(TDR03R) DATA EVALUATION RECORD PAGE 107 OF 134

5-6-83

CASE GS0097 CHLOROTHALONIL PM 400 ~~08/03/82~~

CHEM 0819.1 Chlorothalonil (tetrachloroisophthalon

BRANCH EEB DISC 40 TOPIC 05103043

FORMULATION Bravo 500 40.6% a.i.

FICHE/MASTER ID R10CHL06 CONTENT CAT

Shults, Stephen K. 1982. Aquatic Field study with Bravo 500. An unpublished study submitted by Diamond Shamrock. Data Acc # 071552

SUBST. CLASS = S.

DIRECT RVW TIME = (MH) START-DATE END DATE

REVIEWED BY: Daniel Rieder
TITLE:
ORG: EEB/HED
LOC/TEL: RM 1101

SIGNATURE: Daniel Rieder DATE: 5/6/83

APPROVED BY:
TITLE:
ORG:
LOC/TEL:

SIGNATURE: DATE:

1

DATA EVALUATION SHEET

1. CHEMICAL: Chlorothalonil

2. FORMULATION: Bravo 500 40.6% a.i.

   Shaughnessy Number: 081901

3. CITATION: Shults, Stephen K. 1982. Aquatic field study with Bravo® 500. An unpublished study submitted by Diamond Shamrock. Data Acc # 071552.

4. REVIEWER: Daniel Rieder
   Wildlife Biologist
   EEB/HED

5. REVIEW DATE: 5/6/83

6. TEST TYPE: Aquatic Field Study

   Material: Bravo 500®

7. RESULTS: The study suggests adverse acute effects to bluegill but the results are inconclusive.

8. REVIEWERS CONCLUSION: The study does not fulfill the requirements for an aquatic field study for use of chlorothalonil on soybeans. The purpose of this study was to show that when used under typical "soybean" growing conditions chlorothalonil does not kill fish or show up as hazardous residue levels in fish water or sediment in adjacent aquatic habitat. The study site did not represent a typical soybean ratio of drainage basin to pond size i.e. the pond was too big (3.8 acres and approximately 7 acre-feet) compared to only an 8.3 acre treated field.

   Furthermore, it suggested acute adverse effects to bluegill even under these less than typical conditions; the deaths wereattributed to a parasite. The residue analysis does not seem to be conclusive.

METHODS

The field study was conducted at St. Michaels, Md. Bravo 500 was applied 3 times to 8.3 acres of cropland planted in soybeans. Application was by ground vehicle at a rate of 2.75 pints (1.4 lbs a.i.) per acre. Application dates were September 1, 15, and 29, 1981.

On a predetermined schedule (each spray day, 3 days and 10 days after each spray day and 24 days after the third spray for a total of 10 sampling days) sampl es of pond water, pond sediment, and caged bluegill and channel catfish were taken. After significant rainfall, runoff bottles were collected and replaced in the two main runoff channels of the spray field. Additionally 1 day and 3 days after each of seven runoff events, pond water from both ponds were collected. All collected samples were packed on dry ice for shipping.

A 1.5 acre pond was used as a control, the experimental pond was 3.8 acres. Eight cages were placed in each pond, is sets of two. One cage in each set was for bluegill, the other was for catfish. A hundred fish were placed in each cage. These fish were observed for mortality and sampled for residues. Six catfish and 6 bluegill were sampled from each cage each sampling day.

RESULTS

Residues: EAB's review of the residue sampling aspect of this filed study is not available yet. Analysis showed that runoff from the treated area contained chlorothalonil. Analytical measurements ranged from 11 to 178 ppb with a mean of 77 ppb chlorothalonil. The pond water and sediment measurements were varied showing residues of chlorothalonil in the control pond and in pre-application samples as well as in the experimental pond after treatment. Residues in fish were inconclusive because chlorothalonil was found at low levels in both experimental and control fish samples.

Based on these results it appears that chlorothalonil could transport from a treated area via runoff. However this study does not seem to show that chlorothalonil dissipates from the environment before it can buildup to measureable concentrations in pond water, sediment and fish.

EEB's final conclusion on whether the residue analysis part of this study is useful will be post poned until EAB's review is available.

FISH MORTALITY:

No catfish mortality or intoxication occurred in the experimental pond throughout the study. One catfish was found dead in the control pond at station No. 4 on T_2+3. All other catfish appeared normal and healthly at that time period and throughout the study. It can be concluded that field application of Bravo 500 had no effect on caged channel catfish.

Throughout the study wild birds (mallard ducks, Canadian geese, sea gulls and cattle egrets) were a problem for the caged fish. On numerous occasions birds were seen roosting on the tops of the fish cages. These birds were possibly implicated in opening the tops of the floating cages and in release or eating of the caged fish. In one particular instance (T_2+3) the bluegill cage at station 4 in the experimental pond was damaged and the net was down. All bluegills except three either escaped or were eaten. The three remaining fish were taken for the T_2+3 whole bluegill sunfish sample. The cage was repaired and restocked with bluegill sunfish from the Biospherics Laboratory holding tank on T_2+10. Catfish numbers were also reduced in the experimental pond stations 3 and 4 by T_3+10. Insufficient numbers remained for all samples to be taken and only whole catfish were sampled at station 4 on T_3+10 and T_3+24 and station 3 on T_3+24.

All bluegill sunfish mortalities are presented in Tables 1 and 2.

TABLE 1

FISH MORTALITIES - CONTROL POND

	Bluegill Sunfish Deaths Station[a]			
Study Day	1	2	3	4
T_0	0	1	2	0
T_1+3	0	0	0	0
T_1+10	0	0	0	0
T_2	0	0	1	0
T_2+3	0	0	0	0*
T_2+10	0	0	1	0
T_3	0	0	0	0
T_3+3	0	0	0	0
T_3+10	1	0	0	0
T_3+24	0	0	0	0
Preliminary Mortality Total	0	1	2	0
Test Mortality Total	1	0	2	0

*1 dead catfish.

[a]Station 1 near shore; Station 2 near shore; Station 3 deep; Station 4 far shore.

TABLE 2

FISH MORTALITIES - EXPERIMENTAL POND

Bluegill Sunfish Deaths

Study Day	Station[a] 1	2	3	4
T_0	3	0	6	5
T_1	0	0	0	0
T_1+3	0	0	0	0
T_1+10	0	0	0	0
T_2	0	2	0	0
T_2+3	0	0	0	0
T_2+10	0	0	0	0
T_3	0	0	0	0
T_3+3	0	0	0	0
T_3+10	27[b]	11[b]	0	3[b]
T_3+24	2	0	0	0
Preliminary Mortality Total	3	0	6	5
Test Mortality Total	29	13	0	3

[a]Station 1 near shore; Station 2 near shore; Station 3 deep; Station 4 far shore.

[b]Sampled fish appeared healthy, some remaining fish showed fin and tail rot fungus. Pond water temperature dropped 5°C from $T3+^3$ to T_3+10.

Prior to the T_1 spraying, 3 bluegill mortalities in the control pond were observed. In the experimental pond, 14 dead bluegill were noted prior to study initiation. Of the pre-test mortalities in the experimental pond over 78 percent occurred at either the deep station (Number 3) or the far shore station (Number 4).

During the study 3 additional mortalities were observed in the control pond, one at station 1 and two at station 3. All other control fish appeared healthy throughout the study. In the experimental pond, a total of 45 deaths were noted during the study period. The majority (91 percent) of these mortalities were observed on the T_3+10 sampling day. Analysis of the mortality data revealed that 93.3 percent of the total mortality occurred at the 2 near shore stations.

During the study observations of bluegill behavior were noted. Of particular note was bluegill sunfish caged in the experimental pond were generally thin and did not seem to be feeding as well as catfish on sampling day T_1+10. However, their other activity was normal and they appeared to be healthy. Another point was noted concerning the experimental bluegill at stations 1 and 2 on T_3 + 10. Some of the fish showed tail and fin fungus, however normal healthy fish were also present at both stations.

In order to determine if the fish mortalities could have been due to disease, 25 representative fish specimens sampled on day T_3+24 were sent to Dr. Thomas Welborn at Mississippi State University for analysis. Due to shipping delays some deterioration of some samples occurred and bacterial examination was not possible. Dr. Welborn assessed both bluegill sunfish and catfish from both the control pond and the experimental pond for gross pathology. An eye nematode (Philometra interoculus) was noted in bluegill from the experimental pond which were 60 mm total length or larger. The bluegill were from Stations 1, 2, and 3. No nematode was found in any fish from the control pond. The nematode does effect death in fish and could have been a factor in the bluegill mortality observed.

Throughout the study, no deaths in the native populations of fish in either pond were observed. Additionally, the majority of the rainfall (3.82 of 5.02 inches) and therefore the majority of the run-off occurred before the T_3+3 sampling and to that date only 2 experimental bluegill mortalities since the initial spraying had been observed. From the T_3+3 sample period to the T_3+10 sample period, the recorded rainfall was only 0.4 inches. Therefore, it was not considered that the bluegill mortalities at T_3+10 were a result of Bravo 500 fungicide residues.

REVIEWERS EVALUATION

The purpose of this study was to show that chlorothalonil is safe to fish when used on soybeans. This was to be achieved through a combination of residue analysis and observation of effects to caged fish in both an experimental pond and a control pond.

This study may provide some useful information in that it suggests that following treatment chlorothalonil will be carried away in surface water runoff. However it does not fulfill the requirements to show chlorothalonil is safe to fish when used on soybeans. The following summarize the deficiencies:

1. The test site was not typical as to the size of the pond relative to the size of the treated field. The original protocol called for a 10 acre field surrounding a 1 acre pond. A subsequent change EEB agreed to called for a 1/2 to 1 acre pond surrounded by a 5-acre treated field. The study was actually conducted using a 3.8-acre pond receiving runoff from a 8.3-acre treated field which bordered it on one side. It is the reviewers opinion that this scenario is less than typical for soybeans with regards to acreage of treated area compared to the receiving pond.

2. Furthermore in relation to site selection, the protocol indicated a pond surrounded by a treated field. The test pond was not surrounded at all, rather it was bordered on one side. The significance of this is that the pond received runoff from other sources including a swamp which presumably flowed into the pond. This additional runoff would dilute any residue laden water.

3. By explaining the substantial bluegill mortality as the result of a parasite, the researcher virtually eliminates the observation of caged fish as a useful aspect of the study making it essentially a residue analysis study. On the other hand, if the fish observation is to be maintained as a useful part of the study, it can only be interpreted as an effect of the chemical. Possibly the chlorothalonil in the water made the fish more susceptable to the nematode. In any case the purpose of the study is not achieved because it does not show that it is safe for fish chlorothalonil is used on soybeans.

4. Residue analysis like the bluegill mortality may be discarded as not useful because of the inconsistent results. If it is accepted it can only be construed as showing that chlorothalonil will transport from a treated area via runoff. Again this study fails to show that chlorothalonil would be safe to fish when used on soybeans at the label rates.

CONCLUSIONS

This study does not fulfill the requirements for a field study with soybeans.
Rationale: See Reviewers Evaluation Above

Repairability: Not repairable