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

JAN 27 1995

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: **Iprodione**. Bean and Blueberry Magnitude of the Residue Field Trials. Reregistration Case No. 2335. Chemical No. 109801 MRID #00126577 00144291 0014722 43222501 43222502 43245801 43255701 43295101 DP Barcodes D203334 D205004 D208275 D204980 D206123 CBRS #13730 13960 13959 14496 14134

FROM: Steven A. Knizner, Chemist
Chemistry Pilot Review Team
Chemistry Branch II - Reregistration Support
Health Effects Division (7509C)

THRU: Francis B. Suhre, Acting Chief
Chemistry Branch II - Reregistration Support
Health Effects Division (7509C)

TO: William Wooge, PM Team 52
Special Review and Registration Division (7505C)

The Iprodione Phase 4 Review (C. Olinger, 3/15/91) required the registrant to conduct field trials for dry beans in CO, MI, and ND using either the WP or F formulation and maximum label rates. A label modification specifying a 45 day PHI was also required. Rhone-Poulenc has submitted data in response to this requirement (MRID #43222501, 43245801, 43255701, and 43295101). The Phase 4 review noted that previously submitted studies (MRIDs #00126577, 00144291 and 00147226) were possible candidates for Phase 5 Review.

The Phase 4 Review also required the registrant to conduct field trials for blueberries in MI, NJ, NC, and OR/WA reflecting maximum label application rates and minimum PHI. Rhone-Poulenc has also submitted data in response to this requirement (MRID #43222502).

Data from these submissions are summarized in the attached Data Evaluation Record produced by Dynamac Corp. under contract to the Agency.

The following tolerances have been established for the combined residues of iprodione, its isomer, and its metabolite in/on bean commodities [40 CFR §180.399(a)]: 2.0 ppm for dry beans; 2.0 ppm for succulent beans; 90.0 ppm for bean forage; and 90.0 ppm for the vine hay of dried beans. A tolerance of 15.0 ppm has been established for the combined residues of iprodione, its isomer, and its metabolite in/on blueberries [40 CFR §180.399(a)].

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Recommendations

The submitted data are adequate for fulfilling Guideline 171-4(k) requirements for beans and blueberries. No additional data are required. Label modifications are required as described below.

Beans - The submitted data indicate that the combined residues of iprodione, its isomer, and its metabolite will not exceed the established tolerances of 2.0 ppm in/on **dry beans** harvested 28-72 days following the last of two applications of the 4 lb/gal FlC or 50% WP formulation at 1.0 lb ai/A/application using ground or chemigation equipment or in/on **succulent beans** harvested 3-33 days following the same treatment using ground, chemigation, or aerial equipment. The data also indicate that combined residues will not exceed the established 90-ppm tolerances in/on the **forage of dry or succulent beans** harvested 14-39 or 3-33 days, respectively, following the last of two applications of the 4 lb/gal FlC or 50% WP formulation at 1.0 lb ai/A/application, or in/on the **hay of dry beans** harvested 14-72 days following the same treatment.

Combined residues of iprodione, its isomer, and its metabolite were 4.1-94.2 ppm in/on the **hay of succulent beans** harvested 7 days following the last of two applications of the 4 lb/gal FlC formulation at 1.0 lb ai/A/application using ground or chemigation equipment. No tolerance has been established for the hay of succulent beans because there is a feeding restriction on current product labels.

CBRS notes that the Agency no longer considers restrictions against the feeding of bean forage or hay to livestock to be practical (Table II, June 1994). Therefore, the restriction against the feeding of the hay of snap or succulent beans to livestock must be removed from all pertinent product labels. In addition, in many of the field residue studies, the registrant included drying time in the posttreatment intervals reported for dry beans and bean hay. CBRS considers posttreatment intervals for dry beans and bean hay to be the intervals between last application and cutting of the plants. Therefore, the registrant should modify product labels to specify "Do not cut bean plants for hay until 45 days after last application."

Blueberries - The submitted data indicate that the combined residues of iprodione, its isomer, and its metabolite will not exceed the established 15-ppm tolerance in/on blueberries harvested 0 days following four foliar applications of the 50% WP formulation at 1.0 lb ai/A/application (1x the maximum seasonal rate) using ground equipment.

CBRS notes that blueberries are not caneberries; they are members of the bushberry crop subgroup of the berries group. Product labels must be modified to list blueberries separately from caneberries, i.e. "Caneberries and Blueberries".

cc: S.F., circ., R.F., List B File, S.Knizner
RDI: W. Smith, B. Cropp-Kohlligian, L.Edwards, P.Deschamp, C. Olinger, 1/25/95, M.Metzger, 1/26/95 F.Suhre 1/26/95
7509C:CBRS:CM#2:305-6903:SAK:sak:Iprodion\bean:1/25/95

DATA EVALUATION RECORD

DP BARCODE(S): D203334, D204980, D205004, and D208275

CBRS NOS.: 13730, 13960, 13959, and 14496

STUDY TYPES: Magnitude of the Residue in/on Beans (Dry and Succulent) and Blueberries [Guideline Reference No. 171-4(k)].

STUDY SPONSOR: Rhone-Poulenc Ag Company (Research Triangle Park, NC)

MRID NOS.:

00126577 C. Guyton. Iprodione Residue Data on Succulent and Dry Bean Samples. 1982 Field Program E-9. ASD Report No. 83/011. Study completed in 3/83.

00144291 O. Gillings. Iprodione Residue Data on Succulent and Dry Bean Samples. 1983 Field Program E-1, 1982 Field Program E-9. ASD Report No. 84/097. Study completed in 2/84.

00147226 Rhone-Poulenc, Inc. Additional Chromatograms and Field Data Report for California Residue Tests: Rovral on Beans.

43222501 S. Murayama. ROVRAL®/Dry Beans/Magnitude of Residue/Raw Agricultural Commodity. Rhone-Poulenc Study Number US93R01R. Study Completed on 5/3/94.

43222502 A. Hovis. Ground Application of ROVRAL® WP Fungicide to Blueberries to Determine the Magnitude of Residue Present After Harvest. Rhone-Poulenc Study Number USA92R25. Study Completed on 4/28/94.

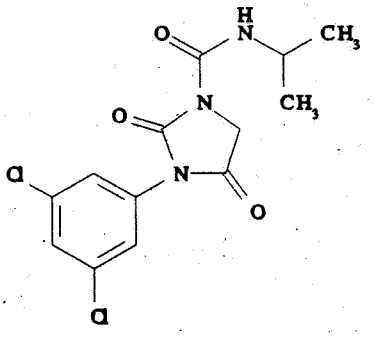
43245801 R. Lee. Determination of the Magnitude of Residues in/on Succulent Beans Treated by Ground Applications of ROVRAL® 4 Flowable Fungicide. Rhone-Poulenc Study Number US93R08R. Study Completed on 5/23/94.

43255701 S. Murayama. ROVRAL®/Dry Beans/Magnitude of Residue/Raw Agricultural Commodity. Rhone-Poulenc Study Number US93R03R. Study Completed on 5/26/94.

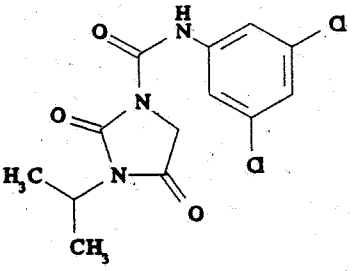
MRID NOS. (continued):	43295101 A. Hovis. Determination of the Magnitude of Residues in/on Succulent Beans Treated by Chemigation with ROVRAL® 4 Flowable Fungicide. Rhone-Poulenc Study Number US93R10R. Study Completed on 7/5/94.
PERFORMING LABORATORIES:	**Field**: MRID 00126577: University of California (Davis, CA); Michigan State University (East Lansing, MI); J. Reed (Clifton Springs, NY); A. Hoven (Clifton Springs, NY); E. Phillips (E. Williamson, NY); H. Lawrence (Walworth, NY); University of Wisconsin (Hancock, WI). MRID 00144291: C.H. West Farms (Milford, DE); Dr. K. Pohrenezny (Homestead, FL); University of Idaho (Kimberly, ID); Michigan State University (East Lansing, MI); Dr. Jim Steadman (Scotts Bluff, NE); R. Knights (Knowlesville, NY); Landrith Farms (Salem, OR); Olin Hollin (Salem, OR); University of Wisconsin (Cambria, WI). MRID 43222501: Research Designed for Agriculture (Austin, CO); Agsearch Company (Conklin, MI); Agvise Laboratories (Northwood, ND). MRID 43222502: Collins Ag Consultants, Inc. (Hillsboro, OR); Michigan State University (East Lansing, MI); Agricultural Systems Associates (Cary, NC); Lehigh Agricultural & Biological Services, Inc. (Hamburg, PA). MRID 43245801: Hale Agricultural Services (Santa Maria, CA); Great Lakes Ag Research Service (Delavan, WI); A.C.D.S Research, Inc. (Phelps, NY); Collins Ag Consultants, Inc. (Hillsboro, OR). MRID 43255701: Plant Sciences, Inc. (Watsonville, CA); Research Designed for Agriculture (Austin, CO); Agvise Laboratories (Northwood, ND). MRID 43295101: Plant Sciences, Inc. (Watsonville, CA); A.C.D.S Research, Inc. (Phelps, NY). **Analytical**: MRIDs 00126577, 00144291, and 00147226: Rhone-Poulenc (Monmouth Junction, NJ). MRIDs 43222501, 43222502, 43245801, 43255701, and 43295101: Horizon Laboratories, Inc. (Columbia, MO).
TEST MATERIAL APPLIED TO CROP:	Iprodione [3-(3,5-dichlorophenyl)-N-(1-methylethyl)-2,4-dioxo-1-imidazolidinecarboxamide] (CAS No. 36734-19-7)

EPA REG. NOS.: 264-453 (Rovral® WP Fungicide)
264-482 (Rovral® 4 Flowable Fungicide)

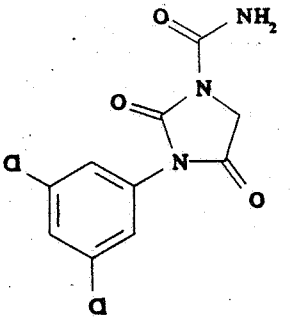
RESIDUES MEASURED: Iprodione



Iprodione isomer [3-(1-methylethyl)-N-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide]



Iprodione metabolite [3-(3,5-dichlorophenyl)-2,4-dioxo-1-imidazolidinecarboxamide]



DETAILED CONSIDERATIONS

Magnitude of the Residue in/on Dry and Succulent Beans

Rhone-Poulenc Ag Company submitted data (1983; MRID 00126577; 1984; MRID 00144291; and 1985; MRID 00147226) from seven dry bean and twelve succulent bean field trials conducted in 1982 and 1983 depicting the residues of iprodione, its isomer, and its metabolite in/on the raw agricultural commodities of dry and succulent beans grown in CA(3), DE, FL, ID, MI(2), NE, NY(5), OR(2), and WI(3). Rhone-Poulenc Ag Company also submitted data (1994; MRIDs 43222501, 43245801, 43255701, and 43295101) from six dry bean and six succulent bean field trials conducted in 1993 and 1994 in CA(3), CO(2), MI(1), NY(2), ND(2), OR(1), and WI(1). Data from these submissions are described and presented in this Data Evaluation Record. We note that MRIDs 00126577, 00144291, and 00147226 were screened in Phase IV and determined to be candidates for Phase V review.

Established tolerance: The following tolerances have been established for the combined residues of iprodione, its isomer, and its metabolite in/on bean commodities [40 CFR §180.399(a)]: 2.0 ppm for dry beans; 2.0 ppm for succulent beans; 90.0 ppm for bean forage; and 90.0 ppm for the vine hay of dried beans.

Use patterns: A REFS search conducted 9/27/94 identified four Rhone-Poulenc iprodione end use products registered for use on dry, snap, and lima beans: two 50% WP formulations (EPA Reg. No. 264-453, ROVRAL® Fungicide, dated 7/7/94; and EPA Reg. No. 264-532, ROVRAL® 50 SP Fungicide, dated 7/6/94), a 4 lb/gal FlC formulation (EPA Reg. No. 264-482, ROVRAL® 4 Flowable Fungicide, dated 7/7/94), and a 50% EC formulation (EPA Reg. No. 264-524, ROVRAL® WG Fungicide, dated 5/x/94; a copy of the label for this product was not available for review). A maximum of two foliar applications at 0.75-1.0 lb ai/A may be made per growing season using ground or chemigation equipment in a minimum of 40 gal/A or aerial equipment in a minimum of 10 gal/A; the first application is to be made at first bloom or up to 10% bloom, and the second application is to be made 5-7 days later or up to peak bloom. Application after peak or full bloom is prohibited. A pregrazing interval of 14 days has been established for bean forage and a prefeeding interval of 45 days has been established for dry bean hay. No PHI has been established for dry or succulent beans. The feeding of the hay of snap or succulent beans to livestock is prohibited.

As required in the Iprodione Phase IV Reviews (C. Olinger, 3/15/91), product labels must be modified to specify a PHI for dry and succulent beans. CBRS notes that Table II of the Pesticide Assessment Guidelines (Subdivision O, Residue Chemistry) has recently been updated; EPA no longer considers restrictions against the feeding of bean forage or hay to livestock to be practical. Therefore, the restriction against the feeding of the hay of snap or succulent beans to livestock must be removed from all pertinent product labels. In addition, in the field residue studies discussed below, the registrant included drying time in the posttreatment intervals reported for dry beans and bean hay. CBRS considers posttreatment intervals for dry beans and bean hay to be the intervals between last application and cutting

of the plants. Therefore, the registrant may wish to modify product labels to specify "Do not cut dry bean plants for hay until 45 days after last application."

Discussion of the data - MRIDs 00126577, 00144291, and 00147226: Nineteen dry and succulent bean field trials were conducted in 1982 and 1983 in CA(3), DE, FL, ID, MI(2), NE, NY(5), OR(2), and WI(3) depicting the magnitude of iprodione residues of concern in/on dry and succulent bean commodities. Dry beans and dry bean hay grown in CA(3), ID, NE, and NY(2) were harvested 45-72 days following the last of two applications, with a 3- to 12-day retreatment interval, of the 50% WP formulation at 1.0 lb ai/A/application (1x the maximum seasonal rate) in 28-40 gal/A using ground equipment. Snap beans and snap bean forage grown in FL, MI(2), NY(3), OR(2), and WI(3) and lima beans and lima bean forage grown in DE were harvested 3-33 days following the last of two applications, with a 2- to 12-day retreatment interval, of the 50% WP formulation at 1.0 lb ai/A/application (1x the maximum seasonal rate) in 15-87 gal/A using ground equipment or 10-15 gal/A using aerial equipment.

No information pertaining to the method of harvest was provided and it could not be determined if dry bean commodity samples were dried in the field prior to harvest. Following harvest, samples were stored frozen (temperature unspecified) for 5-84 days prior to shipment (on dry ice) to the analytical laboratory (Rhone-Poulenc, Monmouth Junction, NJ). At the laboratory, samples were stored frozen (-18 C) prior to analysis. Total storage intervals between harvest and analysis were 55-356 days.

Residues in/on treated and untreated bean commodities were determined using Rhone-Poulenc Method No. 151 for succulent bean commodities and Method No. 162 for dry bean commodities. These methods are GC/ECD methods in which residues of iprodione, its isomer, and its metabolite are separately determined. The results of the dry and succulent bean field trials are presented in Table 1. The registrant stated that residue values were corrected for method recovery; however, the recovery values used to correct residue values were not specified and insufficient raw data were included in the submission to "uncorrect" the reported residue values. Apparent residues of iprodione, its isomer, and its metabolite were nondetectable (<0.05 ppm each) in/on two samples of the hay of untreated dry beans, five samples of untreated dry beans, three samples of the forage of untreated succulent beans, and nine samples of untreated succulent beans. Detectable residues of iprodione were observed in/on five samples of the hay of untreated dry beans (0.07-0.68 ppm), one sample of untreated dry beans (0.10 ppm), eight samples of the forage of untreated succulent beans (0.06-0.66 ppm), and two samples of untreated succulent beans (0.09 ppm); residues of iprodione isomer and metabolite were nondetectable (<0.05 ppm each) in/on each of these samples except one sample of the hay of dry beans which bore detectable residues of iprodione isomer (0.05 ppm). Detectable residues of iprodione metabolite were observed in/on one sample of untreated dry beans (0.05 ppm); residues of iprodione and its isomer were nondetectable (<0.05 ppm each) in/on this sample. No explanation for these detectable residues was provided.

Table 1 *(continued)*.

Table 1. Residues of iprodione, its isomer (RP-30228), and its metabolite (RP-32490) in/on dry and succulent bean commodities following two foliar applications of the 50% WP formulation at ~1.0 lb ai/A/application (trials conducted in 1982 and 1983).

Commodity	Application equipment	Posttreatment interval	Test site	Residues, ppm [a]			
				Iprodione	RP-30228	RP-32490	Combined
Dry beans							
hay	ground	45	ID	6.92	1.53	0.82	9.27
		46	NE	15.51	3.26	0.31	19.08
		49	NY	4.22 7.10	0.24 0.10	0.38 <0.05	4.84 <7.25
		55	CA	85.38	0.44	0.27	86.09
		66	CA	23.17	0.34	<0.05	<23.56
		72	CA	12.55	0.42	<0.05	<13.02
beans	ground	45	ID	<0.05	0.10	<0.05	<0.20
		46	NE	0.09	0.10	<0.05	<0.24
		49	NY	<0.05 <0.05	<0.05 <0.05	<0.05 <0.05	<0.15 <0.15
		55	CA	1.16	<0.05	<0.05	<1.26
		66	CA	0.97	<0.05	<0.05	<1.07
		72	CA	0.11	0.13	<0.05	<0.29
Succulent beans							
forage	ground	3	FL	11.12	0.29	0.15	11.56
		9	OR	12.77	0.52	<0.05	<13.34
		15	WI	10.56	0.23	0.59	11.38
		18	NY	14.90 23.89	0.08 0.83	<0.05 <0.05	<15.03 <24.77
		19	MI	11.13	0.78	<0.05	<11.96
		21	DE	0.89	0.37	<0.05	<1.31
		21	MI	6.69	0.43	<0.05	<7.17
		33	WI	1.33	0.18	<0.05	<1.56
	aerial	9	NY	1.36	0.21	0.22	1.79
		10	OR	2.94	0.28	0.14	3.36
		15	WI	2.87	0.11	<0.05	<3.03
beans	ground	3	FL	0.84	0.06	<0.05	<0.95
		9	OR	0.32	0.08	<0.05	<0.45
		15	WI	0.33	<0.05	<0.05	<0.43

(continued; footnotes follow)

Table 1 *(continued)*.

Commodity	Application equipment	Posttreatment interval	Test site	Residues, ppm [a]			
				Iprodione	RP-30228	RP-32490	Combined
Succulent beans (continued)							
beans	ground	18	NY	0.51 0.59	<0.05 <0.05	<0.05 <0.05	<0.61 <0.69
		19	MI	0.11	<0.05	<0.05	<0.21
		21	DE	0.08	<0.05	<0.05	<0.18
		21	MI	0.13	<0.05	<0.05	<0.23
		33	WI	<0.05	<0.05	<0.05	<0.15
	aerial	9	NY	0.10	<0.05	<0.05	<0.20
		10	OR	0.07	<0.05	<0.05	<0.17
		15	WI	0.06	<0.05	<0.05	<0.16

[a] Each residue value represents one sample unless otherwise indicated in parentheses. Residue values were corrected for method recovery; insufficient raw data were provided to "uncorrect" residue values.

Discussion of the data - MRIDs 43222501, 43245801, 43255701, and 43295101: Twelve field trials were conducted in CA(3), CO(2), MI(1), NY(2), ND(2), OR(1), and WI(1) depicting the magnitude of iprodione residues of concern in/on dry and succulent bean commodities. Dry beans and dry bean vines, hay, and dried vines were harvested 14-47 days following the last of two foliar applications, with a 16- to 44-day retreatment interval, of the 4 lb/gal FlC formulation (EPA Reg. No. 264-482) at 1.0 lb ai/A/application (1x the maximum seasonal application rate) in 45-52 gal/A using ground equipment or in 1980-8400 gal/A using chemigation equipment; dry bean vines and hay from two trials conducted in ND only received one application at 1.0 lb ai/A. Succulent beans and succulent bean vine and hay were harvested six or seven days following the last of two applications, with a 7- to 21-day retreatment interval, of the 4 lb/gal FlC formulation at 1.0 lb ai/A/application (1x the maximum seasonal application rate) in 36-61 gal/A using ground equipment or in 82 or 5400 gal/A using chemigation equipment; the retreatment interval for the chemigation trial conducted in CA was 98 days. Climatic conditions were typical over the duration of the field trials, except for the dry bean field trials conducted in ND. Abnormally high levels of rainfall occurred during June and July at the ND site; applications were made in mid- to late July and at the beginning of September. In the ND chemigation trial, 2.0 inches of rainfall were received within one day of the first application.

Samples of dry and succulent bean commodities were harvested by hand, or by using a walk-behind mower or combine. In some cases (trials conducted in CO), samples of the dried seed and dried vines of dry beans were obtained by pulling dry bean plants and allowing them to dry in the field for 7 days. Samples of bean hay were obtained by drying vine

samples in the field or in dryers for 3-6 days; hay samples from the dry bean trial conducted in CA were dried in the field for 2 days and then dried in a screen house for an additional 13 days. CBRS notes that the registrant erroneously included drying time in the posttreatment intervals reported for dry beans and bean hay. For the dry bean trials conducted in CO, the date of cutting could be determined from the information included in the submission. For all other dry bean trials, the date of cutting could not be determined and therefore, the posttreatment intervals reported in Table 2 include drying time. Adequate raw data pertaining to field trial information, application of the test substance, and sample handling procedures were provided.

Intervals from sampling to shipment, homogenization, extraction, and analysis were also provided for each test. The harvested bean commodity samples were frozen within 5 hours of sample collection and stored frozen (< -7 C) at the field facilities. Samples were shipped frozen via ACDS freezer truck to Rhone-Poulenc, where they were stored frozen (-29 to -7 C) until shipment to the analytical laboratory (Horizon Laboratories, Columbia, MO). At the analytical laboratory, samples were stored frozen (-20 to -10 C) until analysis. The intervals between harvest and residue analysis were 105-199 days (~3.5-6.5 months) for dry bean commodities and 194-238 days (~6.5-8 months) for succulent bean commodities, except for succulent bean commodity samples from the chemigation trial conducted in CA, where samples were analyzed within 17 days of harvest. Samples were analyzed within 4 days of extraction.

Residues in/on treated and untreated bean commodities were determined using a common moiety GC/ECD method. The results of the dry and succulent bean field trials are presented in Table 2. Apparent combined residues of iprodione, its isomer, and its metabolite were nondetectable (< 0.05 ppm) in/on six samples of the vines of untreated dry beans, five samples of the hay of untreated dry beans, six samples of untreated dry beans, and six samples of the dried vines of untreated dry beans, and in/on five samples of the vines of untreated succulent beans, five samples of untreated succulent beans, and three samples of the hay of untreated succulent beans. Detectable combined residues were observed in/on one sample of the hay of untreated dry beans (0.15 ppm), one sample of the vines of untreated succulent beans (0.29 ppm), three samples of the hay of untreated succulent beans (0.10, 0.26, and 2.0 ppm), and one sample of untreated succulent beans (0.05 ppm). The registrant stated that no explanation could be found for the bean hay residue of 2.0 ppm. Otherwise, no explanation for these detectable residues was provided.

Table 2. The combined residues of iprodione, its isomer, and its metabolite, expressed as iprodione equivalents, in/on dry and succulent bean commodities following one or two foliar applications of the 4 lb/gal FlC formulation at ~1.0 lb ai/A/application (trials conducted in 1993 and 1994).

Commodity	Number of applications	Posttreatment interval	Application equipment	Test site	Total rate, lb ai/A	Residues, ppm iprodione equivalents [a]
Dry beans						
vines	1	35	chemigation	ND	1.0	0.25, 0.37, 0.49
		39	ground	ND	1.0	0.65, 0.89, 1.0
	2	14	ground	MI	2.0	3.4, 4.3, 4.5
		20	chemigation	CO	2.0	1.8, 2.0, 2.0
		20	ground	CO	2.1	8.6, 10.2, 12.0
		32	chemigation	CA	1.96	1.2, 1.3, 1.5
hay	1	35	chemigation	ND	1.0	0.57, 0.67, 0.70
		39	ground	ND	1.0	1.1, 1.8, 2.0
	2	14	ground	MI	2.0	5.0, 5.9, 7.0
		20	chemigation	CO	2.0	2.6, 2.8, 3.3
		20	ground	CO	2.1	16.6, 20.8, 20.9
		32	chemigation	CA	1.96	1.5, 2.0, 2.1
dried seed	2	28 [b]	chemigation	ND	2.0	<0.05 (3)
		28 [b]	ground	ND	2.0	<0.05 (3)
		29 [b]	ground	MI	2.0	0.21, 0.24, 0.26
		31	chemigation	CO	2.0	0.13, 0.15, 0.18
		31	ground	CO	2.1	0.097, 0.11, 0.12
		47 [b]	chemigation	CA	1.96	0.10 (3)
dried vines	2	28 [b]	chemigation	ND	2.0	3.6, 3.6, 3.8
		28 [b]	ground	ND	2.0	24.2, 27.5, 29.9
		29 [b]	ground	MI	2.0	7.0, 7.2, 7.6
		31	chemigation	CO	2.0	5.1, 5.3, 5.8
		31	ground	CO	2.1	5.8, 6.3, 7.4
		47 [b]	chemigation	CA	1.96	2.9, 3.2, 4.3
Succulent beans						
vines	2	6	chemigation	CA	1.96	2.1, 2.6, 3.0
		7		NY	1.98	5.3, 5.4, 5.7
			ground	CA	2.0	13.7, 15.0, 16.8
				NY	2.0	33.9, 41.1, 42.3
				OR	1.85	5.6, 5.8, 6.1
				WI	2.0	8.3, 9.6, 9.6

(continued; footnotes follow)

Table 2 *(continued)*.

Commodity	Number of applications	Posttreatment interval	Application equipment	Test site	Total rate, lb ai/A	Residues, ppm iprodione equivalents [a]
Succulent beans (continued)						
beans	2	6	chemigation	CA	1.96	0.33, 0.34, 0.37
		7		NY	1.98	0.45 (3)
			ground	CA	2.0	0.31, 0.32, 0.44
				NY	2.0	0.92, 1.2, 1.3
				OR	1.85	0.31, 0.32, 0.40
				WI	2.0	0.26, 0.28, 0.48
hay	2	6	chemigation	CA	1.96	4.1, 4.5, 5.5
		7 [c]		NY	1.98	7.5, 7.7, 8.5
			ground	CA	2.0	76.7, 86.4, 94.2
				NY	2.0	47.8, 48.8, 49.1
				OR	1.85	9.2, 11.8, 13.3
				WI	2.0	12.2, 13.9, 16.6

[a] Each residue value represents one sample unless otherwise indicated in parentheses. Residue values were not corrected for concurrent method recovery.
[b] Includes drying time; no information pertaining to cutting date or length of drying period was provided.
[c] The date of cutting was not specified for hay samples from trials conducted in NY; the cutting date was assumed to be the same as the harvest date for vine and bean samples from the same trials.

The test states of CA(<0.5%), DE(<0.5%), FL(<0.5%), MI(11%), NY(10%), OR(10%), and WI(33%) accounted for ~64% of the 1991 U.S. production of snap beans for processing; no production statistics were available for dry beans (*1992 USDA Agricultural Statistics*). Dry bean field trials were conducted in Regions 1, 5, 8, 9, 10, and 11 which collectively represent 82% of U.S. dry bean production ("EPA Guidance on Number and Location of Domestic Crop Field Trials for Establishment of Pesticide Residue Tolerances," E. Saito and E. Zager, 6/2/94).

Summary of studies: The submitted data indicate that the combined residues of iprodione, its isomer, and its metabolite will not exceed the established tolerances of 2.0 ppm in/on dry beans harvested 28-72 days following the last of two applications of the 4 lb/gal FlC or 50% WP formulation at 1.0 lb ai/A/application using ground or chemigation equipment or in/on succulent beans harvested 3-33 days following the same treatment using ground, chemigation, or aerial equipment. The data also indicate that combined residues will not exceed the established 90-ppm tolerances in/on the forage of dry or succulent beans harvested 14-39 or 3-33 days, respectively, following the last of two applications of the 4 lb/gal FlC or 50%

WP formulation at 1.0 lb ai/A/application, or in/on the hay of dry beans harvested 14-72 days following the same treatment. Combined residues of iprodione, its isomer, and its metabolite were 4.1-94.2 ppm in/on the hay of succulent beans harvested 7 days following the last of two applications of the 4 lb/gal FlC formulation at 1.0 lb ai/A/application using ground or chemigation equipment. No tolerance has been established for the hay of succulent beans since there is a feeding restriction on current product labels.

Residue analytical methods

Dry and succulent bean commodity samples from the submitted 1982 and 1983 trials were analyzed for residues of iprodione, its isomer, and its metabolite by Rhone-Poulenc (Monmouth Junction, NJ) using GC/electron capture detection (ECD) methods. Rhone-Poulenc Method No. 151 was used for the analysis of succulent bean commodities and Rhone-Poulenc Method No. 162 was used for the analysis of dry bean commodities. The limit of quantitation was 0.05 ppm for each analyte. Rhone-Poulenc Method No. 151 has been submitted for inclusion in PAM Vol. II (PP#1G3998, J. Garbus, 6/8/92 and 12/15/92; PP#3F2810, R. Perfetti, 3/21/83).

In Method No. 151, samples of succulent bean commodities were homogenized with acetone and filtered. The acetone was removed from the filtrate by rotary evaporation and a solution of 1% sodium sulfate was added. The extract was partitioned three times with ethyl acetate:dichloromethane (10:90, v:v) and the organic phases were combined. The solvent was then removed by rotary evaporation and the residue was dissolved in ethyl acetate:toluene (3:1, v:v) for cleanup by GPC using a Bio-Beads column. The eluate was evaporated to dryness under vacuum and the residue was dissolved in ethyl acetate:hexane (3:97, v:v). The extract was then cleaned up on a Florisil column; iprodione and its isomer were eluted with ethyl acetate:hexane (15:85, v:v) and iprodione metabolite was eluted with ethyl acetate:hexane (1:1, v:v). The eluates were evaporated to dryness by rotary evaporation and then dissolved in hexane (iprodione and its isomer) and benzene (iprodione metabolite) prior to analysis by GC/ECD.

Method No. 162 differs from Method No. 151 in the following ways: (i) samples of dry bean commodities were ground and then extracted with water:acetone (10:90, v:v) instead of acetone; (ii) after the 1% sodium sulfate solution was added, the pH was adjusted to 3 using 5 N HCl; (iii) following GPC cleanup, the dried residue was dissolved in acetonitrile (ACN):hexane (50:50, v:v) and the hexane phase was partitioned with ACN; the combined ACN phases were evaporated to dryness under vacuum and dissolved in ethyl acetate:hexane (3:97, v:v) for cleanup on a Florisil column; and (iv) iprodione and its isomer were eluted from the Florisil column with ethyl acetate:hexane (20:80, v:v) and iprodione metabolite was eluted with ethyl acetate:hexane (30:70, v:v).

Concurrent method recoveries were conducted by Rhone-Poulenc to determine the suitability of these method for residue data collection purposes. These data are presented in Table 3.

We note that MRIDs 00126577 and 00144291 contain method validation data for commodities other than beans; these data are not presented in this DER.

Table 3. Concurrent method recoveries of iprodione, its isomer (RP-30228), and its metabolite (RP-32490) from untreated samples of bean commodities fortified with each analyte and analyzed using Rhone-Poulenc Method No. 151 for succulent bean commodities or Rhone-Poulenc Method No. 162 for dry bean commodities (MRIDs 00126577, 00144291, and 00147226).

Commodity	Fortification level, ppm	% Recovery [a]		
		Iprodione	RP-30228	RP-32490
Dry beans	0.1	95.9, 115.4	--	--
	0.2	75.2, 98.9, 120.3	79.9	86.8
	0.5	73.1, 106.2	--	--
	2.0	84.4	--	--
Dry beans, hay	0.2	74.2	--	--
	0.5	79.2, 96.0, 174.4	--	--
	1.0	--	71.4	99.9, 118.5
	2.0	87.5	65.2, 90.2	--
	5.0	89.8, 94.8	--	63.0
	10.0	113.6	--	--
	20.0	118.5	--	--
	100.0	97.4, 119.3	--	--
Succulent beans	0.05	73.2	69.9	107.6
	0.1	73.5, 109.5	80.9	70.7
	0.2	95.2, 95.9	75.7	90.2
	0.5	88.9, 97.0, 101.3	62.5	77.5, 81.2
	1.0	87.1, 109.5, 114.0	72.6, 93.3	99.8, 104.3
	2.0	114.3	--	--
Succulent beans, forage	0.2	--	72.5	88.0
	0.5	110.4	--	--
	1.0	110.2, 116.5	--	--
	2.0	90.5, 92.3, 110.9	92.6	79.2
	4.0	103.7	87.9	69.1
	5.0	106.6, 117.7	--	--
	20.0	103.2	--	--
	30.0	106.9	--	--

[a] Each recovery value represents one sample.

Dry and succulent bean commodity samples from the submitted 1993 and 1994 field trials were analyzed for residues of iprodione, its isomer, and its metabolite by Horizon Laboratories (Columbia, MO) using GC/electron capture detection (ECD) methods in which the analytes are hydrolyzed to a common moiety, 3,5-dichloroaniline (DCA), and then derivatized prior to analysis. The limit of quantitation was 0.05 ppm; the registrant estimated the limit of detection to be 0.004 ppm. The methods are entitled "Method for the Analysis of Rovral®-Related Residues: Common Moiety Method (Version 4.0 for Dry Bean Seeds, Vines, and Hay)" and "Method for the Analysis of Rovral®-Related Residues: Common Moiety Method (Version 5.0 for Succulent Bean Pods-with Seeds, Vines, and Hay)."

In these methods, succulent bean and bean vine and hay samples were ground with dry ice. Dry bean samples which had been ground with dry ice were blended with acetone twice and filtered. The solvent was evaporated under a stream of nitrogen. All samples were then combined with 3 N aqueous KOH and heated at 100 C overnight to hydrolyze iprodione residues of concern to DCA. The hydrolyzed samples were combined with water and distilled; the distillate was mixed with water and partitioned three times with dichloromethane. Following phase separation, the dichloromethane fractions were combined and DCA residues were derivatized to N-(3,5-dichlorophenyl)-2-chloropropylamide (DCPA) by the addition of 2-chloropropionyl chloride. The extract was rotary-evaporated to dryness, taken up in cyclohexane, and evaporated to dryness again. The dried residue was dissolved in 6% diethyl ether in hexane and purified on a Florisil column. DCPA was eluted from the column with 15% diethyl ether in hexane. The eluant was rotary-evaporated to dryness, dissolved in ethyl acetate, and analyzed by GC/ECD. Residues were reported as iprodione equivalents.

Method validation and concurrent method recoveries were conducted by Horizon Laboratories to determine the suitability of this method for residue data collection purposes. For method validation, subsamples of untreated dry beans and dry bean hay from the CO trial (ground application), subsamples of untreated succulent beans from the CA trial (ground application), and subsamples of untreated succulent bean hay from the OR trial (ground application) were separately fortified with iprodione, its isomer (RP-30228), and its metabolite (RP-32490) at ~0.05 ppm, 0.50 ppm, and 5.00 ppm. Apparent residues in unfortified samples from the method validation studies were not included in the submission. For concurrent method recovery, samples of untreated dry bean commodities were fortified with iprodione *per se* at 0.0505-30.30 ppm and samples of untreated succulent bean commodities were separately fortified with iprodione, its isomer, and its metabolite at 0.05-101.0 ppm. Representative chromatograms, sample calculations, and standard curves were provided. Method recovery data are presented in Table 4. Concurrent method recovery data are presented in Table 5. The registrant stated that because the method validation data for dry bean commodities indicated that there was no compound-related effect on recovery, concurrent method recoveries were only conducted for the parent iprodione. Conversely, because method validation was only conducted for iprodione for succulent bean commodities, concurrent method recoveries were conducted with iprodione, its isomer, and its metabolite

for these commodities. CBRS notes that no fortifications of succulent bean samples with iprodione isomer were conducted.

The submitted method validation and concurrent method recovery data indicate that the GC/ECD methods, Rhone-Poulenc Method Nos. 151 and 162 and the common moiety methods, are adequate for residue data collection of iprodione residues of concern in/on dry and succulent bean commodities.

Table 4. Method recoveries of iprodione, its isomer (RP-30228), and its metabolite (RP-32490) from untreated samples of bean commodities fortified with each analyte and analyzed using the common moiety GC/ECD method (MRIDs 43222501, 43245801, 43255701, and 43295101).

Commodity	Fortification level, ppm	% Recovery [a]		
		Iprodione	RP-30228	RP-32490
Dry beans	0.05	98.7, 106.2	91.1, 101.3	90.7, 111.4
	0.50	88.7, 92.0	92.9, 96.0	92.9, 96.1
	5.0	91.9, 97.0	90.5, 95.3	90.2, 90.3
Dry beans, hay	0.05	87.4, 102.9	93.4, 106.3	94.6, 108.3
	0.50	101.6, 102.9	101.2, 102.6	98.9, 103.1
	5.0	96.6, 97.2	94.3, 97.7	92.6, 95.1
Succulent beans	0.05	110.3, 110.9	-- [b]	--
	0.25	106.2, 111.2	--	--
Succulent beans, hay	0.05	90.1, 93.0	--	--
	0.25	98.1, 99.7	--	--

[a] Each recovery value represents one sample.
[b] Method validation was only conducted for iprodione for succulent bean commodities.

Table 5. Concurrent method recoveries of iprodione, its isomer (RP-30228), and its metabolite (RP-32490) from untreated samples of bean commodities fortified with each analyte and analyzed using the common moiety GC/ECD method.

Commodity	Compound	Fortification Level (ppm)	% Recovery [a]
Dry beans, vines	iprodione	0.0505	107.2, 112.5
	iprodione	0.505	95.4, 102.0
	iprodione	5.05	89.4, 103.3
Dry beans, hay	iprodione	0.0505	93.9-106.3 (3)
	iprodione	5.05	88.8, 95.2
	iprodione	15.15	100.1
Dry beans	iprodione	0.0505	94.2-108.5 (4)
	iprodione	0.505	94.1, 101.2
	iprodione	5.05	95.6
Dry beans, dried vines	iprodione	0.0505	101.7
	iprodione	2.525	92.7
	iprodione	5.05	92.6, 93.1
	iprodione	15.15	91.1
	iprodione	25.25	99.9
	iprodione	30.30	92.4
Succulent beans, vines	iprodione	0.05	95.2, 95.9
	iprodione	10.0	100.6
	iprodione	20.2	98.6
	RP-30228	0.0505	101.9
	RP-32490	0.0492	84.5
Succulent beans	iprodione	0.0505	108.7, 109.8
	iprodione	0.2525	109.4
	iprodione	1.010	98.2
	iprodione	2.0	95.5
	iprodione	2.525	98.7
	RP-32490	0.984	91.5
Succulent beans, hay	iprodione	0.0505	87.1-91.8 (3)
	iprodione	5.05	98.9
	iprodione	20.20	98.6
	iprodione	25.0	92.9
	RP-30228	0.0505	101.5
	RP-32490	0.0492	90.0
Succulent beans, vines and hay	iprodione	101.0	91.2
	RP-30228	1.01	93.9

[a] Each recovery value represents one sample unless otherwise indicated in parentheses.

Storage stability data

All samples from the submitted field trials were stored frozen prior to residue analysis. The maximum storage interval prior to residue analysis of commodities collected from the respective field trials was 199 days for dry bean commodities and 356 days for succulent bean commodities. To support the field trials, the registrant cited data depicting the frozen storage stability of iprodione, its isomer, and its metabolite in/on peanuts, peanut vines and peanut hay, which have been reviewed (S.Knizner, 12/27/94, D206161, MRID 43273401, CBRS No. 14162, D206161). The data indicate that iprodione residues of concern are stable for up to 12 months in/on peanuts and peanut vines and hay.

Magnitude of the Residue in/on Blueberries

Rhone-Poulenc Ag Company submitted data (1994; MRID 43222502) from four blueberry field trials conducted in 1992 depicting the residues of iprodione, its isomer, and its metabolite in/on blueberries in MI, NJ, NC, and OR. Data from this submission are described and presented in this Data Evaluation Record.

Established tolerance: A tolerance of 15.0 ppm has been established for the combined residues of iprodione, its isomer, and its metabolite in/on blueberries [40 CFR §180.399(a)].

Use patterns: A REFS search conducted 9/27/94 identified four Rhone-Poulenc iprodione end-use products registered for use on caneberries: two 50% WP formulations (EPA Reg. No. 264-453, ROVRAL® Fungicide dated 7/7/94; and EPA Reg. No. 264-532, ROVRAL® 50 SP Fungicide, dated 7/6/94), a 4 lb/gal FlC formulation (EPA Reg. No. 264-482, ROVRAL® 4 Flowable Fungicide, dated 7/7/94), and a 50% EC formulation (EPA Reg. No. 264-524, ROVRAL® WG Fungicide, dated 5/x/94). A maximum of four foliar applications at 0.5-1.0 lb ai/A may be made per growing season using ground equipment in a minimum of 100 gal water/A; the first application is to be made at early bloom (5-10% bloom), and the second application is to be made at full bloom. Two additional applications may be made at 14-day intervals or as needed. A 0-day PHI has been established.

CBRS notes that blueberries are not caneberries; they are members of the bushberry crop subgroup of the berries group. Product labels must be modified to list blueberries separately from caneberries, i.e. "Caneberries and Blueberries".

Discussion of the data: Four field trials were conducted in MI, NJ, NC, and OR depicting the magnitude of iprodione residues of concern in/on blueberries. Blueberries were harvested on the day of the last of four foliar applications, with a 14- to 48-day retreatment interval, of the 50% WP formulation at 1.0 lb ai/A/application (1x the maximum seasonal application rate) in 50-100 gal/A using ground equipment. The registrant stated that the EPA

Reg. No. of the formulation used was 264-482, however, EPA Reg. No. 264-482 is a 4 lb/gal FlC formulation. CBRS believes the correct EPA Reg. No. to be 264-453, based on the MSDS included in the submission. The first application was made at 5-10% bloom (except in NJ, where the first application was made at 40% bloom), the next two applications were made at no less than 14-day intervals, and the final application was made on the day of harvest. Climatic conditions were typical over the duration of the field trials.

Samples of blueberries were harvested by hand. Adequate raw data pertaining to field trial information, application of the test substance, and sample handling procedures were provided. Intervals from sampling to shipment, homogenization, extraction, and analysis were also provided for each test. The harvested blueberry samples were frozen within 4 hours of sample collection and stored frozen (temperature unspecified) at the field facilities. Samples were shipped frozen via ACDS freezer truck to Rhone-Poulenc, where they were stored frozen (-10 C) until shipment to the analytical laboratory (Horizon Laboratories, Columbia, MO). At the analytical laboratory, samples were stored frozen (-20 to -10 C) until analysis. The intervals between harvest and residue analysis were 542-583 days (~ 18-19 months). Samples were analyzed within 2 days of extraction.

Residues in/on treated and untreated blueberries were determined using a GC/ECD method. The results of the blueberry field trials are presented in Table 6. Apparent combined residues of iprodione, its isomer, and its metabolite were nondetectable (<0.05 ppm) in/on four samples of untreated blueberries.

Table 6. Iprodione residues of concern found in/on blueberries harvested 0 days following four foliar applications of the 50% WP formulation at 1.0 lb ai/A/application (1x the maximum seasonal rate) using ground equipment.

Trial site	Number of samples	Retreatment interval, days	Residues, ppm iprodione equivalents
MI	3	24-32	4.1, 5.4, 5.6
NJ	3	17-22	2.6, 4.1, 5.2
NC	3	23-48	2.9, 3.9, 4.1
OR	3	14-48	5.7, 6.2, 7.0

Blueberry field trials were conducted in Regions 1, 2, 5, and 12. Current information regarding blueberry production was not available in *1992 USDA Agricultural Statistics*. However, Regions 1, 2, 5, and 12, account for 94% of U.S. blueberry production ("EPA Guidance on Number and Location of Domestic Crop Field Trials for Establishment of Pesticide Residue Tolerances," E. Saito and E. Zager, 6/2/94).

Summary of study: The submitted data indicate that the combined residues of iprodione, its isomer, and its metabolite will not exceed the established 15-ppm tolerance in/on blueberries harvested 0 days following four foliar applications of the 50% WP formulation at 1.0 lb ai/A/application (1x the maximum seasonal rate) using ground equipment.

Residue analytical method

Blueberry samples from the submitted field trials were analyzed for residues of iprodione, its isomer, and its metabolite using a GC/electron capture detection (ECD) method in which the analytes are hydrolyzed to a common moiety, 3,5-dichloroaniline (DCA), and then derivatized prior to analysis. The limit of quantitation was 0.05 ppm; the registrant estimated the limit of detection to be 0.004 ppm. The method included in this submission is entitled "Method for the Analysis of Rovral®-Related Residues: Common Moiety Method (Version 1.0 for Blueberries)."

In this method, blueberry samples which had been ground with dry ice were combined with 3 N aqueous KOH and heated at 100 C overnight to hydrolyze iprodione residues of concern to DCA. The hydrolyzed samples were combined with water and distilled; the distillate was mixed with water and partitioned three times with dichloromethane. Following phase separation, the dichloromethane fractions were combined and DCA residues were derivatized to N-(3,5-dichlorophenyl)-2-chloropropylamide (DCPA) by the addition of 2-chloropropionyl chloride. The extract was rotary-evaporated to dryness, taken up in cyclohexane, and evaporated to dryness again. The dried residue was dissolved in 6% diethyl ether in hexane and purified on a Florisil column. DCPA was eluted from the column with 15% diethyl ether in hexane. The eluant was rotary-evaporated to dryness, dissolved in ethyl acetate, and analyzed by GC/ECD. Residues were reported as iprodione equivalents.

Method validation and concurrent method recoveries were conducted by Horizon Laboratories to determine the suitability of this method for residue data collection purposes. For method validation, subsamples of untreated blueberries from the NC and OR field trials were separately fortified with iprodione, its isomer (RP-30228), and its metabolite (RP-32490) at 0.05 ppm, 0.50 ppm, and 5.00 ppm. Apparent residues in unfortified samples were not included in the submission. For concurrent method recovery, subsamples of untreated blueberries were fortified with iprodione *per se* at 0.05-10.0 ppm. Representative chromatograms, sample calculations, and standard curves were provided. Method validation and concurrent method recovery data are presented in Table 7. The submitted recovery data indicate that the GC/ECD method is adequate for data collection of iprodione residues of concern in/on blueberries.

Table 7. Method validation and concurrent method recovery of iprodione, its isomer (RP-30228), and its metabolite (RP-32490) from untreated samples of blueberries fortified with each analyte and analyzed by GC/ECD.

Fortification Level (ppm)	% Recovery [a]		
	Iprodione	RP-30228	RP-32490
Method validation			
0.05	94.3, 99.1	97.1, 100.9	96.3, 116.1
0.50	87.8, 100.5	99.4, 104.4	78.7, 96.2
5.00	96.3, 100.0	89.4, 96.2	87.5, 94.7
Concurrent method recovery			
0.05	113.4	-- [b]	--
1.00	100.7	--	--
5.00	95.2	--	--
10.0	99.2	--	--

[a] Each recovery value represents one sample.
[b] Concurrent method recovery was only conducted for the parent iprodione.

Storage stability data

All samples from the submitted field trials were stored frozen prior to residue analysis. The maximum storage interval prior to residue analysis of commodities collected from the respective field trials was 583 days. Data depicting the frozen storage stability of iprodione, its isomer, and its metabolite in/on blueberries have been reviewed (S.Knizner, 12/27/94, D206161, MRID 43273401, CBRS No. 14162, D206161). These data indicate that iprodione residues of concern are stable for up to 12 months in/on blueberries. Although samples in this study were stored for a longer interval, because the stability of iprodione residues has been demonstrated for numerous racs and processed commodities, CBRS will not require additional storage stability data for blueberries.