(UNDATED)

DATA EVALUATION RECORD

STUDY 2

CHEM 112602 Cimectacarb §164-1

FORMULATION--12--EMULSIFIABLE CONCENTRATE (EC)

STUDY ID 41869539
Braxton, S.M., R.M. Byrd, and T. Wiepke. 1991. CGA-163935 2E - Field dissipation - turf - North Carolina. Project ID: ETI 71TF01/ETI FDS-71-TF-01. Study No: MVTL 01-9004. Protocol No's: Ciba-Geigy 70-90 part A (Field); Ciba-Geigy 70-90 part B (Analytical). Unpublished study performed by Environmental Technologies Institute, Inc., Raleigh, NC and Minnesota Valley Testing Labs, New Ulm, MN; and submitted by Ciba-Geigy Corporation, Greensboro, NC.

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CONCLUSIONS:

Field Dissipation - Terrestrial

1. This study cannot be used to fulfill the data requirement and is of uncertain value for the following reason:

   Less than 50% of the application rate was confirmed.

2. Cimectacarb dissipated with a registrant-calculated half-life of 1.4 days from the upper 6 inches of a bareground plot of loamy sand soil, and was not detected in the soil (sampled to a depth of 36 inches) of

a turf plot of sand soil located in Maxton, North Carolina. The plots were treated with one or two applications of cimectacarb (2 lb ai/gal EC) at a total nominal application rate of 2.676 lb ai/A. The degradate, 4-(cyclo-propyl-alpha-hydroxy-methylene)-3,5-dioxocyclo-hexanecarboxylic acid (CGA-179500), was detected to depths of 12 and 24 inches in the loamy sand and sand soils, respectively (See Tables 1 and 4).

3. For complete fulfillment of the terrestrial field dissipation data requirement, acceptable data applied at the maximum application rate at two field sites are required.

Ancillary Study - Freezer Storage Stability

1. Freezer storage stability studies are not specifically required by Subdivision N guidelines.

2. Cimectacarb degraded slightly in soil (unspecified) that was stored frozen for 6 months; average recoveries decreased from 92% at 0 days to 83% at 6 months. Under similar conditions, CGA-179500 decreased to an average of 90% of the applied after 1 month, 86% after 3 months, and 77% after 6 months of frozen storage.

3. This study is scientifically sound.

4. No additional data on the stability of cimectacarb in soil samples stored frozen up to 6 months are required at this time. Additional information will be required for samples stored longer than 6 months.

METHODOLOGY:

Field Dissipation - Terrestrial

Cimectacarb (2 lb ai/gal EC, Ciba-Geigy) was applied in one or two applications with a backpack sprayer for a total nominal application rate of 2.676 lb ai/A to a bareground plot (100 feet x 100 feet) of loamy sand soil and a turf plot (100 feet x 100 feet) of sand soil located in Maxton, North Carolina. Each treated plot was subdivided into three subplots (each 100 feet x 33 feet) for soil sampling purposes. Untreated bareground and turf plots of sand soil (each 100 feet x 33 feet) that were separated from the corresponding treated bareground and turf plots by a 40-foot wide buffer served as controls (Figure 3). Petri dishes were placed in the plots to collect the spray, and aliquots of the tank mix were collected for analysis.

Bareground plot: A bareground plot of loamy sand soil (Appendix 1) was treated with one application of cimectacarb at a nominal application rate of 2.676 lb ai/A on July 11, 1990. On the day of application, the plot was irrigated with 0.6 inches of water following treatment. Soil samples were collected from the treated and untreated plots 1 day prior to and immediately following

treatment, and at 1, 2, 6, 8, 14, 22, 27, 44, 62, and 77, 97, and 125 days posttreatment.

Soil cores were collected along a diagonal line across each plot at each sampling interval; each diagonal line was sampled only once during the study period. Samples were taken to a maximum depth of 48 inches. Samples from the 0- to 6-inch soil layer were collected by inserting a casing (4-inch diameter) into the soil and manually excavating the soil. Soil cores were then collected from the excavation to a depth of 48 inches using a hydraulic probe (1.75-inch diameter) fitted with acetate liners. The soil from the 0- to 6-inch depth from the same plot and sampling interval were composited, for a total of 1 soil sample for each untreated plot and 3 soil samples for each treated plot. The soil cores (6-48 inches) were sectioned into 6-inch segments; the segments from the same plot, sampling interval, and soil depth were composited. The soil samples were stored in coolers with "blue ice" and placed in freezers within 4 hours of sampling. Then they were shipped on dry ice to the analytical laboratory, homogenized in dry ice, and stored frozen at a mean temperature of -16 C for up to 178 days prior to extraction.

Turf plot: A plot of sand soil (Appendix 1) planted to turf was treated with two applications of cimectacarb at a nominal application rate of 1.338 lb ai/A/application (total 2.676 lb ai/A) on June 12 and July 11, 1990. On the application days, the plot was irrigated with 0.5 inches of water following treatment. The soil samples were collected from the treated and untreated plots as described for the bareground plot soil samples. The samples were collected at 8 days and 1 day prior to treatment, immediately following each treatment, at 1, 2, 3, 7, 14, and 28 days following the first application, and at intervals through 124 days following the second application. The soil samples were sectioned into 6-inch segments, composited, shipped, and stored frozen as described for the bareground soil samples; the maximum storage interval prior to extraction was 212 days.

Analytical procedure for soil analyses for all plots: The homogenized soil samples were analyzed for cimectacarb using Method Number C30023. Subsamples (50 g) of the homogenized soil samples were extracted with methanol:aqueous phosphate buffer (30:70, v:v) by shaking on a wrist action shaker for 30 minutes, and were then centrifuged for 15 minutes. The extract was filtered, and the soil was reextracted with the methanol:phosphate buffer solution for one hour (as described above). The filtered extracts from each extraction were combined, and the pH was adjusted to approximately 3 with 1.2 M phosphoric acid. The acidified extracts were partitioned three times with methylene chloride. The methylene chloride fractions were combined, an aliquot (1 mL) of a water:methanol:acetic acid (69:30:1, v:v:v) solution was added, and the sample was evaporated to near dryness by rotary evaporation. The residue was redissolved in water:methanol:acetic acid (69:30:1, v:v:v), and analyzed for cimectacarb and the degradate CGA-179500 by reverse-

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phase HPLC using a Supelco LC8DB column with a mobile phase of methanol:water:glacial acetic acid:phosphoric acid (450:546:3:1, v:v:v:v) and UV (280 nm) detection. Selected extracts from 0-day soil samples taken from the upper 6 inches of the bareground plot were analyzed by GC/MS to confirm the identity of cimectacarb. Recoveries from soil from all sampling depths fortified with cimectacarb at 0.0118-1.18 ppm ranged from 86 to 100%, and recoveries from soil samples fortified with CGA-179500 at 0.0121-1.21 ppm ranged from 60 to 89%. Average recoveries for untreated soil samples fortified with cimectacarb or CGA-179500 at 0.01-0.12 ppm analyzed concurrently with the field samples were 92-101% and 81-89%, respectively. The method detection limit was 0.01 ppm for both cimectacarb and CGA-179500.

Analytical procedure for petri dishes and tank mix: The petri dishes were rinsed with water:methanol:acetic acid (69:30:1, v:v:v) and analyzed by HPLC as previously described. Aliquots of the tank mix samples were diluted with water:methanol:acetic acid (69:30:1, v:v:v) and analyzed by HPLC as previously described.

Ancillary Study - Freezer Storage Stability

Untreated soil (unspecified) from the test site was spiked in the laboratory with cimectacarb at 0.472 ppm or CGA-179500 at 0.484 ppm and stored frozen at a mean temperature of -16 C. Duplicate samples were analyzed at various intervals up to 6 months of frozen storage. In addition, a field spiking study was performed. Portions (50 g) of untreated soil from the 0- to 6- and 24- to 30-inch depths of soil from the test site were spiked at the test site with a solution of cimectacarb or CGA-179500 at 0.05 or 0.50 ppm, shipped to the analytical laboratory, and stored frozen for 87-88 days until analysis. The soil samples were analyzed as described previously.

DATA SUMMARY:

Field Dissipation - Terrestrial

Cimectacarb dissipated with a registrant-calculated half-life of 1.4 days from the 0- to 6-inch depth of a bareground plot of loamy sand soil located in Maxton, North Carolina, that was treated with one broadcast application of cimectacarb (2 lb ai/gal EC) at a nominal application rate of 2.676 lb ai/A (Table IV). Cimectacarb was not detected in the sand soil from a turf plot that was treated with two broadcast applications of cimectacarb (2 lb ai/gal EC) at a total nominal application rate of 2.676 lb ai/A that was sampled to a depth of 36 inches (Table I). The degradate,

4-(cyclo-propyl-alpha-hydroxy-methylene)-3,5-dioxocyclohexanecarboxylic acid (CGA-179500),

was detected to depths of 12 and 24 inches in the treated bareground and turf plots, respectively (Tables II and V).

In the bareground plot following a single broadcast application of cimectacarb at 2.676 lb ai/A on July 11, 1990, the average concentration in the upper 6 inches of soil increased from 0.398 ppm immediately posttreatment to 0.416 ppm at 1 day; then decreased to 0.073 ppm at 2 days, 0.010 ppm at 6 days, and was not detected (<0.01 ppm) by 8 days posttreatment (Table IV). Cimectacarb was not detected at depths from 6 to 36 inches, except was in one soil sample from the 6- to 12-inch depth that contained 0.012 ppm at 1 day posttreatment. Average concentrations of CGA-179500 in the upper 6 inches increased from 0.203 ppm immediately posttreatment to 0.302 ppm at 2 days; then decreased to 0.030 ppm at 44 days, and 0.019 ppm at 125 days posttreatment (Table V). The registrant-calculated half-life for CGA-179500 in the 0- to 6-inch soil depth was 32 days. In the 6- to 12-inch depth, average concentrations of CGA-179500 were 0.011-0.039 ppm at 1-6 days posttreatment, and were <0.01 ppm (not detected) at all other sampling intervals. CGA-179500 was not detected at depths >12 inches.

In the turf plot following two broadcast applications of cimectacarb at 1.338 lb ai/A (total of 2.676 lb ai/A) on June 12 and July 11, 1990, cimectacarb was not detected (<0.01 ppm) in soil sampled to a depth of 36 inches (Table I). Following the first application, the maximum average concentration of CGA-179500 was 0.075 ppm in the 0- to 6-inch depth at 2 days posttreatment, 0.019 ppm in the 6- to 12-inch depth at 3 days, 0.01 ppm in the 12- to 18-inch depth at 7 days, and was not detected (<0.01 ppm) below 18 inches (Table II). Following the second application, CGA-179500 was a maximum average concentration of 0.043 ppm in the 0- to 6-inch depth at 2 days posttreatment, decreased to 0.014 ppm at 8 days, and was not detected by 14 days posttreatment (Table II). In the 6- to 12-inch depth following the second application, CGA-179500 was a maximum average concentration of 0.014 ppm at 2 days, 0.010 ppm at 8 days, and not detected by 14 days posttreatment. CGA-179500 was not detected below 12 inches following the second application, except at 0.010 and 0.015 ppm in single soil samples from the 12- to 18-inch depth at 8 and 27 days, respectively; and at 0.021 ppm in one sample the 18- to 24-inch depth immediately posttreatment (Table II).

Cimectacarb and CGA-179500 were not detected in any of the soil samples collected at either control plot, except for one soil sample from the upper 6 inches of the bareground control plot, that contained 0.016 ppm of CGA-179500 at 44 days posttreatment.

The concentration of cimectacarb in the tank-mix was 1562.146 ppm for the bareground application; and 795.900 ppm and 1011.381 ppm for the two applications to the turf plots (Table VIII). The nominal concentrations of cimectacarb in the tank mixes were 3799 ppm for the bareground application and 1885 ppm and 1900 ppm for the first and second applications to the turf plot, respectively. The residues in

the petri dishes were 260.6-916.3 ug/dish (average 471.5 ug/dish, equivalent to 0.6614 lb ai/A) for the first application to the turf plot, 0.0-2325.7 ug/dish for the second application to the turf plot (average 881.1 ug/dish, equivalent to 1.236 lb ai/A). For the bareground plot, the petri dishes were 0.0-3757.2 ug/dish (average 1391 ug/dish, equivalent to 1.951 lb ai/A; Table VII).

At the bareground plots, cumulative rainfall plus irrigation totalled 33.87 inches, air temperatures ranged from 32 to 100 F, and soil temperatures (4-inch depth) ranged from 51 to 92 F during the study period. At the turf plots, cumulative rainfall plus irrigation totalled 44.64 inches, air temperatures ranged from 32 to 104 F, and soil temperatures (4-inch depth) ranged from 51 to 94 F during the study period. The slope of the field was 0-2% and the depth to the water table was 17 feet; drainage was to the northeast in the bareground plots and was indeterminate in the turf plots.

Ancillary Study - Freezer Storage Stability

Cimectacarb degraded slightly in soil (unspecified) that was fortified with 0.472 ppm of cimectacarb and stored frozen for 6 months; average recoveries decreased from 92% at 0 days to 83% at 6 months (Table 6). Under similar conditions, CGA-179500 decreased to an average of 90% of the applied after 1 month, 86% after 3 months, and 77% after 6 months of frozen storage (Table 6). Recoveries from soil treated with a solution of cimectacarb and CGA-179500 at the field site, shipped to the analytical laboratory, and then stored frozen for approximately 3 months were 73-98% for cimectacarb and 93-115% for CGA-179500 (Table 5).

COMMENTS:

General

1. The test substance was applied at less than the nominal application rate stated of 2.676 lb ai/A for the turf and bareground plots. Based on the results of glass petri dishes placed in the bareground plot prior to treatment, application rate was 72.8% (1.951 lb ai/A) of the nominal application rate (Table 4). Based on analyses of the petri dishes placed in the turf plot, the application rate was 50.1% (0.6614 lb ai/A) and 92.2% (1.236 lb ai/A) after the first and second applications, respectively; therefore, the total application was 70.9% (1.897 lb ai/A) of the total nominal rate.

   Based on the concentrations in the tank mix, the cimectacarb concentration in the solution applied to the bareground plot was 41.12% (1562.146 ppm) of the nominal concentration (3799 ppm). The solutions applied to the turf plots contained 53.68% (1011.381 ppm) and 41.89% (795.900 ppm) of the nominal concentrations of 1885 and 1900 ppm for the first and second applications, respectively (Table VIII).

2. The turf soil samples were stored for up to 212 days prior to extraction. In this study, freezer storage stability data were only provided for soil samples stored frozen for up to 180 days. However, the freezer storage stability data provided in Study 3 (MRID 41869540) indicate relative stability of cimectacarb and CGA-179500 with average recoveries of 84.4 and 87.2%, respectively, when stored frozen in sandy loam soil for 247 days.

3. The soil was not analyzed for degradates other than CGA-179500. Acceptable data concerning the aerobic soil metabolism of cimectacarb are not available to determine cimectacarb degradates that are likely to be present in the field at significant concentrations.

4. The soil cores from the 6- to 48-inch soil depth were collected using a hydraulic probe fitted with acetate liners with a 24-inch length up to June 12 and on July 11, 1990. Acetate liners with a 48-inch length were used from June 13 to November 13, 1990, except for July 11, 1990.

5. The study authors stated that, due to rain, soil sampling was stopped after soil samples from each control plot were collected at 43 days posttreatment. Soil samples from the treated plots were collected at 44 days posttreatment.

6. The study authors stated that the efficiency of the extraction method for CGA-179500 from soil improved during the course of the study.

7. Although it was stated that soil samples were collected to the 42- to 48-inch depth at each plot, data were only provided to the 30- to 36-inch depth. However, since total cimectacarb residues were not detected (<0.01 ppm) below 24 inches at either treated plot, analyses of the soil samples to the 30- to 36-inch soil depth are adequate to establish the formation and decline of cimectacarb residues in the soil.

8. Air temperature data were obtained from the NOAA Station at Laurinburg, NC, located approximately 5 miles from the test site. Soil temperature data were obtained from the Pee Dee Research and Education Center NOAA Station at Florence, SC, located approximately 34 miles from the test site. Soil temperature data were also provided at the study site, but only on the days of sampling. It is preferred that meteorological data be measured at the test site since temperatures and rainfall can vary between sites in close proximity.

9. The test plots were treated with methyl bromide (350 lb ai/A) on April 25, 1990, and were rolled for leveling on May 9, 1990. The bareground plots were not fertilized or planted to any crops, and were treated with glyphosate (0.27 gal/A) on August 27, 1990. At the turf plots, Bermuda turf sod (Variety 419) was laid by hand and rolled on May 10-11, 1990. The turf plots received nitrate of soda, superphosphate, sulfa mag and pelletized Dolomitic lime on May 2-3,

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1990; urea and zinc sulfate fertilizers were applied on June 27, 1990.

10. The test plots were not treated with pesticides during 1987 and 1989. The plots were planted to soybeans in 1988. At the treated turf plot, metolachlor was applied in 1988 in two applications (total 10 lb ai/A), and glyphosate was spot applied. An "unlabeled herbicide" (not identified) was applied at the untreated turf plot area in 1988.

11. Data for analyses of grass and thatch/sod samples collected from the treated and control turf plots were included in the original document. These data were not reviewed since they are not pertinent to current Subdivision N data requirements for terrestrial field dissipation studies.

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