FLUOPYRAM (243)

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EXPLANATION

Fluopyram, a pyridylethylamide broad spectrum fungicide was first evaluated by the 2010 JMPR, where residue definitions were proposed, an ADI of 0–0.01 mg/kg bw and an ARfD of 0.5 mg/kg bw were established and maximum residue levels were recommended for a limited number of uses where GAP information was available. New GAP and supporting information were evaluated by the JMPR in 2012, 2014 and 2015, with a number of additional maximum residue levels being recommended.

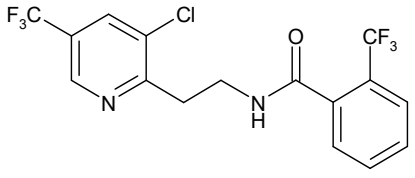
The 2010 JMPR established residue definitions for fluopyram:

- For plant products (compliance with MRLs and dietary intake assessment): *fluopyram*
- For animal products (compliance with MRLs): s*um of fluopyram and 2-(trifluoromethyl) benzamide, expressed as fluopyram*
- For animal products (dietary intake assessment): *sum of fluopyram, 2-(trifluoromethyl)benzamide and the combined residues of N-{(E)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-trifluoromethyl) benzamide and N-{(Z)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-trifluoromethyl) benzamide, all expressed as fluopyram.*

The 48th Session of the CCPR (2016) listed fluopyram for further evaluation by the 2017 JMPR for additional MRLs and the current Meeting received additional studies on anaerobic degradation in soil and on biodegradation in aquatic systems, new GAP information and/or new supporting residue information from the manufacturer for citrus, mango, peppers, Witloof chicory, potato, Globe artichoke, barley, wheat, maize, paddy rice, sunflower seed, peanut, hops, dill and herbs.

The Meeting also considered relevant information provided to the JMPR in 2010, 2012 and 2015 for cherries, cane berries, blueberry, Welsh onion, chives, peppers, tomato, soya bean (dry), beans and peas (dry), potatoes, Globe artichoke, maize, sunflower seed, cotton seed, peanut, hops, basil and dill.

Fluopyram is N-{2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethyl}-2-(trifluoromethyl)benzamide. It is relatively insoluble in water (15 mg/L), stable to hydrolysis, of low volatility (1.2×10^{-6} Pa at 20 °C), has a log P_{OW} of 3.3 and is soluble (> 250 g/L) in methanol, dichloromethane, acetone, ethyl acetate and dimethyl sulfoxide.



Fluopyram (AE C656948)

The following abbreviations are used for the metabolites discussed below:

BZM	-benzamide	2-(trifluoromethyl)benzamide
PAA	-pyridyl-acetic acid	[3-chloro-5-(trifluoromethyl)pyridin-2-yl]acetic acid
PCA [a]	-pyridyl-carboxylic acid	3-chloro-5-(trifluoromethyl)pyridine-2-carboxylic acid
7-OH	-7-hydroxy	N-{2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]-2-hydroxyethyl}-2-trifluoromethyl) benzamide

[a] Also a metabolite of fluopicolide (M05)

ENVIRONMENTAL FATE

Studies on the behaviour of fluopyram in soil under anaerobic conditions and in water/sediment systems were provided to the Meeting.

Anaerobic soil degradation

The anaerobic biotransformation of fluopyram radiolabelled in the phenyl ring and in the pyridyl ring was studied in a silt loam soil (Burscheid) and reported by Meyer, 2008 [Ref: MEGMP070]. In this study, samples of a silt loam soil treated with 0.17–0.18 mg/kg [phenyl-UL-^{14}C]- or [pyridyl-2,6-^{14}C]-fluopyram (equivalent to 250 g ai/ha) were adjusted to 50% of the maximum water holding capacity and incubated at 20 °C in the dark for 28 days under aerobic conditions and then under anaerobic conditions (flooded with water to a depth of about 2 cm deep) for 120 days.

Table 1 Characteristics of the silt loam soil used for the anaerobic degradation study

Sand (50 µm–2 mm) Silt (2 µm–50 µm) Clay (< 2 µm)	13.9% 65.4% 20.7%
pH in water (1:1) pH in 0.01 M $CaCl_2$ (1:1)	6.4 6.1
Organic matter (%)	4.3
Organic carbon (%)	2.5
Soil microbial biomass and activity (day 0 aerobic)	300.3 mg microbial C/ kg dry soil
Cation Exchange Capacity (CEC) meq/100 g	12.3
Maximum Water Holding Capacity (g/100 g dry soil)	47.8%
Water Holding Capacity at 1/3 bar and 15 bar	22.5% and 11%
Bulk density (disturbed soil) g/cm^3	1.03

Duplicate samples of soil, water and volatile components (in the headspace) were taken at intervals during the aerobic and anaerobic phases and radio-assayed by LSC and measured for radioactivity. Soil and water layer were separated by filtering, the water layer was analysed directly and the soil was triple extracted with acetonitrile:water (4:1). Day-92 and day-120 soil samples were also extracted more aggressively (at 100 °C). Samples were stored at 0 °C for 1–5 days before LC/ESI/MS analysis for fluopyram. The limit of quantitation was calculated as 0.42% of the applied radioactivity.

Fluopyram (both labels) did not degrade appreciably, either after 28 days under aerobic conditions or during the 120-day anaerobic phase of the study. No transformation products were identified, with CO_2 and volatile organic compounds produced during the anaerobic phase of the study making up about 1% radioactivity. The unidentified radioactivity, which consisted of two separate components, was less than 3.3% of the applied amount throughout the study duration for both labels.

Table 2 Anaerobic biotransformation of [phenyl-UL-^{14}C]-fluopyram in silt loam soil (% applied radioactivity)

Compound	Matrix	Sampling times [days from flooding]									
		-28	-13	0	3	7	15	30	58	92	120
Fluopyram	Water	N/A	N/A	6.5	5.4	5.3	3.5	3.5	3.5	2.7	3.1
	Soil	96.0	92.0	82.3	82.7	82.3	84.3	82.6	79.6	82.3	83.0
	Subtotal	96.0	92.0	88.8	88.1	87.6	87.8	86.1	83.1	85.0	86.1
Unidentified Radioactivity	Water	N/A	N/A	0.0	0.1	0.0	0.2	0.5	0.8	1.1	0.7
	Soil	0.0	1.3	1.4	1.4	1.6	1.7	1.4	1.8	1.4	2.1
	Subtotal	0.0	1.3	1.4	1.6	1.6	1.9	1.9	2.5	2.5	2.9
Total Extractable Radioactivity	Water	N/A	N/A	6.5	5.5	5.3	3.7	4.0	4.2	3.8	3.8
	Soil	96.0	93.3	83.7	84.2	83.9	86.0	84.0	81.4	83.7	85.1
	Subtotal	96.0	93.3	90.2	89.7	89.2	89.7	88.0	85.6	87.4	88.9
CO_2		0.0	0.0	0.9	0.9	0.9	1.0	1.0	1.0	1.1	1.1
Volatile Organics		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total volatile		0.0	0.0	0.0	0.0	0.0	1.0	1.0	1.0	1.1	1.1

Compound	Matrix	Sampling times [days from flooding]									
		-28	-13	0	3	7	15	30	58	92	120
Non-extractable radioactivity		4.0	3.4	6.5	5.6	5.6	6.7	7.4	12.2	4.7	4.2
Total% Recovery		100.0	96.7	97.6	96.2	95.7	97.5	96.4	98.8	93.2	94.2

N/A = not analysed

Table 3 Anaerobic biotransformation of [pyridyl-2,6-^{14}C]-fluopyram in silt loam soil (% applied radioactivity)

Compound	Matrix	Sampling times [days from flooding]									
		-28	-13	0	3	7	15	30	58	92	120
Fluopyram	Water	N/A	N/A	6.6	6.2	6.4	5.4	4.0	3.0	3.0	3.1
	Soil	95.8	90.0	83.0	82.8	85.5	81.9	83.7	74.5	84.6	85.8
	Subtotal	95.8	90.0	89.6	89.0	91.9	87.2	87.7	77.5	87.7	88.8
Unidentified Radioactivity	Water	N/A	N/A	0.0	0.0	0.0	0.0	1.2	1.0	0.7	0.7
	Soil	0.0	1.1	1.4	1.3	1.6	2.2	1.3	2.2	1.7	2.6
	Subtotal	0.0	1.1	1.4	1.3	1.6	2.2	2.4	3.2	2.5	3.3
Total Extractable Radioactivity	Water	N/A	N/A	6.6	6.2	6.4	5.4	5.2	4.0	3.8	3.7
	Soil	95.8	91.1	84.4	84.1	87.1	84.1	85.0	76.6	86.4	88.4
	Subtotal	95.8	91.1	91.0	90.3	93.5	89.5	90.2	80.7	90.1	92.1
CO_2		0.0	0.0	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8
Volatile Organics		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Volatile		0.0	0.0	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.8
Non-extractable radioactivity		4.2	5.1	6.4	5.3	6.0	7.1	8.1	12.9	4.8	4.9
Total% Recovery		100.0	96.3	98.0	96.3	100.2	97.2	99.0	94.3	95.7	97.8

N/A = not analysed

No degradates were formed during the course of the anaerobic phase of the study. Only non-extractable radioactivity and small amounts of carbon dioxide were formed.

Anaerobic biodegradation in aquatic systems

The anaerobic biotransformation of fluopyram in a pond water/sediment system was reported in two studies by Dalstream *et al*., 2007 [Ref: MEGMP063, MEGMP068]. In these studies, sediment and water from Lawrence, Kansas was collected, incubated for 20 days to establish anaerobic conditions and treated with [phenyl-UL-^{14}C]-fluopyram (MEGMP063) or [pyridyl-2,6-^{14}C]-fluopyram **(**MEGMP068) at a rate equivalent to either 5 or 25 times the maximum field-use rate of 250 kg ai/ha (calculated for a water depth of 100 cm) and incubated in the dark for 121 days at 20 ± 1 °C.

Table 4 Physico-chemical characteristics of the water-sediment test matrix (Lawrence, Kansas)

Sediment	
Texture Class	Clay
Sand (2000 – 50 µm) (%)	5.8
Silt (< 50 – 2 µm) (%)	27.5
Clay (< 2 µm) (%)	66.7
pH in 1:1 Soil:Water ratio pH in 0.01 M CaCl2 saturated paste	5.7 5.3 5.6
Organic Matter (%)	6.4
Organic Carbon (%)	3.7
Soil Microbial Activity [cells/g sediment]	2.11 × 108 (initial) 2.84 × 108 (final)
Cation Exchange Capacity	24.8 meq/100g
Field Moisture Capacity at 0.33 bar (%)	41.1
Field Moisture Capacity at 15 bar (%)	25.9
Bulk Density (g/cm³)	0.94
Water	
pH	7.7
Hardness (CaCO3 ppm)	80
Dissolved organic carbon (DOC) (ppm)	15.6

Sediment	
Redox potential Eh [mV]	194.6 (initial) 116.6 (final)
Oxygen Concentration (mg/L)	0.0 (initial) 0.0 (final)
Biomass (cells/mL water)	6.89 × 107 (initial) 2.72 × 107 (final)
Electrical conductivity	0.21 mmhos/cm

Duplicate samples of sediment, water and volatile components (in the headspace) were taken at intervals during the study period, with the water separated from the sediment by decanting and the sediment triple-extracted with acetonitrile:water (4:1) and filtered. The maximum sample storage time (at or below -6 °C) before analysis was 4 days. Samples were radio-assayed by LSC and chromatographic analyses were performed by HPLC equipped with a radioactivity detector. The identity of the parent compound in the test system was confirmed by LC-ESI/MS analysis and comparing the retention time of the isolated fraction with that of the authentic standard. The limit of detection (LOD) was 1.0% of the applied radioactivity.

In the two studies, overall material balances ranged from 87.8% to 99.5%. The overall [^{14}C]-residues in the water phase decreased from 82–86% at day 0 to 6.9–7.2% AR at the end of the 121 day incubation periods. Extractable [^{14}C] residues in sediment increased from 13–18.5% at day 0 to 80–83% AR at the end of incubation period. Non-extractable [^{14}C]-residues in sediment increased from 0.4–0.7% at day 0 to 6.1–7.6% AR at study termination.

Table 5 Anaerobic degradation of [phenyl-UL-^{14}C]-fluopyram in a water/sediment system (% applied radioactivity)

Compound	Matrix	Sampling time (days after application)							
		0	3	7	14	30	62	91	121
Fluopyram	Water	86.1	51.0	32.4	21.0	15.8	11.2	8.1	6.8
	Sediment	13.1	36.8	59.1	67.0	73.3	76.6	80.0	81.4
	System [a]	99.2	87.8	91.5	88.0	89.0	87.8	88.2	88.2
Unknown 1	Water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
	Sediment	0.0	0.0	0.0	0.0	0.0	0.6	1.4	1.5
	System	0.0	0.0	0.0	0.0	0.0	0.6	1.4	1.9
Unidentified radioactivity	Water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4
	Sediment	0.0	0.0	0.0	0.0	0.0	0.6	1.4	1.5
	System	0.0	0.0	0.0	0.0	0.0	0.6	1.4	1.9
Total extractable radioactivity	Water	86.1	51.0	32.4	21.0	15.8	11.2	8.1	7.2
	Sediment	13.1	36.8	59.1	69.3[b]	73.3	77.2	81.5	82.9
	System	99.2	87.8	91.5	90.3	89.0	88.4	89.6	90.1
CO_2		0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Volatile organics		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total volatile		0.0	0.0	0.0	0.0	0.0	0.1	0.1	0.1
Non-extractable residue (NER)		0.4	4.1	2.3	2.6	5.3	5.2	4.5	6.1
Total recovery%		99.5	91.9	93.8	92.8 [3)]	94.4	93.7	94.2	96.3

[a] Entire system: water + sediment

[b] Includes activity from extracted filter.

Table 6 Anaerobic degradation of [pyridyl-2,6-^{14}C]-fluopyram in a water/sediment system (% applied radioactivity)

Compound	Matrix	Sampling time (days after application)							
		0	3	7	14	30	62	91	121
Fluopyram	Water	81.9	52.8	35.1	25.1	14.8	10.0	8.5	6.5
	Sediment	18.5	39.5	56.1	57.3	75.5	79.5	80.9	80.5
	System [a]	100.4	92.3	91.2	82.4	90.3	89.5	89.4	86.9
Unknown 1	Water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
	Sediment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0

Compound	Matrix	Sampling time (days after application)							
		0	3	7	14	30	62	91	121
	System	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Unidentified radioactivity	Water	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
	Sediment	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	System	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.5
Total extractable radioactivity	Water	81.9	52.8	35.1	25.1	14.8	10.0	8.5	6.9
	Sediment	18.5	39.5	56.1	59.0 [b]	75.5	79.5	80.9	80.5
	System	100.4	92.3	91.2	25.1	90.3	89.5	89.4	87.4
CO_2		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Volatile Organics		0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Total Volatile		0.0	0.0	0.0	0.0	0.0	0.0	0.1	0.1
Non-extractable Residue (NER)		0.7	3.7	2.8	3.8	5.0	5.2	4.7	7.6
Total% Recovery		101.1	95.9	94.0	87.8	95.3	94.7	94.1	95.1

[a] entire system: water + sediment

[b] Includes activity from extracted filter.

No transformation products were detected in the water or sediment phases. Only 0.1% of the applied radioactivity was present as CO_2. No organic volatiles were detected.

Aerobic biodegradation in aquatic systems

The aerobic biotransformation of [phenyl-UL-^{14}C]-fluopyram and [pyridyl-2,6-^{14}C]-fluopyram was studied in two pond water-sediment systems and reported by Allan *et al*, 2007 [Ref: MEGMP064]. Water/sediment systems (3:1) from Germany (sand) and USA (clay) were acclimatized for 9-15 days before being treated with radiolabelled fluopyram at a rate equivalent of 1.25 kg ai/ha (5 times the single field treatment use rate, calculated to a water depth of 100 cm) and incubated under aerobic conditions at 19.7 ± 0.3 °C for up to 120 days.

Table 7 Physico-chemical characteristics of the water-sediment test matrices

	System Anglerweiher	System Lawrence
Sediment		
Geographic location	Anglerweiher, Leverkusen, Germany	Lawrence, Jefferson County, Kansas, USA
Texture class [USDA]	sand	clay
Sand (2000-50 µm); (%)	89.2	5.8
Silt (50-2 µm); (%)	10.7	27.5
Clay (< 2 µm); (%)	0.1	66.7
pH: in 1:1 soil:water ratio pH in 0.01 M $CaCl_2$	5.9 5.6	5.7 5.3
Organic matter (%)	2.0	6.4
Organic carbon (%)	1.1	3.7
Sediment biomass (cells/g sediment) Post handling Initial Final	 251×10^6 320×10^6 103×10^6	 885×10^6 369×10^6 307×10^6
Cation exchange capacity (meq/100 g sediment)	5.1	24.8
Field moisture capacity at 0.33 bar (%)	6.2	41.1
Bulk density (g/cm^3)	1.19	0.94
Water		
Temperature at sampling (°C)	24.0	not measured
pH at sampling	6.8	7.3
Hardness (ppm $CaCO_3$)	202	80
Electrical conductivity (mmhos/cm)	0.64	0.21
Oxygen concentration (mg/L) Initial (at date of sampling) Final (at latest processing date)	 4.63 6.18	 5.1 5.7
Total dissolved solids (ppm)	444	256

	System Anglerweiher	System Lawrence
Alkalinity (mg $CaCO_3$/L)	79	92
Redox potential (mV)		
Initial (at date of sampling)	195	344
Final (at latest processing date)	253	311
Biomass (cells/mL water)		
Post handling	not measured	8.98×10^5
Initial	24.6×10^6	11.6×10^6
Final	9.12×10^6	10.1×10^6

Duplicate samples of water and sediment were taken at intervals during the study period, the water was separated from the sediment and sediment extracted on the day of collection. $^{14}CO_2$ and volatile organics were sampled for LSC directly from the liquid traps. Water and sediment extracts were frozen (< -15 °C) up to 28 days prior to analysis. Water samples were decanted, filtered and analysed by liquid scintillation counting (LSC) and HPLC without concentration while the sediment samples were extracted with ACN:water and analysed by reverse phase radio-HPLC and LSC. The radioactivity of the extracted sediments was determined by combustion and LSC.

In both systems, overall [^{14}C]-residues in the water phase decreased from 91–94% AR at day 0 to 21–28% AR at the end of the 120-day incubation period with extractable [^{14}C] residues in sediment increased from 3.9–5.7% AR at day 0 to 64–69.5% AR after 120 days. Non-extractable [^{14}C]-residues in sediment at study termination were 3.3–6.4% AR and < 1.8% of the applied radioactivity was present as either CO_2 or organic volatile compounds.

In the sandy system, the percentage of [^{14}C]-fluopyram in water decreased from 91–94% AR at day 0 to 19–26% AR by the end of the study and increased in the sediment phase to 63–69% AR at the end of the study period. Overall material balances averaged 96.3% and 97.8% in the sandy and clay sediment systems, respectively.

No major transformation products were detected in the water or sediment phases. Five minor transformation products were detected over both systems, none of which exceeded 2.5% of the applied radioactivity.

The half-live decline times ($T_{1/2}$) via single first order kinetics (SFO) of [^{14}C]-fluopyram in aerobic water were 55.2 and 43.8 days for the sandy loam and clay sediment systems, respectively. Half-life values in the entire system were estimated to be greater than 2 years in both sediment systems.

Table 8 Transformation of radioactivity (% applied radioactivity) after application of [phenyl-UL-^{14}C]-fluopyram to water/sediment and aerobic incubation at 20 °C, in system Anglerweiher

		Sampling time (days after application)							
Matrix		0	2	12	22	47	62	91	120
Fluopyram	Water	91.3	79.0	54.4	48.4	37.8	33.9	29.2	26.3
	Sediment	4.4	17.4	38.4	44.4	54.3	57.9	60.6	62.8
	System [a]	95.7	96.4	92.8	92.8	92.1	91.8	89.8	89.1
comp. A	Water	0.5	0.9	0.7	1.0	1.2	1.2	1.6	1.4
	Sediment	0.0	0.1	0.2	0.2	0.3	0.2	0.4	0.3
	System	0.5	1.0	0.9	1.2	1.5	1.4	2.1	1.7
comp. C	Water	0.0	0.0	0.0	0.2	0.3	0.0	0.3	0.0
	Sediment	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0
	System	0.0	0.0	0.0	0.2	0.5	0.0	0.3	0.0
comp. D	Water	0.0	0.0	0.0	0.0	0.0	0.0	0.3	0.6
	Sediment	0.0	0.0	0.0	0.0	0.3	0.0	0.6	0.7
	System	0.0	0.0	0.0	0.0	0.3	0.0	0.9	1.3
Unidentified	Water	0.5	0.9	0.7	1.2	1.5	1.2	2.3	1.9
	Sediment	0.0	0.1	0.2	0.2	0.8	0.2	1.0	1.0
	System	0.5	1.0	0.9	1.4	2.3	1.4	3.3	2.9
CO_2		0.0	0.0	0.0	0.0	0.2	0.4	0.3	0.0
Total Volatile Organics		NA	ND	ND	ND	ND	ND	ND	ND

		Sampling time (days after application)							
Bound residues		0.0	0.1	0.4	0.7	1.7	2.0	2.4	2.9
Total% recovery	Water	91.8	79.9	55.1	49.6	39.3	35.1	31.4	28.7
	Sediment	4.5	17.7	40.9	47.1	55.1	58.0	61.6	63.8
	System	96.3	97.4	96.4	97.4	96.3	95.5	95.7	95.4

[a] entire system: water + sediment

NA = not analysed, ND = not detected

Table 9 Transformation of radioactivity (% applied radioactivity) after application of [pyridyl-2,6-^{14}C]-fluopyram to water/sediment and aerobic incubation at 20 °C, in system Anglerweiher

		Sampling time (days after application)						
Matrix		0	7	16	30	62	91	120
Fluopyram	Water	89.6	65.3	50.0	44.9	34.1	29.4	25.5
	Sediment	6.7	29.2	40.5	46.7	57.7	61.4	63.3
	System [a]	96.3	94.4	90.5	91.6	91.7	90.7	88.9
comp. A	Water	0.0	0.6	0.4	0.7	0.7	0.6	0.7
	Sediment	0.0	0.0	0.0	0.1	0.2	0.0	0.0
	System	0.0	0.6	0.4	0.9	0.9	0.6	0.7
comp. B	Water	0.0	0.5	0.5	0.5	1.0	1.6	1.2
	Sediment	0.0	0.0	0.0	0.0	0.0	0.0	0.1
	System	0.0	0.5	0.5	0.5	1.0	1.6	1.3
comp. C	Water	0.0	0.0	0.5	0.0	0.2	0.0	0.6
	Sediment	0.0	0.0	0.0	0.0	0.2	0.3	0.7
	System	0.0	0.0	0.0	0.0	0.5	0.3	1.3
Unidentified	Water	0.0	1.1	1.0	1.3	1.9	2.2	2.5
	Sediment	0.0	0.0	0.0	0.1	0.4	0.3	0.8
	System	0.0	1.1	1.0	1.4	2.3	2.5	3.3
CO_2		0.0	0.0	0.0	0.1	0.0	0.0	0.0
Total Volatile Organics		NA	ND	ND	ND	ND	ND	ND
Bound residues		0.0	0.3	0.7	1.0	2.0	3.0	3.7
Total% Recovery	Water	89.6	66.4	50.9	46.2	36.0	31.6	28.1
	Sediment	6.8	30.8	42.4	49.5	58.1	61.7	64.2
	System	96.4	97.6	94.2	96.8	96.1	96.3	95.9

[a] entire system: water + sediment

NA = not analysed, ND = not detected

Table 10 Transformation of radioactivity (% applied radioactivity) after application of [phenyl-UL-^{14}C]-fluopyram to water/sediment and aerobic incubation at 20 °C, in system Lawrence

		Sampling time (days after application)							
Matrix		0	4	11	21	47	62	90	120
Fluopyram	Water	94.0	68.7	52.1	41.9	32.6	30.9	25.0	18.8
	Sediment	3.8	26.6	43.3	50.8	60.2	62.2	64.7	69.9
	System [a]	97.8	95.3	95.4	92.7	92.8	93.2	89.7	88.7
comp. A	Water	0.4	0.7	0.4	1.2	1.1	0.8	0.5	0.3
	Sediment	0.0	0.0	0.2	0.1	0.3	0.0	0.0	0.0
	System	0.4	0.7	0.6	1.3	1.4	0.8	0.5	0.3
comp. B	Water	0.0	0.0	0.0	0.0	1.1	0.3	0.2	0.5
	Sediment	0.0	0.0	0.0	0.1	0.3	0.0	0.2	0.0
	System	0.0	0.0	0.0	0.1	1.4	0.3	0.4	0.5
Unidentified	Water	0.4	0.7	0.4	1.2	2.2	1.1	1.3	0.9
	Sediment	0.0	0.0	0.2	0.3	0.5	0.0	0.8	1.2
	System	0.4	0.7	0.6	1.5	2.8	1.1	2.1	2.1
CO_2		0.0	0.0	0.0	0.0	0.1	0.7	1.8	1.6
Total Volatile Organics		NA[3]	ND	ND	ND	ND	ND	ND	ND
Bound residues		0.0	0.3	0.6	1.4	2.3	3.0	4.1	4.4
Total% recovery	Water	94.8	70.1	52.9	44.3	37.0	33.1	27.0	20.5
	Sediment	3.8	26.6	43.7	51.3	61.3	62.2	65.7	71.1

		Sampling time (days after application)							
Matrix		0	4	11	21	47	62	90	120
	System	98.6	97.0	97.2	97.0	100.7	99.0	98.6	97.6

[a] entire system: water + sediment

NA = not analysed, ND = not detected

Table 11 Transformation of radioactivity (% applied radioactivity) after application of [pyridyl-2,6-^{14}C]-fluopyram to water/sediment and aerobic incubation at 20 °C, in system Lawrence

		Sampling time (days after application)						
Matrix		0	7	15	33	62	90	120
Fluopyram	Water	94.0	64.9	44.9	42.8	30.0	25.9	19.8
	Sediment	3.9	31.8	47.8	53.6	61.8	59.3	67.2
	System [a]	97.9	96.7	92.6	96.4	91.8	85.2	86.9
comp. E	Water	0.0	0.0	0.5	0.0	1.2	2.2	1.3
	Sediment	0.0	0.0	0.0	0.0	0.0	0.2	0.0
	System	0.0	0.0	0.5	0.0	1.2	2.5	1.3
comp. B	Water	0.0	0.0	0.6	1.9	0.0	0.5	0.0
	Sediment	0.0	0.0	0.1	0.0	0.3	0.0	0.0
	System	0.0	0.0	0.8	1.9	0.3	0.5	0.0
comp. D	Water	0.0	0.0	0.0	0.0	0.4	0.3	0.3
	Sediment	0.0	0.0	0.1	0.0	0.0	0.8	0.7
	System	0.0	0.0	0.1	0.0	0.4	1.1	0.9
Unidentified	Water	0.0	0.0	1.2	0.0	3.5	3.0	1.8
	Sediment	0.0	0.0	0.3	0.0	0.3	1.0	0.7
	System	0.0	0.0	1.4	0.0	3.8	4.0	2.5
$^{14}CO_2$		0.0	0.0	0.0	0.0	0.0	0.1	0.2
Total Volatile Organics		NA[3]	ND[4]	ND	ND	ND	ND	ND
Bound residue		0.0	0.5	1.1	2.2	2.8	4.7	8.4
Total% recovery	Water	94.0	64.9	46.0	42.8	33.5	28.9	21.6
	Sediment	3.9	32.7	50.8	53.6	62.1	64.6	67.8
	System	97.9	98.2	98.0	98.7	98.4	98.4	98.1

[a] entire system: water + sediment

NA = not analysed, ND = not detected

In soil, under anaerobic conditions, fluopyram did not degrade appreciably during the 120-day study period, with no transformation products identified. Unidentified radioactivity (two separate components) made up less than 3.3% AR and CO2 and volatile organic compounds produced during the anaerobic phase of the study were each about 1% radioactivity.

In water/sediment systems under aerobic conditions, fluopyram steadily partitioned into the sediment with four unknown degradates found, each at less than about 2% applied radioactivity. Under anaerobic aquatic conditions, only one unknown degradate was found (at up to 1.5% AR).

METHODS OF RESIDUE ANALYSIS

Methods of analysis

The 2010 JMPR reviewed and summarised analytical method descriptions and validation data for fluopyram and major metabolites (BZM, 7-OH, PCA, PAA and the methyl-sulfoxide) in crop and animal commodities and in soil. These included Methods 00984 and GM-001–P07-01, which were used to measure residues of fluopyram in the new supervised residue trials.

In Method 00984 and its minor variants, fluopyram residues were extracted by maceration with acetonitrile/water and residues were quantified by reversed-phase chromatography with tandem mass spectrometry (MS/MS) with electrospray ionisation. In the residue trials on rice, residues were double-extracted and ammonia solution was added to the final extract to achieve a pH of 8 before analysis. A modification of Method 00984 was also used in the residues trials on peppers conducted in

Australia, with extracts being diluted with a 90:10 ratio of acetonitrile and water adjusted to a pH of 8 with ammonia solution (Method ATM-0047).

Method GM-001–P07-01, a modification Method 00984, used an isotopically labelled internal standard and included an additional C-18 solid phase extraction (SPE) clean-up step.

A modified QuEChERS method (as BCS 01207) was validated for the analysis of fluopyram and its -benzamide and -7-hydroxy metabolites in a study reported by Lakaschus & Gizler, 2014 [Ref: S13-03307]. Samples of tomato (fruit), wheat (green material), grape (bunches), wheat (grain), potato (tuber), peas (dry peas) and oilseed rape (seeds) were extracted with acetonitrile:water (4:1 v/v). After the addition of a salt mixture of anhydrous magnesium sulphate, sodium chloride, trisodium citrate dehydrate and disodium hydrogen citrate sesquihydrate (4:1:1:0.5), the phases were separated by centrifugation and an aliquot of the acetonitrile phase was diluted (1:100) with methanol:water (1:1) before LC-MS/MS analysis. Mass transitions monitored for quantification and confirmation were:

Fluopyram	m/z 397→173 (quantification)	m/z 397→208 (confirmation)
-benzamide	m/z 190→102 (quantification)	m/z 190→170 (confirmation)
-7-hydroxy	m/z 413→173 (quantification)	m/z 413→145 (confirmation)

As a measure of precision, the mean relative standard deviations (% RSD) for different sample materials and analytes (at fortification levels of 1.0 mg/kg) ranged from 0.8–10% and as a measure of accuracy, mean overall recovery rates ranged from 77–104% over the range of matrices and analytes (fortification levels of 1.0 mg/kg). The LOQ of the method for fluopyram and each metabolite was 0.01 mg/kg.

Stability of residues in stored analytical samples

Results of a study on the short-term stability of residues in a range of matrix groups was reported by Lakaschus & Gizler, 2016 [Ref: S13-03307]. Representative samples with a high water content (tomato fruit, wheat forage), high starch content (wheat grain, potato tubers), high acid content (grapes), high protein content (dry peas) and high oil content (rape seed) were fortified with 1.0 mg/kg fluopyram, fluopyram-benzamide or fluopyram-7-hydroxy and stored for 8 hours at +1 °C and then for 7 days at -7 °C.

Residues of fluopyram and metabolites were measured using Method BCS 01207 (based on the original QuEChERS method but with acetonitrile:water (4:1) used for extraction.

Since a decrease in the recoveries was observed in the 7-day storage samples of tomato, wheat forage and dry peas (where the extraction steps included 1 minute agitation before and after adding the salt solution), longer extraction times (15 minutes soaking and 15 minutes agitation prior to adding the salt solution) were used in subsequent samples stored for 22–30 days.

Procedural recoveries in freshly fortified samples ranged from 77% to 110% for fluopyram and metabolites in all matrices fortified at 1.0 mg/kg and at the end of the storage intervals, residue recoveries for fluopyram were greater than 78% and more than 76% for the fluopyram metabolites.

Table 12 Stability of residues in plant matrices spiked at 1.0 mg/kg and stored at 1 °C for 8 hours and then -7 °C for 7–30 days

Matrix	Analyte	Storage interval (days)	Residues remaining		Procedural recovery (%)
			Residues (mg/kg)	Mean (%)	
Tomato	Fluopyram	0	0.934, 0.833, 0.927, 0.973, 0.963	-	92
		7	0.791, 0.803, 0.838, 0.818, 0.847	82	98
		30	0.871, 0.92, 0.933, 0.852, 0.857	89	93
	- benzamide	0	1.061, 1.044, 1.033, 1.044, 1.045	-	104
		7	1.054, 0.911, 1.049, 1.123, 1.063	104	107
	-7-hydroxy	0	1.037, 1.083, 1.056, 1.07, 0.938	-	104
		7	1.054, 1.071, 1.063, 1.076, 1.111	107	110
Wheat forage	Fluopyram	0	0.807, 0.867, 0.822, 0.877, 0.996	-	88
		7	0.661, 0.708, 0.738, 0.706, 0.653	69	89
		22	0.796, 0.792, 0.794	79	95

Matrix	Analyte	Storage interval (days)	Residues remaining		Procedural recovery (%)
			Residues (mg/kg)	Mean (%)	
	-	0	0.974, 0.955, 0.808, 0.788, 0.843	-	87
	benzamide	7	0.847, 0.834, 0.811, 0.867, 0.922	86	83
	-7-hydroxy	0	0.976, 0.964, 0.922, 0.949, 0.949	-	95
		7	0.923, 0.943, 0.924, 1.003, 0.924	94	98
Grapes	Fluopyram	0	0.973, 0.954, 0.959, 0.971, 0.925	-	96
(bunches)		7	0.949, 0.893, 0.914, 0.941, 0.929	92	93
	-	0	0.978, 0.972, 0.927, 0.88, 1.02	-	96
	benzamide	7	1.009, 1.062, 1.084, 1.009, 0.961	102	97
	-7-hydroxy	0	1.091, 1.093, 1.101, 1.054, 1.061	-	108
		7	1.029, 1.057, 1.065, 1.085, 1.042	106	101
Wheat grain	Fluopyram	0	0.965, 0.973, 0.946, 0.98, 0.984	-	97
		7	0.793, 0.779, 0.768, 0.81, 0.801	79	87
	-	0	0.979, 0.956, 0.983, 0.895, 1.019	-	97
	benzamide	7	0.911, 0.977, 0.909, 0.879, 1.046	95	97
	-7-hydroxy	0	1.092, 1.115, 1.101, 1.044, 1.085	-	108
		7	1.038, 1.095, 1.111, 1.09, 1.083	108	109
Potato (tuber)	Fluopyram	0	0.903, 0.934, 0.915, 0.926, 0.94	-	92
		7	0.774, 0.79, 0.774, 0.774, 0.814	78	96
	-	0	1.0, 1.17, 0.939, 1.17, 1.042	-	106
	benzamide	7	0.887, 0.923, 0.981, 0.996, 0.854	93	99
	-7-hydroxy	0	1.089, 0.988, 1.047, 1.051, 1.066	-	105
		7	1.084, 1.067, 1.065, 1.099, 1.049	107	110
Peas (dry)	Fluopyram	0	0.879, 0.723, 0.796, 0.888, 0.812	-	82
		7	0.789, 0.798, 0.819, 0.791, 0.674	77	83
		30	0.907, 0.817, 0.945, 0.84, 0.895	88	96
	-	0	1.102, 0.905, 0.97, 1.074, 0.954	-	100
	benzamide	7	0.873, 1.028, 0.942, 0.964, 0.989	96	92
	-7-hydroxy	0	1.012, 1.003, 1.073, 0.972, 1.06	-	102
		7	1.032, 1.063, 1.029, 1.091, 1.085	106	104
Rape seed	Fluopyram	0	0.946, 0.928, 0.894, 0.858, 0.887	-	90
		7	0.834, 0.814, 0.859, 0.9\828, 0.867	84	88
	-	0	0.803, 0.771, 0.714, 0.754, 0.775	-	76
	benzamide	7	0.709, 0.751, 0.849, 0.734, 0.738	76	77
	-7-hydroxy	0	1.041, 0.959, 0.985, 1.029, 0.895	-	98
		7	1.057, 1.09, 1.081, 1.095, 1.079	108	110

USE PATTERNS

Information on GAP in USA, Canada, Taiwan, Malaysia and a number of countries in Europe was provided to the Meeting for foliar applications, seed or soil treatments to crops for which new or previously submitted data were available. This GAP information is summarised in Table 1.

Table 13 Registered uses of fluopyram – SC, EC, ST or SE formulations (including co-formulations with bixafen, prothioconazole, tebuconazole, trifloxystrobin or triadimenol)

Crop	Country	Application				Max/season		PHI (days)	Remarks
		method	kg ai/ha (max)	kg ai/hL (max)	water L/ha	no	kg ai/ha		
Citrus fruit									
Citrus fruit	USA	foliar	0.25				0.5	7	7-21 day RTI
		soil	0.25				0.5	7	30-day RTI chemigation
Stone fruit									
Stone fruit	Canada	foliar	0.25		500 min		0.5	0	7-14 day RTI
Cherries	USA	foliar	0.25				0.5	0	5-7 day RTI
		soil	0.25				0.5	0	30 day RTI chemigation
Berries and other small fruit									
Small berries	Canada	foliar	0.125		500 min		0.5	0	7-14 day RTI
		foliar	0.25		500 min	2	0.5	0	7-10 day RTI from early flowering

Crop	Country	Application				Max/season		PHI (days)	Remarks
		method	kg ai/ha (max)	kg ai/hL (max)	water L/ha	no	kg ai/ha		
Small berries [except cranberry]	USA	foliar	0.25				0.5	0	7 day RTI
Low growing berries [except cranberry]	USA	soil	0.25				0.5	0	7 day RTI drench or chemigation
Assorted tropical and sub-tropical fruit – inedible peel									
Mango	Malaysia	Foliar [b]	0.15	0.015		2		7	7 day RTI
	Taiwan	Foliar [c]	0.075	0.0063				18	
Bulb vegetables									
Bulb vegetables	Canada	foliar	0.25		200 min		0.5	0	7-12 day RTI
	USA	foliar	0.25				0.5	0	5-7 day RTI
Spring onions Welsh onions	Greece	Foliar [b]	0.16		300 min	1		7	
Fruiting vegetables, other than cucurbits									
Fruiting vegetables	Canada	foliar	0.25		200 min		0.5	0	7-14 day RTI
Fruiting vegetables	USA	foliar	0.25				0.5	0	7 day RTI
		soil	0.25				0.5	0	7 day RTI in-furrow, drench or chemigation
Eggplant	Greece	Foliar [e]	0.15	0.01	500 min	3		3	14 day RTI
Pepper	Greece	Foliar [e]	0.15	0.01	750 min	3		3	14 day RTI
Tomato	Greece	Foliar [e]	0.15	0.01	500 min	3		3	14 day RTI
Leafy vegetables									
Leafy vegetables	Canada	foliar	0.25		200 min		0.5	0	7-12 day RTI
Leafy vegetables [except watercress]	USA	foliar	0.25				0.5	0 3 (indoor lettuce)	7-10 day RTI
Witloof chicory	Belgium	root	5 g ai /tonne	0.01		1		21	Pre-storage root dip or spray treatment
		spray	0.5 g ai /m^2					21	Pre-forcing root collar spray treatment
Pulses									
Peas, Beans (dried, shelled)	Canada	foliar	0.25		200 min		0.5	14 (food) 0 (feed)	7-14 day RTI
	USA	foliar	0.25				0.5	14 (food)	7-10 day RTI
		soil	0.25				0.5	14 (food)	7-10 day RTI In-furrow, chemigation
Soya bean	Austria	foliar[a]	0.125		200 min	2		GS	Apply from BBCH 59-75 14 day RTI
	Canada	foliar	0.25		200 min		0.5	14 (food) 7 (feed)	7-14 day RTI
	USA	foliar	0.25				0.5	14 (food)	7-10 day RTI
		soil	0.25				0.5	14 (food)	7-10 day RTI In-furrow, chemigation
	USA	Seed [f]	0.25 mg ai/seed				0.25	-	35g ai/140 000 seeds
Root and tuber vegetables									
Tuber, corm vegetables	Canada	foliar	0.25		200 min		0.5	7 (food) 7 (feed–tops)	7-12 day RTI
	USA	foliar	0.25				0.5	7 (food) 7 (feed–tops)	5-7 day RTI
		soil	0.25				0.5	7 (food) 7 (feed–tops)	5-7 day RTI In-furrow, drench
Stalk and stem vegetables									
Globe artichoke	Canada	foliar	0.25		200 min		0.5	0	7-14 day RTI
	Greece	Foliar [e]	0.075		1000	3		7	14 day RTI
	USA	foliar	0.25				0.5	0	7-10 day RTI
Cereal grains									
Cereal grains [except rice]	USA	foliar	0.25				0.5	14 (food) 14 (feed)	14 day RTI
		soil	0.25				0.5		In-furrow

Crop	Country	Application				Max/season		PHI (days)	Remarks
		method	kg ai/ha (max)	kg ai/hL (max)	water L/ha	no	kg ai/ha		
Barley	Estonia	Foliar [d]	0.078		100 min	1		GS	Between BBCH 31–61
	Sweden	Foliar [d]	0.075			1		GS	Between BBCH 30-61
Maize	Austria	Foliar [a]	0.125		200 min	2		GS	Between BBCH 33-69 14 day RTI
Maize (and sweetcorn)	Hungary	foliar	0.125		200-500	2		14	Between BBCH 30-69 14 day RTI
Maize (field corn, sweetcorn, popcorn)	Canada	foliar	0.25		100 min		0.5	14 (food) 14 (feed)	14 day RTI
Oats	Estonia	Foliar [d]	0.078		100 min	1		GS	Between BBCH 31–61
	Sweden	Foliar [d]	0.075			1		GS	Between BBCH 30-61
Rice	Thailand	Foliar [d]		0.024		2		GS	At booting and 70-100% panicle emergence (BBCH 59)
Rye	Estonia	Foliar [d]	0.098		100 min	1		GS	Between BBCH 31–61
	France	Foliar [d]	0.098			1		GS	Between BBCH 30-61
	Sweden	Foliar [d]	0.075			1		GS	Between BBCH 30-61
Sorghum	Canada	foliar	0.25		100 min		0.5	14 (food) 14 (feed)	14 day RTI
Triticale	Estonia	Foliar [d]	0.098		100 min	1		GS	Between BBCH 31–61
	Sweden	Foliar [d]	0.075			1		GS	Between BBCH 30-61
Wheat	Canada	foliar	0.25		100 min		0.5	14 (food) 14 (feed)	14 day RTI
	France	Foliar [d]	0.098			1		GS	Between BBCH 30-61
Wheat, spring	Estonia	Foliar [d]	0.098		100 min	2		GS	Between BBCH 31–61 14 day RTI
	Sweden	Foliar [d]	0.075			2		GS	Between BBCH 30-61 14 day RTI
Wheat, winter	Estonia	Foliar [d]	0.098		100 min	1		GS	Between BBCH 31–61
	Sweden	Foliar [d]	0.07			1		GS	Between BBCH 30-61
Oilseed									
Cottonseed	USA	foliar	0.25			1	0.5	30	also by air/chemigation
		soil	0.25				0.5	30	In-furrow at planting or soil chemigation
		Seed [f]	0.35 mg ai/seed					-	35 mg ai/100 000 seeds
Peanut	Canada	foliar	0.25		200 min		0.5	7 (food) 7 (feed)	14 day RTI
	USA	foliar	0.25				0.5	7 (food)	14 day RTI also by air/chemigation
		soil	0.25				0.5	7 (food)	14 day RTI In-furrow at planting
		seed	0.82 mg ai/seed				0.5	-	0.125 kg ai/100 kg seed
Sunflower group	Canada	foliar	0.25		100 min		0.5	14	14 day RTI from 10% flowering (R5.1–R5.5) Not for livestock feed
	USA	foliar	0.25				0.5	14	14 day RTI
		soil	0.25				0.5	14	14 day RTI In-furrow
	Hungary	foliar	0.125		150-400	2			Between BBCH 16-69 14 day RTI
Herbs and Spices									
Herbs	Canada	foliar	0.25		200 min	2	0.5	0	7-10 day RTI
	USA	foliar	0.25				0.5	14	7-10 day RTI also by air/chemigation
Dill seed	USA	foliar	0.25				0.5	14	7-10 day RTI also by air/chemigation
	Canada	foliar	0.25		200 min	2	0.5	14	7-10 day RTI
Dried herbs									
Hops	Canada	foliar	0.25		200 min	2	0.5	7	14 day RTI

Crop	Country	Application				Max/season		PHI (days)	Remarks
		method	kg ai/ha (max)	kg ai/hL (max)	water L/ha	no	kg ai/ha		
	USA	foliar	0.25		850-1870		0.5	7	14 day RTI also by air/chemigation

RTI = Re-treatment interval

[a] SE formulation containing 125 g ai/L fluopyram + 125 g ai/L prothioconazole

[b] SC formulation containing 200 g ai/L fluopyram + 200 g ai/L tebuconazole

[c] SC formulation containing 250 g ai/L fluopyram + 250 g ai/L trifloxystrobin

[d] EC formulation containing 65 g ai/L fluopyram + 65 g ai/L bixafen + 130 gai/L prothioconazole

[e] SC formulation containing 250 g ai/L fluopyram + 250 g ai/L triadimenol

[f] FS seed treatment formulation containing 600 g ai/L fluopyram

USA: Citrus fruit = Australian desert lime, Australian finger lime, Australian round lime, Brown river finger lime, calamondin, citron, citrus hybrids, grapefruit, Japanese summer grapefruit, kumquat, lemon, lime, Mediterranean mandarin, Mount white lime, New Guinea wild lime, sour orange, sweet orange, pummelo, Russell river lime, Satsuma mandarin, sweet lime, Tachibana orange, Tahiti lime, tangelo, tangerine (mandarin), tangor, trifoliate orange, uniq fruit, cultivars, varieties and/or hybrids of these.

USA: Cherries = capulin; cherry (black), cherry (Nanking), cherry (sweet), cherry (tart) and cultivars, varieties, and/or hybrids of these.

Canada/USA: Small berries = Caneberries (Group 13-07A) - Blackberry Rubus spp., (including Andean blackberry, Artic blackberry, bingleberry, black satin berry, boysenberry, brombeere, California blackberry, chesterberry, Cherokee blackberry, Cheyenne blackberry, common blackberry, coryberry, darrowberry, dewberry, dirksen thornless berry, evergreen blackberry, Himalayaberry, hullberry, lavacaberry, loganberry, lowberry, lucretiaberry, mammoth blackberry, marionberry, mora, mures deronce, nectarberry, northern dewberry, olallieberry, Oregon evergreen berry, phenomenalberry, rangeberry, ravenberry, rossberry, Shawnee blackberry, southern dewberry, tayberry, youngberry, zarzamora, and cultivars, varieries, and/or hybrids of these). Raspberry Rubus spp. (including bababerry, black raspberry, blackcap, framboise, frambueso, himbeere, keriberry, mayberry, purple raspberry, red raspberry, thimbleberry, tulameen, wild raspberries, yellow raspberry and cultivars, varieties, and/or hybrids of these. Bushberries (Group 13-07B) - aronia berry; blueberry, highbush; blueberry, lowbush; buffalo currant; Chilean guava; cranberry, highbush; currant, black; currant, red; elderberry; European barberry; gooseberry; honeysuckle, edible; huckleberry; jostaberry; juneberry (Saskatoon berry); lingonberry; native currant; salal; sea buckthorn; cultivars, varieties, and/or hybrids of these. Low growing berries (Group 13-07G) - bearberry; bilberry; blueberry, lowbush; cloudberry; cranberry; lingonberry; muntries; partridgeberry; strawberry; cultivars, varieties, and/or hybrids of these.

Canada/USA: Bulb vegetables = chive fresh leaves, chive fresh leaves (Chinese), daylily bulb, Elegans hosta, fritillaria (bulb and leaves), garlic bulb, garlic bulb (great headed and serpent), kurrat, leek, leek (lady's and wild), lily bulb, onion (Beltsville bunching, bulb, Chinese bulb, fresh, green, macrostem, pearl, potato bulb, tree tops, and Welsh), shallot bulbs and fresh leaves. Including all cultivars and/or hybrids of these

Canada/USA: Fruiting vegetables = African eggplant, bush tomato, cocona, currant tomato, eggplant, garden huckleberry, goji berry, groundcherry, martynia, naranjilla, okra, pea eggplant, pepino, pepper (Capsicum spp., including bell, chili, cooking, pimento and sweet), roselle, scarlet eggplant, sunberry, tomatillo, tomato, tree tomato, and cultivars, varieties, and/or hybrids of these.

Canada/USA: Leafy vegetables = amaranth (leafy amaranth, Chinese spinach, tampala), arugula (roquette), cardoon, celery, celtuce, chervil, chinese celery, chrysanthemum (edible-leaved and garland), cilantro, corn salad, garden cress, upland cress (yellow rocket, winter cress), dandelion, dock (sorrel), endive (escarole), Florence fennel (sweet anise, sweet fennel, Finocchio), lettuce (head and leaf), orach, parsley, purslane (garden and winter), radicchio (red chicory), rhubarb, spinach [including New Zealand and vine (Malabar spinach, Indian spinach)], Swiss chard, watercress.

Canada/USA: Peas and Beans: = Beans (Lupinus spp.) including grain lupin, sweet lupin, white lupin, and white sweet lupin; Beans (Phaseolus spp.) including field bean, kidney bean, lima bean, navy bean, pinto bean, runner bean, snap bean, tepary bean, wax bean; Beans (Vigna spp.) including adzuki bean, asparagus bean, blackeyed pea, catjang, Chinese longbean, cowpea, Crowder pea, moth bean, mung bean, rice bean, Southern pea, Urd bean, yardlong bean; Peas (Pisum spp.) including dwarf pea, edible pea, edible-pod pea, English pea, field pea, garden pea, green pea, snow pea, sugar snap pea; Other Beans and Peas including broad bean (fava), chickpea (garbanzo bean), guar, jackbean, lablab bean (hyacinth bean), lentil, pigeon pea; soya bean, soya bean (immature seed), sword bean.

Canada/USA: Sunflower group = calendula, castor oil plant, euphorbia, evening primrose, niger seed, rose hip, safflower, stokes aster, sunflower and cultivars, varieties, and/or hybrids of these. USA label only =, Chinese tallow tree, jojoba, tallowwood, tea oil plant, vernonia.

Canada: Tuber and corm vegetables = Arracacha, Arrowroot, Artichoke (Chinese and Jerusalem), Canna (edible, Queensland arrowroot), Cassava (bitter & sweet), Chayote (root), Chufa, Dasheen (taro), Ginger, Leren, Potato, Sweet Potato, Tanier (cocoyam), Turmeric, Yam bean (jicama, manoic pea), Yam (true).

Canada: Stone fruit = Apricot, Apricot (Japanese), Capulin, Cherry (Black, Nanking, Sweet, Tart), Chokecherry, Jujube (Chinese), Nectarine, Peach, Plum, Plum (American, Beach, Canada, Cherry, Chickasaw, Damson, Japanese, Klamath), Prune, Plumcot, Sloe, and cultivars, varieties, and/or hybrids of these.

USA: Cereal grains (Group 15) = barley, buckwheat, corn (sweet corn, field corn, field corn grown for seed), pearl millet, proso millet, oats, popcorn, rice, rye, sorghum, teosinte, triticale, wheat, wild rice.

Canada/USA: Herbs (subgroup) = angelica, balm (lemon balm), basil (fresh and dried), borage, burnet, camomile, catnip, chervil (dried), Chinese chive, chive, clary, coriander (cilantro or Chinese parsley leaves), costmary, culantro (leaf), curry leaf, dillweed, horehound, hyssop, lavender, lemongrass, lovage (leaf), marigold, marjoram, nasturtium, parsley (dried), pennyroyal, rosemary, rue, sage, savory (summer and winter), sweet bay (bay leaf), tansy, tarragon, thyme, wintergreen, woodruff, wormwood.

Canada: Spices = clove (buds), dill (seed)

RESIDUES RESULTING FROM SUPERVISED TRIALS

The Meeting reviewed new supervised field trial information and relevant data from supervised field trials provided to the JMPR in 2010, 2012 and 2015 for the following crops.

Crop Group	Commodity	Region	Table No.
Citrus	Orange	North America	14
	Mandarin	North America	15
	Lemon	North America	16
	Grapefruit	North America	17
Stone fruit	Cherries	North America	18
Berries and other small fruit	Cane berries	Europe, North America	19
	Blueberries	North America	20
Assorted tropical and sub-tropical fruit – inedible peel	Mango	Peru, Taiwan, Thailand	21
Bulb vegetables	Spring onion	North America	22
	Welsh onions	Europe	23
Fruiting vegetables, other than cucurbits	Peppers, Sweet (protected)	Europe	24
	Peppers, Sweet (outdoor)	Europe, Australia, North America	25-27
	Chili peppers	Australia, North America	28-29
	Tomato (outdoor)	North America	30
Leafy vegetables	Chervil	Europe	31
	Witloof chicory (sprouts)	Europe	32
Pulses	Beans (dry)	North America	33
	Peas (dry)	North America	34
	Soya bean (dry)	North America	35
Root & tuber vegetables	Potatoes	North America	36-37
Stalk & stem vegetables	Artichoke, Globe	Europe	38
Cereal grains	Barley	Europe	39
	Maize/Sweetcorn	North America, Europe	40-41
	Rice	Thailand, Vietnam	42
	Wheat	North America, Europe	43-44
Oilseeds	Cottonseed	North America	45
	Peanut	North America	46-50
	Sunflower seed	Europe, North America	51–52

Crop Group	Commodity	Region	Table No.
Herbs	Basil	North America	53
	Parsley, Sage, Savory	Europe	54
Spices	Dill (seed)	North America	55
Dried herbs	Hops, dry	North America	56
Legume animal feeds	Bean forage and hay	North America	57
	Pea vines and hay	North America	58-59
	Peanut hay	North America	60-64
	Soya bean forage, fodder	North America	65-66
Cereal animal feeds	Barley forage and fodder	Europe	67-68-64
	Maize forage and fodder	North America, Europe	69-72
	Rice forage and fodder	Thailand, Vietnam	73
	Wheat forage and fodder	North America, Europe	74-78
Other animal feeds	Cotton gin trash	North America	79

The supervised trials were well documented with laboratory and field reports. Laboratory reports included method validation including procedural recoveries with spiking at residue levels similar to those occurring in samples from the supervised 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.

When multiple applications were made to a crop, the application rate, spray concentration and spray volume were not always identical from one application to the next. If the variation was small, only the final values for application rate, concentration and spray volume were recorded. For larger variations all values were recorded.

Intervals of freezer storage between sampling and analysis were recorded for all trials and were covered by the conditions of the freezer storage stability studies reviewed by the 2010 JMPR.

Results from replicated field plots are presented as individual values and have not been corrected for concurrent method recoveries unless indicated. When residues were not detected they are shown as below the LOQ (e.g. < 0.01 mg/kg). Residues and application rates have been rounded to two significant digits. Average values have been calculated from the residue results prior to rounding and the results from trials conducted according to the maximum GAP and used for the estimation of maximum residue levels have been (underlined). Where the results of duplicate analyses are available, the highest individual value has been selected as the HR for dietary intake estimation.

In addition to the description and details of the field trials and analytical methods, each report included a summary of the method validation, procedural recoveries, and in most cases, concurrent recoveries in stored frozen samples.

In the trials, where multiple analyses are conducted on a single sample, the average value is reported and where duplicate samples have been analysed, both the individual results and the average value have been reported. Where results from separate plots with distinguishing characteristics such as different formulations, varieties or treatment schedules were reported, results are listed for each plot, and the highest value has been used in calculations of MRLs and STMRs.

Citrus fruits

Oranges, Mandarins, Lemons, Grapefruit

Results from supervised trials from USA on oranges, Satsuma mandarins, lemons and grapefruit were provided to the 2010 Meeting. In these trials, two applications of fluopyram (SC 500 formulation) were applied to mature, full-sized trees 5–8 days apart as foliar sprays using ground-based airblast

equipment to apply a total of 0.5 kg ai/ha/year. At most sites, two application methods were used, one involving low volume sprays (370–670 litres/ha) and one using high volume treatments (1940–2860 L/ha). Plot sizes in these trials ranged from 108–325 square metres and involved at least 4 trees per plot.

In new trials conducted in USA (2012–2013), one plot was treated with two airblast applications of fluopyram (SC 500 formulations with non-ionic surfactant), applied 6–8 days apart and a second plot was treated with 2 soil irrigation (microjet) treatments (400 SC formulations with added wetting agent), applied 28–30 days apart. Plot sizes were at least 120 square metres and at least 4 trees per plot.

Duplicate samples of at least 24 fruit were taken from at least 4 trees/plot, frozen within 6 hours of sampling, stored at -15 °C for up to 466 days before whole fruit analysis for fluopyram using LC/MS/MS Methods 00984, 00984/M001 or GM-001–P07-01, with a reported LOQ of 0.01 mg/kg. Mean recovery rates ranged from 87–107% in samples spiked with 0.01–2.5 mg/kg.

Table 14 Fluopyram residues in oranges from supervised trials in USA involving foliar applications (400 SC or 500 SC formulations).

ORANGE Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA (foliar and/or chemigation)		0.25			7	Max 0.5 kg ai/ha/season		7-21 day RTI (30 day soil RTI)
USA, 2006 DeLeon Springs, FL (Hamlin)	2	0.249 0.255	0.056 0.063	442 407	0 3 7 9 14	0.457, 0.391 0.126, 0.184 0.136 0.146 0.126, 0.175 0.117, 0.118	0.42 0.16 0.14 <u>0.15</u> 0.12	RAGMP036 GM027-06DA
USA, 2006 Dundee, FL (Hamlin)	2	0.249 0.254	0.059 0.066	422 385	7	0.146, 0.154	<u>0.15</u>	RAGMP036 GM020-06HA
USA, 2006 Fresno, CA (Washington Navel)	2	0.251 0.249	0.011 0.011	2358 2366	6	0.130 0.132	<u>0.13</u>	RAGMP036 GM029-06HA
USA, 2006 Vero Beach, FL (Pineapple)	2	0.25 0.254	0.053 0.059	473 433	7	0.127, 0.187	<u>0.16</u>	RAGMP036 GM025-06HA
USA, 2007 Ft. Pierce, FL (Valencia)	2	0.249 0.25	0.007 0.007	3331 3599	7	0.093, 0.075	<u>0.084</u>	RAGMP036 GM026-06HA
USA, 2007 Groveland, FL (Rhode Red Valencia)	2	0.247 0.247	0.06 0.051	411 484	7	0.329, 0.374	<u>0.35</u>	RAGMP036 GM021–06HA
USA, 2007 Haines City, FL (Valencia)	2	0.251 0.248	0.055 0.055	456 449	7	0.304, 0.323	<u>0.31</u>	RAGMP036 GM022-06HA
USA, 2007 Raymondville, TX (N-33 Navels)	2	0.255 0.256	0.011 0.011	2388 2414	7	0.077, 0.036	<u>0.056</u>	RAGMP036 GM028-06HA
USA, 2007 Sanger, CA (Washington Navel)	2	0.249 0.251	0.012 0.012	2076 2160	7	0.311, 0.284	<u>0.3</u>	RAGMP036 GM031–06HA
USA, 2012 Clermont, FL (Midsweet)	2 [a]	0.251 0.246	0.029 0.029	856 839	7	0.25, 0.29	<u>0.27</u>	RAGML213 GM063-12HA
USA, 2012 Clermont, FL (Midsweet)	2 [b]	0.253 0.253	0.0008 0.0008	31164 31164	0 7 14 19 28 35	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, 0.011 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 0.01 < 0.01 < 0.01 < 0.01	RAGML213 GM063-12HA [Drip irrigation]

ORANGE Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
USA, 2012 Umatilla, FL (Fall Glo)	2 [a] 0.252 0.251		0.044 0.045	568 564	7	0.093, 0.109	0.1	RAGML213 GM064-12HA
USA, 2012 Umatilla, FL (Fall Glo)	2 [b] 0.249 0.249		0.0009 0.0009	28310 28298	0 7 14 21 28 35	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGML213 GM064-12HA [Drip irrigation]

Study RAGMP036 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 83]

[a] = low volume airblast application (500 SC formulation) at BBCH 78-79 and 5-8 days later

[b] = drip irrigation 'microjet' application (400 SC formulation) at start of fruit colour and 28-30 days later

Table 15 Fluopyram residues in mandarins from supervised trials in USA involving foliar applications (400 SC or 500 SC formulations).

MANDARIN Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA (foliar and/or chemigation)		0.25			7	Max 0.5 kg ai/ha/season		7-21 day RTI (30 day soil RTI)
USA, 2006 Orland, CA (Mandarin - Satsuma)	2 0.248 0.245		0.053 0.053	468 465	7	0.139, 0.271	0.21	RAGMP036 GM030-06HA
USA, 2012 Orland, CA (Mandarin - Satsuma)	2 [a] 0.247 0.247		0.026 0.026	936 953	7	0.062, 0.066	0.064	RAGML213 GM065-12HA
USA, 2012 Orland, CA (Mandarin - Satsuma)	2 [b] 0.256 0.256		0.0003 0.0003	93599 93500	0 8 14 19 28 35	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGML213 GM065-12HA [Drip irrigation]

Study RAGMP036 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 83]

[a] = low volume airblast application (500 SC formulation) at BBCH 78-79 and 5-8 days later

[b] = drip irrigation 'microjet' application (400 SC formulation) at start of fruit colour and 30 days later

Table 16 Fluopyram residues in lemons from supervised trials in USA involving foliar applications (400 SC or 500 SC formulations)

LEMON Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA (foliar and/or chemigation)		0.25			7	Max 0.5 kg ai/ha/season		7-21 day RTI (30 day soil RTI)
USA, 2006 Porterville, CA (Lisbon)	2 0.257 0.25		0.009 0.009	2736 2832	7	0.206, 0.403	0.3	RAGMP036 GM033-06HA
USA, 2007 Arroyo Grande, CA (Eureka)	2 0.259 0.249		0.01 0.011	2610 2334	7	0.339, 0.311	0.33	RAGMP036 GM035-06HA
USA, 2007 Fresno, CA (Meyer)	2 0.251 0.248		0.051 0.051	495 490	0 3 7 10 14	0.499, 0.626 0.247, 0.387 0.307, 0.328 0.330, 0.224 0.351, 0.168	0.56 0.32 0.32 0.28 0.26	RAGMP036 GM036-06DA

LEMON Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
USA, 2007 Ft Pierce, FL (Bearrs)	2	0.246 0.258	0.01 0.01	2472 2606	7	0.389, 0.353	0.37	RAGMP036 GM032-06HA
USA, 2007 Sanger, CA (Frost Lisbon)	2	0.249 0.25	0.012 0.012	2101 2157	7	0.400, 0.439	0.42	RAGMP036 GM034-06HA
USA, 2012 Arroya Grande, CA (Eureka)	2 [a]	0.249 0.249	0.044 0.044	566 572	7	0.453, 0.506	0.48	RAGML213 GM066-12HA
USA, 2012 Arroya Grande, CA (Eureka)	2 [b]	0.251 0.251	0.0009 0.0009	28062 28031	0 7 14 21 28 35	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, 0.02 0.014, < 0.01 < 0.01, < 0.01 0.021, < 0.01	< 0.01 < 0.01 0.01 0.01 < 0.01 0.02	RAGML213 GM066-12HA [Drip irrigation]
USA, 2012 Sanger, CA (Lisbon)	2 [a]	0.249 0.25	0.042 0.042	590 603	7	0.21, 0.26	0.24	RAGML213 GM067-12HA
USA, 2012 Sanger, CA (Lisbon)	2 [b]	0.251 0.251	0.0007 0.0008	34271 30100	0 6 14 21 28 33	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGML213 GM067-12HA [Drip irrigation]
USA, 2012 Nipomo, CA (Lisbon)	2 [a]	0.249 0.25	0.067 0.068	373 363	7	0.33, 0.2	0.26	RAGML213 GM068-12HA
USA, 2012 Nipomo, CA (Lisbon)	2 [b]	0.249 0.249	0.0004 0.0004	56086 56120	0 7 14 21 28 35	< 0.01, < 0.01 < 0.01, < 0.01 0.013, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 0.01 < 0.01 < 0.01 < 0.01	RAGML213 GM068-12HA [Drip irrigation]

Study RAGMP036 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 84]

[a] = low volume airblast application (500 SC formulation) at BBCH 78-79 and 5-8 days later

[b] = drip irrigation 'microjet' application (400 SC formulation) at start of fruit colour and 27-29 days later

Table 17 Fluopyram residues in grapefruit from supervised trials in USA involving foliar applications (400 SC or 500 SC formulations).

GRAPEFRUIT Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA (foliar and/or chemigation)		0.25			7	Max 0.5 kg ai/ha/season		7-21 day RTI (30 day soil RTI)
USA, 2006 Dundee, FL (White Marsh)	2	0.25 0.252	0.011 0.012	2299 2175	7	0.101, 0.195	0.15	RAGMP036 GM039-06DA
USA, 2006 Porterville, CA (Mellow Gold)	2	0.25 0.25	0.012 0.012	2004 2007	7	0.162, 0.149	0.16	RAGMP036 GM041–06HA
USA, 2006 Vero Beach, FL (White)	2	0.251 0.256	0.053 0.059	475 436	7	0.101, 0.078	0.09	RAGMP036 GM037-06HA
USA, 2007 Raymondville, TX (Rio Red)	2	0.257 0.254	0.046 0.046	554 551	7	0.052, 0.037	0.044	RAGMP036 GM040-06HA
USA, 2007 Sanger, CA (Rio Red)	2	0.255 0.25	0.012 0.039	2131 646	7	0.137, 0.194	0.17	RAGMP036 GM042-06HA

GRAPEFRUIT Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
USA, 2012 Clermont, CA (Ray)	2 [a] 2 [a]	0.256 0.249	0.023 0.023	862 838	7	0.228, 0.142	0.19	RAGML213 GM069-12HA
USA, 2012 Clermont, CA (Ray)	2 [b] 2 [b] 2 [b] 2 [b] 2 [b] 2 [b]	0.249 0.249 0.249 0.249 0.249 0.249	0.0008 0.0008 0.0008 0.0008 0.0008 0.0008	31164 31164 31164 31164 31164 31164	0 7 14 19 28 35	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 0.014, 0.011 < 0.01, 0.022 0.011, 0.018	< 0.01 < 0.01 < 0.01 0.01 0.02 0.01	RAGML213 GM069-12HA [Drip irrigation]
USA, 2012 Umatilla, FL (Flame)	2 [a] 2 [a]	0.256 0.252	0.045 0.044	576 567	6	0.111, 0.097	0.1	RAGML213 GM070-12HA
USA, 2012 Umatilla, FL (Flame)	2 [b] 2 [b] 2 [b] 2 [b] 2 [b] 2 [b]	0.249 0.249 0.249 0.249 0.249 0.249	0.0009 0.0009 0.0009 0.0009 0.0009 0.0009	28293 28298 28293 28298 28293 28298	0 6 13 20 27 34	< 0.01, 0.016 0.015, 0.011 0.014, 0.011 0.016, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	0.01 0.01 0.01 0.01 < 0.01 < 0.01	RAGML213 GM070-12HA [Drip irrigation]
USA, 2012 Sanger, CA (Rio Red)	2 [a] 2 [a]	0.248 0.251	0.042 0.042	588 602	7	0.116, 0.153	0.13	RAGML213 GM071–12HA
USA, 2012 Sanger, CA (Rio Red)	2 [b] 2 [b] 2 [b] 2 [b] 2 [b] 2 [b]	0.25 0.249 0.25 0.249 0.25 0.249	0.0008 0.0006 0.0008 0.0006 0.0008 0.0006	33269 39009 33269 39009 33269 39009	0 6 14 21 28 33	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGML213 GM071–12HA [Drip irrigation]

Study RAGMP036 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 85]

[a] = low volume airblast application (500 SC formulation) at BBCH 78-79 and 5-8 days later

[b] = drip irrigation 'microjet' application (400 SC formulation) at start of fruit colour and 28-30 days later

Stone fruits

Cherries

Results from supervised trials from USA on cherries were provided to the 2010 JMPR. In these trials, two applications of fluopyram (SC 500 formulation) were applied to mature, full-sized trees 5–8 days apart as foliar sprays using ground-based airblast equipment to apply a total of 0.5 kg ai/ha/year. At most sites, two application methods were used, one involving low volume sprays (370–625 litres/ha) and one using high volume treatments (1900–3350 L/ha). Plot sizes in these trials ranged from 56–364 square metres and involved at least 4 trees per plot.

Duplicate samples of at least 24 fruit were taken from at least 4 trees/plot, frozen within 5 hours of sampling, stored at -15 °C for up to 561 days before analysis for fluopyram using a modification of LC/MS-MS Method 00984 (GM-001–P07-01), with a reported LOQ of 0.01 mg/kg. Mean recovery rates in samples spiked with 0.01 mg/kg and 5 mg/kg fluopyram were 96% and 101% respectively.

Table 18 Fluopyram residues in cherries from supervised trials in USA involving two foliar applications (500 SC formulations)

CHERRY Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA (foliar and/or chemigation)		0.25			0	Max 0.5 kg ai/ha/season		5-7 day RTI (30 day soil RTI)

CHERRY Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
USA, 2006 Conklin, Michigan (Montmorency)	2	0.252 0.25	0.013 0.013	1905 1946	0	1.229, 1.12	1.2	RAGMP056 GM178-06HA (Sour cherry)
USA, 2006 Ephrata, Washington (Bing)	2	0.251 0.25	0.041 0.041	606 603	0 3 7 10 14	0.547, 0.48 0.397, 0.432 0.426, 0.356 0.269, 0.295 0.273, 0.294	0.51 0.42 0.39 0.28 0.28	RAGMP056 GM182-06DA c=0.04 mg/kg
USA, 2006 Marysville, California (Rainier)	2	0.261 0.251	0.012 0.012	2194 2115	0	0.162, 0.147	0.16	RAGMP056 GM181–06HA
USA, 2006 Mosier, Oregon (Bing)	2	0.254 0.252	0.009 0.009	2889 2862	0	0.309, 0.25	0.28	RAGMP056 GM183-06HA
USA, 2006 Orefield, Pennsylvania (Montmorency)	2	0.249 0.252	0.011 0.011	2327 2350	0	0.656, 0.603	0.63	RAGMP056 GM179-06HA (Sour cherry)
USA, 2006 Shelby, Michigan (Gold)	2	0.251 0.253	0.041 0.041	611 624	0	0.641, 0.638	0.64	RAGMP056 GM180-06HA

Study RAGMP056 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 92]

Berries and other small fruits

Cane berries

Results from supervised trials from USA on blackberries, raspberries and boysenberries were provided to the 2010 JMPR. In these trials, 2 foliar spray applications of an SC 500 formulation of fluopyram (mixed with pyrimethanil - 600 SC formulation) were made at 7 day intervals using knapsack, boom or CO2 pressurised backpack sprayers, applying 0.24–0.26 kg ai/ha in 337–386 litres water/ha. Plot sizes in these trials ranged from 28–102 square metres.

Duplicate samples of at least 0.5 kg (raspberries) or 1 kg (blackberries/boysenberries) were taken from at least 4 plants within each plot, frozen within 4 hours of sampling and stored frozen for up to 242 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01. Mean recovery rates in samples spiked with 0.01 mg/kg and 5 mg/kg fluopyram were 102% and 101% respectively.

Table 19 Fluopyram residues in cane berries (raspberries, boysenberries, blackberries) from supervised trials in USA, involving 2 foliar applications (500 SC formulation).

CANE BERRIES Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA		0.25			0	Max 0.5 kg ai/ha		7 day RTI
USA, 2007 Enigma, GA (Arapaho) Blackberry	2	0.251 0.252	0.067 0.07	377 360	0	0.837, 0.579	0.71	RAGMP079 GM037-07HA
USA, 2007 Hillsboro, OR (Katata) Blackberry	2	0.254 0.258	0.066 0.075	386 345	0 3 5 7 10	1.42, 1.41 1.29, 1.2 0.712, 0.709 0.569, 0.539 0.32, 0.314	1.4 1.2 0.71 0.55 0.32	RAGMP079 GM144-07DA

CANE BERRIES Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
USA, 2007 Arkansas, WI (Kilarney) Raspberry	2	0.242 0.257	0.067 0.067	363 385	0	2.247, 2.537	2.4	RAGMP079 GM038-07HA
USA, 2007 Jefferson, OR (Meeker) Raspberry	2	0.254 0.262	0.07 0.073	365 358	0	0.484, 0.369	0.43	RAGMP079 GM039-07HA
USA, 2007 Hillsboro, OR (not stated) Boysenberry	2	0.251 0.252	0.066 0.075	382 337	0	0.778, 0.885	0.83	RAGMP079 GM143-07HA

Study RAGMP036 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 101]

Blueberries

Results from supervised trials from USA on blueberries were provided to the 2010 JMPR. In these trials, 2 foliar spray applications of an SC 500 formulation of fluopyram (mixed with pyrimethanil - 600 SC formulation) were made at 7 day intervals using knapsack, airblast/mist blowers or CO_2 pressurised backpack sprayers, applying 0.23–0.26 kg ai/ha in 111–580 litres water/ha. Plot sizes in these trials ranged from 26–70 square metres.

Duplicate samples of at least 0.5 kg were taken from at least 4 plants within each plot, frozen within 5 hours of sampling and stored frozen for up to 266 days before analysis for fluopyram using LC/MS/MS Method GM-001-P07-01. The reported LOQ was 0.01 mg/kg. Mean recovery rates in samples spiked with 0.01–5 mg/kg fluopyram ranged from 92–99%.

Table 20 Fluopyram residues in blueberries from supervised trials in USA, involving 2 foliar applications (500 SC formulation)

BLUEBERRIES Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA		0.25			0	Max 0.5 kg ai/ha		7 day RTI
USA, 2007 New Tripoli, PA (Bluecrop)	2	0.243 0.248	0.053 0.053	462 472	0	1.171, 1.109	1.1	RAGMP037 GM001–07HA
USA, 2007 Chula, GA (Brightwell)	2	0.251 0.249	0.066 0.066	382 378	0	1.558, 1.075	1.3	RAGMP037 GM003-07HA
USA, 2007 Elizabethtown, NC (Reka)	2	0.248 0.253	0.17 0.16	146 158	0	0.554, 0.611	0.58	RAGMP037 GM004-07HA
USA, 2007 Hixton, WI (Patriot)	2	0.25 0.247	0.067 0.067	374 371	0	1.278, 1.694	1.5	RAGMP037 GM005-07HA
USA, 2007 Fennville, MI (Jersey)	2	0.25 0.25	0.159 0.155	157 161	0	0.89, 1.394	1.1	RAGMP037 GM006-07HA
USA, 2007 Covert, MI (Jersey)	2	0.234 0.261	0.047 0.045	495 580	0	4.932, 3.725	4.3	RAGMP037 GM007-07HA
USA, 2007 Hillsboro, OR (Bluecrop)	2	0.245 0.251	0.206 0.226	119 111	0	0.858, 0.892	0.88	RAGMP037 GM008-07HA

BLUEBERRIES Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
USA, 2007	2	0.251	0.054	466	0	0.504, 0.509, *0.53,*		RAGMP037
Ochlocknee, GA		0.254	0.05	508		*0.51, 0.46*	*0.5*	GM002-07DA
(Tifblue)					1	1.163, 1.292	1.2	
					3	0.242, 0.247	0.24	0*d PHI results*
					7	0.243, 0.262	0.25	*incl processing*
					10	0.086, 0.114	0.1	*study samples*

Study RAGMP037 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 102]

Assorted tropical and sub-tropical fruits

Mango

Results from trials on mango conducted in Peru, Taiwan and Thailand were provided to the Meeting. In these trials 2 foliar spray applications (4 sprays in the Taiwan trial) of SC formulations of fluopyram co-formulated with trifloxystrobin or tebuconazole were made at 7–12 day intervals up to the start of ripening (BBCH 81). Applications were made using single-nozzle motorised knapsack sprayers or high pressure single nozzle hand guns, applying either about 500–600 litres or 1500–2000 litres spray mix/ha. Plot sizes in these trials ranged from 8–20 trees (2.3–5.6 m high).

Samples of at least 2 kg fruit (min 12 units) were taken from each plot and frozen within 24 hours of sampling. In some samples from the Thailand trials, fruit were peeled and the stones removed in the field before the pulp was frozen while in the Peru trials, some samples were peeled in the laboratory just prior to extraction and analysis of peel and pulp. Samples were stored at -18 °C or below for up to 300 days before analysis for fluopyram using either LC/MS/MS Method 00984 (Thailand trials), QuEChERS method (Taiwan trials) or Method GM-001–P07-10 (Peru trials). The reported LOQ for fluopyram was 0.01 mg/kg and mean recovery rates ranged from 84–105% in samples spiked with 0.01–0.8 mg/kg fluopyram.

Table 21 Fluopyram residues in mango from supervised trials in Thailand, Taiwan and Peru involving 2–4 foliar applications of fluopyram (SC formulations)

MANGO Country, year Location (variety)	Application				Matrix	DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)				
GAP: Malaysia	2	0.15	0.015			7		
Thailand, 2014	2	0.26	0.012	2097	whole	-0	0.02	RAGMN004
Petchaboen		0.25	0.013	1976	fruit	0	0.07	S13-03742-01
(Num Dok Mai)						3	0.08	
						7	0.08	
						14	0.1	
						21	0.06	
					pulp	0	< 0.01	
						14	< 0.01	
Thailand, 2014	2	0.25	0.017	1511	whole	-0	0.16	RAGMN004
Phichit		0.24	0.017	1427	fruit	0	0.34	S13-03742-02
(Num Dok Mai)						3	0.63	
						7	0.38	
						14	0.44	
						21	0.16	
					pulp	0	< 0.01	
						14	< 0.01	

MANGO Country, year Location (variety)	Application				Matrix	DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)				
Thailand, 2014 Phisanulok (Num Dok Mai)	2 2	0.25 0.25	0.017 0.017	1499 1484	whole fruit	-0 0 3 7 13 21	0.32 0.53 0.39 <u>0.48</u> 0.15 0.28	RAGMN004 S13-03742-03
					pulp	0 13	< 0.01 < 0.01	
Taiwan 2014 TACTRI (Not specified)	4	0.125	0.0083	1500	whole fruit	0 3 7 14 21 28	0.03 0.05 0.05 0.05 0.03 0.03	0484G13RFT19 3000X
Taiwan 2014 TACTRI (Not specified)	4	0.375	0.025	1500	whole fruit	0 3 7 14 21 28	0.24 0.18 0.17 0.17 0.15 0.15	0484G13RFT19 1000X
Peru, 2014 Chulucanas (Kent)	2 2	0.252 0.254	0.049 0.05	516 509	whole fruit	0 7 14 18 28 33	0.235 0.156 0.154, 0.125 (mean: 0.14) 0.18 0.08, 0.082 (mean: 0.081) 0.118	RAGMN054 GM-082-13DA
Peru, 2014 Chulucanas (Kent)	2 2	0.255 0.251	0.016 0.016	1590 1608	whole fruit	0 7 14 18 28 33	0.244 <u>0.126</u> 0.071, 0.111 (mean: 0.091) 0.107 0.111, 0.063 (mean: 0.087) 0.07	RAGMN054 GM-082-13DA
					peel pulp	14 14	0.476, 0.452 (mean: 0.464) < 0.01, 0.013 (mean: 0.012)	
Peru, 2014 Jayanca (Kent)	2 2	0.253 0.256	0.05 0.039	507 652	whole fruit	0 7 14 18 28 33	0.337 0.217 0.207, 0.226 (mean: 0.217) 0.159 0.164, 0.136 (mean: 0.15) 0.092	RAGMN054 GM-083-13DA
Peru, 2014 Jayanca (Kent)	2 2	0.253 0.256	0.016 0.016	1583 1564	whole fruit	0 7 14 18 28 33	0.28 <u>0.18</u> 0.124, 0.139 (mean: 0.132) 0.122 0.078, 0.082 (mean: 0.08) 0.094	RAGMN054 GM-083-13DA
					peel pulp	14 14	0.643, 0.584 (mean: 0.614) 0.017, 0.012 (mean: 0.015)	
Peru, 2014 Casma (Kent)	2 2	0.255 0.25	0.05 0.048	511 522	whole fruit	0 5 13 18 29 33	0.377 0.423 0.303, 0.329 (mean: 0.316) 0.256 0.157, 0.196 (mean: 0.177) 0.099	RAGMN054 GM-084-13DA

MANGO Country, year Location (variety)	Application				Matrix	DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)				
Peru, 2014	2	0.254	0.016	1585	whole	0	0.335	RAGMN054
Casma		0.25	0.016	1565	fruit	5	0.363	GM-084-13DA
(Kent)						13	0.167, 0.282 (mean: 0.225)	
						18	0.171	
						29	0.114, 0.145 (mean: 0.13)	
						33	0.138	
					peel	14	0.718, 0.54 (mean: 0.629)	
					pulp	14	0.01, < 0.01 (mean: 0.01)	

Residues of fluopyram-benzamide were all < 0.01 mg/kg in the Thailand trials

Bulb vegetables

Spring onions

Results from supervised trials from USA on spring onions (green or bunching onions) were provided to the 2010 JMPR. In these trials, unreplicated plots were treated with 2 foliar sprays of an SC 500 formulation of fluopyram, using knapsack or plot sprayers or a tractor-mounted boom sprayer to apply 0.24–0.26 kg ai/ha in 138–187 litres water/ha, with a treatment interval of 5 days.

Duplicate samples of at least 2.5 kg whole plants without roots were taken from 24 plants in each treated plot, frozen within 3.7 hours of sampling and stored frozen for up to 205 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg.

Table 22 Fluopyram residues in spring onion from supervised trials in USA, involving two foliar applications (500 SC formulation)

SPRING ONION Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA		0.25			0	Max 0.5 kg ai/ha/season		7-10 day RTI
USA, 2007	2	0.245	0.178	138	0	1.173, 1.176	1.2	RAGMP083
Salinas, CA		0.254	0.17	149				GM069-07HA
(Emerald Isle)								
USA, 2007	2	0.247	0.132	187	0	4.527, 5.669	5.1	RAGMP083
Chico, CA		0.248	0.133	187				GM071–07HA
(Southport White Bunching)								
USA, 2007	2	0.258	0.14	184	0	5.07, 7.294	6.2	RAGMP083
Raymondville, TX		0.258	0.141	183				GM070-07HA
(Yellow Granex)								

Study RAGMP083 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 108]

Welsh onions

Results from supervised trials from Europe on Welsh onions were provided to the 2010 JMPR. In these trials, 2 applications of fluopyram + tebuconazole (SC 200+200) were applied at 6-7 day intervals as foliar sprays using knapsack sprayers with hand-held booms (3–9 flat fan nozzles), applying fluopyram at 0.2kg ai/ha in 300-600 litres water/ha. Plot sizes in these trials ranged from 27–72 square metres.

Unreplicated 1–2 kg samples (24–84 whole plants, without roots) were taken from each plot, frozen within 24 hours of sampling and stored at -18 °C or below for up to 356 days before analysis for fluopyram and its BZM, PAA and PCA metabolites using LC/MS/MS Method 00984 (LOQs were

0.01 mg/kg for each analyte). Mean recovery rates in samples spiked with 0.01–10 mg/kg fluopyram ranged from 96–98%.

Table 23 Residues in Welsh onions from supervised field trials in France, Germany, Italy and United Kingdom, involving two foliar applications of fluopyram (SC formulation)

ONION, WELSH Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			
GAP: Greece	1	0.16			7		
France, 2006 Tilloloy (Barletta)	2	0.2 0.188	0.04	500 470	-0 0 7 14 21	0.33 2.6 0.7 0.41 0.29	RA-2565/06 0337-06
Germany, 2006 Burscheid (Feast)	2	0.2	0.0666	300	-0 0 7 14 21	0.08 0.99 0.39 0.1 0.07	RA-2565/06 0504-06
Germany, 2007 Burscheid (Vaugirard)	2	0.2	0.0666	300	-0 0 7 14 21	0.08 0.86 0.11 0.12 0.12	RA-2519/07 0042-07
United Kingdom, 2007 Southfleet/Gravesend (Laser)	2	0.2	0.0666	300	-0 0 7 13 21	0.96 3.3 0.61 0.23 0.11	RA-2519/07 0567-07
France, 2006 Saint Bonnet de Mure (Barletta)	2	0.2	0.05	400	-0 0 7 14 21	0.23 3.8 1.2 0.47 0.27	RA-2566/06 0339-06
Italy, 2006 Lusia (Bianco di Lisbona)	2	0.2	0.0334	600	-0 0 7 14 21	0.68 2.1 0.41 0.23 0.1	RA-2566/06 0505-06
France, 2007 Toulouse (Elodie,welsh onion/green onion)	2	0.2	0.0334	600	-0 0 7 14 21	0.49 2.1 0.27 0.24 0.17	RA-2520/07 0043-07
Italy, 2007 Lusia (Bianco di Lisbona)	2	0.2	0.0334	600	-0 0 7 14 21	0.59 2.2 0.61 0.29 0.18	RA-2520/07 0568-07

Studies RA-2519, RA-2520, RA-2565 and RA-2566 were also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 107]

Fruiting vegetables (except Cucurbits)

Peppers

Results from 20 trials were provided to the Meeting. In 12 greenhouse trials, 2 applications of fluopyram (SC 500 formulations) were applied at 7–14 day intervals to mature plants as foliar sprays using knapsack sprayers with hand held lances or mini-booms (1–5 fan or hollow-cone nozzles) to apply 600–1500 litres of spray mix/ha. Plot sizes in these trials ranged from 16–73 square metres.

In eight field trials, 2 applications of fluopyram (SC 500 formulations) were applied at 7–8 day intervals to mature plants as foliar sprays using knapsack sprayers with hand-held mini-booms (1–8 nozzles) to apply 500–1200 litres of spray mix/ha. Plot sizes in these trials ranged from 15–130 square metres.

Unreplicated samples of at least 24 fruit were taken from each plot, frozen within 24 hours of sampling and stored at -18 °C or below for up to 406 days before analysis using LC/MS/MS Methods 00984 or 00984/M001 to measure fluopyram. The LOQ was 0.01 mg/kg and mean recovery rates for fluopyram ranged from 98–105%.

Table 24 Residues in sweet peppers from supervised greenhouse trials in Europe, involving two or three foliar applications of fluopyram (500 SC formulations)

PEPPERS, SWEET Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			
GAP: Greece	3	0.15	0.01		3		14 day RTI
Germany, 2013 Leichlingen (Zamboni)	2	0.169	0.023	750	-0 0 1 3 7 10 14	0.12 0.24 0.2 0.17 0.13 0.19 0.14	13-2123 13-213-01
Netherlands, 2013 Heerhugowaard (Davos Red)	2	0.225 0.231	0.023 0.023	1000 1025	-0 0 1 3 7 10 14	0.054 0.12 0.12 0.12 0.11 0.11 0.14	13-2123 13-213-02
Belgium, 2013 Saint-Amand (Sopra)	2	0.169	0.023	750	-0 0 1 3 7 10 14	0.094 0.33 0.17 0.33 0.26 0.17 0.17	13-2123 13-213-03
France, 2013 Graveson (Almuden)	2	0.169 0.180	0.023 0.023	750 800	-0 0 1 3 7 10 14	0.091 0.16 0.18 0.19 0.15 0.15 0.091	13-2123 13-213-04
Spain, 2013 Vilanova i la Geltru (Pascal Lamuyo)	2	0.203	0.023	900	-0 0 1 3 7 10 14	0.17 0.44 0.34 0.34 0.29 0.3 0.23	13-2123 13-213-05
Italy, 2013 Palidoro-Fiumicino (Nestor Yellow)	2	0.169	0.023	750	-0 0 1 3 7 10 14	0.12 0.2 0.19 0.22 0.2 0.17 0.16	13-2123 13-213-06

PEPPERS, SWEET Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			
Italy, 2013 Terlizzi (Red Bell)	2	0.225	0.023	1000	-0 0 1 3 7 10 14	0.22 0.33 0.35 0.35 0.37 0.35 0.39	13-2123 13-213-07
Greece, 2013 Centrail Makedonia (Raiko)	2	0.191 0.203	0.022 0.023	850 900	-0 0 1 3 7 10 14	0.042 0.12 0.12 0.1 0.11 0.085 0.02	13-2123 13-213-08
Spain, 2013 Roquetas de Mar (Werta)	3	0.15 0.15 0.15	0.025 0.019 0.016	600 800 950	-0 0 1 3 7 10	0.17 0.30 0.27 0.22 0.22 0.20	10-2193 10-2193-01
Italy, 2013 Giovinazzo (Fenice)	3	0.15	0.015	1000	-0 0 1 3 7 10	0.06 0.16 0.11 0.09 0.09 0.08	10-2193 10-2193-02
France, 2013 Graveson (Almuden)	3	0.15	0.015	1000	-0 0 1 3 7 9	0.12 0.23 0.20 0.23 0.20 0.16	10-2193 10-2193-03
Netherlands, 2013 Honselersdik (Jaguar)	3	0.15	0.019	800	-0 0 1 3 7 10	0.07 0.11 0.12 0.14 0.10 0.10	10-2193 10-2193-04

Table 25 Residues in sweet peppers from supervised outdoor trials in Europe, involving two foliar applications of fluopyram (500 SC formulations)

PEPPERS, SWEET Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			
GAP: Greece	3	0.15	0.01		3		14 day RTI
France, 2013 Le Burgaud (Alby)	2	0.2	0.025	800	-0 0 1 3 7 10 14	0.054 0.15 0.13 0.055 0.085 0.071 0.058	13-2122 13-2122-01
Spain, 2013 Cardona (Lloret)	2	0.2	0.02	1000	-0 0 1 3 7 10 14	0.06 0.23 0.24 0.2 0.12 0.14 0.085	13-2122 13-2122-02

PEPPERS, SWEET Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			
Italy, 2013 Catania (Solero Red)	2	0.2	0.029	700	-0 0 1 3 7 10 14	0.15 0.34 0.28 0.29 0.17 0.15 0.15	13-2122 13-2122-03
Portugal, 2013 Azeitada (Rialto Yellow)	2	0.2	0.04	500	-0 0 1 3 7 10 14	0.016 0.1 0.059 0.04 0.023 0.022 0.022	13-2122 13-2122-04
Greece, 2013 Hellas (Makedonia, Table big)	2	0.2	0.033	600	-0 0 1 3 7 10 14	0.49 1.4 1.5 1.3 1.4 0.82 0.27	13-2122 13-2122-05
France, 2013 Pernes les Fontaines Lipari Pepper)	2	0.2	0.033	600	-0 0 1 3 7 10 14	0.17 0.59 0.35 0.41 0.37 0.31 0.25	13-2122 13-2122-06
Spain, 2013 Alginet (Red Bull)	2	0.2	0.04	500	-0 0 1 3 7 10 14	0.04 0.21 0.15 0.17 0.1 0.17 0.18	13-2122 13-2122-07
Italy, 2013 Andria-Trani (Topepo Red)	2	0.2	0.025	800	-0 0 1 3 7 10 14	0.011 0.12 0.052 0.023 0.02 0.023 0.023	13-2122 13-2122-08

Results from supervised trials from Australia on peppers were provided to the Meeting. In these trials, 3 applications of fluopyram (SC 500 formulations) were applied at 7 day intervals to mature plants as foliar sprays using knapsack sprayers or hand-held pressure sprayers with mini-booms (3–4 fan or hollow-cone nozzles) to apply about 600 litres of spray mix/ha. Plot sizes in these trials ranged from 9–30 square metres.

Unreplicated samples of at least 12 fruit were taken from each plot, frozen within 4 hours of sampling and stored at -18 °C or below for up to 470 days before analysis using LC/MS/MS Method ATM-0047 to measure fluopyram, with an LOQ of 0.01 mg/kg. In one trial, the -BZM, -PCA and -PAA metabolites were also analysed. Mean recovery rates ranged from 90–95% in samples spiked with 0.01–1.0 mg/kg fluopyram.

Table 26 Fluopyram residues in peppers from supervised outdoor trials in Australia involving three foliar applications of fluopyram (500 SC formulations)

PEPPERS	Application	DALA	Fluopyram Residues (mg/kg)	Reference &

Country, year Location (variety)	no	kg ai/ha	kg ai/hL	water (L/ha)			Comments
Australia, 2009 3629 Mooroopna, VIC (Bull horn)	3	0.073 0.074 0.073	0.012 0.012 0.012	600 602 600	-0 0 1 3 7 10 21	0.04 0.08 0.03 0.05 0.03 0.02 0.02	BCA-0266 C380-T1
Australia, 2009 3629 Mooroopna, VIC (Bull horn)	3	0.121 0.121 0.121	0.0202 0.0201 0.0202	600 602 600	-0 0 1 3 7 10 21	0.06 0.09 0.05 0.09 0.04 0.03 0.04	BCA-0266 C380-T2
Australia, 2009 3629 Mooroopna, VIC (Bull horn)	3	0.182 0.182 0.181	0.0303 0.0302 0.0302	600 602 600	-0 0 1 3 7 10 21	0.11 0.33 0.14 0.22 0.08 0.06 0.07	BCA-0266 C380-T3
Australia, 2009 6031 Neerabup, WA (Raptor)	3	0.077 0.077 0.077	0.013 0.013 0.013	590 579 592	-0 0 1 3 7 11 21	0.01 < 0.01 0.03 0.02 0.02 0.01 < 0.01	BCA-0266 C381–T1
Australia, 2009 6031 Neerabup, WA (Raptor)	3	0.128 0.127 0.127	0.0217 0.0219 0.0215	590 579 592	-0 0 1 3 7 11 21	0.01 0.09 0.05 0.02 0.03 0.02 0.02	BCA-0266 C381–T2
Australia, 2009 6031 Neerabup, WA (Raptor)	3	0.191 0.192 0.192	0.0324 0.0332 0.0324	590 579 592	-0 0 1 3 7 11 21	0.02 0.06 0.05 0.03 0.02 0.03 0.06	BCA-0266 C381–T3
Australia, 2009 4805 Merinda QLD (Warlock)	3	0.075 0.076 0.076	0.013 0.013 0.013	593 597 600	-0 0 1 3 7 11 21	< 0.01 0.03 0.05 0.02 0.03 0.02 0.01	BCA-0266 C382-T1
Australia, 2009 4805 Merinda QLD (Warlock)	3	0.125 0.126 0.127	0.0211 0.0211 0.0212	593 597 600	-0 0 1 3 7 11 21	0.03 0.03 0.08 0.06 0.07 0.03 0.05	BCA-0266 C382-T2
Australia, 2009 4805 Merinda QLD (Warlock)	3	0.189 0.190 0.191	0.0319 0.0318 0.0318	593 597 600	-0 0 1 3 7 11 21	0.03 0.10 0.14 0.09 0.05 0.09 0.06	BCA-0266 C382-T3

In the USA trials provided to the 2010 JMPR, two applications of 0.24–0.26 kg ai/ha (SC 500 formulation) were applied to mature plants, 3–5 days apart as foliar sprays using ground-based backpack plot sprayers with 1–3 metre hand-held booms to apply a total of 0.49–0.52 kg ai/ha/year. Plot sizes in these trials ranged from 84–264 square metres.

Duplicate samples of mature fresh peppers (12 fruit from 12 areas within each plot) were taken from each plot, frozen within 3.6 hours of sampling and held in frozen storage for up to 559 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01 (LOQ of 0.01 mg/kg). Mean recovery rates in samples spiked with 0.01–10 mg/kg fluopyram ranged from 89–96%.

Table 27 Fluopyram residues in sweet peppers from supervised outdoor trials in USA involving two foliar applications of fluopyram (500 SC formulations)

PEPPER, SWEET Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA (foliar and/or chemigation		0.25			0	Max 0.5 kg ai/ha/season		7 day RTI
USA, 2006 Tifton, GA (Capastrano)	2	0.25 0.254	0.174 0.162	144 157	0	0.143, 0.201	0.17	RAGMP041 GM096-06HA
USA, 2006 Stilwell, KS (California Wonder)	2	0.25 0.244	0.179 0.178	140 137	0	0.04, 0.029	0.034	RAGMP041 GM098-06HA
USA, 2006 East Bernard, TX (California Wonder)	2	0.249 0.247	0.183 0.189	136 131	0	0.363, 0.354	0.36	RAGMP041 GM099-06HA
USA, 2006 Fresno, CA (Revolution)	2	0.262 0.25	0.147 0.147	178 170	0	0.129, 0.153	0.14	RAGMP041 GM100-06HA
USA, 2006 San Ardo, CA (Choice)	2	0.251 0.25	0.144 0.145	174 173	0	0.096, 0.076	0.086	RAGMP041 GM101–06HA
USA, 2006 Molino, FL (Comandant)	2	0.244 0.252	0.178 0.188	137 134	0 3 7 9 14	0.167, 0.097 0.04, 0.06 0.028, 0.017 0.018, 0.023 0.014, 0.011	0.13 0.05 0.02 0.02 0.01	RAGMP041 GM097-06DA

Study RAGMP041 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 130]

Chili peppers

Results from supervised trials from USA on chili (non-bell) peppers were provided to the 2010 Meeting and an additional trial from Australia was also provided to the Meeting. In the USA trials, two applications of 0.24–0.26 kg ai/ha (SC 500 formulation) were applied to mature plants, 4-5 days apart as foliar sprays using ground-based backpack plot sprayers and hand-held mini-booms to apply 120–170 litres of spray mix/ha. In the Australian trial, 3 foliar applications of about 600 litres spray mix/ha were made at 7 day intervals. Plot sizes ranged from 132–140 square metres (15 square metres in the Australian trial).

In the USA trials, two duplicate samples of mature fresh peppers (12 fruit from 12 areas within each plot) were taken from each plot with one set of samples being allowed to air-dry for 14–17 days (to commercial dryness). In the Australian trial, unreplicated samples of fruit were taken from six plants. All samples were frozen within 4 hours of sampling and held in frozen storage for up to 546 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01 (USA trials) or ATM-0047 (Australian trial), with a reported LOQ of 0.01 mg/kg. Mean recovery rates in samples spiked with 0.01–2.5 mg/kg fluopyram ranged from 92–95%.

Table 283 Residues in chili peppers from supervised trials in USA involving two foliar applications of fluopyram (500 SC formulations)

CHILI PEPPER Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)			Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		matrix	values	mean	
GAP: USA (foliar and/or chemigation		0.25			0		Max 0.5 kg ai/ha/season		7 day RTI
USA, 2006 Tifton, GA (Chili Pepper)	2	0.25 0.253	0.174 0.161	144 157	0	fresh dried	0.857, 1.319 0.05, 0.014 (c=0.52)	1.1 0.03	RAGMP041 GM102-06HA
USA, 2006 Molino, FL Pepper (Grande)	2	0.244 0.247	0.203 0.179	120 138	0	fresh dried	0.094, 0.14 0.166, 0.151	0.12 0.16	RAGMP041 GM103-06HA
USA, 2006 Fresno, CA Pepper (Cayenne)	2	0.248 0.25	0.145	171 172	0	fresh dried	1.086, 1.38 3.62, 3.811	1.2 3.72	RAGMP041 GM104-06HA

Study RAGMP041 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 133]

Table 29 Residues in chili peppers from a supervised trial in Australia involving three foliar applications of fluopyram (500 SC formulations)

CHILI PEPPER Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			
Australia, 2009 4805 Bowen QLD (Hercules) (chili pepper)	3	0.076 0.075 0.076	0.013 0.013 0.013	597 593 601	-0 0 1 3 7 12 18	0.05 0.09 0.08 0.10 0.06 0.06 0.05	BCA-0266 C383-T1
Australia, 2009 4805 Bowen QLD (Hercules) (chili pepper)	3	0.126 0.125 0.127	0.0211 0.0211 0.0211	597 593 601	-0 0 1 3 7 12 18	0.07 0.13 0.12 0.09 0.18 0.10 0.07	BCA-0266 C383-T2
Australia, 2009 4805 Bowen QLD (Hercules) (chili pepper)	3	0.190 0.191 0.193	0.0318 0.0322 0.0321	597 593 601	-0 0 1 3 7 12 18	0.14 0.44 0.21 0.17 0.31 0.22 0.22	BCA-0266 C383-T3

Tomatoes

Results from supervised trials from USA on tomatoes were provided to the 2010 JMPR. In these trials, two applications of 0.24–0.26 kg ai/ha (SC 500 formulation) were applied to tomato plants at 3–6 day intervals using ground-based CO_2 plot sprayers, backpack sprayers with hand-held 3–5 metre booms or a tractor-mounted 5m side-boom to apply a total of 0.49–0.52 kg ai/ha/year Plot sizes in these trials ranged from 28–167 square metres.

Duplicate samples of mature fresh fruit (12 fruit from 12 areas within each plot) were taken from each plot, frozen within 3.6 hours of sampling and held in frozen storage for up to 534 days before being analysed for fluopyram using LC/MS/MS Method GM-001–P07-01 (LOQ 0.01 mg/kg).

Table 30 Fluopyram residues in tomatoes from supervised trials in USA involving two foliar applications of fluopyram (500 SC formulations)

TOMATOES Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA (foliar and/or chemigation		0.25			0	Max 0.5 kg ai/ha/season		7 day RTI
USA, 2006 Germansville, PA (Mountain Spring)	2	0.252 0.259	0.139 0.14	181 185	0	0.166, 0.152	0.16	RAGMP041 GM084-06HA
USA, 2006 Tifton, GA (Amelia 0800)	2	0.25 0.253	0.175 0.161	143 157	0	0.031, 0.01	0.021	RAGMP041 GM085-06HA
USA, 2006 Molino, FL (Amelia)	2	0.247 0.251	0.179 0.189	138 133	0	0.092, 0.059	0.076	RAGMP041 GM086-06HA
USA, 2006 Gretna, FL (Amelia)	2	0.252 0.256	0.147 0.147	172 174	0	0.127, 0.1	0.11	RAGMP041 GM087-06HA
Springfield, NE (Crista)	2	0.249 0.251	0.192 0.192	130 131	0	0.04, 0.08	0.06	RAGMP041 GM088-06HA
USA, 2006 Maxwell, CA (Heinz 9663)	2	0.247	0.175	141	0 3 7 10 14	0.092, 0.11 0.083, 0.1 0.098, 0.114 0.089, 0.066 0.051, 0.088	0.101 0.092 0.11 0.077 0.07	RAGMP041 GM089-06DA
USA, 2006 Fresno, CA (Rio Grande)	2	0.248 0.251	0.144 0.144	172	0	0.196, 0.181	0.19	RAGMP041 GM090-06HA Harvest 21 Aug
USA, 2006 Sanger, CA (2601)	2	0.25 0.252	0.197 0.188	127 134	0	0.162, 0.185	0.17	RAGMP041 GM091–06HA
USA, 2006 Fresno, CA (Sunbrite Fresh Mark)	2	0.252 0.249	0.15 0.147	168 169	0	0.162, 0.2	0.18	RAGMP041 GM092-06HA Harvest 18 Jul
USA, 2006 Corning, CA (APT410)	2	0.247	0.132 0.21	187	0	0.314, 0.369	0.342	RAGMP041 GM093-06HA
USA, 2006 Fresno, CA (Roma)	2	0.244 0.249	0.21 0.211	116 118	0	0.091, 0.081	0.086	RAGMP041 GM094-06HA Harvest 21 Aug
USA, 2006 Kettleman City, CA (410)	2	0.252 0.251	0.142 0.139	178 180	0	0.074, 0.06	0.067	RAGMP041 GM095-06HA

Study RAGMP041 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation - Table 127]

Leafy vegetables

Chervil

Results from supervised trials from Europe on chervil were provided to the Meeting. In these trials single treatments of 0.2 kg ai/ha (SC formulations also containing tebuconazole) were applied using wheeled plot sprayers with hand-held mini-booms. Plot sizes in these trials ranged from 4.8–48 square metres.

Unreplicated samples (min 0.6 kg leaves) were taken from each plot and stored frozen for up to 468 days before analysis for fluopyram and its benzamide metabolite using LC/MS/MS Method 00948, with a reported LOQ of 0.01 mg/kg and with average fluopyram recovery rates of 84–104% in leaf fractions spiked with 0.01–6 mg/kg.

Table 31 Fluopyram residues in chervil from supervised trials in Europe, involving one foliar application (400 SC formulations)

CHERVIL Study, Trial Country, Year (Variety)	Application				Matrix	DALA	Fluopyram residues (mg/kg fresh weight)	Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)				
GAP								
Germany, 2013 46359 Heiden (Chervil; Massa)	1	0.2	0.05	400	leaf	7 14	0.296 0.083	OG/12-3-1 LR-K-13-FK-F-01 MUE-01
Germany, 2012 35516 Munzenberg (Chervil; variety not reported)	1	0.2	0.034	640	leaf	7 14	1.536 0.382	OG/12-3-1 LR-K-12-FK-F-01 WET-kerbel

Witloof chicory

Results from supervised trials from Europe on witloof chicory were provided to the Meeting. In these trials chicory roots were dipped for 2 minutes in a 0.01% solution of fluopyram before storage and the root collars were also sprayed with 0.5 g ai fluopyram/square metre (equivalent of 5 kg ai/ha) at the start of forcing, using a single nozzle knapsack sprayer to apply about 600 mL of spray mix per square metre. The spray applications involved 400–770 roots per 0.5–1.0 square metre forcing boxes.

Samples of leaves/chicons (min 1.2 kg) and trimmed roots (min 3 kg) were frozen within 24 hours and held in frozen storage for up to 239 days (leaves) and 245 days (roots) before analysis for fluopyram and its -BZM, -PCA and -PAA metabolites using the LC/MS/MS Method 00984. The reported LOQ was 0.01 mg/kg and mean recovery rates in samples spiked with 0.01–1.0 mg/kg fluopyram ranged from 87–99% in leaves and 72–102% in roots.

Table 32 Fluopyram residues in witloof chicory from supervised trials in Europe involving one pre-storage dip and one pre-forcing spray of fluopyram (500 SC formulations)

WITLOOF CHICORY Country, year Location (variety)	Application				Matrix	DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)				
GAP: Belgium	1 1	5 g ai/tonne (root dip) 0.5 g ai/sq m (collar spray)				21		Pre-storage Pre-forcing
Belgium, 2009 Saint Amand (Atlas)	1 (dip) 1 (spray)	5.0	0.01 0.083	6000	leaf root	21 39 21 39	0.4 [a] 0.05 2.1 2.9	09-2261–01
Netherlands, 2009 1681 ND Zwaagdijk (Vintnor)	1 (dip) 1 (spray)	5.0	0.01 0.083	6000	leaf root	21 21	0.02 1.3	09-2261–02
Germany, 2009 Werdau (Desir)	1 (dip) 1 (spray)	5.0	0.0085 0.083	6000	leaf root	21 21	0.02 2.4	09-2261–03
France, 2009 Goyencourt (Hermes)	1 (dip) 1 (spray)	5.0	0.01 0.083	6000	leaf root	21 21	0.07 3.2	09-2261–03

[a] Insufficient sample size (slow growing leaves)

Pulses

Beans (dry)

Results from supervised trials from USA on dry, shelled beans were provided to the 2010 Meeting. In these trials, two applications of 0.24–0.26 kg ai/ha (SC 500 formulation) were applied to beans, 5–8 days apart as foliar sprays using knapsack or coke can sprayers with hand-held spray booms or tractor-mounted boom sprayers to apply 91–183 litres of spray mix/ha. Plot sizes in these trials ranged from 84–372 square metres. In each trial, one plot was last treated just before flowering (for sampling of forage) and a second plot was last treated after the end of flowering (for sampling of hay and seed). Hay and seeds from this second plot were allowed to dry to commercial dryness before sampling (0–18 days after cutting).

Duplicate samples of at least 1 kg seeds were taken from each plot, frozen within 2 hours of sampling, held in frozen storage for up to 694 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg and mean recovery rates ranged from 76–102% in samples spiked with 0.01–1.0 mg/kg fluopyram.

Table 33 Fluopyram residues in lima beans (dry) from supervised trials in USA involving two foliar applications (500 SC formulations)

BEANS (DRY) Country, year Location (variety)	Application				Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP: Canada		0.25				14	Max 0.5 kg ai/ha/season		7-14 day RTI
USA, 2006 Earlham, IA (Maverick Pinto Beans)	2	0.25 0.253	0.197 0.232	127 109	seeds, dry	14	0.012, 0.016	0.014	RAGMP069 GM325-06HA
USA, 2006 Springfield, NE (Pinto)	2	0.249 0.25	0.192 0.195	130 128	seeds, dry	13+1[(1)]	0.031, 0.022	0.027	RAGMP069 GM326-06HA
USA, 2006 Sabin, MN (Navigator)	2	0.257 0.25	0.161 0.147	160 170	seeds, dry	14	0.012, 0.0098	0.011	RAGMP069 GM327-06HA
USA, 2006 Velva, ND (Maverick)	2	0.251 0.249	0.209 0.204	120 122	seeds, dry	14	< 0.01, < 0.01	< 0.01	RAGMP069 GM328-06HA
USA, 2006 Levelland, TX (Vision)	2	0.249 0.249	0.179 0.179	139 139	seeds, dry	13	0.059, 0.076	0.068	RAGMP069 GM329-06HA 81% DM
USA, 2006 Jerome, ID (410 Pintos)	2	0.25 0.244	0.157 0.157	159 155	seeds, dry	14+17[a]	< 0.01, < 0.01	< 0.01	RAGMP069 GM330-06HA
USA, 2007 Fresno, CA (Lima Beans)	2	0.248 0.25	0.212 0.212	117 118	seeds, dry	0+14[a]	0.049, 0.055	0.052	RAGMP069 GM331–06HA
USA, 2006 Rupert, ID (Bill Z)	2	0.251 0.25	0.27 0.275	93 91	seeds, dry	14+10[a]	< 0.01, < 0.01	< 0.01	RAGMP069 GM332-06HA
USA, 2006 Seymour, IL (Sanilac navy beans)	2	0.25 0.252	0.137 0.138	182 183	seeds, dry	0 7 14 17 22	0.036, 0.041 0.015, 0.013 0.018, 0.011 0.0081, 0.011 0.024, 0.01	0.039 0.014 0.015 < 0.01 0.017	RAGMP069 GM324-06DA

Study RAGMP069 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 149]

[a] Drying interval between cutting and sampling

Peas (dry)

Results from supervised trials from USA on dry, shelled peas were provided to the 2010 Meeting. In these trials, two applications of 0.24–0.26 kg ai/ha (SC 500 formulation) were applied to peas, 5–7 days apart as foliar sprays using CO_2 plot or knapsack sprayers with hand-held spray booms or tractor-mounted boom sprayers to apply 115-190 litres of spray mix/ha. Plot sizes in these trials ranged from 24–74 square metres. In each trial, one plot (for vine and hay sampling) was last treated between flowering and when the first pods had reached their final length (BBCH 70) and a second plot (for seed sampling) was last treated between the end of flowering and early ripening (BBCH 80). Seeds from these second plots were allowed to dry to commercial dryness before sampling (0–6 days after cutting).

Duplicate samples of at least 1 kg seeds were taken from each plot, frozen within 4 hours of sampling, held in frozen storage for up to 624 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg and mean recovery rates ranged from 82–117% in samples spiked with 0.01–2.0 mg/kg fluopyram.

Table 34 Fluopyram residues in peas (dry) from supervised trials in USA involving two foliar applications (500 SC formulations)

PEAS (DRY) Country, year Location (variety)	Application				Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			values	Mean	
GAP: Canada		0.25				14	Max 0.5 kg ai/ha/season		7-14 day RTI
USA, 2006 Parkdale, OR (Green Arrow)	2	0.251 0.258	0.173 0.151	145 171	seeds, dry	14+6[a]	0.037, 0.03	0.033	RAGMP069 GM334-06HA
USA, 2006 Hermiston, OR (Majorettes)	2	0.25 0.244	0.134 0.13	186 188	seeds, dry	14	0.057, 0.06	0.058	RAGMP069 GM335-06HA
USA, 2006 Payette, ID (Austrian winter pea)	2	0.254 0.247	0.134 0.135	190 183	seeds, dry	14+5[a]	0.353, 0.345	0.35	RAGMP069 GM336-06HA 91% DM
USA, 2006 Madras, OR (Maples)	2	0.251 0.249	0.216 0.217	116 115	seeds, dry	14	0.106, 0.214	0.16	RAGMP069 GM337-06HA
USA, 2006 Ephrata, WA (Cruiser)	2	0.253 0.252	0.181 0.18	140 140	seeds, dry	0 7 14 18 24	0.032, 0.04 0.023, 0.037 0.044, 0.039 0.049, 0.03 0.033, 0.018	0.04 0.03 0.042 0.04 0.03	RAGMP069 GM333-06DA

Study RAGMP039 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 150]

[a] Drying interval between cutting and sampling

Soya bean (dry)

Results from supervised trials from USA on soya beans were provided to the 2015 JMPR. In these trials, fluopyram (SC formulation) was applied either as seed treatment to soya bean seeds, or as a seed treatment followed by two foliar applications to the plants. In the plots involving the combined seed plus foliar treatments, the seeds were slurry-treated with 0.25 mg ai/seed and the targeted seeding rate was about 544 000 seeds/ha (equivalent to 0.136 kg ai/ha). Actual seeding rates ranged from 257 000–642 000 seeds/ha. The foliar treatments (one application of 0.11–0.12 kg ai/ha applied about 21 days before harvest and the second treatment of 0.25–0.26 kg ai/ha applied 5–8 days later) were made using CO_2 plot or knapsack sprayers with hand-held spray booms or tractor-mounted boom sprayers to apply 90–190 litres of spray mix/ha. Plot sizes in these trials ranged from 46–370 square metres.

Duplicate samples of at least 1 kg seeds were taken from each plot, frozen within 4 hours of sampling, held in frozen storage for up to 585 days before analysis for fluopyram using LC/MS/MS

Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg and with an average fluopyram recovery rate of 93% in dry soya bean seeds spiked with 0.01–0.4 mg/kg.

Table 354 Fluopyram residues in in soya beans (dry) from supervised trials in USA involving seed treatment plus two foliar applications of fluopyram (SC formulations)

SOYA BEAN Country, Year Location (Variety)	Application			Matrix	DALA	Fluopyram Residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed (water/ha)			values	mean	
GAP: USA (seed and/or foliar/soil)		0.25 mg ai/seed 0.25			14	Max 0.25 kg ai/ha/season Max 0.5 kg ai/ha/season		7-10 day RTI
USA, 2012 Athens, GA (DP 4546 RR)	1+ 1 1	0.136 0.115 0.252	0.25 (156) (162)	seeds, dry	14	0.02, 0.024	0.022	RAGMY006 GM001–12HA
USA, 2012 Suffolk, VA (DP 4546 RR)	1+ 1 1	0.138 0.116 0.256	0.25 (113) (111)	seeds, dry	24	< 0.01, < 0.01	< 0.01	RAGMY006 GM002-12HA
USA, 2012 Fisk, MO (Pioneer 97B52)	1+ 1 1	0.136 0.115 0.25	0.25 (187) (187)	seeds, dry	14	< 0.01, < 0.01	< 0.01	RAGMY006 GM003-12HA
USA, 2012 Proctor, AR (Asgrow STB 4404)	1+ 1 1	0.136 0.114 0.251	0.25 (146) (146)	seeds, dry	13	0.06, 0.077	0.069	RAGMY006 GM004-12HA
USA, 2012 Cheneyville, LA (AG4403RR)	1+ 1 1	0.136 0.118 0.252	0.25 (167) (164)	seeds, dry	3 10 13 15 21	0.072, 0.087 0.25, 0.11 0.107, 0.189 0.153, 0.098 0.092, 0.085	0.08 0.18 0.15 0.126 0.089	RAGMY006 GM005-12DA
USA, 2012 Stewardson, IL (DP 5634 RR)	1+ 1 1	0.136 0.119 0.253	0.25 (139) (133)	seeds, dry	3 10 14 17 21	0.021, 0.018 0.049, 0.018 0.018, 0.017 0.019, 0.018 0.013, 0.019	0.02 0.034 0.018 0.019 0.016	RAGMY006 GM006-12DA
USA, 2012 Marysville, OH (Garst 2834RR)	1+ 1 1	0.064 0.115 0.255	0.25 (165) (164)	seeds, dry	14	< 0.01, < 0.01	< 0.01	RAGMY006 GM007-12HA
USA, 2012 Northwood, ND (Agripro 3212 RR/N)	1+ 1 1	0.09 0.116 0.25	0.25 (142) (140)	seeds, dry	14	< 0.01, < 0.01	< 0.01	RAGMY006 GM008-12HA
USA, 2012 Seymour, IL (NKs28 G1)	1+ 1 1	0.136 0.113 0.254	0.25 (94) (94)	seeds, dry	13	0.032 0.025	0.029	RAGMY006 GM009-12HA
	1+ 1	0.249 0.245	(93) (92)	seeds, dry	13	< 0.01, < 0.01	< 0.01	
USA, 2012 Gardner, KS (S2783-4)	1+ 1 1	0.131 0.114 0.253	0.25 (142) (145)	seeds, dry	12	0.015, 0.015	0.015	RAGMY006 GM010-12HA
USA, 2012 Clarence, MO (RG 200)	1+ 1 1	0.136 0.112 0.261	0.25 (175) (184)	seeds, dry	12	0.015, 0.014	0.015	RAGMY006 GM011–12HA
USA, 2012 Sheridan, IN (Sucrosco 935-01RNX	1+ 1 1	0.102 0.114 0.251	0.25 (179) (181)	seeds, dry	14	0.011, < 0.01	0.01	RAGMY006 GM012-12HA

SOYA BEAN Country, Year Location (Variety)	Application			Matrix	DALA	Fluopyram Residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed (water/ha)			values	mean	
USA, 2012 Campbell, MN (NSQ49-Q9)	1+ 1 1	0.161 0.114 0.251	0.25 (187) (187)	seeds, dry	13	0.083, 0.076	0.08	RAGMY006 GM013-12HA
USA, 2012 Richland, IA (NK S49-Q9)	1+ 1 1	0.136 0.115 0.249	0.25 (163) (171)	seeds, dry	14	< 0.01, < 0.01	< 0.01	RAGMY006 GM014-12HA
USA, 2012 Gardner, ND (DP 4546 RR)	1+ 1 1	0.142 0.116 0.256	0.25 (142) (144)	seeds, dry	13	0.049, 0.057	0.053	RAGMY006 GM015-12HB
USA, 2012 Geneva, MN (Hutchinson)	1+ 1 1	0.134 0.116 0.248	0.25 (172) (183)	seeds, dry	14	0.022, 0.03	0.026	RAGMY006 GM016-12HA
USA, 2006 Springfield, NE (RT3253)	1+ 1 1	0.14 0.115 0.252	0.25 (131) (131)	seeds, dry	12	0.024, 0.032	0.028	RAGMY006 GM017-12HA
USA, 2012 Verona, WI (Pioneer 91M90)	1+ 1 1	0.133 0.116 0.254	0.25 (174) (171)	seeds, dry	14	0.122, 0.132	0.13	RAGMY006 GM018-12HA
USA, 2012 Stafford, KS (Pioneer 93B82)	1+ 1 1	0.136 0.114 0.25	0.25 (173) (172)	seeds, dry	14	0.242, 0.179	0.21	RAGMY006 GM019-12HA
USA, 2012 Delavan, WI (SC 9384RR)	1+ 1 1	0.136 0.114 0.25	0.25 (173) (172)	seeds, dry	14	< 0.01, 0.013	0.012	RAGMY006 GM020-12HA
USA, 2012 Conklin, MI (91M91)	1+ 1 1	0.132 0.114 0.25	0.25 (148) (149)	seeds, dry	14	< 0.01, < 0.01	< 0.01	RAGMY006 GM021–12HA

Study RAGMY006 was also provided to the 2015 JMPR [2015 JMPR Fluopyram Evaluation - Tables 9 & 10]

Root and tuber vegetables

Potatoes

Results from supervised trials from USA on potatoes, where separate plots were treated with either two overhead sprinkler (chemigation) treatments (12–14 days apart, 500 SC formulations), two foliar applications (3–5 days apart, 500 SC formulations) or a combination of one in-furrow treatment (400 SC formulations) at planting followed by a single foliar application close to harvest. Non-ionic surfactants were added to the foliar and chemigation treatments. Plot sizes were at least 23 square metres and the in-furrow and foliar treatments were applied by hand-held or tractor-mounted sprayers with 2–8 nozzle booms.

Duplicate samples were taken from each plot, frozen within 4 hours of sampling, held in frozen storage for up to 256 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01 with a reported LOQ of 0.01 mg/kg and recovery rates of 98–102% in samples spiked with 0.01–2.0 mg/kg fluopyram.

Table 36 Fluopyram residues in potato tubers from supervised outdoor trials in USA involving one in-furrow application at planting (400 SC formulations) and one foliar application (500 SC formulations of fluopyram

POTATO Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA (soil and/or foliar)		0.25 (soil at planting 0.25 (foliar)			7	Max 0.5 kg ai/ha/season		5-7 day RTI
USA, 2012 Alton, NY (Superior)	1+ 1	0.251 0.256	0.534 0.137	47 187	7	< 0.01, < 0.01	< 0.01	RAGML207 GM047-12HA
USA, 2012 North Rose, NY (Keuka Gold)	1+ 1	0.248 0.252	0.670 0.150	37 168	7	0.032, 0.028	0.03	RAGML207 GM048-12HA
USA, 2012 Seven Springs, NC	1+ 1	0.249 0.251	0.593 0.159	42 158	7	0.039, 0.038	0.039	RAGML207 GM049-12HA
USA, 2012 Oveido, FL	1+ 1	0.251 0.237	0.534 0.140	47 169	7	0.054, 0.037	0.046	RAGML207 GM050-12HA
USA, 2012 Verona, WI (Superior)	1+ 1	0.250 0.253	0.568 0.145	44 174	7	0.017, 0.014	0.016	RAGML207 GM051–12HA
USA, 2012 Richland, ID (Yukon Gold)	1+ 1	0.249 0.251	0.566 0.160	44 157	7	0.05, 0.083	0.069	RAGML207 GM052-12HA
USA, 2012 Lexana, KS (Kennebec)	1+ 1	0.259 0.259	0.762 0.173	34 150	7	0.02, 0.015	0.018	RAGML207 GM053-12HA
USA, 2012 Delavan, WI (Kennebec)	1+ 1	0.253 0.252	0.588 0.144	43 175	0 3 7 14 21	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGML207 GM054-12DA
USA, 2012 Jerome, ID (Pontiac)	1+ 1	0.247 0.251	0.574 0.149	43 169	7	0.033, 0.028	0.031	RAGML207 GM055-12HA Plant 17/05/12 Jerome county sandy loam
USA, 2012 Newell, CA (Russett)	1+ 1	0.257 0.248	0.918 0.177	28 140	7	< 0.01, < 0.01	< 0.01	RAGML207 GM056-12HA
USA, 2012 Blaine county, Rupert, ID (Western Russett)	1+ 1	0.255 0.248	0.622 0.146	41 170	7	< 0.01, < 0.01	< 0.01	RAGML207 GM057-12HA
USA, 2012 Ephrata, WA (Russett Burbank)	1+ 1	0.253 0.252	0.527 0.180	48 140	7	0.01, 0.016	0.013	RAGML207 GM058-12HA Plant 24/04/12 Grant county sandy loam
USA, 2012 Ephrata, WA (Russett Norkota)	1+ 1	0.251 0.253	0.584 0.181	43 140	7	0.066, 0.045	0.056	RAGML207 GM059-12HA Plant 25/04/12 Grant county Loamy sand
USA, 2012 Minedoka county, Rupert, ID (Russett Norkotah)	1+ 1	0.251 0.249	0.598 0.164	42 152	7	0.038, 0.01	0.024	RAGML207 GM060-12HA
USA, 2012 Payette, ID (Norkotah)	1+ 1	0.239 0.255	0.598 0.147	40 173	7	0.017, 0.016	0.017	RAGML207 GM061–12HA
USA, 2012 Jerome, ID (Russett)	1+ 1	0.248 0.253	0.577 0.152	43 166	0 3 7 14 21	< 0.01, < 0.01 < 0.01, 0.011 < 0.01, 0.013 0.01, < 0.01 < 0.01, < 0.01	< 0.01 0.011 0.012 0.010 < 0.01	RAGML207 GM062-12HA Plant 30/04/12 Jerome county sandy loam

Table 37 Fluopyram residues in potato tubers from supervised outdoor trials in USA involving two chemigation (overhead sprinkler) applications of fluopyram (500 SC formulations)

POTATO Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA (soil and/or foliar)		0.25 (soil at planting 0.25 (foliar)			7	Max 0.5 kg ai/ha/season		5-7 day RTI
USA, 2012 Alton, NY (Superior)	2	0.254 0.254	0.00011 0.00011	226350 226350	21	< 0.01, < 0.01	< 0.01	RAGML207 GM047-12HA
USA, 2012 North Rose, NY (Keuka Gold)	2	0.251 0.251	0.00019 0.00019	135547 135547	21	< 0.01, < 0.01	< 0.01	RAGML207 GM048-12HA
USA, 2012 Seven Springs, NC	2	0.252 0.251	0.00020 0.00020	127324 127324	21	< 0.01, < 0.01	< 0.01	RAGML207 GM049-12HA
USA, 2012 Oveido, FL	2	0.247 0.247	0.00020 0.00020	121107 121107	21	0.021, 0.018	0.02	RAGML207 GM050-12HA
USA, 2012 Verona, WI (Superior)	2	0.249 0.248	0.00014 0.00014	177026 173000	20	< 0.01, < 0.01	< 0.01	RAGML207 GM051–12HA
USA, 2012 Richland, ID (Yukon Gold)	2	0.251 0.251	0.00009 0.00009	264221 264216	21	0.012, 0.01	0.011	RAGML207 GM052-12HA
USA, 2012 Lexana, KS (Kennebec)	2	0.250 0.250	0.00010 0.00020	252606 126306	7	< 0.01, < 0.01	< 0.01	RAGML207 GM053-12HA
USA, 2012 Delavan, WI (Kennebec)	2	0.252 0.252	0.00016 0.00016	159149 159149	0 7 14 21 28 35	< 0.01, 0.011 0.011, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 0.011, < 0.01 0.01, < 0.01	0.011 0.011 < 0.01 < 0.01 0.011 0.011	RAGML207 GM054-12DA
USA, 2012 Jerome, ID (Pontiac)	2	0.254 0.254	0.00020 0.00020	126265 126265	21	< 0.01, < 0.01	< 0.01	RAGML207 GM055-12HA Plant 17/05/12 Jerome county sandy loam
USA, 2012 Newell, CA (Russett)	2	0.251 0.251	0.00013 0.00013	187060 187060	21	< 0.01, < 0.01	< 0.01	RAGML207 GM056-12HA
USA, 2012 Blaine county, Rupert, ID (Western Russett)	2	0.249 0.247	0.00015 0.00015	167898 167893	21	< 0.01, < 0.01	< 0.01	RAGML207 GM057-12HA
USA, 2012 Ephrata, WA (Russett Burbank)	2	0.248 0.254	0.00015 0.00015	170171 170171	21	0.015, 0.017	0.016	RAGML207 GM058-12HA Plant 24/04/12 Grant county sandy loam
USA, 2012 Ephrata, WA (Russett Norkota)	2	0.249 0.249	0.00011 0.00011	227736 227764	21	0.01, < 0.01	0.01	RAGML207 GM059-12HA Plant 25/04/12 Grant county Loamy sand
USA, 2012 Minedoka county, Rupert, ID (Russett Norkotah)	2	0.243 0.247	0.00015 0.00015	164283 167898	7	< 0.01, < 0.01	< 0.01	RAGML207 GM060-12HA
USA, 2012 Payette, ID (Norkotah)	2	0.247 0.247	0.00013 0.00013	186765 186765	7	< 0.01, < 0.01	< 0.01	RAGML207 GM061–12HA
USA, 2012 Jerome, ID (Russett)	2	0.254 0.254	0.00020 0.00020	126753 126753	0 7 14 21 28 35	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGML207 GM062-12HA Plant 30/04/12 Jerome county sandy loam

Stalk and stem vegetables

Artichoke, Globe

Results from supervised trials from Europe on Globe artichokes were provided to the 2010 JMPR and more recent trials conducted in Italy and Spain were also provided to the meeting. In these trials, 3 applications of fluopyram (SC 500) were applied 6–7 days apart as foliar sprays using knapsack sprayers with single solid or hollow-cone nozzles or mini-booms (3–6 flat-fan or solid cone nozzles), applying 500-1000 litres spray mix/ha. Plot sizes in these trials ranged from 78–360 square metres.

Unreplicated flowerhead samples of 12–24 heads were taken from each plot, frozen within 24 hours of sampling and stored at -18 °C or below for up to 384 days before analysis for fluopyram and its BZM, PAA and PCA metabolites using LC/MS/MS Method 00984 with a reported LOQ of 0.01 mg/kg and mean recovery rates of 82–101% in samples spiked with 0.01–1.0 mg/kg fluopyram.

Table 385 Residues in Globe artichokes from supervised field trials in France, Germany, Italy, Netherlands, Spain and United Kingdom, involving 3 foliar applications of fluopyram (500 SC formulation)

ARTICHOKE, GLOBE Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			
GAP: Greece	3		0.075	1000	7		14 day RTI
Italy, 2006 Stornarella (Violetto di Provenza)	3	0.1	0.01	1000	-0 0 4 7 15	0.1 0.44 0.3 <u>0.18</u> 0.08	RA-2602/06 0389-06
Spain, 2006 Albuixech (Blanca de Tudela)	3	0.1	0.01	1000	-0 0 3 7 14	0.15 0.43 0.23 <u>0.16</u> 0.07	RA-2602/06 0619-06
Spain, 2007 Albuixech (Blanca de Tudela)	3	0.1	0.01	1000	-0 0 3 7 14	0.2 0.47 0.32 <u>0.21</u> 0.1	RA-2516/07 0060-07
Italy, 2006 Cerignola (Violetto di Provenza)	3	0.1	0.0125	800	-0 0 3 7 14	0.15 0.35 0.14 <u>0.05</u> 0.02	RA-2516/07 0575-07
Italy, 2011 95406 Palagonia (Spinoso)	3	0.075	0.009	800	-0 0 3 7 10 14	0.11 0.24 0.16 <u>0.1</u> 0.076 0.038	11–2008 11–2008-01
Spain, 2011 46135 Valencia (Blanca de Tudela)	3	0.075	0.015	500	-0 0 3 7 11 14	0.21 0.37 0.23 <u>0.15</u> 0.043 0.031	11–2008 11–2008-02
Italy, 2008 71042 Cerignola (Violetto di provenza)	3	0.1	0.01	1000	-0 0 7	0.13 0.4 <u>0.09</u>	08-2074 08-2074-01
Spain, 2008 46550 Valenciana (Blanca de Tudela)	3	0.1	0.01	1000	-0 0 7	0.22 1.27 <u>0.29</u>	08-2074 08-2074-02

Studies RA-2516 and RA-2602 were also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 161]

Cereals

Barley

Results from supervised trials in Europe, involving foliar applications of fluopyram to barley were provided to the Meeting. In these trials, single applications of fluopyram (SC or EC formulations) were applied at either BBCH 30–31 (early stem elongation) or BBCH 61 (start of flowering) using knapsack or tractor-mounted boom sprayers with 3–10 flat-fan or hollow-cone nozzles, applying 280–400 litres spray mix/ha. Plot sizes in these trials ranged from 24–144 square metres.

Unreplicated samples of forage (min 0.5 kg fresh weight) were taken 0–28 days after application and samples of mature grain (min 1.1 kg) and straw (min 0.55 kg) were taken at harvest, with all samples being frozen within 24 hours and stored frozen for up to 438 days (forage), 448 days (grain) and 394 days (straw) before analysis for fluopyram (and its BZM metabolite in most trials) using LC/MS/MS Method 00984 with a reported LOQ of 0.01 mg/kg and mean recovery rates of 95–101% in forage and straw samples spiked with 0.01–15 mg/kg fluopyram and 95-105% in grain samples spiked with 0.01–0.8 mg/kg fluopyram.

Table 39 Fluopyram residues in barley grain from supervised trials in Europe involving one foliar application of fluopyram (EC or SE formulations)

BARLEY Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	form	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
GAP, Estonia		0.078		30-61				
France (N), 2012 Chaussy (Volume)	EC	0.078	300	61	64	grain	0.015	12-2130 12-2130-01 winter barley sown Oct 2011, silt soil
Belgium, 2012 Marbais (Quench)	EC	0.078	250	61	47	grain	0.025	12-2130 12-2130-02 spring barley sown Mar 2012 clay-silt soil
Germany, 2012 Burscheid (Simba)	EC	0.078	300	61	69	grain	< 0.01	12-2130 12-2130-04 sown Mar 2012 sandy loam spring barley
France (S), 2012 Bouloc (Queen)	EC	0.078	300	61	49	grain	0.012	12-2132 12-2132-01 winter barley
France (S), 2012 Pouant (Cervoise)	EC	0.078	300	61	57	grain	< 0.01	12-2132 12-2132-02 winter barley
Spain, 2012 Salitja (Gomera)	EC	0.073	282	61	42	grain	0.028	12-2132 12-2132-03 winter barley
Spain, 2012 Marata (Graphic)	EC	0.078	300	61	42	grain	0.034	12-2132 12-2132-04 spring barley

BARLEY Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	form	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
Italy, 2012 Tarquinia (Distich)	EC	0.078	300	61	56	grain	0.079	12-2132 12-2132-05 Dec sowing
Portugal, 2012 Mecca Alenquer (Cevada)	EC	0.078	400	61	55	grain	< 0.01	12-2132 12-2132-07 Jan sowing
Greece, 2012 Kilkis (Lutes)	EC	0.078	300	65	35	grain	0.11	12-2132 12-2132-08 Dec sowing
Italy, 2013 Civitavecchia (Quench)	EC	0.078	300	61	53	grain	0.017	13-2004 13-2004-01 Jan sowing
France (N), 2012 Chaussy (95710) (Volume)	SE	0.125	300	61	64	grain	0.018	12-2163 12-2163-01 sown 2011 Oct silt soil winter barley
Germany, 2012 Langforden (Meridian)	SE	0.125	300	61	62	grain	0.025	12-2163 12-2163-02 winter barley
Netherlands, 2012 Slootdorp (Winter Malt)	SE	0.125	300	61	54	grain	0.027	12-2163 12-2163-03 winter barley
Netherlands, 2012 St Annaparochie (Winter Malt)	SE	0.125	300	61	56	grain	0.014	12-2163 12-2163-04 winter barley
France (N), 2012 Chambourg sur Indre (Sebastien)	SE	0.125	300	61	53	grain	0.018	12-2163 12-2163-05 spring barley
Belgium, 2012 Marbais (Quench)	SE	0.125	200	61	47	grain	0.026	12-2163 12-2163-06 sown Mar 2012 silt soil spring barley
UK, 2012 Little Shelford farm (Simba)	SE	0.125	200	61	46	grain	0.033	12-2163 12-2163-07 spring barley
Germany, 2012 Burscheid (Simba)	SE	0.125	300	61	69	grain	0.016	12-2163 12-2163-08 sown Mar 2012 sandy loam spring barley

Maize & Sweetcorn

Results from supervised trials from USA on maize and sweetcorn were provided to the 2010 Meeting. In these trials, two applications of 0.243–0.267 kg ai/ha (SC 500 formulation) were applied to maize and sweet corn, 5–8 days apart as foliar sprays using knapsack sprayers with hand-held spray booms

or tractor-mounted boom sprayers to apply 111–187 litres of spray mix/ha. Plot sizes in these trials ranged from 37–297 square metres.

In each maize trial, one plot was last treated over the early ripening stages (BBCH 85–87) for sampling of forage and a second plot was last treated when the kernels were at the mature to fully ripe stage (BBCH 87–89) for sampling of kernels and fodder (i.e. leaves, stalks, husks and cobs after removal of the kernels).

Cobs (without husks) and forage (including husks) were sampled from sweetcorn and some field corn trials last treated when the kernels were at the milky stage (BBCH 75–79).

Duplicate samples of at least 1 kg cobs, grain and forage and at least 0.5 kg fodder (stover) were taken from each plot, frozen within 4 hours of sampling, held in frozen storage for up to 340 days (grain), 435 days (cobs), 409 days (forage) and 366 days (fodder) before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg (kernels, cobs, forage and fodder. All residues were reported on a fresh weight basis.

Table 40 Fluopyram residues in maize kernels from supervised trials in USA involving two foliar applications (500 SC formulations)

MAIZE Country, year Location (variety)	Application			DALA	Fluopyram residues (mg/kg fresh weight)			Reference & Comments
	kg ai/ha	water (L/ha)	GS (BBCH)		matrix	values	mean	
GAP: USA	0.25			14		Max 0.5 kg ai/ha/season		14 day RTI
USA, 2006 Germansville, PA (TA5750) Corn , Field	0.262 0.258	187 184	87 89	14 14	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM043-06HA
USA, 2006 Tifton, GA (31N26) Corn , Field	0.25 0.25	141 138	85 87	13 13	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM044-06HA
USA, 2006 New Holland, OH (Crows 7R154) Corn , Field	0.257 0.25	151 147	87 87	14 14	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM046-06HA
USA, 2006 New Holland, OH (NK-N69-P9) Corn , Field	0.25 0.256	147 150	87 87	14 14	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM056-06HA
USA, 2006 Richland, IA (9190 LL HX) Corn , Field	0.247 0.251	118 183	87 87	13 13	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM047-06HA
USA, 2006 Stilwell, KS (Garst 8287 RR) Corn , Field	0.248 0.253	133 136	85 87	14 14	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM048-06HA
USA, 2006 Sabin, MN (Pioneer 39H85) Corn , Field	0.259 0.251	174 183	85 85	14 14	kernels	0.016, 0.02	0.018	RAGMP038 GM051–06HA

MAIZE Country, year Location (variety)	Application			DALA	Fluopyram residues (mg/kg fresh weight)			Reference & Comments
	kg ai/ha	water (L/ha)	GS (BBCH)		matrix	values	mean	
USA, 2006 Earlham, IA (35P17 LL) Corn , Field	0.245 0.249	111 116	85 85	12 12	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM052-06HA
USA, 2006 Springfield, NE (NK38B4) Corn , Field	0.25 0.251	130 131	87 87	11	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM053-06HA
USA, 2006 Percival, IA (NK 65C5) Corn , Field	0.249 0.251	130 129	87 87	12 12	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM054-06HA
USA, 2006 Gardner, KS (Garst 8881 RR) Corn , Field	0.244 0.248	131 132	85 87	14 14	kernels	0.011, < 0.01	< 0.01	RAGMP038 GM055-06HA
USA, 2006 Arkansaw, WI (38B85) Corn , Field	0.253 0.256	177 179	87 87	14 14	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM057-06HA
USA, 2006 Uvalde, TX (Pioneer 32R25) Corn , Field	0.245 0.248	164 171	89 89	12 12	kernels	< 0.01, < 0.01	< 0.01	RAGMP038 GM058-06HA
USA, 2006 Seymour, IL (Garst 8568 CB/LL) Corn , Field	0.252 0.257	173 174	87 89	0 6 13 19 26	kernels	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGMP038 GM049-06DA
USA, 2006 York, NE (NK N70-F1 LL/YG) Corn , Field	0.248 0.244	185 187	87 87	1 8 12 21 26	kernels	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGMP038 GM050-06DA

Study RAGMP038 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 171]

Results from supervised trials in Europe, involving foliar applications of fluopyram to maize were provided to the Meeting. In these trials, two applications of fluopyram (SE formulations) were applied 11–16 days apart, up to BBCH 69 end of flowering) using knapsack or tractor-mounted boom sprayers with 3-10 flat-fan or hollow-cone nozzles, applying 250–400 litres spray mix/ha. Plot sizes in these trials ranged from 36–120 square metres.

Unreplicated samples (min 1 kg) of forage (taken 0-51 days after the last application), immature kernels and cobs-without-husks (taken at the sweet corn milk stage) and mature kernels and stover (taken at harvest) were frozen within 24 hours and stored frozen for up to 393 days (cobs and kernels), 413 days (forage) and 344 days (stover). Analysis for fluopyram (and its BZM metabolite) was conducted using LC/MS/MS Method 00984 with a reported LOQ of 0.01 mg/kg and mean recovery rates of 92–106% in immature and mature kernels and in cobs (without husks) spiked with 0.01–0.1 mg/kg fluopyram and 93–99% in forage and stover samples spiked with 0.01–3.0 mg/kg fluopyram.

Table 416 Fluopyram residues in maize kernels (immature and mature) and cobs-without husks, from supervised trials in Europe involving two foliar application of fluopyram (SE formulations)

MAIZE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
GAP, Hungary	2	0.125		33-69	14			
France (N), 2011 Chambourg sur Indre (Cobalt)	2	0.13	300	69	20 20 40 82	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	11–2109 11–2109-01
Germany, 2011 Leverkusen (Saludo)	2	0.13	300	69	31 31 51 65	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	11–2109 11–2109-02
UK, 2011 Cambridge (Cougar)	2	0.13	250	69	31 31 49 60	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	11–2109 11–2109-03
Belgium, 2011 Villers-Perwin (Delitop)	2	0.13	275	67	29 29 42 64	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	11–2109 11–2109-04
Italy, 2011 Bologna (Constanza)	2	0.13	400	67	17 17 29 62	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	11–2110 11–2110-02
Spain, 2011 Vila-sacra (DKC6667YG)	2	0.13	300	71	20 69	cob without husk kernel	< 0.01 < 0.01	11–2110 11–2110-03
Greece, 2011 Pieria (Dekalp, 5276)	2	0.13	400	69	18 18 31 48	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	11–2110 11–2110-04
France (S), 2011 Calmont (PR 33 A46)	2	0.13	300	69	14 14 29 64	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	11–2110 11–2110-05
Germany, 2012 Langforden ot Repke (Ricardinio)	2	0.125	300	69	10 10 35 72	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	12-2006 12-2006-01
France (N), 2012 Chambourg sur Indre (Nk Cobalt)	2	0.125	300	69	20 20 35 55	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	12-2006 12-2006-02

MAIZE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
Germany, 2012 Leverkusen (Clemente)	2	0.125	300	69	8 8 22 41	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	12-2006 12-2006-03
Netherlands, 2012 Walingsweg (LG30224)	2	0.125	400	71	15 15 36 57	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	12-2006 12-2006-04
France (S), 2012 Le Burgaud (Dkc 5190)	2	0.125	300	65	22 22 49 78	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	12-2007 12-2007-01
Spain, 2012 Vili-sacra (DeKalb6667)	2	0.125	300	69	9 9 22 56	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	12-2007 12-2007-02
Italy, 2012 Bologna (PR33M15)	2	0.125	400	69	15 15 23 45	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	12-2007 12-2007-03
Portugal, 2012 Golega (N 43)	2	0.125	300	69	20 20 38 60	kernel, immature cob without husk cob without husk kernel	< 0.01 < 0.01 < 0.01 < 0.01	12-2007 12-2007-04

Rice

Results from supervised trials in Thailand and Vietnam, involving foliar applications of fluopyram to paddy rice were provided to the Meeting. In the Thailand trials, two applications of fluopyram (SC formulations) were applied 7–12 days apart, up to BBCH 57–65, using motorised knapsack sprayers with single hollow cone nozzles, applying 250–480 litres spray mix/ha. Plot sizes in these trials were 100 square metres.

Unreplicated samples of plants without roots, panicles, straw (min 0.5 kg), grain (min 0.62 kg) and husk (min 0.3 kg) were taken at intervals up to harvest, frozen within 24 hours and stored frozen for up to 334 days (plants), 290 days (grain), 226 days (husk), 298 days (straw) and 313 days (panicles).

Analysis for fluopyram (and five metabolites) was conducted using LC/MS/MS Method 00984 with a reported LOQ of 0.01 mg/kg for each analyte and mean recovery rates of 81–110% in all spiked samples (0.01–0.1 mg/kg spike levels in grain and up to 50 mg/kg in husks, plants and straw).

Table 427 Fluopyram residues in rice grain from supervised trials on paddy rice in Thailand and Vietnam involving two foliar application of fluopyram (SC formulations)

RICE Country, year Location (variety)	Application			DALA	Residues (mg/kg)						Reference & Comments
	kg ai/ha	kg ai/100L	water (L/ha)		matrix	parent	BZM	PCA	PAA	7-OH	
GAP: Thailand	2 sprays	0.024	-	Up to BBCH 59							
Thailand, 2012 Suphan Buri (Pathumthani 1)	0.05	0.02	250	30	husked grain	0.15	0.01	< 0.01	< 0.01	< 0.01	RAGMN023 FR12THAR50 SC33
Thailand, 2012 Nakhon Sawan (Pathumthani 1)	0.05	0.02	250	30	husked grain	0.39	0.03	< 0.01	< 0.01	< 0.01	RAGMN023 FR12THAR50 SP15
Thailand, 2012 Nakhon Sawan (Pathumthani 1)	0.05	0.02	250	30	husked grain	0.03	< 0.01	< 0.01	< 0.01	< 0.01	RAGMN023 FR12THAR50 WP23
Thailand, 2015 Makhamlom Bangplana (RD 41)	0.11	0.027	410	32	grain	0.7	0.026	< 0.01	< 0.01	< 0.01	RAGMP189 A-HA
Thailand, 2015 Samchouk (Pathumthani 1)	0.11 0.11	0.025 0.026	439 426	31	grain	0.3	0.034	< 0.01	< 0.01	< 0.01	RAGMP189 B-HA
Thailand, 2016 Amphoe Mueang (RD 57)	0.11	0.024	460	31	grain	0.9	0.055	< 0.01	< 0.01	0.023	RAGMP189 C-HA
Thailand, 2016 Amphoe Sai Noi (RD 35)	0.11 0.11	0.023 0.024	483 467	31	grain	0.34	0.027	< 0.01	< 0.01	< 0.01	RAGMP189 D-HA
Thailand, 2015 Kamphaeng Saen (RD 41)	0.11 0.11	0.026 0.024	418 462	31 34	grain	0.53 0.56	0.039 0.045	< 0.01 < 0.01	< 0.01 < 0.01	0.013 0.015	RAGMP189 E-DA
Thailand, 2016 Kamphaeng Saen, (Pathumthani 1)	0.11 0.11	0.023 0.025	471 447	30 33	grain	0.63 0.67	0.034 0.036	< 0.01 < 0.01	< 0.01 < 0.01	0.017 0.017	RAGMP189 F-DA
Vietnam, 2016 Tan Lap Village (OM 6976)	0.11 0.11	0.025 0.024	440 450	28	grain	0.35	0.025	< 0.01	< 0.01	0.016	RAGMP189 G-HA
Vietnam, 2016 Binh Nhi Village (OM 5451)	0.11 0.11	0.023 0.024	485 450	31 33	grain	2.1 2.7	0.1 0.099	< 0.01 < 0.01	< 0.01 < 0.01	0.05 0.054	RAGMP189 H-DA
Thailand, 2015-2016 (RD41)	0.33 0.35	0.080 0.074	417 473	31	grain	2.1	0.12	0.01	< 0.01	0.039	RAGMN175 A-PA
Thailand, 2016 (Pathumthani 1)	0.33	0.073	460	030	grain	2.1	< 0.01	< 0.01	< 0.01	0.048	RAGMN175 B-PA

Metabolite residues reported as fluopyram equivalents.

Residues of fluopyram-methyl sulfoxide metabolite all <LOQ in all samples.

Wheat

Results from supervised trials from USA on wheat were provided to the 2010 JMPR. In these trials, two applications of 0.24–0.26 kg ai/ha (SC 500 formulation) were applied to wheat, 12–17 days apart as foliar sprays using knapsack sprayers with hand-held spray booms or tractor-mounted boom sprayers to apply 93–189 litres of spray mix/ha. Plot sizes in these trials ranged from 50–230 square metres. In each trial, one plot was last treated over the tillering period (up to BBCH 41) for sampling of forage, a second plot was last treated before the start of grain ripening (up to BBCH 83) for sampling of hay and a third plot was last treated over the grain ripening period (up to BBCH 89) for sampling of grain and straw. Hay from the second plots was allowed to dry to commercial dryness before sampling (0–9 days after cutting).

Duplicate samples of at least 1 kg forage and grain and at least 0.5 kg hay and straw were taken from each plot, frozen within 2 hours of sampling, held in frozen storage for up to 374 days (grain), 388 days (forage), 340 days (hay) and 391 days (straw) before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg (forage, hay, grain) and 0.1 mg/kg (straw).

Table 438 Fluopyram residues in wheat grain from supervised trials in USA involving foliar applications (500 SC formulations)

WHEAT Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)			Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix	values	mean	
GAP: USA		0.25			14		Max 0.5 kg ai/ha/season		14 day RTI
USA, 2007 Sufflok, VA (Pioneer 26R24) Wheat, Winter	2	0.254 0.252	121 123	83 87	14 14	grain	0.21, 0.21	0.021	RAGMP064 GM238-06HA
USA, 2007 Proctor, AR (Delta King 9410) Wheat, Winter	2	0.251 0.249	132 133	87 89	13 13	grain	0.68, 0.76	0.72	RAGMP064 GM239-06HA
USA, 2007 Richland, IA (Variety Unknown) Wheat, Winter	2	0.249 0.243	152 144	61 75	13 13	grain	0.2, 0.11	0.15	RAGMP064 GM241–06HB
USA, 2007 Carlyle, IL (BT-Branson) Wheat, Winter	2	0.252 0.247	119 109	77 85	14 14	grain	0.31, 0.29	0.3	RAGMP064 GM242-06HA
USA, 2007 East Bernard, TX (Fannin) Wheat, Winter	2	0.249 0.256	97 98	83 87	12 12	grain	0.19, 0.15	0.17	RAGMP064 GM243-06HA
USA, 2007 Grand Island, NE (Wahoo HRW Wheat) Wheat, Winter	2	0.26 0.25	140 189	73 77	14 14	grain	0.13, 0.13	0.13	RAGMP064 GM244-06HA
USA, 2006 New Rockford, ND (Alsen) Wheat, Spring	2	0.248 0.249	138 138	83 87	14 14	grain	0.26, 0.24	0.25	RAGMP064 GM245-06HA

WHEAT Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)			Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix	values	mean	
USA, 2006 Eldridge, ND (Knudson) Wheat, Spring	2	0.248 0.252	137 144	73 83	13 13	grain	0.23, 0.22	0.22	RAGMP064 GM246-06HA
USA, 2006 Velva, ND (Alsen) Wheat, Spring	2	0.251 0.252	122 121	75 85	15 15	grain	0.16, 0.14	0.15	RAGMP064 GM247-06HA
USA, 2007 Larned, KS (Jagalene) Wheat, Winter	2	0.245 0.262	172 172	71 85	13 13	grain	0.14, 0.12	0.13	RAGMP064 GM248-06HA
USA, 2007 Belpre, KS (Overley) Wheat, Winter	2	0.251 0.252	175 173	73 85	13 13	grain	0.037, 0.038	0.038	RAGMP064 GM249-06HA
USA, 2008 Plainview, TX (Dumas) Wheat, Winter	2	0.246 0.253	155 161	69 87	14 14	grain	0.19, 0.19	0.19	RAGMP064 GM250-06HB
USA, 2007 Plainview, TX (TAM 111) Wheat, Winter	2	0.248 0.256	181 187	73 87	14 14	grain	0.19, 0.19	0.19	RAGMP064 GM251–06HA
USA, 2006 Ephrata, WA (Sunstar 50-30) Wheat, Spring	2	0.249 0.252	140 141	85 87	14 14	grain	0.2, 0.19	0.19	RAGMP064 GM252-06HA
USA, 2006 Sabin, MN	2	0.261 0.253	156 179	85 89	0 7 14 21 28	grain	0.35, 0.33 0.19, 0.2 0.22, 0.23 0.23, 0.26 0.24, 0.25	0.34 0.19 0.22 0.24 0.24	RAGMP064 GM240-06DA

Study RAGMP064 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 166]

Results from supervised trials in Europe, involving foliar applications of fluopyram to wheat were provided to the Meeting. In these trials, one or two applications (13–27 days apart) of fluopyram (SC or EC formulations) were applied up to BBCH 61 (start of flowering) using knapsack or tractor-mounted boom sprayers with 3–10 flat-fan or hollow-cone nozzles, applying 250–400 litres spray mix/ha. Plot sizes in these trials ranged from 36–120 square metres.

Unreplicated samples of forage (min 2 kg fresh weight) were taken 0–28 days after application and samples of mature grain (min 1 kg) and straw (min 0.55 kg) were taken at harvest, with all samples being frozen within 24 hours and stored frozen for up to 464 days (forage), 404 days (grain) and 413 days (straw) before analysis for fluopyram (and its BZM metabolite) using LC/MS/MS Method 00984 with a reported LOQ of 0.01 mg/kg and mean recovery rates of 92–100% in forage and straw samples spiked with 0.01–5 mg/kg fluopyram and 97–101% in grain samples spiked with 0.01–0.8 mg/kg fluopyram.

Table 449 Fluopyram residues in wheat grain from supervised trials in Europe involving one or two foliar application of fluopyram (EC or SE formulations)

WHEAT Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
GAP: Estonia Spring wheat	2	0.098		30-61				14 day RTI
GAP, Estonia Winter wheat	1	0.098		30-61				
France (N), 2012 Chaucy (Altigo)	2	0.0975	300	61	58	grain	0.012	12-2131 12-2131–01 winter wheat
UK, 2012 Little Shelford (Tybalt)	2	0.0975	200	61	64	grain	< 0.01	12-2131 12-2131–02 winter wheat
Belgium, 2012 Vieille maison (Ketchum)	1+ 1	0.0975 0.104	250 267	61	51	grain	< 0.01	12-2131 12-2131–03 winter wheat
Germany, 2012 Burscheid (Thasos)	2	0.0975	300	61	56	grain	< 0.01	12-2131 12-2131–04 winter wheat
France (N), 2012 Chaucy (Altigo)	2	0.125	300	61	58	grain	00.014	12-2164 12-2164-01 winter wheat
Germany, 2012 Werl- Niederbergstraube (Akteur)	2	0.125	300	61	59	grain	< 0.01	12-2164 12-2164-02 winter wheat
Netherlands, 2012 Slootdorp (Tuareg)	2	0.125	300	61	53	grain	0.01	12-2164 12-2164-03 winter wheat
Netherlands, 2012 St Jacobieparochie (Tataros)	2	0.125	300	61	56	grain	0.011	12-2164 12-2164-04 winter wheat
Netherlands, 2012 Lijnden (Tybalt)	2	0.125	300	61	55	grain	0.022	12-2164 12-2164-05 spring wheat
Belgium, 2012 Marbais (Granny)	2	0.125	250	61	64	grain	< 0.01	12-2164 12-2164-06 spring wheat
UK, 2012 Little Shelford (Tybalt)	2	0.125	200	61	64	grain	< 0.01	12-2164 12-2164-07 spring wheat
Germany, 2012 Burscheid (Thasos)	2	0.125	300	61	56	grain	< 0.01	12-2164 12-2164-08 spring wheat
France (S), 2012 Maire (Arezzo)	1	0.0975	300	61	48	grain	0.01	12-2133 12-2133-01 spring wheat

WHEAT Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
France (S), 2012 Toulouse (Soissons)	1	0.0975	300	61	50	grain	0.017	12-2133 12-2133-02 winter wheat
Spain, 2012 Alcala de Guadaira (Artur Nick)	1	0.0975	300	61	51	grain	< 0.01	12-2133 12-2133-03 sown Dec 2011
Spain, 2012 Marata (Moncada)	1	0.0975	300	61	51	grain	0.049	12-2133 12-2133-04 sown Jan 2012
Italy, 2012 Tarquinia (Latinur)	1	0.0975	300	61	64	grain	< 0.01	12-2133 12-2133-05 sown Dec 2011
Italy, 2012 Foggia (Iride)	1	0.0975	400	61	53	grain	< 0.01	12-2133 12-2133-06 sown Nov 2011
Portugal, 2012 Carneiria-varzia (Hystar)	1	0.0975	300	61	62	grain	< 0.01	12-2133 12-2133-07 sown Oct 2011
Greece, 2012 Kristoni-Kilkis (Simeto)	1	0.0975	300	61	41	grain	< 0.01	12-2133 12-2133-08 winter wheat

Oilseeds

Cotton seed

Results from supervised trials from USA on cotton were provided to the 2015 Meeting. In these trials, fluopyram was applied either as a pre-plant seed treatment, as a seed treatment in combination with an in-furrow soil treatment at planting or as a combination of a seed treatment, in-furrow soil treatment and a foliar spray applied about 30 days before harvest.

For the plots receiving treated seed, cotton seeds were slurry-treated with 0.5 mg ai/seed and the targeted seeding rate was about 148 000 seeds/ha (equivalent to 0.074 kg ai/ha). Actual seeding rates ranged from 144 495–148 650 seeds/ha. Residues in cotton seed and gin by-products from the seed treatment plots and from plots involving the combination of seed treatment, in-furrow soil treatments and foliar sprays are summarised in the following tables.

Plots were harvested by mechanical picker, mechanical stripper or manually, with duplicate samples of at least 30 kg (undelinted seed plus gin trash) taken from the mechanically harvested plots and at least 1 kg (seed cotton) from the manually harvested plots. Samples were frozen within 24 hours of sampling, ginned and held in frozen storage for up to 148 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg and with average fluopyram recovery rates of 98% in undelinted seed spiked with 0.01–1.0 mg/kg and 97% in gin by-products spiked with 0.01–18 mg/kg.

Table 4510 Fluopyram residues in cotton seed from supervised trials in USA involving fluopyram seed treatments (FS formulation) in combination with in-furrow soil applications and foliar sprays (SC formulations)

COTTON SEED Country, Year Location (Variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed			values	mean	
GAP: USA (seed, in-furrow, foliar		0.25	0.35		30	Max 0.5 kg ai/ha/season		
USA, 2012 Chula, GA (FM 1740)	1+ 1+ 1	0.074 0.182 0.257	0.5	seed	30	0.023, 0.049	0.036	RAGML206-01 GM022-12HA
USA, 2012 Parma, MO (ST4145 LLB2)	1+ 1+ 1	0.073 0.176 0.25	0.5	seed	30	0.031, 0.015	0.023	RAGML206-01 GM023-12HA
USA, 2012 Proctor, AR (ST4145)	1+ 1+ 1	0.074 0.177 0.205	0.5	seed	30	0.152, 0.162	0.16	RAGML206-01 GM024-12HA
USA, 2012 Greenville, MS, (ST 5458 (B2RF))	1+ 1+ 1	0.074 0.178 0.257	0.5	seed	31	< 0.01, < 0.01	< 0.01	RAGML206-01 GM025-12HA
USA, 2012 Claude, TX, (ST 4145)	1+ 1+ 1	0.074 0.257 0.253	0.5	seed	18 24 30 37 43	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGML206-01 GM027-12HA
USA, 2012 Levelland, TX (ST5458 (B2RF))	1+ 1+ 1	0.074 0.179 0.252	0.5	seed	28	0.809, 0.12	0.47	RAGML206-01 GM028-12HA
USA, 2012 Hinton, OK (FM1740 B2RF)	1+ 1+ 1	0.074 0.176 0.259	0.5	seed	105	< 0.01, < 0.01	< 0.01	RAGML206-01 GM029-12HA
USA, 2012 Wall, TX (FM1740 B2RF)	1+ 1+ 1	0.072 0.175 0.248	0.5	seed	28	0.156, 0.114	0.14	RAGML206-01 GM030-12HA
USA, 2012 Sanger, CA (Acala)	1+ 1+ 1	0.072 0.176 0.247	0.5	seed	28	0.079, 0.082	0.081	RAGML206-01 GM031–12HA
USA, 2012 Madera, CA (Acala)	1+ 1+ 1	0.074 0.178 0.25	0.5	seed	30	0.019, 0.012	0.016	RAGML206-01 GM033-12HA
USA, 2012 East Bernard, TX (ST 5458 (B2RF))	1+ 1+ 1	0.073 0.176 0.254	0.5	seed	31	0.279, 0.291	0.29	RAGML206-01 GM073-12HA

Peanut

Results from supervised trials from USA on peanut were provided to the 2010 JMPR and additional studies were also provided to the Meeting on trials from USA involving different combinations of application methods.

In trials involving two foliar applications of fluopyram (SC 500 formulation), treatments were applied to peanuts, 12–14 days apart as foliar sprays using CO_2 plot sprayers or knapsack sprayers with hand-held spray booms or tractor-mounted spray booms to apply 92–184 litres of spray mix/ha. Adjuvants were added to the spray mixes in the 2012 trials. Plot sizes in these trials ranged from 50–335 square metres.

At the specified PHIs, peanuts were dug and the hay was cut (same day), with both commodities allowed to dry to commercial dryness in the field or under cover for 2–17 days before duplicate samples (of at least 1 kg nutmeat and 0.5 kg hay) were taken, frozen within 4 hours of sampling and held in frozen storage for up to 593 days before analysis for fluopyram using

LC/MS/MS Method GM-001–P07-01, with reported LOQs of 0.01 mg/kg (nutmeat) and 1.0 mg/kg (peanut hay). Mean recovery rates were 99–110% in samples spiked with 0.01–1.0 mg/kg (nutmeat) and 0.01–45 mg/kg (hay).

Table 46 Fluopyram residues in peanut (nutmeat) from supervised trials in USA involving two foliar applications (500 SC formulations)

PEANUT Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP: Canada	0.25				7	Max 0.5 kg ai/ha/season		14 day RTI
USA, 2006 Molino, FL (Georgia Green)	0.242 0.249	0.183 0.224	132 111	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGMP048 GM133-06HA
USA, 2006 Tifton, GA (C99R)	0.25 0.25	0.174 0.181	144 138	nutmeat	6	< 0.01, < 0.01	< 0.01	RAGMP048 GM134-06HA
USA, 2006 Sufflok, VA (VA 98 R)	0.255 0.254	0.268 0.247	95 103	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGMP048 GM135-06HA
USA, 2006 Chula, GA (Georgia 02-C)	0.249 0.249	0.151 0.152	165 164	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGMP048 GM136-06HA
USA, 2006 Athens, GA (Georgia Green)	0.246 0.251	0.178 0.186	138 135	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGMP048 GM137-06HA
USA, 2006 Sycamore, GA (Georgia Greens)	0.251 0.253	0.16 0.154	157 164	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGMP048 GM138-06HA
USA, 2006 Chula, GA (Georgia Green)	0.25 0.253	0.159 0.153	157 165	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGMP048 GM139-06HA
USA, 2006 Oviedo, FL (Valencia A 1)	0.256 0.252	0.139 0.14	184 180	nutmeat	7	0.017, 0.018	0.018	RAGMP048 GM140-06HA
USA, 2006 Pearsall, TX (Florunner)	0.244 0.252	0.145 0.145	168 174	nutmeat	7	0.012, 0.01	0.011	RAGMP048 GM141–06HA
USA, 2006 East Bernard, TX (Tamspan 90)	0.251 0.252	0.189 0.274	133 92	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGMP048 GM142-06HA
USA, 2006 Levelland, TX (Tamspan 90)	0.248 0.249	0.175 0.182	142 137	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGMP048 GM143-06HA
USA, 2006 Seven Springs, NC (Perry)	0.252 0.25	0.171 0.162	147 154	nutmeat	0 2 6 9 13	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGMP048 GM132-06DA
USA, 2012 Tallassee, AL (FL07)	0.250 0.252	0.167 0.165	150 153	nutmeat	7	< 0.01, < 0.0136	< 0.01	RAGML209 GM037-12DA with adjuvant
USA, 2012 Jeffersonville, GA (Georgia 06G)	0.252 0.251	0.223 0.222	113 113	nutmeat	12	< 0.01, < 0.01	< 0.01	RAGML209 GM038-12DA with adjuvant
USA, 2012 Charlotte, TX (FL07)	0.242 0.250	0.202 0.182	120 137	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGML209 GM045-12DA with adjuvant

Study RAGML048 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 176]

In plots involving fluopyram-treated seeds, subsequent treatments were either an in-furrow soil treatment of fluopyram at planting or a single pre-harvest foliar application of fluopyram (SC 500 formulation).

Seeds were treated with fluopyram (SC formulation) at a rate of 1.1. mg ai/seed and sown at rates of about 220 000–300 000 seeds/ha (equivalent to about 0.24–0.33 kg ai/ha). The in-furrow soil treatments were applied using single nozzle backpack sprayers or tractor-mounted 4-row band sprayers and the foliar sprays were applied (with added adjuvant) using CO_2 plot sprayers or knapsack sprayers with hand-held spray booms or tractor-mounted spray booms. Plot sizes in these trials ranged from 55–335 square metres.

In plots involving fluopyram treatments at planting (either as in-furrow or 30–40 cm band sprays), subsequent pre-harvest applications of fluopyram (SC 500 formulation) were applied, either as a foliar spray or by chemigation.

The in-furrow soil treatments were applied using single nozzle backpack sprayers or tractor-mounted 4-row band sprayers, the foliar sprays were applied (with added adjuvant) using CO_2 plot sprayers or knapsack sprayers with hand-held spray booms or tractor-mounted spray booms and the chemigation treatments were applied using overhead irrigation equipment. Plot sizes in these trials ranged from 55–335 square metres.

At the specified PHIs, peanuts were dug and the hay was cut (same day), with both commodities allowed to dry to commercial dryness in the field or under cover for 3–8 days before duplicate samples (of at least 1 kg nutmeat and 0.5 kg hay) were taken, frozen within 2 hours of sampling and held in frozen storage for up to 235 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with reported LOQs of 0.01 mg/kg (nutmeat) and 1.0 mg/kg (peanut hay). Mean recovery rates were 88–100% in samples spiked with 0.01–1.0 mg/kg (nutmeat) and 0.01–50 mg/kg (hay).

Table 47 Fluopyram residues in peanut (nutmeat) from supervised trials in USA involving seed treatment and one in-furrow soil application at planting

PEANUT Country, year Location (variety)	Application				Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	mg ai/seed	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP, USA (seed, in-furrow, and/or foliar)	0.82	0.25 0.25	-	-		7	Max 0.5 kg ai/ha/season		
USA, 2012 Chula, GA (GA-06G)	1.1	(0.25) 0.26	- 0.35	- 75	nutmeat	124 128 135 142 149	0.055, 0.04 0.025, 0.054 0.033, 0.058 0.018, 0.026 0.027, 0.032	0.05 0.04 0.05 0.02 0.03	RAGML209 GM035-12DA
USA, 2012 Athens, GA (not reported)	1.1	(0.249) 0.251	- 0.598	- 42	nutmeat	132	0.028, 0.057	0.04	RAGML209 GM036-12DA
USA, 2012 Tallassee, AL (FL07)	1.1	(0.244) 0.25	- 0.64	- 39	nutmeat	120	0.058, 0.022	0.04	RAGML209 GM037-12DA
USA, 2012 Jeffersonville, GA (Georgia 06G)	1.1	(0.328) 0.254	- 0.67	- 38	nutmeat	112	0.034, 0.025	0.03	RAGML209 GM038-12DA
USA, 2012 Elko, SC (GA-06G)	1.1	(0.25) 0.253	- 0.602	- 42	nutmeat	138	0.031, 0.031	0.03	RAGML209 GM039-12DA
USA, 2012 Suffolk, VA (Bailey)	1.1	(0.257) 0.251	- 0.58	- 43	nutmeat	138	0.016, 0.018	0.02	RAGML209 GM040-12DA
USA, 2012 Steven Springs, NC (Bailey)	1.1	(0.25) 0.252	- 0.56	- 45	nutmeat	145	0.027, 0.025	0.026	RAGML209 GM041–12DA

PEANUT Country, year Location (variety)	Application				Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	mg ai/seed	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
USA, 2012 Sycamore, GA (FL 07)	1.1	(0.25) 0.249	- 0.54	- 46	nutmeat	150	0.062, 0.049	0.056	RAGML209 GM042-12DA
USA, 2012 Oviedo, FL (FL 07)	1.1	(0.25) 0.244	- 0.54	- 45	nutmeat	132	0.021, 0.03	0.026	RAGML209 GM043-12DA
USA, 2012 Raymondville, TX (Tamrun)	1.1	(0.238) 0.251	- 0.6	- 42	nutmeat	127	0.055, 0.048	0.052	RAGML209 GM044-12DA
USA, 2012 Charlotte, TX (FL07)	1.1	(0.277) 0.252	- 0.66	- 38	nutmeat	153	0.025, < 0.01	0.018	RAGML209 GM045-12DA
USA, 2012 Levelland, TX (Tamrun)	1.1	(0.25) 0.262	- 0.66	- 40	nutmeat	140	0.073, 0.15	0.11	RAGML209 GM046-12DA

Table 48 Fluopyram residues in peanut (nutmeat) from supervised trials in USA involving seed treatment and one pre-harvest foliar application

PEANUT Country, year Location (variety)	Application				Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	mg ai/seed	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP, USA (seed, r in-furrow and/or foliar)	0.82	0.25 0.25	-	-		7	Max 0.5 kg ai/ha/season		
USA, 2012 Chula, GA (GA-06G)	1.1	(0.25) 0.259	- 0.147	- 176	nutmeat	3 7 14 21 28	0.025, 0.062 0.025, 0.06 0.028, 0.036 0.024, 0.042 0.04, 0.019	0.04 <u>0.04</u> 0.03 0.03 0.03	RAGML209 GM035-12DA
USA, 2012 Athens, GA (not reported)	1.1	(0.249) 0.251	- 0.151	- 166	nutmeat	7	0.042, 0.042	<u>0.042</u>	RAGML209 GM036-12DA
USA, 2012 Tallassee, AL (FL07)	1.1	(0.244) 0.248	- 0.163	- 152	nutmeat	7	0.043, 0.021	<u>0.032</u>	RAGML209 GM037-12DA
USA, 2012 Jeffersonville, GA (Georgia 06G)	1.1	(0.256) 0.246	- 0.224	- 110	nutmeat	7	0.057, 0.036	<u>0.046</u>	RAGML209 GM038-12DA
USA, 2012 Elko, SC (GA-06G)	1.1	(0.25) 0.252	- 0.171	- 147	nutmeat	7	0.029, 0.035	<u>0.032</u>	RAGML209 GM039-12DA
USA, 2012 Suffolk, VA (Bailey)	1.1	(0.257) 0.255	- 0.196	- 130	nutmeat	10	0.022, 0.024	0.02	RAGML209 GM040-12DA
USA, 2012 Steven Springs, NC (Bailey)	1.1	(0.25) 0.246	- 0.15	- 164	nutmeat	7	0.017, 0.012	<u>0.015</u>	RAGML209 GM041–12DA
USA, 2012 Sycamore, GA (FL 07)	1.1	(0.256) 0.249	- 0.141	- 176	nutmeat	10	0.017, 0.012	0.015	RAGML209 GM042-12DA
USA, 2012 Oviedo, FL (FL 07)	1.1	(0.25) 0.255	- 0.147	- 173	nutmeat	10	0.062, 0.042	0.05	RAGML209 GM043-12DA
USA, 2012 Raymondville, TX (Tamrun)	1.1	(0.238) 0.255	- 0.178	- 143	nutmeat	6	0.027, 0.039	<u>0.033</u>	RAGML209 GM044-12DA

PEANUT Country, year Location (variety)	Application				Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	mg ai/seed	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
USA, 2012 Charlotte, TX (FL07)	1.1	(0.277) 0.25	- 0.182	- 137	nutmeat	7	0.012, 0.012	0.012	RAGML209 GM045-12DA
USA, 2012 Levelland, TX (Tamrun)	1.1	(0.25) 0.253	- 0.141	- 179	nutmeat	7	0.121, 0.134	0.13	RAGML209 GM046-12DA

Table 49 Fluopyram residues in peanut (nutmeat) from supervised trials in USA involving in-furrow or band spray at planting and one pre-harvest foliar application

PEANUT Country, year Location (variety)	Application					Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)	Matrix	DALA	values	mean	
GAP, USA (seed, in-furrow and/or foliar)	0.82 mg ai/seed 0.25 0.25				7			foliar by ground, air or chemigation
In-furrow + pre-harvest foliar spray								
USA, 2012 Chula, GA (GA-06G)	0.255 0.253	0.345 0.147	74 172	nutmeat	3 7 14 21 28	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGML209 GM035-12DA
USA, 2012 Athens, GA (not reported)	0.258 0.252	0.586 0.151	44 167	nutmeat	7	0.016, 0.015	0.015	RAGML209 GM036-12DA
USA, 2012 Tallassee, AL (FL07)	0.252 0.248	0.646 0.163	39 152	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGML209 GM037-12DA
USA, 2012 Jeffersonville, GA (Georgia 06G)	0.255 0.246	0.671 0.224	38 110	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGML209 GM038-12DA
USA, 2012 Elko, SC (GA-06G)	0.252 0.253	0.548 0.172	42 147	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGML209 GM039-12DA
USA, 2012 Suffolk, VA (Bailey)	0.25 0.256	0.581 0.197	43 130	nutmeat	10	0.059, 0.032	0.05	RAGML209 GM040-12DA
USA, 2012 Steven Springs, NC (Bailey)	0.253 0.252	0.562 0.15	45 168	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGML209 GM041– 12DA
USA, 2012 Sycamore, GA (FL 07)	0.248 0.246	0.539 0.141	46 174	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGML209 GM042-12DA
USA, 2012 Oviedo, FL (FL 07)	0.246 0.249	0.547 0.147	45 169	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGML209 GM043-12DA
USA, 2012 Raymondville, TX (Tamrun)	0.249 0.256	0.593 0.178	42 144	nutmeat	7	0.011, 0.014	0.01	RAGML209 GM044-12DA
USA, 2012 Charlotte, TX (FL07)	0.250 0.248	0.676 0.182	37 136	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGML209 GM045-12DA
USA, 2012 Levelland, TX (Tamrun)	0.256 0.253	0.656 0.141	39 179	nutmeat	7	0.063, 0.06	0.06	RAGML209 GM046-12DA
Band spray at planting + preharvest foliar spray								
USA, 2012 Chula, GA (GA-06G)	0.253 0.259	0.59 0.154	43 168	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGML209 GM035-12DA

PEANUT Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
USA, 2012 Elko, SC (GA-06G)	0.252 0.252	0147 0.171	172 147	nutmeat	7	< 0.01, < 0.01	< 0.01	RAGML209 GM039-12DA
USA, 2012 Suffolk, VA (Bailey)	0.253 0.256	0158 0.197	160 130	nutmeat	10	0.011, < 0.01	0.01	RAGML209 GM040-12DA

Table 50 Fluopyram residues in peanut (nutmeat) from supervised trials in USA involving one in-furrow application at planting and one pre-harvest chemigation application

PEANUT Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP, USA (seed, in-furrow and/or foliar)	0.82 mg ai/seed 0.25 0.25				7			foliar by ground, air or chemigation
USA, 2012 Tallassee, AL (FL07)	0.252 0.249	0.65 0.000196	39 127077	nutmeat	16 23 30 37 44	0.016, 0.017 0.015, 0.013 0.017, 0.014 0.014, 0.012 0.013, 0.01	0.02 0.01 0.015 0.01 0.01	RAGML209 GM037-12DA
USA, 2012 Jeffersonville, GA (Georgia 06G)	0.249 0.219	0.67 0.000133	37 165076	nutmeat	16 23 30 37 44	0.016, 0.017 0.015, 0.021 0.012, 0.014 0.014, 0.019 0.018, 0.018	0.02 0.02 0.01 0.02 0.02	RAGML209 GM038-12DA
USA, 2012 Charlotte, TX (FL07)	0.249 0.251	0.67 0.000184	37 136064	nutmeat	16 23 28 35 42	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGML209 GM045-12DA

Sunflower seed

Results from supervised trials from Hungary were provided to the Meeting (to supplement previous trials provided to the 2015 JMPR). In these trials, two applications of 0.125 kg ai/ha (SC formulations) were made to sunflower plants, 15–16 days apart as foliar sprays using 6-nozzle boom sprayers knapsack or CO_2 plot sprayers to apply 180 litres spray mix/ha to 90 square metre plots.

Unreplicated samples (min 1 kg seed) were taken from each plot, frozen within 24 hours of sampling, held in frozen storage for up to 322 days before analysis of whole seeds. In a number of trials, seeds (min 9 kg samples) were also conditioned to < 8% moisture content, cleaned, crushed (between 1 mm rubber rollers), shelled and dry-fractioned to separate the kernels (the commodity in trade), prior to analysis. The analytical methods used in these trials for measuring fluopyram residues were LC/MS/MS Method 00948/M001 or 00948/M003, with a reported LOQ of 0.01 mg/kg and with average fluopyram recovery rates of 92–104% in seeds, kernels and seed fractions spiked with 0.01–0.8 mg/kg.

Table 51 Fluopyram residues in sunflower seed (dried) from supervised trials in Europe, involving two foliar applications (SE formulations)

SUNFLOWER SEED Study, Trial Country, Year (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
GAP: Hungary	2	0.125		150-400		To BBCH69		
Hungary, 2012 6100 Kiskunfélegyháza (NSP-IMI)	2	0.125	0.069	180	seed kernel seed fraction	20 22 27 27 27	0.37 0.19 0.165 < 0.01 < 0.01	12-2156 12-2156-01 BBCH 79 & 84
Hungary, 2012 2735 Dánszentmiklós (PR36 E82)	2	0.125	0.069	180	seed kernel seed fraction	21 29 31 35 29 29	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	12-2156 12-2156-02 BBCH 69 & 85

Results from supervised trials from USA on sunflowers were provided to the 2010 JMPR. In these trials, two applications of 0.235–0.253 kg ai/ha (SC 500 formulation) were applied to sunflower plants, 12–14 days apart as foliar sprays using knapsack or CO_2 plot sprayers with hand-held or tractor-mounted spray booms to apply a 121–190 litres spray mix/ha. Plot sizes in these trials ranged from 46–149 square metres.

Duplicate samples (min 1 kg seed) were taken from each plot, frozen within 4 hours of sampling, held in frozen storage for up to 579 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg.

Table 5211 Fluopyram residues in sunflower seed (dried) from supervised trials in USA involving two foliar applications (500 SC formulations)

SUNFLOWER SEED Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: Canada		0.25			14	Max 0.5 kg ai/ha/season		14 day RTI
USA, 2006 Sabin, MN (Dekalb DKF38-80CL)	2	0.242 0.25	0.14 0.149	173 168	13	0.073, 0.078	0.076	RAGMP070 GM339-06HA
USA, 2006 Springfield, NE (Mycogen 8N429CL)	2	0.251 0.253	0.192 0.192	131 132	12	0.014, 0.008	0.011	RAGMP070 GM340-06HA
USA, 2006 Velva, ND (DKF38-80CL)	2	0.249 0.248	0.204 0.205	122 121	14	0.227, 0.214	0.22	RAGMP070 GM341–06HA
USA, 2006 Grand Island, NE (Garst 4704 NS)	2	0.251 0.248	0.132 0.132	190 188	14	0.251, 0.246	0.25	RAGMP070 GM342-06HA
USA, 2006 Eldridge, ND (DKF29-90)	2	0.25 0.249	0.16 0.154	156 162	14	0.02, 0.02	0.02	RAGMP070 GM343-06HA
USA, 2006 New Rockford, ND (Pioneer 63M80)	2	0.237 0.249	0.156 0.154	152 162	14	0.058, 0.055	0.056	RAGMP070 GM344-06HA

SUNFLOWER SEED Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
USA, 2006 Larned, KS (Pioneer 63M91–N402)	2	0.25 0.253	0.148 0.148	169 171	13	0.029, 0.077	0.053	RAGMP070 GM345-06HA
USA, 2007 Carlyle, IL (Hybrid Lot 1)	2	0.25 0.253	0.169 0.169	148 150	1 7 14 22 27	0.775, 0.583 0.674, 0.998 0.479, 0.284 0.292, 0.185 0.108, 0.133	0.68 0.84 0.38 0.24 0.12	RAGMP070 GM338-06DB

Study RAGMP070 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 179]

Herbs

Basil

Results from supervised trials from USA on basil were provided to the 2010 JMPR. In these trials, unreplicated plots were treated with 2 foliar sprays of an SC 500 formulation of fluopyram (tank mixed with trifloxystrobin), using knapsack sprayers to apply 0.246–0.262 kg ai/ha in 140–204 litres water/ha, with a treatment interval of 7 days. Plot sizes ranged from 59–116 square metres.

Duplicate samples of at least 0.45 kg fresh leaves and at least 0.2 kg dried leaves (after 5–12 days drying) were taken from 12 plants in each treated plot, frozen within 2 hours of sampling and stored frozen for up to 395 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with reported LOQs of 0.1 mg/kg for fresh basil leaves and 0.25 mg/kg for dried basil leaves. Mean recovery rates were 95% in samples spiked with 0.1–35 mg/kg (fresh leaves) and 0.25–200 mg/kg (dried leaves).

Table 53 Fluopyram residues in fresh and dried basil leaves from supervised trials in USA, involving two foliar applications (500 SC formulation)

BASIL Country, year Location (variety)	Application				Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP: Canada		0.25				0	Max 0.5 kg ai/ha/season		
USA, 2007 Suffolk, VA (Ceasar)	2	0.253 0.253	0.204 0.202	124 125	fresh dried	0 0	19.13, 19.58 92.49, 99.22	19 96	RAGMP083 GM067-07HA
USA, 2007 Sanger, CA (Italian Large Leaf)	2	0.246 0.252	0.156 0.158	158 159	fresh dried	0 0	32, 28 175, 187	30 180	RAGMP083 GM068-07HA
USA, 2007 Germansville, PA (Unknown)	2	0.257 0.262	0.140 0.144	183 182	fresh dried 	0 1 3 7 10 0 1 3 7 10	15.808, 21.747 14.017, 16.229 1.366, 1.344 0.864, 0.889 0.624, 0.639 90.88, 90.4 64.19, 63.75 9.17, 8.96 4.38, 4.23 3.69, 3.59	19 15 1.35 0.88 0.63 90 64 9.07 4.31 3.64	RAGMP083 GM066-07DA

Study RAGMP083 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 181]

Parsley, Sage, Savory

Results from supervised trials from Europe on parsley, sage and savory were provided to the Meeting. In these trials single treatments of 0.2 kg ai/ha (SC formulations also containing tebuconazole) were applied using wheeled plot sprayers with hand-held mini-booms. Plot sizes in these trials ranged from 4.8–48 square metres.

Unreplicated samples (min 0.6 kg leaves) were taken from each plot and stored frozen for up to 468 days before analysis for fluopyram and its benzamide metabolite using LC/MS/MS Method 00948, with a reported LOQ of 0.01 mg/kg and with average fluopyram recovery rates of 84–104% in leaf fractions spiked with 0.01–6 mg/kg.

Table 54 Fluopyram residues in herbs from supervised trials in Europe, involving one foliar application (400 SC formulations)

HERBS Study, Trial Country, Year (Variety)	Application				Matrix	DALA	Fluopyram residues (mg/kg fresh weight)	Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)				
GAP: USA		0.25	-			0	Max 0.5 kg ai/ha/season	
Parsley								
Germany, 2013 01326 Dresden (Parsley; Laica)	1	0.2	0.05	400	leaf	7 14 21	1.181 0.386 < 0.01	OG/12-3-1 LR-K-13-FK-F-01 DRE-01
Germany, 2012 01326 Dresden (Parsley; Grüne Perle F1)	1	0.2	0.05	400	leaf	7 14	1.117 0.637 (c=0.034)	OG/12-3-1 LR-K-12-FK-F-01 DRE-01
Germany, 2012 21037 Hamburg (Parsley; Laica)	1	0.2	0.033	600	leaf	7 14	1.976 0.540	OG/12-3-1 LR-K-12-FK-F-01 HH-01
Germany, 2012 46325 Borken (Parsley; Gigante Italian)	1	0.2	0.05	400	leaf	7 14	0.744 0.312	OG/12-3-1 LR-K-12-FK-F-01 MUE-01
Sage								
Germany, 2013 01326 Dresden (Sage; variety not reported)	1	0.2	0.05	400	leaf	7 14	1.181 0.131	OG/12-3-1 LR-K-13-FK-F-01 DRE-02
Germany, 2012 35516 Munzenberg (Sage; variety not reported)	1	0.2	0.034	653	leaf	7 14	1.242 0.317	OG/12-3-1 LR-K-12-FK-F-01 WET-Salbei
Germany, 2012 01326 Dresden (Sage; Extrakta)	1	0.2	0.05	400	leaf	7 14	1.536 0.382	OG/12-3-1 LR-K-12-FK-F-01 DRE-02
Savory								
Germany, 2013 Bernberg-Strenzfeld (Savory; Einj. Blatt)	1	0.2	0.051	427	leaf	7 14	5.931 3.640 (c=0.017)	OG/12-3-1 LR-K-13-FK-F-01 BBG-01
Germany, 2013 48147 Munster (Savory; Cyrano)	1	0.2	0.05	400	leaf	7 14	0.263 0.110	OG/12-3-1 LR-K-13-FK-F-01 MUE-02

Spices

Dill (seeds)

Results from supervised trials from USA on dill (seed) were provided to the 2010 JMPR and an additional trial was also provided to the Meeting. In these trials, unreplicated plots were treated with 2 foliar sprays of an SC 500 formulation of fluopyram (tank mixed with trifloxystrobin), using knapsack

sprayers to apply 0.243–0.261 kg ai/ha in 125–186 litres water/ha, with a treatment interval of 7 days. Plot sizes ranged from 74–118 square metres.

Dill seed heads were harvested and allowed to dry in the field for up to 9 days before duplicate samples of at least 0.2 kg dill seed were taken, frozen within 2 hours of sampling and stored frozen for up to 342 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.1 mg/kg in the 2007 trials and 0.05 mg/kg in the 2015 trial.. Mean recovery rates were 84–99% in samples spiked with 0.01–40 mg/kg.

Table 55 Fluopyram residues in dried dill seed from supervised trials in USA, involving two foliar applications (500 SC formulation)

DILL SEED Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA		0.25			14	Max 0.5 kg ai/ha/season		
USA, 2007 Oviedo, FL (Unknown)	2	0.261 0.252	0.14 0.141	186 179	14	8.862, 9.462	9.2	RAGMP106 GM106-07HA
USA, 2007 Sanger, CA (Mammoth)	2	0.243 0.249	0.14 0.147	174 169	14	29.29, 25.47	27	RAGMP106 GM107-07HA
USA, 2007 Parkdale, OR (Long Island Mammoth)	2	0.256 0.247	0.205 0.166	125 149	13	31.2, 27.98	30	RAGMP106 GM108-07HA
USA, 2015 Kerman, CA (Mammoth Long Island)	2	0.25 0.25	0.177	141	0 7 14 21 28	30.8, 36.8 28.9, 29.3 19.3, 18.8 20.7, 18.9 15.4, 13.4	33.8 29.1 19.1 20 14.4	RAGMN132 GM006-15DA

Study RAGMP106 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 183]

Dried herbs

Hops, dry

Results from supervised trials from USA on hops were provided to the 2010 JMPR. In these trials, two applications of 0.246–0.26 kg ai/ha (SC 500 formulation) were applied to mature hop vines, 13-14 days apart as foliar sprays using ground-based airblast equipment to apply 468–525 litres spray mix/ha. Plot sizes in these trials ranged from 65–91 square metres.

Duplicate samples of ripe cones (min 0.5 kg) were harvested, allowed to dry to commercial dryness (oven-dried for 12 hours, hot-air dried for 3.5 hours or air-dried for 24 hours), collected, frozen within 4 hours of collection and held in frozen storage for up to 545 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.05 mg/kg. Mean recovery rates were 82–100% in samples spiked with 0.05–40 mg/kg.

Table 56 Fluopyram residues in hops (dried) from supervised trials in USA involving two foliar applications (500 SC formulations)

HOPS, DRY Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
GAP: USA		0.25			7	Max 0.5 kg ai/ha/season		
USA, 2006 Greenleaf, ID (Zeus)	2	0.254 0.26	0.053 0.053	478 487	7	6.45, 6.97	6.7	RAGMP045 GM127-06HA
USA, 2006 Yakim, WA (Warrior)	2	0.249 0.25	0.053 0.053	468 470	7	4.32, 7.28	5.8	RAGMP045 GM128-06HA

HOPS, DRY Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg)		Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		values	mean	
USA, 2006 Hillsboro, OR (Glacier)	2	0.247 0.248	0.047 0.049	525 508	7	25.7, 25.03	25	RAGMP045 GM129-06HA
USA, 2015 Ephrata (Cascade)	2	0.248 0.246	0.053 0.053	469 466	0 7 14 21 28 35	11.75, 14.50 13.62, 13.39 12.80, 12.41 8.11, 9.38 8.58, 7.63 5.57, 9.31	13.1 14 12.6 8.75 8.11 7.44	RAGMN133 GM007-15DA

Study RAGMP045 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 180]

PRIMARY FEED COMMODITIES

Legume animal feeds

Bean fodder and forage

Results from supervised trials from USA on bean forage and hay were provided to the 2010 JMPR. In these trials, two applications of 0.24–0.26 kg ai/ha (SC 500 formulation) were applied to beans, 5–8 days apart as foliar sprays using knapsack or coke can sprayers with hand-held spray booms or tractor-mounted boom sprayers to apply 91–183 litres of spray mix/ha. Plot sizes in these trials ranged from 84–372 square metres. In each trial, one plot was last treated just before flowering (for sampling of forage) and a second plot was last treated after the end of flowering (for sampling of hay and seed). Hay and seeds from this second plot were allowed to dry to commercial dryness before sampling (0–18 days after cutting).

Duplicate samples of at least 1 kg forage (green plant material) and at least 0.45 kg hay were taken from each plot, frozen within 2 hours of sampling, held in frozen storage for up to 624 days (forage) or 567 days (hay) before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg.

Table 57 Fluopyram residues in bean forage from supervised trials in USA involving two foliar applications (500 SC formulations)

BEAN FORAGE / HAY Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)			Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		matrix	values	mean	
GAP: Canada		0.25			0 (feed)		Max 0.5 kg ai/ha/season		7-14 day RTI
USA, 2006 Earlham, IA (Maverick Pinto Beans)	2	0.248 0.251	0.184 0.187	135 134	0	forage	12.91, 16.32	15	RAGMP069 GM325-06HA
USA, 2006 Springfield, NE (Pinto)	2	0.25 0.253	0.195 0.199	128 127	0	forage	15.45, 12.2	14	RAGMP069 GM326-06HA
USA, 2006 Sabin, MN (Navigator)	2	0.248 0.252	0.152 0.153	163 165	0	forage	12.27, 13.4	13	RAGMP069 GM327-06HA
USA, 2006 Velva, ND (Maverick)	2	0.252 0.25	0.205 0.203	123 123	0	forage	25.43, 25.18	25	RAGMP069 GM328-06HA 16% DM
USA, 2006 Levelland, TX (Vision)	2	0.25 0.252	0.179 0.177	140 142	0	forage	14.14, 13.51	14	RAGMP069 GM329-06HA

BEAN FORAGE / HAY Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)			Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		matrix	values	mean	
USA, 2006 Jerome, ID (Pintos)	2	0.25 0.254	0.158 0.16	158 159	0	forage	13.19, 13.2	13	RAGMP069 GM330-06HA
USA, 2007 Fresno, CA (Lima Beans)	2	0.251 0.251	0.132 0.132	190 190	0	forage	20.09, 22.52	21	RAGMP069 GM331–06HA
USA, 2006 Rupert, ID (Bill Z)	2	0.252 0.252	0.311 0.3	81 84	0	forage	9.79, 10.41	10	RAGMP069 GM332-06HA
USA, 2006 Seymour, IL (Sanilac navy beans)	2	0.261 0.253	0.199 0.178	131 142	0 3 7 10 14	forage forage forage forage forage	13.13, 13.66 5.79, 5 3.46, 3.32 1.56, 1.57 1.18, 1.03	13 5.4 3.39 1.57 1.11	RAGMP069 GM324-06DA
USA, 2006 Earlham, IO (Maverick Pinto Beans)	2	0.25 0.253	0.197 0.232	127 109	0+3[a]	hay	11.46, 21.86	17	RAGMP069 GM325-06HA
USA, 2006 Springfield, NE (Pinto)	2	0.249 0.25	0.192 0.195	130 128	0+3[a]	hay	37.71, 15.39	27	RAGMP069 GM326-06HA 61% DM
USA, 2006 Sabin, MN (Navigator)	2	0.257 0.25	0.161 0.147	160 170	0+18[a]	hay	26.45, 26.65	27	RAGMP069 GM327-06HA
USA, 2006 Velva, ND (Maverick)	2	0.251 0.249	0.209 0.204	120 122	0+3[a]	hay	7.94, 9.83	8.9	RAGMP069 GM328-06HA
USA, 2006 Levelland, TX (Vision)	2	0.249 0.249	0.179 0.179	139 139	0+6[a]	hay	11.33, 13.29	12	RAGMP069 GM329-06HA
USA, 2006 Jerome, ID (410 Pintos)	2	0.25 0.244	0.157 0.157	159 155	0+13[a]	hay	30.13, 27.26	29	RAGMP069 GM330-06HA
USA, 2007 Fresno, CA (Lima Beans)	2	0.248 0.25	0.212 0.212	117 118	0	hay	15.64, 22.51	19	RAGMP069 GM331–06HA
USA, 2006 Rupert, ID (Bill Z)	2	0.251 0.25	0.27 0.275	93 91	0+13[a]	hay	16.74, 29.64	23	RAGMP069 GM332-06HA
USA, 2006 Seymour, IL (Sanilac navy beans)	2	0.25 0.252	0.137 0.137	182 183	0 3 7 10 14	hay hay hay hay	3.91, 4.25 2.78, 2.88 0.77, 0.591 0.598, 0.588 0.525, 0.558	4.1 2.83 0.681 0.593 0.542	RAGMP069 GM324-06DA

[a] Drying interval between cutting and sampling

Pea vines and hay

Results from supervised trials from USA on peas forage and hay were provided to the 2010 JMPR. In these trials, two applications of 0.24–0.26 kg ai/ha (SC 500 formulation) were applied to peas, 5–7 days apart as foliar sprays using CO_2 plot or knapsack sprayers with hand-held spray booms or tractor-mounted boom sprayers to apply 116–190 litres of spray mix/ha. Plot sizes in these trials ranged from 24–74 square metres. In each trial, one plot (for vine and hay sampling) was last treated between flowering and when the first pods had reached their final length (BBCH 70) and a second plot (for seed sampling) was last treated between the end of flowering and early ripening (BBCH 80).

Hay from the first plots was allowed to dry to commercial dryness before sampling (0–10 days after cutting).

Duplicate samples of at least 1 kg vines and at least 0.45 kg hay were taken from each plot,, frozen within 4 hours of sampling, held in frozen storage for up to 397 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg.

Table 58 Fluopyram residues in pea vines from supervised trials in USA involving two foliar applications (500 SC formulations)

PEA VINES Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)			Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		matrix	values	mean	
GAP: Canada		0.25			0 (feed)		Max 0.5 kg ai/ha/season		
USA, 2006 Parkdale, OR (Green Arrow)	2	0.252 0.251	0.166 0.156	152 161	0	vines	5.72, 6.04	5.9	RAGMP069 GM334-06HA
USA, 2006 Hermiston, OR (Majorettes)	2	0.247 0.253	0.14 0.135	177 188	0	vines	5.1, 4.01	4.6	RAGMP069 GM335-06HA
USA, 2006 Payette, ID (Austrian winter pea)	2	0.253 0.247	0.133 0.134	190 185	0	vines	9.08, 11.15	10	RAGMP069 GM336-06HA 16% vine DM 83% hay DM
USA, 2006 Madras, OR (Maples)	2	0.253 0.251	0.216 0.216	117 116	0	vines	5.4, 5.85	5.6	RAGMP069 GM337-06HA
USA, 2006 Ephrata, WA (Cruiser)	2	0.252 0.252	0.18 0.179	140 141	0 3 7 10 14	vines	2.66, 2.71 0.764, 0.838 0.589, 0.468 0.461, 0.358 0.32, 0.204	2.7 0.801 0.529 0.41 0.262	RAGMP069 GM333-06DA

Table 59 Fluopyram residues in pea hay from supervised trials in USA involving two foliar applications (500 SC formulations)

PEA HAY Country, year Location (variety)	Application				DALA	Fluopyram Residues (mg/kg)			Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		matrix	values	mean	
GAP: Canada		0.25			0 (feed)		Max 0.5 kg ai/ha/season		
USA, 2006 Parkdale, OR (Green Arrow)	2	0.252 0.251	0.166 0.156	152 161	0+2[a]	hay	29.05, 31.24	30	RAGMP069 GM334-06HA
USA, 2006 Hermiston, OR (Majorettes)	2	0.247 0.253	0.14 0.135	177 188	0+7[a]	hay	20.3, 15.36	18	RAGMP069 GM335-06HA
USA, 2006 Payette, ID (Austrian winter pea)	2	0.253 0.247	0.133 0.134	190 185	0+4[a]	hay	49.44, 46.9	48	RAGMP069 GM336-06HA 16% vine DM 83% hay DM
USA, 2006 Madras, OR (Maples)	2	0.253 0.251	0.216 0.216	117 116	0+10[a]	hay	15.42, 18.16	17	RAGMP069 GM337-06HA
USA, 2006 Ephrata, WA (Cruiser)	2	0.252 0.252	0.18 0.179	140 141	0+3[a] 3+4[a] 7+3[a] 10+4[a] 14+3[a]	hay	14.95, 13.18 3.15, 2.95 2.36, 1.59 1.37, 1.59 0.833, 0.85	14 3.05 1.975 1.48 0.842	RAGMP069 GM333-06DA

[a] Drying interval between cutting and sampling

Peanut

Results from supervised trials from USA on peanut were provided to the 2010 JMPR and additional studies were also provided to the Meeting on trials from USA involving different combinations of application methods.

In trials involving two foliar applications of fluopyram (SC 500 formulation), treatments were applied to peanuts, 12–14 days apart as foliar sprays using CO_2 plot sprayers or knapsack sprayers with hand-held spray booms or tractor-mounted spray booms to apply 92–184 litres of spray mix/ha. Adjuvants were added to the spray mixes in the 2012 trials. Plot sizes in these trials ranged from 50–335 square metres.

At the specified PHIs, peanuts were dug and the hay was cut (same day), with both commodities allowed to dry to commercial dryness in the field or under cover for 2–17 days before duplicate samples (of at least 1 kg nutmeat and 0.5 kg hay) were taken, frozen within 4 hours of sampling and held in frozen storage for up to 593 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with reported LOQs of 0.01 mg/kg (nutmeat) and 1.0 mg/kg (peanut hay). Mean recovery rates were 99–110% in samples spiked with 0.01–1.0 mg/kg (nutmeat) and 0.01–45 mg/kg (hay).

Table 60 Fluopyram residues in peanut hay from supervised trials in USA involving two foliar applications (500 SC formulations)

PEANUT HAY Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP: Canada	0.25				7 (feed)	Max 0.5 kg ai/ha/season		14 day RTI
USA, 2006 Molino, FL (Georgia Green)	0.242 0.249	0.183 0.224	132 111	hay (82%DM)	7	8.94, 9.2	9.1	RAGMP048 GM133-06HA
USA, 2006 Tifton, GA (C99R)	0.25 0.25	0.174 0.181	144 138	hay (80%DM)	14	17.44, 18.28	17.9	RAGMP048 GM134-06HA
USA, 2006 Sufflok, VA (VA 98 R)	0.255 0.254	0.268 0.247	95 103	hay (79%DM)	7	6.69, 6.71	6.7	RAGMP048 GM135-06HA
USA, 2006 Chula, GA (Georgia 02-C)	0.249 0.249	0.151 0.152	165 164	hay (65%DM)	7	2.69, 2.6	2.7	RAGMP048 GM136-06HA
USA, 2006 Athens, GA (Georgia Green)	0.246 0.251	0.178 0.186	138 135	hay (75%DM)	7	18.37, 19.43	19	RAGMP048 GM137-06HA
USA, 2006 Sycamore, GA (Georgia Greens)	0.251 0.253	0.16 0.154	157 164	hay (74%DM)	7	5.68, 5.05	5.4	RAGMP048 GM138-06HA
USA, 2006 Chula, GA (Georgia Green)	0.25 0.253	0.159 0.153	157 165	hay (75%DM)	7	12.40, 10.47	11	RAGMP048 GM139-06HA
USA, 2006 Oviedo, FL (Valencia A 1)	0.256 0.252	0.139 0.14	184 180	hay (75%DM)	7	2.94, 2.93	2.9	RAGMP048 GM140-06HA
USA, 2006 Pearsall, TX (Florunner)	0.244 0.252	0.145 0.145	168 174	hay (83%DM)	7	3.64, 3.73	3.7	RAGMP048 GM141–06HA
USA, 2006 East Bernard, TX (Tamspan 90)	0.251 0.252	0.189 0.274	133 92	hay (82%DM)	7	4.48, 3.85	4.2	RAGMP048 GM142-06HA
USA, 2006 Levelland, TX (Tamspan 90)	0.248 0.249	0.175 0.182	142 137	hay (58%DM)	7	1.34, 1.08	1.2	RAGMP048 GM143-06HA

PEANUT HAY Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP: Canada	0.25				7 (feed)	Max 0.5 kg ai/ha/season		14 day RTI
USA, 2006 Seven Springs, NC (Perry)	0.252 0.25	0.171 0.162	147 154	hay (48%DM)	0 2 6 9 13	23.94, 29.13 33.25, 31.37 19.44, 21.88 8.97, 12.03 10.24, 12.35	26.5 32.3 <u>21</u> 10.5 11.3	RAGMP048 GM132-06DA
USA, 2012 Tallassee, AL (FL07)	0.250 0.252	0.167 0.165	150 153	hay (84% DM)	7	23.83, 12.36	<u>18</u>	RAGML209 GM037-12DA with adjuvant
USA, 2012 Jeffersonville, GA (Georgia 06G)	0.252 0.251	0.223 0.222	113 113	hay (66% DM)	12	12.05, 8.22	10	RAGML209 GM038-12DA with adjuvant
USA, 2012 Charlotte, TX (FL07)	0.242 0.250	0.202 0.182	120 137	hay (77% DM)	7	4.23, 3.87	<u>4.1</u>	RAGML209 GM045-12DA with adjuvant

Study RAGMP048 was also provided to the 2010 JMPR [2010 JMPR Fluopyram Evaluation – Table 176]

In plots involving fluopyram-treated seeds, subsequent treatments were either an in-furrow soil treatment of fluopyram at planting or a single pre-harvest foliar application of fluopyram (SC 500 formulation).

Seeds were treated with fluopyram (SC formulation) at a rate of 1.1. mg ai/seed and sown at rates of about 220 000–300 000 seeds/ha (equivalent to about 0.24–0.33 kg ai/ha). The in-furrow soil treatments were applied using single nozzle backpack sprayers or tractor-mounted 4-row band sprayers and the foliar sprays were applied (with added adjuvant) using CO_2 plot sprayers or knapsack sprayers with hand-held spray booms or tractor-mounted spray booms. Plot sizes in these trials ranged from 55–335 square metres.

In plots involving fluopyram treatments at planting (either as in-furrow or 30–40 cm band sprays), subsequent pre-harvest applications of fluopyram (SC 500 formulation) were applied, either as a foliar spray or by chemigation.

The in-furrow soil treatments were applied using single nozzle backpack sprayers or tractor-mounted 4-row band sprayers, the foliar sprays were applied (with added adjuvant) using CO_2 plot sprayers or knapsack sprayers with hand-held spray booms or tractor-mounted spray booms and the chemigation treatments were applied using overhead irrigation equipment. Plot sizes in these trials ranged from 55–335 square metres.

At the specified PHIs, peanuts were dug and the hay was cut (same day), with both commodities allowed to dry to commercial dryness in the field or under cover for 3–8 days before duplicate samples (of at least 1 kg nutmeat and 0.5 kg hay) were taken, frozen within 2 hours of sampling and held in frozen storage for up to 235 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with reported LOQs of 0.01 mg/kg (nutmeat) and 1.0 mg/kg (peanut hay). Mean recovery rates were 88–100% in samples spiked with 0.01–1.0 mg/kg (nutmeat) and 0.01–50 mg/kg (hay).

Table 61 Fluopyram residues in peanut hay from supervised trials in USA involving seed treatment and one in-furrow soil application at planting

PEANUT HAY Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP, Canada	0.25	-			7 (feed)	Max 0.5 kg ai/ha/season		Ground
GAP, USA	0.82 mg ai/seed-		-		-	Max 0.5 kg ai/ha/season		Seed treatment
USA, 2012 Chula, GA (GA-06G)	0.25 0.26	- 0.35	- 75	hay (73-76%DM)	124 128 135 142 149	1.28, 1.67 0.73, 0.89 0.66, 0.42 0.63, 0.84 0.5, 0.48	1.48 0.81 0.54 0.73 0.49	RAGML209 GM035-12DA
USA, 2012 Athens, GA (not reported)	0.249 0.251	- 0.598	- 42	hay (71%DM)	132	1.26, 1.07	1.17	RAGML209 GM036-12DA
USA, 2012 Tallassee, AL (FL07)	0.244 0.25	- 0.64	- 39	hay (83%DM)	120	1.44, 1.67	1.56	RAGML209 GM037-12DA
USA, 2012 Jeffersonville, GA (Georgia 06G)	0.328 0.254	- 0.67	- 38	hay (45%DM)	112	0.84, 1.02	0.93	RAGML209 GM038-12DA
USA, 2012 Elko, SC (GA-06G)	0.25 0.253	- 0.602	- 42	hay (79%DM)	138	1.47, 1.66	1.57	RAGML209 GM039-12DA
USA, 2012 Suffolk, VA (Bailey)	0.257 0.251	- 0.58	- 43	hay (56%DM)	138	0.59, 0.71	0.65	RAGML209 GM040-12DA
USA, 2012 Steven Springs, NC (Bailey)	0.25 0.252	- 0.56	- 45	hay (80%DM)	145	1.45, 1.78	1.62	RAGML209 GM041– 12DA
USA, 2012 Sycamore, GA (FL 07)	0.25 0.249	- 0.54	- 46	hay (68%DM)	150	1.23, 0.69	0.96	RAGML209 GM042-12DA
USA, 2012 Oviedo, FL (FL 07)	0.25 0.244	- 0.54	- 45	hay (83%DM)	132	0.63, 0.75	0.69	RAGML209 GM043-12DA
USA, 2012 Raymondville, TX (Tamrun)	0.238 0.251	- 0.6	- 42	hay (83% DM)	127	1.21, 1.35	1.28	RAGML209 GM044-12DA
USA, 2012 Charlotte, TX (FL07)	0.277 0.252	- 0.66	- 38	hay (74% DM)	153	0.96, 0.96	0.96	RAGML209 GM045-12DA
USA, 2012 Levelland, TX (Tamrun)	0.25 0.262	- 0.66	- 40	hay (80% DM)	140	1.2, 1.26	1.23	RAGML209 GM046-12DA

Table 62 Fluopyram residues in peanut hay from supervised trials in USA involving seed treatment and one pre-harvest foliar application

PEANUT HAY Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP, Canada	0.25	-			7 (feed)	Max 0.5 kg ai/ha/season		Ground
GAP, USA	0.82 mg ai/seed-			-	-	Max 0.5 kg ai/ha/season		Seed treatment
USA, 2012 Chula, GA (GA-06G)	0.250 0.259	- 0.147	- 176	hay (75-89%DM)	3 7 14 21 28	15.6, 22.8 13.2, 13.2 5.03, 3.02 15.4, 12.5 7.1, 7.92	19.2 13.2 4.03 14.0 7.51	RAGML209 GM035-12DA

PEANUT HAY Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
USA, 2012 Athens, GA (not reported)	0.249 0.251	- 0.151	- 166	hay (70%DM)	7	8.57, 9.61	9.09	RAGML209 GM036-12DA
USA, 2012 Tallassee, AL (FL07)	0.244 0.248	- 0.163	- 152	hay (73%DM)	7	20.14, 20.05	20.1	RAGML209 GM037-12DA
USA, 2012 Jeffersonville, GA (Georgia 06G)	0.256 0.246	- 0.224	- 110	hay (36%DM)	7	2.72, 3.37	3.05	RAGML209 GM038-12DA
USA, 2012 Elko, SC (GA-06G)	0.250 0.252	- 0.171	- 147	hay (76%DM)	7	19.0, 18.1	18.6	RAGML209 GM039-12DA
USA, 2012 Suffolk, VA (Bailey)	0.257 0.255	- 0.196	- 130	hay (54%DM)	10	5.39, 6.04	5.72	RAGML209 GM040-12DA
USA, 2012 Steven Springs, NC (Bailey)	0.250 0.246	- 0.150	- 164	hay (77%DM)	7	7.45, 7.74	7.60	RAGML209 GM041–12DA
USA, 2012 Sycamore, GA (FL 07)	0.256 0.249	- 0.141	- 176	hay (72%DM)	10	3.13, 4.28	3.71	RAGML209 GM042-12DA
USA, 2012 Oviedo, FL (FL 07)	0.250 0.255	- 0.147	- 173	hay (82%DM)	10	9.25, 9.46	9.4	RAGML209 GM043-12DA
USA, 2012 Raymondville, TX (Tamrun)	0.238 0.255	- 0.178	- 143	hay (84%DM)	6	15.3, 11.2	13.3	RAGML209 GM044-12DA
USA, 2012 Charlotte, TX (FL07)	0.277 0.250	- 0.182	- 137	hay (76%DM)	7	1.99, 2.31	2.15	RAGML209 GM045-12DA
USA, 2012 Levelland, TX (Tamrun)	0.250 0.253	- 0.141	- 179	hay (79%DM)	7	21.1, 18.2	19.7	RAGML209 GM046-12DA

Table 63 Fluopyram residues in peanut hay from supervised trials in USA involving in-furrow or band spray at planting and one pre-harvest foliar application

PEANUT HAY Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP, Canada	0.25	-			7 (feed)	Max 0.5 kg ai/ha/season		Ground
GAP, USA	0.82 mg ai/seed		-		-	Max 0.5 kg ai/ha/season		Seed treatment
In-furrow + pre-harvest foliar spray								
USA, 2012 Chula, GA (GA-06G)	0.255 0.253	0.345 0.147	74 172	hay (70-81%DM)	3 7 14 21 28	17.9, 23.4 13.4, 12.8 5.96, 6.22 7.82, 6.54 4.65, 4.83	20.7 13.1 6.09 7.18 4.74	RAGML209 GM035-12DA
USA, 2012 Athens, GA (not reported)	0.258 0.252	0.586 0.151	44 167	hay (71%DM)	7	7.47, 8.8	8.14	RAGML209 GM036-12DA
USA, 2012 Tallassee, AL (FL07)	0.252 0.248	0.646 0.163	39 152	hay (79%DM)	7	17.0, 24.8	20.9	RAGML209 GM037-12DA
USA, 2012 Jeffersonville, GA (Georgia 06G)	0.255 0.246	0.671 0.224	38 110	hay (76%DM)	7	6.16, 5.63	5.9	RAGML209 GM038-12DA

PEANUT HAY Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
USA, 2012 Elko, SC (GA-06G)	0.252 0.253	0.548 0.172	42 147	hay (75%DM)	7	23.0, 23.5	23.3	RAGML209 GM039-12DA
USA, 2012 Suffolk, VA (Bailey)	0.25 0.256	0.581 0.197	43 130	hay (53%DM)	10	3.65, 6.26	4.96	RAGML209 GM040-12DA
USA, 2012 Steven Springs, NC (Bailey)	0.253 0.252	0.562 0.15	45 168	hay (77%DM)	7	7.7, 7.12	7.41	RAGML209 GM041–12DA
USA, 2012 Sycamore, GA (FL 07)	0.248 0.246	0.539 0.141	46 174	hay (71%DM)	7	3.1, 3.45	3.28	RAGML209 GM042-12DA
USA, 2012 Oviedo, FL (FL 07)	0.246 0.249	0.547 0.147	45 169	hay (84%DM)	7	13.1, 10.2	11.7	RAGML209 GM043-12DA
USA, 2012 Raymondville, TX (Tamrun)	0.249 0.256	0.593 0.178	42 144	hay (84%DM)	7	15.6, 16.2	15.9	RAGML209 GM044-12DA
USA, 2012 Charlotte, TX (FL07)	0.250 0.248	0.676 0.182	37 136	hay (77%DM)	7	1.81, 1.58	1.7	RAGML209 GM045-12DA
USA, 2012 Levelland, TX (Tamrun)	0.256 0.253	0.656 0.141	39 179	hay (76%DM)	7	19.2, 17.9	18.4	RAGML209 GM046-12DA
Band spray at planting + preharvest foliar spray								
USA, 2012 Chula, GA (GA-06G)	0.253 0.259	0.59 0.154	43 168	hay (81%DM)	7	11.5, 11.0	11.3	RAGML209 GM035-12DA
USA, 2012 Elko, SC (GA-06G)	0.252 0.252	0147 0.171	172 147	hay (81%DM)	7	17.7, 17.7	17.7	RAGML209 GM039-12DA
USA, 2012 Suffolk, VA (Bailey)	0.253 0.256	0158 0.197	160 130	hay (52%DM)	10	3.49, 3.26	3.38	RAGML209 GM040-12DA

Table 64 Fluopyram residues in peanut hay from supervised trials in USA involving one in-furrow application at planting and one pre-harvest chemigation application

PEANUT HAY Country, year Location (variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference & Comments
	kg ai/ha	kg ai/hL	water (L/ha)			values	mean	
GAP, Canada	0.25				7 (feed)	Max 0.5 kg ai/ha/season		Ground
GAP, USA	0.82 mg ai/seed		-		-	Max 0.5 kg ai/ha/season		Seed treatment
USA, 2012 Tallassee, AL (FL07)	0.252 0.249	0.65 0.000196	39 127077	hay (76-90%DM)	16 23 30 37 44	1.76, 1.99 1.73, 1.45 1.59, 2.32 1.86, 2.45 1.15, 1.14	1.88 1.59 1.96 2.16 1.15	RAGML209 GM037-12DA
USA, 2012 Jeffersonville, GA (Georgia 06G)	0.249 0.219	0.67 0.000133	37 165076	hay (38-73%DM)	16 23 30 37 44	1.73, 1.85 1.41, 1.89 1.44, 1.57 1.52, 1.41 1.09, 1.06	1.79 1.65 1.51 1.47 1.08	RAGML209 GM038-12DA
USA, 2012 Charlotte, TX (FL07)	0.249 0.251	0.67 0.000184	37 136064	hay (61–85%DM)	16 23 28 35 42	0.946, 0.536 1.01, 0.535 0.988, 0.576 0.484, 0.338 0.465, 0.463	0.74 0.77 0.78 0.41 0.46	RAGML209 GM045-12DA

Soya bean forage and fodder

Results from supervised trials from USA on soya beans were provided to the 2010 JMPR. In these trials, two applications of 0.24–0.27 kg ai/ha (SC 500 formulation) were applied to soya beans, 5–7 days apart (14 days in one plot) as foliar sprays using knapsack or coke can sprayers with hand-held spray booms, tractor-mounted or motorised boom sprayers to apply 113–197 litres of spray mix/ha. Plot sizes in these trials ranged from 62–298 square metres. In each trial, one plot was treated over the flowering period (for sampling of forage and hay) and a second plot was treated when pods were close to maturity (for sampling of seed). Hay from the first plot was allowed to dry to commercial dryness before sampling, 0–6 days after cutting (22 days in one plot).

Duplicate samples of at least 1 kg forage and 0.3 kg hay were taken from at least 12 areas within each plot, frozen within 4 hours of sampling, held in frozen storage for up to 585 days (hay) and 581 days (forage) before measuring dry matter content and analysing for fluopyram using LC/MS/MS Method GM-001–P07-01 (with a reported LOQ of 0.01 mg/kg).

Table 65 Fluopyram residues in soya bean forage from supervised trials in USA involving foliar applications (500 SC formulations)

SOYA BEAN FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg)			Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		matrix	values	mean	
GAP: Canada		0.25			7 (feed)		Max 0.5 kg ai/ha/season		7-14 day RTI
USA, 2006 Tifton, GA (DP 4546 RR)	2	0.25 0.25	0.156 0.211	144 160	7	forage (28%DM)	2.37, 1.42	1.9	RAGMP039 GM062-06HA
USA, 2006 Molino, FL (Pioneer 97B52)	2	0.251 0.243	0.188 0.2	137 129	6	forage (21%DM)	2.34, 2.8	2.6	RAGMP039 GM063-06HA
USA, 2006 Leland, MS (Asgrow STS 4404)	2	0.258 0.252	0.2 0.169	122 126	7	forage (23%DM)	1.39, 2.88	2.1	RAGMP039 GM064-06HA
USA, 2006 Proctor, AR (AG4403RR)	2	0.25 0.251	0.17 0.154	149 148	7	forage (22%DM)	4.98, 6.19	5.6	RAGMP039 GM065-06HA
USA, 2006 Cheneyville, LA (DP 5634 RR)	2	0.252 0.247	0.152 0.134	166 163	7	forage (27%DM)	4.05, 3.33	3.7	RAGMP039 GM066-06HA
USA, 2006 Springfield, NE (NKS28 G1)	2	0.253 0.25	0.195 0.2	128 128	6	forage (16%DM)	1.21, 1.08	1.1	RAGMP039 GM069-06HA
USA, 2006 Earlham, IA (S2783-4)	2	0.254 0.259	0.216 0.15	129 120	7	forage (19%DM)	1.06, 1.23	1.1	RAGMP039 GM070-06HA
USA, 2006 Sabin, MN (RG 200)	2	0.257 0.239	0.147 0.195	160 163	7	forage (63%DM)	0.32, 0.4	0.36	RAGMP039 GM071–06HA
USA, 2006 Percival, IA (Sucrosco 935-01RNX)	2	0.251 0.248	0.195 0.181	129 127	6	forage (21%DM)	2.52, 2.78	2.6	RAGMP039 GM072-06HA
USA, 2006 Stilwell, KS (NSQ49-Q9)	2	0.25 0.248	0.18 0.179	138 138	7	forage (19%DM)	5.56, 5.85	5.7	RAGMP039 GM073-06HA
USA, 2006 Stilwell, KS (NKS49-Q9)	2	0.252 0.248	0.18 0.134	140 138	7	forage (19%DM)	2.54, 2.92	2.73	RAGMP039 GM074-06HA

SOYA BEAN FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg)			Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		matrix	values	mean	
USA, 2006 Campbell, MN (Dekalb 009-51 RR)	2	0.251 0.251	0.134 0.17	188 188	7	forage (19%DM)	3.29, 3.21	3.2	RAGMP039 GM075-06HA
USA, 2006 Bernie, MO (Hutchison)	2	0.252 0.25	0.168 0.181	149 149	7	forage (19%DM)	2.64, 1.96	2.3	RAGMP039 GM076-06HA
USA, 2006 Sheridan, IN (RT3253)	2	0.251 0.252	0.208 0.155	119 121	7	forage (19%DM)	1.21, 1.21	1.2	RAGMP039 GM077-06HA
USA, 2006 Geneva, MN (Pioneer 91M90)	2	0.256 0.252	0.158 0.147	162 160	7	forage (15%DM)	2.4, 2.23	2.3	RAGMP039 GM078-06HA
USA, 2006 Richland, IA (Pioneer 93B82)	2	0.249 0.25	0.168 0.17	167 149	7	forage (16%DM)	1.18, 1.05	1.1	RAGMP039 GM079-06HA
USA, 2006 Washington, OH (SC 9384RR)	2	0.25 0.254	0.173 0.142	146 147	6	forage (20%DM)	3.09, 3.6	3.3	RAGMP039 GM080-06HA
USA, 2006 Arkansas, WI (91M91)	2	0.251 0.251	0.143 7	176 176	7	forage (19%DM)	2.98, 3.54	3.3	RAGMP039 GM081–06HA
USA, 2006 York, NE (Garst 2834 RR)	2	0.249 0.256	0.138 0.138	180 185	0 3 7 10 14	forage (16%DM) forage (16%DM) forage (19%DM) forage (17%DM) forage (18%DM)	14.98, 12.69 11.07, 9.75 4.62, 4.65 2.05, 1.73 1.32, 1.39	13.84 10.41 4.6 1.89 1.36	RAGMP039 GM067-06DA
USA, 2006 Seymour, IL (Agripro 3212 RR/N)	2	0.259 0.248	0.191 0.193	146 130	0 3 7 9 14	forage (20%DM) forage (17%DM) forage (18%DM) forage (19%DM) forage (19%DM)	17.86, 18.42 2.08, 2.02 1.29, 1.37 1.15, 1.14 0.92, 0.7	18.14 2.05 1.3 1.15 0.81	RAGMP039 GM068-06DA c=0.014 mg/kg (day 7 forage)

Table 66 Fluopyram residues in soya bean hay from supervised trials in USA involving foliar applications (500 SC formulations)

SOYA BEAN HAY Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg)			Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		matrix	values	mean	
GAP: Canada		0.25			7 (feed)		Max 0.5 kg ai/ha/season		7-14 day RTI
USA, 2006 Tifton, GA (DP 4546 RR)	2	0.25 0.25	0.156 0.211	144 160	7+6[a]	hay (70%DM)	6.17, 6.22	6.2	RAGMP039 GM062-06HA
USA, 2006 Molino, FL (Pioneer 97B52)	2	0.251 0.243	0.188 0.2	137 129	6+6[a]	hay (91%DM)	9.71, 8.44	9.1	RAGMP039 GM063-06HA
USA, 2006 Leland, MS (Asgrow STS 4404)	2	0.258 0.252	0.2 0.169	122 126	7+3[a]	hay (63%DM)	3.51, 3.64	3.6	RAGMP039 GM064-06HA
USA, 2006 Proctor, AR (AG4403RR)	2	0.25 0.251	0.17 0.154	149 148	7+1[a]	hay (81%DM)	10.47, 11.69	11	RAGMP039 GM065-06HA
USA, 2006 Cheneyville, LA (DP 5634 RR)	2	0.252 0.247	0.152 0.134	166 163	7+3[a]	hay (81%DM)	10.79, 11.04	11	RAGMP039 GM066-06HA

SOYA BEAN HAY Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg)			Reference & Comments
	no	kg ai/ha	kg ai/hL	water (L/ha)		matrix	values	mean	
USA, 2006 Springfield, NE (NKS28 G1)	2	0.253 0.25	0.195 0.2	128 128	6+2[a]	hay (46%DM)	3.0, 3.3	3.1	RAGMP039 GM069-06HA
USA, 2006 Earlham, IA (S2783-4)	2	0.254 0.259	0.216 0.15	129 120	7+5[a]	hay (56%DM)	3.25, 2.69	3.0	RAGMP039 GM070-06HA
USA, 2006 Sabin, MN (RG 200)	2	0.257 0.239	0.147 0.195	160 163	7+22[a]	hay (87%DM)	1.21, 2.37	1.8	RAGMP039 GM071–06HA
USA, 2006 Percival, IA (Sucrosco 935-01RNX)	2	0.251 0.248	0.195 0.181	129 127	6+1[a]	hay (44%DM)	7.83, 4.02	5.9	RAGMP039 GM072-06HA
USA, 2006 Stilwell, KS (NSQ49-Q9)	2	0.25 0.248	0.18 0.179	138 138	7	hay (77%DM)	19.5, 20.9	20	RAGMP039 GM073-06HA
USA, 2006 Stilwell, KS (NKS49-Q9)	2	0.252 0.248	0.18 0.134	140 138	7	hay (71%DM)	9.91, 9.58	9.75	RAGMP039 GM074-06HA
USA, 2006 Campbell, MN (Dekalb 009-51 RR)	2	0.251 0.251	0.134 0.17	188 188	7+2[a]	fhay (58%DM)	5.96, 8.91	7.4	RAGMP039 GM075-06HA
USA, 2006 Bernie, MO (Hutchison)	2	0.252 0.25	0.168 0.181	149 149	7+2[a]	hay (61%DM)	6.52, 6.44	6.5	RAGMP039 GM076-06HA
USA, 2006 Sheridan, IN (RT3253)	2	0.251 0.252	0.208 0.155	119 121	7+2[a]	hay (39%DM)	2.33, 2.11	2.2	RAGMP039 GM077-06HA
USA, 2006 Geneva, MN (Pioneer 91M90)	2	0.256 0.252	0.158 0.147	162 160	7+4[a]	hay (49%DM)	6.93, 5.23	6.1	RAGMP039 GM078-06HA
USA, 2006 Richland, IA (Pioneer 93B82)	2	0.249 0.25	0.168 0.17	167 149	7+2[a]	hay (55%DM)	3.32, 3.43	3.4	RAGMP039 GM079-06HA
USA, 2006 Washington, OH (SC 9384RR)	2	0.25 0.254	0.173 0.142	146 147	6+3[a]	hay (39%DM)	5.46, 5.83	5.6	RAGMP039 GM080-06HA
USA, 2006 Arkansaw, WI (91M91)	2	0.251 0.251	0.143 7	176 176	7+3[a]	hay (77%DM)	11.48, 15.74	14	RAGMP039 GM081–06HA
USA, 2006 York, NE (Garst 2834 RR)	2	0.249 0.256	0.138 0.138	180 185	0+3[a] 3+5[a] 7+3[a] 10+4[a] 14+1[a]	hay (72%DM) hay (66%DM) hay (58%DM) hay (59%DM) hay (45%DM)	66.95, 67.88 43.3, 34.2 17.53, 14.44 7.11, 7.12 3.75, 3.77	67.42 38.75 16 7.12 3.76	RAGMP039 GM067-06DA
USA, 2006 Seymour, IL (Agripro 3212 RR/N)	2	0.259 0.248	0.191 0.193	146 130	0+4[a] 3+5[a] 7+4[a] 9+9[a] 14+5[a]	hay (56%DM) hay (ND%DM) hay (56%DM) hay (56%DM) hay (66%DM)	59.28, 61.8 7.71, 9.35 3.89, 5.37 4.06, 3.68 3, 2.52	60.54 8.53 4.6 3.87 2.76	RAGMP039 GM068-06DA c=0.014 mg/kg (day 7 forage)

[a] Drying interval between cutting and sampling

Cereal animal feeds

Barley

Results from supervised trials in Europe, involving foliar applications of fluopyram to barley were provided to the Meeting. In these trials, single applications of fluopyram (SC or EC formulations) were applied at either BBCH 30–31 (early stem elongation) or BBCH 61 (start of flowering) using knapsack or tractor-mounted boom sprayers with 3–10 flat-fan or hollow-cone nozzles, applying 280–400 litres spray mix/ha. Plot sizes in these trials ranged from 24–144 square metres.

Unreplicated samples of forage (min 0.5 kg fresh weight) were taken 0–28 days after application and samples of mature grain (min 1.1 kg) and straw (min 0.55 kg) were taken at harvest, with all samples being frozen within 24 hours and stored frozen for up to 438 days (forage), 448 days (grain) and 394 days (straw) before analysis for fluopyram (and its BZM metabolite in most trials) using LC/MS/MS Method 00984 with a reported LOQ of 0.01 mg/kg and mean recovery rates of 95–101% in forage and straw samples spiked with 0.01–15 mg/kg fluopyram and 95–105% in grain samples spiked with 0.01–0.8 mg/kg fluopyram.

Table 67 Fluopyram residues in barley forage from supervised trials in Europe involving one foliar application of fluopyram (EC or SE formulations)

BARLEY FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	form	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
GAP, Estonia	1	0.078		30-61	-			
France (N), 2012 Chaussy (Volume)	EC	0.078	300	61	0 7 14 28	forage	1.0 0.23 0.16 0.035	12-2130 12-2130-01
Belgium, 2012 Marbais (Quench)	EC	0.078	250	61	0	forage	1.3	12-2130 12-2130-02
UK, 2012 Cambridge (Carrat)	EC	0.078	200	61	0 7 14 27	forage	1.7 0.86 0.28 0.080	12-2130 12-2130-03
Germany, 2012 Burscheid (Simba)	EC	0.078	300	61	0	forage	1.8	12-2130 12-2130-04
Germany, 2013 Burscheid (Conchita)	SE	0.125	300	30	0 1 2 3 5 7 10	forage	8.6 6.8 5.0 2.3 1.5 0.53 0.24	13-2950 13-2950-01
Germany, 2013 Langforden (Grace)	SE	0.125	300	31	0 1 2 3 5 7 10	forage	4.5 0.96 0.83 0.75 0.61 0.44 0.25	13-2950 13-2950-02
Belgium, 2013 Saint-Amand (Quench)	SE	0.125	300	30	0 1 2 3 5 7 10	forage	7.3 1.4 1.2 1.0 0.54 0.30 0.20	13-2950 13-2950-03

BARLEY FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	form	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
Netherlands, 2013 Middenmeer (Tipple)	SE	0.125	300	30	0 1 2 3 5 7 10	forage	8.0 6.3 1.5 1.4 0.67 0.41 0.20	13-2950 13-2950-04
France (S), 2012 Bouloc (Queen)	EC	0.078	300	61	0 7 14 28	forage	1.3 0.33 0.11 0.042	12-2132 12-2132-01
France (S), 2012 Pouant (Cervoise)	EC	0.078	300	61	0	forage	1.5	12-2132 12-2132-02 winter barley
Spain, 2012 Salitja (Gomera)	EC	0.073	282	61	0 7 15 28	forage	2.0 0.58 0.17 0.1	12-2132 12-2132-03
Spain, 2012 Marata (Graphic)	EC	0.078	300	61	0 7 14 28	forage	2.0 0.71 0.55 0.32	12-2132 12-2132-04
Italy, 2012 Tarquinia (Distich)	EC	0.078	300	61	0 7 14 28	forage	2.0 0.89 0.58 0.62	12-2132 12-2132-05
Portugal, 2012 Mecca Alenquer (Cevada)	EC	0.078	400	61	0	forage	2.1	12-2132 12-2132-07
Greece, 2012 Kilkis (Lutes)	EC	0.078	300	65	0	forage	2.0	12-2132 12-2132-08
Italy, 2013 Civitavecchia (Quench)	EC	0.078	300	61	28	forage	0.27	13-2004 13-2004-01
France (N), 2012 Chaussy (95710) (Volume)	SE	0.125	300	61	0 7 14 28	forage	1.8 0.26 0.19 0.043	12-2163 12-2163-01
Germany, 2012 Langforden (Meridian)	SE	0.125	300	61	0 7 14 28	forage	1.8 0.95 0.31 0.14	12-2163 12-2163-02
Netherlands, 2012 Slootdorp (Winter Malt)	SE	0.125	300	61	0 7 14 28	forage	2.6 0.62 0.30 0.062	12-2163 12-2163-03
Netherlands, 2012 St Annaparochie (Winter Malt)	SE	0.125	300	61	0 7 14 28	forage	2.1 0.25 0.088 0.03	12-2163 12-2163-04
France (N), 2012 Chambourg sur Indre (Sebastien)	SE	0.125	300	61	0	forage	1.9	12-2163 12-2163-05
Belgium, 2012 Marbais (Quench)	SE	0.125	200	61	0	forage	2.2	12-2163 12-2163-06
UK, 2012 Little Shelford farm (Simba)	SE	0.125	200	61	0	forage	2.4	12-2163 12-2163-07

BARLEY FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	form	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
Germany, 2012 Burscheid (Simba)	SE	0.125	300	61	0	forage	2.6	12-2163 12-2163-08

Trace residues of fluopyram-benzamide reported in some forage and straw samples (max 0.06 mg/kg – straw)

Table 68 Fluopyram residues in barley straw from supervised trials in Europe involving one foliar application of fluopyram (EC or SE formulations)

BARLEY STRAW Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	form	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
GAP, Estonia	1	0.078		30-61	-			
France (N), 2012 Chaussy (Volume)	EC	0.078	300	61	64	straw	0.054	12-2130 12-2130-01
Belgium, 2012 Marbais (Quench)	EC	0.078	250	61	47	straw	0.058	12-2130 12-2130-02
Germany, 2012 Burscheid (Simba)	EC	0.078	300	61	69	straw	0.024	12-2130 12-2130-04
France (S), 2012 Bouloc (Queen)	EC	0.078	300	61	49	straw	0.097	12-2132 12-2132-01
France (S), 2012 Pouant (Cervoise)	EC	0.078	300	61	57	straw	0.025	12-2132 12-2132-02
Spain, 2012 Salitja (Gomera)	EC	0.073	282	61	42	straw	0.018	12-2132 12-2132-03
Spain, 2012 Marata (Graphic)	EC	0.078	300	61	42	straw	0.77	12-2132 12-2132-04
Italy, 2012 Tarquinia (Distich)	EC	0.078	300	61	56	straw	1.1	12-2132 12-2132-05
Portugal, 2012 Mecca Alenquer (Cevada)	EC	0.078	400	61	55	straw	0.095	12-2132 12-2132-07
Greece, 2012 Kilkis (Lutes)	EC	0.078	300	65	35	straw	0.4	12-2132 12-2132-08
Italy, 2013 Civitavecchia (Quench)	EC	0.078	300	61	53	straw	0.81	13-2004 13-2004-01
France (N), 2012 Chaussy (95710) (Volume)	SE	0.125	300	61	64	straw	0.14	12-2163 12-2163-01
Germany, 2012 Langforden (Meridian)	SE	0.125	300	61	62	straw	0.066	12-2163 12-2163-02
Netherlands, 2012 Slootdorp (Winter Malt)	SE	0.125	300	61	54	straw	0.057	12-2163 12-2163-03
Netherlands, 2012 St Annaparochie (Winter Malt)	SE	0.125	300	61	56	straw	0.025	12-2163 12-2163-04

BARLEY STRAW Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	form	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
France (N), 2012 Chambourg sur Indre (Sebastien)	SE	0.125	300	61	53	straw	0.14	12-2163 12-2163-05
Belgium, 2012 Marbais (Quench)	SE	0.125	200	61	47	straw	0.081	12-2163 12-2163-06
UK, 2012 Little Shelford farm (Simba)	SE	0.125	200	61	46	straw	0.13	12-2163 12-2163-07
Germany, 2012 Burscheid (Simba)	SE	0.125	300	61	69	straw	0.11	12-2163 12-2163-08

Trace residues of fluopyram-benzamide reported in some forage and straw samples (max 0.06 mg/kg – straw)

Maize and Sweetcorn

Results from supervised trials from USA on maize and sweetcorn were provided to the 2010 Meeting. In these trials, two applications of 0.243–0.267 kg ai/ha (SC 500 formulation) were applied to maize and sweet corn, 5–8 days apart as foliar sprays using knapsack sprayers with hand-held spray booms or tractor-mounted boom sprayers to apply 111–187 litres of spray mix/ha. Plot sizes in these trials ranged from 37–297 square metres.

In each maize trial, one plot was last treated over the early ripening stages (BBCH 85–87) for sampling of forage and a second plot was last treated when the kernels were at the mature to fully ripe stage (BBCH 87–89) for sampling of kernels and fodder (i.e. leaves, stalks, husks and cobs after removal of the kernels).

Cobs (without husks) and forage (including husks) were sampled from sweetcorn and some field corn trials last treated when the kernels were close to mature (BBCH 75–79).

Duplicate samples of at least 1 kg cobs, grain and forage and at least 0.5 kg fodder (stover) were taken from each plot, frozen within 4 hours of sampling, held in frozen storage for up to 340 days (grain), 435 days (cobs), 409 days (forage) and 366 days (fodder) before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg (kernels, cobs, forage and fodder. All residues were reported on a fresh weight basis.

Table 69 Fluopyram residues in maize/sweetcorn forage from supervised trials in USA involving two foliar applications of fluopyram (500 SC formulations)

SWEETCORN FORAGE Country, year Location (variety)	Application			DALA	Fluopyram residues (mg/kg fresh weight)			Reference & Comments
	kg ai/ha	water (L/ha)	GS – BBCH		matrix	values	mean	
GAP: USA	0.25			14		Max 0.5 kg ai/ha/season		14 day RTI
USA, 2006 Germansville, PA (TA5750) Corn, Field	0.26 0.267	180 190	73 75	0	forage (23%DM)	2.98, 2.93	2.96	RAGMP038 GM043-06HA
USA, 2006 Tifton, GA (31N26) Corn, Field	0.25 0.25	135 125	71 75	0	forage (29%DM)	4.97, 3.02	3.99	RAGMP038 GM044-06HA

SWEETCORN FORAGE Country, year Location (variety)	Application			DALA	Fluopyram residues (mg/kg fresh weight)			Reference & Comments
	kg ai/ha	water (L/ha)	GS – BBCH		matrix	values	mean	
GAP: USA	0.25			14		Max 0.5 kg ai/ha/season		14 day RTI
USA, 2006 New Holland, OH (Crows 7R154) Corn, Field	0.253 0.252	146 148	71 79	0	forage (24%DM)	3.83, 3.15	3.49	RAGMP038 GM046-06HA
USA, 2006 Richland, IA (9190 LL HX) Corn, Field	0.245 0.25	129 131	73 75	0	forage (22%DM)	2.53, 2.45	2.49	RAGMP038 GM047-06HA
USA, 2006 Stilwell, KS (Garst 8287 RR) Corn, Field	0.245 0.252	131 136	71 79	0	forage (24%DM)	4.64, 5.41	5.02	RAGMP038 GM048-06HA
USA, 2006 Fresno, CA (Silver Queen) Corn, Sweet	0.25 0.251	170 172	71 73	0 3 7 10 14	forage (22%DM) forage (25%DM) forage (26%DM) forage (26%DM) forage (28%DM)	4.78, 5.52 4.06, 5.85 4.74, 5.78 4.75, 4.23 3.81, 4.07	5.15 4.96 5.26 4.49 3.9	RAGMP038 GM059-06DA
USA, 2006 Sabin, MN (Pioneer 39H85) Corn, Field	0.253 0.243	158 159	79 85	0	forage (47%DM)	3.39, 4.34	3.87	RAGMP038 GM051–06HA 16d spray interval
USA, 2006 Earlham, IO (35P17 LL) Corn, Field	0.258 0.25	118 118	85 85	0	forage (51%DM)	2.21, 3.7	2.95	RAGMP038 GM052-06HA
USA, 2006 Springfield, NE (NK38B4) Corn, Field	0.251 0.25	129 131	83 85	0	forage (25%DM)	2.54, 3.54	3.04	RAGMP038 GM053-06HA
USA, 2006 Percival, IO (NK 65C5) Corn, Field	0.251 0.252	131 132	85 85	0	forage (33%DM)	1.98, 3.1	2.54	RAGMP038 GM054-06HA
USA, 2006 Gardner, KS (Garst 8881 RR) Corn, Field	0.253 0.245	136 132	79 85	0	forage (48%DM)	5.01, 4.42	4.72	RAGMP038 GM055-06HA
USA, 2006 New Holland, OH (NK-N69-P9) Corn, Field	0.258 0.252	153 148	85 85	0	forage (28%DM)	5.05, 3.97	4.51	RAGMP038 GM056-06HA
USA, 2006 Arkansaw, WI (38B85) Corn, Field	0.254 0.249	178 174	83 87	0	forage (36%DM)	1.56, 2.11	1.84	RAGMP038 GM057-06HA
USA, 2006 Uvalde, TX (Pioneer 32R25) Corn, Field	0.251 0.255	179 188	85 85	0	forage (24%DM)	2.55, 3.19	2.87	RAGMP038 GM058-06HA

SWEETCORN FORAGE Country, year Location (variety)	Application			DALA	Fluopyram residues (mg/kg fresh weight)			Reference & Comments
	kg ai/ha	water (L/ha)	GS – BBCH		matrix	values	mean	
GAP: USA	0.25			14		Max 0.5 kg ai/ha/season		14 day RTI
USA, 2006	0.26	174	85	0	forage (38%DM)	4.13, 5.08	4.61	RAGMP038
Seymour, IL	0.247	170	85	3	forage (46%DM)	5.79, 5.08	5.43	GM049-06DA
(Garst 8568 CB/LL)				7	forage (46%DM)	1.82, 2.06	1.94	
				9	forage (46%DM)	1.48, 2.55	2.02	
Corn, Field				13	forage (47%DM)	1.75, 1.26	1.5	
USA, 2006	0.251	181	85	1	forage (33%DM)	2.53, 2.04	2.29	RAGMP038
York, NE	0.258	186	87	3	forage (40%DM)	1.82, 2.78	2.3	GM050-06DA
(NK N70-F1				7	forage (40%DM)	1.71, 2.91	2.31	
LL/YG)				10	forage (36%DM)	1.75, 1.69	1.72	
				13	forage (47%DM)	1.92, 2.07	2.0	
Corn, Field								

Table 70 Fluopyram residues in maize fodder (stover) from supervised trials in USA involving two foliar applications (500 SC formulations)

MAIZE FODDER Country, year Location (variety)	Application			DALA	Fluopyram residues (mg/kg fresh weight)			Reference & Comments
	kg ai/ha	water (L/ha)	GS – BBCH		matrix	values	mean	
GAP: USA	0.25			14		Max 0.5 kg ai/ha/season		14 day RTI
USA, 2006	0.262	187	87	14	fodder (32%DM)	1.64, 1.31	1.5	RAGMP038
Germansville, PA	0.258	184	89					GM043-06HA
(TA5750)								
Corn, Field								
USA, 2006	0.25	141	85	13	fodder (80%DM)	2.38, 2.13	2.3	RAGMP038
Tifton, GA	0.25	138	87					GM044-06HA
(31N26)								
Corn, Field								
USA, 2006	0.25	147	87	14	fodder (40%DM)	0.967, 1.06	1.0	RAGMP038
New Holland, OH	0.256	150	87					GM056-06HA
(NK-N69-P9)								
Corn, Field								
USA, 2006	0.257	151	87	14	fodder (40%DM)	0.698, 0.871	0.79	RAGMP038
New Holland, OH	0.25	147	87					GM046-06HA
(Crows 7R154)								
Corn, Field								
USA, 2006	0.247	118	87	13	fodder (34%DM)	1.51, 2.12	1.8	RAGMP038
Richland, IA	0.251	183	87					GM047-06HA
(9190 LL HX)								
Corn, Field								
USA, 2006	0.248	133	85	14	fodder (60%DM)	1.99, 1.74	1.9	RAGMP038
Stilwell, KS	0.253	136	87					GM048-06HA
(Garst 8287 RR)								
Corn, Field								
USA, 2006	0.259	174	85	14	fodder (79%DM)	2.98, 2.57	2.8	RAGMP038
Sabin, MN	0.251	183	85					GM051–06HA
(Pioneer 39H85)								
Corn, Field								

MAIZE FODDER Country, year Location (variety)	Application			DALA	Fluopyram residues (mg/kg fresh weight)			Reference & Comments
	kg ai/ha	water (L/ha)	GS – BBCH		matrix	values	mean	
USA, 2006 Earlham, IA (35P17 LL) Corn, Field	0.245 0.249	111 116	85 85	12	fodder (37%DM)	0.782, 1.56	1.2	RAGMP038 GM052-06HA
USA, 2006 Springfield, NE (NK38B4) Corn, Field	0.25 0.251	130 131	87 87	11	fodder (50%DM)	4.36, 3.89	4.1	RAGMP038 GM053-06HA
USA, 2006 Percival, IA (NK 65C5) Corn, Field	0.249 0.251	130 129	87 87	12	fodder (33%DM)	1.28, 0.962	1.1	RAGMP038 GM054-06HA
USA, 2006 Gardner, KS (Garst 8881 RR) Corn, Field	0.244 0.248	131 132	85 87	14	fodder (55%DM)	1.4, 0.999	1.2	RAGMP038 GM055-06HA
USA, 2006 Arkansas, WI (38B85) Corn, Field	0.253 0.256	177 179	87 87	14	fodder (44%DM)	1.9, 2.24	2.1	RAGMP038 GM057-06HA
USA, 2006 Uvalde, TX (Pioneer 32R25) Corn, Field	0.245 0.248	164 171	89 89	12	fodder (53%DM)	14.69, 12.12	13	RAGMP038 GM058-06HA
USA, 2006 Seymour, IL (Garst 8568 CB/LL) Corn, Field	0.252 0.257	173 174	87 89	0 6 13 19 26	fodder (35%DM) fodder (44%DM) fodder (47%DM) fodder (49%DM) fodder (52%DM)	6.9, 7.36 3.55, 3.42 3.19, 2.79 2.8, 2.18 2.74, 2.26	7.13 3.48 3.0 2.49 2.5	RAGMP038 GM049-06DA
USA, 2006 York, NE (NK N70-F1 LL/YG) Corn, Field	0.248 0.244	185 187	87 87	1 8 12 21 26	fodder (38%DM) fodder (38%DM) fodder (40%DM) fodder (60%DM) fodder (83%DM)	9.21, 8.13 1.18, 1.55 1.39, 0.827 1.13, 0.913 1.08, 0.689	8.67 1.36 1.1 1.02 0.88	RAGMP038 GM050-06DA

Results from supervised trials in Europe, involving foliar applications of fluopyram to maize were provided to the Meeting. In these trials, two applications of fluopyram (SE formulations) were applied 11–16 days apart, up to BBCH 61 (start of flowering) using knapsack or tractor-mounted boom sprayers with 3–10 flat-fan or hollow-cone nozzles, applying 250–400 litres spray mix/ha. Plot sizes in these trials ranged from 36–120 square metres.

Unreplicated samples (min 1 kg) of forage (taken 0–51 days after the last application), immature kernels and cobs-without-husks (taken at the sweet corn milk stage) and mature kernels and stover (taken at harvest) were frozen within 24 hours and stored frozen for up to 393 days (cobs and kernels), 413 days (forage) and 344 days (stover). Analysis for fluopyram (and its BZM metabolite) was conducted using LC/MS/MS Method 00984 with a reported LOQ of 0.01 mg/kg and mean recovery rates of 92–106% in immature and mature kernels and in cobs (without husks) spiked with 0.01–0.1 mg/kg fluopyram and 93–99% in forage and stover samples spiked with 0.01–3.0 mg/kg fluopyram.

Table 71 Fluopyram residues in maize forage and stover from supervised trials in Europe involving two foliar application of fluopyram (SE formulations)

MAIZE FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
GAP, Austria	2	0.125		33-69				
France (N), 2011 Chambourg sur Indre (Cobalt)	2	0.13	300	69	-0 0 20 40	forage	0.45 1.5 0.40 0.27	11–2109 11–2109-01
Germany, 2011 Leverkusen (Saludo)	2	0.13	300	69	-0 0 31 51	forage	0.31 1.5 0.26 0.24	11–2109 11–2109-02
UK, 2011 Cambridge (Cougar)	2	0.13	250	69	-0 0 31 49	forage	0.64 2.1 0.55 0.48	11–2109 11–2109-03
Belgium, 2011 Villers-Perwin (Delitop)	2	0.13	275	67	-0 0 29 42	forage	0.12 1.5 0.22 0.19	11–2109 11–2109-04
Italy, 2011 Bologna (Constanza)	2	0.13	400	67	-0 0 17 29	forage	0.18 1.5 0.41 0.39	11–2110 11–2110-02
Spain, 2011 Vila-sacra (DKC6667YG)	2	0.13	300	71	-0 0 20	forage	0.32 1.2 0.48	11–2110 11–2110-03
Greece, 2011 Pieria (Dekalp, 5276)	2	0.13	400	69	-0 0 18 31	forage	0.46 2.4 1.4 1.2	11–2110 11–2110-04
France (S), 2011 Calmont (PR 33 A46)	2	0.13	300	69	-0 0 14 29	forage	0.47 2.5 0.60 0.61	11–2110 11–2110-05
Germany, 2012 Langforden ot Repke (Ricardinio)	2	0.125	300	69	-0 0 10 35	forage	0.36 1.3 0.66 0.42	12-2006 12-2006-01
France (N), 2012 Chambourg sur Indre (Nk Cobalt)	2	0.125	300	69	-0 0 20 35	forage	0.36 1.5 0.87 0.57	12-2006 12-2006-02
Germany, 2012 Leverkusen (Clemente)	2	0.125	300	69	-0 0 8 22	forage	0.42 1.3 0.85 0.57	12-2006 12-2006-03
Netherlands, 2012 Walingsweg (LG30224)	2	0.125	400	71	-0 0 15 36	forage	0.56 1.4 0.33 0.16	12-2006 12-2006-04
France (S), 2012 Le Burgaud (Dkc 5190)	2	0.125	300	65	-0 0 22 49	forage	0.26 1.3 0.27 0.10	12-2007 12-2007-01
Spain, 2012 Vili-sacra (DeKalb6667)	2	0.125	300	69	-0 0 9 22	forage	0.74 1.5 1.2 0.57	12-2007 12-2007-02

MAIZE FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
Italy, 2012 Bologna (PR33M15)	2	0.125	400	69	-0 0 15 23	forage	0.19 1.2 0.55 0.5	12-2007 12-2007-03
Portugal, 2012 Golega (N 43)	2	0.125	300	69	-0 0 20 38	forage	0.14 0.96 0.27 0.12	12-2007 12-2007-04

Trace residues of fluopyram-benzamide reported in some forage and stover samples (max 0.05 mg/kg – forage)

Table 72 Fluopyram residues in maize stover from supervised trials in Europe involving two foliar application of fluopyram (SE formulations)

MAIZE STOVER Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
GAP, Austria	2	0.125		33-69				
France (N), 2011 Chambourg sur Indre (Cobalt)	2	0.13	300	69	82	stover	0.38	11–2109 11–2109-01
Germany, 2011 Leverkusen (Saludo)	2	0.13	300	69	65	stover	0.37	11–2109 11–2109-02
UK, 2011 Cambridge (Cougar)	2	0.13	250	69	60	stover	0.99	11–2109 11–2109-03
Belgium, 2011 Villers-Perwin (Delitop)	2	0.13	275	67	64	stover	0.34	11–2109 11–2109-04
Italy, 2011 Bologna (Constanza)	2	0.13	400	67	62	stover	0.42	11–2110 11–2110-02
Spain, 2011 Vila-sacra (DKC6667YG)	2	0.13	300	71	69	stover	0.54	11–2110 11–2110-03
Greece, 2011 Pieria (Dekalp, 5276)	2	0.13	400	69	48	stover	1.3	11–2110 11–2110-04
France (S), 2011 Calmont (PR 33 A46)	2	0.13	300	69	64	stover	1.2	11–2110 11–2110-05
Germany, 2012 Langforden ot Repke (Ricardinio)	2	0.125	300	69	72	stover	0.46	12-2006 12-2006-01
France (N), 2012 Chambourg sur Indre (Nk Cobalt)	2	0.125	300	69	55	stover	1.7	12-2006 12-2006-02
Germany, 2012 Leverkusen (Clemente)	2	0.125	300	69	41	stover	0.8	12-2006 12-2006-03
Netherlands, 2012 Walingsweg (LG30224)	2	0.125	400	71	57	stover	0.13	12-2006 12-2006-04
France (S), 2012 Le Burgaud (Dkc 5190)	2	0.125	300	65	78	stover	0.28	12-2007 12-2007-01

MAIZE STOVER Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
Spain, 2012 Vili-sacra (DeKalb6667)	2	0.125	300	69	56	stover	0.33	12-2007 12-2007-02
Italy, 2012 Bologna (PR33M15)	2	0.125	400	69	45	stover	0.41	12-2007 12-2007-03
Portugal, 2012 Golega (N 43)	2	0.125	300	69	60	stover	0.42	12-2007 12-2007-04

Trace residues of fluopyram-benzamide reported in some forage and stover samples (max 0.05 mg/kg – forage)

Rice

Results from supervised trials in Thailand and Vietnam, involving foliar applications of fluopyram to paddy rice were provided to the Meeting. In the Thailand trials, two applications of fluopyram (SC formulations) were applied 7–12 days apart, up to BBCH 57–65, using motorised knapsack sprayers with single hollow cone nozzles, applying 250–480 litres spray mix/ha. Plot sizes in these trials were 100 square metres.

Unreplicated samples of plants without roots, panicles, straw (min 0.5 kg), grain (min 0.62 kg) and husk (min 0.3 kg) were taken at intervals up to harvest, frozen within 24 hours and stored frozen for up to 334 days (plants), 290 days (grain), 226 days (husk), 298 days (straw) and 313 days (panicles).

Analysis for fluopyram (and five metabolites) was conducted using LC/MS/MS Method 00984 with a reported LOQ of 0.01 mg/kg for each analyte and mean recovery rates of 81–110% in all spiked samples (0.01–0.1 mg/kg spike levels in grain and up to 50 mg/kg in husks, plants and straw).

Table 73 Fluopyram residues in plants, panicles and straw from supervised trials on paddy rice in Thailand and Vietnam involving two foliar application of fluopyram (SC formulations)

RICE Country, year Location (variety)	Application			DALA	Residues (mg/kg)						Reference & Comments
	kg ai/ha	kg ai/100L	water (L/ha)		matrix	parent	BZM	PCA	PAA	7-OH	
GAP, Thailand	2 sprays	0.024		BBCH 59							
Thailand, 2012 Suphan Buri (Pathumthani 1)	0.05	0.02	250	20	panicle	0.25	0.02	< 0.01	< 0.01	< 0.01	RAGMN023 FR12THAR50 SC33
				20	straw	0.23	< 0.01	< 0.01	< 0.01	< 0.01	
				30	straw	0.22	< 0.05	< 0.05	< 0.05	< 0.05	
				30	husk	1.2	0.1	< 0.05	< 0.05	< 0.05	
Thailand, 2012 Nakhon Sawan (Pathumthani 1)	0.05	0.02	250	20	panicle	0.81	0.08	< 0.01	< 0.01	0.01	RAGMN023 FR12THAR50 SP15
				20	straw	1.8	0.2	< 0.05	< 0.05	< 0.05	
				30	straw	1.3	0.16	< 0.05	< 0.05	0.06	
				30	husk	1.6	0.21	< 0.05	< 0.05	< 0.05	
Thailand, 2012 Nakhon Sawan (Pathumthani 1)	0.05	0.02	250	20	panicle	0.14	0.01	< 0.01	< 0.01	< 0.01	RAGMN023 FR12THAR50 WP23
				20	straw	0.2	< 0.05	< 0.05	< 0.05	< 0.05	
				30	straw	0.08	< 0.05	< 0.05	< 0.05	< 0.05	
				30	husk	0.32	< 0.05	< 0.05	< 0.05	< 0.05	

RICE Country, year Location (variety)	Application kg ai/ha	Application kg ai/100L	Application water (L/ha)	DALA	Residues (mg/kg) matrix	parent	BZM	PCA	PAA	7-OH	Reference & Comments
Thailand, 2015 Makhamlom Bangplana (RD 41)	0.11	0.027	410	0	whole plant	3.3	< 0.01	< 0.01	< 0.01	< 0.01	RAGMP189 A-HA
				21	panicles	0.9	0.02	< 0.01	< 0.01	< 0.01	
				21	rest of plant	1.0	0.023	< 0.01	< 0.01	0.018	
				32	straw	3.5	0.12	< 0.05	< 0.05	0.12	
Thailand, 2015 Samchouk (Pathumthani 1)	0.11 0.11	0.025 0.026	439 426	0	whole plant	13	0.021	< 0.01	< 0.01	0.01	RAGMP189 B-HA
				20	panicles	0.69	0.034	< 0.01	< 0.01	0.012	
				20	rest of plant	2.8	0.057	0.01	0.012	0.039	
				31	straw	6.1	0.18	< 0.05	< 0.05	0.17	
Thailand, 2016 Amphoe Mueang (RD 57)	0.11	0.024	460	0	whole plant	4.7	0.013	< 0.01	< 0.01	0.012	RAGMP189 C-HA
				20	panicles	1.0	0.051	< 0.01	< 0.01	0.021	
				20	rest of plant	1.6	0.043	0.012	0.012	0.11	
				31	straw	4.0	0.13	0.05	< 0.05	0.44	
Thailand, 2016 Amphoe Sai Noi (RD 35)	0.11 0.11	0.023 0.024	483 467	0	whole plant	4.1	< 0.01	< 0.01	< 0.01	< 0.01	RAGMP189 D-HA
				19	panicles	0.30	0.017	< 0.01	< 0.01	< 0.01	
				19	rest of plant	0.51	0.015	< 0.01	< 0.01	0.022	
				31	straw	1.6	0.056	< 0.05	< 0.05	0.13	
Thailand, 2015 Kamphaeng Saen (RD 41)	0.11 0.11	0.026 0.024	418 462	0	whole plant	7.3	0.016	< 0.01	< 0.01	0.016	RAGMP189 E-DA
				14	panicles	0.56	0.017	< 0.01	< 0.01	0.01	
				14	rest of plant	1.8	0.018	< 0.01	< 0.01	0.026	
				21	panicles	0.58	0.023	< 0.01	< 0.01	0.014	
				21	rest of plant	2.1	0.041	0.01	< 0.01	0.053	
				31	straw	6.1	0.3	0.081	0.051	0.3	
				34		6.7	0.29	0.092	< 0.05	0.34	
Thailand, 2016 Kamphaeng Saen, (Pathumthani 1)	0.11 0.11	0.023 0.025	471 447	0	whole plant	3.6	0.014	< 0.01	< 0.01	< 0.01	RAGMP189 F-DA
				14	panicles	0.60	0.024	< 0.01	< 0.01	0.012	
				14	rest of plant	0.40	< 0.01	< 0.01	< 0.01	0.011	
				22	panicles	0.69	0.032	< 0.01	< 0.01	0.019	
				22	rest of plant	0.30	< 0.01	< 0.01	< 0.01	0.014	
				30	straw	0.89	< 0.05	< 0.05	< 0.05	0.055	
				33		0.66	< 0.05	< 0.05	< 0.05	< 0.05	
Vietnam, 2016 Tan Lap Village (OM 6976)	0.11 0.11	0.025 0.024	440 450	0	whole plant	6.9	0.016	0.014	< 0.01	0.011	RAGMP189 G-HA
				21	panicles	0.43	0.03	0.011	< 0.01	0.02	
				21	rest of plant	0.64	0.03	0.015	< 0.01	0.048	
				28	straw	0.74	< 0.05	< 0.05	< 0.05	0.058	
Vietnam, 2016 Binh Nhi Village (OM 5451)	0.11 0.11	0.023 0.024	485 450	0	whole plant	4.1	0.015	< 0.01	< 0.01	0.012	RAGMP189 H-DA
				12	panicles	2.4	0.69	< 0.01	< 0.01	0.022	
				12	rest of plant	1.5	0.039	< 0.01	0.01	0.042	
				20	panicles	2.2	0.82	< 0.01	< 0.01	0.03	
				20	rest of plant	0.86	0.35	< 0.01	0.013	0.047	
				31	straw	3.8	0.14	< 0.05	0.062	0.49	
				33		2.5	0.082	< 0.05	0.057	0.38	

RICE Country, year Location (variety)	Application			DALA	Residues (mg/kg)						Reference & Comments
	kg ai/ha	kg ai/100L	water (L/ha)		matrix	parent	BZM	PCA	PAA	7-OH	
Thailand, 2015-2016 (RD41)	0.33 0.35	0.080 0.074	417 473	0 31	whole plant straw	26 20	0.28 0.62	< 0.01 0.016	< 0.01 0.074	0.031 0.59	RAGMN175 A-PA
Thailand, 2016 (Pathumthani 1)	0.33	0.073	460	0 30	whole plant straw	12 4.2	< 0.01 < 0.05	< 0.01 < 0.05	< 0.01 < 0.05	0.02 0.19	RAGMN175 B-PA

Metabolite residues reported as fluopyram equivalents.

Residues of fluopyram-methyl sulfoxide metabolite all <LOQ in all samples.

Wheat

Results from supervised trials from USA on wheat were provided to the 2010 JMPR. In these trials, two applications of 0.24–0.26 kg ai/ha (SC 500 formulation) were applied to wheat, 12–17 days apart as foliar sprays using knapsack sprayers with hand-held spray booms or tractor-mounted boom sprayers to apply 93–189 litres of spray mix/ha. Plot sizes in these trials ranged from 50–230 square metres. In each trial, one plot was last treated over the tillering period (up to BBCH 41) for sampling of forage, a second plot was last treated before the start of grain ripening (up to BBCH 83) for sampling of hay and a third plot was last treated over the grain ripening period (up to BBCH 89) for sampling of grain and straw. Hay from the second plots was allowed to dry to commercial dryness before sampling (0–9 days after cutting).

Duplicate samples of at least 1 kg forage and grain and at least 0.5 kg hay and straw were taken from each plot, frozen within 2 hours of sampling, held in frozen storage for up to 374 days (grain), 388 days (forage), 340 days (hay) and 391 days (straw) before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg (forage, hay, grain) and 0.1 mg/kg (straw).

Table 74 Fluopyram residues in wheat forage from supervised trials in USA involving foliar applications (500 SC formulations)

WHEAT FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)			Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix	values	mean	
GAP: USA		0.25			14		Max 0.5 kg ai/ha/season		14-day RTI
USA, 2007 Suffolk, VA (Delta King 9410) Wheat, Winter	2	0.253 0.25	125 130	29 37	12	forage (27%DM)	0.52, 0.49	0.51	RAGMP064 GM238-06HA
USA, 2007 Proctor, AR (Variety Unknown) Wheat, Winter	2	0.25 0.25	133 133	21 26	14	forage (27%DM)	0.92, 0.75	0.83	RAGMP064 GM239-06HA
USA, 2007 Richland, IA (BT-Branson) Wheat, Winter	2	0.25 0.25	161 167	15 23	14	forage (24%DM)	0.14, 0.13	0.14	RAGMP064 GM241–06HB
USA, 2007 Carlyle, IL (Fannin) Wheat, Winter	2	0.247 0.25	180 146	24 29	13	forage (19%DM)	0.53, 0.52	0.53	RAGMP064 GM242-06HA

WHEAT FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)			Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix	values	mean	
GAP: USA		0.25			14		Max 0.5 kg ai/ha/season		14-day RTI
USA, 2007 East Bernard, TX (Wahoo HRW Wheat) Wheat, Winter	2	0.245 0.25	93 94	26 27	13	forage (22%DM)	0.39, 0.32	0.36	RAGMP064 GM243-06HA
USA, 2007 Grand Island, NE (Alsen) Wheat, Spring	2	0.245 0.25	186 183	23 24	14	forage (18%DM)	0.49, 0.58	0.53	RAGMP064 GM244-06HA
USA, 2006 New Rockford, ND (Knudson) Wheat, Spring	2	0.254 0.25	143 140	11 21	12	forage (16%DM)	0.17, 0.12	0.14	RAGMP064 GM245-06HA
USA, 2006 Eldridge, ND (Alsen) Wheat, Spring	2	0.249 0.257	140 144	22 32	13	forage (22%DM)	1.43, 1.12	1.3	RAGMP064 GM246-06HA
USA, 2006 Velva, ND (Jagalene) Wheat, Winter	2	0.243 0.249	130 122	12 22	14	forage (19%DM)	0.067, 0.052	0.06	RAGMP064 GM247-06HA
USA, 2007 Larned, KS (Overley) Wheat, Winter	2	0.249 0.257	171 173	23 30	14	forage (23%DM)	1.2, 1.13	1.2	RAGMP064 GM248-06HA
USA, 2007 Belpre, KS (Dumas) Wheat, Winter	2	0.256 0.256	176 173	23 30	14	forage (22%DM)	1.08, 1.08	1.1	RAGMP064 GM249-06HA
USA, 2007 Plainview, TX (Dumas) Wheat, Winter	2	0.241 0.242	152 155	24 30	14	forage (17%DM)	0.88, 0.99	0.94	RAGMP064 GM250-06HA
USA, 2008 Plainview, TX (Sunstar 50-30) Wheat, Spring	2	0.246 0.245	157 155	14 28	14	forage (21%DM)	0.79, 0.79 (c=0.013)	0.79	RAGMP064 GM250-06HB
USA, 2006 Ephrata, WA (Steele) Wheat, Spring	2	0.25 0.251	138 141	16 30	14	forage (23%DM)	0.64, 0.48	0.56	RAGMP064 GM252-06HA
USA, 2006 Sabin, MN (Steele) Wheat, Spring	2	0.251 0.257	165 159	22 41	0 6 13 20 29	forage (16%DM) forage (18%DM) forage (25%DM) forage (32%DM) forage (43%DM)	9.31, 10.76 4.13, 3.64 3.03, 2.78 1.55, 1.34 1.31, 1.27	10.0 3.88 2.9 1.45 1.29	RAGMP064 GM240-06DA

Table 75 Fluopyram residues in wheat hay from supervised trials in USA involving foliar applications (500 SC formulations)

WHEAT HAY Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)			Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix	values	mean	
USA, 2007 Sufflok, VA (Delta King 9410) Wheat, Winter	2 	0.252 0.252	111 110	57 73	12	hay (69%DM)	3.41, 3.4	3.4	RAGMP064 GM238-06HA
USA, 2007 Proctor, AR (Variety Unknown) Wheat, Winter	2 	0.249 0.249	133 133	59 61	14	hay (51%DM)	2.38, 1.79	2.1	RAGMP064 GM239-06HA
USA, 2007 Richland, IA (BT-Branson) Wheat, Winter	2 	0.25 0.252	174 173	24 41	14	hay (70%DM)	1.11, 0.9	1.0	RAGMP064 GM241–06HB
USA, 2007 Carlyle, Illinois (Fannin) Wheat, Winter	2 	0.252 0.252	147 123	29 30	17	hay (39%DM)	0.55, 0.84	0.7	RAGMP064 GM242-06HA
USA, 2007 East Bernard, TX (Wahoo HRW Wheat) Wheat, Winter	2 	0.253 0.248	97 103	61 65	13	hay (70%DM)	0.99, 0.92	0.95	RAGMP064 GM243-06HA
USA, 2007 Grand Island, NE (Alsen) Wheat, Spring	2 	0.244 0.245	185 186	43 55	13	hay (87%DM)	0.51, 0.41	0.46	RAGMP064 GM244-06HA
USA, 2006 New Rockford, ND (Knudson) Wheat, Spring	2 	0.249 0.251	139 141	58 71	14	hay (81%DM)	2.67, 2.44	2.6	RAGMP064 GM245-06HA
USA, 2006 Eldridge, ND (Alsen) Wheat, Spring	2 	0.253 0.254	143 150	32 51	12	hay (69%DM)	4.73, 5.12	4.9	RAGMP064 GM246-06HA
USA, 2006 Velva, ND (Jagalene) Wheat, Winter	2 	0.249 0.251	122 123	30 59	12	hay (65%DM)	5.06, 4.97	5.0	RAGMP064 GM247-06HA
USA, 2007 Larned, KS (Overley) Wheat, Winter	2 	0.258 0.247	179 172	32 47	12	hay (59%DM)	0.29, 0.35	0.32	RAGMP064 GM248-06HA
USA, 2007 Belpre, KS (Dumas) Wheat, Winter	2 	0.263 0.263	178 178	32 53	12	hay (68%DM)	0.28, 0.3	0.29	RAGMP064 GM249-06HA

WHEAT HAY Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)			Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix	values	mean	
USA, 2007 Plainview, TX (Dumas) Wheat, Winter	2	0.239 0.24	153 153	30 41	14	hay (61%DM)	1.54, 1.53	1.5	RAGMP064 GM250-06HA
USA, 2008 Plainview, TX (TAM 111) Wheat, Winter	2	0.249 0.252	157 159	30 36	14	hay (52%DM)	3.5, 3.54	3.5	RAGMP064 GM250-06HB
USA, 2007 Plainview, TX (Sunstar 50-30) Wheat, Spring	2	0.253 0.249	185 181	37 61	15	hay (73%DM)	2.27, 2.26	2.3	RAGMP064 GM251–06HA
USA, 2006 Ephrata, WA (Steele) Wheat, Spring	2	0.247 0.25	138 140	65 83	14	hay (86%DM)	0.58, 0.66	0.62	RAGMP064 GM252-06HA
USA, 2006 Sabin, MN (Steele) Wheat, Spring	2	0.257 0.254	159 148	49 53	0 7 14 21 28	hay (84%DM) hay (86%DM) hay (86%DM) hay (92%DM) hay (88%DM)	36.5, 36.67 13.52, 14.82 5.31, 5.51 4.95, 4.67 2.01, 2.08	36.6 14.2 5.4 4.81 2.05	RAGMP064 GM240-06DA

Table 76 Fluopyram residues in wheat straw from supervised trials in USA involving foliar applications (500 SC formulations)

WHEAT STRAW Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)			Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix	values	mean	
GAP: USA		0.25			14		Max 0.5 kg ai/ha/season		14 day RTI
USA, 2007 Sufflok, VA (Pioneer 26R24) Wheat, Winter	2	0.254 0.252	121 123	83 87	14	straw (84%DM)	7.06, 6.82	6.9	RAGMP064 GM238-06HA
USA, 2007 Proctor, AR (Delta King 9410) Wheat, Winter	2	0.251 0.249	132 133	87 89	13	straw (91%DM)	7.33, 10.56	8.9	RAGMP064 GM239-06HA
USA, 2007 Richland, IA (Variety Unknown) Wheat, Winter	2	0.249 0.243	152 144	61 75	13	straw (72%DM)	0.89, 0.81	0.85	RAGMP064 GM241–06HB
USA, 2007 Carlyle, IL (BT-Branson) Wheat, Winter	2	0.252 0.247	119 109	77 85	14	straw (75%DM)	4.62, 4.97	4.8	RAGMP064 GM242-06HA
USA, 2007 East Bernard, TX (Fannin) Wheat, Winter	2	0.249 0.256	97 98	83 87	12	straw (87%DM)	12.26, 10.79	12	RAGMP064 GM243-06HA

WHEAT STRAW Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)			Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix	values	mean	
USA, 2007 Grand Island, NE (Wahoo HRW Wheat) Wheat, Winter	2	0.26 0.25	140 189	73 77	14	straw (84%DM)	2.93, 3.56	3.3	RAGMP064 GM244-06HA
USA, 2006 New Rockford, ND (Alsen) Wheat, Spring	2	0.248 0.249	138 138	83 87	14	straw (81%DM)	3.99, 4	4.0	RAGMP064 GM245-06HA
USA, 2006 Eldridge, ND (Knudson) Wheat, Spring	2	0.248 0.252	137 144	73 83	13	straw (68%DM)	04.66, 4.69	4.7	RAGMP064 GM246-06HA
USA, 2006 Velva, ND (Alsen) Wheat, Spring	2	0.251 0.252	122 121	75 85	15	straw (87%DM)	4.6, 5.97	5.3	RAGMP064 GM247-06HA
USA, 2007 Larned, KS (Jagalene) Wheat, Winter	2	0.245 0.262	172 172	71 85	13	straw (52%DM)	1.04, 0.94	0.99	RAGMP064 GM248-06HA
USA, 2007 Belpre, KS (Overley) Wheat, Winter	2	0.251 0.252	175 173	73 85	13	straw (59%DM)	0.89, 0.85	0.87	RAGMP064 GM249-06HA
USA, 2008 Plainview, TX (Dumas) Wheat, Winter	2	0.246 0.253	155 161	69 87	14	straw (83%DM)	7.32, 7.35	7.3	RAGMP064 GM250-06HB
USA, 2007 Plainview, TX (TAM 111) Wheat, Winter	2	0.248 0.256	181 187	73 87	14	straw (69%DM)	3.15, 3.21	3.2	RAGMP064 GM251–06HA
USA, 2006 Ephrata, WA (Sunstar 50-30) Wheat, Spring	2	0.249 0.252	140 141	85 87	14	straw (85%DM)	5.27, 6.08	5.7	RAGMP064 GM252-06HA
USA, 2006 Sabin, MN	2	0.261 0.253	156 179	85 89	0 7 14 21 28	straw (89%DM) straw (89%DM) straw (89%DM) straw (91%DM) straw (88%DM)	26.82, 30.29 5.3, 5.26 5.5, 4.89 4.44, 4.29 1.48, 1.82	28.6 5.28 5.2 4.36 1.65	RAGMP064 GM240-06DA

Results from supervised trials in Europe, involving foliar applications of fluopyram to wheat were provided to the Meeting. In these trials, one or two applications (13–27 days apart) of fluopyram (SC or EC formulations) were applied up to BBCH 61 (start of flowering) using knapsack or tractor-mounted boom sprayers with 3–10 flat-fan or hollow-cone nozzles, applying 250–400 litres spray mix/ha. Plot sizes in these trials ranged from 36–120 square metres.

Unreplicated samples of forage (min 2 kg fresh weight) were taken 0–28 days after application and samples of mature grain (min 1 kg) and straw (min 0.55 kg) were taken at harvest,

with all samples being frozen within 24 hours and stored frozen for up to 464 days (forage), 404 days (grain) and 413 days (straw) before analysis for fluopyram (and its BZM metabolite) using LC/MS/MS Method 00984 with a reported LOQ of 0.01 mg/kg and mean recovery rates of 92–100% in forage and straw samples spiked with 0.01–5 mg/kg fluopyram and 97–101% in grain samples spiked with 0.01–0.8 mg/kg fluopyram.

Table 77 Fluopyram residues in wheat forage and straw from supervised trials in Europe involving one or two foliar application of fluopyram (EC or SE formulations)

WHEAT FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
GAP, Estonia Spring wheat	2	0.098		30-61	-			
GAP, Estonia Winter wheat	1	0.098	100-300	30-61	-			
France (N), 2012 Chaucy (Altigo)	2	0.0975	300	61	-0 0 7 14 28	forage	0.21 1.7 0.96 0.46 0.13	12-2131 12-2131–01 winter wheat
UK, 2012 Little Shelford (Tybalt)	2	0.0975	200	61	0	forage	1.6	12-2131 12-2131–02 winter wheat
Belgium, 2012 Vieille maison (Ketchum)	1+ 1	0.0975 0.104	250 267	61	-0 0 7 14 28	forage	0.24 1.8 0.29 0.16 0.092	12-2131 12-2131–03 winter wheat 7-day RTI
Germany, 2012 Burscheid (Thasos)	2	0.0975	300	61	0	forage	2.7	12-2131 12-2131–04 winter wheat
France (N), 2012 Chaucy (Altigo)	2	0.125	300	61	-0 0 7 14 28	forage	0.22 1.5 0.75 0.44 0.12	12-2164 12-2164-01 winter wheat
Germany, 2012 Werl-Niederbergstraube (Akteur)	2	0.125	300	61	-0 0 7 14 28	forage	0.37 2.1 0.56 0.49 0.22	12-2164 12-2164-02 winter wheat
Netherlands, 2012 Slootdorp (Tuareg)	2	0.125	300	61	-0 0 7 14 28	forage	0.12 2.0 0.59 0.34 0.12	12-2164 12-2164-03 winter wheat
Netherlands, 2012 St Jacobieparochie (Tataros)	2	0.125	300	61	-0 0 7 14 28	forage	2.2 0.072 0.31 0.20 0.061	12-2164 12-2164-04 winter wheat
Netherlands, 2012 Lijnden (Tybalt)	2	0.125	300	61	0	forage	2.3	12-2164 12-2164-05 spring wheat
Belgium, 2012 Marbais (Granny)	2	0.125	250	61	0 64	forage	2.0	12-2164 12-2164-06 spring wheat

WHEAT FORAGE Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
UK, 2012 Little Shelford (Tybalt)	2	0.125	200	61	0	forage	2.1	12-2164 12-2164-07 spring wheat
Germany, 2012 Burscheid (Thasos)	2	0.125	300	61	0	forage	2.8	12-2164 12-2164-08 spring wheat
France (S), 2012 Maire (Arezzo)	1	0.0975	300	61	0 7 14 28	forage	1.5 0.80 0.48 0.17	12-2133 12-2133-01 spring wheat
France (S), 2012 Toulouse (Soissons)	1	0.0975	300	61	0	forage	1.8	12-2133 12-2133-02 winter wheat
Spain, 2012 Alcala de Guadaira (Artur Nick)	1	0.0975	300	61	0 7 14 28	forage	2.3 1.1 0.96 0.47	12-2133 12-2133-03 sown Dec 2011
Spain, 2012 Marata (Moncada)	1	0.0975	300	61	0 6 13 26	forage	2.3 1.6 1.1 0.66	12-2133 12-2133-04 sown Jan 2012
Italy, 2012 Tarquinia (Latinur)	1	0.0975	300	61	0 7 14 28	forage	2.8 0.57 0.22 0.11	12-2133 12-2133-05 sown Dec 2011
Italy, 2012 Foggia (Iride)	1	0.0975	400	61	0	forage	2.8	12-2133 12-2133-06 sown Nov 2011
Portugal, 2012 Carneiria-varzia (Hystar)	1	0.0975	300	61	0	forage	1.7	12-2133 12-2133-07 sown Oct 2011
Greece, 2012 Kristoni-Kilkis (Simeto)	1	0.0975	300	61	0	forage	3.9	12-2133 12-2133-08 winter wheat

Trace residues of fluopyram-benzamide reported in some forage and straw samples (max 0.07 mg/kg – straw)

Table 78 Fluopyram residues in wheat straw from supervised trials in Europe involving one or two foliar application of fluopyram (EC or SE formulations)

WHEAT STRAW Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
GAP, Estonia Spring wheat	2	0.098		30-61	-			
GAP, Estonia Winter wheat	1	0.098	100-300	30-61	-			
France (N), 2012 Chaucy (Altigo)	2	0.0975	300	61	58	straw	0.21	12-2131 12-2131–01 winter wheat

WHEAT STRAW Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
UK, 2012 Little Shelford (Tybalt)	2	0.0975	200	61	64	straw	0.11	12-2131 12-2131–02 winter wheat
Belgium, 2012 Vieille maison (Ketchum)	1+ 1	0.0975 0.104	250 267	61	51	straw	0.091	12-2131 12-2131–03 winter wheat 7-day RTI
Germany, 2012 Burscheid (Thasos)	2	0.0975	300	61	56	straw	0.11	12-2131 12-2131–04 winter wheat
France (N), 2012 Chaucy (Altigo)	2	0.125	300	61	58	straw	0.28	12-2164 12-2164-01 winter wheat
Germany, 2012 Werl-Niederbergstraube (Akteur)	2	0.125	300	61	59	straw	0.35	12-2164 12-2164-02 winter wheat
Netherlands, 2012 Slootdorp (Tuareg)	2	0.125	300	61	53	straw	0.16	12-2164 12-2164-03 winter wheat
Netherlands, 2012 St Jacobieparochie (Tataros)	2	0.125	300	61	56	straw	0.13	12-2164 12-2164-04 winter wheat
Netherlands, 2012 Lijnden (Tybalt)	2	0.125	300	61	55	straw	0.26	12-2164 12-2164-05 spring wheat
Belgium, 2012 Marbais (Granny)	2	0.125	250	61	64	straw	0.057	12-2164 12-2164-06 spring wheat
UK, 2012 Little Shelford (Tybalt)	2	0.125	200	61	64	straw	0.2	12-2164 12-2164-07 spring wheat
Germany, 2012 Burscheid (Thasos)	2	0.125	300	61	56	straw	0.11	12-2164 12-2164-08 spring wheat
France (S), 2012 Maire (Arezzo)	1	0.0975	300	61	48	straw	0.11	12-2133 12-2133-01 spring wheat
France (S), 2012 Toulouse (Soissons)	1	0.0975	300	61	50	straw	0.17	12-2133 12-2133-02 winter wheat
Spain, 2012 Alcala de Guadaira (Artur Nick)	1	0.0975	300	61	51	straw	0.67	12-2133 12-2133-03 sown Dec 2011

WHEAT STRAW Country, year Location (variety)	Application				DALA	Fluopyram residues (mg/kg, fresh weight)		Reference & Comments
	no	kg ai/ha	water (L/ha)	GS (BBCH)		matrix		
Spain, 2012 Marata (Moncada)	1	0.0975	300	61	51	straw	0.63	12-2133 12-2133-04 sown Jan 2012
Italy, 2012 Tarquinia (Latinur)	1	0.0975	300	61	64	straw	0.089	12-2133 12-2133-05 sown Dec 2011
Italy, 2012 Foggia (Iride)	1	0.0975	400	61	53	straw	1.1	12-2133 12-2133-06 sown Nov 2011
Portugal, 2012 Carneiria-varzia (Hystar)	1	0.0975	300	61	62	straw	0.13	12-2133 12-2133-07 sown Oct 2011
Greece, 2012 Kristoni-Kilkis (Simeto)	1	0.0975	300	61	41	straw	0.13	12-2133 12-2133-08 winter wheat

Trace residues of fluopyram-benzamide reported in some forage and straw samples (max 0.07 mg/kg – straw)

By-products as animal feeds

Cotton gin trash

Results from supervised trials from USA on cotton were provided to the 2015 Meeting. In these trials, fluopyram was applied either as a pre-plant seed treatment, as a seed treatment in combination with an in-furrow soil treatment at planting or as a combination of a seed treatment, in-furrow soil treatment and a foliar spray applied about 30 days before harvest.

For the plots receiving treated seed, cotton seeds were slurry-treated with 0.5 mg ai/seed and the targeted seeding rate was about 148 000 seeds/ha (equivalent to 0.074 kg ai/ha). Actual seeding rates ranged from 144,495–148,650 seeds/ha. Residues in cotton seed and gin by-products from the seed treatment plots and from plots involving the combination of seed treatment, in-furrow soil treatments and foliar sprays are summarised in the following tables.

Plots were harvested by mechanical picker, mechanical stripper or manually, with duplicate samples of at least 30 kg (undelinted seed plus gin trash) taken from the mechanically harvested plots and at least 1 kg (seed cotton) from the manually harvested plots. Samples were frozen within 24 hours of sampling, ginned and held in frozen storage for up to 148 days before analysis for fluopyram using LC/MS/MS Method GM-001–P07-01, with a reported LOQ of 0.01 mg/kg and with average fluopyram recovery rates of 98% in undelinted seed spiked with 0.01–1.0 mg/kg and 97% in gin by-products spiked with 0.01–18 mg/kg.

Table 79 Fluopyram residues in cotton seed and gin by-products from supervised trials in USA involving fluopyram seed treatments (FS formulation) in combination with in-furrow soil applications and foliar sprays (SC formulations)

COTTON GIN TRASH Country, Year Location (Variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed			values	mean	
GAP: USA (seed, in-furrow, foliar		0.25	0.35		30	Max 0.5 kg ai/ha/season		
USA, 2012 Chula, GA (FM 1740)	1+ 1+ 1	0.074 0.182 0.257	0.5	gin by-products	30	3.89, 3.91	3.9	RAGML206-01 GM022-12HA
USA, 2012 Parma, MO (ST4145 LLB2)	1+ 1+ 1	0.073 0.176 0.25	0.5	gin by-products	30	13.1, 14.9	14	RAGML206-01 GM023-12HA
USA, 2012 Proctor, AR (ST4145)	1+ 1+ 1	0.074 0.177 0.205	0.5	gin by-products	30	7.53, 6.99	7.3	RAGML206-01 GM024-12HA
USA, 2012 Claude, TX, (ST 4145)	1+ 1+ 1	0.074 0.257 0.253	0.5	gin by-products	18 24 30 37 43	< 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01 < 0.01, < 0.01	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01	RAGML206-01 GM027-12HA
USA, 2012 Levelland, TX (ST5458 (B2RF))	1+ 1+ 1	0.074 0.179 0.252	0.5	gin by-products	28	6.52, 7.15	6.8	RAGML206-01 GM028-12HA
USA, 2012 East Bernard, TX (ST 5458 (B2RF))	1+ 1+ 1	0.073 0.176 0.254	0.5	gin by-products	31	2.5, 2.58	2.5	RAGML206-01 GM073-12HA

FATE OF RESIDUES IN STORAGE AND IN PROCESSING

Magnitude of the residue in processing

Information was provided to the 2010 JMPR on the residue distribution of fluopyram in peel and pulp (melons), on the effects of trimming, washing and cooking of strawberries, blueberries, cabbage, broccoli, summer squash, lettuce, spinach, Mustard greens, celery and on the effects of simulated commercial processing on residues of fluopyram and metabolites in oranges, apples, plums, grapes, tomatoes, potatoes, sugar beet, soya beans, wheat, maize, peanut, rape seed, cotton seed and sunflower seed.

Rice

Rice processing studies were conducted in Thailand to measure residues of fluopyram and its metabolites in rice grain and processing fractions following exaggerated (3X) field treatment on paddy rice [Woodard & Lemke, 20178, Ref: RAGMN175]. Unreplicated 100 square metre plots were treated with 2 foliar spray applications of fluopyram plus tebuconazole (SC 400 formulation), 10 days apart, at BBCH 45–51 and BBCH 65, using a single nozzle motorised knapsack sprayer to apply 0.33–0.35 kg ai/ha in 420–470 litres water/ha.

Duplicate whole plant samples from a minimum of 12 plants were allowed to dry (1–3 days) and separated into rice straw and paddy rice. After a further 1–3 days drying, 1 kg samples of the sun-dried paddy rice were dehulled and milled using a dehulling machine to obtain unpolished, brown rice and rice hulls. Samples of brown rice (min 1 kg) were milled/polished, using a milling machine, to produce polished rice and rice bran. Samples of polished rice were cooked by adding 1 kg of rice to 2.5 litres of salted boiling water and cooked until soft (about 20 minutes).

The samples analysed in this study were held in frozen storage for a maximum of 313 days before analysis for fluopyram and five metabolites using LC/MS/MS Method 00984. The reported LOQs were 0.01 mg/kg for each analyte and mean recovery rates for fluopyram were 100–104% in samples spiked with 0.01mg/kg and 6 mg/kg (grain), 0.9 mg/kg (brown rice), 0.5 mg/kg (polished rice) and 0.1 mg/kg (cooked rice). Mean recovery rates for the fluopyram metabolites ranged from 84-105% in samples spiked with each metabolite at 0.01 mg/kg and 6 mg/kg (grain) and 0.1 mg/kg (cooked rice).

Table 80 Fluopyram residues in rice grain and processed grain fractions from supervised trials on paddy rice in Thailand, involving two foliar application of fluopyram (SC formulations)

RICE Country, year Location (variety) Reference	Application			PHI, (days)	Residues (mg/kg)						Fluopyram processing factors
	kg ai/ha	kg ai/100L	water (L/ha)		matrix	parent	BZM	PCA	PAA	7-OH	
Thailand, 2015-2016	0.33	0.080	417	31	grain	2.1	0.12	0.01	< 0.01	0.039	
(RD41)	0.35	0.074	473	31	-brown	0.51	0.029	< 0.01	< 0.01	< 0.01	0.24
				31	-polished	0.21	0.026	< 0.01	< 0.01	< 0.01	0.1
RAGMN175 A-PA				31	hulls	4.0	0.27	0.017	< 0.01	0.11	1.9
				31	bran	2.4	0.065	0.016	< 0.01	0.017	1.1
				31	cooked rice	0.081	0.011	< 0.01	< 0.01	< 0.01	0.04
Thailand, 2016	0.33	0.073	460	30	grain	2.1	< 0.01	< 0.01	< 0.01	0.048	
(Pathumthani 1)				30	-brown	0.71	< 0.01	< 0.01	< 0.01	< 0.01	0.34
				30	-polished	0.25	< 0.01	< 0.01	< 0.01	< 0.01	0.12
RAGMN175 A-PA				30	hulls	4.5	< 0.01	< 0.01	< 0.01	0.14	2.2
				30	bran	2.2	< 0.01	< 0.01	< 0.01	0.21	1.0
				30	cooked rice	0.084	< 0.01	< 0.01	< 0.01	< 0.01	0.04

Results are the mean values from two duplicate samples

Metabolite residues reported as fluopyram equivalents.

Residues of fluopyram-methyl sulfoxide metabolite all <LOQ in all samples

Processing factors derived by the current Meeting and by the 2010 JMPR that are of relevance to the commodities considered for maximum residue levels, dietary intake or livestock dietary burden estimation by the current meeting are summarized below:

Table 81 Summary of selected processing factors for fluopyram

Raw agricultural commodity	Processed commodity	Calculated processing factors [a]	Processing factor (mean or median)
Orange	Peel	1.8	1.8
	Pulp	0.16	0.16
	Juice	0.01	0.01
	Oil	16	16
Plums	Washed fruit	0.49	0.49
	Dried fruit	1.1	1.1
Blueberry	Washed berries	0.65	0.65
	Cooked berries	0.42	0.42
Tomato	Washed fruit	0.32, 0.51, 0.67, 0.92, 0.94	0.67
	Juice	0.09, 0.27, 0.42, 0.44, 0.56	0.36
	Pulp	0.08, 0.09, 0.11, 0.13	0.1
	Preserve	0.07, 0.18, 0.21, 0.25, 0.33	0.21
	Puree	0.18, 0.46, 0.73, 0.94, 2.2	0.73
	Paste	0.46	0.46
Soya bean	Meal	0.05	0.05
	Refined oil	0.02	0.02
	Flour	0.04	0.04
	Soymilk	< 0.02	< 0.02

Raw agricultural commodity	Processed commodity	Calculated processing factors [a]	Processing factor (mean or median)
	Asp grain fraction	223	223
Potato	Washed tubers	0.7	0.7
	Peeled tubers	< 0.64	<0.64
	Chips	< 0.64	<0.64
	Flakes	1	1
	Wet peel	4.3	4.3
Maize	Grits	0.51	0.51
	Meal	0.81	0.81
	Flour	0.85	0.85
	Bran	2.7	2.7
	Starch	0.36	0.36
	Oil (wet milled)	0.58	0.58
	Oil (dry milled)	< 0.36	<0.36
	Asp grain fraction	161	161
Rice	Brown rice	0.24, 0.34	0.29
	Polished rice	0.1, 0.12	0.11
	Rice hulls	1.9, 2.2	2
	Rice bran	1.0, 1.1	1.1
	Cooked rice	0.04, 0.04	0.04
Wheat	Wheat bran	2.7	2.7
	Middlings	0.34	0.34
	Shorts	0.75	0.75
	Flour	0.12	0.12
	Asp grain fraction	70	70
	Wheat germ	2.4	2.4
Cotton seed	Oil (refined)	< 0.01	< 0.01
	Meal	0.022	0.022
Peanut	Nuts (roasted)	0.26	0.26
	Meal	0.19	0.19
	Butter	0.22	0.22
	Oil	0.01	0.01
Sunflower seed	Oil (refined)	< 0.01	< 0.01
	Meal	0.02	0.02

[a] Each value represents a separate study where residues were above the LOQ in the RAC. The factor is the ratio of the total residue in the processed item divided by the total residue in the RAC.

APPRAISAL

Fluopyram, a pyridylethylamide broad spectrum fungicide was evaluated for the first time by the 2010 JMPR, where an ADI of 0–0.01 mg/kg bw and an ARfD of 0.5 mg/kg bw were established, residue definitions were proposed and maximum residue levels were recommended for a number of uses where GAP information was available. New GAP and supporting information were evaluated by the JMPR in 2012, 2014 and 2015, with a number of additional maximum residue levels being recommended.

Residue definitions recommended by the 2010 JMPR are:

Definition of the residue (for compliance with the MRL and for the estimation of dietary exposure) for plant commodities*: fluopyram*

Definition of the residue (for compliance with the MRL) for animal commodities*: Sum of fluopyram and 2-(trifluoromethyl) benzamide, expressed as fluopyram*

Definition of the residue (for the estimation of dietary exposure) for animal commodities*: Sum of fluopyram, 2-(trifluoromethyl)benzamide and the combined residues of N-{(E)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-trifluoromethyl) benzamide and N-{(Z)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-trifluoromethyl) benzamide, all expressed as fluopyram.*

The residue is not fat-soluble

New GAP information, supporting residue trial data, additional analytical sample storage stability studies and environmental fate data were provided by the manufacturer for evaluation by the Meeting.

The following abbreviations are used for the metabolites discussed below:

BZM	-benzamide	2-(trifluoromethyl)benzamide
PAA	-pyridyl-acetic acid	[3-chloro-5-(trifluoromethyl)pyridin-2-yl]acetic acid
PCA [a]	-pyridyl-carboxylic acid	3-chloro-5-(trifluoromethyl)pyridine-2-carboxylic acid
7-OH	-7-hydroxy	N-{2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]-2-hydroxyethyl}-2-trifluoromethyl) benzamide
	-methyl sulfoxide	3-(methylsulfinyl)-5-(trifluoromethyl) pyridine-2-carboxylic acid

[a] Also a metabolite of fluopicolide (M05)

Environmental fate

The Meeting reviewed information on the behaviour of fluopyram in soil under anaerobic conditions and in water/sediment systems, to determine whether the existing fluopyram residue definitions for plant commodities were also appropriate for paddy rice.

Under aerobic soil conditions, fluopyram slowly degraded, with identified metabolites being 7-OH, -BZM, -PCA and methyl sulfoxide (each less than 5% AR). Under anaerobic soil conditions, fluopyram is essentially stable, with no transformation products being detected.

In water/sediment systems under aerobic conditions, fluopyram steadily partitioned into the sediment with four unknown degradates found, each at less than about 2% applied radioactivity. Under anaerobic aquatic conditions, only one unknown degradate was found (at up to 1.5% AR).

Based on the above, the Meeting concluded that the fluopyram degradates formed in soil under aerobic conditions are not expected in anaerobic soils or in water/sediment systems, and while several unknown degradates were formed in soil under anaerobic conditions, these were only present at low levels and not expected to be taken up by paddy rice.

In addition, analysis of paddy rice grain and straw for the metabolites found in other plants and in aerobic soil showed a similar pattern to that found in other treated and rotational crops, with fluopyram being the predominant residue and significant levels of the 7-OH and the BZM metabolites also found in rice straw and to a much lesser extent in grain.

The Meeting concluded that the residue profile in paddy rice is similar to that in other treated or rotational crops and that the current plant commodity residue definitions would also cover paddy rice.

Methods of analysis

The Meeting received information on the use of a modified QuEChERS method of analysis (as BCS 01207), together with validation studies for the analysis of fluopyram and its -benzamide (BZM), -pyridyl-acetic acid (PAA) and -pyridyl-carboxylic acid (PCA) metabolites in tomato, wheat (forage and grain), grape, potato, pea seed and oilseed rape. The LOQ for all analytes in all matrices was 0.01 mg/kg and mean recovery rates were within the range of 77–114% (RSDs of 0.8–10%). The Meeting concluded that this method was suitable for both data generation and enforcement.

Stability of pesticide residues in stored analytical samples

The 2012 JMPR concluded that, residues of fluopyram and its -benzamide, -pyridyl-acetic acid and -pyridyl-carboxylic acid metabolites were all stable for up to 36–37 months in representative substrates covering those with a high water content (lettuce), a high starch content (wheat grain), a high protein content (dry pea seed), a high oil content (rape seed) and a high acid content (orange) stored frozen for up to 36–37 months (6 months for the -pyridyl-acetic acid metabolite in orange). In the supervised trials considered by the Meeting, the frozen storage periods were all less than 36 months.

The Meeting received information on the short-term stability of fluopyram, fluopyram-benzamide and fluopyram-7-hydroxy residues in conditions reflecting field sampling practices. In representative substrates covering those with a high water content (tomato and wheat forage), a high starch content (wheat grain and potato), a high protein content (dry pea seed), a high oil content (rape seed) and a high acid content (grape) residues were stable following storage for 8 hours at +1 °C followed by 7 days at -7 °C.

Results of supervised residue trials on crops

The Meeting received new GAP information and/or new supporting residue information from the manufacturer for citrus, mango, peppers, Witloof chicory, potato, Globe artichoke, barley, wheat, maize, rice, sunflower seed, peanut, hops, dill and herbs. The Meeting agreed to use the data provided to JMPR in 2010, 2012 and 2015 to estimate maximum residue levels for commodities for which new GAP information was available.

The results from these new trials and those previously reported by JMPR and either matching critical GAP or where the results can be proportionally adjusted (scaled) to reflect GAP application rates were used to estimate maximum residue levels, STMRs and HRs for a number of commodities.

Citrus fruits

The critical GAP in the USA for fluopyram on citrus fruit is 2× 0.25 kg ai/ha (foliar applications), PHI of 7 days, with a maximum seasonal rate of 0.5 kg ai/ha.

In 11 independent trials on oranges from the USA matching this GAP, fluopyram residues were: 0.056, 0.084, 0.1, 0.13, 0.15, 0.15, 0.16, 0.27, 0.3, 0.31 and 0.35 mg/kg. The highest residue of replicate samples was 0.37 mg/kg.

Based on the data set for oranges, the Meeting estimated a subgroup maximum residue level of 0.6 mg/kg, an STMR of 0.15 mg/kg and an HR of 0.37 mg/kg for fluopyram on the Subgroup of Oranges, Sweet, Sour.

In two independent trials on mandarins from USA matching this GAP, fluopyram residues were: 0.064 and 0.21 mg/kg.

The Meeting agreed to combine the data sets for oranges and mandarins to mutually support subgroup maximum residue limits for oranges and mandarins. The combined data set is: 0.056, 0.064, 0.084, 0.1, 0.13, 0.15, 0.15, 0.16, 0.21, 0.27, 0.3, 0.31 and 0.35 mg/kg.

Based on the combined data set for oranges and mandarins, the Meeting estimated sub-group maximum residue levels of 0.6 mg/kg, STMRs of 0.15 mg/kg and HRs of 0.37 mg/kg for fluopyram on the Subgroup of Mandarins and the Subgroup of Oranges, Sweet, Sour.

In eight independent trials on lemons from USA matching this GAP, fluopyram residues were: 0.24, 0.26, 0.3, 0.32, 0.33, 0.37, 0.42 and 0.48 mg/kg. The highest residue of replicate samples was 0.51 mg/kg.

Based on the data set for lemons, the Meeting estimated a sub-group maximum residue level of 1 mg/kg, an STMR of 0.325 mg/kg and an HR of 0.51 mg/kg for fluopyram on the Subgroup of Lemons and Limes.

In eight independent trials on grapefruit from USA matching this GAP, fluopyram residues were: 0.044, 0.09, 0.1, 0.13, 0.15, 0.16, 0.17 and 0.19 mg/kg. The highest residue of replicate samples was 0.23 mg/kg.

Based on the data set for grapefruit, the Meeting estimated a sub-group maximum residue level of 0.4 mg/kg, an STMR of 0.14 mg/kg and an HR of 0.23 mg/kg for fluopyram on the Subgroup of Pummelo and Grapefruits.

Stone fruits

Cherries

The critical GAP in USA for cherries is 2× 0.25 kg ai/ha (foliar applications), PHI of 0 days and a maximum of 0.5 kg ai/ha/season.

In six independent trials on cherries from USA matching this GAP, fluopyram residues were: 0.16, 0.28, 0.51, 0.63, 0.64 and 1.2 mg/kg.

Based on the data set for cherries, the Meeting estimated a sub-group maximum residue level of 2 mg/kg, an STMR of 0.57 mg/kg and an HR of 1.2 mg/kg for fluopyram on the Subgroup of Cherries to replace the previous recommendation.

Berries and other small fruits

Cane berries

The critical GAP in Canada and USA for fluopyram on small fruit (including cane berries) is 2× 0.25 kg ai/ha, PHI of 0 days and a maximum seasonal rate of 0.5 kg ai/ha.

In five trials from USA matching this GAP, fluopyram residues in raspberries, boysenberries and blackberries were: 0.43, 0.71, 0.83, 1.4 and 2.4 mg/kg. The highest residue of replicate samples was 2.5 mg/kg.

Noting that the GAP in USA included cane berries, the Meeting estimated a sub-group maximum residue level of 5 mg/kg, an STMR of 0.83 mg/kg and an HR of 2.5 mg/kg for fluopyram on the Subgroup of Cane berries to replace the previous recommendation.

Bush berries

The critical GAP in Canada and USA for fluopyram on small fruit (including bush berries) is 2× 0.25 kg ai/ha, PHI of 0 days and a maximum seasonal rate of 0.5 kg ai/ha.

In eight trials from USA (reported by the 2010 JMPR) matching the critical GAP in USA, fluopyram residues in blueberries were: 0.58, 0.88, 1.1, 1.1, 1.2, 1.3, 1.5 and 4.3 mg/kg. The highest residue of replicate samples was 4.9 mg/kg

Noting that the GAP in USA included bush berries the Meeting estimated a sub-group maximum residue level of 7 mg/kg, an STMR of 1.15 mg/kg and an HR of 4.9 mg/kg for fluopyram on the Subgroup of Bush berries.

Assorted tropical and subtropical fruit – inedible peel

Mango

The critical GAP for mango is in Malaysia (2× 0.15 kg ai/hL, PHI of 7-days).

In five trials from Thailand and Peru matching this GAP, fluopyram residues in whole fruit were: 0.1, 0.13, 0.18, 0.44 and 0.48 mg/kg.

In the trials from Peru, fluopyram residues were also measured in mango flesh. Calculated processing factors (flesh:whole fruit ratios) were: 0.04, 0.11 and 0.13).

The Meeting estimated a maximum residue level of 1 mg/kg, and applied the median processing factor (0.11) to the whole fruit median residue (0.18 mg/kg) and the maximum residue (0.48 mg/kg) to estimate an STMR of 0.02 mg/kg and an HR of 0.053 mg/kg for fluopyram on mango.

Bulb vegetables

Spring onions

GAP for bulb vegetables (including green onions) in USA and Canada for fluopyram is 2× 0.25 kg ai/ha, PHI of 0 days and a maximum seasonal rate of 0.5 kg ai/ha.

In three trials conducted in USA and matching the USA GAP for bulb vegetables, residues in spring onions were: 1.2, 5.1 and 6.2 mg/kg. The highest residue of replicate samples was 7.3 mg/kg.

The Meeting estimated a maximum residue level of 15 mg/kg, an STMR of 5.1 mg/kg and an HR of 7.3 mg/kg for fluopyram for spring onions.

Welsh onion

GAP for Welsh onions in Greece is 1× 0.16 kg ai/ha, PHI of 7 days.

In eight European trials in Europe involving 2 applications of 0.2 kg ai/ha, 7 days apart, residues in samples taken just before the second application (i.e. 7 days after the first application) and thus matching GAP, were: 0.08, 0.08, 0.23, 0.33, 0.49, 0.59, 0.68 and 0.96 mg ai/kg.

The Meeting estimated a maximum residue level of 2 mg/kg, an STMR of 0.41 mg/kg and an HR of 0.96 mg/kg for fluopyram for Onion, Welsh.

Fruiting vegetables, other than Cucurbits

Peppers

The critical GAP in USA for fruiting vegetables is 2× 0.25 kg ai/ha, PHI of 0 days.

In nine trials conducted in USA matching this GAP, fluopyram residues in sweet peppers and chili peppers were: 0.034, 0.086, 0.12, 0.13, 0.14, 0.17, 0.36, 1.1 and 1.2 mg/kg. The highest residue of replicate samples was 1.4 mg/kg.

The Meeting estimated a maximum residue level of 3 mg/kg, an STMR of 0.14 mg/kg and an HR of 1.4 mg/kg for fluopyram on the Subgroup of Peppers (except Martynia, Okra and Roselle) to replace the previous recommendation for peppers.

For dried chili peppers, using the data set for peppers and a dehydration factor of 10, the Meeting estimated an STMR of 1.4 mg/kg, an HR of 14 mg/kg and recommended a maximum residue level of 30 mg/kg for fluopyram on peppers chili, dried to replace the previous recommendation.

Tomato

The critical GAP in USA for fruiting vegetables is 2× 0.25 kg ai/ha, PHI of 0 days.

In 11 independent trials conducted in USA and matching this GAP, fluopyram residues in tomatoes were: 0.021, 0.06, 0.067, 0.076, 0.11, 0.11, 0.16, 0.17, 0.18, 0.19 and 0.34 mg/kg. The highest residue of replicate samples was 0.37 mg/kg.

The Meeting estimated a maximum residue level of 0.5 mg/kg, an STMR of 0.11 mg/kg and an HR of 0.37 mg/kg for fluopyram on tomato (to replace the previous recommendation) and to establish a new maximum residue level of 0.4 mg/kg for cherry tomato based on the previous recommendation for tomato (STMR of 0.09 mg/kg and an HR of 0.23 mg/kg).

Eggplant

Noting that the GAP for fluopyram in USA is for the fruiting vegetables group, including the commodities in the new Codex classification of eggplants and eggplant-like commodities, the Meeting agreed to extrapolate the recommendations for tomatoes to eggplants.

The Meeting estimated a maximum residue level of 0.5 mg/kg, an STMR of 0.11 mg/kg and an HR of 0.37 mg/kg for fluopyram on the Subgroup of Eggplants.

Leafy vegetables

Witloof chicory (sprouts)

GAP in Belgium for Witloof chicory in Belgium is for one pre-plant root dip of 0.01 kg ai/hL plus one pre-forcing root collar spray of 0.5 g ai/square metre, PHI of 21 days.

In three trials conducted in Europe matching this GAP, fluopyram residues in sprouts (chicons) were: 0.02, 0.02 and 0.07 mg/kg.

The Meeting estimated a maximum residue level of 0.15 mg/kg, an STMR of 0.02 mg/kg and an HR of 0.07 mg/kg for fluopyram on Witloof chicory (sprouts).

Pulses

Dry beans

The GAP in USA and Canada for dried peas and beans (including soya bean) is for foliar applications of up to 0.25 kg ai/ha, PHI of 14 days, with a maximum of 0.5 kg ai/ha/season and that in USA the GAP for soya beans also included a seed treatment of 0.25 mg ai/seed.

In nine trials conducted in USA on dry beans, matching the foliar treatment GAP in USA, fluopyram residues were: < 0.01 (3), 0.011, 0.014, 0.017, 0.027, 0.052 and 0.068 mg/kg.

The Meeting estimated a maximum residue level of 0.15 mg/kg, an STMR of 0.014 mg/kg for fluopyram for the Subgroup of Dry beans (except soya bean), to replace the previous recommendations for beans (dry) and lupin (dry).

In 20 trials conducted in USA on soya beans, matching the seed treatment plus foliar treatment GAP in USA, fluopyram residues were: < 0.01 (5), 0.01, 0.012, 0.015, 0.015, 0.019, 0.022, 0.026, 0.028, 0.029, 0.053, 0.069, 0.08, 0.13, 0.15 and 0.21 mg/kg.

The Meeting estimated a maximum residue level of 0.3 mg/kg, an STMR of 0.0205 mg/kg for fluopyram for soya bean (dry).

Dry peas

The critical GAP in Canada for dried peas and beans is 2× 0.25 kg ai/ha, PHI of 14 days, with a maximum of 0.5 kg ai/ha/season).

In five trials conducted in USA, fluopyram residues in dry peas were: 0.033, 0.042, 0.058, 0.16 and 0.35 mg/kg.

The Meeting estimated a maximum residue level of 0.7 mg/kg and an STMR of 0.058 mg/kg for fluopyram on the Subgroup of Dry peas, to replace the previous recommendations for chick-pea (dry) and lentil (dry).

Root and tuber vegetables

Potato

The critical GAP in USA for tuber and corm vegetables (including potatoes) is for an in-furrow soil treatment (0.25 kg ai/ha) at planting followed by one foliar application of 0.25 kg ai/ha, PHI 7 days, with a total seasonal application rate of 0.5 kg ai/ha.

In 14 USA trials matching this GAP, fluopyram residues were: < 0.01 (4), 0.016, 0.017, 0.018, 0.024, 0.03, 0.031, 0.039, 0.046, 0.056 and 0.069 mg/kg. The highest residue of replicate samples was 0.083 mg/kg.

The Meeting estimated a maximum residue level of 0.15 mg/kg and an STMR of 0.021 mg/kg and an HR of 0.083 mg/kg for fluopyram on potato, to replace the previous recommendation.

Stalk and stem vegetables

Artichoke, globe

GAP in Greece for globe artichoke is 3× 0.075 kg ai/ha and a PHI of 7 days.

In two trials conducted in Europe on globe artichokes matching this GAP, fluopyram residues were: 0.1 and 0.15 mg/kg.

In a further six trials matching this GAP but with higher application rates of 0.1 kg ai/ha, residues were: 0.05, 0.09, 0.16, 0.18, 0.21 and 0.29 mg/kg.

When the results of these six trials are proportionally adjusted to match the GAP application rate of 0.075 kg ai/ha rate, the combined data set is: 0.04, 0.07, 0.1, 0.12, 0.14, 0.15, 0.16 and 0.22 mg/kg.

The Meeting estimated a maximum residue level of 0.4 mg/kg, an STMR of 0.13 mg/kg and an HR of 0.22 mg/kg for fluopyram on Artichoke, globe.

Cereal grains

Barley, oats

The critical GAP for barley and oats in Estonia is one foliar application of 0.078 kg ai/ha, up to BBCH 61 (start of flowering).

In 11 trials, conducted in Europe, on barley matching the GAP in Estonia for barley and oats, fluopyram residues were: < 0.01 (3), 0.012, 0.015, 0.017, 0.025, 0.028, 0.034, 0.079 and 0.11 mg/kg.

The Meeting estimated a maximum residue level of 0.2 mg/kg and an STMR of 0.017 mg/kg for fluopyram on barley and agreed to extrapolate these estimations to oats.

Maize

The critical GAP in USA is for cereal grains (except rice), 2 × 0.25 kg ai/ha foliar applications, PHI of 14 days and a maximum seasonal rate of 0.5 kg ai/ha/season.

In 14 trials conducted in USA matching this GAP, fluopyram residues were: < 0.01 (13) and 0.018 mg/kg.

The Meeting estimated a maximum residue level of 0.02 mg/kg and an STMR of 0.01 mg/kg for fluopyram on the Subgroup of Maize cereals.

Sweet corn (corn-on-the-cob)

GAP for maize and sweet corn in Hungary is 2 foliar applications of 0.125 kg ai/ha up to the end of flowering (BBCH 69), and a PHI of 14 days.

In European maize trials matching this GAP, residues of fluopyram were all < 0.01 mg/kg (n=16) in samples of cobs+kernels (without husks) taken at about the milk stage (i.e. to represent sweetcorn), 20–51 days after the last application.

The Meeting estimated maximum residue levels of 0.01 (*) mg/kg, an HR of 0.01 mg/kg and an STMR of 0.01 mg/kg for fluopyram for sweet corn (corn-on-the-cob).

Rice

GAP for rice in Thailand is 2 foliar applications of 0.024 kg ai/hL between booting and the start of flowering (up to BBCH 59).

In eight trials conducted in Thailand and Vietnam, matching this GAP, fluopyram residues in rice grain were: 0.3, 0.34, 0.35, 0.56, 0.67, 0.7, 0.9 and 2.7 mg/kg.

The Meeting estimated a maximum residue level of 4 mg/kg and an STMR of 0.615 mg/kg for fluopyram on rice.

Wheat, rye, triticale

The critical GAP in USA for cereal grains (except rice) is 2× 0.25 kg ai/ha, PHI of 14 days and a maximum seasonal rate of 0.5 kg ai/ha.

In 15 trials conducted in USA matching this GAP, fluopyram residues were: 0.021, 0.038, 0.13, 0.13, 0.15, 0.15, 0.17, 0.19, 0.19, 0.19, 0.22, 0.24, 0.25, 0.3 and 0.72 mg/kg.

The Meeting estimated a maximum residue level of 0.9 mg/kg and an STMR of 0.19 mg/kg for fluopyram on wheat.

The Meeting agreed to extrapolate the wheat results to rye and triticale and estimated maximum residue levels of 0.9 mg/kg and STMRs of 0.19 mg/kg for fluopyram on rye and triticale.

Oilseeds

Cotton seed

The critical GAP in USA for cotton seed is a seed treatment of 0.35 mg ai/seed and an in-furrow soil treatment at planting (0.25 kg ai/ha) followed by one foliar spray of 0.25 kg ai/ha, PHI 30 days, with a total maximum rate of 0.5 kg ai/ha/season.

In 10 trials from USA matching this GAP (seed treatment + in-furrow soil treatment + foliar spray), but using a higher seed treatment rate of 0.5 mg ai/seed), fluopyram residues were: < 0.01, < 0.01, 0.016, 0.023, 0.036, 0.081, 0.14, 0.16, 0.29 and 0.47 mg/kg.

The Meeting estimated a maximum residue level of 0.8 mg/kg and an STMR of 0.0585 mg/kg for fluopyram on cotton seed to replace the previous recommendation.

Peanut

The USA GAP for peanut includes options for a pre-plant in-furrow soil treatment (0.25 kg ai/ha), a seed treatment (0.35 mg ai/seed) and/or foliar treatments (0.25 kg ai/ha), a PHI of 7 days and a total seasonal application rate of 0.5 kg ai/ha. The label also states that treated crops must not be fed to livestock.

In trials from USA comparing these treatment options, highest residues of fluopyram were 0.018 mg/kg following 2 foliar treatments (14 trials), 0.06 mg/kg following the in-furrow + foliar treatments (15 trials), 0.11 mg/kg in the seed + in-furrow treatments (12 trials).

In the trials matching the critical USA GAP (seed treatment + foliar spray), but with a higher seed treatment rate of 1.1 mg ai/seed), fluopyram residues in peanut (nutmeat) were (n=9): 0.012, 0.015, 0.032, 0.032, 0.033, 0.042, 0.042, 0.046 and 0.13 mg/kg.

The Meeting estimated a maximum residue level of 0.2 mg/kg and an STMR of 0.033 mg/kg for fluopyram on peanut to replace the previous recommendation.

Sunflower seed

The critical GAP in Canada and USA for sunflower seed is 2 × 0.25 kg ai/ha, PHI of 14 days and a maximum of 0.5 kg ai/ha/season.

In eight independent trials from USA matching this GAP, fluopyram residues in sunflower seeds were: 0.011, 0.02, 0.053, 0.056, 0.076, 0.22, 0.25 and 0.38 mg/kg.

The Meeting estimated a maximum residue level of 0.7 mg/kg and an STMR of 0.066 mg/kg for fluopyram on sunflower seed.

Herbs, dried herbs and spices

Basil

The critical GAP in Canada for Herbs (including basil) is 2× 0.25 kg ai/ha, PHI of 0 days and a maximum seasonal rate of 0.5 kg ai/ha.

In three trials conducted in USA and matching the GAP in Canada, fluopyram residues in fresh basil leaves were: 19, 19 and 30 mg/kg. The highest residue of replicate samples was 32 mg/kg.

The Meeting estimated a maximum residue level of 70 mg/kg, an STMR of 19 mg/kg and an HR of 32 mg/kg for fluopyram on basil.

Basil, dry

The critical GAP in Canada for Herbs (including basil) is 2× 0.25 kg ai/ha, PHI of 0 days and a maximum seasonal rate of 0.5 kg ai/ha.

In three trials conducted in USA and matching this GAP, fluopyram residues in dried basil leaves (i.e. after drying in the field for up to 9 days) were: 90, 96 and 180 mg/kg. The highest residue of replicate samples was 187 mg/kg.

The Meeting estimated a maximum residue level of 400 mg/kg, an STMR of 96 mg/kg and an HR of 187 mg/kg for fluopyram on basil, dry.

Dill (seed)

The critical GAP in USA for dill seed is 2× 0.25 kg ai/ha, PHI of 14 days and a maximum seasonal rate of 0.5 kg ai/ha.

In four trials conducted in USA and matching this GAP, fluopyram residues in dill seed were: 9.2, 20, 27 and 30 mg/kg.

The Meeting estimated a maximum residue level of 70 mg/kg and an STMR of 23.5 mg/kg for fluopyram on dill seed.

Hops (dry)

The critical GAP in USA for hops in USA is 2× 0.25 kg ai/ha, PHI of 7 days and a maximum seasonal rate of 0.5 kg ai/ha).

In four trials conducted in USA and matching this GAP, fluopyram residues in dried hops (i.e. oven-dried for 12 hours, hot-air dried for 3.5 hours or air-dried for 24 hours) were: 5.8, 6.7, 14 and 25 mg/kg.

The Meeting estimated a maximum residue level of 50 mg/kg and an STMR of 10.35 mg/kg for fluopyram on hops (dry).

Animal feeds

Bean forage and fodder

The critical GAP for dry beans (except soya beans) in Canada (2×0.25 kg ai/ha, with a maximum seasonal rate of 0.5 kg ai/ha) includes a statement that except for soya beans, legume forage and vines may be grazed or harvested for livestock feed on the day of application.

In nine trials conducted in USA and matching this GAP, fluopyram residues in bean forage sampled the day of the last application were: 10, 13, 13, 13, 14, 14, 15, 21 and 25 mg/kg.

For livestock dietary burden estimation, the Meeting estimated a median residue of 14 mg/kg and a highest residue of 25 mg/kg for fluopyram on bean forage.

In these same trials, fluopyram residues in bean hay (i.e. after drying for up to 18 days in the field) fluopyram residues were: 4.1, 8.9, 12, 17, 19, 23, 27, 27 and 29 mg/kg.

The Meeting estimated a median residue of 19 mg/kg, a highest residue of 29 mg/kg and based on a dry matter content of 85% (OECD Livestock Feed Table – soya bean hay), estimated a maximum residue level of 70 mg/kg for fluopyram on bean fodder.

Pea vines and hay

The critical GAP in Canada for dry peas (2× 0.25 kg ai/ha, PHI of 14 days with a maximum seasonal rate of 0.5 kg ai/ha) includes a statement that except for soya beans, legume forage and vines may be grazed or harvested for livestock feed on the day of application.

In five trials conducted in USA and matching this GAP, fluopyram residues in pea vines sampled the day of the last application were: 2.7, 4.6, 5.6, 5.9 and 10 mg/kg.

For livestock dietary burden estimation, the Meeting estimated a median residue of 5.6 mg/kg and a highest residue of 10 mg/kg for fluopyram on peavines.

In these same trials, fluopyram residues in pea hay (i.e. after drying for up to 10 days in the field) residues were: 14, 17, 18, 30 and 48 mg/kg.

The Meeting estimated a median residue of 18 mg/kg, a highest residue of 48 mg/kg and based on a dry matter content of 88% (OECD Livestock Feed Table), estimated a maximum residue level of 100 mg/kg for fluopyram on pea hay or pea fodder (dry).

Soya bean forage and fodder

The critical GAP in Canada for soya beans is 2× 0.25 kg ai/ha with a maximum of 0.5 kg ai/ha/season and a 7-day livestock withholding period.

In 19 trials conducted in USA and matching the GAP in Canada, fluopyram residues in soya bean forage sampled 7 days after the last application were: 0.36, 1.1, 1.1, 1.1, 1.2, 1.3, 1.9, 2.1, 2.3, 2.3, 2.6, 2.6, 3.2, 3.3, 3.3, 3.7, 4.6, 5.6 and 5.7 mg/kg.

For livestock dietary burden estimation, the Meeting estimated a median residue of 2.3 mg/kg and a highest residue of 5.7 mg/kg for fluopyram on soya bean forage.

In these same trials, fluopyram residues in soya bean hay (i.e. dried in the field for up to 6 days) were: 1.8, 2.2, 3.0, 3.2, 3.4, 3.6, 4.6, 5.6, 5.9, 6.1, 6.2, 6.5, 7.4, 9.1, 11, 11, 14, 16 and 20 mg/kg.

The Meeting estimated a median residue of 6.1 mg/kg, a highest residue of 20 mg/kg and based on a dry matter content of 85% (OECD Livestock Feed Table), estimated a maximum residue level of 35mg/kg for fluopyram on soya bean fodder.

Barley, oat forage and fodder

In 12 trials conducted in Europe on barley, matching the GAP in Estonia (1 foliar application of 0.078 kg ai/ha up to BBCH61, with no specified livestock withholding interval, fluopyram residues in barley forage sampled on the day of application were: 0.27, 1.0, 1.3, 1.3, 1.5, 1.7, 1.8, 2.0, 2.0, 2.0, 2.0 and 2.1 mg/kg.

For livestock dietary burden estimation, the Meeting estimated a median residue of 1.75 mg/kg and a highest residue of 2.1 mg/kg for fluopyram on barley forage and agreed to extrapolate these estimations to oat forage.

In barley straw from these same trials, fluopyram residues in samples taken at maturity (35–69 days after treatment) were: 0.018, 0.024, 0.025, 0.054, 0.058, 0.095, 0.097, 0.4, 0.77, 0.81 and 1.1 mg/kg.

The Meeting estimated a median residue of 0.095 mg/kg, a highest residue of 1.1 mg/kg and based on a dry matter content of 89% (OECD Livestock Feed Table), estimated a maximum residue level of 2 mg/kg for fluopyram on barley straw and fodder, agreed to extrapolate these estimations to oat straw and fodder, dry.

Maize forage and fodder

In the trials conducted in USA on maize, matching the GAP in USA for cereal grains except rice (0.25 kg ai/ha, maximum seasonal rate of 0.5 kg ai/ha) and with a livestock withholding interval of 14 days, fluopyram residues in maize forage following treatments up to about the soft dough stage (BBCH 73–87) were (n=3): 1.5, 2 and 3.9 mg/kg.

For livestock dietary burden estimation, the Meeting estimated a median residue of 2 mg/kg and a highest residue of 3.9 mg/kg for fluopyram on maize forage.

In maize fodder (stover) fluopyram residues in samples taken at maturity, 12-14 days after the last application were (n=14): 1.0, 1.1, 1.1, 1.2, 1.2, 1.5, 1.8, 1.9, 2.1, 2.3, 2.8, 3.0, 4.1 and 13 mg/kg.

The Meeting estimated a median residue of 1.85 mg/kg, a highest residue of 13 mg/kg and based on a dry matter content of 83% (OECD Livestock Feed Table), estimated a maximum residue level of 18 mg/kg for fluopyram on maize fodder (dry).

Rice straw

In 10 trials conducted in Thailand and Vietnam, matching the GAP for rice in Thailand (2 foliar applications of 0.024 kg ai/hL between booting and the start of flowering - BBCH 59), fluopyram residues in rice straw at maturity were: 0.22, 0.74, 0.89, 1.3, 1.6, 3.5, 3.8, 4.0, 6.1 and 6.7 mg/kg.

The Meeting estimated a median residue of 2.55 mg/kg, a highest residue of 6.7 mg/kg and based on a dry matter content of 90% (OECD Livestock Feed Table), estimated a maximum residue level of 17 mg/kg for fluopyram on rice straw and fodder (dry).

Wheat, rye, triticale forage and fodder

In the trials conducted in USA on wheat, matching the GAP in USA for cereal grains except rice (0.25 kg ai/ha, maximum seasonal rate of 0.5 kg ai/ha) and with a livestock withholding interval of 14 days, fluopyram residues in wheat forage following treatments up to the end of stem elongation (BBCH 21–41) were (n=15): 0.06, 0.14, 0.14, 0.36, 0.51, 0.53, 0.53, 0.56, 0.79, 0.83, 0.94, 1.1, 1.2, 1.3, and 2.9 mg/kg.

For livestock dietary burden estimation, the Meeting estimated a median residue of 0.56 mg/kg and a highest residue of 2.9 mg/kg for fluopyram on wheat forage and agreed to extrapolate these estimations to rye forage and triticale forage.

In wheat hay, fluopyram residues in samples taken between BBCH 41 and BBCH 83 (to reflect harvesting for hay) but at least 13-15 days after the last application were (n=16): 0.29, 0.32, 0.46, 0.62, 0.7, 0.95, 1.0, 1.5, 2.1, 2.3, 2.6, 3.4, 3.5, 4.9, 5.0 and 5.4 mg/kg.

In wheat straw, fluopyram residues in samples taken at maturity, 13-15 days after the last application were (n=15): 0.85, 0.87, 0.99, 3.2, 3.3, 4.0, 4.7, 4.8, 5.2, 5.3, 5.7, 6.9, 7.3, 8.9 and 12 mg/kg.

Based on the results for wheat straw, the Meeting estimated a median residue of 4.8 mg/kg, a highest residue of 12 mg/kg and based on a dry matter content of 88% (OECD Livestock Feed Table), estimated a maximum residue level of 23 mg/kg for fluopyram on wheat straw and fodder dry and agreed to extrapolate these estimations to rye straw and fodder, dry and to triticale straw and fodder, dry.

Peanut hay

The critical GAP in Canada for peanuts is 2 foliar applications of 0.25 kg ai/ha with a maximum seasonal rate of 0.5 kg ai/ha and with a livestock withholding interval of 7 days.

In 13 trials matching this GAP, residues of fluopyram in peanut hay were: 1.2, 2.7, 2.9, 3.7, 4.1, 4.2, 5.4, 6.7, 9.1, 11, 18, 19 and 21 mg/kg.

The Meeting estimated a median residue of 5.4 mg/kg, a highest residue of 21 mg/kg and based on a dry matter content of 85% (OECD Livestock Feed Table), estimated a maximum residue level of 47 mg/kg for fluopyram on peanut hay.

Cotton gin trash

In six trials conducted in USA matching the critical GAP in USA for cotton seed (seed treatment of 0.35 mg ai/seed plus an in-furrow soil treatment at planting (0.25 kg ai/ha) followed by one foliar spray of 0.25 kg ai/ha, PHI 30 days, with a total maximum rate of 0.5 kg ai/ha/season, residues of fluopyram in cotton gin by-products were: < 0.01, 2.5, 3.9, 6.8, 7.3 and 14 mg/kg.

For livestock dietary burden estimation, the Meeting estimated a maximum residue level of 30 mg/kg, a median residue of 5.4 mg/kg and a highest residue of 14 mg/kg for fluopyram on cotton gin trash.

Fate of residues during processing

The 2010 JMPR reported that fluopyram was stable under conditions simulating pasteurisation, boiling and sterilisation and also estimated processing factors and STMR-Ps for a range of commodities.

In addition to the processing studies evaluated by the 2010 JMPR, the Meeting received a processing study on rice. Fluopyram residues decreased during the processing of rice grain (removal of the hulls) to brown rice and after polishing (white rice). Residues in bran were about the same as in the whole grain and higher levels were reported in hulls. Residues in cooked polished rice were also significantly lower than in uncooked polished rice.

Relevant processing factors and STMR-Ps for the commodities considered at this Meeting and used for dietary exposure risk assessment or for estimating livestock animal burdens are summarised below.

Raw agricultural commodity STMR [HR] mg/kg	Processed commodity	Calculated processing factors [a]	Processing factor (mean or median)	STMR-P [HR-P] (mg/kg)
Orange	Peel	1.8	1.8	0.27 [0.67]
STMR: 0.15 mg/kg	Flesh	0.16	0.16	0.024 [0.059]
HR: 0.37 mg/kg	Juice	0.01	0.01	0.0015
	Oil	16	16	2.4
Tomato	Washed fruit	0.32, 0.51, 0.67, 0.92, 0.94	0.67	0.074 [0.25]
STMR: 0.11 mg/kg	Juice	0.09, 0.27, 0.42, 0.44, 0.56	0.36	0.04
HR: 0.37 mg/kg	Pulp	0.08, 0.09, 0.11, 0.13	0.1	0.011
	Preserve	0.07, 0.18, 0.21, 0.25, 0.33	0.21	0.023

Raw agricultural commodity STMR [HR] mg/kg	Processed commodity	Calculated processing factors [a]	Processing factor (mean or median)	STMR-P [HR-P] (mg/kg)
	Puree	0.18, 0.46, 0.73, 0.94, 2.2	0.73 (median)	0.08
	Paste	0.46	0.46	0.051
Soya bean	Meal	0.05	0.05	0.001
STMR: 0.019 mg/kg	Refined oil	0.02	0.02	0.00041
	Flour	0.04	0.04	0.00082
	Soymilk	< 0.02	< 0.02	0.00041
	Asp grain fraction	223	223	4.6
Potato	Washed tubers	0.7	0.7	0.015 [0.058]
STMR: 0.021 mg/kg	Peeled tubers	< 0.64	< 0.64	0.013 [0.053]
HR: 0.083 mg/kg	Chips	< 0.64	< 0.64	0.013
	Flakes	1	1	0.021
	Wet peel	4.3	4.3	0.09
Maize	Grits	0.51	0.51	0.051
STMR: 0.01 mg/kg	Meal	0.81	0.81	0.0081
	Flour	0.85	0.85	0.0085
	Bran	2.7	2.7	0.027
	Starch	0.36	0.36	0.0036
	Oil (wet milled)	0.58	0.58	0.0058
	Oil (dry milled)	< 0.36	< 0.36	0.0036
	Asp grain fraction	161	161	16
Rice	Brown rice	0.24, 0.34	0.29	0.178
STMR: 0.615 mg/kg	Polished rice	0.1, 0.12	0.11	0.0676
	Cooked rice	0.04, 0.04	0.04	0.0246
	Rice hulls	1.9, 2.2	2	1.23
	Rice bran	1.0, 1.1	1.1	0.68
Wheat	Wheat bran	2.7	2.7	0.51
STMR: 0.19 mg/kg	Middlings	0.34	0.34	0.065
	Shorts	0.75	0.75	0.14
	Flour	0.12	0.12	0.023
	Asp grain fraction	70	70	13
	Wheat germ	2.4	2.4	0.46
Cotton seed	Oil (refined)	< 0.01	< 0.01	0.000585
STMR: 0.0585 mg/kg	Meal	0.022	0.022	0.001287
Peanut	Nuts (roasted)	0.26	0.26	0.0086
STMR: 0.033 mg/kg	Meal	0.19	0.19	0.0063
	Butter	0.22	0.22	0.0073
	Oil	0.01	0.01	0.00033
Sunflower seed	Oil (refined)	< 0.01	< 0.01	0.00066
STMR: 0.066 mg/kg	Meal	0.02	0.02	0.0013

[a] The processing factor is the ratio of the fluopyram residue in the processed item divided by the fluopyram residue in the RAC.

Residues in animal commodities

Farm animal dietary burden

The Meeting estimated the dietary burden of fluopyram in farm animals were estimated using the OECD diets listed in Appendix IX of the 2016 edition of the FAO Manual.

	Animal dietary burden, fluopyram, ppm of dry matter diet							
	US-Canada		EU		Australia		Japan	
	Max	Mean	Max	Mean	Max	Mean	Max	Mean
Beef cattle	4.1	2.8	28	9.5	65[a]	32[c]	4.3	1.8
Dairy cattle	14	6.1	36	14	55[b]	31[d]	5.2	2.7
Poultry – broiler	0.37	0.37	0.41	0.32	0.57	0.57	0.079	0.079
Poultry – layer	0.37	0.37	9.0[eg]	3.1[fh]	0.57	0.57	0.2	0.2

[a] Highest maximum beef or dairy cattle dietary burden suitable for MRL estimates for mammalian tissues

[b] Highest maximum dairy cattle dietary burden suitable for MRL estimates for mammalian milk

[c] Highest mean beef or dairy cattle dietary burden suitable for STMR estimates for mammalian tissues.

[d] Highest mean dairy cattle dietary burden suitable for STMR estimates for milk.

[e] Highest maximum poultry dietary burden suitable for MRL estimates for poultry tissues.

[f] Highest mean poultry dietary burden suitable for STMR estimates for poultry tissues.

[g] Highest maximum poultry dietary burden suitable for MRL estimates for poultry eggs.

[h] Highest mean poultry dietary burden suitable for STMR estimates for poultry eggs.

Farm animal feeding studies

The 2010 JMPR reviewed feeding studies with fluopyram on lactating dairy cows and laying hens and the conclusions from these residue transfer studies were used to estimate residue levels of fluopyram and its metabolites in milk, eggs and livestock tissues, based on the above dietary burdens.

Animal commodity maximum residue levels

Cattle

Maximum and mean residues expected in milk and tissues were obtained by using the residue transfer factors estimated by the 2010 JMPR.

For maximum residue estimation, the high residues of fluopyram and BZM (expressed as fluopyram equivalents) were calculated by interpolating the maximum dietary burden (65 ppm) from the 44:133 ppm feeding levels in the dairy cow feeding study and using the highest tissue concentrations of fluopyram plus BZM (fluopyram equivalents) from individual animals within those feeding groups. The same interpolation was used to calculate the highest tissue concentrations of fluopyram, BZM plus total olefins (fluopyram equivalents) for estimating HRs for dietary exposure estimation.

The STMR values for the tissues were calculated by interpolating the STMR dietary burden (32 ppm from the from the 14.4:44 ppm feeding levels and using the mean tissue concentrations of fluopyram, BZM plus total olefins (fluopyram equivalents) from those feeding groups.

For milk MRL estimation, the high residues in the milk were calculated by interpolating the maximum dietary burden for dairy cattle (55 ppm) from the 44:133 ppm feeding levels in the dairy cow feeding study and using the mean milk concentrations of fluopyram and BZM (fluopyram equivalents) from this feeding group.

The STMR value for milk was calculated by interpolating the mean dietary burden for dairy cows (32 ppm) from the 14.4:44 ppm feeding levels and using the mean milk concentrations of fluopyram, BZM plus total olefins (fluopyram equivalents).

	Feed level for milk (ppm)	Residues in milk (mg/kg)	Feed level for tissues (ppm)	Residues (mg/kg)			
				Muscle	Liver	Kidney	Fat
MRL beef or dairy cattle ((fluopyram + BZM)							

	Feed level for milk (ppm)	Residues in milk (mg/kg)	Feed level for tissues (ppm)	Residues (mg/kg)			
				Muscle	Liver	Kidney	Fat
Feeding study (1)	44 133	0.62 1.42	44 133	0.83 1.53	6.0 11	0.93 1.68	0.78 1.81
Dietary burden/residue estimate	55[d]	**0.72**	65[c]	**1**	**7.2**	**1.1**	**1**
High residue beef or dairy cattle (fluopyram + BZM + Total olefins)							
Feeding study [a]			44 133	0.86 1.57	6.13 11.6	0.97 1.83	1.1 2.75
Dietary burden/residue estimate			65[c]	**1**	**7.4**	**1.2**	**1.5**
STMR beef or dairy cattle ((fluopyram + BZM + Total olefins)							
Feeding study [b]	14.4 44	0.27 0.65	14.4 44	0.32 0.64	1.96 4.99	0.41 0.79	0.31 0.91
Dietary burden/residue estimate	31[f]	**0.48**	32[e]	**0.51**	**3.8**	**0.6**	**0.67**

[a] Highest residues for tissues and mean residues for milk

[b] Mean residues for tissues and for milk

[c] Highest maximum beef or dairy cattle dietary burden suitable for MRL estimates for mammalian tissues

[d] Highest maximum dairy cattle dietary burden suitable for MRL estimates for mammalian milk

[e] Highest mean beef or dairy cattle dietary burden suitable for STMR estimates for mammalian tissues.

[f] Highest mean dairy cattle dietary burden suitable for STMR estimates for milk.

Combined residues of fluopyram and BZM (expressed as fluopyram equivalents) expected in cattle milk and tissues for use in estimating maximum residue levels are: 1 mg/kg (fat), 1 mg/kg (muscle), 7.2 mg/kg (liver) and 1.1 mg/kg (kidney) and the mean residue for milk is 0.72 mg/kg.

The Meeting estimated maximum residue levels of 1.5 mg/kg for fluopyram in meat (from mammals other than marine mammals), 1.5 mg/kg for mammalian fat, 8 mg/kg for edible offal (mammalian) and 0.8 mg/kg for milks to replace the existing recommendations and agreed to withdraw the previous recommendations for meat (from mammals other than marine mammals), liver and kidney of cattle, goats, pigs and sheep, and milks.

Estimated HRs for dietary exposure estimation for fluopyram (and including residues of BZM and total olefins) are 1.5 mg/kg for mammalian fat, 1 mg/kg for mammalian muscle, 7.4 mg/kg for liver and 1.2 mg/kg for kidney.

Estimated STMRs for dietary exposure estimation for fluopyram (and including residues of BZM and total olefins) are 0.67 mg/kg for mammalian fat, 0.51 mg/kg for mammalian muscle, 3.8 mg/kg for liver, 0.6 mg/kg for kidney and 0.48 mg/kg for milks

Poultry

The dietary maximum and mean burdens for poultry broilers are 0.57 ppm but the Meeting decided to estimate residue levels in poultry tissues using the higher mean/maximum dietary burden in poultry layers (3.1 pm and 9 ppm respectively) as they may also be consumed.

In the 28-day poultry feeding study evaluated by the 2010 JMPR, in hens dosed with 4.8 ppm fluopyram in the diet, maximum residues of fluopyram+BZM (for estimating maximum residue levels) were 0.72 mg/kg, (eggs), 0.33 mg eq/kg (muscle), 0.64 mg eq/kg (fat) and 1.6 mg eq/kg (liver). Maximum residues of fluopyram+BZM+olefins (for estimating HRs) were 0.95 mg eq/kg (eggs), 0.39 mg eq/kg (muscle), 0.72 mg eq/kg (fat) and 1.6 mg eq/kg (liver). Mean fluopyram-equivalent residues of fluopyram+BZM (for estimating a maximum residue level for eggs) were 0.72 mg eq/kg (eggs) and mean residues of fluopyram+BZM+olefins (for estimating STMRs) were 0.74 mg/kg (eggs), 0.31 mg/kg (muscle), 0.46 mg/kg (fat) and 1.42 mg/kg (liver).

In the 1.6 ppm dose group, mean residues of fluopyram+BZM+olefins (for estimating STMRs) were 0.22 mg/kg (eggs), 0.09 mg eq/kg (muscle), 0.12 mg eq/kg (fat) and 0.41 mg eq/kg (liver).

The Meeting noted that the maximum dietary burden of 9 ppm for poultry layers was about twice the highest dose of 4.8 ppm used in the poultry feeding study and agreed to estimate revised maximum residue levels for poultry tissues and eggs by interpolating between the highest feeding study dose level (4.8 ppm) and the 26 ppm dose used in the 14-day poultry metabolism study (phenyl-label) evaluated by the 2010 JMPR.

In this metabolism study, residues of fluopyram+BZM were 3.47 mg/kg (eggs), 3.23 mg/kg (muscle), 1.17 mg/kg (fat) and 8.74 mg/kg (liver). Total residues (fluopyram+BZM+olefins) were 3.52 mg/kg (eggs), 3.25 mg/kg (muscle), 1.63 mg/kg (fat) and 8.78 mg/kg (liver).

For estimating STMRs, the Meeting agreed to extrapolate the results of the 1.6 ppm and the 4.8 ppm dose groups in the poultry feeding study.

Tissue concentrations of fluopyram plus BZM (fluopyram equivalents) were used for estimating maximum residue levels and concentrations of fluopyram, BZM plus total olefins (fluopyram equivalents) were used for dietary exposure estimation.

	Feed level for eggs (ppm)	Residues in eggs (mg/kg)	Feed level for tissues (ppm)	Residues (mg/kg)		
				Muscle	Liver	Skin with Fat
MRL broiler or laying hen (fluopyram + BZM)						
Feeding study [a]	4.8 26	0.72 3.47	4.8 26	0.33 3.23	1.6 8.74	0.64 1.17
Dietary burden/residue estimate	9[e]	**1.3**	9[c]	**0.91**	**3**	**0.75**
High residue broiler or laying hen (fluopyram + BZM + Total olefins)						
Feeding study [a]	4.8 26	0.95 3.47	4.8 26	0.39 3.25	1.6 8.78	0.72 1.63
Dietary burden/residue estimate	9[c]	**1.4**	9c	**0.93**	**3**	**0.9**
STMR broiler or laying hen (fluopyram + BZM + Total olefins)						
Feeding study [b]	1.6 4.8	0.22 0.74	1.6 4.8	0.09 0.31	0.41 1.42	0.12 0.46
Dietary burden/residue estimate	3.1[f]	**0.46**	3.1[d]	**0.19**	**0.88**	**0.28**

[a] Highest residues for tissues and mean residues for eggs

[b] Mean residues for tissues and for eggs

[c] Highest maximum poultry dietary burden suitable for MRL estimates for poultry tissues.

[d] Highest mean poultry dietary burden suitable for STMR estimates for poultry tissues.

[e] Highest maximum poultry dietary burden suitable for MRL estimates for poultry eggs.

[f] Highest mean poultry dietary burden suitable for STMR estimates for poultry eggs.

Combined residues of fluopyram and BZM (expressed as fluopyram equivalents) expected in poultry eggs and tissues for use in estimating maximum residue levels are: 0.75 mg/kg (fat), 0.91 mg/kg (muscle), 3 mg/kg (liver) and 1.3 mg/kg (eggs).

The Meeting estimated maximum residue levels of 1.5 mg/kg for fluopyram in poultry meat, 1 mg/kg for poultry fat, 5 mg/kg for poultry edible offal and 2 mg/kg for eggs, to replace the previous recommendations.

Estimated HRs for dietary intake estimation for fluopyram (and including residues of BZM and total olefins) are 0.9 mg/kg for poultry fat, 0.95 mg/kg for poultry muscle, 1.4 mg/kg for eggs and 3 mg/kg for poultry edible offal.

Estimated STMRs for dietary intake estimation for fluopyram (and including residues of BZM and total olefins) are 0.28 mg/kg for poultry fat, 0.19 mg/kg for poultry muscle, 0.88 mg/kg for poultry edible offal and 0.46 mg/kg for eggs.

RECOMMENDATIONS

On the basis of the data from supervised 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 and for the estimation of dietary exposure for plant commodities: *fluopyram*

Definition of the residue for compliance with the MRL for animal commodities: *Sum of fluopyram and 2-(trifluoromethyl) benzamide, expressed as fluopyram*

Definition of the residue for the estimation of dietary exposure for animal commodities: *Sum of fluopyram, 2-(trifluoromethyl)benzamide and the combined residues of N-{(E)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-trifluoromethyl) benzamide and N-{(Z)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-trifluoromethyl) benzamide, all expressed as fluopyram.*

The residue is not fat-soluble.

	Commodity	MRL	mg/kg	STMR or	HR or
CCN	Name	New	Prev	STMR-P	HR-P
VS 0620	Artichoke, globe	0.4		0.13	0.22
GC 0640	Barley	0.2		0.017	
	Barley forage			1.75	2.1
AS 0640	Barley straw and fodder, dry	2		0.095	1.1
HH 0722	Basil	70		19	32
DH 0722	Basil, dry	400		96	187
AL 0061	Bean fodder	70		19	29
AL 1030	Bean forage (green)			14	25
VD 0071	Beans (dry)	W	0.07		
FB 0264	Blackberries	W	3		
VO 2700	Cherry tomato	0.4		0.09	0.23
VD 0524	Chick-pea (dry)	W	0.07		
	Cotton gin trash	30		5.4	14
SO 0691	Cottonseed	0.8	0.01 (*)	0.0585	
HS 0730	Dill seed	70		23.5	
MO 0105	Edible offal (mammalian)	8		3.8 (liver) 0.6 (kidney)	7.4 (liver) 1.2 (kidney)
PE 0112	Eggs	2	1	0.46	1.4
DH 1100	Hops (dry)	50		10.35	
MO 0098	Kidney of cattle, goats, pigs and sheep	W	0.8		
VD 0533	Lentil (dry)	W	0.07		
MO 0099	Liver of cattle, goats, pigs and sheep	W	5		
VD 0545	Lupin (dry)	W	0.07		
AS 0645	Maize fodder	18		1.85	13
AF 0645	Maize forage			2	3.9
MF 0100	Mammalian fat	1.5		0.67	1.5
FI 0345	Mango	1		0.02	0.053
MM 0095	Meat (from mammals other than marine mammals)	1.5	0.8	0.51	1
ML 0106	Milks	0.8	0.5	0.48	
AF 0647	Oat forage (green)			1.75	2.1
AS 0647	Oat straw and fodder, dry	2		0.095	1.1
GC 0647	Oats	0.2		0.017	
VA 0387	Onion, Welsh	2		0.41	0.96
AL 0072	Pea hay or Pea fodder (dry)	100		18	48
AL 0528	Pea vines (green)			5.6	10
SO 0697	Peanut	0.2	0.03	0.033	
AL 0697	Peanut fodder	47		5.4	21
HS 0444	Peppers Chili, dried	30	5	1.4	14
VR 0589	Potato	0.15	0.03	0.021	0.083
PF 0111	Poultry fat	1		0.28	0.9

	Commodity	MRL	mg/kg	STMR or	HR or
CCN	Name	New	Prev	STMR-P	HR-P
PM 0110	Poultry meat	1.5	0.5	0.19	0.95
PO 0110	Poultry, Edible offal of	5	2	0.88	3
FC 005	Pummelo and Grapefruits	0.4		0.14	0.23
FB 0272	Raspberries, Red, Black	W	3		
GC 0649	Rice	4		0.615	
AS 0649	Rice straw and fodder, dry	17		2.55	6.7
GC 0650	Rye	0.9		0.19	
AF 0650	Rye forage (green)			0.56	2.9
AS 0650	Rye straw and fodder, dry	23		4.8	12
VD 0541	Soya bean (dry)	0.3		0.0205	
AL 0541	Soya bean fodder	35		6.1	20
AL 1265	Soya bean forage (green			2.3	5.7
VA 0389	Spring onion	15		5.1	7.3
FB 2006	Subgroup of Bush berries	7		1.15	4.9
FB 2005	Subgroup of Cane berries	5		0.83	2.5
FS 0013	Subgroup of Cherries	2	0.7	0.57	1.2
VD 2065	Subgroup of Dry Beans (except Soya bean (dry))	0.15		0.014	
VD 2066	Subgroup of Dry Peas	0.7		0.058	
VO 2046	Subgroup of Eggplants	0.5		0.11	0.37
FC 0002	Subgroup of Lemons and Limes	1		0.325	0.51
GC 2091	Subgroup of Maize Cereals	0.02		0.01	
FC 0003	Subgroup of Mandarins	0.6		0.15	0.37
FC 0004	Subgroup of Oranges, Sweet, Sour	0.6		0.15	0.37
VO 0051	Subgroup of Peppers (exept Martynia, Okra, Roselle)	3	0.5	0.14	1.4
SO 0702	Sunflower seed	0.7		0.066	
GC 0447	Sweet corn (Corn-on-the-cob)	0.01 (*)		0.01	0.01
VO 0448	Tomato	0.5	0.4	0.11	0.37
GC 0653	Triticale	0.9		0.19	
	Triticale forage			0.56	2.9
AS 0653	Triticale straw and fodder, dry	23		4.8	12
GC 0654	Wheat	0.9		0.19	
AF 0645	Wheat forage (whole plant)			0.56	2.9
AS 0654	Wheat straw and fodder, dry	23		4.8	12
VL 2832	Witloof chicory (sprouts)	0.15		0.02	0.07
	Cooked rice			0.0246	
OR 0691	Cottonseed oil (refined)			0.000585	
AB 1203	Cottonseed, meal			0.0013	
	Maize asp grain fraction			16	
	Maize bran			0.027	
CF 1255	Maize flour			0.0085	
	Maize grits			0.0051	
CF 0645	Maize meal			0.0081	
	Maize oil (dry milled)			0.0036	
	Maize oil (wet milled)			0.0058	
	Maize starch			0.0036	
JF 0004	Orange juice			0.0015	
OR 0004	Orange oil			2.4	
	Orange peel			0.27	0.67
	Orange pulp			0.024	0.059
	Peanut butter			0.0073	
	Peanut meal			0.0063	
OR 0697	Peanut oil			0.00033	
	Potato (peeled)			0.013	0.053
	Potato chips (crisps)			0.013	
	Potato flakes			0.021	
	Potato wet peel (process waste)			0.09	
CM 1206	Rice bran, Unprocessed			0.68	
CM 1207	Rice hulls			1.23	

	Commodity	MRL	mg/kg	STMR or	HR or
CCN	Name	New	Prev	STMR-P	HR-P
CM 0649	Rice, Husked			0.178	
CM 1205	Rice, Polished			0.0676	
	Soya bean asp fraction			4.6	
	Soya bean flour			0.00082	
AB 1265	Soya bean meal			0.001	
	Soya bean milk			0.00041	
OR 0541	Soya bean oil			0.00041	
	Sunflower meal			0.0013	
OR 0702	Sunflower seed oil, Edible			0.00066	
JF 0448	Tomato juice			0.04	
VW 0448	Tomato paste			0.051	
	Tomato pomace (wet)			0.011	
	Tomato preserve			0.023	
	Tomato puree			0.08	
	Wheat asp grain fraction			13	
CF 0654	Wheat bran, Processed			0.51	
CF 1211	Wheat flour			0.023	
CF 1210	Wheat germ			0.46	
	Wheat middlings			0.065	
	Wheat shorts			0.14	

DIETARY RISK ASSESSMENT

Long-term exposure

The International Estimated Daily Intakes (IEDIs) for fluopyram were calculated for the food commodities for which STMRs or HRs were estimated and for which consumption data were available. The results are shown in Annex 3.

The International Estimated Daily Intakes of fluopyram for the 17 GEMS/Food regional diets, based on estimated STMRs were 10–80% of the maximum ADI of 0.01 mg/kg bw (see Annex 3 of the 2017 Report). The Meeting concluded that the long-term dietary exposure to residues of fluopyram from uses that have been considered by the JMPR is unlikely to present a public health concern.

Short-term exposure

The International Estimated Short-term Intakes (IESTIs) for fluopyram were calculated for the food commodities for which STMRs or HRs were estimated by the current and previous meetings and for which consumption data were available (see Annex 4 of the 2017 Report).

For fluopyram the IESTI varied from 0–100% of the ARfD (0.5 mg/kg bw) and the Meeting concluded that the short-term dietary exposure of residues of fluopyram from uses considered by the JMPR is unlikely to present a public health concern.

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