

POTENTIAL OF METHIOCARB SEED TREATMENT FOR PROTECTION
OF SPROUTING RICE FROM PHILIPPINE BIRD
PESTS, *LONGHURA* SPP.

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Repellency effect (R-50) of methiocarb was determined in the laboratory on three species of *Lonchura*. R-50 values of 0.043%, 0.057%, and 0.036% were found for *L. malacca*, *L. punctulata*, and *L. leucogaster*, respectively. Field test with seed treater (Mesuro) proved to be effective in reducing damage to sprouting rice. The percent damage determined at the conclusion of the test was significantly ($P < 0.01$) lower for the treated plot (5.3%) than the control plot (61.7%).

INTRODUCTION

Economic losses to hand sown rice seeds by bird predation has been reported by farmers from several areas of the Philippines. Most losses are caused by three species of Philippine weavers (*Lonchura malacca*, *L. punctulata*, and *L. leucogaster*) and by the sparrow (*Passer montanus*). In a few areas, the Philippine mallard (*Anas philippinus*) has been observed feeding on newly sprouted rice seedlings.

In the United States and West Africa, studies have been conducted with a chemical bird repellent to protect sprouting rice. Methiocarb (4-(methylthio)-3,5 xylyl N-methylcarbamate), the active ingredient in Mesuro seed treater, has been shown to repel blackbirds in the U.S. from sprouting rice (Besser, 1973; Mott et al., 1976; and Hollar, personal communication) and from two species of birds in Senegal, West Africa (Ruelle and Bruggers, 1979).

This initial study was conducted to determine the repellency of methiocarb to caged *Lonchura* species and evaluate the effectiveness of the seed treatment in a limited field test in the Philippines.

MATERIALS AND METHODS

This study consisted of two phases — first, a laboratory phase where standard measures of repellency were taken on the three species of *Lonchura*, and second, a field phase where the methiocarb seed treatment was tested. Birds used in the laboratory phase were provided by professional trappers in Laguna Province, Philippines, and housed in the aviary at the National Crop Protection Center, University of the Philippines at Los Baños.

For repellency determination, the method reported by Schafer and Brunton (1971) was used to determine an R-50 (R = repellency) value for each of the three species of *Lonchura*. *L. leucogaster* was tested in December 1980 and *L. punctulata* and *L. malacca* in February 1981. Birds were removed from the aviary to individual 15 x 22 x 15 cm wire mesh cages with water and *binlid* (broken rice) provided for 3 days before pretesting. During pretesting each bird was offered 25 whole hulled rice seeds for 18 hr. Only those birds that consumed all of the rice seeds were used in the repellency testing. Concentrations of 0.0125, 0.025, 0.05, and 0.1% (a.i.) methiocarb (75% wettable powder) treated rice seeds were prepared. Six pretested birds were assigned to each treatment level and offered 25 treated rice seeds for an 18-hr period. A bird was considered repelled when 12 or fewer treated rice seeds were consumed. The R-50 value, with 95% confidence limits, was calculated for each species by probit analysis (Finney, 1971).

Methiocarb seed treatment field evaluation was conducted in Mamburao, Occidental Mindoro, from July 28, 1981 to August 15, 1981. Two 1/4-ha plots, about 100 m apart, were randomly selected as either a treated or control plot. Ground preparation in both plots was according to normal farmer practices.

Treated rice seeds (variety IR 26) were prepared by placing rice seeds (2.0 kg) in a container with an aqueous solution of 0.25% methiocarb plus an adhesive (0.2%) that was poured over the seeds and thoroughly mixed for 10 min. Coated seeds were then air-dried for 24 hr. Treated seeds, as well as nontreated seeds, were pregerminated according to normal practices of the area. Plots were then handseeded.

Each field had five randomly spaced sampling lines, with five sampling points each, marked by wooden stakes. A 25-cm wooden sampling square was used to standardize the area in which the sown seeds and surviving plants were counted. One protective area in each plot was established immediately after sowing, to determine normal density.

Immediately after sowing, bird counts were made to determine the number of birds landing on each site. The counts continued until the final

damage appraisal (18 days). Each site was observed daily for an 8.5 hr period and counts were made between 0600 and 1100 hr and 1500 and 1830 hr. The starting point for daily counts was alternated between the two plots.

RESULTS AND DISCUSSION

Neither species of birds showed any sensitivity to the 0.0125% level. Of the three species of birds tested, *L. leucogaster* showed the greatest sensitivity to methiocarb, with an R-50 of 0.036% (0.026% to 0.049%). *L. malacca* showed the second highest sensitivity with an R-50 of 0.043% (0.027% to 0.069%). The third species, *L. punctulata*, responded with the lowest sensitivity, R-50 = 0.057% (0.037% to 0.083%). The average R-50 of 0.045% for the three species of *Lonchura* is three times higher than the R-50 (0.015%) reported for quelea (*Quelea quelea*) (Shumake et al., 1977). However, the average is similar to the R-50 of 0.042% reported for house sparrows (*Passer domesticus*) and one-half the R-50 of 0.089% reported for red-winged blackbirds (*Agelaius phoeniceus*) (Schafer and Brunton, 1971).

The results of the field trial clearly indicated that 0.25% methiocarb seed treatment has potential for reducing bird predation to hand-sown rice seeds. Bird counts, primarily *L. punctulata* with fewer numbers of *L. malacca* and *L. leucogaster*, in the reference plot remained much higher throughout the study as compared with the treated plot (Figure 1). Based on damage appraisals conducted at the conclusion of the study, the treated plot suffered only 5.3% damage whereas the reference plot suffered significantly ($P < 0.01$) more damage at 61.7%. These findings generally agree with results from studies that evaluated the effectiveness of methiocarb as a seed repellent (Mott et al., 1976; Holler, personal communication) in protecting rice seeds from blackbirds in the U.S. Ruelle and Bruggers (1979) also found methiocarb seed treatment effective against bird pests in Nianga, Senegal, West Africa.

Findings from this initial study show potential for the use of methiocarb seed treatment for the protection of hand-sown rice seed from bird predation in the Philippines. Before any specific recommendations can be made, however, a larger scale multiple plot field study should be undertaken that would include a cost/benefit ratio evaluation.

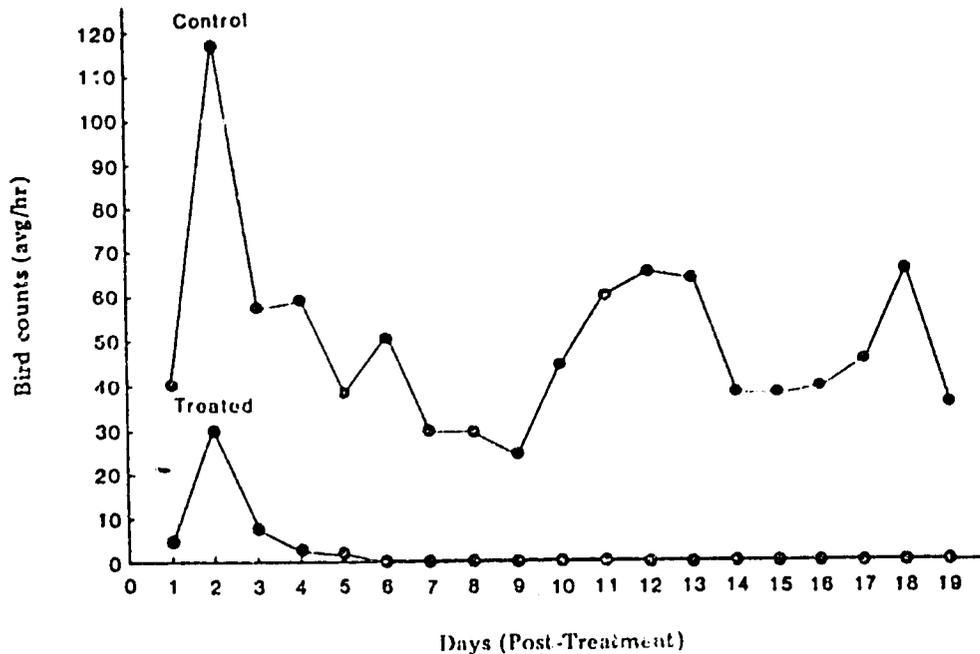


Fig. 1. Average bird counts at the experimental study sites in Mamburao, Occidental Mindoro. Counts were made between July 28 and August 15, 1982.

LITERATURE CITED

- BESSER, J. F. 1973. Protecting seeded rice from blackbirds with methiocarb. *Int'l Rice Commission Newsletter* 22(3): 9-14.
- FINNEY, D. J. 1971. *Probit analysis*, 3rd ed. Cambridge Univ. Press, England. 333 p.
- MOTT, D. F., J. L. GUARINO, E. W. SCHAFFER, Jr., and D. J. CUNNINGHAM. 1976. Methiocarb for preventing blackbird damage to sprouting rice. *Proc. 7th Vertebr. Pest Conf.* 7:22-25.
- RUELLE, P. and R. L. BRUGGERS. 1979. Evaluating bird protection to mechanically sown rice seed treated with methiocarb at Nianga, Senegal, West Africa. *In* J. R. Beck, ed., *Vertebrate Pest Control and Management Materials*, ASTM STP 680, American Society for Testing and Materials, pp. 211-216.
- SCHAFFER, E. W. and R. B. BRUNTON. 1971. Chemicals as bird repellents: two promising agents. *J. Wildlife Mgt.* 35(3):569-572.
- SHUMAKE, S. A., S. E. GADDIS, and E. W. SCHAFFER, Jr. 1977. Behavioral response of *Quelea* to methiocarb (Mesurol). *Proc. 7th Bird Control Seminar* 7:250-254.

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