silica gel columns. The samples were then analysed using reverse phase HPLC separation coupled to tandem mass spectrometry (LC-MS/MS). The ion transitions monitored were *m/z* 475→286 and/or 475→444.1 (cyantraniliprole) and *m/z* 457→188 (IN-J9Z38). The limit of quantification (LOQs) for parent was 0.005 mg/L (water), 0.01 mg/kg for soil and brown rice and 0.05 mg/kg for rice straw and rice hull. The LOQs for metabolite IN-J9Z38 were 0.01 mg/L (water), 0.02 mg/kg (soil and brown rice), and 0.1 mg/kg for rice straw and rice hull.

No geometric mean was calculated.

Table 1 Degradation dynamics of cyantraniliprole and its metabolite IN-J9Z38 in water of rice fields

DALA	Location ZHejiang				Location Hunan				Location Shandong			
	parent		IN-J9Z38		parent		IN-J9Z38		parent		IN-J9Z38	
	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)
1 h	0.16	-	<0.01	-	0.19	-	0.043	-	0.34	-	0.34	-
1	0.22	-	<0.01	-	0.054	71.6	0.061	-	0.15	55.9	0.28	17.6
3	0.12	25	<0.01	-	0.023	87.9	0.024	60.7	0.053	84.4	0.14	58.8
5	0.090	43.8	<0.01	-	0.018	90.5	<0.01	-	0.052	84.7	0.14	58.8
7	0.027	83.1	<0.01	-	0.013	93.2	<0.01	-	0.025	92.6	0.092	72.9
14	0.0090	94.3	<0.01	-	<0.005	-	<0.01	-	0.023	93.2	0.085	75.0
21	0.0059	96.3	<0.01	-	<0.005	-	<0.01	-	0.013	96.2	0.047	86.2
28	0.0056	96.5	<0.01	-	<0.005	-	<0.01	-	0.0071	97.9	0.044	87.1
control	<0.005	-	<0.01	-	<0.005	-	<0.01	-	<0.005	-	<0.01	-
formula and $T_{1/2}$	$Ct=0.1469e^{-0.141t}$ $R^2=0.8747$ $T_{1/2}$=4.9 days		-		$Ct=0.1064e^{-0.343t}$ $R^2=0.8255$ $T_{1/2}$=2.0 days		-		$Ct=0.1224e^{-0.1115t}$ $R^2=0.8005$ $T_{1/2}$=6.2 days		$Ct=0.2236e^{-0.0375t}$ $R^2=0.8428$ $T_{1/2}$=10.3 days	

Table 2 Degradation dynamics of cyantraniliprole and its metabolite IN-J9Z38 in soil of rice fields

DALA	Location Zhejiang				Location Hunan				Location Shandong			
	parent		IN-J9Z38		parent		IN-J9Z38		parent		IN-J9Z38	
	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)
1 h	<0.01	-	<0.02	-	<0.01	-	<0.02	-	0.28	-	<0.02	-
1	0.012	-	<0.02	-	<0.01	-	<0.02	-	0.21	25.0	<0.02	-
3	0.023	-	<0.02	-	<0.01	-	<0.02	-	0.19	32.1	<0.02	-
5	0.018	-	<0.02	-	<0.01	-	<0.02	-	0.18	35.7	<0.02	-
7	0.015	-	<0.02	-	<0.01	-	<0.02	-	0.048	82.9	<0.02	-
14	0.024	-	<0.02	-	<0.01	-	<0.02	-	0.055	80.4	<0.02	-
21	0.023	-	<0.02	-	<0.01	-	<0.02	-	0.032	88.6	<0.02	-
28	0.022	-	<0.02	-	<0.01	-	<0.02	-	/	-	<0.02	-
control	<0.01	-	<0.02	-	<0.01	-	<0.02	-	<0.01	-	<0.02	-
formula and $T_{1/2}$	-		-		-		-		$Ct=0.2273e^{-0.1022t}$ $R^2=0.8057$ $T_{1/2}$=6.8 days		-	

Table 3 Degradation dynamics of cyantraniliprole and its metabolite IN-J9Z38 in rice plants

DALA	Location ZHejiang				Location Hunan				Location Shandong			
	parent		IN-J9Z38		parent		IN-J9Z38		parent		IN-J9Z38	
	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)	res. (mg/kg)	degr. rate (%)
1 h	18	-	<0.01	-	0.57	-	<0.01	-	1.6	-	<0.01	-
1	12	33.3	<0.01	-	0.41	28.1	<0.01	-	1.2	25.0	<0.01	-
3	0.84	95.3	<0.01	-	0.14	75.4	<0.01	-	/	-	<0.01	-
5	0.65	96.4	<0.01	-	0.099	82.6	<0.01	-	/	-	<0.01	-
7	0.67	96.3	<0.01	-	0.095	83.3	<0.01	-	0.21	86.9	<0.01	-
14	0.34	98.1	<0.01	-	0.055	90.4	<0.01	-	0.111	93.1	<0.01	-
21	0.084	99.5	<0.01	-	<0.005	-	<0.01	-	0.077	95.2	<0.01	-
28	/	-	<0.01	-	<0.005	-	<0.01	-	0.076	95.3	<0.01	-
control	<0.05	-	<0.01	-	<0.005	-	<0.01	-	<0.005	-	<0.01	-
formula and $T_{1/2}$	$Ct=5.493e^{-0.2177t}$ $R^2=0.7475$ $T_{1/2}$=3.2 days		-		$Ct=0.3531e^{-0.1578t}$ $R^2=0.7758$ $T_{1/2}$=4.4 days		-		$Ct=0.9392e^{-0.1109t}$ $R^2=0.8231$ $T_{1/2}$=6.3 days		-	

Analytical methods

For determination of the residues in the supervised residue trials and processing studies submitted to the 2018 JMPR LC-MS/MS method 1187A [McClory *et al.*, 2007, Report DP-15736] and extended with additional metabolites (supplement 1) as evaluated by JMPR 2013 and 2015 were used. The method was further validated [Kinney, 2008, Report DP-18846] and evaluated by JMPR 2013. The method was adapted for use to determine residues of IN-N5M09 and IN-F6L99 in grape processed fractions [Aitken, 2011, Report DP-27718] as evaluated by the JMPR 2013. Concurrent recoveries and method validation results as presented for the current evaluation and not previously evaluated are included in Table 4 (parent) and Table 5 to Table 10 (metabolites).

Table 4 Validation results for LC-MS/MS method in plant commodities for determination of parent cyantraniliprole

Matrix	Reported LOQ	Fortification level (mg/kg)	Recovery (%) mean	range	RSD (%)	n	control mg/kg	calibration	Code no; Report no
grape, mature fruit	0.01	0.01 0.1	80 83 88	77–86 82–84 85, 91	3.8 1.2 -	3 3 2	<0.01	external standard 0.1–20 ng/mL linear R ≥ 0.99	Report DP-39380, concurrent recovery
cranberry, fruit	0.01	0.01 0.1 1.0 [a]	85 90 92	80–89 87–96 89, 95	4.8 4.5 -	4 4 2	<0.01	external standard, R2 ≥ 0.9954	Report IR-4-10199, concurrent recovery
cranberry, fruit	0.01	0.01 0.1 1.0	92 84 93	75–100 79–88 92–95	9.5 5.4 1.6	6 3 3	<0.01	external standard, R2 ≥ 0.9987	Report IR-4-10199, method validation
strawberry, fruit	0.01	0.01 0.1 1.0	96 99 84	93–100 96–104 79–90	3.8 4.4 6.5	3 3 3	<0.01	external standard, linear, R2 ≥ 0.9975	Report IR-4-10328, method validation
strawberry, fruit	0.01	0.01 0.1 1.0	112 94 96	98–127 86–106 95–97	12.9 6.3 1.2	3 7 3	<0.01	external standard, linear, R2 ≥ 0.9966	Report IR-4-10328, concurrent recovery
mango, peel	0.01	0.01 0.10 2.0 2.6	96 97 - 88	90–105 94–100 105 85–91	5.7 2.6 - 3.5	6 4 1 3	<0.01	external standard 0.050–20 ng/mL R2 ≥ 0.99	Report No. 46393, concurrent recovery
mango, peel	0.01	0.01 0.10	95 89	88–100 70–103	4.9 16	5 5	<0.01	external standard 0.20–20 ng/mL R2 ≥ 0.99	Report No. 46393, method validation, quantification
mango, peel	0.01	0.01 0.10	96 89	83–109 68–106	11 18	5 5	<0.01	external standard 0.20–20 ng/mL R2 ≥ 0.99	Report No. 46393, method validation, confirmation
mango, pulp	0.01	0.01 0.10	92 98	87–100 92–102	6.5 4.8	4 4	<0.01	external standard 0.050–20 ng/mL R2 ≥ 0.99	Report No. 46393, concurrent recovery
mango, pulp	0.01	0.01 0.10	103 97	93–110 86–103	7.7 7.7	5 5	<0.01	external standard 0.20–20 ng/mL R2 ≥ 0.99	Report No. 46393, method validation, quantification
mango, pulp	0.01	0.01 0.10	102 96	86–110 88–102	9.8 6.2	5 5	<0.01	external standard 0.20–20 ng/mL R2 ≥ 0.99	Report No. 46393, method validation, quantification

[a] storage stability concurrent recoveries.

Table 5 Validation results for LC-MS/MS method in plant commodities for determination of metabolite IN-J9Z38

Matrix	analyte	Fortification level (mg/kg)	Recovery (%) mean	range	RSD (%)	n	Control mg/kg	calibration	Code no; Report no
grape, mature fruit	IN-J9Z38	0.01 0.1	82 85	81–83 84–87	1.2 1.8	3 3	<0.01	external standard 0.1–20 ng/mL linear R ≥ 0.99	Report DP-39380, concurrent recovery
cranberry, fruit	IN-J9Z38	0.01 0.1 1.0 [a]	89 92 103	80–98 89–94 96, 110	8.4 2.6 -	4 4 2	<0.01	external standard, linear R^2 ≥0.9664	Report IR-4-10199, concurrent recovery
cranberry,	IN-J9Z38	0.01	94	77–115	18	6	<0.01	external standard,	Report IR-4-10199,

Matrix	analyte	Fortifi- cation level (mg/kg)	Recovery (%) mean	 range	RSD (%)	n	Control mg/kg	calibration	Code no; Report no
fruit		0.1 1.0	90 95	82–95 94–96	8.0 1.2	3 3		linear R^2 ≥0.9954	method validation

[a] storage stability concurrent recoveries.

Table 6 Validation results for LC-MS/MS method in plant commodities for determination of metabolite IN-JCZ38

Matrix	analyte	Fortifi- cation level (mg/kg)	Recovery (%) mean	 range	RSD (%)	n	control mg/kg	calibration	Code no; Report no
grape, mature fruit	IN-JCZ38	0.01 0.1	84 85	80–90 84–86	6.3 1.4	3 3	<0.01	external standard 0.1–20 ng/mL linear R ≥ 0.99	Report DP-39380, concurrent recoveries
cranberry, fruit	IN-JCZ38	0.01 0.1 1.0 [a]	93 102 88 94	83– 83–91 87, 101	10 4.7 -	4 4 2	<0.01	external standard, linear R^2 ≥0.9909	Report IR-4- 10199, concurrent recovery
cranberry, fruit	IN-JCZ38	0.01 0.1 1.0	86 105 83 94	73– 78–86 87–98	13 5.5 6.5	6 3 3	<0.01	external standard, linear R^2 ≥0.9831	Report IR-4- 10199, method validation

[a] storage stability concurrent recoveries.

Table 7 Validation results for LC-MS/MS method in plant commodities for determination of metabolites IN-K7H19

Matrix	analyte	Fortifi- cation level (mg/kg)	Recovery (%) mean	 range	RSD (%)	n	control mg/kg	calibration	Code no; Report no
grape, mature fruit	IN-K7H19	0.01 0.1	99 106 102 103	91– 101–	7.6 1.1	3 3	<0.01	external standard 0.1–20 ng/mL linear R ≥ 0.99	Report DP- 39380, concurrent recoveries
cranberry, fruit	IN-K7H19	0.01 0.1 1.0 [a]	88 111 92 94	72– 88–97 94, 95	19 4.0 -	4 4 2	<0.01	external standard, linear R^2 ≥0.9976	Report IR-4- 10199, concurrent recovery
cranberry, fruit	IN-K7H19	0.01 0.1 1.0	80 92 94	69–97 90–96 92–95	13 3.8 1.6	6 3 3	<0.01	external standard, linear R^2 ≥0.9981	Report IR-4- 10199, method validation

[a] storage stability concurrent recoveries.

Table 8 Validation results for LC-MS/MS method in plant commodities for determination of metabolite IN-MLA84

Matrix	analyte	Fortifi- cation level (mg/kg)	Recovery (%) mean	 range	RSD (%)	n	Control mg/kg	calibration	Code no; Report no
grape, mature fruit	IN-MLA84	0.01 0.1	87 87	85–91 86–88	4.0 1.3	3 3	<0.01	external standard 0.1–20 ng/mL linear R ≥ 0.99	Report DP- 39380, concurrent recovery
cranberry,	IN-MLA84	0.01	96	94–106	8.2	4	<0.01	external standard,	Report IR-4-

Matrix	analyte	Fortification level (mg/kg)	Recovery (%) mean	range	RSD (%)	n	Control mg/kg	calibration	Code no; Report no
fruit		0.1 1.0 [a]	96 106	84–104 98, 115	8.9 11	4 2		linear R^2 ≥0.9714	10199, concurrent recovery
cranberry, fruit	IN-MLA84	0.01 0.1 1.0	90 85 92	68–106 55–100 85–106	17 30 13	6 3 3	<0.01	external standard, linear R^2 ≥0.9859	Report IR-4-10199, method validation

[a] storage stability concurrent recoveries.

Table 9 Validation results for LC-MS/MS method in plant commodities for determination of metabolite IN-MYX98

Matrix	analyte	Fortification level (mg/kg)	Recovery (%) mean	range	RSD (%)	n	control mg/kg	calibration	Code no; Report no
grape, mature fruit	IN-MYX98	0.01 0.1	87 90	84–92 89–91	4.8 1.3	3 3	<0.01	external standard 0.1–20 ng/mL linear R ≥ 0.99	Report DP-39380, concurrent recoveries
cranberry, fruit	IN-MYX98	0.01 0.1 1.0 [a]	86 93 93	79–91 89–95 93, 93	5.9 3.1 -	4 4 2	<0.01	external standard, linear R^2 ≥0.9991	Report IR-4-10199, concurrent recovery
cranberry, fruit	IN-MYX98	0.01 0.1 1.0	89 90 93	83–93 88–91 92–95	4.4 1.7 1.9	6 3 3	<0.01	external standard, linear R^2 ≥0.9980	Report IR-4-10199, method validation

[a] storage stability concurrent recoveries.

Table 10 Validation results for LC-MS/MS method in plant commodities for determination of metabolite IN-N7B69

Matrix	analyte	Fortification level (mg/kg)	Recovery (%) mean	range	RSD (%)	n	control mg/kg	calibration	Code no; Report no
grape, mature fruit	IN-N7B69	0.01 0.1	94 102 98	88– 97–98	7.7 0.6	3 3	<0.01	external standard 0.1–20 ng/mL linear R ≥ 0.99	Report DP-39380, concurrent recoveries
cranberry, fruit	IN-N7B69	0.01 0.1 1.0 [a]	82 92 92	80–84 87–99 91, 92	2.5 5.3 -	4 4 2	<0.01	external standard, linear R^2 ≥0.9983	Report IR-4-10199, concurrent recovery
cranberry, fruit	IN-N7B69	0.01 0.1 1.0	82 86 95	76–93 85–88 92–97	7.6 2.0 2.7	6 3 3	<0.01	external standard, linear R^2 ≥0.9978	Report IR-4-10199, method validation

[a] storage stability concurrent recoveries.

Stability of pesticide residues in stored analytical samples

The 2018 Meeting did not receive additional specific storage stability studies. However, storage stability data were included in the submitted supervised residue trials [Dorschner, 2012, Report IR-4-10313 and Samoil, 2013, Report IR-P No. 10199]. The study by Dorschner, 2012 (cucumber) was evaluated by the previous Meeting [JMPR 2013]. Results were not re-included. The data on cranberries were new and summarised below.

Storage stability samples were fortified with cyantraniliprole and each of its six metabolites at 1.0 mg/kg (cranberries) soon after the receipt of the samples by the analytical laboratory. The storage stability samples were held in frozen storage under similar conditions to the field generated samples. After 546 days (cranberry study) of freezer storage (prior to analysis of field-treated samples), and again after 576 days of storage (after completion of the analysis of field-treated samples), the samples were analyzed for cyantraniliprole and its six metabolites. The recoveries for the storage stability samples ranged from 74 to100% at

546 days and from 75 to 101% at 576 days. Concurrent recoveries for spikes analyzed along with the storage stability samples were in the range of 87–115%. This data indicates that cyantraniliprole and its metabolites are stable under the conditions which the samples were held between harvest and analysis.

The results are presented in Table 11 (metabolites). Samples were reported as uncorrected for average concurrent method recoveries.

Table 11 Storage stability of cyantraniliprole and the six metabolites in cranberries as determined in field residue trials [Samoil, 2011, Report IR-4-10199]

Compound	Storage time (days)	Spike level (mg/kg)	% remaining (n)
cyantraniliprole	546	1.0	87, 88, 92 (3)
cyantraniliprole	576	1.0	85, 86, 87 (3)
IN-J9Z38	546	1.0	91, 87, 77 (3)
IN-J9Z38	576	1.0	77, 82, 82 (3)
IN-JCZ38	546	1.0	85, 77, 74 (3)
IN-JCZ38	576	1.0	86, 77, 79 (3)
INK7H19	546	1.0	95, 93, 90 (3)
INK7H19	576	1.0	97, 91, 97 (3)
IN-MLA84	546	1.0	95, 92, 100 (3)
IN-MLA84	576	1.0	79, 75, 101 (3)
IN-MYX98	546	1.0	99, 96, 89 (3)
IN-MYX98	576	1.0	93, 92, 94 (3)
IN-N7B69	546	1.0	82, 82, 74 (3)
IN-N7B69	576	1.0	79, 79, 79 (3)

USE PATTERN

Cyantraniliprole is registered in many countries for the control of insect pests on fruits, vegetables and cereals. Cyantraniliprole is intended for use as foliar applications in a wide range of fruit and vegetable crops, tree crops and oil seed crops. Other applications include seed treatments and pre-plant soil applications. The information from the labels made available to the 2018 Meeting and relevant for the submitted field trial data are included in the following table.

Table 12 Registered pre-harvest uses of cyantraniliprole

Crop	F/G	Country	Form	Application				PHI, days
				Method	Rate g ai/ha	Spray conc, g ai/hL	Number	
Berries and other small fruits (004) - small fruit vine climbing – Subgroup 004D								
grape, wine (FB 1236)	F	UK	SE, 100 g/L	foliar spray	72–90	6–18	1–2 (RTI 14 days)	10 days 500–1200 L/ha
grape, table and wine (FB 1235 and FB 1236)	F	BE	SE, 100 g/L	foliar spray	53	n.r.	1–2/year (RTI 10 days)	10 days
grape, wine (FB1236)	F	I	SE, 100 g/L	foliar spray	75–112.5	5–7.5	1–2 (RTI 14 days)	10 days
Berries and other small fruit – low growing berries – Subgroup 004E								
cranberries (FB 0265) Label: low growing berries, except strawberry.	F	Canada	SE, 100 g/L	foliar spray or ground spray	75–150	25–75 [d]	1–4 (RTI 7 days)	14 days [a] [b]
strawberries (FB 0275)	F	Canada	SE, 100 g/L	foliar or ground spray	50–150	50 [e]	1–4 (RTI 5 days)	1 day [a] [b]
strawberries (FB 0275)	F	UK	OD, 100 g/L	foliar spray	75	7.5–25	1–2 (RTI 7 days)	1 days [a]
strawberries (FB 0275)	F	USA	SE 100 g/L	foliar spray	99–148	158 (max) [f]	1–3 (RTI 7 days)	1 day [a] [b] [c] [g]

Crop	F/G	Country	Form	Application				PHI, days
				Method	Rate g ai/ha	Spray conc, g ai/hL	Number	
Assorted tropical and sub-tropical fruits – inedible smooth peel – large – Subgroup 006B								
mango (FI 0345)	F	Cambodia	OD, 100 g/L	foliar spray	150–180	15–18	2 (RTI 7 days)	7 days
Fruiting vegetables, cucurbits – Group 011								
cucumber (VC 0424)	G	USA	SE, 100 g/L	foliar spray	73–149	158 (max)	1–3 (RTI 5 days)	0 days [a] [b] [c]
cucumber (VC 0424)	G	Canada	SE, 100 g/L	foliar spray	25–100	ns	1–4 (RTI 7 days)	0 day [a] [b]
Rice cereals – Subgroup 020C								
rice (GC 0649)	F	China	OD, 100 g/L	spray	30–60	ns	2 (RTI 7 days)	21 days max 2 applications /season

OD=Oil based suspension concentrate; SE=Suspo emulsion; ns=not specified; n.r.=not reported; RTI=retreatment interval

[a] Use of an adjuvant is advised for enhanced control.

[b] Do not apply more than 450 kg ai/ha /calendar year.

[c] Re-entry interval 12 days.

[d] Minimum 200 L/ha - up to 3000 L/ha

[e] This is de maximum concentration a the minimum water rate of 325 L/ha.

[f] This is the maximum concentration at the minimum water rate.

[g] Crops on this label and the following crops or crop groups may be planted immediately following the last application of DuPont™ EXIREL®: Brassica Leafy Vegetables (Crop Group 5); Bulb Vegetables (Crop Group 3-07); Cotton; Cucurbit Vegetables (Crop Group 9); Fruiting Vegetables (Crop Group 8-10); Leafy Vegetables (except brassicas) (Crop Group 4); Leaves of Root and Tuber Vegetables (Crop Group 2); Legume Vegetables (Crop Groups 6 and 7); Low Growing Berries (Berry and Fruit Crop Subgroup 13-07H); Oilseeds (Crop Group 20); Peanuts; Root and Tuber Vegetables (Crop Subgroups 1B and 1C); Tobacco. The following crops or crop groups may be planted 30 days following the last application of EXIREL®: Cereal Grains (Crop Group 15); Forage, Fodder and Straw of Cereal Grains (Crop Group 16); Grass Forage, Fodder and Hay (Crop Group 17); Non-grass Animal Feeds (forage, fodder, straw and hay) (Crop Group 18); Sugar beets. There is no plant back restriction for conversion of a treated field to, or for making a new or replacement planting into established orchards or fields of "Low Growing Berries". All other crops cannot be planted until 12 months after the last application.

RESIDUES RESULTING FROM SUPERVISED TRIALS

The Meeting received information on supervised field trials following foliar applications of cyantraniliprole to the following crops: wine grapes, strawberries, cranberries, cucumber (greenhouse), mango and rice.

The supervised trials were documented with laboratory and field reports. Laboratory reports included method validation including procedural recoveries with spiking at residue levels similar to those occurring in the samples from the supervised residue trials. Dates of analyses or duration of residue sample storage were also provided. Although trials included control plots, no control data are recorded in the tables unless residues in control samples exceeded the LOQ. In such cases, the residues found are noted as "c = nn mg/kg" in the reference and comments columns. Residue data are recorded unadjusted for recovery.

Results from replicated field plots are presented as individual values. When residues were not detected they are shown as <LOQ. Residues and application rates have been reported as provided in the study reports, although the results from trials used for estimation of maximum residue levels (underlined) have been rounded to two significant figures in the Appraisal.

In some trials, samples were taken just before the final application and then, again on the same day after the spray had dried. The notation for these two sampling times in the data tables is '-0' and '0' respectively.

The analytical methods used in the majority of the field trials were capable of analysing both cyantraniliprole and one to six metabolites (among them, four metabolites are considered in a residue definition). In most cases, residues of these metabolites were not detected (LOD of 0.003 mg/kg in most trials) or in some cases were reported at levels below the LOQ of 0.01 mg/kg. Where metabolite residues were present at levels above the LOQ, these values are recorded in the tables of previous evaluations using the abbreviations listed below:

M1=IN-J9Z38 2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-3,4-dihydro-3,8-dimethyl-4-oxo-6-quinazolinecarbonitrile

M2=IN-MYX98 3-Bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2[[(hydroxymethyl)amino]carbonyl]-6-methylphenyl]-1*H*-pyrazole-5-carboxamide

M3=IN-N7B69 3-Bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2-(hydroxymethyl)-6-[(methylamino)carbonyl]phenyl]-1*H*-pyrazole-5-carboxamide

M4=IN-MLA84 2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]-1,4-dihydro-8-methyl-4-oxo-6-quinazolinecarbonitrile

M5=IN-JCZ38 4-[[[3-Bromo-1-(3-chloro-2-pyridinyl)-1*H*-pyrazol-5-yl]carbonyl]amino]-N'3',5-dimethyl-1,3-benzenedicarboxamide

M6=IN-N5M09 6-Chloro-4-methyl-11-oxo-11*H*-pyrido[2,1-*b*]quinazoline-2-carbonitrile

Berries and other small fruits (Group 004)

Small fruit vine climbing (Subgroup 004D)

Grapes, wine (FB 1236)

Two studies on grapes were submitted to the 2018 Meeting [Aitken 2011, Report DP-27718 and Munro and Campbell, 2015, Report DP-39380]. One study [Aitken 2011, Report DP-27718] was previously evaluated by the 2013 JMPR, but not further addressed as no registered use label was submitted at that time. For completeness, it is included in the current evaluation in Table 13, referenced as JMPR 2013.

In a second study nine field residue trials on wine grapes were conducted in Northern and Southern Europe in the 2014 growing season [Munro and Campbell, 2015, Report DP-39380]. Two foliar applications at a targeted rated of 112.5 g ai/ha cyantraniliprole (100 g/L SE formulation) were applied at 14 day intervals, using 1500 L/ha. In the tests performed in France (Trial 08 and 09) a reduced water volume of 300 L/ha was used. No adjuvant was added.

Samples of mature wine grapes were collected by hand 10 days after the last application and weighed at least 1 kg (≥ 12 bunches). Samples were frozen within 8 hours of collection and stored at -20 °C for up to 8.2 months (245 days) before analysis. The samples were analyzed for residues as described for the study above. This method is based on LC-MS-MS method described in Report DP-15736 [McClory *et al.*, 2007, Report 15736 and modified in McClory *et al.*, 2011, DP-15736, S1] and validated on representative crops [Kinney, 2008, Report DP-18846]. The method with its modifications and the validation are evaluated by JMPR 2013. Concurrent recoveries ranged from 77–91% (cyantraniliprole) and 81–106% (metabolites) in samples spiked with 0.01 and 0.1 mg/kg (n = 3/fortification level and n = 2 for fortification level 1.0 mg/kg (parent only)). The recovery levels are reported in the analytical section. The reported residue levels were not corrected for concurrent recoveries. The LOQ of the method was 0.01 mg/kg. The results are summarized in Table 13.

Storage stability for cyantraniliprole and its metabolites was assessed in a separate study [Rodgers, 2010, Report DP-16990], evaluated by JMPR 2013 and supports the storage period and conditions employed for both grape studies (stable in grapes for up to 24 months).

Parent was the only residue found. All other metabolites (M1–M6) were below LOQ.

Table 13 Residues of cyantraniliprole in field grown grapes from supervised (reversed decline) trials in Europe following 2 foliar applications.

Location, year, (variety)	Form	No	Interval (days)	g ai/ha	g ai/hL	method, timing, last application	DAT [d]	parent, mg/kg [a]	trial number, reference
Kato Milia, Pieria, Central	SE 100 g/L	2	14	150 150	10	foliar broadcast,	-0	0.14	Trial 01 [JMPR 2013]
Macedonia, Greece, 2009						BBCH 89, 04 Sept	0	0.32	
(Muscat)				149 152	10	BBCH 87 21 August,	10	0.28	

Location, year, (variety)	Form	No	Inter val (days)	g ai/ha	g ai/hL	method, timing, last application	DAT [d]	parent, mg/kg [a]	trial number, reference
				151 151	10	BBCH 84, 11 August	21	0.076	
				151 149	10	BBCH 81, 31 July	28	0.11	
				154 150	10	BBCH 77, 10 July	56	0.029	
Villié Morgon, Rhône Alpes, South France, 2009 (Gamay)	SE 100 g/L	2	14	150	10	foliar broadcast	-0	0.050	Trial 02 [JMPR 2013]
				147 150	10	BBCH 89, 03 Sept	0	0.24	
				147 149	10	BBCH 85, 24 August	10	0.14	
				148 147	10	BBCH 83, 13 August	21	0.11	
				154 150	10	BBCH 81–83, 06 August	28	0.096	
				151 149	10	BBCH 77, 09 July	56	0.050	
Höhnstedt, Saxony-Anhalt, Germany, 2009 (Gutedel)	SE 100 g/L	2	14	155 154	10	foliar broadcast	-0	0.29	Trial 03 [JMPR 2013]
						BBCH 89, 14 Sept	0	0.42	
				146 152	10	BBCH 81–85 31 August	10	0.33	
				152 144	10	BBCH 79 21 August	21	0.27	
				144 144	10	BBCH 77–79, 10 August	28	0.15	
				144 152	10	BBCH 73, 20 July	56	0.17	
Mearea Island, Colchester, Essex, United Kingdom, 2009 (Reichensteiner)	SE 100 g/L	2	14	150 150	10	foliar broadcast	-0	0.11	Trial 04 [JMPR 2013]
						BBCH 89, 29 Sept	0	0.23	
				150 150	10	BBCH 85, 19 Sept	10	0.30	
				150 150	10	BBCH 79, 08 Sept	21	0.16	
				151 150	10	BBCH 77–79, 01 Sept	28	0.16	
				150 150	10	BBCH 71–75, 04 August	56	0.10	
Veldenz, Wittlich, Germany, 2009 (Kerner)	SE 100 g/L	2	13–15	146 146	10	foliar broadcast	-0	0.16	Trial 05 [JMPR 2013]
						BBCH 89 15 Oct	0	0.46	
				144 150	10	BBCH 87, 05 Oct	10	0.36	
				143 148	10	BBCH 83, 24 Sept	21	0.30	
				145 143	10	BBCH 81, 17 Sept	28	0.68	
				144	10	BBCH 75,	56	0.19	

Location, year, (variety)	Form	No	Interval (days)	g ai/ha	g ai/hL	method, timing, last application	DAT [d]	parent, mg/kg [a]	trial number, reference
				148		20 August			
Miradolo Terme, Lombardia, Italy, 2009 (Bonarda)	SE 100 g/L	2	13–14	153 149	10	foliar broadcast	-0	0.34	Trial 06 [JMPR 2013]
						BBCH 89, 17 Sept	0	0.65	
				144 149	10	BBCH 87, 06 Sept	10	0.56	
				147 152	10	BBCH 85, 26 August	21	0.48	
				150 152	10	BBCH 83, 19 August	28	0.67	
				150 148	10	BBCH 79, 22 July	56	0.63	
				144 149	10	BBCH 87, 06 Sept	11	0.16 [t]	Trial 06 [p]
Guimera, Catalunya, Spain, 2009 (Tempranillo)	SE 100 g/L	2	13–14	151 150	10	foliar broadcast	-0	0.062	Trial 07 [JMPR 2013]
						BBCH 89, 17 Sept	0	0.065	
				181 152	10	BBCH 87, 05 Sept	10	0.21	
				151 152	10	BBCH 85, 27 August	21	0.18	
				151 150	10	BBCH 85, 20 August	28	0.079	
				150 149	10	BBCH 81, 23 July	56	0.077	
				151 152	10	BBCH 87, 05 Sept	10	0.12 [t]	Trial 07 [p]
Marfaux, Champgane Ardenne, North France, 2009 (Chardonnay)	SE 100 g/L	2	14–15	155 145	10	foliar broadcast	-0	0.023	Trial 08 [JMPR 2013] 14 DAA1
						BBCH 89, 15 Oct	0	0.071	
				153 145	10	BBCH 89, 06 Oct	10	0.070	
				164 145	10	BBCH 88, 24 Sept	21	0.034	
				147 149	10	BBCH 87–88, 17 Sept	28	0.040	
				150 150	10	BBCH 81 20 August	56	0.047	
				153 145	10	BBCH 89 06 Oct	9	0.11 [t]	Trial 08 [p]
Kato Milia, Pieria, Central Macedonia, Greece, 2010 (Muscat)	SE 100 g/L	2	14	151 150	10	foliar broadcast	-0	0.15	Trial 13 [JMPR 2013]
						BBCH 89, 02 Sept	0	0.33	
				150 145	10	BBCH 87, 23 August	10	0.41	
				150 151	10	BBCH 85, 12 August	21	0.31	
				151	10	BBCH 83,	28	0.18	

Location, year, (variety)	Form	No	Inter val (days)	g ai/ha	g ai/hL	method, timing, last application	DAT [d]	parent, mg/kg [a]	trial number, reference
				150		05 August			
				149 147	10	BBCH 76, 08 July	56	0.071	
Villié Morgon, Rhône Alpes, South France, 2010 (Gamay)	SE 100 g/L	2	13–15	118 123	8	foliar broadcast	-0	0.021	Trial 14 [JMPR 2013]
						BBCH 89, 10 Sept	0	0.073	
				120 117	8	BBCH 83–85, 31 August	10	0.071	
				123 122	8	BBCH 81, 20 August	21	0.036	
				121 122	8	BBCH 79–81, 13 August	28	0.028	
				121 119	8	BBCH 73, 16 July	56	0.032	
La Roche Vineause, Bourgogne, Rhône Alpes, North France, 2010 (Gamay)	SE 100 g/L	2	13–14	121 121	40	foliar broadcast	-0	0.061	Trial 15 [JMPR 2013]
						BBCH 89, 13 Sept	0	0.13	
				118 118	40	BBCH 85, 03 Sept	10	0.16	
				119 120	40	BBCH 79–81, 23 August	21	0.16	
				121 120	40	BBCH 79, 16 August	28	0.047	
				119 117	40	BBCH 75, 19 July	56	0.047	
Miradolo Terme, Lombardia, Italy, 2010 (Bonarda)	SE 100 g/L	2	13–14	123 120	8	foliar broadcast	-0	0.45	Trial 16 [JMPR 2013]
						BBCH 89, 15 Sept	0	0.99	
				122 120	8	BBCH 85, 05 Sept	10	0.80	
				122 121	8	BBCH 81, 25 August	21	0.63	
				120 121	8	BBCH 79, 18 August	28	0.45	
				123 121	8	BBCH 75, 21 July	56	0.21	
Verdu, Catalunya, Spain, 2010 (Ull de Llebre)	SE 100 g/L	2	14	120 120	8	foliar broadcast	-0	0.13	Trial 17 [JMPR 2013]
						BBCH 89, 30 Sept	0	0.40	
				120 120	8	BBCH 89, 20 Sept	10	0.13	
				119 120	8	BBCH 85, 09 Sept	21	0.19	
				120 119	8	BBCH 85, 02 Sept	28	0.074	

Location, year, (variety)	Form	No	Inter val (days)	g ai/ha	g ai/hL	method, timing, last application	DAT [d]	parent, mg/kg [a]	trial number, reference
				119 120	8	BBCH 83, 05 August	56	0.024	
Verdu, Catalunya,	SE 100 g/L	2	13–14	120 120	8	foliar broadcast	-0	0.060	Trial 18 [JMPR 2013]
Spain, 2010 (Macabeu)						BBCH 89, 06 Sept	0	0.16	
				121 120	8	BBCH 87, 27 August	10	0.48	
				120 120	8	BBCH 83, 16 August	21	0.14	
				120 119	8	BBCH 79, 09 August	28	0.19	
				120 120	8	BBCH 77 12 July	56	0.056	
Boxted, Colchester, Essex, United	SE 100 g/L		14–15	121 120	8	foliar broadcast	-0	0.053	Trial 19 [JMPR 2013]
Kingdom, 2010 (Baccus)						BBCH 89, 07 Oct	0	0.13	
				121 120	8	BBCH 85, 27 Sept	10	0.096	
				120 122	8	BBCH 85, 15 Sept	21	0.059	
				122 121	8	BBCH 83–85, 08 Sept	28	0.039	
				120 121	8	BBCH 77 12 August	56	0.034	
Höhnstedt, Saxony,	SE 100 g/L	2	14	118 119	8	foliar broadcast	-0	0.033	Trial 20 [JMPR 2013]
Germany, 2010 (Müller-Thurgau)						BBCH 89, 27 Sept	0	0.34	
				119 148	8	BBCH 85, 13 Sept	10	0.11	
				125 126	8	BBCH 83, 03 Sept	21	0.14	
				120 122	8	BBCH 79, 23 August	28	0.12	
				125 121	8	BBCH 75, 02 August	56	0.045	
Kesten, Wittlich,	SE 100 g/L		14–15	121 125	8	foliar broadcast	-0	0.16	Trial 21 [JMPR 2013]
Germany, 2010 (Riesling)						BBCH 89, 05 Oct	0	0.23	
				125 119	8	BBCH 87, 25 Sept	10	0.24	
				120 123	8	BBCH 85, 14 Sept	21	0.22	
				125 122	8	BBCH 85, 07 Sept	28	0.21	
				119 121	8	BBCH 81, 02 August	56	0.12	
Veldenz, Wittlich,	SE 100 g/L	2	14	117 115	8	foliar broadcast	-0	0.14	Trial 22 [JMPR 2013]
Germany, 2010 (Müller-Thurgau)						BBCH 89 28 Sept	0	0.22	
				119	8	BBCH 87	10	0.19	

Location, year, (variety)	Form	No	Interval (days)	g ai/ha	g ai/hL	method, timing, last application	DAT [d]	parent, mg/kg [a]	trial number, reference
				120		18 Sept			
				115 115	8	BBCH 85 07 Sept	21	0.49	
				115 122	8	BBCH 83–85 31 August	28	0.64	
				116 118	8	BBCH 77 03 August	56	0.22	
Los Palacios, Andalucia, Spain, 2014 (Merlot-red)	SE 100 g/L	2	13	112 114	7.5 7.5	foliar broadcast, BBCH 83, 11 Aug	10	0.18	Trial 01 [Munro&Campbell, 2015, Report DP-39380]
Sant Marti de Malda, Catalonia, Spain, 2014 (Macabeu-white)	SE 100 g/L	2	14	113 112	7.5 7.5	foliar broadcast, BBCH 87, 26 Aug	10	0.099	Trial 02 [Munro&Campbell, 2015, Report DP-39380]
Klein Umstadt, Hessen, Germany, 2014 (Riesling-white)	SE 100 g/L	2	13	110 117	7.5 7.5	foliar broadcast, BBCH 85, 18 Sept	10	0.031	Trial 03 [Munro&Campbell, 2015, Report DP-39380]
Kato Mila, Central Macedonia, Greece, 2014 (Cabernet Sauvignon-red)	SE 100 g/L	2	15	113 114	7.5 7.5	foliar broadcast, BBCH 87, 19 August	10	0.43	Trial 04 [Munro&Campbell, 2015, Report DP-39380]
Pannonhalma, Györ-Moson-Sopron, Hungary, 2014 (Welshriesling-white)	SE 100 g/L	2	13	114 112	14 14	foliar broadcast, BBCH 87, 16 Sept	10	0.42	Trial 05 [Munro&Campbell, 2015, Report DP-39380]
Miradolo Terme, Lomardia, Italy, 2014 (Verdea-white)	SE 100 g/L	2	13	112 113	7.5 7.5	foliar broadcast, BBCH 86, 03 Sept	10	0.40	Trial 06 [Munro&Campbell, 2015, Report DP-39380]
Hühnstedt, Saxony-Anhalt, Germany, 2014 (Pinot noir-red)	SE 100 g/L	2	15	108 114	7.6 7.6	foliar broadcast, BBCH 85, 13 Sept	10	0.34	Trial 07 [Munro&Campbell, 2015, Report DP-39380]
Villié-Morgon, Rhône-Alpes, South France, 2014 (Garnay-red)	SE 100 g/L	2	14	110 111	37.5 37.5	foliar broadcast, BBCH 85, 15 August	10	0.058	Trial 08 [Munro&Campbell, 2015, Report DP-39380]
Courville, Champagne-Ardenne, North France, 2014 (Pinot meunier-red)	SE 100 g/L	2	13	118 115	37.5 37.5	foliar broadcast, BBCH 87, 02 Sept	10	0.11	Trial 09 [Munro&Campbell, 2015, Report DP-39380]

[a] Residues refer to parent. Metabolites M1–M6 were analysed, but were all < LOQ of 0.01 mg/kg.

[d] -0 = sample is taken before last treatment; 0 = sample is taken after last treatment

[p] used for processing study

[t] mean of three field samples.

Low growing berries (Subgroup 004E)

Strawberries

Two studies on strawberries were submitted to the 2018 Meeting [Aitken *et al.*, 1013, Report DP-29223 and Lennon, 2015, Report IR-4-10328]. One of these studies on greenhouse and field grown strawberries [Aitken *et al.*, 1013, Report DP-29223] was previously evaluated by the 2015 JMPR, but without a supporting label. Since these field trials only support a less critical GAP from the United Kingdom and sufficient data in support of the critical GAP from Canada and the USA were provided, the results were not re-included in the current evaluation.

Supervised residue data on applications by drip irrigation in field and greenhouse grown strawberries [McConnell *et al.*, 2013, Report DP-34085] were made available to the 2015 Meeting. These data were not resubmitted to the 2018 Meeting, because higher residues are found following foliar applications for which the registered label information was supplied.

In the newly submitted supervised field residue trials on strawberries conducted in the USA [Lennon, 2015, Report IR-4-10328] three foliar applications of 150 g ai/ha cyantraniliprole (100 g/L SE formulation) were applied by backpack sprayer or R&D sprayer model T, at 4–6 day intervals, using 178–458 L/ha, with adjuvant added. Mature strawberries were harvested 1–2 day after the last application and 0, 1, 3, 8 and 14 days after the last application in the decline trial. Duplicate samples (≥ 0.9 kg) were collected from 12 separate areas within the plot. Caps were removed before bagging and cooling. Samples were stored frozen within 24 hours after collection. Though the samples weighed slightly lower than 1 kg, this was not considered to influence the findings.

Samples were stored at –18 °C for up to 421 days (9.1 months) before extraction. Stability samples were prepared, but were not analyzed. Analysis of the field samples took place within 14–15 months. The LC-MS/MS analytical method 15736 [McClory *et al.*, 2011, Report DP-15736], as evaluated by JMPR in 2013, was used to determine parent and its metabolites, with a method LOQ of 0.01 mg/kg for all analytes. The average concurrent recoveries were within 70–120% for parent cyantraniliprole in samples spiked with 0.01, 0.1 and 1.0 mg/kg (n = 3–7/fortification level). Metabolites M1–M6 were not analysed in this study. Method validation and concurrent recoveries in this study are summarized in the analytical method section.

The storage period and conditions employed in the strawberry study is covered by the storage stability studies evaluated by the 2013 JMPR (stable in matrices with high water and/or acid content for up to 24 months).

The results of the residue trials are presented in Table 14.

Table 14 Residues of cyantraniliprole in field grown strawberries in supervised trials following foliar applications using an SE formulation.

Location, year, (variety)	Form	No	Inter-val (days)	g ai/ha	g ai/hL	method, timing	DAT	parent, mg/kg [a]	Trial number and reference
Parlier, CA, USA, 2013 (San Andreas) [+ADJ]	SE, 100 g/L	3	5 6	150 151 150	40 40 40	foliar, crop height 25 cm, fruiting, 29 April	1	0.67, 0.73 (0.70)	13-CA80 [Lennon, 2015, Report IR-4-10328]
Aurora, OR, USA, 2013 (Totem) [+ADJ]	SE, 100 g/L	3	4	155 154 151	53 53 54	foliar, crop height 38–46 cm, fruiting 05 June	0 1 3 8 14	0.28, 0.33 (0.31) 0.27, 0.27 (0.27) 0.16, 0.18 (0.17) 0.15, 0.16 (0.16) 0.11, 0.12 (0.12)	13-OR18 [Lennon, 2015, Report IR-4-10328]
Salina, CA, USA, 2013 (Monterey) [+ADJ]	SE, 100 g/L	3	4	154 150 150	44 45 45	foliar, crop height 20–30 cm, all stages of flowers and fruit, 28 Aug	1	0.44, 0.44 (0.44)	13-CA81 considered a duplicate of 13-CA82 [Lennon, 2015, Report IR-4-10328]
Salina, CA, USA, 2013 (Albion)	SE, 100 g/L	3	4	146 148 148	33 32 33	foliar, crop height 15–28 cm, all stages of flowers and	1	0.86, 0.82 (0.84)	13-CA82 [Lennon, 2015, Report IR-4-10328]

Location, year, (variety)	Form	No	Inter-val (days)	g ai/ha	g ai/hL	method, timing	DAT	parent, mg/kg [a]	Trial number and reference
[+ADJ]						fruit, 28 Aug			
Cream Ridge, NJ, USA, 2013 (AC Wendy) [+ADJ]	SE, 100 g/L	3	4 6	154 151 151	86 85 85	foliar, crop height 30–36 cm, green and ripe fruit, 23 May	1	0.22, 0.23 (0.22)	13-NJ12 [Lennon, 2015, Report IR-4-10328]
Coloma, WI, USA, 2013 (Cavendish) [+ADJ]	SE, 100 g/L	3	5 6	149 151 156	64 67 67	foliar, crop height 51 cm, fruiting, 25 June	1	0.091, 0.081 (0.086)	12-WI16 [Lennon, 2015, Report IR-4-10328]
Citra, FL, USA, 2013 (Festival) [+ADJ]	SE, 100 g/L	3	5 6	148 151 152	53 54 53	foliar, crop height 10–15 cm, fruiting, 25 March	1	0.65, 0.63 (0.64)	13-FL28 [Lennon, 2015, Report IR-4-10328]
Clinton, NC, USA, 2013 (Chandler) [+ADJ]	SE, 100 g/L	4	6 6 4	146 150 151 150	54 55 54 55	foliar, crop height 15–30 cm, fruiting, 27 April	1	0.25, 0.23 (0.24) [b]	13-NC13 [Lennon, 2015, Report IR-4-10328]
Harrow, ON, Canada, 2013 (Tribute) [+ADJ]	SE, 100 g/L	3	6 6	167 154 154	55 50 50	foliar, crop height 25 cm, mature fruit, 08 June	1	0.19, 0.22 (0.20)	13-ON11 [Lennon, 2015, Report IR-4-10328]
L'Acadie, QC, Canada, 2013 (Seascape) [+ADJ]	SE, 100 g/L	3	4	148 157 155	75 76 75	foliar, crop height ~25 cm, fruiting, 21 August	2	0.69, 0.58 (0.64)	13-QC11 [Lennon, 2015, Report IR-4-10328]
L'Acadie, QC, Canada, 2013 (Albion) [+ADJ]	SE, 100 g/L	3	4	152 156 155	49 51 50	foliar, crop height ~20 cm, fruiting, 21 August	2	0.30, 0.24 (0.28)	13-QC12 considered a duplicate of 13-QC11 [Lennon, 2015, Report IR-4-10328]

SE = Suspoemulsion

[+ADJ] = an adjuvant was added (non-ionic surfactant, crop oil concentrate, or methylated seed oil)

[a] Residues reported represent the parent compound. Samples were not analysed for metabolites (M1–M6). Values between brackets after two reported values represent the mean of two replicate field samples of parent only.

[b] Additional application was needed because cool weather delayed maturity of the strawberries. Decline trials show significant levels of residues after the retreatment interval. Given the short PHI, the trial was not considered suitable for use in MRL setting.

Cranberries

The Meeting received one study reporting supervised field trials on cranberries [Samoil, 2013, Report IR-P No. 10199]. This study was not submitted to the Meeting previously. In the trials on cranberries conducted in Canada (1) and the USA (5), three foliar applications at a target rate of 150 (actual rates 149–163) g ai/ha cyantraniliprole (OD formulation) were applied at 6–8 day intervals, using 253–444 L/ha, with adjuvant added [Samoil, 2011, Report IR-4PR-10199]. The BBCH code of the crop stage was not reported. Application was at fruiting stage with a crop height of 6–12 inches. Duplicate samples (≥ 0.9 kg) were collected from 12 separate areas within the plot. Samples were stored frozen within 24 hours after collection. Though the samples weighed slightly lower than 1 kg, this was not considered to influence the findings.

Samples were frozen upon collection and stored at -20 °C for up to 20 months (616 days) before analysis. Storage stability was demonstrated up to 546 days (n = 3/ compound) to be 77–100% and up to 576 days (n = 3/compound) to be 75–101%. Longer storage durations were covered by another study [Rodgers, 2010, Report DP-16990] evaluated by the 2013 JMPR. The LC-MS/MS analytical method 15736 [McClory *et al.*, 2011, Report DP-15736] as evaluated by the JMPR in 2013 was used to determine parent and its metabolites, with a method LOQ of 0.01 mg/kg for all analytes. Average (n = 5–10 per fortification level) method validation and concurrent recoveries were 87–93% (cyantraniliprole) and 82–98% (metabolites) in samples spiked with 0.01, 0.1 and 1.0 mg/kg. Specific recoveries were summarised in the analytical section.

The results of the study are summarised in Table 15.

Table 15 Residues of cyantraniliprole in field grown cranberries in supervised trials following 3 foliar applications.

Location, year, (variety)	Form	No	Interval (days)	g ai/ha	g ai/hL	method, timing, date of last application	DAT	parent, mg/kg [a]	Trial number and reference
Plymouth, MA, USA, 2009 (Stevens) [ADJ-1]	SE	3	7 6	149 149 149	37.1 36.2 36.2	foliar broadcast, fruiting, 09 Sept, 2009	8 10 15 19	0.013, <0.01 (0.011) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01)	MA02 [Samoil, 2011, Report IR-4-10199]
Cream Ridges, NJ, USA, 2009 (Early Black) [ADJ]	SE	3	7 7	149 163 156	51.4 48.4 52.2	foliar broadcast, fruiting, 02 Sept, 2009	14	<0.01, 0.011 (0.010)	NJ08 [Samoil, 2011, Report IR-4-10199]
Langlois, OR, USA, 2009 (Pilgrim) [ADJ]	SE	3	7 8	152 152 157	45.1 45.1 45.1	foliar broadcast, fruiting, 18 Sept, 2009	14	0.011, 0.013 (0.012)	OR17 [Samoil, 2011, Report no. IR-4 PR- 10199]
Warren, WI, USA, 2009 (Ben Lear) [ADJ]	SE	3	8 7	160163 149	38.0 38.7 38.9	foliar broadcast, fruiting, 12 Sept, 2009	12	0.039, 0.043 (0.041) [b]	WI05 [Samoil, 2011, Report IR-4-10199]
Warren, WI, USA, 2009 (Stevens) [ADJ]	SE	3	8 7	262 253 243	62.6 64.8 62.1	foliar broadcast, fruiting, 12 Sept, 2009	12	0.023, 0.029 (0.026) [b]	WI06 [Samoil, 2011, Report IR-4-10199]
Langley, BC, Canada, 2009 (Stevens) [ADJ]	SE	3	7 8	152 155 150	34.9 34.9 34.9	foliar broadcast, fruiting, 12 Sept, 2009	14	0.032, 0.028 (0.030)	BC02 [Samoil, 2011, Report IR-4-10199]

ADJ-1 = Plyac non-ionic surfactant; ADJ = adjuvant not specified

[a] Results represent the results of the individual replicate field trials and the mean of the results in brackets for the parent compound. Metabolites M1–M6 were analysed, but all < LOQ of 0.01 mg/kg.

[b] Field trial WI05 and WI06 are considered duplicate trials. Though different cop varieties were used, identical location and application dates apply.

Assorted tropical and sub-tropical fruits – inedible peel (Group 006)

Assorted tropical and sub-tropical fruits – inedible smooth peel – large (Subgroup 006B)

Mango (FI0345)

In newly submitted trials on mangoes conducted in Thailand and Vietnam, two foliar applications at a target rate of 2 × 180 (actual rates 172–194) g ai/ha cyantraniliprole (OD formulation) were applied at 7–8 day intervals, using 982–3017 L/ha, without an adjuvant added [Shernikau, 2017, Report FMC-46393 and later updated to Petrova, 2018, FMC Report 46393]. The last application was at BBCH stage 81–85.

Samples of at least 2 kg fruit (≥ 12 fruits) were taken from several places in the tree from at least 4 trees. Samples were frozen upon collection and stored at ≤-18 °C for less than 4 months (between sampling and extraction). Storage stability was demonstrated in previous evaluations by the JMPR. The LC-MS/MS analytical method 15736 [McClory *et al.*, 2011, Report DP-15736] as evaluated by the JMPR in 2013 was used to determine parent, with a method LOQ of 0.01 mg/kg. Average (n = 1–6 per fortification level) concurrent recoveries were 88–98% (cyantraniliprole) in samples spiked with 0.01, 0.1, 2.0 and 2.6 mg/kg in mango peel and pulp. The individual recovery results are summarized in the analytical method section.

The trials are summarised in Table 16 and Table 17.

Based on the individual weights of the pulp, peel and stone fraction of the mangoes, the reviewer calculated a mean and median peeling-pitting factor based on weight ratio of 0.60 and 0.61, respectively (n = 16). The calculated chemical specific mean and median peeling-pitting factor (based on residue concentration in peel and pulp, corrected for the weight of the fractions of stone, peel and pulp) was lower being 0.11 and 0.085 (n = 16), respectively.

Table 16 Residues of cyantraniliprole in field grown mangoes (whole fruit) in supervised trials following 2 foliar applications with a 100 g/L OD formulation.

Location, year, (variety)	Form	No	Interval (days)	g ai/ha	g ai/hL	method, timing, last application	DAT [d]	parent, mg/kg [a]	Trial number and reference
Don Chedi, Suphanburi, Thailand, 2017 (Num Dok Mai)	OD, 100 g/L	2	7	176 172	6.0 6.0	foliar spray, BBCH 85, 04 April	-0 0 3 7 10 14	ND 0.10, 0.095 (0.097) 0.044, 0.045 (0.45) 0.031, 0.060 (0.046) 0.016, 0.075 (0.046) 0.081, 0.043 (<u>0.064</u>)	S17-00346-01 [Shernikau&Colorado, 2017, Report FMC-46393]
Sawaengha, Ang Thong, Thailand, 2017 (num Duan Koa)	OD, 100 g/L	2	7	178 175	6.0 6.0	foliar spray, BBCH 85, 04 April	7	0.10, 0.11 (<u>0.11</u>)	S17-00346-02 [Shernikau &Colorado, 2017, Report FMC-46393]
Muak Lek, Saraburi, Thailand, 2017 (R2E2)	OD, 100 g/L	2	7	180 194	12 12	foliar spray, BBCH 85, 19 April	7	0.18, 0.18 (<u>0.18</u>)	S17-00346-03 [Shernikau &Colorado, 2017, Report FMC-46393]
Pak Chong, Nakhon Ratchasima, Thailand, 2017 (Keiw Yai)	OD, 100 g/L	2	7	177 176	18 18	foliar spray, BBCH 85, 19 April	7	0.50, 0.41 (<u>0.45</u>)	S17-00346-04 [Shernikau & Colorado, 2017, Report FMC-46393]
Dong Nai, Xuan Loc, Vietnam, 2017 (Xoai Buoi)	OD, 100 g/L	2	7	181 181	12 12	foliar spray, BBCH 81, 09 June	-0 0 3 7 11 14	ND 0.20, 0.16 (0.18) 0.084, 0.086 (0.085) 0.067, 0.059 (0.063) 0.054, 0.073 (<u>0.064</u>) 0.041, 0.049 (0.045)	S17-00346-05 [Shernikau &Colorado, 2017, Report FMC-46393]
Thinh Thoi, Dong Thap, Vietnam, 2017 (Chai Chu)	OD, 100 g/L	2	7	181 179	6.0 6.0	foliar spray, BBCH 85, 06 June	7	0.039, 0.032 (<u>0.035</u>)	S17-00346-06 [Shernikau &Colorado, 2017, Report FMC-46393]
Han Giang, Han Giang, Vietnam, 2017 (Dai Loan)	OD, 100 g/L	2	7	182 188	7.2 10	foliar spray, BBCH 85, 07 June	7	0.083, 0.088 (<u>0.086</u>)	S17-00346-07 [Shernikau &Colorado, 2017, Report FMC-46393]
Cai Be, Tien Giong, Vietnam, 2017 (Dai Loan)	OD, 100 g/L	2	7	180 184	12 12	foliar spray, BBCH 85, 07 June	7	0.11, 0.12 (<u>0.12</u>)	S17-00346-08 [Shernikau &Colorado, 2017, Report FMC-46393]

OD = Oil based suspension concentrate

[a] Residues for whole fruit are calculated based on residues measured in peel and pulp and corrected for weight of peel, pulp and stone [{(R_{peel} × W_{peel}) + (R_{pulp} × W_{pulp})}/(W_{peel} + W_{pulp} + W_{stone}))], where is R = the residue (mg/kg), W = the weight (kg). Values were recalculated by the reviewer to establish the mean. Results represent the results of the individual replicate field trials and the mean of the results in brackets for the parent compound. Metabolites M1–M6 were not analysed.

[d] -0 = sample is taken before last treatment; 0 = sample is taken after last treatment

Table 17 Residues of cyantraniliprole in field grown mangoes (pulp) from supervised trials in following 2 foliar applications with a 100 g/L OD formulation

Location, year, (variety)	Form	No	Inter val (days)	g ai/ha	g ai/hL	method, timing, last application	DAT	parent, mg/kg [a]	Trial number and reference
Don Chedi, Suphanburi, Thailand, 2017 (Num Dok Mai)	OD, 100 g/L	2	7	176 172	6.0 6.0	foliar spray, BBCH 85, 04 April	-0 0 3 7 10 14	ND <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) ND, <0.01 (<0.01) <0.01, ND (<0.01)	S17-00346-01 [Shernikau&Colorado, 2017, Report FMC-46393]
Sawaengha, Ang Thong, Thailand, 2017 (num Duan Koa)	OD, 100 g/L	2	7	178 175	6.0 6.0	foliar spray, BBCH 85, 04 April	7	0.010, <0.01 (<0.01)	S17-00346-02 [Shernikau &Colorado, 2017, Report FMC-46393]
Muak Lek, Saraburi, Thailand, 2017 (R2E2)	OD, 100 g/L	2	7	180 194	12 12	foliar spray, BBCH 85, 19 April	7	<0.01, <0.01 (<0.01)	S17-00346-03 [Shernikau &Colorado, 2017, Report FMC-46393]
Pak Chong, Nakhon Ratchasima, Thailand, 2017 (Keiw Yai)	OD, 100 g/L	2	7	177 176	18 18	foliar spray, BBCH 85, 19 April	7	0.027, 0.029 (0.028)	S17-00346-04 [Shernikau & Colorado, 2017, Report FMC-46393]
Dong Nai, Xuan Loc, Vietnam, 2017 (Xoai Buoi)	OD, 100 g/L	2	78	181 181	12 12	foliar spray, BBCH 81, 09 June	-0 0 3 7 11 14	ND 0.070, 0.038 (0.054) 0.029, 0.025 (0.027) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01) <0.01, <0.01 (<0.01)	S17-00346-05 [Shernikau &Colorado, 2017, Report FMC-46393]
Thinh Thoi, Dong Thap, Vietnam, 2017 (Chai Chu)	OD, 100 g/L	2	7	181 179	6.0 6.0	foliar spray, BBCH 85, 06 June	7	<0.01, <0.01 (<0.01)	S17-00346-06 [Shernikau &Colorado, 2017, Report FMC-46393]
Han Giang, Han Giang, Vietnam, 2017 (Dai Loan)	OD, 100 g/L	2	7	182 188	7.2 10	foliar spray, BBCH 85, 07 June	7	<0.01, <0.01 (<0.01)	S17-00346-07 [Shernikau &Colorado, 2017, Report FMC-46393]
Cai Be, Tien Giong, Vietnam, 2017 (Dai Loan)	OD, 100 g/L	2	7	180 184	12 12	foliar spray, BBCH 85, 07 June	7	<0.01, 0.011 (<0.01)	S17-00346-08 [Shernikau &Colorado, 2017, Report FMC-46393]

OD = Oil based suspension concentrate

[a] Values were recalculated by the reviewer to establish the mean. Results represent the results of the individual replicate field trials and the mean of the results in brackets for the parent compound. Metabolites M1–M6 were not analysed.

Fruiting vegetables, cucurbits (Group 011)

Fruiting vegetables, Cucurbits – Cucumbers and Summer Squashes (Subgroup 011A)

Cucumber (VC0424)

A study including supervised trials on greenhouse grown cucumbers [Dorschner, 2012, Report IR-4-10313] that was evaluated by the 2015 Meeting was resubmitted to the 2018 Meeting in support of Canadian and USA labels for use on cucumber under glass house conditions (Table 18).

Supervised residue data for foliar applications and for drip irrigation (2013 Meeting) applications in field and glass grown cucumbers, summer squash, and melons were made available to the 2013 Meeting [Report DP-25642, Report DP-27711, Report DP-31413, DP-28201, Report DP-25642], but were not resubmitted for the current evaluation. The current Meeting only received labels for foliar applications on protected cucumbers. The glass house data submitted to the 2013 Meeting [Report DP-28201] were not re-included, since the application rates in the studies (OD formulation, 4 × 120 g ai/ha, RTI 7 days, PHI 1 day) do not support the newly submitted label (SE formulation, 3 × 150 g ai/ha, RTI 5–7 days, PHI 0 days).

Table 18 Residues of cyantraniliprole in greenhouse grown cucumbers from supervised trials following 3 foliar applications (backpack sprayer) with an SE formulation.

Location, year, (variety)	Form	No	Inter val (days)	g ai/ha	g ai/hL	method, timing: growth stage and last application	DAT	parent, mg/kg [a]	Trial number and reference
Parlier, CA, USA, 2010 (Manar F1) [+ADJ]	10 SE	3	 5 6	151 154 156	40 40 40	foliar spray, fruiting, 203 cm, 13 Sept	0	0.20, 0.19 (0.19)	CA67 [JMPR 2015]
Citra, FL, USA, 2010 (Jawell) [+ADJ]	10 SE	3	 5 4	153 152 151	53 54 54	foliar spray, fruiting, crop height 71–102 cm, 16 April	0	0.33, 0.32 (0.33)	FL14 [JMPR 2015]]
Salisbury, MD, USA, 2010 (Danito) [+ADJ]	10 SE	3	 4 4	147 148 148	32 32 32	foliar spray, fruiting, 120 cm, 25 May	0	0.039, 0.047 (0.043)	MD10 [JMPR 2015]
Raleigh, NC, USA, 2010 (Jawell F1) [+ADJ]	10 SE	3	 5 5	157 154 151	36 36 36	foliar spray, fruiting, 198 cm, 02 August	0	0.18, 0.18 (0.18)	NC12 [JMPR 2015]
Harrow, ON, Canada 2010 (Camaro) [+ADJ]	10 SE	3	 5 5	152 152 152	12.5 12.5 12.5	foliar spray, fruiting, 183 cm, 04 Oct	0	0.027, 0.036 (0.032)	ON12 [JMPR 2015]

SE = Suspoemulsion

[a] Residues reported represent the parent compound. Values between brackets represent mean of duplicate field samples. Residues of each of the six metabolites were found below the LOQ of 0.01 mg/kg in each sample.

Cereal grains (Group 020)

Rice cereals (Subgroup 020C)

Rice (GC0649)

A study including supervised trials in rice was conducted in China [Qing, 2012, Report CL-2010-026]. The study was previously evaluated by the 2013 Meeting, but could not be matched to the submitted label on rice from Vietnam. The study was resubmitted to the 2018 Meeting in support of a Chinese label for use of an OD formulation on rice.

The residues found in paddy rice grain are summarized in Table 19.

Table 19 Residues of cyantraniliprole in rice grain from supervised trials following 2 or 3 foliar applications of 100 or 150 g ai/ha (backpack sprayer).

Location, year, (variety)	Form	No	Inter val (days)	g ai/ha	g ai/hL	method, timing: growth stage and last treatment date	DAT	residues, mg/kg [a]	Trial number and reference
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 02 Nov, 2010	7 14 21	<0.01 <0.01 <0.01	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 04 August, 2011	7 14 21	<0.01 <0.01 <0.01	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 02 Nov, 2010	7 14 21	0.02 0.013 <0.01	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 04 August, 2011	7 14 21	0.023 0.016 0.01	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 09 Nov, 2010	7 14 21	0.01 <0.01 <0.01	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 11 August, 2011	7 14 21	<0.011 <0.01 <0.01	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 09 Nov, 2010	7 14 21	0.035 0.019 <0.01	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 11 August, 2011	7 14 21	0.041 0.022 0.012	Zejiang, [JMPR 2013]
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	<0.01 <0.01 <0.01	Hunan [JMPR 2013]
Hunan Changsha, China, 2011 (Xin Dao 16)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 19 August, 2011	7 14 21	<0.01 <0.01 <0.01	Hunan [JMPR 2013]
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	<0.01 <0.01 <0.01	Hunan [JMPR 2013]
Hunan Changsha, China, 2011 (Xin Dao 16)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 19 August, 2011	7 14 21	0.07 0.029 <0.01	Hunan [JMPR 2013]
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	<0.01 <0.01 <0.01	Hunan [JMPR 2013]
Hunan Changsha, China, 2011	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported,	7 14 21	0.018 0.01 <0.01	Hunan [JMPR 2013]

Location, year, (variety)	Form	No	Inter val (days)	g ai/ha	g ai/hL	method, timing: growth stage and last treatment date	DAT	residues, mg/kg [a]	Trial number and reference
(Xin Dao 16)						19 August, 2011			
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	<0.01 <0.01 <0.01	Hunan [JMPR 2013]
Hunan Changsha, China, 2011 (Xin Dao 16)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 19 August, 2011	7 14 21	0.039 0.025 0.019	Hunan [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu SHui 009)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 17 Sept, 2010	7 14 21	<0.01 <0.01 <0.01	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu SHui 009)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 08 August, 2011	7 14 21	<0.01 <0.01 <0.01	Shandong [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu SHui 009)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 17 Sept, 2010	7 14 21	<0.01 <0.01 <0.01	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu SHui 009)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 08 August, 2011	7 14 21	<0.01 <0.01 <0.01	Shandong [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu Shui 009)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 24 Sept, 2010	7 14 21	<0.01 <0.01 <0.01	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu Shui 009)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 15 August, 2011	7 14 21	<0.01 <0.01 <0.01	Shandong [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu Shui 009)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 24 Sept, 2010	7 14 21	<0.01 <0.01 <0.01	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu Shui 009)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 15 August, 2011	7 14 21	<0.01 <0.01 <0.01	Shandong [JMPR 2013]

nr = not reported

[a] Residues reported represent the parent compound. Metabolite J9Z38 was determined, but all values were below the LOQ of 0.02 mg/kg and therefore not summarised in the table above.

Animal feed

Rice straw

A study including supervised trials in rice was conducted in China [Qing, 2012, Report CL-2010-026]. The study was previously evaluated by the 2013 Meeting, but could not be matched to the submitted label on rice from Vietnam. The study was resubmitted to the 2018 Meeting in support of a Chinese label for use of an OD formulation on rice.

The residues found in rice straw are summarized in Table 20.

Table 20 Residues of cyantraniliprole in rice straw from supervised trials following 2 or 3 foliar applications at 100 or 150 g ai/ha (backpack sprayer).

Location, year, (variety)	Form	No	Inter val (days)	g ai/ha	g ai/hL	method, timing: growth stage and last treatment date	DAT	residues, mg/kg [a]		Trial number and reference
								parent	IN-J9Z38	
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 02 Nov, 2010	7 14 21	0.67 1.4 1.1	0.29 0.28 0.20	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 04 August, 2011	7 14 21	<0.05 <0.05 <0.05	0.21 0.12 <0.10	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 02 Nov, 2010	7 14 21	1.1 3.7 1.9	0.46 0.47 0.31	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 04 August, 2011	7 14 21	0.12 0.063 0.075	0.50 0.46 0.16	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 09 Nov, 2010	7 14 21	0.78 1.9 1.4	0.34 0.24 0.16	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 11 August, 2011	7 14 21	<0.05 0.095 <0.05	0.24 0.24 <0.10	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 09 Nov, 2010	7 14 21	1.8 4.1 3.0	0.59 0.43 0.51	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 11 August, 2011	7 14 21	<0.05 <0.05 0.12	0.36 0.59 0.39	Zejiang, [JMPR 2013]
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	<0.05 0.083 0.057	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha, China, 2011 (Xin Dao 16)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 19 August, 2011	7 14 21	0.15 0.098 0.18	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	0.37 0.33 0.17	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha, China, 2011 (Xin Dao 16)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 19 August, 2011	7 14 21	0.42 1.1 0.13	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	0.085 0.058 <0.05	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha, China, 2011	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported,	7 14 21	0.68 0.40 0.35	<0.10 <0.10 <0.10	Hunan [JMPR 2013]

Location, year, (variety)	Form	No	Inter val (days)	g ai/ha	g ai/hL	method, timing: growth stage and last treatment date	DAT	residues, mg/kg [a]		Trial number and reference
								parent	IN-J9Z38	
(Xin Dao 16)						19 August, 2011				
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	0.58 0.51 0.36	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha, China, 2011 (Xin Dao 16)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 19 August, 2011	7 14 21	0.55 0.26 0.33	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu SHui 009)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 17 Sept, 2010	7 14 21	0.27 0.14 0.40	<0.10 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu SHui 009)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 08 August, 2011	7 14 21	0.20 0.13 0.075	<0.10 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu SHui 009)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 17 Sept, 2010	7 14 21	0.31 0.33 <0.05	<0.10 0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu SHui 009)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 08 August, 2011	7 14 21	0.25 0.18 0.079	<0.10 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu SHui 009)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 24 Sept, 2010	7 14 21	0.26 0.44 0.28	<0.10 0.13 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu SHui 009)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 15 August, 2011	7 14 21	0.34 0.20 0.12	0.18 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu SHui 009)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 24 Sept, 2010	7 14 21	1.3 0.33 <0.05	0.12 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu SHui 009)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 15 August, 2011	7 14 21	0.35 0.24 0.18	0.11 <0.10 <0.10	

nr = not reported

[a] Residues reported represent the parent compound and metabolite IN-J9Z38. The other metabolites were not determined.

Rice hulls

A study with supervised trials in rice was conducted in China [Qing, 2012, Report CL-2010-026]. The study was previously evaluated by the 2013 Meeting, but could not be matched to the submitted label on rice from Vietnam. The study was resubmitted to the 2018 Meeting in support of a Chinese label for use of an OD formulation on rice.

The residues found in rice hulls are summarized in Table 21.

Table 21 Residues of cyantraniliprole in rice hulls from supervised trials following 2 or 3 foliar applications at 100 or 150 g ai/ha (backpack sprayer).

Location, year, (variety)	Form	No	Inter val (days)	g ai/ha	g ai/hL	method, timing: growth stage and last treatment date	DAT	residues, mg/kg [a]		Trial number and reference
								parent	IN-J9Z38	
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 02 Nov, 2010	7 14 21	3.3 4.3 2.3	0.28 0.35 0.20	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 04 August, 2011	7 14 21	0.67 0.37 0.43	0.099 <0.10 <0.10	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 02 Nov, 2010	7 14 21	7.5 12 3.4	0.92 0.76 0.41	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 04 August, 2011	7 14 21	1.7 1.2 0.95	0.21 0.20 0.17	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 09 Nov, 2010	7 14 21	4.6 3.7 1.7	0.55 0.52 0.37	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 11 August, 2011	7 14 21	1.2 0.71 0.42	0.18 0.16 0.096	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2010 (Yue You 712)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 09 Nov, 2010	7 14 21	12 11 9.9	1.4 0.60 0.84	Zejiang, [JMPR 2013]
Hangzhou Zhejiang, China, 2011 (Yue You 712)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 11 August, 2011	7 14 21	2.3 2.4 0.95	0.33 0.30 0.19	Zejiang, [JMPR 2013]
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 08 Oct, 2010 [b]	7 14 21	0.99 1.1 0.92	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha, China, 2011 (Xin Dao 16)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 19 August, 2011 [c]	7 14 21	1.4 1.4 1.6	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	1.4 2.2 1.5	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha, China, 2011 (Xin Dao 16)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 19 August, 2011	7 14 21	8.2 6.8 2.2	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	0.87 1.1 1.4	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Hunan Changsha,	100	3	7	100	nr	spraying,	7	4.0	<0.10	Hunan

Location, year, (variety)	Form	No	Interval (days)	g ai/ha	g ai/hL	method, timing: growth stage and last treatment date	DAT	residues, mg/kg [a]		Trial number and reference
								parent	IN-J9Z38	
China, 2011 (Xin Dao 16)	g/L OD		7			growth stage not reported, 19 August, 2011	14 21	2.5 1.6	0.11 <0.10	[JMPR 2013]
Hunan Changsha, China, 2010 (Xin Dao 16)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 08 Oct, 2010	7 14 21	1.6 1.8 2.1	<0.10 <0.10 0.096	Hunan [JMPR 2013]
Hunan Changsha, China, 2011 (Xin Dao 16)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 19 August, 2011	7 14 21	6.2 4.1 2.4	<0.10 <0.10 <0.10	Hunan [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu SHui 009)	100 g/L OD	2	7	100	nrn	spraying, growth stage not reported, 17 Sept, 2010	7 14 21	0.46 0.38 0.32	<0.10 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu SHui 009)	100 g/L OD	2	7	100	nr	spraying, growth stage not reported, 08 August, 2011	7 14 21	0.081 0.092 0.57	<0.10 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu SHui 009)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 17 Sept, 2010	7 14 21	0.92 0.18 0.14	<0.10 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu SHui 009)	100 g/L OD	2	7	150	nr	spraying, growth stage not reported, 08 August, 2011	7 14 21	<0.05 <0.05 <0.05	<0.10 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu SHui 009)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 24 Sept, 2010	7 14 21	0.55 0.71 0.57	<0.10 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu SHui 009)	100 g/L OD	3	7 7	100	nr	spraying, growth stage not reported, 15 August, 2011	7 14 21	<0.05 0.16 0.13	<0.10 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2010 (Ziu SHui 009)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 24 Sept, 2010	7 14 21	1.2 0.21 0.66	<0.10 <0.10 <0.10	Shandong [JMPR 2013]
Jinan Shandong, China, 2011 (Ziu SHui 009)	100 g/L OD	3	7 7	150	nr	spraying, growth stage not reported, 15 August, 2011	7 14 21	<0.05 <0.05 <0.05	<0.10 <0.10 <0.10	Shandong [JMPR 2013]

nr = not reported

[a] Residues reported represent the parent compound and metabolite IN-J9Z38. The other metabolites were not determined.

[b] The date listed in table is for two and three times application and sampling at 14 days. The date is 01 October 2010 for two and three times applications and sampling at 21 days.

[c] The date listed in table is for two and three times application and sampling at 14 days. The date is 12 August 2011 for two and three times applications and sampling at 21 days.

FATE OF RESIDUES IN STORAGE AND PROCESSING

In storage

No data submitted.

In processing

The Meeting received a processing study on grapes [Aitken, 2011, Report DP-27718], which was already evaluated by the 2013 Meeting, but without a supporting label for grapes. For the current evaluation a label for use of cyantraniliprole on grapes was submitted. The processing study was not summarised again, but is referred to in the Appraisal.

RESIDUES IN ANIMAL COMMODITIES

No new information submitted.

APPRAISAL

Cyantraniliprole was initially evaluated for toxicology and residues by the JMPR in 2013 and an ADI of 0–0.03 mg/kg bw was established. An ARfD was considered to be unnecessary. Additional use patterns were evaluated by the 2015 JMPR. The residue definitions established in 2013 and maintained at the 2015 JMPR are:

Definition of the residue for compliance with the MRL for both plant and animal commodities: *cyantraniliprole.*

Definition of the residue for dietary risk assessment for unprocessed plant commodities: *cyantraniliprole.*

Definition of the residue for dietary risk assessment for processed plant commodities: *sum of cyantraniliprole and IN-J9Z38, expressed as cyantraniliprole.*

Definition of the residue for dietary risk assessment for animal commodities: sum of cyantraniliprole, 2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-3,4-dihydro-3,8-dimethyl-4-oxo-6-quinazolinecarbonitrile [IN-J9Z38], 2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1Hpyrazol-5-yl]-1,4-dihydro-8-methyl-4-oxo-6-quinazolinecarbonitrile [IN-MLA84], 3-Bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2-(hydroxymethyl)-6-[(methylamino)carbonyl]phenyl]-1H-pyrazole-5-carboxamide [IN- N7B69] and 3-Bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2[[(hydroxymethyl)amino]carbonyl]-6-methylphenyl]-1H-pyrazole-5-carboxamide [IN- MYX98],expressed as cyantraniliprole

The residue is not fat soluble.

At the Forty-ninth Session of the CCPR (2017), cyantraniliprole was scheduled for evaluation of additional use patterns by the 2018 JMPR.

The Meeting received a soil degradation study in rice, various supervised residue trial data for foliar and soil applications of cyantraniliprole on grapes, strawberries (outdoor), cranberries (outdoor), mango (outdoor), cucumber (glasshouse), and paddy rice and information on registered uses of cyantraniliprole on corresponding crops. In addition a processing study on grapes was resubmitted.

Environmental fate

In a supervised residue trial on rice, the degradation of cyantraniliprole and its metabolite IN-J9Z38 was investigated at three sites. A single application of 150 g ai/ha was sprayed over the rice paddies. Soil, plant and water samples were taken at various intervals ranging from 1 hour to 60 days after application.

The calculated half lives in water ranged from 2.0–6.2 days for cyantraniliprole (n = 3) and 10.3 days (one site only) for IN-J9Z38. The calculated half lives in plants ranged from 3.2–6.3 days for cyantraniliprole (n = 3). No residue of IN-J9Z38 was detected in the plant samples at any time point and no half-life could be calculated. The calculated half-life in soil was 6.8 days for cyantraniliprole (n = 1). No residue of parent or IN-J9Z38 was detected in any of the other soil samples at any time point.

Parent cyantraniliprole and metabolite IN-J9Z38 are not persistent in soil/water systems.

Methods of analysis

The methods for analysing cyantraniliprole and metabolites IN-F6L99, IN-J9Z38, IN-JCZ38, IN-K7H19, IN-MLA84, IN-MYX98, IN-N5M09, and IN-N7B69 as previously evaluated (2013 Meeting) were supported with additional recovery data from supervised trials. The methods are considered valid for the commodities evaluated

Stability of pesticide residues in stored analytical samples

The stability of residues of cyantraniliprole and its metabolites in stored samples was covered by the freezer stability studies evaluated by the 2013 JMPR. Additional storage stability data on cranberries were submitted and support the conclusions on storage stability from previous Meetings. Analysis of the samples from the residues trials and processing studies submitted for the current Meeting are sufficiently covered.

Results of supervised residue trials on crops

The Meeting received supervised trials data for cyantraniliprole on grapes (field), strawberries (greenhouse and field), cranberries (field), mango (field), cucumber (glasshouse), and paddy rice (field).

The Meeting noted that GAPs have been authorised for the use of cyantraniliprole and the product labels were available from Belgium, Cambodia, Canada, China, the United Kingdom, and the USA.

For the estimation of maximum residue levels and STMRs, the 2018 Meeting also used data from the 2013 and 2015 JMPR evaluations.

Wine grapes

The critical GAP for cyantraniliprole on wine grapes is from Italy with 2 foliar applications of 112.5 g ai/ha, a re-treatment interval of 14 days and PHI of 10 days.

Only four trials conducted in the 2014 growing season, conducted in Europe and evaluated by the current Meeting, matched this GAP. European trials conducted in the 2009/2010 growing seasons evaluated by the 2013 JMPR and additional trials from the 2014 season could be matched using the proportionality principle.

Cyantraniliprole residues from trials matching GAP without applying proportionality are (n = 27): 0.031, 0.058, 0.070, 0.071, 0.096, 0.099, 0.11, 0.14, 0.14, 0.16, 0.18, 0.19, 0.21, 0.24, 0.28, 0.30, 0.33, 0.34, 0.40, 0.41, 0.42, 0.43, 0.48, 0.64, 0.67, 0.68 and 0.80 mg/kg.

Scaling factors applied ranged from 0.74–1.0.

Scaled residues were (n = 27): 0.30, 0.054, 0.059, 0.068, 0,090, 0,099, 0.11, 0.11, 0.12, 0.15, 0.16, 0.18, 0.18, <u>0.21</u>, 0.22, 0.23, 0.24, 0.32, 0.34, 0.40, 0.42, 0.42, 0.45, 0.50, 0.53, 0.59, and 0.75 mg/kg.

The Meeting estimated a maximum residue level of 1.0 mg/kg and a STMR of 0.21 mg/kg for wine grapes on the basis of the critical GAP from Italy.

Table grapes

The critical GAP for table grapes was from Belgium where the GAP for both table and wine grapes consists of 2 foliar applications of 53 g ai/ha, a re-treatment interval of 10 days and a PHI of 10 days.

As no trials matched this GAP the Meeting did not estimate a maximum residue level for table grapes.

Cranberries

The critical GAP for cyantraniliprole on cranberries is from Canada and comprises 3 foliar applications of 150 g ai/ha, a re-treatment interval of 7 days with a PHI of 14 days.

Five trials conducted in the 2009 growing season in Canada and the USA matched this GAP. The resulting residues were (n = 5): < 0.01, 0.010, <u>0.012</u>, 0.030, and 0.041 mg/kg.

The Meeting estimated a maximum residue level for cyantraniliprole of 0.08 mg/kg and a STMR value of 0.012 mg/kg for cranberries.

Strawberries

The critical GAP for cyantraniliprole on strawberries is the GAP from Canada (field) with 3 foliar applications of 150 g ai/ha, a re-treatment interval of 5 days and a PHI of 1 day. Residue levels in trials from Canada and the USA matching this GAP were (n = 8): 0.086, 0.20, 0.22, <u>0.27</u>, <u>0.64</u>, 0.64, 0.70, and 0.84 mg/kg.

Based on the USA/Canadian data set the Meeting estimated a maximum residue level for cyantraniliprole of 1.5 mg/kg and a STMR value of 0.455 mg/kg for strawberries.

Mango

The critical GAP for cyantraniliprole on mangoes is the Cambodian GAP which comprises 2 foliar applications of 180 g ai/ha, with a re-treatment interval of 7 days and a PHI of 7 days.

Eight trials performed in the 2017 growing season in Thailand and Vietnam matched this GAP. The resulting residues in the RAC (whole fruit with stone and peel) were (n = 8): 0.035, 0.064, 0.064, 0.086, 0.11, 0.12, 0.18, and 0.45 mg/kg.

Residues in the edible portion (mango pulp) for dietary risk assessment were (n = 8): < <u>0.01</u> (7) and 0.028 mg/kg.

The Meeting estimated a maximum residue level for cyantraniliprole of 0.7 mg/kg and a STMR value of 0.01 mg/kg for mango.

Cucurbits, cucumbers - Greenhouse

The 2013 Meeting recommended a maximum residue level of 0.3 mg/kg for fruiting vegetables, cucurbits, based on outdoor uses on cucumber, summer squash and melons. The current Meeting received labels from Canada and the USA for the use of cyantraniliprole on greenhouse grown cucumbers.

The critical greenhouse GAP for cyantraniliprole on cucumbers is the GAP in the USA which comprises 3 foliar applications of 150 g ai/ha, a re-treatment interval of 5 days and a PHI of 0 days.

Five trials performed in the 2010 growing season in the USA (evaluated by the 2015 JMPR) matched this GAP. The resulting residues were (n = 5): 0.032, 0.043, 0.18, 0.19 and 0.33 mg/kg. However, five trials were considered insufficient to estimate a maximum residue level for a major crop.

An alternate GAP for greenhouse grown cucumbers submitted to the current Meeting is the Canadian GAP of 4 × 100 g ai/ha, a RTI of 7 days, and a PHI of 0 days. Only four greenhouse trials from Europe (2013 JMPR) could be matched to this GAP. The number of trials was considered insufficient for the estimation of a maximum residue level for cucumbers.

The trials from Europe could not be matched to the USA GAP using the “GAP versus trial” model introduced by the 2017 Meeting either, as the model estimated the residue levels to be 29% lower than the GAP in the European trials.

The Meeting decided to withdraw its previous recommendation for “Fruiting vegetables, cucurbits” of 0.3 mg/kg, based on outdoor uses, and to replace it with a maximum residue level 0.3 mg/kg for the “Group of Fruiting vegetables, Cucurbits”.

Rice

Residue trials on rice evaluated by the 2013 Meeting could not be matched to the GAP from Vietnam (50–100 g ai/ha, PHI 5 days) submitted in 2013. The 2018 Meeting received a new label for a use on rice in China for 2 spray applications at 60 g ai/ha, with a re-treatment interval of 7 days and a PHI of 21 days.

Supervised residue trials conducted in the 2010 and 2011 growing season in China (JMPR 2013), did not match the GAP submitted to the current Meeting.

However, residues in husked rice in overdosed trials conducted with 2 or 3 × 100 g ai/ha, RTI 7 days and a PHI of 21 days were all < 0.01 mg/kg (n = 12). In trials using 2 or 3 × 150 g ai/ha, RTI 7 days and PHI 21 days residues ranged from < 0.01 (9) to 0.019 mg/kg (n = 12). The data suggested a residue below LOQ at the critical GAP.

The Meeting concluded that residues above LOQ are not anticipated, when applied according to GAP and estimated a maximum residue level for cyantraniliprole of 0.01(*) mg/kg and a STMR value of 0.01 mg/kg for rice, husked. As residues in husked rice were below LOQ and residues in polished rice are expected to be even less, the Meeting decided to apply the estimations for husked rice to polish rice.

Cereal and grass forages, straws and hays

Rice straw

The supervised trials data were available for rice straw from China.

Overdosed trials conducted with 2 (n = 6) or 3 (n = 6) × 100 g ai/ha, RTI 7 days and a PHI of 21 days could be matched to the Chinese GAP by applying proportionality. The trials using different application rates were performed at the same location and were considered replicate trials. The highest residue level after scaling was selected per site. Unscaled cyantraniliprole residues in rice straw from trials matching the critical GAP were (n = 6): 0.075 (2), 0.17, 0.18, 0.4, and 1.9 mg/kg.

Scaling factors ranging from 0.4–0.6 were applied, resulting in scaled residues of (n = 6): 0.030, 0.045, <u>0.068</u>, <u>0.11</u>, 0.24, and 0.76 mg/kg.

The Meeting estimated a maximum residue level of 1.5 mg/kg (1.7 mg/kg dry weight) for cyantraniliprole in rice straw. The Meeting estimated median residue level of 0.089 mg/kg (0.099 mg/kg dry weight assuming 90% DM) and a highest residue of 0.76 mg/kg (0.84 mg/kg dry weight assuming 90% DM) for rice straw.

Miscellaneous

Rice hulls

The same trials as for rice were considered for rice hulls. Overdosed trials conducted with 2 (n = 6) or 3 (n = 6) × 100 g ai/ha, RTI 7 days and PHI of 21 days could be matched to this GAP by applying proportionality. The trials using different application rates were performed at the same location and were considered replicate trials. The highest residue level after scaling was selected per site.

Unscaled cyantraniliprole residues in rice straw from trials matching the critical GAP were (n = 6): 0.32, 0.57, 0.95, 1.5, 1.6, and 2.3 mg/kg.

Scaling factors ranging from 0.4–0.6 were applied, resulting in scaled residues of (n = 6): 0.19, 0.34, 0.38, 0.60, 0.96 and 1.4 mg/kg.

The Meeting estimated a median residue level of 0.49 mg/kg (0.54 mg/kg dry weight assuming 90% DM) for rice hulls.

Residues in processed commodities

Processing studies were undertaken for grapes and were evaluated by the 2013 Meeting. STMR-Ps were derived by the current Meeting.

Commodity	PF Residue: parent + IN-J9Z38	PF median [a]	STMR-RAC	STMR-P
Grape				
- must	0.79, 1.5, 1.6	1.5	0.21	0.32
- juice	0.48, 0.52, 1.4	0.52	0.21	0.11
- wine (bottled)	0.5, 1.0, 1.2	1.0	0.21	0.21
- raisin	0.48, 0.52, 2.3	0.52	[b]	[b]
- wet pomace	1.4, 2.7, 3.9	2.7	0.21	0.57

[a] Values were taken from the 2013 evaluation.

[b] The Meeting did not estimate a STMR-P for raisins, since the labels refer to wine-grapes only.

Residues in animal commodities

Farm animal dietary burden

The 2018 Meeting evaluated residues in grapes (pomace) and rice (hulls, grain and straw), which were listed in the OECD feeding table in addition to dietary burden calculated in 2015. The Meeting noted that the estimation did not result in a significant change to the dietary burdens of farm animals; a maximum increase of 9.6% of the maximum dietary burden was observed. The previous recommendations of maximum residue levels for animal commodities were maintained.

RECOMMENDATIONS

On the basis of the data from supervised residue trials the Meeting concluded that the residue levels listed below are suitable for establishing maximum residue limits and for IEDI assessment.

Definition of the residue for compliance with the MRL for both plant and animal commodities: *cyantraniliprole.*

Definition of the residue for dietary risk assessment for unprocessed plant commodities: *cyantraniliprole.*

Definition of the residue for dietary risk assessment for processed plant commodities: *sum of cyantraniliprole and IN-J9Z38, expressed as cyantraniliprole.*

Definition of the residue for dietary risk assessment for animal commodities: sum of cyantraniliprole, 2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1H-pyrazol-5-yl]-3,4-dihydro-3,8-dimethyl-4-oxo-6-quinazolinecarbonitrile [IN-J9Z38], 2-[3-Bromo-1-(3-chloro-2-pyridinyl)-1Hpyrazol-5-yl]-1,4-dihydro-8-methyl-4-oxo-6-quinazolinecarbonitrile [IN-MLA84], 3-Bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2-(hydroxymethyl)-6-[(methylamino)carbonyl]phenyl]-1H-pyrazole-5-carboxamide [IN- N7B69] and 3-Bromo-1-(3-chloro-2-pyridinyl)-N-[4-cyano-2[[(hydroxymethyl)amino]carbonyl]-6-methylphenyl]-1H-pyrazole-5-carboxamide [IN- MYX98],expressed as cyantraniliprole.

The residue is not fat soluble.

CCN	Commodity	Recommended Maximum Residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
		new	previous		
FB 0265	Cranberries	0.08	-	0.012	
VC 0045	Fruiting vegetables, Cucurbits	W	0.3		
VC 0045	Fruiting vegetables, Cucurbits, Group of (includes all commodities in this group)	0.3	-	0.065 [a] 0.01 [b]	
FI 0345	Mango	0.7	-	0.01	
GM 0649	Rice, Husked	0.01*	-	0.01	

CCN	Commodity	Recommended Maximum Residue level (mg/kg)		STMR or STMR-P (mg/kg)	HR or HR-P (mg/kg)
		new	previous		
CM 1205	Rice, polished	0.01*	-	0.01	
AS 0649	Rice straw & fodder (dry)	1.7 (dw)	-	Median: 0.099 (dw)	Highest: 0.84 (dw)
FB 0275	Strawberry	1.5	-	0.455	
FB 1236	Wine-grapes	1	-	0.21	

[a] edible peel

[b] inedible peel

Dietary exposure and feed burden only

CCN	Commodity	STMR, STMR-P or median (mg/kg)
JF 0269	Grape, juice	0.11
-	Grape, must	0.32
-	Grape, wine	0.21
AB 0269	Grape pomace, wet	0.57
CM 1207	Rice hulls	0.54 (dw)

DIETARY RISK ASSESSMENT

Long-term dietary exposure

The ADI for cyantraniliprole is 0–0.03 mg/kg bw. The International Estimated Daily Intakes (IEDIs) for cyantraniliprole were estimated for the 17 GEMS/Food Consumption Cluster Diets using the STMR or STMR-P values estimated by the 2013, 2015 and 2018 JMPR. The results are shown in Annex 3 of the 2018 JMPR Report. The IEDIs ranged from 4–40% of the maximum ADI.

The Meeting concluded that long-term dietary exposure to residues of cyantraniliprole from uses considered by the JMPR is unlikely to present a public health concern.

Acute dietary exposure

The 2013 JMPR decided that an ARfD for cyantraniliprole was unnecessary. The current Meeting therefore concluded that the acute dietary exposure to residues of cyantraniliprole from the uses considered is unlikely to present a public health concern.

REFERENCES

Code	Author	Year	Title, Institute & report number, Submitting manufacturer and report code, GLP/Non-GLP. Published/Unpublished
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