

PN-AAK-194

ISSN 14648

Reprints

# BANGLADESH JOURNAL OF AGRICULTURAL RESEARCH

A half-yearly agricultural research journal of Bangladesh  
Agricultural Research Institute, Joydebpur, Dacca.

Vol. V.

July, 1980

No. 2

Bird damage control in sprouting wheat.

M. Poche, Md. Abdul Karim and Md. Emdadul Haque

## BIRD DAMAGE CONTROL IN SPROUTING WHEAT

RICHARD M. POCHÉ<sup>1</sup> MD. ABDUL KARIM and MD. EMDADUL HAQUE  
*Bangladesh Agricultural Research Institute, Vertebrate Pest Division,  
Joydehpur, Dacca*

### Abstract

The chemical methiocarb was used as a repellent to reduce bird damage to sprouting wheat. Treatment levels of 0.1, 0.25, 0.5 and 1.0% by seed weight produced plant survival against bird attacks. From 18 to 27% more plants were observed on treated plots as compared to those with no applied repellent. It is recommended that the chemical be used to protect wheat experiments against bird damage and possible use by farmers to increase wheat yield as the desired end-product. Additional field trials are programmed before large scale field applications are instituted.

### Introduction

As the population of man continues to increase and agricultural lands are expanded throughout much of the globe, more cereal crops are exposed to bird damage. An overview of the world bird problems is presented by DeGrazio (1978).

An effective method of reducing bird damage to field crops is through the use of repellents, of which methiocarb (3,5-dimethyl 4-(methylthio) phenol methylcarbamate) is most promising. Reviews on the use of methiocarb for reducing bird damage are presented by Crase and DeHaven (1976) and Guarino (1972). As a means of curbing yield loss to birds in rice, research by Guarino *et al* (1975), Bruggers and Ruelle (1977), Ruelle and Bruggers (1979), and Besser (1973) demonstrated the effectiveness of the compound.

In South Asia reports on birds damage to crops are rare and generally lack qualified data. For examples, see Perumal (1972) and Ramzan and Toor (1971), Toor and Ramzan (1974). Bird damage to cereal crops in Pakistan were documented by Roberts (1976) and Bashir (1978). Bashir (1978) used methiocarb on corn and noted damage was 3.5 time greater on control plots.

In the United States, bird damage to sprouting wheat was observed by Dolbeer *et al.* (1978/1979) and Stickley *et al.* (1977). During the period 1974 to

---

1. Permanent address : U. S. Fish & Wildlife Service, Denver Wildlife Research Center, Bldg. 16, Federal Center, Denver, Colorado, U. S. A.

1980 wheat has become a popular crop in Bangladesh. Farmers have noted an increase in bird damage to sprouting wheat. In December 1979, we observed fields with over 50% of the wheat sprouts removed. The major bird species responsible for the damage include the house sparrow (*Passer domesticus*), Indian myna (*Aeridotheres tristis*), pied myna (*Sturnus contra*), house crow (*Coryus splendens*), jungle crow (*C. macrorhynchos*), the blue rock pigeon (*Columba livia*) and the ring dove (*Streptopelia decaocto*). The roseringed parakeet (*Psittacula krameri*) was reported to menace sprouting wheat, but we only observed this bird in mature wheat crops. In the Bogra District farmers complained of parakeets and weaver birds (*Ploceus* spp) as severe problems in mature wheat.

Based on preliminary field observations, numerous complaints from farmers expressed during 116 farmer interviews, and government requests, a field trial was organized. The objectives of this study were to, (1) test the repellency of methiocarb in reducing bird damage to sprouting wheat, and (2) compare different levels of methiocarb seed treatment and the effects on plant survival against bird attacks.

### Materials and Methods

The study area was located on the BARI regional farm at Ishurdi, Bangladesh, approximately 200 km northwest of Dacca. Annually, numerous varietal and fertilizer experiments are conducted in wheat at Ishurdi. The site selected for this study was in a seed multiplication field.

A randomized complete block design was used to test different levels of methiocarb applications. Five replicates of 4 concentrations were applied; 1, 0.5, 0.25 and 0.1% methiocarb by seed weight. Subplots (treated and controls) were 10×10m and spaced at 10m intervals. A random numbers table was used to assign treatment levels and controls within each block.

The methiocarb (75% wettable powder) for each treatment level (5 replicates) was dissolved in approximately 300 ml of water. The methiocarb was provided by the Denver Wildlife Research Center. Norteno-67 wheat variety was seeded at the rate of 1.1 kg per subplot (110 kg/ha). The treated seeds were dried for one hour.

Seeds were broadcast by hand on 11 November 1979 and covered with a bullock drawn rake. The plots were irrigated two weeks after planting and sampling was conducted on 10 December 1979. Each subplot was sampled for the surviving wheat plant population. Five randomly selected samples (50×50) cm wooden frame) were taken from each subplot. The total number of wheat tillers were enumerated and the data analyzed using a 1-way analysis of variance.

On 21 January 1980 a similar experiment was initiated on the BARI, Joydebpur farm. Methiocarb treated seeds, at 1, 0.5, 0.25 and 0.1% treatment levels, were planted in clay pots and covered with 2.5 cm of fine soil. Five pots were allocated per treatment level and for the controls. Seeds were planted at the rate of 30 seeds per pot. Pots were watered every 4 to 5 days and placed in an open field, an exposed to birds, in groups according to treatment levels, with a minimum of 5m between groups. Four weeks after sowing plant population counts were made in each pot and the data compared.

To obtain preliminary data on the effect of planting depth and survival against bird predation, 15 pots were seeded (30 seeds each) with three pots each for five planting depths: 1, 2.5, 5, 7.5 and 10 cm below the soil surface. The 15 pots were placed approximately 0.5m apart in an open field.

### Results and Discussion

The results of this study revealed that methiocarb treatment of wheat seed produced a greater plant density and provided increased protection from bird damage. The greatest bird repellency was shown in the 0.5% treatment application plots, where an increase of 27.8% in plant number was observed over the controls. The lowest concentration of 0.1% resulted in an increase in 19.7% more surviving wheat tillers. The results are summarized in Table 1.

Table-1. The effects of methiocarb treated wheat seeds on plant survival from bird damage in sprouting wheat at Ishurdi, Bangladesh.

Treatment Level	Active Ingredient (g/ha)	Mean Tillers per m <sup>2</sup>	Per cent Deviation from control
1%	1,100	186.7	+18.0
0.5	550	202.1	+27.8
0.25	275	180.3	+13.9
0.1	110	189.4	+19.7
Control	—	158.2	—

In the pot experiment comparing treated and untreated seeds, similar results were obtained. Significant differences ( $F=9.06$ ,  $P<.01$ ) were observed among the treatment levels. The best results were at the 0.1 and 0.25% treatment levels. Seeds treated with 0.25% methiocarb resulted in a mean of 17.4 plants surviving as compared to only 4.8 plants in the control pots (Table 2).

**Table-2.** Results of pot experiments examining the repellency of methiocarb treated wheat seeds in preventing damage by the Indian Myna and Pied Myna in sprouting wheat at Joydebpur, Bangladesh.

Treatment Levels*	Replicates					Σ	Mean
	1	2	3	4	5		
0.1%	12	13	19	25	16	85	17.0
0.25	16	17	20	17	17	87	17.4
0.5	5	4	8	7	11	35	5.0
1.0	1	6	15	10	10	42	8.4
Controls	1	2	0	13	8	24	4.8

\*F= 9.06, P<.01

Data obtained for the trial testing different sowing depths showed no significant difference in seed survival when planted at 1 and 2.5 cm deep (Table 3). Seeds planted at 5 to 10 cm deep had a significantly reduced survival rate ( $P < .01$ ), a result of poor germination rather than the effects of birds. The results suggest that the best sowing depth is from 1 to 2.5 cm and that additional field trials should be conducted to further examine the possibility of depth versus protection against birds. The tradeoff lies in the amount of possible bird damage of field may be exposed to, a function of planting depth versus the germination rate, the latter of which is also a function of depth beneath the soil surface. Planting deep provides increased protection against birds pulling up sprouts, but the seed germination rate is reduced.

**Table-3.** Results of wheat survival from bird damage when the seeds were sown at various depths. The data are sprouts per pots.

Depth (cm)	Replicates			Σ	Mean
	1	2	3		
1.0	17	19	16	52	17.3
2.5	15	14	26	55	18.3
5.0	8	13	7	28	9.3
7.5	6	6	6	18	6.0
10.0	0	0	1	1	0.3

Traditional bird control in Bangladesh involves frightening tactics with bamboo clappers, attaching cloth streamers to bamboo sticks positioned throughout the field, or using aquatic plant roots attached to sticks and other forms of scarecrows. During the wheat season when the seeds are sprouting, government farm officials often hire laborers for about 3 hours after daybreak and two hours before dusk to frighten away birds. On BARI farms, laborers are paid about Taka 15 (\$ 1) per day and often 15 are hired for about a two-week period. The cost would amount to approximately \$ 210 for a 20 ha plot. Crop protection is extremely important especially during varietal and yield experiments. Too often trials are disrupted by bird damage.

The field trial at Ishurdi amounted to a reduction in bird damage to sprouting wheat. Damage may have been reduced more if a binder or adhesive, rather than water, had been available to hold the methiocarb more securely to the seeds. Besser and Elias (1979), however, noted increased bird repellency when methiocarb was applied to sorghum during the dough stage without the use of an adhesive.

This preliminary study on sprouting wheat indicated the potential of using methiocarb for bird damage control in Bangladesh. Had more field space been available and larger plots used, it is felt, the differences between the treated and controls would have been greater. Since the results are promising, larger plots will be used to further examine the compound at Ishurdi.

The findings indicated a 0.1% measuro treated wheat seed application is sufficient to reduce bird damage. Bruggers (Personal comm.) reported similar observations in field trials conducted in Senegal using methiocarb to repel several bird species.

Although the use of methiocarb has great potential for use in Bangladesh and would appear to be more economical than using hand frightening devices, a comparison between chemical and frightening methods in reducing damage to sprouting wheat should be evaluated. A cost benefit analysis of each method will be compared in 1980-81.

### Acknowledgement

This study was financially supported by BARI and the US Agency for International Development under the Project "Agricultural Research, Vertebrate Pest Component, PASA ID/BNG-0003-78" and is the VPD Research Publication No. 5.

### References

- Bashir, E. A. 1978. The problem of birds as pests of agricultural crops and suggested methods of their control. Vertebrate Pest Centre Report, Karachi, Pakistan, 7 pp.

- Besser, J. F. 1973. Protecting seeded rice from blackbirds with methiocarb. *International Rice Comm. Newsletter*, 22: 9-14.
- Besser, J. F. and D. J. Elias. 1979. Methiocarb sprays as a grain sorghum protectant against damage by house sparrows, Weslaco, Texas. *DWRC Report*, 7 pp.
- Bruggers, R. L. and P. Ruelle. 1977. Bird losses in Senegal rice significantly cut. *Rice Journal*, Dec. 10-14.
- Crase, F. T. and R. W. DeHaven. 1976. Methiocarb: its current status as a bird repellent. *Proc. 7th Vertebrate Pest Conf.*, Sacramento, California 7: 46-50.
- DeGrazio, J. W. 1978. World bird damage problems. *Proc. 8th Vertebrate Pest Conf.*, Sacramento, California, 8: 9-24.
- Dolbeer, R. A., Stickley, A. R., Jr. and P.P. Woronecki. 1978/79. Starling, *Sturnus Vulgaris*, damage to sprouting wheat in Tennessee and Kentucky, U.S.A. *Protection Ecology*, 1: 159-169.
- Guarino, J. L. 1972. Methiocarb, a chemical bird repellent: A review of its effectiveness on crops. *Proc. 5th Vertebrate Pest Control Conf.*, Fresno, California, 5: 108-111.
- Guarino, J. L., Mott, D. E. and E. W. Schafer, Jr. 1975. Methiocarb for preventing black-bird damage to sprouting rice in Louisiana. *Denver Wildlife Research Center*, Report of Study No. 62, Work Unit DF-102.3, 11 pp.
- Perumal, R. S. 1972. Bird damage in Sorghum Crop. *Farm Facts*, 7: 41-42.
- Ramzan, M. and H.S. Toor. 1971. Damage to maize crop by roseringed parakeet, *Psittacula krameri* (Scopoli). *J. Bombay Nat. Hist. Soc.*, 70: 201-204.
- Roberts T.J. 1976. Report on sparrow control trials in standing wheat crops in 1976. *Vertebrate Pest Centre Report*. Karachi, Pakistan. 15. pp.
- Ruelle, P. and R.L. Bruggers. 1979. Evaluating bird protection to mechanically sown rice seed treated with methiocarb at Nianga, Senegal, West Africa. *American Soc. for Testing & Materials*, Special Technical Publication 680, pp. 211-216.
- Stickley, A. R., Jr., Dolbeer, R. A. and S. B. White. 1977. Starling damage to sprouting wheat in Tennessee. *Proc. Bird Control Seminar*, Bowling Green State Univ., Bowling Green, Ohio, 7: 30-38.
- Toor, H.S. and M. Ramzan. 1974. A study on grapes lost to birds. *Punjab Horticultural Journal*, 14: 46-48.