

BAS 510 F
Bean (Dry, Snap, and Lima)
PMRA a.i. code (CCH)

Magnitude of the Residue
OPPTS 860.1500
DACO 7.4.1

PC Code: 128008
MRID: 45405120
Submission # 2001-1027, 1036, 1043



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

MEMORANDUM

Date: July 2, 2003

Reviewers:

William Cutchin Date: *8/25/03*

William Cutchin
Reviewer
SIMB/HED (7509C)

Henri P. Bietlot Date: *Aug 16/03*
Henri P. Bietlot
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DP Barcode: D278386

Petition No.: 1F06313

Citation: 45405120 Haughey, D.; Abdel-Baky, S. (2000) The Magnitude of BAS 510 F Residues in Dry, Snap, and Lima Beans: Final Report: Lab Project Number: 2001/5000905: 46764: 2000177. Unpublished study prepared by BASF Agro Research. 89 p.

Sponsor: BASF Corporation

Background

The information contained herein was compiled by Dynamac Corporation (20440 Century Boulevard, Suite 100, Germantown MD 20874), contractor, under the supervision of RAB2/HED. This DER has undergone secondary review by RAB2, and reflects current HED and Office of Pesticide Programs (OPP) policies. This DER was also peer-reviewed by PMRA.

Executive Summary

BASF Corporation has submitted field trial data on snap bean, lima bean, and dried bean of the Legume Vegetables Crop Group (Group 6). Field trial data for peas were submitted in a separate study (see DER of MRID 45623405). Only rotational crop studies are available for soybean seed (see DER of MRID 45623412).

Seven U.S. snap bean field trials were conducted in Regions 1 (1 trial; PA), 2 (1 trial; GA), 3 (1 trial; FL), 5 (2 trials; MN and WI), 10 (1 trial; CA), and 11 (1 trial; ID) and three Canadian snap bean trials were conducted in Regions 1A (1 trial; NS) and 5B (2 trials; QC). Seven U.S. lima bean field trials were conducted in Regions 2 (3 trials; GA and NC), 5 (1 trial; WI), 10 (2 trials; CA), and 11 (1 trial; ID). Nine U.S. dry bean trials were conducted in Regions 5 (4 trials; MN, ND, and WI), 7 (1 trial; ND), 8 (1 trial; TX), 9 (1 trial; CO), 10 (1 trial; CA), and 11 (1 trial; ID) and one Canadian dry bean trial was conducted in Region 7A (AB). The number and location of field trials are adequate with respect to the residue data requirements for beans for both the EPA and the PMRA.

At each test location, the 70% WG formulation of BAS 510 F was applied two times as a foliar spray at ~0.50 lb ai/A/application (~0.56 kg ai/ha/application), with a 4- to 8-day retreatment interval, for a total rate of 0.97-1.05 lb ai/A (1.09-1.18 kg/ha). Weather information indicates that, for beans, temperatures were normal with somewhat above normal rainfall.

Mature samples of dry beans were cut 21 days following the last application and collected following 0-15 days of field drying, and mature samples of snap and lima beans were collected 7 days after last application. In one field trial, additional samples of dry bean were collected at 0, 7, 14, and 28 days following treatment to evaluate residue decline. In two field trials, additional samples of snap and lima bean were collected at 0, 3, 10, and 14 days following treatment to evaluate residue decline.

Residues of BAS 510 F in/on beans (dried, snap, and lima) were quantitated using a validated LC/MS/MS method (D9908), the data collection method for plant commodities. Storage stability data (refer to the DER for MRID 45405109) are available to support the storage conditions and intervals of samples (154 days (5.1 months) for dry beans, 247 days (8.1 months) for snap beans, and 176 days (5.8 months) for lima beans) from the submitted field trials.

In dry beans, residues of BAS 510 F were <0.05-2.35 ppm in/on samples harvested 21 days following the last of two foliar spray applications of the 70% WG formulation at 0.48-0.52 lb ai/A/application (0.54-0.58 kg ai/ha/application), for a total rate of 0.97-1.02 lb ai/A (1.09-1.14 kg ai/ha). We note that residues ranged <0.05-0.46 ppm in all dry bean samples, except for samples from one trial, where residues were much higher (2.25 and 2.35 ppm); the petitioner did not provide any explanation for this difference in residues. No conclusions regarding residue decline could be made because residues of BAS 510 F were at or near the LOQ in all dry bean samples from the decline study.

In snap beans, residues of BAS 510 F were 0.10-1.16 ppm in/on samples harvested 7 days following the last of two foliar spray applications of the 70% WG formulation at 0.495-0.534 lb ai/A/application (0.55-0.60 kg ai/ha/application), for a total rate of 0.99-1.05 lb ai/A (1.11-1.18 kg ai/ha). The residue decline data for snap beans indicated that BAS 510 F residues decreased in a linear fashion with a half-life of 6 days and complete dissipation of the residues by approximately day 12.

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In lima beans, residues of BAS 510 F were <0.05-0.54 ppm in/on samples harvested 7 days following the last of two foliar spray applications of the 70% WG formulation at 0.493-0.518 lb ai/A/application (0.55-0.58 kg ai/ha/application), for a total rate of 1.00-1.02 lb ai/A (1.12-1.14 kg ai/ha). The residue decline data for lima beans indicated that BAS 510 F residues decreased minimally at longer posttreatment intervals.

Residue data from the current submission are acceptable to fulfill crop field trial data requirements for beans. In addition, when combined with the submitted residue data for dried and succulent peas (see DER of MRID 45623405), the residue data from the current submission fulfill crop field trial data requirements for Crop Group 6, provided soybeans are excluded.

GLP Compliance

Signed and dated GLP, Quality Assurance, and Data Confidentiality statements were provided. No GLP deviations were reported which would impact the study results or their interpretation.

1. Materials and Methods

1.1. Test Substance

Active Ingredient

Common Name: Nicobifen (ISO, proposed)

IUPAC Name: 2-Chloro-N-(4'-chlorobiphenyl-2-yl)nicotinamide

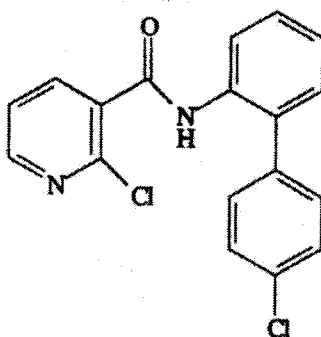
CAS Name: 3-Pyridinecarboxamide, 2-chloro-N-(4'chloro[1,1'-biphenyl]-2-yl)-

CAS Number: 188425-85-6

Company Name: BAS 510 F

Other Synonyms: BASF Registry No. 300355

Chemical Structure:



BAS 510 F

1.2. Trial Locations

TABLE B.1.2. Trial Numbers and Geographical Locations for the Bean Sub-crop group ¹												
NAFTA Growing Region	Beans, dried				Beans, snap				Beans, Lima, green			
	Canada		US		Canada		US		Canada ²		US	
	SUB	REQ	SUB	REQ	SUB	REQ	SUB	REQ	SUB	REQ	SUB	REQ
1							1	1				
1A					1	1						
2							1	1			3	3
3							1	1				
4												
5	4	4	4	4	2	2	2	2			1	1
5A												
5B					2	2						
6												
7			1	1								
7A	1	1										
8			1	1								
9			1	1								
10			1	1			1				2	1
11			1	1			1	1			1	1
12												
13												
14												
15												
16												
17												
18												
19												
20												
21												
Total	5	5	9	9	5	5	10	6	7	N/A	7	6

¹ The representative crops for beans are one succulent cultivar of edible podded bean (*Phaseolus* spp.), one succulent shelled cultivar of bean (*Phaseolus* spp.), and one dried cultivar of shelled bean (*Phaseolus* spp.)

² No specific requirements listed in Dir 98-02 Section 15.

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Table 1.2.2. Crop and Field Trial Information.

EPA Region	Location (County, State, Year)	Crop, Variety	Formul.	Applic. Timing	Applic. Rate (lb ai/A) [kg ai/ha]	Retreat. Intervals (days)	No. of Applics.	Applic. Method/ Applic. Volume (GPA) [l/ha]	Total Applic. Rate (lb ai/A) [kg ai/ha]	Tank Mix Adjuvants	Harvest Procedures
5	Grand Forks, ND, 2000	Dry bean, Pinto, Topaz	70% WG	Plants 12-14" tall, 30% fully ripe	0.51 [0.57]	6	2	Foliar spray/ 20.2-20.26 [226-227]	1.02 [1.14]	Prime Oil (1%, v:v)	Dry beans harvested 21 days after last application (DALA) and dried for 2 days.
				Plants 12-14" tall, 30-40% fully ripe							
5	Cass, ND, 2000	Dry bean, Maverick	70% WG	Plants 24" tall, full seed	0.5-0.52 [0.56-0.58]	8	2	Foliar spray/ 19.97-20.62 [22.4-231]	1.02 [1.14]	Activator 90 (4pt/100 gal)	Dry beans harvested 21 DALA.
				Plants 24" tall, early pods turned yellow							
5	Freeborn, MN, 2000	Dry bean, Pinto, Topaz	70% WG	Plants 12-15" tall, R6-R7	0.49-0.51 [0.55-0.57]	4	2	Foliar spray/ 17.54-18.0 [196-201]	1.00 [1.12]	Crop Oil Plus (1%, v:v)	Dry beans harvested 21 DALA and dried for 2 days.
5	Pepin, WI, 2000 (decline study)	Dry bean, Dark Red Kidney 126	70% WG	Plants 18" tall, mature pods drying	0.506-0.507 [0.57]	5	2	Foliar spray/ 20.23-20.29 [227]	1.013 [1.13]	Latron CS-7us (24oz/100gal)	Dry beans harvested 0, 7, 14, 21, and 28 DALA and dried for 2-4 days.
7	McHenry, ND, 2000	Dry bean, Maverick	70% WG	Plants 18-20" tall, striping	0.49-0.504 [0.55-0.56]	5	2	Foliar spray/ 14.8-15.1 [166-169]	0.994 [1.11]	Class 17% Crop Oil Concentrate (1qt/A)	Dry beans harvested 21 DALA.
8	Hockley, TX, 2000	Dry bean, Pinto, Taylor Horticulture Improved	70% WG	Plants 16-18" tall, maturing beans	0.4952-0.5078 [0.55-0.57]	5	2	Foliar spray/ 19.8-20.3 [222-227]	1.003 [1.12]	Agridex (1%, v:v)	Dry beans harvested 21 DALA and dried for 2 days.
				Plants 18" tall, maturing beans							

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Table 1.2.2. Crop and Field Trial Information.

EPA Region	Location (County, State, Year)	Crop, Variety	Formul.	Applic. Timing	Applic. Rate (lb ai/A) [kg ai/ha]	Retreat. Intervals (days)	No. of Applies.	Applic. Method/ Applic. Volume (GPA) [l/ha]	Total Applic. Rate (lb ai/A) [kg ai/ha]	Tank Mix Adjuvants	Harvest Procedures
9	Larimer, CO, 2000	Dry bean, Pinto, Bill Z	70% WG	Plants 12-18" tall, pod development	0.49-0.51 [0.55-0.57]	5	2	Foliar spray/ 11.35-11.7 [127-131]	1.00 [1.12]	Activator 90 (1qt/100gal)	Dry beans harvested 21 DALA and dried for 9 days.
10	Butte, CA, 2000	Dry bean, Linden Light Red Kidneys	70% WG	Plants 30" tall, bean development	0.501-0.502 [0.56-0.56]	5	2	Foliar spray/ 23.1-23.9 [259-268]	1.003 [1.12]	RNA Activator 85 (1pt/100gal)	Dry beans harvested 21 DALA and dried for 15 days.
11	Payette, ID, 2000	Dry bean, Pinto, Apache	70% WG	Plants 20" tall, 3-5" long green pods Plants 18" tall, mature vegetation	0.489-0.504 [0.55-0.56]	5	2	Foliar spray/ 29.36-30.21 [329-338]	0.993 [1.11]	R-11 (1pt/100gal)	Dry beans harvested 21 DALA and dried for 3 days.
7A	Taber, AB, Canada, 2000	Dry bean, Pinto, Othello	70% WG	Plants 11.8" tall, BBCH 79-80 Plants 13.4" tall, BBCH 80-81	0.48-0.486 [0.54]	6	2	Foliar spray/ 20.63-20.74 [231-232]	0.966 [1.08]	Ag-Surf (0.1%, v:v)	Dry beans harvested 21 DALA and dried for 4 days.
1	Lehigh, PA, 2000	Snap bean, Bush Bean Roma II	70% WG	Plant 12-18" tall; bloom/pod set Plant 12-18" tall; midbloom to early maturity	0.506-0.51 [0.57]	4	2	Foliar spray/ 30.4-30.8 [340-345]	1.016 [1.14]	Induce (0.125%, v:v)	Snap beans harvested 7 DALA.
2	Clarke, GA, 2000	Snap bean, Roma II	70% WG	Plants 10-14" tall; pod fill Plants 12-17" tall; pod fill	0.503-0.504 [0.56]	5	2	Foliar spray/ 27.5-28.18 [308-316]	1.007 [1.13]	Surf-Ac-820 (0.25%, v:v)	Snap beans harvested 7 DALA.

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Table 1.2.2. Crop and Field Trial Information.

EPA Region	Location (County, State, Year)	Crop, Variety	Formul.	Applic. Timing	Applic. Rate (lb ai/A) [kg ai/ha]	Retreat. Intervals (days)	No. of Applies.	Applic. Method/ Applic. Volume (GPA) [l/ha]	Total Applic. Rate (lb ai/A) [kg ai/ha]	Tank Mix Adjuvants	Harvest Procedures
3	Alachua, FL, 2000	Snap bean, Rhapsody	70% WG	Plants 13" tall; flow Plants 13" tall; flowering & pod set	0.50-0.51 [0.556-0.57]	5	2	Foliar spray/ 25.1-25.5 [281-286]	1.01 [1.14]	Agridex COC (1qt/A)	Snap beans harvested 7 DALA.
5	Freeborn, MN, 2000	Snap bean, Top Crop	70% WG	Plants 10" tall; pod formation	0.5 [0.56]	5	2	Foliar spray/ 17.8-18.1 [199-202]	1.0 [1.12]	Crop Oil Plus (1%, v/v)	Snap beans harvested 7 DALA.
5	Pepin, WI, 2000 (decline study)	Snap bean, Bush Blue Lake 274 Green Bean	70% WG	Plants 16" tall; pod formation Plants 17" tall; pod development - continuing to blossom	0.503-0.506 [0.56-0.57]	5	2	Foliar spray/ 20.11-20.24 [225-227]	1.009 [1.12]	Latron CS-7us (24oz/100gal)	Snap beans harvested 0, 3, 7, 10, and 14 DALA.
10	Madera, CA, 2000	Snap bean, Seville	70% WG	Plants 12-16" tall, bean with new bloom Plants 12-16" tall, bloom to mature beans	0.49485-0.498 [0.55]	5	2	Foliar spray/ 29.69-29.88 [333-335]	0.99285 [1.11]	Latron B-1956 (3oz/100gal)	Snap beans harvested 7 DALA.
11	Payette, ID, 2000	Snap bean ¹ , Tendergreen	70% WG	Plants 20" tall; BBCH 74 Plants 20" tall; BBCH 75	0.498-0.50 [0.56]	4	2	Foliar spray/ 32.77-33.52 [367-375]	0.998 [1.12]	Agri-dex (1pt/A)	Snap beans harvested 7 DALA.

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Table 1.2.2. Crop and Field Trial Information.

EPA Region	Location (County, State, Year)	Crop Variety	Formul.	Applic. Timing	Applic. Rate (lb ai/A) [kg ai/ha]	Retreat. Intervals (days)	No. of Applies.	Applic. Method/ Applic. Volume (GPA) [l/ha]	Total Applic. Rate (lb ai/A) [kg ai/ha]	Tank Mix Adjuncts	Harvest Procedures
1A	Kings, NS, Canada, 2000	Snap bean, Provider	70% WG	Plants 8-30" tall; flowering	0.502-0.51 [0.56.57]	5	2	Foliar spray/ 26.81-27.34 [300-304]	1.012 [1.13]	Agral 90 (0.25%, v:v)	Snap beans harvested 7 DALA.
				Plants 8-30" tall; some flowering & small pods							
5B	Rouville, QC, Canada, 2000	Snap bean, Goldmine	70% WG	Plants 7-10" tall; BBCH 65-75	0.512-0.534 [0.57-0.60]	5	2	Foliar spray/ 30.1-31.3 [337-351]	1.046 [1.17]	Agral 90 (0.2%, v:v)	Snap beans harvested 7 DALA.
				Plants 8-11" tall; BBCH 75							
5B	Rouville, QC, Canada, 2000	Snap bean, Goldmine	70% WG	Plants 7-10" tall; BBCH 65-75	0.512-0.52 [0.57-0.58]	4	2	Foliar spray/ 30-30.5 [336-342]	1.032 [1.16]	Agral 90 (0.2%, v:v)	Snap beans harvested 7 DALA.
				Plants 10-12" tall; BBCH 75							
2	Wake, NC, 2000	Lima bean, Early Thorogreen	70% WG	Plants 26-28" tall, pod development	0.50-0.5035 [0.56]	4	2	Foliar spray/ 30.03-30.21 [336-338]	1.0035 [1.12]	Crop Oil Concentrate (1.25%, v:v)	Lima beans harvested 7 DALA.
				Plants 18-24" tall, fruiting							
2	Clarke, GA, 2000	Lima bean, Henderson	70% WG	Plants 16-18" tall; 5-7 nodes, pod fill	0.499 [0.56]	5	2	Foliar spray/ 28.91-29.17 [324-327]	0.998 [1.12]	Surf-Ac-820 (0.25%, v:v)	Lima beans harvested 7 DALA.
				Plants 16-20" tall; pods maturing							
2	Tift, GA, 2000	Lima bean, Nenagreen	70% WG	Plants 14-16" tall; flowering through full size pods	0.493-0.504 [0.55-0.56]	5	2	Foliar spray/ 18.54-21.2 [207-237]	0.997 [1.12]	Latron CS-7 (1pt/100gal)	Lima beans harvested 7 DALA.

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Table 1.2.2. Crop and Field Trial Information.

EPA Region	Location (County, State, Year)	Crop, Variety	Formul.	Applic. Timing	Applic. Rate (lb ai/A) [kg ai/ha]	Retreat. Intervals (days)	No. of Applics.	Applic. Method/ Applic. Volume (GPA) [l/ha]	Total Applic. Rate (lb ai/A) [kg ai/ha]	Tank Mix Adjuvants	Harvest Procedures
				Plants 14-20" tall; bloom to harvestable pods							
5	Pepin, WI, 2000 (decline study)	Lima bean, Henderson's Bush Lima Bean	70% WG	Plants 17" tall; pods filling	0.494-0.510 [0.55-0.57]	5	2	Foliar spray/ 19.77-20.39 [221-228]	1.004 [1.12]	Latron CS-7us (24oz/100gal)	Lima beans harvested 0, 3, 7, 10, and 14 DALA.
10	Madera, CA, 2000	Lima bean, Henderson Bush	70% WG	Plants 8-14" tall; small pods Plants 8-14" tall; mature pods	0.500-0.504 [0.56]	5	2	Foliar spray/ 30.05-30.22 [337-338]	1.004 [1.12]	Latron B-1956 (4oz/100gal)	Lima beans harvested 7 DALA.
10	Tulare, CA, 2000	Lima bean, Fordhood 242	70% WG	Plants ~2" tall; near maturity	0.503-0.51 [0.56-0.57]	6	2	Foliar spray/ 30.1-30.4 [337-340]	1.013 [1.13]	Latron B-1956 (4oz/100gal)	Lima beans harvested 7 DALA.
11	Payette, ID, 2000	Lima bean, Henderson	70% WG	Plants 22" tall; 3" long young pods Plants 20-22" tall; flowering to 3" lower pods	0.504-0.518 [0.56-0.58]	5	2	Foliar spray/ 30.21-31.05 [338-348]	1.022 [1.14]	R-11 (1pt/100gal)	Lima beans harvested 7 DALA.

¹ In the summary of the field trials (Appendix C), the target crop is listed as dry bean for this ID trial (RCN 2000193), however, Table 1 on page 18 of the MRID lists this trial as a snap bean field trial.

1.3. Post-harvest Procedures

A single untreated and duplicate treated samples of mature dry bean plants, snap bean (with pod), and lima bean (without pod) were harvested from each field trial; sample weights were ≥ 2.2 lbs (≥ 1 kg) each. Samples of dry bean plants were cut 21 days after the last application and allowed to dry in the field or at the test facility for 0-9 days prior to threshing and collection of the seed, with the exception of one CA trial where samples were dried for 15 days. Samples of snap and lima beans were collected 7 days after the last application. Additional samples of dry, snap, and lima bean were collected from the WI trials (Pepin County) at various time intervals for residue decline samples. Samples were bagged and stored frozen (temperature not specified) on the day of harvest. Samples were shipped frozen within 0-58 days of harvest to BASF Agricultural Products Center (Research Triangle Park, NC) for analysis.

Table 1.3.1. Summary of Storage Conditions			
Matrix	RAC or Extract	Storage Temperature (°C) (Analytical Laboratory)	Duration
Dry bean	seed	<-10	102-154 days (3.4-5.1 months)
Snap bean	succulent bean with pod	<-10	140-247 days (4.6-8.1 months)
Lima bean	succulent bean without pod	<-10	113-176 days (3.7-5.8 months)

1.4. Analytical Methods

Samples of beans (dry, snap, and lima) were analyzed for residues of BAS 510 F using LC/MS/MS method D9908, the data collection method for plants. Briefly, bean samples were extracted with methanol:water:2N HCl (70:25:5, v:v:v) using Polytron homogenization. An aliquot of the extract was subjected to liquid/liquid partitioning with saturated sodium chloride and cyclohexane. An aliquot of the cyclohexane phase was collected and evaporated to dryness. Residues were redissolved in ammonium formate:formic acid for analysis by LC/MS/MS; refer to the DER for MRID 45405027 for a complete description of the quantitation procedures. The limit of detection (LOD) was 0.025 ppm, and the validated limit of quantitation (LOQ) was 0.05 ppm for the residues of BAS 510 F in/on dry, snap, and lima beans. The results of concurrent validation trials are presented in Table 2.1 below.

2. Results

Table 2.1. Summary of Concurrent Analytical Method Validation.			
Crop Matrix	Fortification Level (ppm)	Recoveries (%)	Mean Recovery \pm SD
Dry bean	0.05-3.00	76, 79, 79, 80, 86, 86, 91, 98	84 \pm 7
Snap bean	0.05, 1.00	68, 79, 84, 84	79 \pm 8
Lima bean	0.05, 1.00	78, 82, 85, 89	84 \pm 5

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Table 2.2. Residue Data from Crop Field Trials in Beans (Dry, Snap, and Lima) with BAS 510 F.

Location (County, State, Year)	Crop Variety	Commodity	Formul.	Total Rate (lbs ai/A) [kg ai/ha]	PHI ¹ (days)	BAS 510 F residues (ppm)
Dry Bean						
Grand Forks, ND, 2000	Pinto, Topaz	Seed	70% WG	1.02 [1.14]	21 (2)	<0.05, <0.05
Cass, ND, 2000	Maverick	Seed	70% WG	1.02 [1.14]	21 (0)	<0.05, <0.05
Freeborn, MN, 2000	Pinto, Topaz	Seed	70% WG	1.00 [1.12]	21 (2)	<0.05, 0.06
Pepin, WI, 2000 (decline study)	Dark Red Kidney 126	Seed	70% WG	1.013 [1.13]	0 (4)	<0.05, <0.05
					7 (4)	<0.05, 0.08
					14 (3)	0.08, 0.08
					21 (2)	<0.05, <0.05
					28 (2)	0.08, 0.09
McHenry, ND, 2000	Maverick	Seed	70% WG	0.994 [1.11]	21 (0)	<0.05, <0.05
Hockley, TX, 2000	Pinto, Taylor Horticulture Improved	Seed	70% WG	1.003 [1.12]	21 (2)	0.09, 0.15
Larimer, CO, 2000	Pinto, Bill Z	Seed	70% WG	1.00 [1.12]	21 (9)	2.25, 2.35 ²
Butte, CA, 2000	Linden Light Red Kidneys	Seed	70% WG	1.003 [1.12]	21 (15)	0.28, 0.46
Payette, ID, 2000	Pinto, Apache	Seed	70% WG	0.993 [1.11]	21 (3)	<0.05, <0.05
Taber, AB, Canada, 2000	Pinto, Othello	Seed	70% WG	0.966 [1.08]	21 (4)	0.12, 0.16
Snap Bean						
Lehigh, PA, 2000	Bush Bean Roma II	Bean, succulent (with pod)	70% WG	1.016 [1.14]	7	0.26, 0.30
Clarke, GA, 2000	Roma II	Bean, succulent (with pod)	70% WG	1.007 [1.12]	7	0.78, 1.16
Alachua, FL, 2000	Rhapsody	Bean, succulent (with pod)	70% WG	1.01 [1.12]	7	0.67, 0.77
Freeborn, MN, 2000	Top Crop	Bean, succulent (with pod)	70% WG	1.0 [1.12]	7	0.50, 0.58
Pepin, WI, 2000 (decline study)	Bush Blue Lake 274 Green Bean	Bean, succulent (with pod)	70% WG	1.009 [1.12]	0	0.25, 0.32
					3	0.20, 0.23

Table 2.2. Residue Data from Crop Field Trials in Beans (Dry, Snap, and Lima) with BAS 510 F.						
Location (County, State, Year) Bean (Dry, Snap, and Lima) PMRA a.i. code (CCH)	Crop Variety	Commodity Magnitude of the Residue OPPTS 860.1500 DACO 7.4.1	Formul.	Total Rate (lbs ai/A) Submission # (kg ai/ha)	PHI ¹ (days) MRND ²	BAS 510 F residues (ppm) Code: 128008 MRND: 4465420
					7	0.10, 0.15
					10	0.05, 0.06
					14	<0.05, <0.05
Madera, CA, 2000	Seville	Bean, succulent (with pod)	70% WG	0.99285 [1.11]	7	0.33, 0.50
Payette, ID, 2000	Tendergreen	Bean, succulent (with pod)	70% WG	0.998 [1.12]	7	0.34, 0.38
Kings, NS, Canada, 2000	Provider	Bean, succulent (with pod)	70% WG	1.012 [1.13]	7	0.39, 0.42
Rouville, QC, Canada, 2000	Goldmine	Bean, succulent (with pod)	70% WG	1.046 [1.17]	7	0.51, 0.52
Rouville, QC, Canada, 2000	Goldmine	Bean, succulent (with pod)	70% WG	1.032 [1.16]	7	0.45, 0.46
Lima Bean						
Wake, NC, 2000	Early Thorogreen	Bean, succulent (without pod)	70% WG	1.0035 [1.12]	7	0.39, 0.54
Clarke, GA, 2000	Henderson	Bean, succulent (without pod)	70% WG	0.998 [1.12]	7	0.07, 0.07
Tift, GA, 2000	Nenagreen	Bean, succulent (without pod)	70% WG	0.997 [1.12]	7	0.06, 0.07
Pepin, WI, 2000 (decline study)	Henderson's Bush Lima Bean	Bean, succulent (without pod)	70% WG	1.004 [1.12]	0	0.08, 0.11
					3	0.07, 0.08
					7	0.06, 0.07
					10	0.07, 0.08
					14	0.07, 0.07
Madera, CA, 2000	Henderson Bush	Bean, succulent (without pod)	70% WG	1.004 [1.12]	7	0.07, 0.08
Tulare, CA, 2000	Fordhood 242	Bean, succulent (without pod)	70% WG	1.013 [1.13]	7	<0.05, <0.05
Payette, ID, 2000	Henderson	Bean, succulent (without pod)	70% WG	1.022 [1.14]	7	<0.05, <0.05

¹ For dry beans, the first number represents the number of days after the last application when plants were cut; the number in parentheses represents the number of days plants were dried in the field prior to collection. Snap and lima beans were not dried.

² The highest value of triplicate analyses is reported.

Table 2.3. Summary of Residue Data from Crop Field Trials in Beans with BAS 510 F.

Commodity	Total Applic. Rate (lb ai/A)	PHI (days)	Residue Levels (ppm)				
			Minimum	Maximum	HAFT	Mean [median]	Std. Dev.
Dry bean	0.966-1.02	21	<0.05	2.35	2.30	0.32 [0.05]	0.68
Snap bean	0.993-1.046	7	0.10	1.16	0.97	0.48 [0.48]	0.24
Lima bean	0.997-1.022	7	<0.05	0.54	0.47	0.12 [0.07]	0.15

3. Discussion

3.1. Methods

Mature dry bean plants were harvested 21 days following the last of two foliar spray applications of the 70% WG formulation at ~0.50 lb ai/A/application (~0.56 kg ai/ha/application), with a 4- to 8-day retreatment interval, for a total rate of 0.97-1.02 lb ai/A (1.09-1.14 kg ai/ha). Bean plants were dried in the field or at the facility for 0-15 days prior to threshing and collection of the seed. Applications were made using ground equipment in 11.35-30.21 gal/A (127-338 l/ha) of water with a spray adjuvant added. In one trial (Pepin County, WI), additional dry bean samples were collected at 0, 7, 14, and 28 days following treatment to evaluate residue decline.

Mature snap bean (with pods) and lima beans (without pods) were harvested 7 days following the last of two foliar spray applications of the 70% WG formulation at ~0.50 lb ai/A/application (~0.56 kg ai/ha/application), with a 4- to 6-day retreatment interval, for a total rate of 0.99-1.05 lb ai/A (1.11-1.18 kg ai/ha). Applications were made using ground equipment in 17.8-33.52 gal/A (199-375 l/ha) of water with a spray adjuvant added. In two trials (Pepin County, WI), additional snap and lima bean samples were collected at 0, 3, 10, and 14 days following treatment to evaluate residue decline.

Nine U.S. dry bean trials were conducted in Regions 5 (4 trials), 7 (1 trial), 8 (1 trial), 9 (1 trial), 10 (1 trial), and 11 (1 trial) and one Canadian dry bean trial was conducted in Region 7A. Seven U.S. snap bean field trials were conducted in Regions 1 (1 trial), 2 (1 trial), 3 (1 trial), 5 (2 trials), 10 (1 trial), and 11 (1 trial) and three Canadian snap bean trials were conducted in Regions 1A (1 trial) and 5B (2 trials). Seven U.S. lima bean field trials were conducted in Regions 2 (3 trials), 5 (1 trial), 10 (2 trials), and 11 (1 trial). Geographic representation of residue data for beans is adequate. The number and location of field trials conducted for dry beans, snap beans, and lima beans are in accordance with the guidance requirements (OPPTS 860.1500, Tables 4 and 5). These trials also satisfy the requirements of the PMRA (Dir 98-02).

Residues of BAS 510 F in/on beans (dry, snap, and lima) were quantitated using a validated LC/MS/MS method (D9908), the data collection method for plant commodities. Storage stability

data (refer to the DER for MRID 45405109) are available to support the storage interval elapsed during these experiments [154 days (5.1 months) for dry beans, 247 days (8.1 months) for snap beans, and 176 days (5.8 months) for lima beans].

3.2. Results

In dry beans, residues of BAS 510 F were <0.05-2.35 ppm in/on samples harvested 21 days following the last of two foliar spray applications of the 70% WG formulation at 0.48-0.52 lb ai/A/application (0.54-0.58 kg ai/ha/application), for a total rate of 0.97-1.02 lb ai/A (1.09-1.14 kg ai/ha). We note that residues ranged <0.05-0.46 ppm in all dry bean samples, except for samples from one trial, where residues were much higher (2.25 and 2.35 ppm); the petitioner did not provide any explanation for this difference in residues and there is no obvious reason to dismiss these data points. Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on ten samples of untreated dry beans. No conclusions regarding residue decline could be made because residues of BAS 510 F were at or near the LOQ in all dry bean samples from the decline study.

In snap beans, residues of BAS 510 F were 0.10-1.16 ppm in/on samples harvested 7 days following the last of two foliar spray applications of the 70% WG formulation at 0.495-0.534 lb ai/A/application (0.554-0.600 kg ai/ha/application), for a total rate of 0.99-1.05 lb ai/A (1.11-1.18 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on ten samples of untreated snap beans. The residue decline data for snap beans indicated that BAS 510 F residues decreased in a linear fashion. The linear plot had a line equation of $y = -0.0238x + 0.2915$ with a correlation coefficient of 0.9988. The equation predicts a half-life of 6 days and depletion (≤ 0.05) by 13 days.

In lima beans, residues of BAS 510 F were <0.05-0.54 ppm in/on samples harvested 7 days following the last of two foliar spray applications of the 70% WG formulation at 0.493-0.518 lb ai/A/application (0.552-0.580 kg ai/ha/application), for a total rate of 1.00-1.02 lb ai/A (1.12-1.14 kg ai/ha). Apparent residues of BAS 510 F were less than the method LOQ (<0.05 ppm) in/on seven samples of untreated lima beans. Unlike the residue decline observed in snap beans, the residue decline data presented for lima beans indicated that BAS 510 F residues decreased slightly at longer posttreatment intervals.

4. Deficiencies

None

5. References

45672101 Wofford, J.; et al (2002) A Summary of Weather Conditions for BAS 510 F Field Residue Studies Conducted from 1999-2001 Data: BASF Registration Document Number: 2002/5002878. Unpublished study prepared by BASF Agro Research. 24 p.