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**FILE COPY**

To: Product Manager 23  
TS-767

From: Dr. Willa Garner <sup>14</sup>  
Chief, Review Section No. 1  
Environmental Fate Branch

Attached please find the environmental fate review of:

Reg./File No.: 2139-EUP-23

Chemical: THIDIAZURON

Type Product: cotton defoliant

Product Name: DROPP 50 WP

Company Name: NOR-AM

Submission Purpose: New rotational crop data to support removal of  
the restriction

ZBB Code: Sect 5

ACTION CODE: 726

Date in: June 27, 1980

EFB # 516

Date Completed: 9/12/80

Deferrals To:

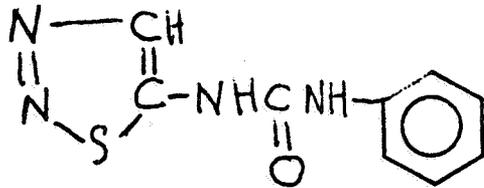
       Ecological Effects Branch

       Residue Chemistry Branch

       Toxicology Branch

Introduction. This a review of NOR-AM's request to have the 12 month rotational crop restriction removed from their EUP label (2139-EUP-23). The product is the cotton defoliant Dropp 50 WP (ai thidiazuron, 50%), and their EUP on cotton was granted an extension on 4-4-80.

Chemical. N- phenyl-N<sup>1</sup>-1, 2, 3- thiadiazol- 5 yl urea



thidiazuron

Past submissions. See thidiazuron reviews dated 11/14/78, 6/5/78, 8/5/77, and 8/9/76.

Directions for Use. See review of 11/14/78.

Discussion of Data. "Rotational Plant Uptake Studies With Thidiazuron" dated 6/11/80. Acc. no. 242669

This submission consists of seven separate studies, some of which, or portions of some of which, have been reviewed previously. A data summary is also included.

TAB

R-1 "Uptake of SN 49537 from Soil by Soybeans and Alfalfa-Final Report" dated 11/2/76.

This radiolabeled study was reviewed on 8/9/76. However, additional plant samples were taken at further times after sowing, and their analyses are now included.

R-2 "Rotational Plant Uptake Study With Radioactive SN 49537 - Final Report" dated 8/10/78.

This study was reviewed on 11/14/78. However, an appendix to that study dated 12/11/79 is now included. Also included is a report (progress II) on aerobic and anaerobic soil metabolism. No new data are included in this undated report, which was reviewed on 8/9/76.

49537/NA 35, 37, 38, 39, 50 "Rotational Plant Uptake of Thidiazuron Soil Residues." These are non-radiolabeled studies:

NA-35 This study, dated 5/18/77, was reviewed on 8/5/77.

NA 37 This study, dated 8/5/77, has not been reviewed previously.

NA 38 This study, dated 8/5/77, has not been reviewed previously.

NA 39 This study, dated 8/16/77, has not been reviewed previously.

NA 50 This study, dated 12/13/78, has not been reviewed previously. Also included under this tab are several rotational crop phytotoxicity reports. These are not reviewed.

Reviews and Comments.

NA 35. Our 8/5/77 review concludes that we cannot determine whether nonaniline portions of thidiazuron (SN 49537) will be taken up by rotational crops since samples were analyzed only for aniline-containing residues in this non-labeled study. (There were no (<0.02 ppm) aniline-containing residues found in the fruit of rotational corn, soybeans, squash and peanuts).

NA 37. Cotton was treated with thidiazuron at the normal time for defoliation at the rates of 0.25, 0.5, and 2.0 lb ai/A. After harvesting the stalks were chopped and rototilled into the top 6" of soil, and a cover crop of oats and vetch planted. These crops were disced in the following spring and "rotational" cotton was planted 9 months after treatment. Mature plants were harvested and analyzed 431 days after application for aniline-containing residues (as thidiazuron)

by previously-reviewed methods. Samples contained <0.02 ppm except two samples which contained 0.04 and 0.05 ppm. (Recoveries not reported).

Comments. Since only aniline-containing residues were measured, this study cannot be used to support removal of the rotational crop restriction. See our 8/5/79 review of study 49537/NA 35.

NA 38. Oats were treated at 0.25, 0.5, and 2.0 lb ai/A thidiazuron. This crop was disced after 3 months. Rotational cotton was planted 4 months after application, and mature plants harvested at the soil line 257 days post treatment and analyzed for aniline-containing residues. None (<0.02ppm) were found. (Recoveries not reported).

Comments. See NA 37 comments above.

NA 39. Millet was treated with thidiazuron at 2.0 lb ai/A. This crop was disced after 1 month. Rotational oats were planted two months after application and mature oat stems/heads, oat roots, and soil were analyzed for aniline-containing residues 185 days after application. No (<0.02 ppm) residues were detected in the stems/heads. Root samples contained 0.09 and 0.13 ppm. Soil samples contained between 0.16 and 0.38 ppm. (Recoveries not reported).

Comments. See NA 37 comments above.

NA 50. Soil (sandy clay) was treated with thidiazuron at rates of 0.25 and 0.5 lbs ai/A. Corn, soybeans, and sugarbeets were planted 314 days after treatment and mature plants harvested 392 days after application and analyzed for aniline-containing residues. All samples contained less than detectable residues (<0.02 ppm) except one corn sample (cob and kernel) which contained 0.03 ppm. Recoveries were 100-110% (for 0.2 ppm) for all plant tissues.

Comments. See NA 37 comments above.

R-1. UL-<sup>14</sup>C-phenyl-labeled thidiazuron was added to sandy loam soil to a level of 0.25 ppm. The soil was aged for seven days, and soybeans and alfalfa were sowed. After 4 weeks the plants were harvested, and aerial and root portions analyzed by combustion. Levels found (as thidiazuron) were 0.02 ppm in the fresh shoots and 0.2 ppm in the root portions for both crops (No recoveries given). This was reviewed on 8/9/76.

More mature samples are now included in the report (experimental conditions are the same). Soybeans were analyzed at 8 and 11 weeks after planting in addition to the 4 week harvest previous reported, and alfalfa at 8, 12, and 17 weeks in addition to the previously-reported 4 week samples.

For soybeans, the results can be summarized as follows. The average levels found in the 11 week samples were 0.04 ppm in the shoots and fruit and about 0.2 ppm in the roots. The levels in the shoots and fruit were higher than those observed in the 8 week samples while residues in the root portion remained essentially constant over the course of the study.

For alfalfa, the 17 week samples contained <0.01-0.03 ppm in shoots and fruit and 0.02 ppm, in the roots. (Recoveries not given for either crop).

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Comments. The new sample analyses added to this previously-reviewed study do not change our conclusion or allow this study to be used to support the removal of the rotational crop restriction for two reasons: 1) The seven day aging period is insufficient to classify this study as a rotational crop study. 2) The position of the label allows only monitoring of the aniline portion of the pesticide.

R-2 (Appendix). This appendix is an attempt to characterize the labeled residues in certain rotational crops from the Aug. 10, 1978 study which we reviewed on 11/14/78.

The history of the experiential samples is as follows. Loamy sand was fortified with 0.2 ppm of either UL-<sup>14</sup>C-phenyl-(P\*) or 5-<sup>14</sup>C-thiadiazole- (T\*) labeled thidiazuron. The soil was aged two weeks and soybeans, sugarbeets and sorghum planted. After six months the plants were removed, and the containers were resowed with the same crops. Mature plants were harvested at ca. six months (approx. one year after treatment) and separated into leaves plus stems, fruit, and root portions. The fruit portion of the sugar beets did not contain detectable (<0.01 ppm) levels of residues (by combustion). The fruit portions from soybeans and sorghum did, and individual samples of each were combined for further characterization.

The combined four samples contained the following total residues (determined as parent by combustion):

	<u>ppm (as parent)</u>
Sorghum - P*	0.09
Sorghum - T*	0.07
Soybeans - P*	0.05
Soybeans - T*	0.05

These samples were ground and extracted with methanol for one hour. <0.01 ppm of the radioactivity was methanol-extractable under these conditions. No recovery data were reported.

Comments. It is difficult to judge the validity of this study without recovery data for the methanol extraction procedure. If the method is effective, the label is likely to be chiefly plant-incorporated material.

Conclusions. There are two problems which would not permit removal of the 12 month rotational crop restriction for registration purposes. First, no leafy vegetable rotational crop studies have been submitted. Second, recovery data must be submitted for the methanol extraction procedure used to characterize the residues in rotational crops (R-2 appendix) to validate the conclusion that non-extractable radioactivity is incorporated into the plant matrix.

However, the 12 month rotational crop restriction may be removed from the EUP label. The cold studies indicated that aniline-containing residues are not taken up by rotational crops in detectable amounts, and the labeled studies (R-2) indicate that equivalent amounts of the phenyl ring and heterocyclic ring moieties are taken up into rotational crops. These data are sufficient to allow removal of the restriction for the purposes of this EUP.

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Recommendations. EFB concurs with removal of the 12 month rotational crop restriction from the 2139-EUP-23 label. However, we still require additional information if the restriction is to be removed from any registered labels:

1) A leafy vegetable rotational crop study must be submitted or an appropriate restriction placed on the label.

2) Recovery data must be submitted for the methanol extraction procedure used to characterize the residues in rotational crops (p2, "Appendix to Report-Rotational Plant Uptake Study with Radioactive SN 49537," dated 12/11/79)

Joe C. Reinert  
Review section 1  
EFB  
HED

