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TYPE PRODUCT(S): I, D, H, F, N, R, S Insecticide/Nematicide

DATA ACCESSION NO(S). \_\_\_\_\_

PRODUCT MANAGER NO. J. Ellenberger (12)

PRODUCT NAME(S) Temik

COMPANY NAME Union Carbide Company

SUBMISSION PURPOSE Submission of field monitoring data

SHAUGHNESSEY NO.

CHEMICAL, & FORMULATION

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Environmental Safety Review  
Fish and Wildlife

100.0 Submission Purpose: A field monitoring study was submitted by Union Carbide for review. This study was required for the registration of Temik.

103.51 Field Study

The object of the study was to evaluate the effects of Temik to avian and mammalian species. The study was conducted between May 7 and June 14, 1983 on six corn fields ranging in size from 15 to 47 acres near Blissfield, Michigan. Methods used to evaluate impacts to avian and mammalian species included a ten minute observation period followed by a perimeter walk during which all birds and mammals observed were recorded as well as their sign. In addition during these perimeter walks curcuss searches were made, bird terretories were plotted, and behavioral oservations made.

The report indicates that no bird mortality was observed or no other indication of treatment impacts to avian species was noted two dead mice were found and believed to have been killed from the treatment. For other mammals no change in activity patterns were observed, but it's noted, observations were too limited to permit analysis. The report concluded that Temik in corn can be used safety relative to wildlife when applied according to label directions.

104.0 Discussion

This field study was initiated prior to EEB's review of the proposed protocol (See memo from Bowen dated 7/5/83). This memo points out that due to insufficient details on many aspects of the study, as well as other deficiencies, the merits of the proposed tests could not be made. And since the study had already been initiated the acceptability of the study would be deferred until completed.

As anticipated in the above referenced memo, the study design was insufficient to evaluate impacts to non-target species. The major problems are due to:

- (1) Scant details given on procedures used.
- (2) Size of plots and area sample for each plot restricts the usefulness of the data collected.
- (3) Combining most, if not all, activities during one treatment survey.

- (4) Reliability of carcass searches, that is, if birds were killed would they have been found.
- (5) Planting patterns among the fields were not uniform, fields were not comparable, planting dates were not the same, and observations were too limited to assess impacts to mammals.

The attached DER discusses these points further.

107.0 Conclusion

EEB has reviewed the field study submitted by Union Carbide on Temik applied in corn, which is a requirement for Registration. This study due to the reasons given in section 104.0 of this review and as discussed in the attached DER is inadequate to support the Registration of Temik.

Ed Fite, Wildlife Biologist  
Ecological Effects Branch

*Ed Fite 2/17/84*

Norm Cook, Section Head  
Ecological Effects Branch

*Norm Cook 2/17/84*

Clayton Bushong, Chief  
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## Data Evaluation Record

1. CHEMICAL: Temik (Aldicarb)
2. FORMULATION: Temik 15C
3. CITATION: Ashton, A. D. and W.B. Jackson. 1983. Temik Field Trial (Michigan). Unpublished report submitted by Union Carbide to EPA. Ass. No. 251947.
4. REVIEWED BY: Ed Fite  
Wildlife Biologist  
EEB/HED
5. DATE REVIEWED: 2/6/84
6. Test Type: Field Study
7. Reported Results
  - (1) No bird mortality was observed number of singing males were similar adjacent to treated and control fields. No evidence of treatment impact was found for area birds, including raptors.
  - (2) Two dead mice were found, presumably killed by feeding on newly emerged corn seedlings.
  - (3) Other small mammals and large mammals, including fox, were not observed in large numbers; but their activities and general frequency of sightings did not change during the study.
8. Reviewer's Conclusions: The study does not provide adequate data to assess the impacts of Temik 15G to non-target species.
9. Methods and Materials
  - A. Test Procedures

This study was reported to be conducted between May 7 and 14 June 1983. Four treated plots and two "reference plots", ranging from 15 to 47 acres, were established near Blissfield, Michigan. Methods included a 10-minute observation period at each field followed by a perimeter walk and transect surveys. The total field area surveyed accounted for approximately 10% of the total acreage. Bird numbers and species and carcass recoveries for birds and mammals were recorded on each perimeter/transect walk. Territorial (singing) males in field border areas were mapped during the walk.

Pre-treatment observation and carcass recovery were for at least three days in each field. Additionally, observations, carcass recovery, and mapping were conducted daily for the first week; every other day, during the second week post-planting. Some variation occurred in the schedule due to weather conditions.

General observations were made of mammals and their burrows and tracks. Extensive checks also were made in the ditch bank areas to recover birds or mammal carcasses.

Temik 15C was applied in accordance with the label granted under a Federal Experimental Use permit (264-EUP-67). The rate was 1.5 lb ai/A applied in a 7" band and incorporated at planting. Since Temik ~~is~~ highly toxic, particular attention was paid to ends of rows, where spillage could be a problem. Surface spills of fertilizer were noted in one field; Temik granules were not observed on the surface, however.

#### B. Statistical Analysis

None used

#### C. Discussion & Results

The report indicates that 4019 birds of 93 species were observed during this study and that the Red-wing Black Bird was the predominant species in the study area, followed by the Song Sparrow, Horned Lark, and Grackle.

The monitoring of Red-winged Blackbirds was believed to reveal bird numbers from pre to post treatment periods remained constant. They cited the counts from the Isley field as an example, ~~where~~ <sup>where</sup> ten pairs were seen consistently throughout the trial. However, they note, a decline in Redwing numbers in both Fisher #1 and Fisher #2 fields. The large drop at Fisher #1 was attributed to change in habitat. This field, it's explained, had been planted in clover and supported a good number of birds, but many birds were displaced when the field was plowed. The decline in Fisher #2, was not speculated on, except for noting this was an untreated control site. Also noted for both these fields was that both Bobolinks and Song Sparrows moved out at plowing time.

Grackle activity was reported to have increased in most fields after planting. This was believed due partly to the late May planting of the Eisenman, Goetz, and Brubaker fields, thus coinciding with the establishment of Grackle territories.

Bird activity in ditch banks were reported to have continued throughout the trial. Again, the ten Red-wing pairs at the Isley site were given as an example, indicated all had nests with eggs, and when last checked, 8 of the 10 nests had young. They also reported a similar pattern at the Fisher #2 control field.

No bird carcasses were reported to have been recovered. Two white-footed mice carcasses were reported found, one from the Goetz field and one from the Eisermann field. Analysis of the mice by Union Carbide showed residues of 0.87 and 2.6 ppm in the body, respectively, and residues of 0.26 and 1.1 ppm, respectively, in the skin. Both mice were reported to have had corn sprout material in their stomachs and were found within 48 hours of corn emergence. They believed the most likely cause of death of these mice was Temik.

Few mammalian species were reported seen during the study. Reason given for this was that twilight or nocturnal observations were not attempted. A female red fox with two cubs were reported observed at a ditch-bank den adjacent to the Eisermann field, which remained active during the observation period. Deer and burrowing animal sign were also noted with no observed change in activity pattern; however, it was felt observations were too limited to permit formal analysis.

Raptors were rarely seen, however they indicated that no indication of decreased numbers was deserved.

## 10. Reviewers Evaluation

### A. Test Procedures

Several aspects of the study design raise question with this study for evaluating hazards posed to non-targets from the use of Temik 15C. In part, some of the questions arise due to the scant details given on procedures used in this study. However, even with adequate information on procedures, other questions deter from interpretation of results.

The report indicates that censuses of avian species were made using a 10-minute observation period followed by a perimeter walk and transect survey so that 10 percent of the total acreage was included. Therefore it appears that 13.2 acres were sampled to determine the impact of Temik to non-targets. While this area alone raises question with this aspect of the study, the absence of explanation or references to how the techniques provide data to evaluate change from pre-to post-treatment makes any use of the data questionable. Although counts of animals are often used as indices of density, their accuracy depends on strict standardization of the conditions under which they were measured. In the absence of this information the usefulness of the data collected is obscure.

Also as mentioned above, size of plots restricts the usefulness of the census data. Area treated is too limited to assess potential population reductions, that is, the size of the area does not appear to be representative of what could be expected to be treated in high corn production areas. And, therefore, results

from this study on reduction of non-target populations, even if the results are accurate, have limited applicability to large scale applications.

Further, in relation to the census methods, it appears that census work, mapping, behavioral observations and carcass searches were combined during one transect survey. Considering the intense observation necessary to do any one of these, combining them would seem to lessen the reliability of the information collected.

The absence of details on procedures used for searches also hinder evaluation of information collected. The only mention of carcass searches, besides the above indication that carcass searches were combined with census transects, is that "extensive checks also were made in the ditch bank areas to recover birds or mammal carcasses". It's not clear whether or not this was a separate search or combined with other activities. Further, there appears that no methods were included to assess the efficiency of the carcass searches. That is if birds died what percent would have been found.

The authors of the report also point out other problems. They indicate that interpretation of data was hampered because planting patterns among the fields were not uniform, fields were not comparable, planting dates were not the same and observations were too limited to assess impacts to mammals.

#### B. Statistical Analysis

As pointed out in the report, the study design does not lend itself to statistical procedures. They state

Initially statistical treatment of data was desired. However, the planting patterns among the fields were not uniform. Two groups of fields, based on planting dates, were available. Even within these groups, however, fields were not comparable because of specific locations and differing cultural practices this advised against the use of formal statistical procedures.

#### C. Results and Discussion

While the results and discussion presented are consistent with observations, the questions with study design render the data highly questionable for use in assessing the impact of Temik to non-target species.

### 10. Reviewer's Conclusions

Due to several questions with the adequacy of the study design, the study is insufficient to meet the requirement imposed on the registration of Temik 15C.