

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 and in 2014, with a number of additional maximum residue levels being recommended.

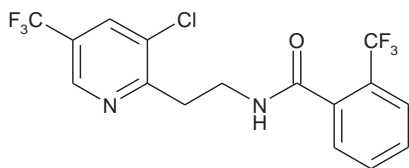
The 2010 JMPR also established residue definitions for fluopyram:

- For plant products (compliance with MRLs and dietary intake assessment)—*fluopyram*
- For animal products (compliance with MRLs)—*sum 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 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 46th Session of the CCPR (2014) listed fluopyram for further evaluation by the 2015 JMPR for additional MRLs and the current Meeting received new GAP information and/or new supporting residue information from the manufacturer for tomatoes, eggplants, beans, peas, soya beans (dry), sunflower seeds and cotton seed.

The Meeting also considered relevant residue information provided to the JMPR in 2010 for tomatoes, beans and peas (fresh and dry) and sunflower seeds.

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
E-olefine		N-{(E)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]-2-trifluoromethyl benzamide
Z-olefine		N-{(Z)-2-[3-chloro-5-(trifluoromethyl)pyridin-2-yl]ethenyl}-2-trifluoromethyl benzamide

Methods of residue analysis

Analytical methods

The 2010 JMPR reviewed and summarized 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 on tomatoes, beans and peas, soya beans, sunflower and cotton.

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. Method GM-001-P07-01, a modification Method 00984, used an isotopically labelled internal standard and included an additional C₁₈ solid phase extraction (SPE) clean-up step.

USE PATTERNS

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

Table 1 Registered uses of fluopyram, SC or FS formulations (including co-formulations with tebuconazole, trifloxystrobin and triadimenol)

Crop	Country	Application				Max/season		PHI (days)	Remarks:
		method	max kg ai/ha	kg ai/hL (max)	water L/ha	no	kg ai/ha		
Fruiting vegetables (except Cucurbits)									
Eggplant (indoor)	Greece	spray ^d	0.15	0.01	750–1500	3		3	14 day RTI
Peppers (indoor)	Greece	spray ^d	0.15	0.01	750–1500	3		3	14 day RTI
Tomato	Chile	spray ^a	0.25	0.025	1000	2		4	7 day RTI
Tomato (indoor)	Greece	spray ^d	0.15	0.01	750–1500	3		3	14 day RTI
Tomato	Morocco (2012)	spray ^b		0.0125		2		3	7 day RTI
Tomato	Ukraine	spray ^a	0.15	0.01		2		7	
Legume vegetables									
Beans	Netherlands	spray	0.25			2	0.5	7	7 day RTI
Beans	Belgium	spray	0.25		200–800	2	0.5	7	7 day RTI from flowering (BBCH 60–79)
Peas (without pods)	Netherlands	spray	0.25		200–800	2	0.5	7	7 day RTI
Peas (without pods)	Belgium	spray	0.25			2	0.5	7	7 day RTI from flowering (BBCH

Crop	Country	Application				Max/season		PHI (days)	Remarks:
		method	max kg ai/ha	kg ai/hL (max)	water L/ha	no	kg ai/ha		
								60–79)	
Pulses									
Soya bean	USA	seed ^e		0.25 mg ai/seed		1	0.25	pre-plant	No grazing or feed use
Oilseeds									
Sunflower	Moldovia	spray ^c	0.125			2		50	BBCH 32–57
Sunflower	Ukraine	spray ^c	0.125			2		50	BBCH 32–57
Cotton seed	USA	seed ^e		0.35 mg ai/seed		1		pre-plant	
Cotton seed	USA	in-furrow spray	0.25		94 (gr)	1		pre-plant	

RTI = Re-treatment interval

^a SC formulation containing 200 g ai/L fluopyram + 200 g ai/L tebuconazole

^b SC formulation containing 250 g ai/L fluopyram + 250 g ai/L trifloxystrobin

^c SE formulation containing 125 g ai/L fluopyram + 125 g ai/L prothioconazole

^d SC formulation containing 250 g ai/L fluopyram + 250 g ai/L triadimenol

^e FS seed treatment formulation containing 600 g ai/L fluopyram

Residues resulting from supervised trials

The Meeting reviewed supervised field trial information provided to the JMPR in 2010 and received new information on supervised field trials involving applications of fluopyram to the following crops.

Crop Group	Commodity	Region	Table No.
Fruiting vegetables, other than cucurbits	Tomato (protected)	Europe	2
	Tomato (outdoor)	Europe	3
Legume vegetables	Beans (protected)	Europe	4 ^a
	Beans (outdoor)	Europe	5 ^a , 6
	Peas	Europe	7 ^a , 8
Pulses	Soya bean (dry)	North America	9 ^a , 10
Oilseeds	Sunflower seed	Europe	11
	Cottonseed	North America	12, 13
Legume animal feeds	Bean forage	Europe	14 ^a , 15
	Pea vines and hay	Europe	16 ^a , 17

^a Data from trials evaluated by the 2010 JMPR

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 rates, spray concentrations and spray volumes 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 (or if close to the LOQ, rounded to one significant digit). 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.

In addition to the description and details of the field trials and analytical methods, each report includes 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 values 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.

Fruiting vegetables (except Cucurbits)

Tomatoes

Results from supervised trials from Europe on greenhouse and field tomatoes were provided to the Meeting to supplement the data provided to the 2010 JMPR.

In four greenhouse trials provided to the Meeting, three applications of fluopyram (SC formulations) were made at 13–14 day intervals to mature plants as foliar sprays using knapsack sprayers with hand lances (1–4 nozzles) to apply 0.15 kg ai/ha in 1000–1500 L water/ha. Plot sizes in these trials ranged from 15–46 m². In a further eight greenhouse trials, two applications of 0.15 kg ai/ha fluopyram in 1000 L water/ha were made at 7-day intervals using similar equipment and with plot sizes of 12–38 m².

In eight field trials provided to the Meeting, two applications of fluopyram (SC formulations) were made at 6–7 day intervals to mature plants as foliar sprays using knapsack or motorised sprayers with 1–2 nozzle hand lances or mini-booms (3–9 flat-fan nozzles) to apply 0.15 kg ai/ha in 500–1000 L water/ha. Plot sizes in these trials ranged from 23–80 m².

In all trials, unreplicated samples of at least 2 kg or 24–28 fruit (48–100 for cherry tomatoes) were taken from each plot, frozen within 24 hours of sampling and stored at or below –18 °C for up to 440 days before analysis for fluopyram and metabolites using LC/MS/MS Methods 00984 or 00984/M001 (LOQ 0.01 mg/kg). Mean recovery rates in samples spiked with 0.01–1.0 mg/kg fluopyram ranged from 87–109%.

Table 2 Residues in tomatoes from supervised greenhouse trials in Europe involving two or three foliar applications of fluopyram (SC formulation)

TOMATO Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)		Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram		
Spain, 2010 Sanlucar de Barrameda (Matias)	3	0.15	0.01	1500	fruit	-0	0.02	10-2194 10-2194-01	
						0	0.05		
						1	0.03		
						3	<u>0.04</u>		
						7	0.03		
						10	0.02		
Italy, 2010 Croce Camerina (Parsifal)	3	0.15	0.012	1300	fruit	-0	0.07	10-2194 10-2194-02	
						0	0.09		
						1	0.07		
						3	0.06		
						7	<u>0.13</u>		
						10	0.08		
Germany, 2010 Leichlingen (Albis)	3	0.15	0.015	1000	fruit	-0	0.05	10-2194 10-2194-03	
						0	0.08		
						1	0.10		
						3	<u>0.08</u>		
						7	0.07		
						10	0.06		
Netherlands, 2010 Honselersdyk (Dolores)	3	0.15	0.015	1000	fruit	-0	0.02	10-2194 10-2194-04	
						0	0.06		
						1	0.07		
						3	0.06		
						7	<u>0.07</u>		
						10	0.05		
Germany, 2013 Leichlingen (Meceno)	2	0.15	0.015	1000	fruit	-0	0.017	13-2121 13-2121-01	
						0	0.049		
						1	0.019		
						3	0.045		
						7	0.034		
						10	0.026		
14	0.023								
Netherlands, 2013 Zwaagdijk (Super Sweet 100) Cherry tomato	1+	0.14	0.015	950	fruit	-0	0.044	13-2121 13-2121-02	
	1	0.15		980		0	0.16		
						1	0.17		
						3	0.15		
						7	0.14		
						10	0.069		
			14	0.079					
Belgium, 2013 Saint-Amand (Macarena Beef tomato)	2	0.15	0.015	1000	fruit	-0	0.062	13-2121 13-2121-03	
						0	0.064		
						1	0.15		
						3	0.12		
						7	0.075		
						10	0.098		
14	0.08								
France, 2013 Castelsarrasin (Kiveli F1 Hybrid)	1+	0.14	0.015	950	fruit	-0	0.054	13-2121 13-2121-04	
	1	0.15		980		0	0.11		
						1	0.12		
						3	0.11		
						7	0.093		
						10	0.11		
			14	0.086					

Fluopyram

TOMATO Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)		Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram		
Spain, 2013 Bigues i Riells (Plumcher) Cherry tomato	2	0.15 0.16	0.015	1000 1060	fruit	-0	0.23	13-2121 13-2121-05	
						0	0.1		
						1	0.24		
						3	0.23		
						7	0.21		
						10	0.22		
						14	0.21		
Italy, 2013 Vittoria (RG) (Creativo) Cherry tomato	2	0.15	0.015	1000	fruit	-0	0.068	13-2121 13-2121-06	
						0	0.17		
						1	0.12		
						3	0.13		
						7	0.097		
						10	0.11		
						14	0.099		
Greece, 2013 Katerini, Pieria (Corbus) Cherry tomato	1+	0.14 0.15	0.015	950 1000	fruit	-0	0.032	13-2121 13-2121-07	
	1					0.063			
	1					0.052			
	3					0.04			
	7					0.029			
	10					0.034			
	14					0.041			
Portugal, 2013 Silveira-Torres Vedras (Bigran)	2	0.15	0.015	1000	fruit	-0	0.11	13-2121 13-2121-08	
						0	0.16		
						1	0.18		
						3	0.15		
						7	0.19		
						10	0.21		
						14	0.19		

Table 3 Fluopyram residues in tomatoes from supervised field trials in Europe involving two foliar applications of fluopyram (SC formulation)

TOMATO Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
France (S), 2013 St Etienne du gres (Leader)	2	0.15	0.025	600	fruit	-0	0.046	13-2120 13-2120-01
						0	0.22	
						1	0.14	
						3	0.10	
						7	<u>0.058</u>	
						10	0.047	
						14	0.047	
Spain, 2013 Los Palacios (Albatross)	2	0.15	0.019	800	fruit	-0	0.066	13-2120 13-2120-02
						0	0.30	
						1	0.24	
						3	0.18	
						7	0.097	
						10	<u>0.13</u>	
						14	0.095	
Italy, 2013 Bologna (Monti)	2	0.15	0.025	600	fruit	-0	0.034	13-2120 13-2120-03
						0	0.21	
						1	0.13	
						3	0.18	
						7	0.067	
						10	<u>0.07</u>	
						14	0.053	
Portugal, 2013 Almeirim (H-1015)	2	0.15	0.03	500	fruit	-0	0.018	13-2120 13-2120-04
						0	0.075	
						1	0.046	
						3	0.03	
						7	<u>0.020</u>	
						10	0.014	
						14	0.016	
Greece, 2013 Aronas, Katerini (Evia)	2	0.15	0.015	1000	fruit	-0	< 0.01	13-2120 13-2120-05
						0	0.014	
						1	0.014	
						3	0.017	
						7	< <u>0.01</u>	
						10	< 0.01	
						14	< 0.01	
RA-13-1210, 13-2120-06 France (S), 2013 Boé (Leader)	2	0.15	0.019	800	fruit	-0	0.037	13-2120 13-2120-06
						0	0.16	
						1	0.10	
						3	0.14	
						7	<u>0.096</u>	
						10	0.087	
						14	0.082	
Spain, 2013 Alginet (Maplica)	2	0.15	0.019	800	fruit	-0	0.070	13-2120 13-2120-07
						0	0.14	
						1	0.18	
						3	0.10	
						7	<u>0.17</u>	
						10	0.12	
						14	0.13	
Italy, 2013 Ostellato (5408 f1)	2	0.15	0.03	500	fruit	-0	0.066	13-2120 13-2120-08
						0	0.24	
						1	0.11	
						3	0.15	
						7	0.11	
						10	<u>0.13</u>	
						14	0.098	

*Legume vegetables**Common beans*

Results from supervised trials from Europe on protected and outdoor common beans were provided to the Meeting to supplement the data provided to the 2010 JMPR.

In the 2007–2008 trials evaluated by the 2010 JMPR, two applications of fluopyram (SC 500 formulations) were made 7–8 days apart as foliar sprays using knapsack or wheel barrow sprayers with 1–4 flat-fan, solid or hollow-cone nozzles or hand-held-booms (3–12 flat-fan nozzles), applying 0.3 kg ai/ha in 600–1500 L water/ha to the protected crops and 0.25 kg ai/ha in 300–1000 L water/ha to the outdoor crops. Plot sizes in these trials ranged from 8–108 m².

In the more recent trials, two foliar applications of 0.2 kg ai/ha fluopyram (SC formulations) were made 7–9 days apart using knapsack sprayers with 1–3 flat-fan, solid or hollow-cone nozzles or plot boom sprayers (5–12 nozzles) to apply 300–500 L spray mix/ha to the protected crops and 0.25 kg ai/ha in 300–1000 L water/ha to the outdoor crops. Plot sizes in these trials ranged from 18–125 m².

Unreplicated samples of 1–3 kg of pods (including seeds) and in the outdoor trials at least 12–18 kidney bean plants (min 1 kg green material, including pods and seeds) were taken from each plot, frozen within 24 hours of sampling and stored at –18 °C or below for up to 456 days before analysis for fluopyram using LC/MS/MS Methods 00984 or 00984/M001. The reported LOQs were 0.01 mg/kg for each analyte. Mean fluopyram recovery rates ranged from 87–98% in fresh pods spiked with 0.01–4.0 mg/kg, 85–100% in vines spiked with 0.01–10 mg/kg and 101% in seeds (fresh) spiked with 0.01–0.1 mg/kg.

Table 4 Fluopyram residues in protected common beans from supervised trials in Europe, evaluated by the 2010 JMPR [Ref: JMPR 2010 E, Table 143, pp 1565–66]

BEANS Country, year Location (variety)	Application				matrix	DALA	Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hl	water (L/ha)			Fluopyram	
France, 2006 Rognonas (Nadal)	2	0.3	0.03	1000	pods	–0	0.24	RA-2596/06 0379-06
						0	1.2	
						3	0.63	
						7	<u>0.43</u>	
						10	0.33	
						14	0.24	
France, 2006 Noves (Donna)	2	0.3	0.03	1000	pods	–0	0.43	RA-2596/06 0752-06
						0	1.2	
						3	0.78	
						7	<u>0.69</u>	
						10	0.49	
						14	0.36	
Spain, 2006 Almerimar (Donna)	2	0.3	0.02	1500	pods	–0	0.14	RA-2596/06 0753-06
						0	0.83	
						3	0.63	
						7	<u>0.2</u>	
						10	0.16	
						14	0.09	
Spain, 2006 St M del Aguila (Festival)	2	0.3	0.02	1500	pods	–0	0.27	RA-2596/06 0754-06
						0	0.99	
						3	0.68	
						7	<u>0.22</u>	
						10	0.15	
						14	0.09	

BEANS Country, year Location (variety)	Application				matrix	DALA	Residues (mg/kg)	Reference & Comments
	no	kg ai/ha	kg ai/hl	water (L/ha)			Fluopyram	
Germany, 2006 Langenfeld (Markant)	2	0.3	0.05	600	Pods	-0 0 3 7 10 14	0.23 0.39 0.28 <u>0.16</u> 0.09 0.1	RA-2596/06 0755-06
Germany, 2006 Meckenbeuren (Eva)	2	0.3	0.02	1500	Pods	-0 0 3 7 10 13	0.21 0.55 0.49 0.12 <u>0.16</u> 0.08	RA-2596/06 0756-06
Netherlands, 2006 Andijk (Overvloed)	2	0.3	0.03	1000	Pods	-0 0 3 7 10 14	0.16 0.33 0.11 0.06 <u>0.07</u> 0.03	RA-2596/06 0757-06
Belgium, 2006 Villers-Perwin (Grappes de Malines)	1+ 1	0.3 0.327	0.03 0.03	1000 1090	Pods	-0 0 3 7 10 14	0.1 0.27 0.22 0.14 <u>0.15</u> 0.08	RA-2596/06 0759-06
Spain, 2007 Puebla de Vicar (Donna)	2	0.3	0.02	1500	Pods	-0 0 3 7 10 14	0.2 0.73 0.59 <u>0.22</u> 0.09 0.06	RA-2607/07 0248-07

Table 5 Residues in outdoor common beans from supervised trials in Europe, evaluated by the 2010 JMPR [Ref: JMPR 2010 E, Table 144, pp 1567–71]

BEANS Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Germany, 2006 Lampertheim (Albani)	2	0.25	0.05	500	Pods	-0 0 3 7 10 14	0.09 0.57 0.53 <u>0.24</u> 0.18 0.15	RA-2594/06 0377-06
Germany, 2006 Langenfeld-Reusrath (Classic)	2	0.25	0.0835	300	Pods	-0 0 3 7 10 14	0.05 0.2 0.1 <u>0.07</u> 0.06 0.06	RA-2594/06 0654-06
Netherlands, 2006 Zwaagdijk-Oost (Unknown)	2	0.25 0.23	0.05	500 460	Pods	-0 0 3 7 10 14	0.05 0.22 0.21 <u>0.2</u> 0.19 0.13	RA-2594/06 0655-06
Belgium, 2006 Villers-Perwin (Polder)	2	0.25	0.0385	650	Pods	-0 0 3 7 10 14	0.14 0.47 0.41 <u>0.21</u> 0.18 0.12	RA-2594/06 0656-06
Belgium, 2007 Villers-Perwin (Cadillac)	2	0.25	0.025	1000	Pods	-0 0 3 7 10 14	0.06 0.34 0.3 <u>0.12</u> 0.09 0.08	RA-2511/07 0014-07
Germany, 2007 Langenfeld-Reusrath (Classic)	2	0.25	0.0415	600	Pods	-0 0 3 7 10 14	0.09 0.39 0.23 <u>0.18</u> 0.14 0.13	RA-2511/07 0546-07
France, 2007 Fresnoy les Roye (Lugos)	2	0.25	0.05	500	Pods	-0 0 3 7 10 14	0.13 0.45 0.39 <u>0.26</u> 0.18 0.13	RA-2511/07 0547-07
Netherlands, 2007 Biddinghuizen (Cadillac)	2	0.25	0.05	500	Pods	-0 0 3 7 10 14	0.07 0.27 0.19 <u>0.19</u> 0.17 0.15	RA-2511/07 0548-07
Germany, 2007 Swistal-Heimerzheim (Sonesta)	2	0.25	0.0415	600	Pods	-0 0 3 6 10 13	0.08 0.41 0.35 <u>0.17</u> 0.1 0.08	RA-2511/07 0549-07

BEANS Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Spain, 2006 Alginet (Cleo)	2	0.25	0.0415	600	Pods	-0 0 3 7 10 14	0.03 0.4 0.17 <u>0.24</u> 0.13 0.14	RA-2595/06 0378-06
Italy, 2006 Pradelle di Nogarole Rocca (Jamaica)	2	0.25	0.05	500	Pods	-0 0 3 7 10 14	0.08 0.6 0.15 <u>0.1</u> 0.08 0.06	RA-2595/06 0620-06
Spain, 2006 Malgrat de Mar (Nasao)	2	0.25	0.05 0.0415	500 600	Pods	-0 0 2 7 10 14	0.03 0.42 0.1 <u>0.05</u> 0.05 0.03	RA-2595/06 0657-06
Italy, 2006 Ladispoli (Bronco)	2	0.25	0.0315	800	Pods	-0 0 3 7 10 14	0.06 0.33 0.18 <u>0.11</u> 0.08 0.1	RA-2595/06 0658-06
France, 2007 Chazay d'azergues (Contender)	2	0.25	0.025	1000	Pods	-0 0 3 7 10 14	0.07 0.45 0.25 <u>0.11</u> 0.1 0.08	RA-2512/07 0035-07
Italy, 2007 Ladispoli (Bronco)	2	0.25	0.0315	800	Pods	-0 0 3 7 10 14	0.02 0.47 0.05 <u>0.03</u> 0.02 0.02	RA-2512/07 0550-07
Spain, 2007 Alginet (Cleo)	2	0.25	0.025	1000	Pods	-0 0 3 7 10 14	0.12 0.17 0.26 <u>0.25</u> 0.19 0.16	RA-2512/07 0551-07
Portugal, 2007 Ribafria Peniche (Tradicional)	2	0.25	0.025	1000	Pods	-0 0 3 7 10 14	0.3 0.52 0.45 <u>0.43</u> 0.27 0.32	RA-2512/07 0552-07

Table 6 Fluopyram residues in common beans from supervised outdoor trials in Europe involving two foliar applications of fluopyram (SC formulation)

BEANS Country, Year Location (Variety)	Application				Matrix	DAL A	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	

Fluopyram

BEANS Country, Year Location (Variety)	Application				Matrix	DAL A	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Germany, 2012 Werl-Mawicke (Primel bean)	2	0.2	0.067	300	pods	7 10 14 21	<u>0.078</u> 0.058 0.021 < 0.01	12-2030 12-2030-01
France (N), 2012 Fondettes (Contender)	2	0.2	0.04	500	pods	-0 0 7 10 14 21	0.068 0.51 <u>0.14</u> 0.13 0.11 0.052	12-2030 12-2030-02
France (N), 2008 Picardie (Flavert) SC500 formulation A	2	0.25	0.05	500	pods	-0 0 3 7 10 14	0.07 0.41 0.48 <u>0.17</u> 0.14 0.16	08-2034 08-2034-01
France (N), 2008 (Flavert) SC500 formulation B	2	0.25	0.05	500	pods	-0 0 3 7 10 14	0.06 0.48 0.45 0.17 0.12 0.14	08-2034 08-2034-01
Italy, 2008 Lazio (Bronco) Kidney bean SC500 formulation A	2	0.25	0.031	800	pods	-0 0 3 7 10 14	0.04 0.39 0.24 0.11 0.09 0.06	08-2096 08-2096-01
Italy, 2008 Lazio (Bronco) Kidney bean SC500 formulation B	2	0.25	0.031	800	pods	-0 0 3 7 10 14	0.05 0.42 0.32 <u>0.15</u> 0.13 0.08	08-2096 08-2096-01
France (N), 2010 Criquebeuf sur Seine (Flagrano)	2	0.2	0.067	300	pods seeds (green)	-0 0 7 14 21 28	0.07 0.41 <u>0.05</u> 0.02 < 0.01 < 0.01	10-2128 10-2128-01
France (N), 2010 Damery (Flagrano)	2	0.2	0.067	300	pods seeds (green)	-0 0 7 14 21 28	< 0.01 0.19 <u>0.04</u> 0.02 < 0.01 < 0.01	10-2128 10-2128-02
Germany, 2010 Heimerzheim (Orinoko)	2	0.2	0.067	300	pods	15 21 28	< 0.01 < 0.01 < 0.01	10-2125 10-2125-01
Belgium, 2010 Villers-Perwin (Beaufort)	2	0.2	0.05	400	pods	7 14 21 28	<u>≤ 0.01</u> < 0.01 < 0.01 < 0.01	10-2125 10-2125-02

BEANS Country, Year Location (Variety)	Application				Matrix	DAL A	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Spain, 2010 Alginet (Cleo)	2	0.2	0.04	500	Pods	-0 0 7 14 22 28	< 0.01 0.02 <u>0.01</u> 0.01 0.01 0.01	10-2125 10-2125-03
Italy, 2010 Ladispoli (Orinoko)	2	0.2	0.04	500	Pods	-0 0 7 14 21 28	< 0.01 0.05 <u>< 0.01</u> < 0.01 < 0.01 < 0.01	10-2125 10-2125-04
France (S), 2010 Toulouse (Argus)	2	0.2	0.04	500	Pods	-0 0 7 14 21 28	< 0.01 0.03 < 0.01 <u>0.04</u> 0.02 0.03	10-2125 10-2125-05
Portugal, 2010 Ribafria (Bolinhas)	2	0.212	0.04	530	Pods	-0 0 7 14 21 28	0.16 0.26 <u>0.08</u> 0.05 0.02 0.02	10-2125 10-2125-06
France (S), 2011 Toulouse-Croix daurade (Argus French bean)	2	0.2	0.04	500	Pods	-0 0 7 14 21 28	0.077 0.62 <u>0.088</u> 0.054 0.045 0.038	11-2001 11-2001-01
Spain, 2011 Alginet (Cleo dwarf bean)	2	0.2	0.04	500	Pods	-0 0 7 14 21 30	0.12 0.87 <u>0.32</u> 0.084 0.067 0.041	11-2001 11-2001-02
Italy, 2011 Andria (Blue lake)	2	0.2	0.04	500	Pods	-0 0 7 14 21 28	0.056 4.3 <u>0.17</u> 0.072 0.015 < 0.01	11-2001 11-2001-03
Portugal, 2011 Atowia da Enreia (Bolinhas)	2	0.2	0.04	500	Pods	-0 0 7 14 21 28	0.072 0.33 <u>0.1</u> 0.05 0.037 0.039	11-2001 11-2001-04

Peas

Results from supervised trials from Europe conducted in 2012 on field peas were provided to the Meeting to supplement the data provided to the 2010 JMPR.

In the trials evaluated by the 2010 JMPR, two applications of fluopyram (SC formulation) were made to peas 7–8 days apart as foliar sprays using knapsack or wheel barrow

sprayers with hand-held spray booms (3–12 flat-fan or hollow cone nozzles), applying 0.25 kg ai/ha in 300–600 L water/ha. Plot sizes in these trials ranged from 24–101 m².

Unreplicated samples of at 0.5–4 kg succulent seeds, pods and/or whole plants (including pods and seeds but without roots) were taken from each plot, frozen within 24 hours of sampling and stored at –18 °C or below for up to 329 days before analysis for fluopyram and its metabolites using LC/MS/MS Method 00984. The reported LOQs were 0.01 mg/kg for each analyte and average fluopyram recovery rates were 100–101% in plants and pods spiked with 0.01–10 mg/kg and 88–99% in succulent seeds spiked with 0.01–0.5 mg/kg.

In the 2012 trials, two applications of fluopyram (SC formulations) were made to peas 7–9 days apart as foliar sprays using knapsack or plot sprayers with hand-held single-nozzle lances or spray booms (3–12 flat-fan or hollow cone nozzles), applying 0.2–0.25 kg ai/ha in 300–500 L water/ha. Plot sizes in these trials ranged from 45–160 m².

Unreplicated samples of at least 1 kg of fresh pods and vines (without pods and roots) and at least 0.5 kg of dry seeds and straw were taken from each plot, frozen within 24 hours of sampling and stored at –18 °C or below for up to 467 days before analysis for fluopyram using LC/MS/MS Method 00984 or 00984/M003. The reported LOQs were 0.01 mg/kg for each analyte and average fluopyram recovery rates ranged from 91–100% in fresh pods spiked with 0.01–2.0 mg/kg, 93–101% in vines spiked with 0.01–20 mg/kg, 87–100% in seeds (fresh and dry) spiked with 0.01–1.0 mg/kg and 89–98% in straw spiked with 0.01–20 mg/kg.

Table 7 Residues in fresh peas (with and without pods) from supervised trials in Europe evaluated by the 2010 JMPR. [Ref: JMPR 2010 E, Table 147, pp 1573–75]

PEAS Country, Year Location (Variety)	Application				Matrix	DAL A	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Germany, 2006 Machern (Harnaß)	2	0.25	0.079 0.0745	317 336	Pods	3	0.2	RA-2597/06 0380-06
					seeds (green)	7	<u>0.03</u>	
						10	0.02	
						14	0.03	
United Kingdom, 2006 Needham (Hawk)	2	0.25	0.0835	300	Pods	3	0.57	RA-2597/06 0722-06
					seeds (green)	7	<u>0.05</u>	
						10	0.03	
						14	0.04	
Germany, 2006 Meckenbeuren (Rondo)	2	0.25	0.0835	300	Pods	3	0.4	RA-2597/06 0723-06
					seeds (green)	7	<u>0.01</u>	
						10	< 0.01	
						13	< 0.01	
Netherlands, 2007 Kopstukken (unknown)	2	0.25	0.0415	600	seeds (green)	7	<u>0.05</u>	RA-2513/07 0036-07
						10	0.04	
						14	0.03	
Germany, 2007 Burscheid (Wunder von Kelvedon)	2	0.25	0.0835	300	seeds (green)	7	<u>0.02</u>	RA-2513/07 0553-07
						10	0.02	
						14	0.02	
France, 2007 Goyencourt (Arabelle)	2	0.25	0.0835	300	seeds (green)	7	0.03	RA-2513/07 0554-07
						10	0.03	
						14	<u>0.05</u>	
Belgium, 2007 Landenne-Sur-Meuse (Tristar)	2	0.25	0.0625	400	seeds (green)	7	<u>0.02</u>	RA-2513/07 0555-07
						10	0.02	
						14	0.02	

PEAS Country, Year Location (Variety)	Application				Matrix	DAL A	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Germany, 2007 Swisttal- Heimerzheim (Spring)	2	0.25	0.0835	300	seeds (green)	7 10 13	<u>0.02</u> 0.01 < 0.01	RA-2513/07 0556-07
Spain, 2006 Brenes (Rondo)	2	0.25	0.0835	300	Pods seeds (green)	3 7 9 14	0.94 <u>0.1</u> 0.05 0.03	RA-2598/06 0381-06
Italy, 2006 Migliarino (Agami)	2	0.25	0.0625	400	Pods seeds (green)	3 7 9 14	0.06 <u>< 0.01</u> < 0.01 < 0.01	RA-2598/06 0724-06
France, 2007 Chazay d'Azergues (Douce de provence)	2	0.25	0.0625	400	seeds (green)	7 10 14	<u>0.03</u> 0.03 0.02	RA-2514/07 0037-07
Spain, 2007 Brenes (Rondo)	2	0.25	0.0625	400	seeds (green)	7 10 14	0.01 <u>0.02</u> 0.01	RA-2514/07 0557-07

Table 8 Residues in peas (with and without pods) from supervised field trials in Europe involving two applications of fluopyram (SC formulations)

PEAS Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Spain, 2012 Salobrena Granada (Utrillo)	2	0.2	0.05	400	Pods seeds (green) seeds (dry)	-0 0 6 6 9 14 22	0.56 1.2 0.53 <u>0.085</u> 0.032 0.029 0.083	12-2155 12-2155-01
Spain, 2012 Malaga (Utrillo)	2	0.2	0.05	400	Pods seeds (green) seeds (dry)	-0 0 7 7 10 14 20 34	0.13 0.49 0.33 0.014 0.014 <u>0.017</u> 0.014 0.043	12-2155 12-2155-02
Italy, 2012 Papiana Marsciano (Gran Rugoso Tondo)	2	0.2	0.04	500	Pods seeds (green) seeds (dry)	-0 0 7 7 10 14 21 28	0.41 0.66 0.61 <u>0.055</u> 0.045 0.045 0.13 0.062	12-2155 12-2155-03

Fluopyram

PEAS Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Southern France, 2012 Lapalud (Isard)	2	0.2	0.05	400	pods	-0	0.019	12-2032 12-2032-01
						0	0.35	
						6	0.25	
					seeds (green)	6	<u>0.02</u>	
						10	< 0.01	
						14	< 0.01	
						21	0.013	
seeds (dry)	40	0.017						
Spain, 2012 Dos Hermanas (Cartouche)	1+	0.2	0.067	300	pods	-0	0.29	12-2032 12-2032-02
						7	0.21	
						7	0.064	
					seeds (green)	10	0.053	
						14	<u>0.092</u>	
						21	0.097	
					Italy, 2012 Ladispoli (RM) (Attika)	2	0.2	
0	0.18							
7	0.052							
seeds (green)	7	< 0.01						
	10	< 0.01						
	14	<u>0.012</u>						
seeds (dry)	21	0.024						
Greece, 2012 Nea Messimvria (Li Violetta)	2	0.2	0.05	400	pods	-0	0.031	12-2032 12-2032-04
						0	0.48	
						7	0.015	
					seeds (green)	7	<u>0.027</u>	
						10	0.017	
						14	0.017	
					seeds (dry)	21	0.029	
33	0.029							
Spain, 2012 Alginet (Lincoln)	2	0.2	0.04	500	pods	-0	0.19	12-2032 12-2032-05
						0	0.58	
						7	0.5	
					seeds (green)	7	<u>0.057</u>	
						9	0.046	
						13	0.055	
					seeds (dry)	21	0.2	
Germany, 2012 Burscheid (Respect)	2	0.2	0.067	300	pods	-0	0.095	12-2031 12-2031-01
						0	0.44	
						7	0.051	
					seeds (green)	7	<u>< 0.01</u>	
						10	< 0.01	
						14	< 0.01	
						21	< 0.01	
seeds (dry)	39	0.01						

PEAS Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
France (N), 2012 Chaussy (Genial)	2	0.2	0.067	300	pods seeds (green) seeds (dry)	-0 0 7 7 10 14 21 35	0.028 0.39 0.11 0.011 <u>0.012</u> < 0.01 0.012 0.02	12-2031 12-2031-02
Germany, 2012 Beucha-Wolfshain (Rocket)	2	0.2	0.067	300	pods seeds (green) seeds (dry)	-0 0 7 7 10 14 21 43	0.16 0.49 0.04 0.021 <u>0.024</u> 0.015 0.016 0.034	12-2031 12-2031-03
Belgium, 2012 Villers-Perwin (Ravenna)	2	0.2	0.05	400	pods seeds (green) seeds (dry)	-0 0 7 7 10 14 21 37	0.053 0.22 0.03 < 0.01 < 0.01 < 0.01 < 0.01 0.019	12-2031 12-2031-04
United Kingdom, 2012 Cambridge (Tommy)	2	0.2	0.067	300	pods seeds (green) seeds (dry)	-0 0 6 7 10 13 20	0.017 0.4 0.42 (c=0.011) <u>0.028</u> 0.022 0.024 0.056	12-2031 12-2031-05
Germany, 2012 Langförden (Alvesta)	2	0.2	0.067	300	pods seeds (green) seeds (dry)	-0 0 7 7 10 13 22 32	0.033 0.16 0.021 < 0.01 < 0.01 < 0.01 < 0.01 0.01	12-2031 12-2031-06
Germany, 2011 Burscheid (Mascara)	2	0.2	0.067	300	pods seeds (dry)	-0 0 7 14 21 28	0.037 0.74 0.1 0.017 0.016 0.05	11-2000 11-2000-02

Fluopyram

PEAS Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
France (N), 2011 Ambleville (Athos)	2	0.2	0.067	300	pods	-0	0.094	11-2000 11-2000-01 4mm rain within 1 hour after 2 nd application
						0	0.33	
						0	0.18	
					7	0.15		
					seeds (dry)	14	0.017	
						21	0.017	
28	0.015							
Spain, 2012 Salobrena (Utrillo)	2	0.25	0.063	400	pods	-0	0.46	12-2159 12-2159-01
						0	12	
						6	0.9	
					seeds (green)	9	<u>0.035</u>	
						14	0.027	
					seeds (dry)	22	0.084	
Italy, 2012 Zibido San Giacomo (Utrillo)	2	0.25	0.083	300	pods	-0	0.43	12-2159 12-2159-02
						0	0.82	
						7	0.3	
					seeds (green)	7	<u>0.053</u>	
						10	0.045	
					14	0.037		
seeds (dry)	21	0.11						
28	0.098							
Spain, 2013 Alginet (Lincoln)	2	0.25	0.05	500	pods	-0	0.21	12-2048 12-2048-01
						0	0.64	
						7	0.59	
					seeds (green)	7	<u>0.063</u>	
						9	0.05	
					13	0.043		
seeds (dry)	21	0.14						
Spain, 2013 Dos Hermanas (Cartouche)	2	0.25	0.05	500	pods	-0	0.4	12-2048 12-2048-01
						7	0.26	
						7	0.066	
					seeds (green)	10	0.076	
						14	<u>0.12</u>	
					seeds (dry)	21	0.13	

*Pulses**Soya bean (dry)*

Results from supervised trials from the USA on soya beans were provided to the Meeting. 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 seed treatments, the seeds were slurry-treated with either 0.15 or 0.25 mg ai/seed and the targeted seeding rate was about 544,000 seeds/ha (equivalent to 0.082 kg ai/ha or 0.136 kg ai/ha respectively). Actual seeding rates ranged from 257,000–642,000 seeds/ha. Plot sizes in these trials ranged from 46–370 m².

In the plots that also included foliar fluopyram treatments, one application of 0.11–0.12 kg ai/ha was made about 21 days before harvest with a second treatment of 0.25–0.26 kg ai/ha applied 5–8 days later, using CO₂ plot or knapsack sprayers with hand-held spray booms or tractor-mounted boom sprayers to apply 90–190 L spray mix/ha.

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 9 Fluopyram residues in in soya beans (dry) from supervised trials in the USA involving seed treatment 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				mean	
Seed treatment—0.15 mg ai fluopyram/seed								
USA, 2012 Athens, GA (DP 4546 RR)	1	0.082	0.15	seeds, dry	145	0.01, < 0.01	0.01	RAGMY006 GM001-12HA
USA, 2012 Suffolk, VA (DP 4546 RR)	1	0.083	0.15	seeds, dry	148	< 0.01, < 0.01	< 0.01	RAGMY006 GM002-12HA
USA, 2012 Fisk, MO (Pioneer 97B52)	1	0.082	0.15	seeds, dry	131	< 0.01, < 0.01	< 0.01	RAGMY006 GM003-12HA
USA, 2012 Proctor, AR (Asgrow STB 4404)	1	0.081	0.15	seeds, dry	130	< 0.01, < 0.01	< 0.01	RAGMY006 GM004-12HA
USA, 2012 Cheneyville, LA (AG4403RR)	1	0.081	0.15	seeds, dry	120 127 130 132 138	0.031, < 0.01 < 0.01, < 0.01 0.018, 0.017 0.026, 0.024 0.021, 0.021	< 0.02 < 0.01 0.018 0.025 0.021	RAGMY006 GM005-12DA
USA, 2012 Stewardson, IL (DP 5634 RR)	1	0.082	0.15	seeds, dry	145 148 152 155 159	0.019, 0.022 0.029, 0.023 0.021, 0.028 0.029, 0.026 0.032, 0.018	0.021 0.026 0.025 0.028 0.025	RAGMY006 GM006-12DA
USA, 2012 Marysville, OH (Garst 2834RR)	1	0.038	0.15	seeds, dry	110	< 0.01, < 0.01	< 0.01	RAGMY006 GM007-12HA
USA, 2012 Northwood, ND (Agripro 3212 RR/N)	1	0.054	0.15	seeds, dry	136	< 0.01, < 0.01	< 0.01	RAGMY006 GM008-12HA
USA, 2012 Seymour, IL (NKs28 G1)	1	0.082	0.15	seeds, dry	130	0.013, 0.011	0.012	RAGMY006 GM009-12HA
USA, 2012 Gardner, KS (S2783-4)	1	0.079	0.15	seeds, dry	136	< 0.01, < 0.01	< 0.01	RAGMY006 GM010-12HA
USA, 2012 Clarence, MO (RG 200)	1	0.082	0.15	seeds, dry	136	< 0.01, < 0.01	< 0.01	RAGMY006 GM011-12HA
USA, 2012 Sheridan, IN (Sucrosc 935- 01RNX)	1	0.061	0.15	seeds, dry	143	0.018, 0.019	0.019	RAGMY006 GM012-12HA

Fluopyram

SOYA BEAN Country, Year Location (Variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed				mean	
USA, 2012 Campbell, MN (NSQ49-Q9)	1	0.097	0.15	seeds, dry	121	< 0.01, < 0.01	< 0.01	RAGMY006 GM013-12HA
USA, 2012 Richland, IA (NK S49-Q9)	1	0.082	0.15	seeds, dry	143	< 0.01, 0.01	0.01	RAGMY006 GM014-12HA
USA, 2012 Gardner, ND (DP 4546 RR)	1	0.085	0.15	seeds, dry	118	< 0.01, < 0.01	< 0.01	RAGMY006 GM015-12HB
USA, 2012 Geneva, MN (Hutchinson)	1	0.081	0.15	seeds, dry	140	< 0.01, < 0.01	< 0.01	RAGMY006 GM016-12HA
USA, 2006 Springfield, NE (RT3253)	1	0.084	0.15	seeds, dry	140	0.012, 0.012	0.012	RAGMP039 GM017-12HA
USA, 2012 Verona, WI (Pioneer 91M90)	1	0.08	0.15	seeds, dry	116	0.02, 0.02	0.02	RAGMY006 GM018-12HA
USA, 2012 Stafford, KS (Pioneer 93B82)	1	0.081	0.15	seeds, dry	134	0.022, 0.032	0.027	RAGMY006 GM019-12HA
USA, 2012 Delavan, WI (SC 9384RR)	1	0.082	0.15	seeds, dry	136	< 0.01, < 0.01	< 0.01	RAGMY006 GM020-12HA
USA, 2012 Conklin, MI (91M91)	1	0.08	0.15	seeds, dry	146	< 0.01, < 0.01	< 0.01	RAGMY006 GM021-12HA
Seed treatment—0.25 mg ai fluopyram/seed								
USA, 2012 Athens, GA (DP 4546 RR)	1	0.136	0.25	seeds, dry	145	0.028, 0.023	0.026	RAGMY006 GM001-12HA
USA, 2012 Suffolk, VA (DP 4546 RR)	1	0.138	0.25	seeds, dry	148	< 0.01, < 0.01	< 0.01	RAGMY006 GM002-12HA
USA, 2012 Fisk, MO (Pioneer 97B52)	1	0.136	0.25	seeds, dry	131	< 0.01, < 0.01	< 0.01	RAGMY006 GM003-12HA
USA, 2012 Proctor, AR (Asgrow STB 4404)	1	0.136	0.25	seeds, dry	130	< 0.01, < 0.01	< 0.01	RAGMY006 GM004-12HA
USA, 2012 Cheneyville, LA (AG4403RR)	1	0.136	0.25	seeds, dry	120 127 130 132 138	0.031, < 0.01 < 0.01, < 0.01 0.018, 0.017 0.026, 0.024 0.021, 0.021	< 0.021 < 0.01 0.018 <u>0.025</u> 0.021	RAGMY006 GM005-12DA
USA, 2012 Stewardson, IL (DP 5634 RR)	1	0.136	0.25	seeds, dry	145 148 152 155 159	0.019, 0.022 0.029, 0.023 0.021, 0.028 0.029, 0.026 0.032, 0.018	0.021 0.026 0.025 <u>0.028</u> 0.025	RAGMY006 GM006-12DA
USA, 2012 Marysville, OH (Garst 2834RR)	1	0.065	0.25	seeds, dry	110	< 0.01, < 0.01	< 0.01	RAGMY006 GM007-12HA

SOYA BEAN Country, Year Location (Variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed				mean	
USA, 2012 Northwood, ND (Agripro 3212 RR/N)	1	0.090	0.25	seeds, dry	136	< 0.01, < 0.01	< 0.01	RAGMY006 GM008-12HA
USA, 2012 Seymour, IL (NKs28 G1)	1	0.136	0.25	seeds, dry	130	0.013, 0.011	0.012	RAGMY006 GM009-12HA
USA, 2012 Gardner, KS (S2783-4)	1	0.131	0.25	seeds, dry	136	< 0.01, < 0.01	< 0.01	RAGMY006 GM010-12HA
USA, 2012 Clarence, MO (RG 200)	1	0.136	0.25	seeds, dry	136	< 0.01, < 0.01	< 0.01	RAGMY006 GM011-12HA
USA, 2012 Sheridan, IN (Sucrosco 935- 01RNX)	1	0.102	0.25	seeds, dry	143	0.018, 0.019	0.019	RAGMY006 GM012-12HA
USA, 2012 Campbell, MN (NSQ49-Q9)	1	0.161	0.25	seeds, dry	121	< 0.01, < 0.01	< 0.01	RAGMY006 GM013-12HA
USA, 2012 Richland, IA (NK S49-Q9)	1	0.136	0.25	seeds, dry	143	< 0.01, 0.01	0.01	RAGMY006 GM014-12HA
USA, 2012 Gardner, ND (DP 4546 RR)	1	0.142	0.25	seeds, dry	118	< 0.01, < 0.01	< 0.01	RAGMY006 GM015-12HB
USA, 2012 Geneva, MN (Hutchinson)	1	0.134	0.25	seeds, dry	140	< 0.01, < 0.01	< 0.01	RAGMY006 GM016-12HA
USA, 2006 Springfield, NE (RT3253)	1	0.140	0.25	seeds, dry	140	0.012, 0.012	0.012	RAGMP039 GM017-12HA
USA, 2012 Verona, WI (Pioneer 91M90)	1	0.133	0.25	seeds, dry	116	0.02, 0.02	0.02	RAGMY006 GM018-12HA
USA, 2012 Stafford, KS (Pioneer 93B82)	1	0.136	0.25	seeds, dry	134	0.022, 0.032	0.027	RAGMY006 GM019-12HA
USA, 2012 Delavan, WI (SC 9384RR)	1	0.136	0.25	seeds, dry	136	< 0.01, < 0.01	< 0.01	RAGMY006 GM020-12HA
USA, 2012 Conklin, MI (91M91)	1	0.132	0.25	seeds, dry	146	< 0.01, < 0.01	< 0.01	RAGMY006 GM021-12HA

Table 10 Fluopyram residues in in soya beans (dry) from supervised trials in the USA involving seed treatment plus two foliar applications of fluopyram (SC formulations)

SOYA BEAN Country, Year Location (Variety)	Application			Matrix	DAL A	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed (water/ha)				mean	
Seed treatment—0.25 mg ai fluopyram/seed								

Fluopyram

SOYA BEAN Country, Year Location (Variety)	Application			Matrix	DAL A	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed (water/ha)				mean	
USA, 2012 Athens, GA (DP 4546 RR)	1+	0.136	0.25	seeds, dry	14	0.02, 0.024	0.022	RAGMY006 GM001-12HA
	1	0.115	(156)					
	1	0.252	(162)					
USA, 2012 Suffolk, VA (DP 4546 RR)	1+	0.138	0.25	seeds, dry	24	< 0.01, < 0.01	< 0.01	RAGMY006 GM002-12HA
	1	0.116	(113)					
	1	0.256	(111)					
USA, 2012 Fisk, MO (Pioneer 97B52)	1+	0.136	0.25	seeds, dry	14	< 0.01, < 0.01	< 0.01	RAGMY006 GM003-12HA
	1	0.115	(187)					
	1	0.25	(187)					
USA, 2012 Proctor, AR (Asgrow STB 4404)	1+	0.136	0.25	seeds, dry	13	0.06, 0.077	0.069	RAGMY006 GM004-12HA
	1	0.114	(146)					
	1	0.251	(146)					
USA, 2012 Cheneyville, LA (AG4403RR)	1+	0.136	0.25	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 0.148 0.126 0.089	RAGMY006 GM005-12DA
	1	0.118	(167)					
	1	0.252	(164)					
	1	0.118	(167)					
	1	0.252	(164)					
USA, 2012 Stewardson, IL (DP 5634 RR)	1+	0.136	0.25	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
	1	0.119	(139)					
	1	0.253	(133)					
	1	0.119	(139)					
	1	0.253	(133)					
USA, 2012 Marysville, OH (Garst 2834RR)	1+	0.064	0.25	seeds, dry	14	< 0.01, < 0.01	< 0.01	RAGMY006 GM007-12HA
	1	0.115	(165)					
	1	0.255	(164)	seeds, dry	14	< 0.01, < 0.01	< 0.01	
	1+	0.254	(164)					
1	0.255	(164)						
USA, 2012 Northwood, ND (Agripro 3212 RR/N)	1+	0.09	0.25	seeds, dry	14	< 0.01, < 0.01	< 0.01	RAGMY006 GM008-12HA
	1	0.116	(142)					
	1	0.25	(140)	seeds, dry	14	0.01, < 0.01	0.01	
	1+	0.251	(140)					
1	0.256	(143)						
USA, 2012 Seymour, IL (NKs28 G1)	1+	0.136	0.25	seeds, dry	13	0.032 0.025	0.029	RAGMY006 GM009-12HA
	1	0.113	(94)					
	1	0.254	(94)	seeds, dry	13	< 0.01, < 0.01	< 0.01	
	1+	0.249	(93)					
1	0.245	(92)						
USA, 2012 Gardner, KS (S2783-4)	1+	0.131	0.25	seeds, dry	12	0.015, 0.015	0.015	RAGMY006 GM010-12HA
	1	0.114	(142)					
	1	0.253	(145)					
USA, 2012 Clarence, MO (RG 200)	1+	0.136	0.25	seeds, dry	12	0.015, 0.014	0.015	RAGMY006 GM011-12HA
	1	0.112	(175)					
	1	0.261	(184)					
USA, 2012 Sheridan, IN (Sucroscos 935- 01RNX)	1+	0.102	0.25	seeds, dry	14	0.011, < 0.01	0.01	RAGMY006 GM012-12HA
	1	0.114	(179)					
	1	0.251	(181)					

SOYA BEAN Country, Year Location (Variety)	Application		Matrix	DAL A	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha			mg ai/seed (water/ha)		
USA, 2012 Campbell, MN (NSQ49-Q9)	1+	0.161	0.25	seeds, dry	13	0.083, 0.076	0.08
	1	0.114	(187)				
	1	0.251	(187)				
USA, 2012 Richland, IA (NK S49-Q9)	1+	0.136	0.25	seeds, dry	14	< 0.01, < 0.01	< 0.01
	1	0.115	(163)				
	1	0.249	(171)				
USA, 2012 Gardner, ND (DP 4546 RR)	1+	0.142	0.25	seeds, dry	13	0.049, 0.057	0.053
	1	0.116	(142)				
	1	0.256	(144)				
USA, 2012 Geneva, MN (Hutchinson)	1+	0.134	0.25	seeds, dry	14	0.022, 0.03	0.026
	1	0.116	(172)				
	1	0.248	(183)				
USA, 2006 Springfield, NE (RT3253)	1+	0.14	0.25	seeds, dry	12	0.024, 0.032	0.028
	1	0.115	(131)				
	1	0.252	(131)				
USA, 2012 Verona, WI (Pioneer 91M90)	1+	0.133	0.25	seeds, dry	14	0.122, 0.132	0.127
	1	0.116	(174)				
	1	0.254	(171)				
USA, 2012 Stafford, KS (Pioneer 93B82)	1+	0.136	0.25	seeds, dry	14	0.242, 0.179	0.211
	1	0.114	(173)				
	1	0.25	(172)				
USA, 2012 Delavan, WI (SC 9384RR)	1+	0.136	0.25	seeds, dry	14	< 0.01, 0.013	0.012
	1	0.114	(173)				
	1	0.25	(172)				
USA, 2012 Conklin, MI (91M91)	1+	0.132	0.25	seeds, dry	14	< 0.01, < 0.01	< 0.01
	1	0.114	(148)				
	1	0.25	(149)				

Oilseeds

Sunflower seed

Results from supervised trials from Europe on sunflowers were provided to the Meeting. In these trials, two applications of 0.117–0.13 kg ai/ha (SC formulations) were made to sunflower plants, 13–15 days apart as foliar sprays using knapsack or CO₂ plot sprayers with hand-held or wheeled spray booms (1–12 nozzles) to apply 275–400 L spray mix/ha. Applications were made up to the seed development or early ripening stages (BBCH 67–85) Plot sizes in these trials ranged from 36–740 m².

Unreplicated samples (min 1 kg seed) were taken from each plot, frozen within 24 hours of sampling, held in frozen storage for up to 358 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 92–100% in seeds, kernels and seed fractions spiked with 0.01–0.1 mg/kg.

Table 11 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) Fluopyram	Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)				
Germany, 2010 Burscheid (Rigasol)	2	0.125	0.042	300	seed	28	< 0.01	10-2238 10-2238-01 BBCH 71 & 73
Belgium, 2010 Frasnes-Lez-Gosselies (LG 54.50 HO)	2	0.125	0.0455	275	seed	27	< 0.01	10-2238 10-2238-02 BBCH 69 & 85
Greece, 2010 Gallikos, Kilkis (Sanay MP)	2	0.125	0.031	400	seed	28	0.04	10-2238 10-2238-03 BBCH 71 & 79
Spain, 2010 Fuentes de Andalucia (Transol)	2	0.125	0.042	300	seed	27+ 6 ^a	0.04	10-2247 10-2247-01 BBCH 71 & 79
Germany, 2011 Burscheid (Rigasol)	2	0.13	0.042	300	seed kernel seed fraction	21 24 28 31 35 28 28	0.019 0.011 0.011 < 0.01 < 0.01 < 0.01 < 0.01	11-2002 11-2002-01 BBCH 61 & 71
Belgium, 2011 Villers-Perwin (P64HE01)	2	0.13	0.045	275	seed kernel seed fraction	21 23 28 30 35 28 28	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	11-2002 11-2002-02 BBCH 65 & 69
Greece, 2011 Kissa/Kozani (Sanay)	2	0.13	0.031	400	seed kernel seed fraction	21 24 28 31 35 28 28	0.011 0.019 0.032 < 0.01 < 0.01 < 0.01 < 0.01	11-2002 11-2002-03 BBCH 83 & 85
France (S), 2011 Gargas (Tekny)	2	0.13	0.042	300	seed kernel seed fraction	21 23 28 30 35 28 28	< 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01 < 0.01	11-2002 11-2002-04 BBCH 71 & 81
France (N), 2008 Mesnil Milon (Vellox Early variety)	2	0.125	0.042	300	seed kernel seed fraction	21 24 28 31 35 28 28	0.011 < 0.01 < 0.01, 0.015 0.011 0.01 < 0.01 < 0.01	12-2008 12-2008-01 BBCH 71 & 83

SUNFLOWER SEED Study, Trial Country, Year (Variety)	Application				Matrix	DALA	Residues (mg/kg) Fluopyram	Reference
	no	kg ai/ha	kg ai/hL	water (L/ha)				
Belgium, 2008 Marbais (P64HE01)	2	0.125	0.042	300	seed	21	< 0.01	12-2008 12-2008-02 BBCH 76 & 83
						25	< 0.01	
						28	< 0.01	
						31	< 0.01	
						35	< 0.01	
					kernel seed fraction	28	< 0.01	
28	< 0.01							
France, 2009 Tarascon (CSF 10902)	2	0.125	0.042	300	seed	21	0.019	12-2009 12-2009-01 BBCH 79 & 83
						24	0.074	
						28	0.073, 0.065	
						31	< 0.01	
						35	0.016	
					kernel seed fraction	28	< 0.01	
28	< 0.01							
Spain, 2009 Dos Hermanas (PR64H37)	2	0.125	0.042	300	seed	21	0.021	12-2009 12-2009-02 BBCH 72 & 83
						24	0.023	
						28	0.019, 0.022	
						31	0.028	
						35	0.02	
					kernel seed fraction	28	< 0.01	
28	< 0.01							
Italy, 2009 Furbara Cerveteri (RM) (Starsol)	2	0.125	0.031	400	seed	21	0.023	12-2009 12-2009-03 BBCH 73 & 79
						24	0.029	
						28	0.016, 0.018	
						31	0.018	
						35	0.016	
					kernel seed fraction	28	< 0.01	
28	< 0.01							
Portugal, 2009 Aramanha-Várzea (PR64H47)	2	0.125	0.042	300	seed	21	0.051	12-2009 12-2009-04 BBCH 65 & 73
						24	0.041	
						28	0.031	
						31	0.092	
						35	0.04	
					kernel seed fraction	28	< 0.01	
28	< 0.01							
Greece, 2009 Kissa, Kozani (PR64LE20)	2	0.125	0.031	400	seed	21	< 0.01	12-2009 12-2009-05 BBCH 63 & 67
						24	0.015	
						28	0.016, 0.021	
						31	0.016	
						35	0.025	
					kernel seed fraction	28	< 0.01	
28	< 0.01							
Italy, 2009 Bologna (PR64H41)	1+	0.117	0.031	374	seed	21	0.020	12-2009 12-2009-06 BBCH 69 & 79
	1	0.125	0.031	400		24	< 0.01	
						28	0.013	
						31	0.014	
						35	0.01	
					kernel seed fraction	28	< 0.01	
					28	< 0.01		

^a Seeds stored for 6 days at 18–31 °C before sampling

Cotton seed

Results from supervised trials from the USA on cotton were provided to the 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 byproducts from the seed treatment plots and from plots involving the combination of seed treatment and in-furrow soil treatments are summarized 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 12 Fluopyram residues in cotton seed and gin byproducts from supervised trials in the USA involving fluopyram seed treatment applications (0.5 mg ai/seed (FS formulation))

COTTON SEED Country, Year Location (Variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed				mean	
USA, 2012 Chula, GA (FM 1740)	1	0.074	0.5	seed	136	< 0.01, < 0.01	< 0.01	RAGML206-01 GM022-12HA
				gin by-products		0.469, 0.239	0.354	
USA, 2012 Parma, MO (ST4145 LLB2)	1	0.073	0.5	seed	181	< 0.01, < 0.01	< 0.01	RAGML206-01 GM023-12HA
				gin by-products		0.03, 0.017	0.024	
USA, 2012 Proctor, AR (ST4145)	1	0.074	0.5	seed	153	< 0.01, < 0.01	< 0.01	RAGML206-01 GM024-12HA
				gin by-products		0.016, 0.013	0.015	
USA, 2012 Greenville, MS, (ST 5458 (B2RF))	1	0.074	0.5	seed	144	< 0.01, < 0.01	< 0.01	RAGML206-01 GM025-12HA
USA, 2012 Claude, TX, (ST 4145)	1	0.074	0.5	seed	194	< 0.01, < 0.01	< 0.01	RAGML206-01 GM027-12HA
					200	< 0.01, < 0.01	< 0.01	
					206	< 0.01, < 0.01	< 0.01	
					213	< 0.01, < 0.01	< 0.01	
					219	< 0.01, < 0.01	< 0.01	
				gin by-products	194	< 0.01, < 0.01	< 0.01	
					200	< 0.01, < 0.01	< 0.01	
					206	< 0.01, < 0.01	< 0.01	
					213	< 0.01, < 0.01	< 0.01	
					219	< 0.01, < 0.01	< 0.01	
USA, 2012 Levelland, TX (ST5458 (B2RF))	1	0.074	0.5	seed	158	< 0.01, < 0.01	< 0.01	RAGML206-01 GM028-12HA
				gin by-products		< 0.01, < 0.01	< 0.01	
USA, 2012 Hinton, OK (FM1740 B2RF)	1	0.074	0.5	seed	142	< 0.01, < 0.01	< 0.01	RAGML206-01 GM029-12HA
USA, 2012 Wall, TX (FM1740 B2RF)	1	0.072	0.5	seed	151	< 0.01, < 0.01	< 0.01	RAGML206-01 GM030-12HA

COTTON SEED Country, Year Location (Variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed				mean	
USA, 2012 Sanger, CA (Acala)	1	0.072	0.5	seed	170	< 0.01, < 0.01	< 0.01	RAGML206-01 GM031-12HA
USA, 2012 Madera, CA (Acala)	1	0.074	0.5	seed	170	< 0.01, < 0.01	< 0.01	RAGML206-01 GM033-12HA
USA, 2012 East Bernard, TX (ST 5458 (B2RF))	1	0.073	0.5	seed gin by-products	143	< 0.01, < 0.01 0.021, 0.02	< 0.01 0.02	RAGML206-01 GM073-12HA

Table 13 Fluopyram residues in cotton seed and gin byproducts from supervised trials in the USA involving fluopyram seed treatments (FS formulation) in combination with in-furrow soil applications (SC formulations)

COTTON SEED Country, Year Location (Variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed				mean	
USA, 2012 Chula, GA (FM 1740)	1+ 1	0.074 0.261	0.5	seed gin by-products	136	< 0.01, < 0.01 0.064, 0.05	< 0.01 0.057	RAGML206-01 GM022-12HA
USA, 2012 Parma, MO (ST4145 LLB2)	1+ 1	0.073 0.252	0.5	seed gin by-products	181	< 0.01, < 0.01 0.035, 0.027	< 0.01 0.031	RAGML206-01 GM023-12HA
USA, 2012 Proctor, AR (ST4145)	1+ 1	0.073 0.252	0.5	seed gin by-products	153	< 0.01, < 0.01 0.018, 0.021	< 0.01 0.02	RAGML206-01 GM024-12HA
USA, 2012 Greenville, MS, (ST 5458 (B2RF))	1+ 1	0.074 0.25	0.5	seed	144	< 0.01, < 0.01	< 0.01	RAGML206-01 GM025-12HA
USA, 2012 Claude, TX, (ST 4145)	1+ 1	0.074 0.257	0.5	seed gin by-products	194 200 206 213 219 194 200 206 213 219	< 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 < 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	0.074 0.25	0.5	seed gin by-products	158	< 0.01, < 0.01 0.017, 0.015	< 0.01 0.016	RAGML206-01 GM028-12HA
USA, 2012 Hinton, OK (FM1740 B2RF)	1+ 1	0.074 0.252	0.5	seed	142	< 0.01, < 0.01	< 0.01	RAGML206-01 GM029-12HA
USA, 2012 Wall, TX (FM1740 B2RF)	1+ 1	0.072 0.248	0.5	seed	151	< 0.01, < 0.01	< 0.01	RAGML206-01 GM030-12HA
USA, 2012 Sanger, CA (Acala)	1+ 1	0.072 0.248	0.5	seed	170	< 0.01, < 0.01	< 0.01	RAGML206-01 GM031-12HA
USA, 2012 Madera, CA (Acala)	1+ 1	0.074 0.255	0.5	seed	170	< 0.01, < 0.01	< 0.01	RAGML206-01 GM033-12HA

COTTON SEED Country, Year Location (Variety)	Application			Matrix	DALA	Fluopyram residues (mg/kg)		Reference
	no.	kg ai/ha	mg ai/seed				mean	
USA, 2012 East Bernard, TX (ST 5458 (B2RF))	1+	0.073	0.5	seed	143	< 0.01, < 0.01	< 0.01	RAGML206-01 GM073-12HA
	1	0.25		gin by-products		0.031, 0.03	0.03	

Primary feed commodities

Legume animal feeds

Bean fodder and forage

In the European outdoor field trials on beans evaluated by the Meeting, two applications of fluopyram (SC 500 formulations) were made 7–8 days apart as foliar sprays using knapsack or wheel barrow sprayers with 1–4 flat-fan, solid or hollow-cone nozzles or hand-held-booms (3–12 flat-fan nozzles), applying 0.25 kg ai/ha in 300–1000 L water/ha to plots ranging from 8–108 m².

Unreplicated samples of 1–3 kg of pods (including seeds) and at least 12–18 bean plants (min 1 kg green material, including pods and seeds) were taken from each plot, frozen within 24 hours of sampling and stored at –18 °C or below for up to 456 days before analysis for fluopyram using LC/MS/MS Methods 00984 or 00984/M001. The reported LOQs were 0.01 mg/kg for each analyte. Mean fluopyram recovery rates ranged from 87–98% in fresh pods spiked with 0.01–4.0 mg/kg, 85–100% in vines spiked with 0.01–10 mg/kg and 101% in seeds (fresh) spiked with 0.01–0.1 mg/kg.

Table 14 Residues in bean forage from supervised trials in Europe, evaluated by the 2010 JMPR [Ref: JMPR 2010 E, Table 144, pp 1567–71]

BEAN FORAGE Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Germany, 2006 Lampertheim (Albani)	2	0.25	0.05	500	vines	–0	0.24	RA-2594/06 0377-06
						0	3.2	
						3	4.1	
						7	<u>0.71</u>	
						10	0.4	
						14	0.26	
Germany, 2006 Langenfeld-Reusrath (Classic)	2	0.25	0.0835	300	vines	–0	0.25	RA-2594/06 0654-06
						0	7.8	
						3	0.42	
						7	<u>0.24</u>	
						10	0.17	
						14	0.08	
Netherlands, 2006 Zwaagdijk-Oost (Unknown)	2	0.25	0.05	500	vines	–0	0.33	RA-2594/06 0655-06
		0.23		460		0	5.7	
						3	2.6	
						7	<u>0.88</u>	
						10	0.55	
						14	0.37	
Belgium, 2006 Villers-Perwin (Polder)	2	0.25	0.0385	650	vines	–0	0.98	RA-2594/06 0656-06
						0	14	
						3	8	
						7	<u>1.3</u>	
						10	0.99	
						14	0.99	

BEAN FORAGE Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Belgium, 2007 Villers-Perwin (Cadillac)	2	0.25	0.025	1000	vines	-0 0 3 7 10 14	0.37 7 4.2 <u>0.42</u> 0.33 0.19	RA-2511/07 0014-07
Germany, 2007 Langenfeld-Reusrath (Classic)	2	0.25	0.0415	600	vines	-0 0 3 7 10 14	0.14 3 1.4 <u>0.57</u> 0.37 0.2	RA-2511/07 0546-07
France, 2007 Fresnoy les Roye (Lugos)	2	0.25	0.05	500	vines	-0 0 3 7 10 14	0.37 6.2 3.4 <u>0.68</u> 0.34 0.17	RA-2511/07 0547-07
Netherlands, 2007 Biddinghuizen (Cadillac)	2	0.25	0.05	500	vines	-0 0 3 7 10 14	0.56 5.4 1.8 <u>0.72</u> 0.65 0.46	RA-2511/07 0548-07
Germany, 2007 Swisttal-Heimerzheim (Sonesta)	2	0.25	0.0415	600	vines	-0 0 3 6 10 13	0.2 5.9 5.4 <u>0.31</u> 0.18 0.09	RA-2511/07 0549-07
Spain, 2006 Alginet (Cleo)	2	0.25	0.0415	600	vines	-0 0 3 7 10 14	0.25 3.0 2.9 <u>1.6</u> 1.3 1.2	RA-2595/06 0378-06
Italy, 2006 Pradelle di Nogarole Rocca (Jamaica)	2	0.25	0.05	500	vines	-0 0 3 7 10 14	0.22 7.7 0.42 <u>0.34</u> 0.26 0.2	RA-2595/06 0620-06
Spain, 2006 Malgrat de Mar (Nasao)	2	0.25	0.05 0.0415	500 600	vines	-0 0 2 7 10 14	0.18 3.9 0.81 <u>0.25</u> 0.19 0.13	RA-2595/06 0657-06
Italy, 2006 Ladispoli (Bronco)	2	0.25	0.0315	800	vines	-0 0 3 7 10 14	0.51 5.8 4.1 0.84 <u>0.86</u> 0.39	RA-2595/06 0658-06

BEAN FORAGE Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
France, 2007 Chazay d'azergues (Contender)	2	0.25	0.025	1000	vines	-0 0 3 7 10 14	0.52 8.2 5.7 0.61 0.69 <u>0.8</u>	RA-2512/07 0035-07
Italy, 2007 Ladispoli (Bronco)	2	0.25	0.0315	800	vines	-0 0 3 7 10 14	0.28 8.9 0.58 <u>0.26</u> 0.19 0.1	RA-2512/07 0550-07
Spain, 2007 Alginet (Cleo)	2	0.25	0.025	1000	vines	-0 0 3 7 10 14	2.6 5.9 3.7 <u>4.3</u> 2.4 1.2	RA-2512/07 0551-07
Portugal, 2007 Ribafria Peniche (Tradicional)	2	0.25	0.025	1000	vines	-0 0 3 7 10 14	1.7 7.8 3.4 2.2 <u>2.8</u> 2.0	RA-2512/07 0552-07

Table 15 Fluopyram residues in bean forage from supervised outdoor trials in Europe involving two foliar applications of fluopyram (SC formulations)

BEAN FORAGE Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Germany, 2012 Werl-Mawicke (Primel bean)	2	0.2	0.067	300	vines	-0 0	1.7 10	12-2030 12-2030-01
France (N), 2008 Picardie (Flavert) SC500 formulation A	2	0.25	0.05	500	vines	-0 0 3 7 10 14	0.19 3.52 3.57 <u>0.55</u> 0.33 0.30	08-2034 08-2034-01
France (N), 2008 (Flavert) SC500 formulation B	2	0.25	0.05	500	vines	-0 0 3 7 10 14	0.13 3.75 3.78 <u>0.58</u> 0.32 0.27	08-2034 08-2034-01
Italy, 2008 Lazio (Bronco) Kidney bean SC500 formulation A	2	0.25	0.031	800	vines	-0 0 3 7 10 14	0.65 7.7 4.6 <u>0.82</u> 0.67 0.41	08-2096 08-2096-01

BEAN FORAGE Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Italy, 2008 Lazio (Bronco) Kidney bean SC500 formulation B	2	0.25	0.031	800	vines	-0	0.59	08-2096 08-2096-01
						0	6.5	
						3	5.4	
						7	<u>0.85</u>	
						10	0.73	
						14	0.36	
Germany, 2010 Heimerzheim (Orinoko)	2	0.2	0.067	300	vines	-0	0.63	10-2125 10-2125-01
						0	5.5	
						8	<u>0.38</u>	
Belgium, 2010 Villers-Perwin (Beaufort)	2	0.2	0.05	400	vines	-0	0.07	10-2125 10-2125-02
						0	0.64	

Pea vines and hay

In the European trials on peas evaluated by the Meeting, two applications of fluopyram (SC formulation) were made to peas 7–9 days apart as foliar sprays using knapsack or wheel barrow sprayers with hand-held spray booms (1–12 flat-fan or hollow cone nozzles), applying 0.2–0.25 kg ai/ha in 300–600 L water/ha. Plot sizes in these trials ranged from 24–160 m².

Unreplicated samples of at 0.5–4 kg whole plants (including pods and seeds but without roots), at least 1 kg of fresh pods and vines (without pods and roots) and at least 0.5 kg of dry seeds and straw were taken from each plot, frozen within 24 hours of sampling and stored at –18 °C or below for up to 467 days before analysis for fluopyram and metabolites using LC/MS/MS Method 00984 or 00984/M003. The reported LOQs were 0.01 mg/kg for each analyte and average fluopyram recovery rates ranged from 100–101% in plants spiked with 0.01–10 mg/kg, 93–101% in vines spiked with 0.01–20 mg/kg, 87–100% in seeds (fresh and dry) spiked with 0.01–1.0 mg/kg and 89–98% in straw spiked with 0.01–20 mg/kg.

Table 16 Residues in fresh pea vines from supervised trials in Europe evaluated by the 2010 JMPR [Ref: JMPR 2010 E, Table 147, pp 1573–75]

PEA VINES Country, Year Location (Variety)	Application				Matrix	DAL A	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Germany, 2006 Machern (Harnaß)	2	0.25	0.079 0.0745	317 336	vines	-0	1.2	RA-2597/06 0380-06
						0	3.4	
						3	3.4	
						7	<u>3.5</u>	
						10	1.8	
						14	2.1	
United Kingdom, 2006 Needham (Hawk)	2	0.25	0.0835	300	vines	-0	0.91	RA-2597/06 0722-06
						0	3.9	
						3	4.1	
						7	<u>3.3</u>	
						10	2.7	
14	1.7							
Germany, 2006 Meckenbeuren (Rondo)	2	0.25	0.0835	300	vines	-0	0.05	RA-2597/06 0723-06
						0	4.2	
						3	3.8	
						7	<u>0.46</u>	
						10	0.37	
13	0.24							

Fluopyram

PEA VINES Country, Year Location (Variety)	Application				Matrix	DAL A	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Netherlands, 2007 Kopstukken (unknown)	2	0.25	0.0415	600	vines	-0 0 3 7 10 14	0.29 5.7 4.9 <u>1.9</u> 1.8 0.66	RA-2513/07 0036-07
Germany, 2007 Burscheid (Wunder von Kelvedon)	2	0.25	0.0835	300	vines	-0 0 3 7 10 14	2.1 6.6 1.6 <u>1.1</u> 0.7 0.51	RA-2513/07 0553-07
France, 2007 Goyencourt (Arabelle)	2	0.25	0.0835	300	vines	-0 0 3 7 10 14	0.97 7.6 3.8 1.3 1.3 <u>2.3</u>	RA-2513/07 0554-07
Belgium, 2007 Landenne-Sur-Meuse (Tristar)	2	0.25	0.0625	400	vines	-0 0 3 7 10 14	0.31 2.5 2.4 <u>0.81</u> 0.7 0.45	RA-2513/07 0555-07
Germany, 2007 Swisttal- Heimerzheim (Spring)	2	0.25	0.0835	300	vines	-0 0 3 7 10 13	0.58 6.7 7.1 <u>4.3</u> 2.5 1.1	RA-2513/07 0556-07
Spain, 2006 Brenes (Rondo)	2	0.25	0.0835	300	vines	-0 0 3 7 9 14	4.5 8.8 8 <u>6.6</u> 4.6 5.7	RA-2598/06 0381-06
Italy, 2006 Migliarino (Agami)	2	0.25	0.0625	400	vines	-0 0 3 7 9 14	0.21 5.8 0.24 <u>0.2</u> 0.15 0.12	RA-2598/06 0724-06
France, 2007 Chazay d'Azergues (Douce de provence)	2	0.25	0.0625	400	vines	-0 0 3 7 10 14	0.75 7.9 6 <u>0.93</u> 0.51 0.35	RA-2514/07 0037-07
Spain, 2007 Brenes (Rondo)	2	0.25	0.0625	400	vines	-0 0 3 7 10 14	0.3 3.4 2.2 <u>0.45</u> 0.39 0.24	RA-2514/07 0557-07

Table 17 Residues in pea vines and hay from supervised field trials in Europe involving two applications of fluopyram (SC formulations)

PEA VINES/HAY Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Spain, 2012 Salobrena Granada (Utrillo)	2	0.2	0.05	400	vines	-0	0.46	12-2155 12-2155-01
						0	0.93	
						6	<u>0.5</u>	
						14	0.4	
					straw	22	<u>6.3</u>	
Spain, 2012 Malaga (Utrillo)	2	0.2	0.05	400	vines	-0	0.1	12-2155 12-2155-02
						0	0.35	
						7	<u>0.14</u>	
						14	0.14	
					straw	20	2.0	
34	<u>3.4</u>							
Italy, 2012 Papiana Marsciano (Gran Rugoso Tondo)	2	0.2	0.04	500	vines	-0	0.51	12-2155 12-2155-03
						0	0.79	
						7	<u>0.92</u>	
						14	0.89	
					straw	21	<u>19</u>	
28	15							
Southern France, 2012 Lapalud (Isard)	2	0.2	0.05	400	vines	-0	0.11	12-2032 12-2032-01
						0	3.9	
						6	<u>3.2</u>	
						14	0.45	
					21	0.43		
straw	40	<u>0.33</u>						
Spain, 2012 Dos Hermanas (Cartouche)	1+	0.2	0.067	300	vines	-0	6.2	12-2032 12-2032-02
						0	13	
						7	3.9	
						14	<u>4.9</u>	
					straw	21	<u>3.6</u>	
Italy, 2012 Ladispoli (RM) (Attika)	2	0.2	0.067	300	vines	-0	0.28	12-2032 12-2032-03
						0	3.8	
						7	1.2	
						14	<u>2.1</u>	
					straw	21	<u>3.6</u>	
Greece, 2012 Nea Messimvria (Li Violetta)	2	0.2	0.05	400	vines	-0	0.24	12-2032 12-2032-04
						0	3.8	
						7	<u>1.7</u>	
						14	0.71	
					straw	21	0.51	
33	<u>0.82</u>							
Spain, 2012 Alginet (Lincoln)	2	0.2	0.04	500	vines	-0	2.8	12-2032 12-2032-05
						0	6.3	
						7	4.5	
						14	<u>8.4</u>	
					straw	21	<u>0.64</u>	

Fluopyram

PEA VINES/HAY Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Germany, 2012 Burscheid (Respect)	2	0.2	0.067	300	vines	-0 0 7 14 21	0.8 3.3 <u>0.46</u> 0.43 0.36	12-2031 12-2031-01
					straw	39	<u>0.44</u>	
France (N), 2012 Chaussy (Genial)	2	0.2	0.067	300	vines	-0 0 7 14 21	0.13 3.0 <u>0.54</u> 0.49 0.29	12-2031 12-2031-02
					straw	35	<u>0.44</u>	
Germany, 2012 Beucha-Wolfshain (Rocket)	2	0.2	0.067	300	vines	-0 0 7 14	0.4 2.4 <u>0.28</u> 0.13	12-2031 12-2031-03
					straw	21 43	0.095 <u>0.15</u>	
Belgium, 2012 Villers-Perwin (Ravenna)	2	0.2	0.05	400	vines	-0 0 7 14	1.6 3.4 <u>0.4</u> 0.23	12-2031 12-2031-04
					straw	21 37	0.21 <u>0.8</u>	
United Kingdom, 2012 Cambridge (Tommy)	2	0.2	0.067	300	vines	-0 0 6 13	0.19 6.1 <u>8.0</u> 4.2	12-2031 12-2031-05
					straw	20	<u>4.8</u> (c=0.01)	
Germany, 2012 Langförden (Alvesta)	2	0.2	0.067	300	vines	-0 0 7 13	0.7 2.9 0.56 <u>0.63</u>	12-2031 12-2031-06
					straw	22 32	0.6 <u>0.93</u> (c=0.029)	
Spain, 2012 Salobrena (Utrillo)	2	0.25	0.063	400	vines	-0 0 6 14	4.9 12 6.2 <u>9.2</u>	12-2159 12-2159-01
					straw	22	<u>11</u> (c=0.013)	
Italy, 2012 Zibido San Giacomo (Utrillo)	2	0.25	0.083	300	vines	-0 0 7 14	7.6 13 <u>4.0</u> 2.9	12-2159 12-2159-02
					straw	21 28	3.9 <u>7.2</u>	

PEA VINES/HAY Country, Year Location (Variety)	Application				Matrix	DALA	Residues (mg/kg)	Reference
	no.	kg ai/ha	kg ai/hL	water (L/ha)			Fluopyram	
Spain, 2013 Alginet (Lincoln)	2	0.25	0.05	500	vines	-0 0 7 13	3.1 11 9.5 <u>9.6</u>	12-2048 12-2048-01
					straw	21	<u>18</u>	
Spain, 2013 Dos Hermanas (Cartouche)	2	0.25	0.05	500	vines	-0 0 7 14	6.9 15 5.3 <u>7.7</u>	12-2048 12-2048-01
					straw	21	<u>4.9</u>	

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 JMPR in 2012 and 2014 JMPRs and a number of additional maximum residue levels were recommended.

Residue definitions established by the 2010 JMPR are:

- for plant products (compliance with MRLs and dietary intake assessment): *fluopyram*
- for animal products (compliance with MRLs): sum 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 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.

New GAP information and supporting residue data were provided by the manufacturer for evaluation by the Meeting.

Results of supervised residue trials on crops

The Meeting received new supervised trial data for foliar applications of fluopyram (SC formulations, generally in combinations with other fungicides) on tomatoes, beans, peas, and sunflower and for seed treatments or in-furrow soil treatments on soya bean and cotton. The Meeting also noted that data for some of these crops had been provided to the 2010 JMPR.

The results from these new trials and those previously reported by the 2010 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 for which GAP information was available. Frozen sample storage times in the new trials were within the storage intervals considered acceptable by the 2010 JMPR and the analytical methods used in these trials were the same as those evaluated by JMPR in 2010.

*Fruiting vegetables (except Cucurbits)**Tomato*

The Meeting was advised that new GAP exists in Greece for fluopyram on protected tomatoes, involving up to three foliar applications of 0.15 kg ai/ha with a 3-day PHI.

In four independent protected tomato trials matching this GAP in Greece, residues were 0.04, 0.07, 0.08 and 0.13 mg/kg.

New GAP was also provided for tomatoes in Ukraine, up to two foliar applications of 0.15 kg ai/ha with a 7 day PHI.

In eight independent trials on field tomatoes conducted in Europe and matching this GAP in Ukraine, fluopyram residues were: < 0.01, 0.02, 0.06, 0.07, 0.1, 0.13, 0.13 and 0.17 mg/kg.

The Meeting noted that the 2010 JMPR had recommended a fluopyram maximum residue level of 0.4 mg/kg based on trials on protected tomatoes where residues had been proportionally adjusted to the GAP in Morocco.

The Meeting agreed that the 2010 JMPR recommendations accommodated the new GAPs for tomatoes in Greece and Ukraine.

Peppers and eggplant

The Meeting noted that the new GAP in Greece for fluopyram on protected tomatoes (3× 0.15 kg ai/ha, 3-day PHI) also applied to protected peppers and eggplants and that the 2012 JMPR had recommended a maximum residue level of 0.5 mg/kg for peppers based on the GAP in Turkey.

No trials matching the GAP in Greece on peppers and eggplants were available. The Meeting noted that the previous trials on protected peppers provided to the 2010 and 2012 JMPRs all involved only two applications and application rates of either 0.06 kg ai/ha or 0.3 kg ai/ha and agreed that the proportionality approach could not be used to support revised recommendations for peppers and/or extrapolation to eggplants.

*Legume vegetables**Beans (except broad bean and soya bean)*

The critical GAP for beans in Netherlands and Belgium is for up to two foliar applications of 0.25 kg ai/ha, with a 7-day PHI and results from supervised trials from Europe on protected and outdoor beans were provided to the Meeting to supplement the data provided to the 2010 JMPR.

In nine independent trials on protected beans matching this critical GAP, fluopyram residues were: 0.07, 0.15, 0.16, 0.16, 0.2, 0.22, 0.22, 0.43 and 0.69 mg/kg in beans with pods.

In 32 independent trials on outdoor beans conducted in Europe and matching this critical GAP, fluopyram residues were: < **0.01**, < **0.01**, **0.01**, 0.03, **0.04**, 0.04, **0.05**, 0.05, 0.07, **0.08**, **0.08**, **0.09**, **0.1**, 0.1, 0.11, 0.11, 0.12, **0.14**, **0.15**, **0.17**, **0.17**, 0.17, 0.18, 0.19, 0.2, 0.21, 0.24, 0.24, 0.25, 0.26, **0.32** and 0.43 mg/kg in beans with pods. (Results in bold are from the new trials).

The Meeting noted that the data sets for protected and outdoor bean were statistically different and agreed to use the data from the trials on protected beans to estimate a maximum residue level of 1 mg/kg, an STMR of 0.2 mg/kg and an HR of 0.69 mg/kg for fluopyram on beans (except broad bean and soya bean).

Peas, shelled

The critical GAP for peas (without pods) in Netherlands and Belgium is for up to two foliar applications of 0.25 kg ai/ha, with a 7-day PHI and results from supervised trials from Europe on outdoor peas were provided to the Meeting to supplement the data provided to the 2010 JMPR.

In 30 independent trials conducted in Europe and matching this critical GAP, fluopyram residues were: < **0.01**, < **0.01**, < **0.01**, < 0.01, **0.01**, **0.01**, 0.01, **0.02**, **0.02**, **0.02**, 0.02, 0.02, 0.02, 0.02, **0.03**, **0.03**, 0.03, 0.03, **0.04**, 0.05, 0.05, 0.05, **0.05**, **0.06**, **0.06**, **0.06**, **0.09**, **0.09**, 0.1 and **0.12** mg/kg in peas without pods. (Results in bold are from the new trials).

The Meeting estimated a maximum residue level of 0.2 mg/kg, an STMR of 0.03 mg/kg and an HR of 0.12 mg/kg for fluopyram on peas, shelled.

Beans, shelled

The Meeting noted that the GAP for beans in Netherlands and Belgium (up to two foliar applications of 0.25 kg ai/ha, with a 7-day PHI) was for beans with and without pods, and since this GAP for beans was the same as for peas, the Meeting agreed to extrapolate the data from peas, shelled to beans, shelled.

The Meeting estimated a maximum residue level of 0.2 mg/kg, an STMR of 0.03 mg/kg and an HR of 0.12 mg/kg for fluopyram on beans, shelled.

Soya bean (dry)

Results from supervised trials from the USA on soya beans were provided to the Meeting. In 21 independent trials matching the GAP in the USA for use as a seed treatment (0.25 mg ai/seed) fluopyram residues were ≤ 0.01 (12), 0.01, 0.01, 0.01, 0.02, 0.02, 0.03, 0.03 and 0.03 mg/kg in dry soya beans.

The Meeting noted that the metabolism studies did not cover the use of fluopyram as a seed treatment. However the Meeting noted the 2010 JMPR conclusions that fluopyram is slowly degraded in soil and when present, is the major residue in 30-day PBI rotational crops and agreed that the established residue definitions would also cover the use of fluopyram as a seed treatment.

The Meeting estimated a maximum residue level of 0.05 mg/kg and an STMR of 0.01 mg/kg for fluopyram on soya bean (dry).

Oilseeds

Sunflower seed

Results from supervised trials from Europe on sunflowers were provided to the Meeting.

The critical GAP in Ukraine and Moldova is for up to two foliar sprays of 0.125 kg ai/ha, applied before the start of flowering (BBCH 57) and with a minimum PHI of 50 days.

The Meeting received results from 12 independent trials conducted in Europe, where two foliar sprays of 0.125–0.13 kg fluopyram/ha were applied up to the seed development or early ripening stages (BBCH 67–85). As these trials did not match the critical GAP, the Meeting did not recommend a maximum residue level for fluopyram on sunflower seed.

Cotton seed

Results from supervised trials from the USA on cotton were provided to the Meeting. These trials included separate plots where fluopyram was applied as a pre-plant seed treatment, or as a combination of a seed treatment and an in-furrow soil treatment at planting.

In the USA, GAP exists for the use of fluopyram as a pre-plant seed treatment (0.35 mg ai/seed) and also as an in-furrow soil treatment of 0.25 kg ai/ha.

In the plots from 11 independent trials where the seed was treated with 0.5 mg/kg/seed (1.4× GAP), fluopyram residues in cotton seed were all < 0.01 mg/kg (n=11) and in the plots treated with a seed treatment (0.5 mg ai/seed—1.4× GAP) followed by an in-furrow soil treatment matching the US GAP (0.25 kg ai/ha) residues in cotton seed were also < 0.01 mg/kg.

The Meeting noted that the US GAP did not exclude the use of both a seed treatment and an in-furrow treatment at planting, and since residues following the seed treatment + in-furrow soil treatment were all < 0.01 mg/kg (n=11), the Meeting estimated a maximum residue level of 0.01 mg/kg and an STMR of 0.01 mg/kg for fluopyram on cotton seed.

Animal feeds

Bean forage

In 22 of the European trials on outdoor beans evaluated by the Meeting, residues of fluopyram in fresh bean forage from trials matching the GAP in Belgium and Netherlands (two applications of 0.25 kg ai/ha, PHI 7 days) were: 0.24, 0.25, 0.26, 0.31, 0.34, **0.38**, 0.42, **0.55**, 0.57, **0.58**, 0.68, 0.71, 0.72, 0.8, **0.82**, **0.85**, 0.86, 0.88, 1.3, 1.6, 2.8 and 4.3 mg/kg (Results in bold are from the new trials).

The Meeting estimated a median residue of 0.7 mg/kg (fresh weight) and a highest residue of 4.3 mg/kg (fresh weight) for fluopyram on bean forage.

Cotton gin by-products

In the trials from the USA on cotton, residues of fluopyram were measured in gin by-products from six plots that were treated with a combination of a seed treatment (at 1.4× GAP) and an in-furrow soil treatment (at GAP). Residues in these trials were: < 0.01, 0.02, 0.02, 0.03, 0.03 and 0.06 mg/kg.

The Meeting noted that although the in-furrow soil treatment rates in these trials matched the USA GAP, the seed treatment rates were 1.4× higher than GAP and agreed it was not possible to apply the proportionality approach for this combined treatment regime to derive median and highest residues for calculating the livestock dietary burden.

Pea vines and hay

In 30 of the European trials on outdoor peas evaluated by the Meeting, residues of fluopyram in fresh pea vines from trials matching the GAP in Belgium and Netherlands (two applications of 0.25 kg ai/ha, PHI 7 days) were: **0.14**, 0.2, **0.28**, **0.4**, 0.45, **0.46**, 0.46, **0.5**, **0.54**, **0.63**, 0.81, **0.92**, 0.93, 1.1, 1.7, 1.9, **2.1**, 2.3, **3.2**, 3.3, 3.5, **4.0**, 4.3, **4.9**, 6.6, **7.7**, **8.0**, **8.4**, **9.2** and **9.6** mg/kg (Results in bold are from the new trials).

The Meeting estimated a median residue of 1.8 mg/kg (fresh weight) and a highest residue of 9.6 mg/kg (fresh weight) for fluopyram on pea vines (green).

Residues of fluopyram in pea hay/straw from the new European trials matching the GAP in Belgium and Netherlands and sampled 20–43 days after the last application were: 0.15, 0.33, 0.44, 0.44, 0.64, 0.8, 0.82, 0.93, 3.4, 3.6, 3.6, 4.8, 4.9, 6.3, 7.2, 11, 18 and 19 mg/kg (n=18).

The Meeting estimated a median residue of 3.5 mg/kg (fresh weight), a highest residue of 19 mg/kg (fresh weight) and after correction for an average 88% dry matter content, estimated a maximum residue level of 40 mg/kg for fluopyram on pea hay.

Animal commodity maximum residue levels

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.

Farm animal dietary burden

The Meeting estimated the dietary burden of fluopyram in farm animals on the basis of the diets listed in Annex 6 of the 2009 JMPR Report (OECD Feedstuffs Derived from Field Crops) and using the estimated residues in livestock feed commodities evaluated by the Meeting and by previous JMPRs.

Animal dietary burden, fluopyram, ppm of dry matter diet								
	US-Canada		EU		Australia		Japan	
	Max	Mean	Max	Mean	Max	Mean	Max	Mean
Beef cattle	0.14	0.13	16	2.4	32 a	7.6 c	0.04	0.04
Dairy cattle	4.5	1.3	21	2.7	25 b	7 d	0.07	0.07
Poultry—broiler	0.041	0.041	0.21	0.12	0.021	0.021	–	–
Poultry—layer	0.041	0.041	5.8 e, g	0.92 f, h	0.021	0.021	–	–

^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

Animal commodity maximum residue levels

The calculations used to estimate total residues for use in estimating maximum residue levels, STMRs and HRs are shown below. For maximum residue level estimation, the total residues are the sum of fluopyram plus BZM (expressed as fluopyram equivalents) and for dietary intake estimation (STMRs and HRs) the total residues are the sum of fluopyram, BZM and total olefins (expressed as fluopyram equivalents).

Cattle

For beef and dairy cattle, the highest maximum dietary burdens were 32 ppm and 25 ppm (dairy) and the mean dietary burdens were 7.6 ppm and 7 ppm (dairy).

	Feed level for milk (ppm)	Total residues in milk (mg/kg)	Feed level for tissues (ppm)	Total residues (mg/kg)			
				Muscle	Liver	Kidney	Fat
MRL beef or dairy cattle (fluopyram + BZM)							
Feeding study ^a	14.4 44	0.25 0.64	14.4 44	0.045 0.83	2.88 6.	0.39 0.93	0.4 0.78
Dietary burden/residue estimate	25	0.38	32	0.52	4.7	0.71	0.63
High residue beef or dairy cattle (fluopyram + BZM + Total olefins)							
Feeding study ^a			14.4 44	0.47 0.86	2.9 6.1	0.41 0.97	0.52 1.2
Dietary burden/residue estimate			32	0.7	4.8	0.74	0.86
STMR beef or dairy cattle ((fluopyram + BZM + Total olefins)							
Feeding study ^b	1.5 14.4	0.02 0.27	1.5 14.4	0.02 0.32	0.35 2	0.03 0.31	0.04 0.31
Dietary burden/residue estimate	7	0.12	7.6	0.16	1.1	0.16	0.17

^a For estimating highest residues for tissues and mean residues for milk

^b For estimating mean residues for tissues and for milk

Total residues of fluopyram and BZM (expressed as fluopyram equivalents) calculated in cattle milk and tissues for use in estimating maximum residue levels are: 0.63 mg/kg (fat), 0.52 mg/kg (muscle), 4.7 mg/kg (liver) and 0.71 mg/kg (kidney) and the mean residue for milk is 0.38 mg/kg.

The Meeting estimated maximum residue levels of 0.7 mg/kg for fluopyram in meat (from mammals other than marine mammals), 0.7 mg/kg for mammalian fats (except milk fats), 0.8 mg/kg for edible offal (mammalian) except liver, 5 mg/kg for liver of cattle, goats, pigs and sheep and 0.5 mg/kg for milks and agreed to withdraw the previous recommendations.

Estimated HRs for dietary intake estimation for fluopyram (and including residues of BZM and total olefins) are 0.86 mg/kg for mammalian fat, 0.7 mg/kg for mammalian muscle, 4.8 mg/kg for liver and 0.74 mg/kg for kidney and other edible offal.

Estimated STMRs for dietary intake estimation for fluopyram (and including residues of BZM and total olefins) are 0.17 mg/kg for mammalian fat, 0.16 mg/kg for mammalian muscle, 1.1 mg/kg for liver of cattle, goats, pigs and sheep, 0.16 mg/kg for kidney and other edible offal of cattle, goats, pigs and sheep and 0.12 mg/kg for milks

Poultry

The dietary burdens for poultry broilers are 0.21 ppm (maximum) and 0.12 ppm (mean) but the Meeting decided to estimate residue levels in poultry tissues using the higher maximum and mean dietary burdens in poultry layers (5.8 ppm and 0.92 ppm respectively) as they may also be consumed. Since the dose-response curves in the poultry feeding study showed a linear relationship (R^2 values of 0.97–0.99) and as the maximum dietary burden estimates were not more than 120% of the highest dose, the Meeting agreed to estimate maximum total residues by extrapolation from the results of the poultry feeding study.

	Feed level for eggs (ppm)	Total residues in eggs (mg/kg)	Feed level for tissues (ppm)	Total residues (mg/kg)		
				Muscle	Liver	Skin with Fat
MRL broiler or laying hen (fluopyram + BZM)						
Feeding study ^a	4.8	0.72	4.8	0.33	1.6	0.64
Dietary burden/residue estimate	5.8	0.87	5.8	0.39	1.9	0.75
High residue broiler or laying hen (fluopyram + BZM + Total olefins)						
Feeding study ^a	4.8	0.74	4.8	0.39	1.64	0.72
Dietary burden/residue estimate	5.8	0.8	5.8	0.46	1.9	0.85
STMR broiler or laying hen (fluopyram + BZM + Total olefins)						
Feeding study ^b	0.49	0.08	0.49	0.03	0.16	0.06
	1.6	0.22	1.6	0.09	0.43	0.12
Dietary burden/residue estimate	0.92	0.13	0.92	0.058	0.26	0.086

^a For estimating highest residues for tissues and mean residues for eggs

^b For estimating mean residues for tissues and for 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), 0.39 mg/kg (muscle), 1.9 mg/kg (liver) and 0.87 mg/kg (eggs).

The Meeting estimated maximum residue levels of 0.5 mg/kg for fluopyram in poultry meat, 1 mg/kg for poultry fat, 2.0 mg/kg for poultry edible offal and 1.0 mg/kg for eggs.

Estimated HRs for dietary intake estimation for fluopyram (and including residues of BZM and total olefins) are 0.85 mg/kg for poultry fat, 0.46 mg/kg for poultry muscle, 1.9 mg/kg for poultry edible offal and 0.8 mg/kg for eggs.

Estimated STMRs for dietary intake estimation for fluopyram (and including residues of BZM and total olefins) are 0.086 mg/kg for poultry fat, 0.058 mg/kg for poultry muscle, 0.26 mg/kg for poultry edible offal and 0.13 mg/kg for eggs.

RECOMMENDATIONS

On the basis of the data from supervised trials the Meeting concluded that the residue levels listed in Annex 1 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 intake 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 intake for animal commodities: Sum of fluopyram, 2-(trifluoromethyl)benzamide and the combined residues 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.

CCN	Commodity	Recommended Maximum residue level (mg/kg)		STMR or STMR-P mg/kg	HR or HR-P mg/kg
		New	Previous		
VP 0061	Beans, except broad bean and soya bean	1		0.2	0.69
VP 0062	Beans, shelled	0.2		0.03	0.12
SO 0691	Cotton seed	0.01		0.01	
PE 0112	Eggs	1	0.3	0.13	
MO 0098	Kidney of cattle, goats, pigs and sheep	0.8	0.5	0.16	0.74
MO 0099	Liver of cattle, goats, pigs and sheep	5	3	1	4.8
MM 0095	Meat (from mammals other than marine mammals)	0.8	0.5	0.16	0.7
ML 0106	Milks	0.6	0.3	0.12	
VP 0064	Peas, Shelled	0.2		0.03	0.12
AL 0072	Pea hay or pea fodder (dry)	40 (dw) ^a		3.5 (fw)	19 (fw)
PO 0111	Poultry, Edible offal of	2	0.7	0.27	1.9
PM 0110	Poultry meat	0.5	0.2	0.058	0.46
VD 0541	Soya bean (dry)	0.05		0.01	
AL 0528	Pea vines (green)			1.8 (fw)	9.6 (fw)
AL 1030	Bean Forage (green)			0.7 (fw)	4.3 (fw)

DIETARY RISK ASSESSMENT***Long-term intake***

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 to the 2015 Report.

The International Estimated Daily Intakes of fluopyram for the 17 GEMS/Food regional diets, based on estimated STMRs were 4–30% of the maximum ADI of 0.01 mg/kg bw (Annex 3). The Meeting concluded that the long-term intake of residues of fluopyram from uses that have been considered by the JMPR is unlikely to present a public health concern.

Short-term intake

The International Estimated Short-term Intakes (IESTIs) for fluopyram were calculated for the food commodities for which STMRs or HRs were estimated and for which consumption data were available (Annex 4 to the 2015 Report).

For fluopyram the IESTI varied from 0–10% of the ARfD (0.5 mg/kg bw) and the Meeting concluded that the short-term intake of residues of fluopyram from uses considered by the Meeting is unlikely to present a public health concern.

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M-365542-01-1	Cavaille, C	2010	Determination of the residues of AE C656948 in/on bean, kidney after spraying of fluopyram SC 500 in the field in Italy. Bayer S.A.S., Bayer CropScience, Lyon, France. Report includes Trial Nos: 08-2096-01, 08-2096-02. Date: 2010-03-16. GLP/GEP: yes, unpublished. 08-2096
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Code	Author	Year	Title, Institute, Report reference
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M-475814-01-1	Glaubitz, J & Ballmann, C	2014	Determination of the residues of fluopyram and trifloxystrobin in/on field pea after spray application of AE C656948 & CGA279202 SC 500 in the field in Germany, Northern France, Belgium and United Kingdom. Bayer CropScience. Report includes Trial Nos: 12-2031-01, 12-2031-02, 12-2031-03, 12-2031-04, 12-2031-05, 12-2031-06. Date: 2014-01-28. GLP/GEP: yes, unpublished. 12-2031
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Fluopyram

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