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SCREENING THE EFFECTIVENESS OF GRANULAR AND FOLIAR INSECTICIDES AGAINST CORN STALK BORER, *CHILO PARTELLUS* (SWINHOE)

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Whorl application of carbofuran G (1.40 kg a.i./ha), diazinon G (1.40 kg), endrin G (0.56 kg), fenthion G (1.12 kg) and trichlorfon G (0.70 kg) 18 and 37 days after sowing revealed erratic and inconclusive results against the corn stalk borer, *Chilo partellus* (Swinhoe). Phytotoxicity was noted in the carbaryl treated plots. Spray application of bromophos (.038%) isobenzan (0.023%), 24 and 40 days post-sowing, were the best in reducing and checking the infestation levels. These were followed by bromophos–ethyl (0.06%), isoprocarb (0.10%), and fenitrothion (0.10%). Phenthoate (0.05%) was fairly effective. Stubble infestation levels were comparable in the treated and untreated plots.

INTRODUCTION

The corn stalk borer, *Chilo partellus* (Swinhoe), is a serious pest of the maize crop which is grown extensively in NWFP Granular preparations of carbaryl [2, 3, 6, 7, 12, 14, 17], diazinon [3, 7, 10, 17], endrin [1, 2, 6, 7, 11, 15, 16, 17], fenthion [8, 9] and trichlorfon [4 – 7, 12, 17] have been reported to give effective control of the corn stalk borer, *Chilo partellus* (Swinhoe). Foliar sprayable preparations of bromophos, bromophosethyl [7], fenitrothion [7, 14], isobenzan [5, 6], and phenthoate [8, 13] have been reported to give effective control of this borer.

Reported here are the results of granular and foliar experiments carried out at Agricultural Research Institute Tarnab, Peshawar.

MATERIALS AND METHODS

Granular. Maize seed was sown in lines, 0.6 m apart, on July 15, 1974, in a randomised complete block design. Treatment and check plots measured 4.2 x 9.6 m and were replicated six times. Treatments and replications were buffered with neutral plantation of maize. The first and the 2nd on August 21, 1974.

Infested and uninfested plants were counted in each treatment/replication on September 26, 1974 (36 days after the last application). Stubble infestation data were recorded on October 28, 1974 (68 days after the last application). The infestation (stalks and stubbles) was converted into a percentage scale and the comparative effect was evaluated on this standard.

Foliar. Maize seed was sown in lines, 0.6 m apart, on July 15, 1974, in a randomised complete block design. Treatment and check plots measured 2.4 x 9 m and were replicated six times. Treatments and replications were buffered with neutral plantation of maize. The first spray of the insecticides was done on August 8, 1974 and the 2nd on August 24, 1974, using a knapsack sprayer.

Infested and uninfested plants were counted in each treatment/replication one day before the Ist spray operation and then 7 days after the 2nd spray. Stubble infestation data were recorded on October 15, 1974 (52 days after the last spray). The infestation levels (stalks and stubbles) were converted into a precentage scale and the comparative effect of the insecticides sprayed was evaluated on this standard.

Data obtained in percent were transformed into arcsin and then subjected to analysis of variance. Means were compared through Duncan's multiple range test.

RESULTS AND DISCUSSION

Granular. The infestation levels (stalk and stubbles) were relatively low in the endrin treated plots in comparison with the remaining insecticdes treated plots (Table 1). However, the trend of infestation was comparable on statistical terms ($P > 0.05$) in the treated and untreated plots. The results, therefore, seem to be erratic and inconclusive. The present results are not in line with the reports of investigators regarding the granular preparations

of carbaryl [2, 3, 6, 7, 12, 14, 17], diazinon [3, 7, 10, 17], endrin [1, 2, 6, 7, 11, 15, 16, 17], fenthion [8, 9] and trichlorfon [4 – 7, 12, 17]. It may be assumed that the larvae of this borer might have entered the stem through lateral perforations and thereby avoided direct contact with these preparations due to their repellent action. Or oviposition and hatchings may have occurred during the time when the residual effectiveness of these products had greatly dissipated due to photodegradation mechanism and were not lethal to the vulnerable stage of the pest. Phytotoxicity was noted in the carbaryl treated plots following application.

Table 1. Percent infestation of maize plants by the corn stalk borer, *Chilo partellus* (Swinhoe), following granular application of insecticides

S. No.	Treatment	Rate (kg a.i./ha)	Percentage infested plants after the last application in days	
			36	68
			Stalks	Stubbles
1.	Carbaryl G	1.40	6.3	6.3
2.	Diazinon G	1.40	5.1	6.2
3.	Endrin G	0.56	4.6	4.8
4.	Fenthion G	1.12	5.6	6.1
5.	Trichlorfon G	0.70	5.9	6.3
6.	Untreated	–	5.6	8.5
Analysis of variance			ns	ns

Foliar. Stalk infestation levels (column i), recorded one day before the Ist spray application revealed a similar trend in all plots (Table 2). Significant variations, however, occurred in the stalk infestation levels in the treated and untreated plots following 2 spray applications (column ii). Bromophos and isobenzan proved superior in this respect. These were followed by bromophos-ethyl, isoprocarb, fenitrothion (as Folithion) and fenthion. Fenitrothion (as Sumithion) and phenthoate were found fairly effective. Reduction in infestation (stalk) over the pretreatment levels (column iii) revealed that all the insecticides were butter than the no treatment. Bromophos and isobenzan were found to be superior in this respect. These were followed by bromophos-ethyl, isoprocarb, and fenthion. The remaining insecticides revealed a fair reduction. Stubble infestation levels (column iv) were more or less similar in the

Table 2. Percent infestation of maize plants by the corn stalk borer, *Chilo partellus* (Swinhoe), following insecticidal spray treatment

S.No.	Treatment	Concentration (%)	1 day pretreatment % infestation (stalk)	Post-treatment % infestation (stalk)	Percentage reduction in infestation (stalk) over pre-treatment levels	Percentage stubble infestation
			(i)	(ii)	(iii)	(iv)
1.	Bromophos EC	0.038	8.7	4.6a	47.1	4.6
2.	Bromophos-ethyl EC	0.06	10.1	5.6ab	44.6	4.3
3.	Fenitrothion EC (Sumithion)	0.05	13.6	8.1bc	40.4	3.9
4.	Fenitrothion EC (Folithion)	0.10	10.8	6.3ab	41.7	5.8
5.	Fenthion EC	0.05	11.7	6.6ab	43.6	5.1
6.	Isobenzan EC	0.023	9.4	4.9a	47.9	3.7
7.	Isoprocarb EC	0.10	10.8	6.0ab	44.4	5.7
8.	Phenthoate EC	0.05	12.5	7.3abc	41.6	3.5
9.	Untreated	–	10.5	9.2c	12.4	5.1
Analysis of variance			ns	*		ns

* = Significant at 0.05 levels of probability. Means followed by common letters are not significantly different.

treated and untreated plots ($P > 0.05$). The results achieved in the present case regarding the spray application of bromophos, bromophos-ethyl [7], fenitrothion [7, 14], isobenzan [5, 6] and phenthoate [8, 13] are in line with the previous reports as indicated in parentheses. No report could be traced in literature regarding the use of isoprocarb and fenthion against the corn stalk borer.

It could be concluded from the results of these two experiments that the foliar application of sprayable formulation of pesticides is better in reducing/checking the incidence levels of the corn stalk borer than foliar whorl application of granular preparation of pesticides if repeated 2-3 times during the maize growing season. The increased effectiveness of the sprayable formulations of pesticides may have been due to a thorough coverage of the plants with spray deposit being lethal in all respects to the larvae even if they change their mode of attack. In the case of granular preparations full coverage of the plants is not achieved and the larvae may tunnel down the stem through lateral perforations by avoiding direct contact with the insecticides being concentrated in the apical region of the plants.

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