PP#6F3422

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

WASHINGTON, D.C. 20460

OFFICE OF
PREVENTION, PESTICIDES
AND TOXIC SUBSTANCES

JUL 31 1996

MEMORANDUM

SUBJECT: **PP#6F3422**, Amendment Dated 8/9/95, Response to Review and Storage Stability Study. Amendment Dated 8/9/95, Withdrawing Request for Wheat and Barley Tolerances. Tolerances for the Inadvertent Residues of Cyromazine in/on Cabbage, Sugar Beets, Sweet Potatoes and Sorghum. Chemical# 121301, DP Barcode: D218433 and D218863, Case# 240669, CBTS#: 16043 and 17383, MRID#: 437530-00 through 02.

FROM: William D. Cutchin, Chemist
Tolerance Petition Team I
Chemistry Branch I: Tolerance Support
Health Effects Division (7509C)

THROUGH: Elizabeth Haeberer, Acting Branch Chief
Chemistry Branch I: Tolerance Support
Health Effects Division (7509C)

TO: Debbie McCall, Acting Section Head
Registration Section
Risk Characterization and Analysis Branch
Health Effects Division (7509C)

Executive Summary of Residue Chemistry Deficiencies

Revised Section B,
Revised Section F,
Additional Data for Sugar Beets.

CBTS recommends against the proposed tolerances. However, CBTS can recommend for 10 month plantback intervals for all crops which do not have established tolerances.

Background

Ciba Crop Protection Division, Ciba-Geigy Corp. responds to our review of PP#6F3422 (A. Smith, 10/5/87). The registrant submits additional data in support of tolerance requests for the residues of the insecticide/ insect growth regulator cyromazine (N-cyclopropyl-1,3,5-triazine-2,4,6-triamine) and its metabolite melamine (1,3,5-triazine-2,4,6-triamine) calculated as cyromazine after rotation from treated crops at 0.05 ppm on cabbage, sweet potatoes, sugar beet roots, sugar beet tops, and grain sorghum forage, and 0.1 ppm on sorghum grain and fodder. In the original petition, the registrant also requested tolerances on wheat and barley commodities. The registrant has also sent an amendment withdrawing the request for wheat and barley tolerances. References in the submitted data packages for wheat and barley tolerances will not be discussed in this review.

Tolerances have been established for cyromazine in/on other RACs; including head lettuce at 5 ppm, celery at 10 ppm as an insecticide (40 CFR §180.414 (d)), and cucurbit vegetables at 2 ppm, and leafy vegetables (except brassica, including leaf lettuce) at 10 ppm as a growth regulator (40 CFR §180.414(e)). Separate tolerances for both cyromazine and melamine are established at 0.05 ppm for poultry fat, meat, and meat byproducts from chicken layer hens and chicken breeder hens only (40 CFR §180.414(b)&(c)).

CBTS has recently recommended for a tolerance on the combined residues of cyromazine and melamine on tomatoes at 1.0 ppm (PP#6F3333/ FAP#2H5640, DP Barcode: D217689, CBTS#: 15912, 10/18/95). Another petition to establish tolerances for the inadvertent residues of cyromazine on sweet corn and radishes planted at 30 days after last application at 0.5 ppm is currently in reject status awaiting an ILV and revised Section F (PP#6F3332, J. Garbus, 2/13/95).

No Registration Standard for cyromazine has been issued.

Conclusions

1. The product chemistry of cyromazine has been adequately described. No further product data are required for this proposed use.

2a. The proposed plantback intervals for cabbage, sorghum, and sweet potato are acceptable, although CBTS suggests that for uniformity, the intervals be 10 months for all these crops. In the absence of additional data, the minimum interval acceptable for sugar beets is 10 months.

2b. Plantback intervals for rotation to sweet corn and radishes should remain at 3 months until the deficiencies in PP#6F3332 are resolved.

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2c. The registrant has requested the removal of wheat and barley as rotational crops. As noted in 2d, a 10 month plantback interval would be acceptable. CBTS requests that an updated Section B and cyromazine label be submitted with the appropriate revisions.

2d. The proposed use directions regarding rotational crops in Section B are inadequate. CBTS considers any rotational crop restrictions past 12 months to be impractical unless necessitated by phytotoxicity concerns. The 18 month plantback restriction should be removed. However, CBTS recommends for 10 month plantback intervals for all crops which do not have established tolerances except sweet corn and radishes which have a 3 month plantback interval. The registrant should submit a revised Section B.

2e. The rotational crop field trial residue data submitted with the original petition were generated only following treated tomatoes. The original review stated in conclusion 1b that the proposed use be limited to rotation only from cyromazine treated tomatoes. However, the data indicate that any crop may be planted at the ten month plant back interval. CBTS considers this interval appropriate regardless of the primary crop. Should the registrant desire plantback intervals shorter than 10 months, appropriate residue data would be required for a tolerance on the inadvertent residues.

3. The metabolism of cyromazine in plants is adequately understood. No further plant metabolism data are required for this proposed use. Based on data from other crops, the residues of concern are cyromazine and its metabolite, melamine. Total residues are expressed as parent.

4. The metabolism of cyromazine in animals is adequately understood. No additional animal metabolism data are necessary for this proposed use. The residues of concern are cyromazine and its metabolite, melamine. An additional metabolite, 1-methyl-cyromazine, has also been found in liver and kidney. Total residues are expressed as parent.

5. Adequate enforcement methods for cyromazine and melamine are published in PAM II. The analytical method used for data collection was a HPLC method designated AG-408, which has been published in PAM II for enforcement purposes. No further analytical methodology is necessary for this proposed use.

6. Data have been submitted for the recovery of cyromazine, and its melamine and 1-methyl-cyromazine metabolites by FDA Multiresidue Methods. Cyromazine is recovered by FDA multiresidue methods. Melamine and 1-methyl-cyromazine are not recovered by those methods. No further multiresidue data are required for this proposed use.

7a. The data indicate that residues of cyromazine are not

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detectable on leafy vegetables, grain sorghum, and sweet potatoes when rotated from primary crops treated according to label directions and planted at the proposed intervals. CBTS also concludes that tolerances for the inadvertent residues of cyromazine on all crops planted at a ten month plantback interval will not be required. CBTS recommends for plantback at ten months for all crops which do not have established tolerances. The registrant is reminded that any desired rotational crop interval less than 10 months must be supported by the appropriate data to establish tolerances for inadvertent residues. Additional data (at least 2 more sites) are required for sugar beets at the 5 week plantback interval to determine if tolerances are needed, and, if so, at what level. CBTS notes that residues were observed in the related crop carrots at intervals much longer than the 5 weeks in the ^{14}C study.

7b. The crops with processed commodities of regulatory concern associated with this petition is sugar beets. Data were previously submitted for sugar beet tops and roots rotated from tomatoes. No cyromazine residues were found. Since no residues were found on the RAC, data for processed sugar beet commodities are not required.

7c. These studies are essentially limited field trials. The studies were conducted in areas where the crops are normally grown. No further geographically diverse data are necessary for this petition with the exception of sugar beets (assuming the 5 week plantback interval is still desired).

8. There are sufficient storage stability data in EPA files to support cyromazine residue data. No further data are necessary for this proposed use.

9. Sorghum grain, forage, fodder, and aspirated grain fractions, and sugar beet tops, dried pulp, and molasses are significant livestock feed items. Since no cyromazine residues were detected at the 10 month plantback interval on the RACs and no detectable residues would be expected on the associated processed commodities, feedstuffs from rotated crops are not expected to result in detectable cyromazine residues in animals. However, should the registrant desire plantback intervals less than ten months on crops which do not have established tolerances, the dietary burden for animals will need to be reassessed.

Recommendations

CBTS recommends against the proposed tolerances for the reasons stated in Conclusions 2a, 2c, 2d, 7a, and 7c. CBTS can recommend for 10 month plantback intervals for all crops which do not have established tolerances with the exception of sweet corn and radishes which have a 3 month plantback interval. Tolerances are not required for residues in such crops.

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The need for a DRES analysis can not be determined at this time. Additional data are required to assess the need for a tolerance on sugar beets.

Detailed Considerations

Manufacture and Formulation

The product chemistry of cyromazine has been adequately described (PP#9G2230, 11/14/79 and PP#5F3177, 2/13/85). Technical cyromazine (CGA-72662) is 95% ai. CBTS does not foresee a residue problem for the impurities identified at or above 0.1% in the TGAI cyromazine when it is formulated into Trigard and used as directed. No further product chemistry data are required for this proposed use.

Proposed Use

The proposed use directions state that the product, Trigard® (EPA Reg. No. 100-654), a wettable powder containing 75% active ingredient cyromazine, is to be applied at a rate of 0.125 lb ai/A as a foliar spray. For ground applications use 50 gal/A of water and 5 gal/A for air applications. Repeat applications at seven day intervals as necessary. Do not apply within seven days of harvest, 7 day PHI. Do not exceed the number of applications specified for a given crop. Rotations from a primary crop may be made according to the following schedule: radishes, sweet corn, and wheat at 1 week, barley and sugar beets at 5 weeks, cabbage at 36 weeks, sorghum at 40 weeks, and sweet potatoes at 42 weeks. All other crops may be planted 18 months following the last application of Trigard.

The proposed plantback intervals for cabbage, sorghum, and sweet potato are acceptable, although CBTS suggests that for uniformity, the intervals be 10 months for all these crops. In the absence of additional data, the minimum interval acceptable for sugar beets is 10 months.

All the requirements allowing the rotation in 30 days to sweetcorn and radishes have not been met. The petition for the rotation in 30 days to sweetcorn and radishes is currently in reject status awaiting an ILV and a revised Section F (PP#6F3332, 2/13/95). The rotation interval to sweetcorn and radishes should remain at 3 months until the deficiencies for lowering the plantback interval to 30 days are met.

The registrant has withdrawn the request for wheat and barley tolerances. As noted above, a 10 month plantback interval would be acceptable. The plantback interval for wheat and barley should be revised in Section B.

The proposed use pattern states that rotation is permitted to other crops planted 18 months following the last application. CBTS considers any rotational crop restrictions past 12 months to be impractical unless necessitated by phytotoxicity concerns. The 18 month restriction should be removed.

CBTS concludes that any crop which does not have an established tolerance may be planted at a ten month interval. The registrant should change the plantback interval for all crops not having tolerances to 10 months. The registrant is reminded that any desired rotational crop interval 10 months or less must be supported by the appropriate data.

Nature of Residue - Plants

The metabolism of cyromazine in plants is adequately understood. The metabolism of cyromazine has been studied in celery, head lettuce, and tomatoes (PP#5G3176, 2/4/85; PP#5F3180, 3/20/85; and PP#6F3329, 1/28/87). The residues of concern are cyromazine and its metabolite melamine. Residues are expressed as parent equivalents. No further plant metabolism data are required for this proposed use.

Nature of Residue - Animals

The metabolism of cyromazine in animals is adequately understood. The residues of concern in meat, milk, and meat byproducts (except liver and kidney) are cyromazine and melamine. The residues of concern in liver and kidney are cyromazine and melamine, and 1-methyl-cyromazine (PP#6F3329, 4/2/93). The residues of concern in poultry and eggs are cyromazine and melamine (1F4016, 12/8/92). No further animal metabolism data are required for this proposed use.

Analytical Methods- Enforcement

Adequate methodology exists for the determination of the residues of cyromazine and its metabolite melamine in plants. Ciba-Geigy Method AG-408, used here for data collection, has been validated as *an enforcement* method and has been published in PAM II, June 1986.

A method for the determination of cyromazine residues in animal tissues, designated Method AG-548A, has been submitted but has yet to undergo an adequate independent laboratory validation (ILV). The ILV of Method AG-548A must be completed prior to tolerance method validation (PP#6F3333/FAP#2H5640, 2/13/95).

Analytical Methods- Multiresidue

Multiresidue methods data indicate the recovery of cyromazine via FDA Multiresidue Protocol III, while no recovery of melamine or 1-methyl-cyromazine via any of the multiresidue methods was

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accomplished. The information has been forwarded to FDA for evaluation (PP#1F4016 & 2F4053, 7/16/93). No further testing is necessary for this proposed use.

Magnitude of Residue

Rotational Residue Trials

The registrant previously submitted soil uptake and rotational crop studies conducted with ^{14}C cyromazine. These studies indicate that inadvertent residues of cyromazine can occur in grains and legume crops and are possible in root crops (PP#5F3180, RCB# 331, Study# ABR 82003, C. Deyrup, 2/8/85 and PP#6F3332, Accession # 260663, Study# ABR 85009, submitted 12/16/85, See Table 1).

The original submission of this petition included trials conducted after 12 or 13 applications of cyromazine to tomatoes. Each trial consisted of two plots treated with either 0.125 (1x) or 0.25 (2x) lb ai/A Trigard®. The rotational crops were planted at intervals of 45-305 days after last application as shown in Table 2. The analytical method used for data generation was HPLC method AG-408. Two grain sorghum and two cabbage trials were conducted in Texas (Region 6) and Mississippi (Region 4). No cyromazine residues were found on sorghum grain, forage, or fodder, <0.10, <0.05, and <0.06 ppm, respectively, after a ten month plantback interval. A grain sorghum processing study was not conducted. No cyromazine residues were found on cabbage leaves, <0.05 ppm, also after a 10 month plantback interval. The sweet potato trial was conducted in Mississippi (Region 4). No cyromazine residues were found on sweet potato roots, <0.05 ppm. The sugar beet trial was conducted in California (Region 10) with a 46 day plantback interval. No cyromazine residues were found in sugar beet roots or tops, <0.05 ppm. (See Table 2).

The registrant has submitted data from a study of cyromazine on winter wheat and fractions (MRID#: 437530-01, Ciba-Geigy Corp. AG-A 8004 01-04, 9/4/85). The registrant has stated his intention to withdraw wheat and barley from this petition. The submitted study is therefore not germane and will not be reviewed.

Processing Study

Grain sorghum and sugar beets have processed commodities of regulatory concern. Data were previously submitted for sorghum forage, fodder, and grain, and sugar beet roots and tops rotated from tomatoes. No cyromazine residues were found. Since no residues were found on the RAC, data for processed commodities are not required for these rotated crops.

Geographic Representation

These studies are essentially limited field trials. The studies were conducted in areas where the crops are normally grown. No further geographically diverse data are necessary for this petition with the exception of sugar beets (assuming the 5 week plantback interval is still desired).

CBTS Conclusions

The data indicate that residues of cyromazine are not detectable on leafy vegetables, grain sorghum, and sweet potatoes when rotated from primary crops treated according to label directions and planted at the proposed intervals. CBTS also concludes that tolerances for the inadvertent residues of cyromazine on all crops planted at a ten month plantback interval will not be required. CBTS recommends for plantback at ten months for all crops which do not have established tolerances. The registrant is reminded that any desired rotational crop interval less than 10 months must be supported by the appropriate data to establish tolerances for inadvertent residues. Additional data (at least 2 more sites) are required for sugar beets at the 5 week plantback interval to determine if tolerances are needed, and, if so, at what level. CBTS notes that residues were observed in the related crop carrots at intervals much longer than the 5 weeks in the ^{14}C study.

Storage Stability MRID# 437530-02

The registrant has submitted a storage stability study which has been previously reviewed (PP#6F3329, 1/28/87). Head lettuce, leaf lettuce, celery, mushrooms, and tomatoes containing cyromazine and melamine residues were analyzed and frozen at -15°C for periods from 9 to 24 months. Samples were removed from storage and reanalyzed; there were no significant changes in the level of the residues. Residues of cyromazine and melamine were stable in/on those crops in frozen storage for at least 24 months. This study was deemed adequate to support the previously submitted rotational crop residue trials.

Meat, Milk, Poultry, and Eggs

Grain sorghum and sugar beets have associated livestock feed items. Data were previously submitted for sorghum forage, fodder, and grain, and sugar beet roots and tops rotated from tomatoes. No cyromazine residues were found using the proposed use pattern. Feedstuffs from rotated crops using this proposed use pattern will result in no increased cyromazine residues in animal commodities. However, should the registrant desire plantback intervals less than ten months on crops which do not have established tolerances, the dietary burden for animals will need to be reassessed.

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Table 1: ^{14}C Cyromazine Crop Studies

Commodity	Study Type	Total Dose lb/ai /A	Planting Interval Days	Residues ppm as Cyromazine
lettuce	S	0.05	30	<0.009
lettuce	R	1.50	spring	<0.01
sugar beets	S	0.05	30	
tops				<0.009
roots				<0.009
sugar beets	R	1.50	spring	
tops				<0.01
roots				<0.01
wheat	S	0.05	30	
grain				<0.009
straw				0.112
hulls				0.078
wheat	R	1.50	fall	
grain				<0.01
stalks				0.04
hulls				<0.01
carrots	R	1.50	spring	
immature				
tops				0.03
roots				0.19
mature				
tops				0.05
roots				<0.02
soybeans	R	1.50	spring	
immature stalks				0.02
pods				0.05
beans				0.03

S = Soil Uptake. (PP#5F3180, RCB# 331, Study# ABR 82003, C. Deyrup, 2/8/85).

R = Rotation from Tomatoes. Fall planting of winter wheat followed in the spring by soybeans, carrots, lettuce, and sugar beets (PP#6F3332, Accession # 260663, Study# ABR 85009, submitted 12/16/85).

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Table 2: Rotational Crop Studies from Cyromazine Treated Tomatoes

Commodity	Planting Interval Days(a)	Sampling Interval Days(b)	Residues ppm as Cyromazine(c) 1x	2x
Sugar Beets	46			
forage		98	<0.05	<0.05
tops		256	<0.05	<0.05
roots		256	<0.05	<0.05
Barley	45			
forage				
fall		108	<0.05-0.06	<0.13
spring		228	<0.05	<0.05
straw		269	0.98-1.27	0.68-0.9
grain		269	0.08	≤0.05
Wheat	75			
forage				
fall		159	0.4	0.38
spring		238-245	<0.05-0.22	0.27
straw		300-306	<0.18-0.42	<0.15
grain		300-306	<0.05	<0.05
Sorghum	292			
forage		338-353	<0.05	<0.05
fodder		410-455	<0.05	<0.06
grain		410-455	<0.10	<0.10
Cabbage	289			
forage		305-308	<0.05	<0.05
head		363-410	<0.05	<0.05
Sweet Potatoes	305			
forage		367	<0.05-<0.18	<0.18
fodder		455	<0.05-0.15	<0.11
roots		455	<0.05	<0.05

(a) = last application to planting
(b) = last application to sampling
(c) = label application rate for tomatoes (12 appl. x 0.125 lb ai/A)
(PP#6F3422, RCB# 1120, Accession #263320 and 263321, A. Smith, 10/5/87)

cc: RF, PP#6F3422, circ., Cutchin,
PM Team 13 (G. LaRocca/ L. Deluise)

7509C: CBTS, Reviewer (WDC), CM#2, Rm 804P, 305-7990, WDC: 7/31/96
R/I: TPT1, 7/9/96;
Br. Sr. Sci.: R. Loranger, 7/31/96;
Act. Br. Chief: E. Haeberer, 7/31/96

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

OCT 5 1987

OFFICE OF
PESTICIDES AND TOXIC SUBSTANCES

MEMORANDUM

SUBJECT: PP#6F3422 - Cyromazine in Various Commodities - (Accession Nos. 263320, 263321; RCB No. 1120) - Evaluation of Residue Data and Analytical Methods

FROM: A. Smith
Alfred Smith, Chemist
Residue Chemistry Branch
Hazard Evaluation Division (TS-769C)

TO: Joseph M. Tavano, Acting PM 17
Insecticide-Rodenticide Branch
Registration Division (TS-767C)

and

Robert Coberly
Toxicology Branch
Hazard Evaluation Division (TS-769C)

THRU: Charles Trichilo, Chief
Residue Chemistry Branch
Hazard Evaluation Division (TS-769C)

Ciba-Geigy Corporation proposes that tolerances be established for combined residues of the insecticide cyromazine (N-cyclopropyl-1,3,5-triazine-2,4,6-triamine), and its principal metabolite melamine 1,3,5-triazine-2,4,6-triamine (calculated as cyromazine) in or on the following commodities.

Cabbage	0.05 ppm
Sweet potatoes	0.05 ppm
Sugar beet roots	0.05 ppm
Sugar beet tops	0.05 ppm
Wheat grain	0.05 ppm
Wheat forage	0.50 ppm
Wheat straw	0.50 ppm

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Wheat hay	0.20 ppm
Barley grain	0.10 ppm
Barley forage	0.10 ppm
Barley hay	0.05 ppm
Barley straw	1.5 ppm
Sorghum grain	0.10 ppm
Sorghum fodder	0.10 ppm
Sorghum forage	0.05 ppm

The tolerances are to cover residues resulting from the planting of these crops as rotational crops following the harvest of cyromazine-treated crops.

Permanent tolerances are established for combined residues of the insecticide cyromazine and its metabolite melamine in eggs at 0.25 ppm, head lettuce at 5 ppm, and celery at 10 ppm (§180.414(a)). Tolerances are established for residues of cyromazine in meat, fat, and meat byproducts of chicken layer hens at 0.05 ppm (§180.414(b)). Tolerances are established for the cyromazine metabolite melamine in meat, fat, and meat byproducts of chicken layer hens at 0.05 ppm (§180.414(c)). A permanent tolerance for cyromazine in mushrooms at 10 ppm has been approved by the Residue Chemistry Branch (RCB) (PP#5F3177).

Tolerances for residues of cyromazine and its metabolite melamine have been proposed for carrots at 3 ppm (PP#6F3329), sweet corn and radishes at 0.50 ppm (PP#6F3332), tomatoes at 1.0 ppm (PP#6F3333), and peppers at 2.0 ppm (PP#6F3342).

Conclusions

1a. The statement "All other crops may be planted 18 months following the last application of Trigard" is included under Section B, Rotational Crops. RCB defers to Exposure Assessment Branch (EAB) on the need for residue data to support this statement.

1b. Residue data are submitted only for rotation crops that follow the harvest of cyromazine-treated tomatoes. The proposed use should be revised to limit the rotation of the crops of this petition only with cyromazine-treated tomatoes. If rotation of these crops with other cyromazine-treated crops is desired, then additional residue data should be submitted. These data should show the residue levels expected in the rotation crops that follow each cyromazine-treated crop.

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2a. The nature of the residue in plants is adequately understood. The significant components of plant residues are the parent compound cyromazine and its metabolite melamine.

2b. The nature of the residue in nonruminants (hogs, horses, and poultry) is adequately understood. Ingested cyromazine is metabolized and excreted with some deposition in eggs and meat. The significant components of the residues are the parent compound cyromazine and its metabolite melamine.

2c. The nature of the residue in ruminants (cows, goats, and sheep) is not adequately understood. Ingested cyromazine is metabolized and excreted with some deposition in milk and meat. The metabolite 1-methylcyromazine is reported to comprise a significant portion of the residues, and an unidentified component is one-third of milk residue. The petitioner has been requested (PP#6F3329) to submit the characterization study for 1-methylcyromazine and to identify the unidentified component in milk.

3. Adequate analytical methods are available for enforcement of the proposed tolerances on the crops of this petition.

4a. Tolerance levels for the wheat and barley commodities are likely to be more adequate and provide for a better statistical variation when the residue data for both crops are considered together. Therefore, the following tolerances are considered appropriate and should be proposed.

Wheat grain, barley grain	0.10 ppm
Wheat forage, barley forage	0.50 ppm
Wheat hay, barley hay	0.20 ppm
Wheat straw, barley straw	1.50 ppm

4b. The data do not show if residues in the wheat milling fractions (bran, flour, germ) or barley milling fractions (hulls, bran, pearl barley, flour) are likely to exceed the level in the grains. The petitioner should explain what the "hull" in Study No. ABR-82003 represents and how it is related to the milling fractions of wheat. If the data do not adequately show residues expected in the

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milling fractions, then a wheat processing study that shows residues in the milling fractions will be needed and should be submitted.

4c. Residues in or on sorghum grain or its milled products, fodder, and forage are not likely to exceed the proposed tolerances. The tolerance levels for the forage (0.05 ppm) and the grain (0.10 ppm) represent the sensitivities of the analytical method for these items.

4d. Residues in or on cabbage or sweet potatoes are not likely to exceed the proposed tolerances.

4e. Residues in or on sugar beet roots and its byproducts (sugar, pulp, molasses) or sugar beet tops are not likely to exceed the proposed tolerances.

5a. Combined residues of cyromazine and its metabolite melamine could occur in eggs and meat of poultry, hogs, and horses [§180.6(a)(1)]. However, residues in eggs and poultry would be adequately covered by the level of the existing tolerances for layer hens (0.05 ppm, §180.414). The established tolerance should be revised to reflect poultry, in general. As a result, revised tolerance proposals are needed and should be submitted.

The tolerance expression for hogs and horses is the same as for poultry eggs [cf. §180.414(a)]. However, the levels are as follows:

0.50 ppm	meat and meat byproducts of hogs and horses
0.05 ppm	fat of hogs and horses

The petitioner should submit a revised Section F which proposes these tolerances (as suggested in PP#6F3329).

5b. The exact expression for the tolerance in livestock meat, fat, and meat byproducts will be decided after we have reviewed the 1-methylcyromazine study requested in PP#6F3329 and Toxicology Branch (TB) has been consulted for their opinion. Assuming 1-methyl-cyromazine will be part of the tolerance expression, combined residues of cyromazine and its metabolites 1-methylcyromazine and melamine are likely to occur in milk and meat of livestock (except poultry, horses,

and hogs) [§180.6(a)(1)]. Therefore, tolerances are needed to cover such residues. The petitioner should submit a revised Section F proposing the following tolerances (as suggested in PP#6F3329).

> . . . combined residues of the insecticide cyromazine (N-cyclopropyl-1,3,5-triazine-2,4,6-triamine), and its metabolites melamine (1,3,5-triazine-2,4,6-triamine), and 1-methylcyromazine, each calculated as cyromazine, in or on the following raw agricultural commodities:
>
> | | |
> |---|---|
> | meat and meat byproducts of cattle, goats, and sheep | 0.50 ppm |
> | fat of cattle, goats, and sheep | 0.05 ppm |

5c. RCB concluded in PP#6F3329 that no estimates of residues in milk can be made until unidentified residues [see 2(c) above] have been identified. We reiterate that conclusion here.

6. There are no Codex proposals, Canadian limits, or Mexican tolerances for cyromazine in the commodities of this petition. An International Residue Limit Status sheet is attached.

Recommendation

RCB recommends against the proposed tolerances. A favorable recommendation is contingent upon resolution of the deficiencies noted in Conclusions 1a, 1b, 2c, 4a, 4b, 4c, 5a, 5b, and 5c.

When the tolerances are approved, such tolerances should be placed under §180.414(e), Indirect or Inadvertent Tolerances (see PP#6F3329).

Note to PM: The petitioner should be informed that the Residue Chemistry Data Requirements in 40 CFR 158.125(b)(15) require that regulated pesticide residues be subjected to one or more of the multiresidue procedures published in an Addendum to Pesticide Assessment Guidelines Subdivision O - Residue Chemistry Data Requirements for Analytical Methods in 40 CFR 158.125, Multiresidue Protocols. To our knowledge, such

testing has not been conducted on cyromazine residues. Therefore, the following data are required:

Residues of cyromazine and its metabolites must be subjected to analysis by the multiresidue protocols in any future tolerance request.

Protocols for Methods I, II, III, and IV are available from the National Technical Information Service under Order No. PB 86 203734/AS.

Detailed Considerations

The manufacturing process and composition of technical cyromazine has been adequately discussed in PP#9G2230 (A. Rathman memorandum dated November 14, 1979). The impurities are not likely to produce a residue problem.

Formulation

Cyromazine is formulated as Trigard® 75W Insecticide, a wettable powder containing 75 percent active ingredient, for leafminer control on designated plants. The inert ingredients are cleared for use under §180.1001.

Uses

Apply 1/6 pound Trigard 75W per acre (0.125 lb ai/A) as a foliar spray in a minimum of 5 gallons of water by air or 50 gallons of water by ground equipment as leafminers first appear. Repeat applications at 7-day intervals or as necessary to maintain control.

Do not exceed the number of applications for a given crop, or illegal residues may occur.

Rotational Crops

All crops on this label may be planted according to normal agricultural practices immediately following harvest of a Trigard 75W-treated crop. The following crops may be planted according to the designated interval from harvest of the Trigard-treated crop. All other crops may be planted 18 months following the last application of Trigard.

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Crop	Rotation Interval (Weeks between harvest and planting)
Radishes	1
Sweet Corn	1
Wheat	1
Barley	5
Sugar Beets	5
Cabbage	36
Grain Sorghum	40
Sweet Potatoes	42

Refer to the Trigard 75W label for crops to be treated, further directions, precautions, and limitations. This label must be in the possession of the user at the time of application.

With respect to the statement "All other crops may be planted 18 months following the last application of Trigard," RCB defers to EAB on the need for residue data to support this statement.

According to the proposed use, the crops (radishes, sweet corn, and the crops of this petition) may be planted following harvest of a Trigard-treated crop. However, the residue data have been submitted only for rotation crops following the harvest of Trigard-treated tomatoes. (Radishes and sweet corn are being considered in PP#6F3332.)

Different soil residue deposition patterns could result from different Trigard-treated crops. As a result, rotated crops could have different residue levels due to rotation with crops other than tomatoes. Therefore, the presently proposed tolerances may not be adequate to cover residues in rotation crops planted after Trigard-treated crops other than tomatoes.

The proposed use should be revised to limit the rotation of the crops of this petition only with Trigard-treated tomatoes. If rotation of these crops with other Trigard-treated crops is desired, then additional residue data should be submitted. The residue data should show the residue levels expected in the rotation crops that follow each Trigard-treated crop.

Nature of the Residue

Plant and animal metabolism studies have been submitted in earlier petitions and reviewed (cf. PP#6F3329, memorandum of A. Smith).

Plants absorb, metabolize, and translocate residues of cyromazine. The significant components of plant residues are the parent compound cyromazine and its metabolite melamine. The nature of the residue in plants is adequately understood.

In animals, ingested cyromazine is metabolized and execreted with some deposition in eggs, milk, and meat. The significant components of the residues are the parent compound cyromazine and its metabolite melamine.

In ruminants (cows, goats, and sheep), the metabolite 1-methylcyromazine is reported to comprise a significant portion of the residues: up to 60 percent in liver and 38 percent in milk. Additionally, an unidentified component in milk made up 34 percent of the residue.

The petitioner has been asked to submit the study in which the 1-methylcyromazine is identified and to identify and characterize the unidentified component in milk.

The nature of the residues in nonruminants (hogs, horses, and poultry) is adequately understood. The significant components of the residues are the parent compound cyromazine and its metabolite melamine.

The nature of the residues in ruminants is not adequately delineated. A significant portion of milk residues has not been identified, and the identity of the major component in liver must be verified.

The exact expression for the tolerance in livestock meat, fat, and meat byproducts will be decided after we have reviewed the 1-methylcyromazine study requested and TB has been consulted for their opinion.

Soil Uptake Studies

In one study (PP#5F3180, Study No. ABR-82003), soil was treated with radiolabeled C^{14}-cyromazine at 0.05 lb ai/A and aged for 30 days. The soil residues were characterized, and the 0- to 3-inch layer had 72.3% cyromazine and 6.5% melamine at 30 days after treatment. At 121 days the soil residue consisted of 65.4% cyromazine and 17.8% melamine.

Wheat, sugar beets, and lettuce were grown in the treated soil. The plants were harvested and analyzed for C^{14} radioactivity to determine the uptake pattern for residues of cyromazine.

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Mature lettuce, sugar beet tops and roots, and wheat grain each had less than 0.009 ppm cyromazine equivalent residues. Mature wheat straw had residues of 0.112 ppm; the wheat grain hulls had 0.078 ppm; the wheat grain had less than 0.009 ppm. Residues in the wheat straw were further characterized and consisted of the parent compound cyromazine (72%) and the metabolite melamine (6%).

A study was performed in which rotational crops were planted in the same soil and containers in which celery was grown. Sweet corn and radishes were grown to maturity after the celery harvest. Sweet corn stalks, cob, and grain each contained only 0.02 ppm total radioactivity at 11 weeks. At 7 weeks the radish tops had 0.02 ppm and the radish roots had 0.01 ppm cyromazine-equivalent residues. The levels were reported to be too low for further characterization.

The soil was sampled by taking cores, and the samples were examined for radioactivity. The soil had 1.93-3.80 ppm (0- to 3-inch depth) during the course of the study. The residue levels were variable, and unextractable residues ranged from 97-210% of the total activity. The extractable residue was only 10-24%. At lower soil depths (3-6 inches and 6-8 inches), a similar erratic pattern of residues was noted: 0.02-1.74 ppm. These erratic results were thought to be due to poor sampling techniques (cores were taken). Samples were later obtained by removing each soil layer to a given depth instead of coring. At 0-3 inches, residues were 1.24 ppm; 3-6 inches (0.07 ppm); 6-8 inches (0.11 ppm). These results are consistent with expectations (i.e., the residue levels generally decrease with increasing depth.)

In another study (Report No. ABR-85009), various crops (lettuce, sugar beets, wheat, carrots, soybeans) were grown to maturity in soil in which tomatoes had been grown. The tomatoes had been treated with six applications of C^{14}-cyromazine at 0.25 lb ai/A.

At the time of the first crop planting (lettuce), soil residues were 0.32 ppm (0-3 inches), 0.14 ppm (3-6 inches), and less than 0.05 ppm (6-9 inches). At the time of the last crop harvest (soybeans), soil residue levels had not changed significantly: 0.34 ppm (0-3 inches); 0.15 ppm (3-6 inches); less than 0.05 ppm (6-9 inches). Only amounts of 5-7% of the radioactivity were extractable from the soil samples when using the methanol/water solvent system. (This is the initial extracting solvent system used in the residue method for plants.)

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In order to improve the extraction of the soil residues, samples were extracted using a 1-hour reflux with an 8:1:1 mixture of acetic acid:sodium acetate:methanol. This mixture extracted approximately 70 percent of the activity. The activity was characterized as the parent compound cyromazine (17-21%) and the metabolite melamine (45-82%). It is therefore apparent that, in some soils, the residues are present in bound forms.

Residues were taken up by the crops and translocated. Samples of lettuce, sugar beet roots and tops, wheat grain, and hulls each had less than 0.01 ppm cyromazine-equivalent residues. Wheat stalks had 0.04 ppm residues. Samples of immature carrot roots had 0.03 ppm, mature carrot tops had 0.05 ppm, and the mature carrot roots had < 0.02 ppm. The immature carrot tops had 0.19 ppm cyromazine equivalent residues. Characterization of residues in the immature carrot tops (0.19 ppm) showed cyromazine (14%) and melamine (79%). Activity in the other samples was reported to be too low to characterize.

For the immature soybeans, the stalks had 0.02 ppm at 60 days after planting. The mature soybean stalks had 0.04 ppm, the pods had 0.05 ppm, and the soybeans had 0.03 ppm cyromazine-equivalent residues.

The studies show that cyromazine-treated soils that have been planted to crops retain some cyromazine residues. The residues consist generally of free and bound forms of the parent compound cyromazine and its metabolite melamine. The residue is taken up by plants grown in the treated soils.

The foregoing plant metabolism and soil uptake studies are sufficient to reflect the metabolic behavior of cyromazine in plants in general. Therefore, the nature of the residue in plants is adequately understood. The significant components of the residue are the parent compound cyromazine and its metabolite melamine.

Analytical Method

The procedure entitled "Determination of Cyromazine and Melamine Residues in Crops" is the residue method for crop samples (Method No. AG-408). The method is discussed in connection with PP#5F3180 (see below for details). A chopped sample is refluxed in a water/methanol solvent system for 2 hours and cooled. An aliquot is evaporated to the aqueous phase and partitioned with a hydrochloric acid/dichloromethane mixture. The residues are extracted into the acidic phase, which is washed with hexane.

The acidic phase is cleaned up on an ion-exchange column, and the residues are eluted with an ammonium hydroxide/methanol solvent and evaporated to dryness. If needed, an additional cleanup with an anion exchange column is available.

The residue is taken up with methanol and determined by high-performance liquid chromatography (HPLC). The components cyromazine and melamine are determined as two separate peaks, and the results are expressed in terms of the parent compound cyromazine.

Untreated (control) samples of sweet corn ears and forage, radish tops and roots, celery, wheat forage, straw and grain, barley forage, straw, and grain, sorghum forage, fodder, and grain, cabbage plants and heads, sweet potato forage and roots, and sugar beet tops and roots had < 0.05-0.08 ppm cyromazine-equivalent residues (sweet corn ears had 0.06 and 0.08 ppm; the remaining control samples were all less than 0.05 ppm.)

The above control samples were fortified with cyromazine and its metabolite melamine at levels of 0.05-2.0 ppm. Recoveries were 58 to 151 percent.

The method's sensitivity is reported to be 0.05 ppm for cyromazine and 0.04 ppm for melamine (0.05 ppm when expressed as cyromazine). The method appears to be adequate for the determination of residues of cyromazine and its metabolite melamine in the subject crops.

The analytical method (No. AG-408) has been tested successfully on lettuce with cyromazine at 4 and 8 ppm and melamine at 1 and 2 ppm (PP#5F3180, memorandum dated May 8, 1985, Mark Law, ACS, COB). The method's detection limit was reported as 0.05 ppm. This method was judged to be adequate for enforcement of tolerances of 10 ppm on celery and 5 ppm on lettuce (PP#5F3180, N. Dodd memorandum dated May 16, 1985).

RCB concludes that the results of the method trial can be extrapolated to include the crops of this petition. Therefore, an adequate analytical method is available for enforcement of the proposed tolerances.

Storage Stability (PP#6F3329)

Several field crops (head lettuce, leaf lettuce, celery, mushrooms, and tomatoes) were sampled and analyzed for residues of cyromazine and melamine. The samples were stored frozen (-15 °C) for periods of 9 to 24 months. Analyses following frozen storage showed no loss of residues in any of the crops.

A study was performed to determine the stability of cyromazine residues in eggs during frozen storage. Blended egg samples were fortified with cyromazine at a level of 0.2 ppm, stored under freezer conditions (5 °F), and analyzed over a 23-month storage period. No significant change in residue levels were noted over the 23-month period.

The above studies show that cyromazine residues are stable under frozen storage for periods up to 24 months.

RCB concludes that the results of the method trial can be extrapolated to include carrots. Therefore, an adequate analytical method is available for enforcement of the proposed tolerance for carrots (3.0 ppm).

The petitioner should also be informed that the Residue Chemistry Data Requirements in 40 CFR 158.125(b)(15) require that regulated pesticide residues be subjected to one or more of the multiresidue procedures published in an Addendum to Pesticide Assessment Guidelines Subdivision O - Residue Chemistry Data Requirements for Analytical Methods in 40 CFR 158.125, Multiresidue Protocols. To our knowledge, such testing has not been conducted on cyromazine residues. Therefore, the following data are required:

> Residues of cyromazine and its metabolites must be subjected to analysis by the multiresidue protocols in any future tolerance request.

Protocols for Methods I, II, III, and IV are available from the National Technical Information Service under Order No. PB 86 203734/AS.

Eggs, Milk, and Meat

Cyromazine and Melamine (Method No. AG-417)

The method is discussed in connection with PP#2F2707 (see below for details).

A sample is extracted by homogenizing with acetonitrile: water (for meat) or methanol:water (for eggs), and the supernatant is decanted.

An aliquot is cleaned up by SepPak filtration followed by ion exchange chromatography. The residues are eluted from the ion exchange column with ammonium hydroxide:methanol and evaporated to dryness. The residue is taken up with water and cleaned up on an anion exchange resin. The residues are eluted with ammonium hydroxide:methanol, which is evaporated to dryness.

The residues are taken up and determined, as separate entities, by HPLC. The residues are expressed as cyromazine residues.

Untreated (control) samples of eggs and tissues had no detectable cyromazine equivalent (< 0.05 ppm) or melamine-equivalent (< 0.05 ppm) residues. Control samples of eggs and tissues were fortified with cyromazine and melamine each at levels of 0.05 to 0.50 ppm. Recoveries were 55 to 79 percent (cyromazine) and 70 to 99 percent (melamine).

Validation data were also submitted in PP#2F2707. Control samples of eggs and tissues were fortified with cyromazine and melamine at individual levels of 0.05 to 1.0 ppm. Recoveries were 66 to 119 percent.

The method (No. AG-417) has been validated with cyromazine at 0.3 ppm and melamine at 0.1 ppm on poultry tissues and eggs in a collaborative effort of four laboratories (USDA report dated October 24, 1984, R.L. Ellis - see PP#2F2707).

An EPA laboratory has also performed a successful method trial in connection with PP#2F2707. Eggs and poultry liver samples were fortified with cyromazine and melamine at levels of 0.05 and 0.1 ppm. Recoveries were 78 to 110 percent. The method was judged to be adequate for enforcement of cyromazine and melamine tolerances in eggs and poultry tissues.

RCB concluded that the analytical method is adequate for enforcement of the proposed tolerances for cyromazine and its metabolite melamine in milk, meat, fat, and meat byproducts, kidney, and liver. The expression ". . . meat, fat, and meat byproducts . . ." includes kidney and liver. Therefore, the tolerance expression should be revised to read ". . . meat, fat, and meat byproducts . . . ."

1-Methylcyromazine (Method No. AG-398)

The method is discussed in connection with PP#6F3332 (see below).

The compound 1-methylcyromazine is a metabolite of cyromazine in cattle or ruminants in general. Method No. AG-398 is used to determine residues of 1-methylcyromazine in milk and meat. The method has been validated by analysis of tissue and milk samples fortified with 1-methylcyromazine trifluoromethanesulfonate (TFMS). Also, validation data were provided through analysis of liver samples from goats fed radiolabeled C^{14}-cyromazine in the daily diet at levels of 5 and 50 ppm (see also Nature of the Residue, Animal Studies).

A sample is extracted by shaking (for milk) or homogenizing (for tissues) with acetonitrile:water and filtered. An aliquot of the extract is cleaned up on a cation exchange column, and the residues are eluted with ammonium hydroxide, mixed with methanol, and evaporated to dryness.

The residue is taken up in methanol, and the 1-methylcyromazine is determined by HPLC. The results are expressed in terms of cyromazine.

Untreated (control) samples of tissues (muscle, beef liver, goat liver, and blood) had no detectable 1-methylcyromazine-equivalent residues (< 0.05 ppm). Control milk samples also had no detectable 1-methylcyromazine-equivalent residues (< 0.01 ppm).

Control milk samples were fortified with 1-methylcyromazine at levels of 0.02 to 0.20 ppm. Recoveries were 79 to 93 percent. Control tissue samples were fortified with 1-methylcyromazine at levels of 0.05 to 5.0 ppm. Recoveries were 67 to 89 percent.

The method is adequate for the determination of 1-methylcyromazine in milk and tissues.

The extraction and cleanup procedures are essentially the same as those for cyromazine and melamine (Method No. AG-417 above). However, the 1-methylcyromazine procedure is shorter. Because of the similarity in the methods and the adequacy of the validation data, it is reasonable to assume that the results of the method trials can be extended to include the metabolite 1-methylcyromazine. As a result, a method trial will not be needed.

An adequate analytical method is available for enforcement of tolerances involving 1-methylcyromazine in meat and milk. This method should be incorporated into PAM-II as a lettered method.

Conclusions concerning the 1-methylcyromazine method are contingent upon the verification of the identity of this metabolite through our evaluation of the requested characterization and identification study.

Residue Data

This petition involves tolerance proposals for various crops (cabbage, sweet potatoes, sugar beets, wheat, barley, sorghum) grown as rotational crops with cyromazine-treated crops. The present residue data are obtained from crops that were planted in plots in which tomatoes had been grown.

A tolerance has been proposed for cyromazine in tomatoes at 1.0 ppm (PP#6F3333). The proposed use is for application to tomatoes grown in Florida for final marketing as fresh tomatoes. A maximum of 12 foliar applications at 0.125 lb ai/A is proposed.

The residue data are discussed below.

Wheat

Winter wheat was grown in Mississippi and Ohio in soil that treated tomatoes had been grown in. The tomatoes had received 7 or 12 applications of cyromazine at 0.125 or 0.250 lb ai/A. Samples of wheat forage, straw, and grain were collected and analyzed for residues of cyromazine and its metabolite melamine.

Fall forage samples were collected at 159 days after the last application to tomatoes (84 days after wheat was planted). The fall forage had 0.40 ppm combined residues of cyromazine and its metabolite melamine due to the 0.125 lb ai/A rate. Combined residues were 0.38 ppm due to the 0.250 lb ai/A rate.

Spring forage or hay samples were collected at 238-245 days after the last application to tomatoes (162-223 days after wheat planting). Combined residues were < 0.05 to 0.22 ppm due to the 0.125 lb ai/A rate and 0.27 ppm from the 0.250 lb ai/A rate.

Wheat straw and grain samples were collected at 300-306 days after the last application to tomatoes (230-278 days after the wheat was planted). The straw had combined residues of < 0.18 to 0.42 ppm from the 0.125 lb ai/A and < 0.15 ppm from the 0.250 lb ai/A rate. The grain had no detectable residue (< 0.05 ppm) from either rate.

Byproducts

Data are available that show if residues concentrate in the hull of the grain (PP#5F3180, Report No. ABR-82003). Soil was treated with C^{14}-cyromazine at 0.05 lb ai/A and aged for 30 days. Wheat was grown in the treated soil. The wheat grain had less than 0.009 ppm cyromazine equivalent residues. The wheat grain hulls had 0.078 ppm cyromazine equivalent residues.

The study (Report No. ABR-82003) is not a wheat processing study and, therefore, does not show if residues concentrate in the processing fractions of the wheat grain.

In the milling process, the wheat grain is processed to bran (outer covering of the kernel, about 14.5%), wheat germ (about 2.5%), and flour (about 83% of the kernel).

The petitioner's study (ABR-82003) provides residue data for the hull and the grain. It is not clear what portion of the grain the hull represents. [The bran consists of the outer layers of the kernel, the seed coat, and part of the endosperm. "From Wheat to Flour," The Wheat Flour Institute, revised 1981.] The petitioner should provide information that clearly indicates how the hull is related to the milling fractions (bran, flour, germ). If the hull residue data do not adequately relate to the milling fractions, then a wheat processing study that shows the residue levels in the milled fractions (bran, flour, germ) will be needed and should be submitted.

Residues in or on wheat grain, wheat forage, wheat straw, or wheat hay are not likely to exceed the proposed tolerances for these items.

Barley

Winter barley was grown in California in soil that treated tomatoes had been grown in. The tomatoes had received 13 foliar applications of cyromazine (Trigard 75W) at 0.125 or 0.250 lb ai/A. The barley was planted 46 days after the last application to the tomato crop. Samples of barley forage, straw, hay, and grain were collected and analyzed for residues of cyromazine and its metabolite melamine.

Fall forage samples were collected at 108 days after the last application to tomatoes (62 days after planting barley). The fall forage had combined residues of < 0.05 to 0.06 ppm due to the 0.125 lb ai/A rate and < 0.13 ppm due to the 0.250 lb ai/A rate.

Spring forage or hay samples were collected at 228 days after the last application to tomatoes (182 days after barley was planted). No detectable residues of cyromazine or melamine (<0.05 ppm) were noted due to the 0.125 lb ai/A rate. Combined residues of 0.06 ppm were noted due to the 0.250 lb ai/A rate.

Straw and grain samples were collected at 269 days after the last application to tomatoes (223 days after barley was planted). Combined residues in the straw were 0.98 to 1.27 ppm due to the 0.125 lb ai/A rate and 0.68 to 0.90 ppm due to the

0.250 lb ai/A rate. The grain had residues of 0.08 ppm due to the 0.125 lb ai/A rate and less than or equal to 0.05 ppm due to the 0.250 lb ai/A rate.

No data are submitted for the milled products (hulls, bran, pearl barley, flour) of barley. However, data have been requested for the related wheat grain, and such data can be used for the barley milled products when it is submitted.

Residues in or on barley grain are adequately covered by the proposed tolerance for the grain (0.10 ppm). There are no data for the barley grain which show the residue levels expected in the milling fractions (hulls, bran, pearl barley, flour). A processing study is needed. Alternatively, the wheat grain processing information requested above may be applied to barley.

Residues in or on barley forage, barley straw, or barley hay are not likely to exceed the proposed tolerances for these items.

Wheat and Barley Tolerances

The residue data for the small grain crops wheat and barley are obtained from States (California, Mississippi, Ohio) in which approximately 38 percent of the tomatoes are produced in the United States (Agricultural Statistics 1985). However, the number of samples and the geographical distribution for each crop may not be adequate when considered alone; these factors are adequate when the two crops are considered together. As a result, tolerance levels for the crops are likely to be more adequate and provide for a better statistical variation when the data for both crops are considered together.

Therefore, the following tolerances are considered appropriate and should be proposed.

Wheat grain	0.10 ppm
Barley grain	0.10 ppm
Wheat forage	0.50 ppm
Barley forage	0.50 ppm
Wheat hay	0.20 ppm
Barley hay	0.20 ppm
Wheat straw	1.50 ppm
Barley straw	1.50 ppm

Sorghum

Grain sorghum was planted in Mississippi and Texas in soils that tomatoes had been grown in. The tomatoes had received 12 foliar applications of Trigard 75W at 0.125 or 0.250 lb ai/A. The grain sorghum was planted 291-292 days after the last application to the tomatoes. Samples of sorghum forage, fodder, and grain were collected and analyzed for residues of cyromazine and its metabolite melamine.

The forage samples were collected 338-353 days after the last application to the tomatoes (about 46-60 days after sorghum planting). The forage had no detectable residues (< 0.05 ppm) of cyromazine or melamine from either application rate.

Samples of sorghum fodder and grain were collected 410-455 days after the last application to the tomatoes (about 118-162 days after sorghum planting). The fodder had < 0.05 to < 0.06 ppm, and the grain had no detectable residues (< 0.10 ppm) from either application rate.

Residues in or on sorghum grain, fodder, and forage are not likely to exceed the proposed tolerances. The tolerance levels for the forage (0.05 ppm) and the grain (0.10 ppm) represent the sensitivities of the residue method for these items. No real residues of cyromazine or melamine were detected in the grain or forage from the 1X or 2X application rates.

No data are submitted that show the residues expected in the sorghum grain milled products (flour, starch). However, the absence of detectable residues in the grain from the exaggerated rate indicate that any residues that might occur in the grain would not be higher than the proposed tolerance in the raw agricultural commodity sorghum grain. As a result, the proposed tolerance level is sufficient to cover residues that might result in the milled fractions. Therefore, no food additive tolerance is needed.

Cabbage

Tomatoes were treated in Mississippi and Texas with 12 applications of Trigard 75W at 0.125 or 0.250 lb ai/A. Cabbage were planted in rotation, and samples of forage and mature cabbage heads were collected and analyzed for residues of cyromazine and its metabolite melamine.

The cabbage forage samples had no detectable residues (< 0.05 ppm) 16-41 days after planting (305-308 days after last application to tomatoes) from either rate. The cabbage head samples also had no detectable residues (< 0.05 ppm) 99-102 days after planting (363-410 days after last application to tomatoes) from either application rate.

Residues in or on cabbage are not likely to exceed the proposed tolerance (0.05 ppm) from planting following treated tomatoes.

Sweet Potatoes

Tomatoes were treated in Mississippi with 12 applications of Trigard 75W at rates of 0.125 or 0.250 lb ai/A. Sweet potatoes were planted in rotation, and samples of sweet potato forage, fodder, and roots were collected and analyzed for residues of cyromazine and its metabolite melamine.

The forage samples had combined residues of < 0.05 to < 0.18 ppm at 62 days after planting (367 days after the last application to tomatoes) from the 0.125 lb ai/A rate. Residues were < 0.18 ppm from the 0.250 lb ai/A rate and the same intervals.

The sweet potato fodder had combined residues of < 0.05 to 0.15 ppm from the 0.125 lb ai/A rate and < 0.11 ppm from the 0.250 lb ai/A rate. The fodder and potato root samples were collected at 150 days after planting (455 days after last application to tomatoes). The roots had no detectable residues (< 0.05 ppm) from either tomato application rate.

Residues in or on sweet potatoes are not likely to exceed the proposed tolerance (0.05 ppm) as a result of rotation with treated tomatoes.

Sugar Beets

Tomatoes were treated in California with 13 applications of Trigard 75W at rates of 0.125 or 0.250 lb ai/A. Sugar beets were planted following tomato harvest. Sugar beet forage samples were collected 98 days following the last application (52 days after sugar beet planting) and analyzed for residues of cyromazine and its metabolite melamine. The forage samples had no detectable residues (< 0.05 ppm) from either application rate.

Sugar beet tops and roots were sampled 256 days after the last application to tomatoes (209 days after sugar beet planting). No detectable residues (< 0.05 ppm) were noted in the tops or the roots from either application rate.

No data are submitted that show the level of residues, if any, in sugar beet processing fractions (sugar, pulp, molasses). However, the absence of detectable residues in the roots from the 1X or 2X application rates indicates that if residues occur in the processing fractions or byproducts, then such residues would be adequately covered by the proposed tolerance (0.05 ppm).

Residues in or on sugar beet roots and tops and their byproducts would be adequately covered by the proposed tolerance.

Meat, Milk, Poultry, and Eggs

Feeding studies have been submitted and are summarized below.

Cows (Report No. ABR-83067 - PP#6F3332)

Lactating cows (two control cows and three groups of three cows each for treatment) were fed diets containing 5, 25, and 50 ppm cyromazine for periods up to 28 days. Milk samples were collected periodically and examined for residues. The animals were sacrificed on test days 14, 21, and 28, and tissue samples were taken for analyses. Residues were determined as cyromazine and its metabolites melamine and 1-methylcyromazine and expressed as cyromazine. Residue levels were generally highest at the 14-day interval and decreased thereafter.

The combined residues found in milk and tissues are summarized below.

	Combined Residues (ppm) at Feeding Levels		
Feeding Level (ppm)	5	25	50
Tissues			
Round Muscle	< 0.05 - 0.22	0.13 - 0.50	0.23 - 0.74
Tenderloin	< 0.05 - 0.07	0.06 - 0.29	0.20 - 0.37
Kidney	< 0.05 - 0.21	0.19 - 1.3	0.66 - 2.6
Liver	0.07 - 0.17	0.22 - 0.69	0.37 - 1.1
Omental fat	< 0.05	< 0.05	< 0.05
Perirenal fat	< 0.05	< 0.05	< 0.05
Milk	< 0.01 - 0.10	0.12 - 0.23	0.15 - 0.47

Poultry

Feeding studies were submitted earlier and summarized in PP#2F2707. The summaries are reported below.

Poultry Feeding Study (Report Nos. ABR-84082 and ABR-84028).

In these studies, 120 laying hens (1 control and 3 treatment groups of 30 birds each) were maintained on poultry feed containing 5 ppm cyromazine for 56 days. The dosed feeding period was followed by 14 days on untreated feed (depletion period). Birds were sacrificed at 14-day intervals, during the 56-day treatment period and at 1, 3, and 7 days after cessation of the treatment period. Tissue samples were taken and analyzed for residues of the parent compound cyromazine and its metabolite melamine. Egg samples were collected at 0, 1, 3, 7, 14, 28, 42, and 56 days during feeding with treated feed and at 1 to 7 days, 10, and 14 days during the depletion period. The whites and yolks were separated from the shell, pooled, and the shell was discarded. Analyses were performed on the pooled samples for residues of cyromazine and melamine.

Residue Results

Tissues

No detectable residues (< 0.05 ppm) of cyromazine were noted in the fat or skin at any time during the feeding period or the depletion period. Cyromazine was noted in lean meat (< 0.05 to 0.08 ppm) and liver (0.06 to 0.13 ppm) throughout the feeding period. No detectable residues (< 0.05 ppm) of cyromazine were noted in any tissues during the 7-day depletion period.

No detectable residues (< 0.05 ppm) of melamine were noted in poultry tissues (lean meat, liver, fat, skin) at any time.

Eggs

Detectable residues of cyromazine were first noted on day 3 of feeding and were 0.09 to 0.11 ppm. Overall residues of cyromazine during the feeding period (1 to 56 days) were < 0.05 to 0.11 ppm. During the depletion period, residues of cyromazine were 0.08 to 0.11 ppm on day 1. No detectable residues (< 0.05 ppm) were noted beyond depletion day 1. No detectable melamine residues (< 0.05 ppm) were noted at any time.

Several commodities in this petition may be used as livestock feed items. These are sugar beet tops, pulp, and molasses; cabbage; wheat grain, forage, straw, hay, and bran; barley grain, forage, straw, and hay; sorghum grain, fodder, forage, and hay. We can estimate the maximum level of residues likely to be ingested by livestock by using the proposed and estimated tolerance levels for the feed items and the percentage of the feed item in the diet of the livestock (i.e., tolerance level x percent).

The ingestion levels are as follows: beef cattle (0.26 ppm); dairy cattle (0.42 ppm); layer hens (0.10 ppm); broilers (0.07 ppm); hogs (0.10 ppm); horses (0.50 ppm); goats and sheep (0.50 ppm).

The level of residues likely to result in eggs, milk, and meat of livestock can be estimated through the use of the ingestion levels and the livestock feeding studies. For ruminants we assume that the residue consists of the parent compound and the metabolites melamine and 1-methylcyromazine. (The residue content has been discussed at length in PP#6F3329, cyromazine in carrots.)

The estimated levels are as follows:

Meat and meat byproducts of beef cattle	0.011 ppm
Meat and meat byproducts of dairy cattle	0.018 ppm
Meat and meat byproducts of hogs	0.004 ppm
Meat and meat byproducts of horses, sheep, and goats	0.022 ppm
Meat and meat byproducts of poultry	0.003 ppm
Fat of cattle, goats, hogs, horses, poultry, and sheep	<0.05 ppm
Milk	0.008 ppm
Eggs	0.002 ppm

Residues could occur in eggs, milk, meat, fat, and meat byproducts of livestock as a result of the above feed items [§180.6(a)(2)]. However, such residues would be adequately covered by the tolerances suggested by RCB in PP#6F3329 and established poultry tolerances [§180.414(a)(b) and (c)].

The tolerances suggested in PP#6F3329 are as follows:

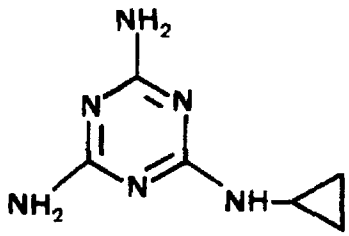
Meat and meat byproducts of cattle, goats, hogs, horses, and sheep	0.50 ppm
Fat of cattle, goats, hogs, horses, and sheep	0.05 ppm

We have concluded in PP#6F3329 that no estimate of residues in milk can be made until the unknown residues discussed under Nature of the Residue above are identified. We reiterate that conclusion here.

Attachments: Figure 1: Chemical Names and Structures
International Residues Limit Status Sheet

cc (with attachments): Circu., Smith, PP#6F3422, TOX, EEB, EAB, PMSD/ISB, Reading File:Typist:Kendrik:9/18/87:edited by: mt:9/30/87

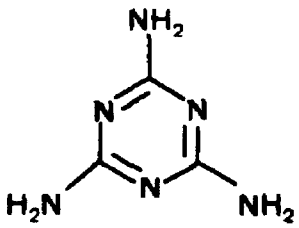
ABR-83067



Cyromazine

N-cyclopropyl-1,3,5-triazine-2,4,6-triamine

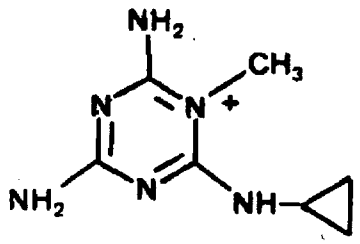
$C_6H_{10}N_6$ MW 166



Melamine

1,3,5-Triazine-2,4,6-triamine

$C_3H_6N_6$



1-Methylcyromazine TFMS

$C_8H_{13}N_6O_3SF_3$ MW324

FIGURE 1: CHEMICAL NAMES AND STRUCTURES

End of Document

231-20-R.Chem

3.0

Ciba Crop Protection

Ciba-Geigy Corporation
P.O. Box 18300
Greensboro, NC 27419-8300
Telephone 910 632 6000

August 9, 1995

Document Processing Desk (CAN/WD)
Office of Pesticide Programs - H7504C
U.S. Environmental Protection Agency
401 M. Street (SW)
Washington, D.C. 20460

Attn: Mr. George T. LaRocca, Product Manager (13)

SUBJECT: TRIGARD®; EPA REG. NO. 100-654; REQUEST TO WITHDRAW WHEAT AND BARLEY FROM THE PETITION TO ESTABLISH TOLERANCES IN VARIOUS COMMODITIES OF ROTATIONAL CABBAGE, SUGAR BEETS, SWEET POTATOES, SORGHUM, WHEAT, AND BARLEY (PP#6F3422)

Dear Mr. LaRocca:

With this document, Ciba Crop Protection hereby asks that the Agency withdraw, from Pesticide Petition No. PP#6F3422, the request to establish tolerances in raw agricultural commodities of wheat and barley. We do wish to pursue the establishment of tolerances for all remaining crops listed in the petition (cabbage, sweet potatoes, sugar beets, and sorghum). A response to the Agency's comments regarding this petition has just been submitted.

If you have any questions or comments regarding this correspondence, please feel free to contact me at (910) 632-2366.

Sincerely,

Greg Peters

Gregory T. Peters, Ph.D.
Senior Regulatory Manager

Enclosure: Completed Application for Pesticide Registration Form (8570-1)

cc: L. DeLuise

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Please read instructions on reverse before completing form. Form Approved. OMB No. 2070-0060. Approval expires 2-28-95

EPA

United States
Environmental Protection Agency
Washington, DC 20460

[X] Registration
[ ] Amendment
[ ] Other

OPP Identifier Number: 236476

Application for Pesticide - Section I

1. Company/Product Number	2. EPA Product Manager	3. Proposed Classification
100-654	LaRocca	[X] None [ ] Restricted
4. Company/Product (Name)	PM#	
Trigard® 75W	13	

5. Name and Address of Applicant *(Include ZIP Code)*
Ciba Crop Protection
Ciba-Geigy Corporation
P. O. Box 18300
Greensboro, NC 27419-8300
[ ] *Check if this is a new address*

6. **Expedited Review.** In accordance with FIFRA Section 3(c)(3)(b)(i), my product is similar or identical in composition and labeling to:
EPA Reg. No. _____
Product Name _____

Section - II

[ ] Amendment - Explain below.
[ ] Resubmission in response to Agency letter dated _____
[ ] Notification - Explain below.
[ ] Final printed labels in response to Agency letter dated _____
[ ] "Me Too" Application.
[X] Other - Explain below.

Explanation: Use additional page(s) if necessary. (For section I and Section II.)
Request to withdraw wheat and barley from the petition to establish tolerances in the RACs of rotational cabbage, sugar beets, sweet potatoes, sorghum, wheat, and barley (PP #6F3422).

Section - III

1. Material This Product Will Be Packaged In:

Child-Resistant Packaging	Unit Packaging	Water Soluble Packaging	2. Type of Container
[ ] Yes* [ ] No	[ ] Yes [ ] No	[ ] Yes [ ] No	[ ] Metal [ ] Plastic [ ] Glass [ ] Paper [ ] Other (Specify) _____
* *Certification must be submitted*	If "Yes" Unit Packaging wgt. / No. per container	If "Yes" Package wgt / No. per container	

3. Location of Net Contents Information	4. Size(s) Retail Container	5. Location of Label Directions
[X] Label [ ] Container		[ ] On Label [ ] On Labeling accompanying product

6. Manner in Which Label is Affixed to Product: [ ] Lithograph [ ] Paper glued [ ] Stenciled [ ] Other _____

Section - IV

1. Contact Point *(Complete items directly below for identification of individual to be contacted, if necessary, to process this application.)*

Name	Title	Telephone No. (Include Area Code)
Gregory T. Peters, Ph.D.	Senior Regulatory Manager	

Certification

I certify that the statements I have made on this form and all attachments thereto are true, accurate and complete. I acknowledge that any knowingly false or misleading statement may be punishable by fine or imprisonment or both under applicable law.

2. Signature	3. Title	6. Date Application Received (Stamped)
Greg Peters	Senior Regulatory Manager	
4. Typed Name: Gregory T. Peters, Ph.D.	5. Date: August 9, 1995	

EPA Form 8570-1 (Rev. 8-94) Previous editions are obsolete. White - EPA File Copy (original) Yellow - Applicant Copy

End of Document

INTERNATIONAL RESIDUE LIMIT STATUS

CHEMICAL CYROMAZINE

PETITION NO. 6F3422

CCPR NO. _____

Reviewer: ALFRED SMITH

Codex Status

/X/ No Codex Proposed Step 6 or above

Residue (if Step 9): _____

_____

_____

Crop(s) Limit (mg/kg)

Proposed U.S. Tolerances

N-CYCLOPROPYL-1,3,5-TRIAZINE-2,4,6-TRIAMINE AND ITS METABOLITE MELAMINE,

Residue: 1,3,5-TRIAZINE-2,4,6-TRIAMINE (RESULTING FROM ROTATION WITH CYROMAZINE-TREATED CROPS)

Crop(s)	Tol. (ppm)
Cabbage	0.05 ppm
Sweet Potatoes	0.05 ppm
Sugar Beet Roots & Tops	0.05 ppm
Wheat Grain	(0.05 ppm)
Wheat Forage & Straw	(0.5 ppm)
Wheat Hay	(0.2 ppm)
Barley Grain, Forage; Sorghum Grain & Fodder	(0.10 ppm)
Barley Hay	(0.05 ppm)
Barley Straw	(1.5 ppm)
Sorghum Forage	(0.05 ppm)

CANADIAN LIMIT

Residue: _____

_____

Crop	Limit (ppm)
NONE	

MEXICAN TOLERANCIA

Residue: _____

_____

Crop	Tolerancia (ppm)
NONE	

NOTES:

End of Document

REGISTRATION DIVISION DATA REVIEW RECORD

Confidential Business Information – Does Not Contain National Security Information (E.O. 12065)

1. CHEMICAL NAME: Cyromazine (Trigard 75 W) 6/16/86

2. IDENTIFYING NUMBER	3. ACTION CODE	4. ACCESSION NUMBER
6F3422	230	263321
~~6F3422~~	~~230~~	263320

TO BE COMPLETED BY PM

5. RECORD NUMBER: 175464
6. REFERENCE NUMBER:
7. DATE RECEIVED (EPA): 6/16/86
8. STATUTORY DUE DATE:
9. PRODUCT MANAGER (PM): Castillo / Kiak
10. PM TEAM NUMBER: 17

14. CHECK IF APPLICABLE

- ☐ Public Health/Quarantine
- ☐ Minor Use
- ☐ Substitute Chemical
- ☐ Part of IPM
- ☑ Seasonal Concern
- ☐ Review Requires Less Than 4 Hours

TO BE COMPLETED BY PCB

11. DATE SENT TO HED/TSS: 6-26-86
12. PRIORITY NUMBER: 49
13. PROJECTED RETURN DATE: 10-14-86

15. INSTRUCTIONS TO REVIEWER

A. HED
- ☑ Total Assessment - 3(c)(5)
- ☐ Incremental Risk Assessment - 3(c)(7) and/or E.L. Johnson memo of May 12, 1977.

B. SPRD (Send Copy of Form to SPRD PM)
- ☐ Chemical Undergoing Active RPAR Review
- ☐ Chemical Undergoing Active Registration Standards Review

C. ☐ BFSD
D. ☐ TSS/RD
E. ☐ Other

F. INSTRUCTIONS: Rotational Crop tolerances - wheat barley, sugar beets, cabbage grain sorghum, sweet potatoes

16. RELATED ACTIONS:

17. 3(c)(1)(D)
- ☐ Use Any or All Available Information
- ☐ Use Only Attached Data
- ☐ Use Only the Attached Data for Formulation and Any or All Available Information on the Technical or Manufacturing Chemical.

18. REVIEWS SENT TO
- ☑ TB
- ☑ EEB
- ☐ EF
- ☐ PL
- ☐ RCB
- ☑ EFB
- ☐ CH
- ☐ BFSD

19.	To	TYPE OF REVIEW	NUMBER OF ACTIONS: Registration	Petition	EUP	SLN	Sec. 18	Inert	MNR. USE	Other
HED		TOXICOLOGY								
HED		ECOLOGICAL EFFECTS								
HED	☑	RESIDUE CHEMISTRY		X						
HED		ENVIRONMENTAL DATE								
RD/TSS		CHEMISTRY								
RD/TSS		EFFICACY								
RD/TSS		PRECAUTIONARY LABELING	8							
BFSD		ECONOMIC ANALYSIS								

20.	21.	22.	23.	24.
☑ Label Submitted with Application Attached	☑ Confidential Statement of Formula	☑ Representative Labels Showing Accepted Uses Attached	Date Returned to RD (to be completed by HED)	Include an Original and 4 (four) Copies of This Completed Form for Each Branch Checked for Review.

EPA Form 8570-13 (Rev. 11-81) PREVIOUS EDITIONS ARE OBSOLETE.

End of Document

Appl & Suppl

Form Approved OMB No. 2070-0012

U.S. ENVIRONMENTAL PROTECTION AGENCY
OFFICE OF PESTICIDE PROGRAM (TS-767)
WASHINGTON, D.C. 20460

APPLICATION FOR PESTICIDE:

☐ REGISTRATION
☒ AMENDMENT A

Please read instructions on reverse before completing.

SECTION I

1. COMPANY/PRODUCT NO.	2. DATE	3. PRODUCT MANAGER	4. PROPOSED CLASSIFICATION
100-654	6-3-82	Castillo (17)	☒ GENERAL ☐ RESTRICTED

5. NAME AND ADDRESS OF APPLICANT (Include ZIP Code)

Agricultural Division
CIBA-GEIGY Corporation
P.O. Box 18300
Greensboro, NC 27419

☐ CHECK IF THIS IS A NEW ADDRESS

6. PRODUCT NAME
Trigard® 75W Insecticide

SECTION II

1. SUBJECT OF AMENDMENT

☐ RESUBMISSION IN RESPONSE TO AGENCY LETTER DATED _____

☐ FINAL PRINTED LABEL IN RESPONSE TO AGENCY LETTER DATED _____

☒ OTHER (explain below) Amendment to expand rotational crop statement to include wheat, barley, sugar beets, cabbage, grain sorghum, sweet potatoes

SECTION III

1. WILL THIS PRODUCT BE PACKAGED IN:

CHILD-RESISTANT PACKAGING ☐ YES ☒ NO

UNIT PACKAGING ☐ YES ☒ NO
If YES, unit pkg. wt. _____ No. per container _____

WATER-SOLUBLE PACKAGING ☒ YES ☐ NO
If YES, pkg. wt. 2 lb. No. per container 1

2. TYPE OF CONTAINER
☐ METAL
☐ PLASTIC
☐ GLASS
☒ PAPER
☐ OTHER (Specify)

3. LOCATION OF NET CONTENTS	4. SIZE(S) OF RETAIL CONTAINER
☐ LABEL ☒ CONTAINER	2 lb. bag

5. LOCATION OF LABEL DIRECTIONS	6. MANNER IN WHICH LABEL IS AFFIXED TO PRODUCT
☒ ON LABEL	☒ LITHOGRAPH ☐ OTHER (Specify)
☐ ON MATERIAL ACCOMPANYING PRODUCT	☐ PAPER GLUED ☐ STENCILED

SECTION IV

1. CONTACT POINT (Complete items directly below for identification of individual to be contacted, if necessary, to process this application).

NAME
Karen S. Stumpf

TITLE	TELEPHONE NO. (Include Area Code)
Regulatory Specialist	919-292-7100

2. SIGNATURE	3. TITLE
Karen S. Stumpf	Regulatory Specialist

4. TYPED NAME	5. DATE SIGNED
Karen S. Stumpf	6-3-82

7. DATE APPLICATION RECEIVED (Stamped)

EPA Form 8570-1 (Rev. 5-81) PREVIOUS EDITION IS OBSOLETE.

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Supplemental Labeling
Trigard® 75W Insecticide
EPA Reg. No. 100-654

Trigard is a 75% wettable powder which, when mixed with water, will control certain insect species on designated plants.

For leafminer control, apply 1/6 lb. Trigard 75W per acre as a foliar spray in a minimum of 50 gallons of water by ground equipment or 5 gallons by air, as leafminers first appear. Repeat applications at 7-day intervals or as necessary to maintain control.

Note: Do not exceed the number of applications for a given crop, or illegal residues may occur.

Rotational Crops

All crops on this label may be planted according to normal agricultural practices immediately following harvest of a Trigard 75W-treated crop. The following crops may be planted according to the designated interval from harvest of the Trigard-treated crop. All other crops may be planted 18 months following the last application of Trigard.

Crop	Rotation Interval (Weeks between harvest and planting)
Radishes	1
Sweet Corn	1
Wheat	1
Barley	5
Sugar Beets	5
Cabbage	36
Grain Sorghum	40
Sweet Potatoes	42

Refer to the Trigard 75W label for crops to be treated, further directions, precautions, and limitations.

This label must be in the possession of the user at the time of application.

Agricultural Division
CIBA-GEIGY Corporation
P.O. Box 18300
Greensboro, NC 27419

13544

R106093

Chemical:	**Cyromazine**
PC Code:	**121301**
HED File Code	**11500 Petition Files Chemistry**
Memo Date:	**03/25/2005**
File ID:	**00000000**
Accession Number:	**412-05-0094**

HED Records Reference Center
04/15/2005