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

OFFICE OF
PREVENTION, PESTICIDES AND
TOXIC SUBSTANCES

MEMORANDUM

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SUBJECT: Review of Final Study Report on Tile Drain Study for Isoxaflutole in New Holland, Ohio.

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DATE: August 21, 2002

This memorandum presents our review of the final study reports for the fifth of five tile drain monitoring studies conducted with isoxaflutole, the active ingredient of BALANCE® WDG herbicide. The September, 1998 conditional registration (EPA Reg. No. 264-567) for this chemical required five tile drain studies in midwestern corn fields to assess the potential for isoxaflutole or its metabolites to contaminate water resources. The concern was that water drained from such fields might flow to a stream large enough to be used for irrigation, and then be used on other sensitive crops, thereby causing damage to those crops. There was also a concern for endangered plant species.

The study reviewed in this memo had to be extended for a year, from 1999 to 2000, because drought conditions in 1999 resulted in no flow from the tile drain system after day 6 of the study, and no flow in the receiving ditch after several weeks.

The submission of this final study report completes EFED's requirements for studies of isoxaflutole in tile-drained fields.

Conclusions

The conclusions reached in this memo are essentially the same as in the previous memo on

this study (DP barcode D278258, Eckel to Kenny memo dated 2/15/02). The New Holland, Ohio tile drain study reviewed in this report indicates the following:

1. Tile drain water was contaminated with the first metabolite of isoxaflutole (RPA202248 or DKN) at concentrations up to 14 parts-per-billion immediately following application of 2.25 oz ai/acre in the 2000 growing season. This is above the concentrations (about 4 ppb) observed to cause reduction in cotton seed yield.

2. Consistent with its environmental fate properties, large spikes in DKN concentration are well-correlated with rainfall events, indicating that this transformation product is very mobile, and tends to run-off to surface water, where *it can contaminate potential irrigation water*.

3. Little or no isoxaflutole or metabolites were observed in drain or ditch water during the 1999 drought. This is consistent with the main transport mechanism of isoxaflutole being runoff from precipitation.

4. When precipitation resumed in the winter of 1999-2000, the phytotoxic metabolite RP202248 (or DKN) was observed at concentration approaching 1 ppb in drain water, over 0.1 ppb in ditch water, and over 0.01 ppb in Compton Creek. This metabolite was consistently observed from December 1999 through May 2000.

5. The longer persistence of isoxaflutole under drought conditions indicates a potential for year-to-year carryover in the soil. Longer persistence was also observed in the California terrestrial field dissipation study conducted before the first conditional registration in 1998. The impact of isoxaflutole on water resources may be delayed by drought. This behavior is also consistent with the main transport (dissipation) mechanism being runoff.

6. The persistence of RPA202248 in soil under drought conditions also raises a concern for off-site transport by wind-blown soil. This could result in damage to sensitive crops, as was seen in the recent incident with a sulfonylurea herbicide impacting crops in Idaho. EFED has already discussed this scenario with the Registration Division, and language restricting the use of isoxaflutole to areas receiving at least 15 inches of precipitation plus irrigation annually has already been incorporated into the label (EPA Reg. no. 264-567, label accepted 4/11/2002).

7. The registrant's conclusion that no phytotoxic symptoms were observed at any study site *was not supported by any data* at all in the final reports. This conclusion is rejected until properly supported.

Description of the Study

The 17-acre field studied was located near Good Hope, New Holland Road, Wayne Township, Fayette County, Ohio. BALANCE® WDG herbicide was applied at the maximum labeled use rate in 1999 and 2000. A tracer substance (potassium bromide salt) was also applied at 100 lb/acre in 1999 only. Field corn was then planted, and the concentrations of isoxaflutole and its two metabolites (RPA202248 or DKN for diketonitrile; and RPA203328) were monitored in tile drain water, ditch water, and stream/river water daily for 100 days, then every 10-14 days for 10 events. Data on rainfall, and tile drain flow rate were also collected. The study was repeated on the same site in 2000. The study protocol also called for observations of phytotoxic symptoms (bleaching of chlorophyll) to be made along the ditches.

Results

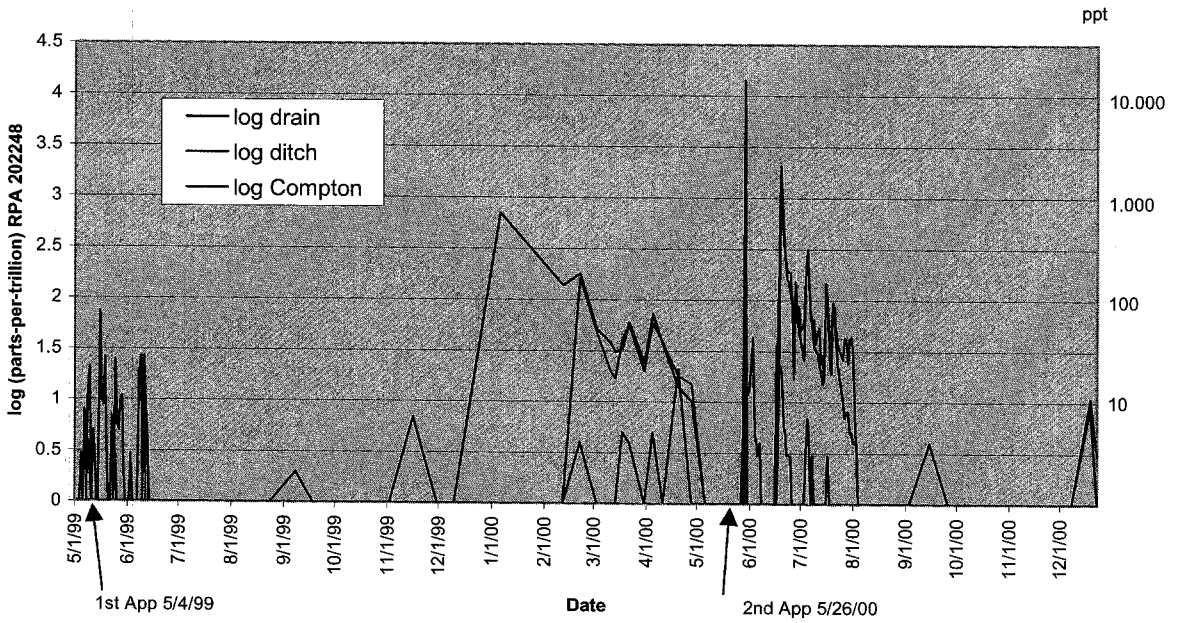
The data for the first metabolite of isoxaflutole (RPA202248 or DKN), which is known to be herbicidally active and is more mobile than the parent chemical, is graphed in Figure 1. The concentration scale in Fig. 1 is logarithmic in parts-per-trillion.

Due to the drought in 1999, there was no flow in the tile drain system after day 6 of the study. Concentrations of RPA202248 below 0.1 ppb were observed in the ditch water and Compton Creek up to the middle of June. Because no runoff was generated, this contamination may be the result of base flow (discharge of contaminated ground water to the ditch), transport of contaminated soil, or may be due to contamination from isoxaflutole use upstream (in the Creek).

RPA202248 was observed in the tile drain discharge, ditch water and creek over the winter in response to the resumption of rainfall, as discussed above.

The 2000 data show the more typical pattern of high concentration shortly after application and gradual decline over the growing season. Low (10 ppt) concentrations were observed in the drain and ditch as late as December 2000.

Figure 1: New Holland OH 2-year Tile Drain study



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