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

Read 7-20-93

JUL 20 1993

OFFICE OF  
PREVENTION, PESTICIDES AND  
TOXIC SUBSTANCES

MEMORANDUM

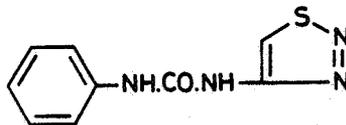
Subject: Thidiazuron (Dropp® 50WP; List D, Case 4092, PC 120301): 6(a)(2) Data from Rotational Crop Study. DP Barcode No. D188667. CBRS No. 11481. MRID No. 42660901.

From: Stephen Funk, Ph.D., Chemist *S. R. Funk*  
Reregistration Section II  
Chemistry Branch II - Reregistration Support  
Health Effects Division (H7509C)

Through: William J. Hazel, Ph.D., Section Head *W. J. Hazel*  
Reregistration Section II  
Chemistry Branch II - Reregistration Support  
Health Effects Division (H7509C)

To: Joanne Miller, PM 23  
Fungicide-Herbicide Branch  
Registration Division (H7505C)

Thidiazuron, or 1-phenyl-3-(1,2,3-thiadiazol-5-yl)urea, is a herbicide used for the defoliation of cotton. Tolerances have been established (40 CFR § 180.403) for the combined residues of thidiazuron and its aniline-containing metabolites in/on cottonseed (0.4 ppm), poultry and ruminant meat/fat/mbyop (0.2 ppm), eggs (0.1 ppm), and milk (0.05 ppm). A feed additive tolerance exists (40 CFR § 186.5600) for the same residue in/on cottonseed hulls (0.8 ppm). The structure of thidiazuron is as follows:



Recycled/Recyclable  
Printed with Soy/Canola Ink on paper that  
contains at least 50% recycled fiber

The label directions (Dropp® 50WP, 45639-89) specify a maximum application rate of 0.3 lb. a.i./acre in two applications or a single application not exceeding 0.2 lb. a.i./acre. There is a restriction on feeding foliage or gin trash to cattle. The following rotational crop restrictions apply:

Crop	Treatment to Planting Interval <sup>1</sup>
Small grain	2 weeks
Sorghum	2 weeks
Corn	2 weeks
Root crops (except carrots)	2 weeks
Legumes	2 months
Alfalfa	2 months
Leafy vegetables (except lettuce)	2 months
Lettuce	9 months
Carrots	9 months

<sup>1</sup> Do not use immature crops for food or feed.

### Conclusion and Recommendation

CBRS reiterates the Phase IV EFGWB requirement for new confined rotational crop studies (GLN §165-1). The results of these studies may indicate a need for field rotational crop studies and/or rotational crop tolerances or modified plant-back restrictions.

A copy of this Memorandum should be forwarded to the registrant to provide additional guidance in planning new confined rotational crop studies for compliance with reregistration requirements.

### **NOTE TO PM:**

Issues of phytotoxicity/efficacy are not in the purview of HED/CBRS. Consideration may want to be given to specifying the following label plant-back intervals: onions, 9 months; sugarbeets, 4 months; spinach, 6 months. Also, it appears that lettuce should not be rotated into cotton fields treated with thidiazuron.

### Detailed Considerations

Nor-Am Chemical Company in a submission dated 02/05/93, MRID No. 42660901, briefly reports adverse effects (FIFRA Sec. 6(a)(2)) found in a rotational crop plant-back study (GLN §165-2) conducted

at the Nor-Am Field Station, San Joaquin Valley, California in the fall of 1991. Cotton plants were defoliated with Dropp® 50WP (application rate(s) unspecified) and picked. The stalks were shredded, and the field was disked with stubble incorporation to a depth of about 4 inches. Several rotational crops were planted at monthly intervals to evaluate any residual effects of the thidiazuron. Results are summarized in Table 1.

Crop	Plant-Back Interval	Phytotoxicity <sup>1</sup>
Tomatoes	1 month <sup>2</sup>	No damage
Peppers	1 month <sup>2</sup>	No damage
Cantaloupe	1 month <sup>2</sup>	No damage
Garlic	1 month <sup>2</sup>	No damage
Wheat	1 month <sup>2</sup>	No damage
Broccoli	1 month <sup>2</sup>	No damage
Alfalfa	1 month <sup>2</sup>	No damage
Safflower	1 month <sup>2</sup>	No damage
Lettuce	2 - 4 month (0.20 lb. a.i./A - 0.30 lb. a.i./A)	Severe damage
	12 month	Moderate to extensive damage
Onions	6 month	Slight damage
	9 month	No damage
Sugarbeets	3 month	Slight damage
	> 3 month	No damage
Spinach	5 month	Slight damage
Carrot	9 month	No damage
<sup>1</sup> Redlined entries indicate damage under conditions of the label restrictions. <sup>2</sup> Interval assumed from the general description provided. "No injury was observed in any of the plantings...."		

The registrant speculates that several factors not typical of agricultural practice contributed to the apparent excessive carry-over of thidiazuron. The factors are minimal tillage, lack of soil moisture (minimal irrigation), light soil, and low soil organic matter content (0.5%). Low soil organic content would promote thidiazuron uptake by the roots of the rotated crop (A. W. Jones, EFGWB, Data Evaluation Record for GLN §165-1 for Thidiazuron, 04/28/93). However, low organic content soils are typical of those in which cotton are grown and would therefore be appropriate.

The Environmental Fate and Ground Water Branch in a Phase IV Review (Paul Mastradone, 04/30/93) rejected the registrant's submissions for confined rotational crop studies (GLN §165-1) and designated the studies ancillary. New studies were recommended, and the requirement for field rotational crop studies (GLN §165-2) was reserved. In the deficient studies (MRID Nos. 00030793, 41364907, 41364908), residue levels above the trigger action level of 0.01 ppm (*Pesticide Reregistration Rejection Rate Analysis/Environmental Fate Follow Up Guidance for Conducting Rotational Crop Studies*, EPA 738-B-93-001, 02/93) were found in several rac food/feed items. However, interpretation of the results is difficult because the soil concentration (0.2 ppm) was not related to the label application rate. Also, no metabolite identification was attempted, and only total radioactive residue level data were provided. Because of the deficiencies noted in the EFGWB reviews (Data Evaluation Record, L. Binari, 04/28/93; A. W. Jones, 04/28/93), the data should be considered supplemental only. Some pertinent findings are summarized in Table 2. Given that residues of thidiazuron are apparently found in the confined studies (soybeans and sorghum), carry-over and phytotoxic effects at periods up to one year from treatment to planting are not unreasonable. The lack of radiolabeled residues in sugarbeets (2 week plant-back) does not appear to correlate with the phytotoxic effects noted at 3 months for sugarbeets in the present submission.

New confined rotational crops studies, including identification of metabolites if the trr is substantially greater than 0.01 ppm and including the study of a leafy vegetable, will be required before determining the need for field rotational crop studies (GLN §165-2) and/or revised plant-back restrictions.

<b>Table 2: Selected Results of Ancillary Confined Rotational Crop Studies<sup>1</sup></b>		
<b>RAC</b>	<b>Plant-Back Interval</b>	<b><sup>14</sup>C-Thidiazuron (ppm)</b>
<b>Soybean seed</b>	<b>2 weeks</b>	<b>0.01 - 0.03</b>
	<b>6 months</b>	<b>&lt;0.01 - 0.07</b>
	<b>1 year</b>	<b>&lt;0.01</b>
<b>Soybean foliage</b>	<b>2 weeks</b>	<b>0.01 - 0.04</b>
	<b>6 months</b>	<b>&lt;0.01 - 0.04</b>
	<b>1 year</b>	<b>0.03 - 0.05</b>
<b>Sugarbeet root</b>	<b>2 weeks</b>	<b>&lt;0.01</b>
	<b>6 months</b>	<b>&lt;0.01</b>
	<b>1 year</b>	<b>&lt;0.01</b>
<b>Sugarbeet foliage</b>	<b>2 weeks</b>	<b>&lt;0.01</b>
	<b>6 months</b>	<b>&lt;0.01</b>
	<b>1 year</b>	<b>&lt;0.01</b>
<b>Sorghum foliage</b>	<b>2 weeks</b>	<b>&lt;0.01</b>
	<b>6 months</b>	<b>&lt;0.01 - 0.03</b>
	<b>1 year</b>	<b>&lt;0.01 - 0.03</b>
<b>Sorghum grain</b>	<b>2 weeks</b>	<b>&lt;0.01 - 0.01</b>
	<b>6 months</b>	<b>0.05 - 0.13</b>
	<b>1 year</b>	<b>&lt;0.01 - 0.03</b>
<sup>1</sup> From EFGWB reviews: A. W. Jones, 04/28/93; L. Binari, 04/28/93. Results are not definitive; substantial deficiencies were found in the submissions.		

cc: Circ., RF, Thidiazuron List D File, Thidiazuron SF, S. Funk.

RDI:W. Hazel:07/13/93:M. Metzger:07/19/93:E. Zager:07/19/93:

H7509C:CBRS:S.Funk:305-5430:CM#2:RM803-A:SF(0793.3):07/08/93.