**DATA EVALUATION RECORD**
**§ 70-1 (d) -- AVIAN DIETARY DISCRIMINATION TEST**

1. **CHEMICAL:** PIRATE™ PC Code No.: 129093

2. **TEST MATERIAL:** AC 303,630 Technical Purity: 94.5%

3. **CITATION**

Authors: A. Fairbrother, J.A. Gange, J.P. Sullivan and B.A. Williams
Title: Food Choice Test with AC 303,630 Technical in Northern Bobwhite (*Collinus virginianus*)
Study Completion Date: December 22, 1995
Laboratory: Ecological Planning and Toxicology, Inc. Corvallis, OR
Sponsor: American Cyanamid Company, Princeton, NJ
Laboratory Report ID: ACLCC-494
MRID No.: 438870-07
DP Barcode: D222690

4. **REVIEWED BY:** John D. Eisemann, Wildlife Biologist, EEB, EFED

**Signature:** John D. Eisemann **Date:** 10/25/96

5. **APPROVED BY:** Ann Stavola, Head of Section (5), EEB, EFED

**Signature:** Ann Stavola **Date:** 10/25/96

6. **STUDY PARAMETERS**

**Scientific Name of Test Organism:** *Collinus virginianus*
**Age of Test Organisms at Test Initiation:**
Adults: 16 weeks (177 to 237 g) Juveniles: 44 days
**Definitive Study Duration:** 10 days

7. **CONCLUSIONS:**

This study appears to be conducted using scientifically sound methods. Methiocarb was used as a positive control for the adults, but was not tested concurrently with PIRATE. No adult mortality or significant weight change occurred with PIRATE exposure at levels up to 250 ppm. Five juveniles died at 250 ppm. Significant weight changes were observed in juveniles at 250 ppm by day 6, and 140 and 250 ppm by day 10. Juveniles consumed significantly more untreated feed by day 10 in the 70, 140 and 250 ppm treatment groups. It is noted that Northern Bobwhite could discriminate PIRATE treated food at concentrations lower than food treated with Mesurol. However, due to the low sensitivity to Mesurol, the use of the Northern Bobwhite as the test species is questioned.

Adult NOEL (mortality) = 250 ppm
Adult Discrimination Threshold = 28.9 ppm
Juvenile NOEL (mortality) = 140 ppm; NOEL (weight) = 70 ppm
Juvenile Discrimination Threshold = 23.5 ppm

8. **ADEQUACY OF THE STUDY**

**Classification:** Supplemental

**Rationale:** This is not a required study. No additional information is required.

9. **SUBMISSION PURPOSE:** To support registration for use on cotton.

10. **MATERIALS AND METHODS**

**A. Test Organisms**

| Guideline Criteria | Reported Information |
|---|---|
| **Species** | Northern Bobwhite (*Colinus virginianus*) |
| **Age at beginning of test** | Adults: >16 weeks old<br>Juveniles: 44 days |
| **Supplier**<br>All birds should be from the same source. | **Adults:** Panhandle Game Bird Farms, Milton, FL<br>**Juveniles:** Steveson Game Bird Farms, Riverside, TX |
| Were birds pen-reared? Were the birds phenotypically indistinguishable from wild birds? | Yes to both questions |
| **Acclimation period**<br>2 to 6 weeks. | Adults: 14 days<br>Juveniles: 18 days |
| Were birds healthy and without excessive mortality prior to the test? | Yes |

**B. Test System**

| Guideline Criteria | Reported Information |
|---|---|
| Were pens for adult birds and chicks of adequate size and designed to conform to good husbandry practices? | Yes Cages were 25 cm x 61 cm X 25 cm in dimensions. |
| **Temperature**<br>Approx. 21°C (70°F) | Adults: 21.3°C (22.7°C to 22.2°C)<br>Juveniles: 22.7°C (22.2°C to 23.1°C) |
| **Relative humidity**<br>Approx. 55% | Adults: 44% to 84%<br>Juveniles: 62% to 82% |
| **Lighting** | 8L:16D and 100 lux at bird level (both juveniles and adults) |
| **Treatment Assignment** | Stratified Random assignment |
| **Diet and Water** | Adults: Purina Maintenance Diet<br>Juveniles: Purina Startena Diet<br>Water: *ad libitum* |
| **Diet Preparation**<br>A premix containing the test substance should be mechanically mixed with basal diet. If an evaporative vehicle is used, it must be completely evaporated prior to feeding. | At each treatment level 150 ml acetone, 60 ml corn oil, and 60 g feed were mixed with the appropriate concentration of chemical. The premix was then mixed into 1500 g of diet and finally into an additional 1440 g of diet. Diets at the 2 and 8 ppm level were mixed using a volumetric technique to allow for accurate dilution of the test substance.<br><br>Fresh control and treatment feed was mixed on day 5 (adult) and day 6 (juvenile). |
| **Diet Storage**<br>Was the premix stored under conditions which maintain stability? | Yes - stored frozen |

| Guideline Criteria | Reported Information |
|---|---|
| **Dose Verification**<br>Was the diet analyzed to verify homogeneity and stability of the test substance? | Yes. 10 day storage and freezing stability tests |

C. Test Design

| Guideline Criteria | Reported Information |
|---|---|
| **Nominal concentrations** | Nominal concentrations:<br>(adjusted for % a.i.)<br>0, 2, 8, 35, 70, 140, 250 ppm |
| **Control Groups** | Both Negative control and vehicle control. The vehicle control contained both corn oil and acetone. |
| **Vehicle amount (% of diet by weight)**<br>Not more than 2%. | Yes, assuming the 150 ml of acetone evaporated out of the diet (60 ml corn oil in 3 kg diet) |
| **Positive control**<br>Was a know avian repellent used to verify the adequacy of the test method and apparatus? | Yes. Methiocarb Tech (99% ai) (Mesurol™)<br><br>This test was not run concurrently with the PIRATE test. |
| **Number of birds per pen** | One bird was randomly assigned to each cage. |
| **Number of pens per group** | Control - 18 pens<br>Treatment groups - 12 |
| **Exposure Period** | 10 days |

| Guideline Criteria | Reported Information |
|---|---|
| **Feed presentation and replenishment** | Two polypropylene cups, one for control and one for treated feed, feed assignment per cup was decided randomly each day to reduce sidedness effects of placement. Food consumption was recorded daily. |
| **Test Endpoints** | Body weight Change<br>Food consumption change<br>Mortality<br>Discrimination Threshold<br>Food Avoidance Concentration<br>Behavioral Observations |

## 11. REPORTED RESULTS

| Guideline Criteria | Reported Information |
|---|---|
| Quality assurance and GLP compliance statements were included in the report? | Yes |
| Measured treatment concentrations | Adult: 1.8, 7.6, 34, 69, 131 and 237 ppm<br>Juvenile: 1.9, 7.7, 32.8, 70.4, 145, and 256 ppm |
| Did diet analysis show that the test substance was stable and homogeneous? | Yes |
| Were body weights reported for adults and juveniles at test initiation and conclusion and periodically throughout the test. | Yes. Body weight was recorded at test initiation, conclusion and on either test day 5 or 6. |
| Was average food consumption of adults reported at least biweekly? | Yes. Food consumption was recorded daily. |

| Guideline Criteria | Reported Information |
|---|---|
| Were data reported by pen for all endpoints? | No |

**Significant Results**:

Chemical analysis of the feed stored in open containers averaged 97% of nominal concentration at 10 days. Analysis of frozen samples averaged 97% of nominal concentration 98% at 51 days. Analysis of diet used in the definitive adult and juvenile tests averaged 95% and 98%, respectively, with a CV of 4%.

| | Adult | Juvenile |
|---|---|---|
| **Mortality** | No birds in any treatment group | 5 birds in the 250 ppm treatment group by day 6 |
| **Behavior** | No symptoms | 1 bird was fluffed, tremoric and resting prior to death |
| **Body Weight** | No significant differences | Significant differences from the controls at:<br>:Day 6 - 250 ppm<br>:Day 10 - 140 and 250 ppm |
| **Body Weight Change** | No significant differences | Significant differences from the controls at:<br>:Day 6 - 250 ppm<br>:Day 10 - 104 and 250 ppm |

| | Adult | Juvenile |
|---|---|---|
| **Food Consumption** | Average total feed consumption was not significantly different than the controls in any treatment group.<br><br>Significantly more untreated feed was consumed after the 5th day in the 70, 140 and 250 ppm treatment groups | Average total feed consumption was significantly less than the controls in the 250 ppm treatment group |
| **NOEL** | Mortality - 250 ppm | Mortality - 140 ppm<br>Weight - 70 ppm |
| **Discrimination Threshold** | 28.9 ppm<br>(95% CL 18 - 53.5 ppm) | 23.5 ppm<br>(95% CL 0 - 115 ppm) |

## 12. REVIEWER'S COMMENTS

This study appears to be conducted using scientifically sound methods. The study methods used are similar to those drafted by the SETAC Working Group on Avoidance (1995).

Interpretation of a study of this design must be done so with a understanding of the factors which influence the outcome and consideration of the uncertainties these factors contribute. As with many other toxicology study designs, factors such as species, sex, age, health and physical condition, environmental conditions and many other influences (SETAC Working Group on Avoidance, 1995) affect the way in which a toxicant affects an individual. This study demonstrates this by the observed response of the adults and juveniles to PIRATE treated feed.

The reviewer is uncertain if Methiocarb is registered as a repellent to the Northern Bobwhite or whether the Northern Bobwhite was the best choice as a reference species. No reports of previous tests with the Northern Bobwhite were found in the literature. Comparison of the results of this test to previous studies of avian repellency and currently recommended application rates for Methiocarb, indicate the Northern Bobwhite may not be sensitive to Methiocarb. Currently, products containing methiocarb (ie. Mesurol 75WP) registered as avian repellents, recommend maximum treatment rates of 2 lbs ai/acre for turf, blueberries and cherries when applied as a spray. Concentrations are much higher if applied

as a seed treatment. If maximum Estimated Environmental Concentrations (EECs) are calculated using Fletcher et al. (1994) recommendations, 480 ppm would be expected in short grass habitats and 30 ppm on fruits. The results of this study show that at these concentrations Northern Bobwhite would not reliably discriminate against Methiocarb contaminated food. The avoidance threshold, as determined by reduced food consumption, for the Northern Bobwhite is 600 ppm for adults. However, as indicated by the recommended application rates on the label, it is enough to deter grazing geese and fruit eating passerines. As was reported in the study, other species, ie. the Cedar Waxwing, could detect Methiocarb at a concentration of 1 ppm. It might have been more appropriate to choose a species which is more sensitive to Methiocarb.

Exposure to PIRATE treated feed resulted in differences in juvenile mortality, food consumption and weight. Five juvenile quail died in the 250 ppm treatment group during the test. The average total feed consumption of the juveniles in the 250 ppm group was significantly less than the controls during the first 5 days, presumably due to chemical induced sickness. Treated feed consumption in this group was 43% of the control on day 1 and averaged 71% on days 2, 3, 4 and 5. Significant differences in juvenile weight change were reported on day 6 and 10. The 250 ppm treatment group was 11.9X lower than the controls on day 6 and the 140 and 250 ppm treatment groups were 1.4X and 2.7X lower than the controls, respectively.

It is interesting to note the adult Northern Bobwhite $LC_{50}$ for PIRATE is 132 ppm. In this study at the test concentration of 140 ppm adults exhibited no weight loss, behavioral abnormalities, or mortality and no significant differences were noted in food consumption. This is probably due to the provision of a clean alternate food source.

**References**

Fletcher J.S., J.E. Nellessen and T.G. Pfleeger. 1994. Literature review and evaluation of the EPA Food-Chain (Kenaga) Nomogram, an instrument for estimating Pesticide Residues on Plants. Environ. Toxico. and Chem., 13(9):1383-1391.

SETAC Working Group on Avoidance. 1995. Draft Report to the SETAC/OECD Workshop on Avian Toxicity Testing. Pensacola, FL, USA December 4-7, 1995. PP 51-79.