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DATA EVALUATION REPORT

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STUDY TYPE:	Simulated and Actual Field Testing - Mammals and Birds, Guideline No. 71-5
MRID NO:	444526-15
TEST MATERIAL:	Cotton Fields
STUDY NO:	ECO 95-132, Protocol No. 954-95-132
SPONSOR:	Original Sponsor: American Cyanamid Co. Agricultural Products Research Division P.O. Box 400 Princeton NJ, 08543-400
TESTING FACILITY:	American Cyanamid Co. Agricultural Products Research Division P.O. Box 400 Princeton NJ, 08543-400 And Ecotoxicology and Biosystems Associates, Inc. 69330 Deer Ridge Lane Sisters, OR 97759
TITLE OF REPORT:	Techniques for Monitoring Avian Species On and Around Cotton Fields in Arizona as a Representative Area for the Southwestern United States
AUTHOR(S):	James A. Gagne, Ph.D., American Cyanamid Co. Joseph P. Sullivan, Ph.D., EBA, Inc. Harry L. McQuillen, EBA, Inc. Larry W. Brewer, EAB, Inc.
STUDY COMPLETED:	December 16, 1997

CONFIDENTIALITY CLAIMS: None.

CLASSIFICATION: Supplemental

Study Summary:
The purpose of the study was to evaluate methods for assessing the occurrence and mortality of birds in and around cotton fields in Arizona. In addition, documentation of bird species and numbers in and around Arizona cotton fields, activity in cotton fields, stomach content of birds as indication of possible oral exposure to pesticides, and the amount of time birds spend in cotton fields, was recorded.

Specific techniques included radio-telemetric monitoring, carcass searching and counting, population observation, behavior monitoring and crop and stomach content analysis.

Test Methods:
Methodology specific to validating the utility of radio-telemetry as a testing method will not be discussed here.

Each census plot measured 100 m in diameter. Plots were interior near the central portion of the cotton fields assayed. Nine plots were used at each site. Perimeter plots were also used. An automated weather station was set up on one of the sites, recording every 30 minutes, 24 hours per day. Vegetation in the plots was sampled twice, once early (late June - early July) and once late (August - early September).

At least one census was scheduled each week during the season for each study field. Sampling was by the fixed circular plot method (Ramsey and Scott, 1979). Census was thus taken from the center of each plot for eight minutes. Two minutes were allowed at the beginning to let the birds adjust to the presence of the census takers. All birds seen or heard were recorded. Data recorded were habitat, species and number of birds, as well as behavior where possible

Avian activity/behavior was studied at least once per week at each field, after the census data were recorded. Red-winged blackbirds used for the examination of GI content were captured with mist nets. After birds were captured and killed, they were injected with formalin and kept on ice until their GI tracts could be examined. Birds for GI tract examination were captured throughout the census period.

Species diversity was estimated using Brillouin's Diversity Index on each field.

Results Summary:
Results support the use of telemetry as a method of monitoring bird mortality, and was

much more efficient in finding marked carcasses (78%-94% compared to non-telemetric searching). Another major advantage of telemetry is in monitoring the amount of time the birds spend in the field compared to visual observation.

Red-winged blackbirds exhibited an omnivorous diet. Birds were not often observed foraging, but observation was made difficult by the growth of the cotton. It should be assumed that birds in the foliage are foraging. Based on observations from other studies for time spent foraging, birds are likely to be foraging in cotton. It is assumed for this study that birds in the cotton fields spend 10% of their time foraging.

Of the vegetation found in the GI tract of red-winged blackbirds, virtually all appeared to be seeds (and a small amount of fruit) of a single unidentified species not found in the cotton fields.

Red-winged blackbirds were the most commonly observed species, at 70% - 84% of all birds, and therefore most at risk. Native species of birds not present in the artificial environment of the cotton field would not be at risk.

Individual species other than red-winged blackbirds accounted for less than 10% of observations in any field. In general, bird numbers in cotton fields increased following irrigation.

20 out of the 35 species of observed birds were found within as well as at the edge of cotton fields.

Almost 90% of birds were observed flying, with the second greatest number of birds in the cotton crop. The latter due at least in part to most observations being made within the cotton crop rather than in adjacent habitat. Relatively few observations were made in habitats other than the cotton fields. The reason that more birds were observed in cotton rather than in surrounding habitats may also be due to the availability of irrigation water in an otherwise desert environment. Birds in the desert are notably more numerous in washes and near other water sources where vegetation is more varied and abundant.

Many of the results of this study concerned the applicability of radio-telemetry as a means of monitoring birds, which are not immediately relevant to the current product, AF36, and are therefore not reviewed.

Study Author's Conclusions

Red-winged blackbird GI content revealed that the birds ate a variety of invertebrates and vegetation. Birds were not often observed foraging, but this was probably due to the difficulty of observing bird behavior after the cotton canopy grew. It should be

assumed that birds in the cotton foliage are foraging. About 15% of the birds observed around cotton fields would be at risk of direct exposure to a sprayed pesticide.

Reviewer's Conclusion

Much of the current study concerned validation of the use of radio-telemetry as a method of following bird mortality and behavior in cotton fields. This data is not immediately relevant to the avian risk evaluation for use of AF36 on cotton in Arizona.

Many species of birds were found to occupy Arizona cotton fields, especially red-winged blackbirds, which were by far the most abundant species. Unlike MRID No. 444642-02, little data is presented comparing presence in adjacent habitat to bird presence in cotton fields. This is significant, because low numbers in the fields may reflect the fact that natural abundance is also low, in which case it is important to note that occurrence in the fields reflects natural abundance. If the natural abundance is low, and is reflected in the cotton fields, then the percentage of adverse impact from exposure in cotton fields will be higher than may appear to be the case if abundance in the cotton fields alone is examined.

While the stomach content of red-winged blackbirds indicated that they were not eating seeds from cotton fields, these data are not likely to be applicable to the case of AF36, which is applied on a likely food avian source, as a carrier. Most pesticides are not applied in this manner, and therefore are not intrinsically attractive to birds as a food source. Information on foraging behavior is more applicable as an indicator of how likely it would be for birds in cotton fields to eat AF36 treated wheat.

Although observed foraging behavior was reported to be very low in this study, the authors cite other work that indicates that foraging behavior is likely to be much higher. The authors believe that actual foraging behavior in Arizona cotton fields is much higher than their observations suggest and that their low numbers were an artifact of the dense growth in cotton fields, which made observation difficult. This latter conclusion is supported by observations of much higher levels of foraging behavior reported in MRID No. 444642-02. Therefore, it is likely that birds spend a substantial amount of time foraging. In the absence of evidence to the contrary, we assume that foraging birds will find and consume some of the treated wheat seed in AF36 treated fields.

In summary, native Arizona bird species are found foraging in cotton fields. The proportion of birds is comparable, depending on species, to the numbers in adjacent native habitats (as determined in MRID No. 444642-02). Therefore, oral exposure to *A. flavus* may be increased due to the use of the proposed AF36 containing product in Arizona wheat. In addition, if sporulating AF36 increases the amount of airborne *A. flavus* spores in and around cotton fields, pulmonary exposure may be increased as well. Whether these last conclusions represent an exposure increase of concern depends in part on exposure of birds to *A. flavus* from other sources, as well as the

relative virulence of AF36 as a bird pathogen compared to other strains of *A. flavus*. This issue has been addressed in other reviews, which conclude that there is currently not enough data available concerning these other factors to draw conclusions about oral exposure, in particular. Data discussed in other reviews suggests, tentatively, that pulmonary exposure may not be significantly increased.

Therefore, acute oral and pulmonary pathogenicity/toxicity testing must be performed, including a quail species, prior to full registration.

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Chemical: Aspergillus flavus 36 colonized wheat seed

PC Code:
006456

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