

A Schedule of Treatments Against Stem Borer and Earhead Bug Pests of Vellai Cholam

by

B. VASANTHARAJ DAVID¹, R. SIVAGAMI² and A. JANAGARAJAN³

Introduction: In the southern districts of Tamil Nadu the shootfly, *Atherigona varia soccata* R., the stem borer, *Chilo zonellus* Swinhoe, and the earhead bug, *Calocoris angustatus* Leth. are the potential insect enemies that cause considerable damage to irrigated sorghum (K.2) during the summer season (April to July). Two sets of insecticidal trials were conducted for the control of stem borer and the earhead bug separately at the Regional Research Station, Kovilpatti during 1965 and 1966 with a view to assess the efficacy of the insecticides against these pests independently and to formulate from the results obtained a schedule of treatments for controlling them and realising maximum yield of grain.

Materials and Methods: Separate field trials were conducted during the summer season of 1965 and 1966 at the Regional Research Station, Kovilpatti for the control of the stem borer and the earhead bugs on K.2 *Vellai Cholam*. The seeds in the trial plots were sown on the same day (16-4-1965 and 15-4-1966) and the crop received a basal dressing of 12.5 tonnes of compost, 44.84 kg N in the form of urea and 22.42 kg P₂O₅ in the form of super phosphate per hectare.

In the trial against the stem borer during the summer of 1965 the treatments were granules of endrin (2%) and heptachlor 6%, and sprays of carbaryl 0.1%, endrin 0.02%, BHC 0.05%, dieldrin 0.1%, carbophenothion 0.06% and parathion 0.025%, with a suitable control, randomised and replicated four times. In the trial conducted during the summer of 1966 one more treatment viz. methyl demeton 0.025% spray was also included. The granules were applied at 30 kg/ha on the whorls and axils of plants. A month after sowing, at the time of thinning the seedlings, the plants affected by shootfly were also removed. Three rounds of treatments were given at 15 days intervals commencing a month after sowing. The control plots did not receive any treatment. The incidence of stem borer a fortnight after each round of application was recorded by counting the total number of tillers and affected ones and the percentage of infestation worked out. The yield of grain and straw were also recorded.

In the trials laid out for the control of the earhead bugs the treatments tried were dusts of carbaryl 10%, BHC 10%, malathion 4%, dieldrin 5% and carbophenothion 2%, compared with a suitable untreated control.

1. Lecturer in Entomology, 2. Assistant Entomologist, Agril. College and Research Institute, Coimbatore and 3. Assistant in Entomology, Regional Research Station, Kovilpatti.

The treatments were randomised and replicated four times. When the crop was in ears two rounds of dusting of the insecticides at 10 days interval were given synchronising with the milky stage of the crop. The population of the bugs on ten ears selected at random in each replication 72 hours after application was recorded and the efficacy of the insecticides assessed. In addition, all the plots including the control received two rounds of BHC 0.05% spray, the first a month after sowing and the second 15 days after, as a prophylactic measure against stemborer attack. The data on the yield of grain and straw obtained were also recorded and analysed statistically.

Results: The mean percentage of incidence of stemborer, mean plot yield of grain and straw and calculated yields of grain and straw per hectare recorded under the different treatments as well as the results of statistical analyses are furnished in Table 1. The mean population of earhead bugs after treatments, mean plot yield of grain and straw and calculated yields of grain and straw per hectare as well as the results of statistical analyses are furnished in Table 2.

A. Control of the Stemborer: (i) *Infestation:* In both years all the treated plots recorded lower incidence of stemborer than untreated control but the difference was not statistically significant. In the trial conducted during 1965 carbaryl 0.1% spray recorded the lowest incidence (3.01%) followed by heptachlor granule (3.69%), carbophenothion spray (3.91%), parathion spray (4.08%), BHC spray (4.35%), endrin granule (4.57%), dieldrin spray (4.84%), endrin spray (5.08%) and control (8.37%). During 1966 the plots treated with heptachlor granule recorded the lowest incidence (2.92%) followed by endrin granule (2.95%) and sprays of carbaryl (3.53%), dieldrin (3.9%), parathion (3.98%), endrin (4.84%), carbophenothion (5.44%), BHC (5.86%) and methyl demeton (5.97%), control recording the maximum attack of 7.64%. The differences in infestation between the treatments were not significant during both the years.

(ii) *Yield of grain:* There was no significant difference in the yield of grain between the different treatments during 1965 and the plots sprayed with BHC 0.05% recorded the highest yield of 3,647 kg/ha. During 1966 the yield differences were significant, carbophenothion spray resulting in the highest yield of 1924 kg/ha followed by BHC spray (1500 kg), heptachlor granule (1218 kg), parathion spray (1215 kg) etc., control and endrin granule recording lower yield of 833 and 765 kg/ha respectively.

(iii) *Yield of straw:* The difference in the yield of straw between the different treatments was significant in both the trials. The treatments endrin granule and carbophenothion spray recorded the highest yields of straw during 1965 and 1966, respectively.

TABLE 1. Control of *Cholam stemborer*

Treatments	Yield of grain		Yield of straw	
	Yield 1965 (kg/plot) (kg/ha)	Yield 1966 (kg/plot) (kg/ha)	Yield 1965 (kg/plot) (kg/ha)	Yield 1966 (kg/plot) (kg/ha)
Endrin granules	3.98	2962	1.10	765
Heptachlor granules	4.82	3576	1.75	1218
Carbaryl 0.1% spray	4.60	3408	1.47	1024
Endrin 0.02% spray	4.81	3565	1.74	1213
B.H.C. 0.05% spray	4.92	3647	2.16	1500
Dieldrin 0.1%	3.95	2930	1.56	1089
Carbophenothion 0.06% spray	4.60	3414	2.77	1924
Parathion 0.025% spray	4.00	2629	1.74	1215
Methyldemeton 0.1% spray	N.T.	N.T.	1.63	1132
Control	3.85	2858	1.19	833

N.S. Significant

SE 0.63 0.22

CD — 0.62

Significant

0.98

2.04

Significant

-0.46

1.31

N.T. Not tested

N.S. Not significant

TABLE 2. Control of the *Cholam Ear-head bugs*

Treatments	Yield of grain		Yield of straw	
	Yield 1965 (kg/plot) (kg/ha)	Yield 1966 (kg/plot) (kg/ha)	Yield 1965 (kg/plot) (kg/ha)	Yield 1966 (kg/plot) (kg/ha)
Carbaryl 10% dust	5.45	4042	1.84	1281
B. H. C. 10% dust	5.37	4245	2.04	1420
Malathion 4% dust	4.88	3620	2.02	1403
Dieldrin 5% dust	5.45	4035	2.20	1534
Carbophenothion 2% dust	5.10	3780	1.97	1373
Control	4.69	3435	1.70	1185

B. *Control of the earhead bugs:* (i) *Infestation:* In both the years significantly lower population of bugs was noticed in the treated plots than the untreated control. During 1965 dieldrin 5% dust recorded the lowest mean population of bugs (7.33) followed by BHC 10% (9.75), carbaryl 10% (10.25), malathion 4% (13.25) and carbophenothion (16.88), control recording the highest mean population of 50.50 bugs. During 1966 also dieldrin recorded the lowest mean population (2.12) followed by BHC (2.5), carbaryl (6.12), carbophenothion (8.2) and malathion (9.25), control recording the highest mean population of 18.87 bugs. The differences in infestation between treatments were significant during 1965 & 1966.

(ii) *Yield of grain:* In the trial conducted during 1965 BHC 10% dusted plots recorded the highest yield of 4,245 kg/ha followed by carbaryl (4,042 kg), dieldrin (4,035 kg), carbophenothion (3,780 kg) and malathion (3,620 kg). The lowest yield of 3,435 kg/ha was obtained in the control plots. During 1966 the maximum yield was recorded by dieldrin (1,534 kg) followed by BHC (1,420 kg), malathion (1,403 kg), carbophenothion (1,373 kg) and carbaryl (1,281 kg), control recording the lowest yield of 1,185 kg/ha. However, the difference in yield between the different treatments was not significant.

(iii) *Yield of straw:* The difference in the yield of straw between the different treatments was not significant during 1965 and 1966. The plots treated with carbaryl and dieldrin recorded the highest yields of 12,222 kg and 8,290 kg of straw per ha respectively.

Control of mites: Incidentally it was observed during 1966 that carbophenothion 0.06% spray application gave good protection against mite attack, whereas the plants treated with the rest of the chemicals showed severe incidence of mites, which was controlled by the application of sulphur dust.

Discussion: A perusal of the results obtained indicates that heptachlor and endrin granules and carbaryl 0.1% spray have recorded lower incidence of stem borer than the other treatments. The maximum infestation has been observed in the untreated control plot. However, the difference in infestation between the treatments was not significant. In this connection it is to be noted that studies carried out on the control of the pest elsewhere in India have shown the effectiveness of carbaryl (Young, 1962) and endrin granule (Anon, 1964) in minimising its incidence. In the present study sprays of endrin, parathion and BHC have also recorded lower incidence of the pest than the other treatments as was reported earlier by Kushwana *et al.* (1961) and Sivagami and Sulochana Bai (1965). When yield factor is also taken into account it may be seen that plots treated with BHC and heptachlor granules have recorded appreciably higher yield of grain as also lower stem borer incidence in both the trials.

As far as the control of the earhead bugs is concerned dieldrin and BHC dusts have consistently recorded lower population of the bug and appreciably higher yield of grain in both the trials. Carbaryl dust has also been found promising.

It can be seen that when the crop has been protected with two rounds of BHC 0.05% spray against stem borer and with two rounds of dusts of either BHC or dieldrin have recorded the highest yields of grain in both the years. It is also clear that mere protection of the crop from stem borer attack alone will not be sufficient and it has to be saved from the ravages of earhead bug, which fact is also well exhibited by the yield trends shown in the table above. Thus the present study throws light on the possibility of suggesting a schedule of treatments for realising economically higher yield of *Vellai cholam*.

Of all the chemicals tried, BHC which has been found to give appreciable control of the pests and higher yield of grain, is economical in view of its cheap cost and easy availability. The cost of treating an area of one ha of cholam crop with BHC works out to about Rs. 63/- for two sprayings and two dustings and the net extra income over unprotected crop comes to about Rs. 630/- during 1965 and Rs. 230/- during 1966. The cost of application of sulphur per ha comes to about Rs. 30/-. During 1966 due to failure of timely rains, the crop was not normal and in spite of this there has been an extra net income of about Rs. 200/- per ha.

Conclusion: From the results of the two sets of trials enumerated the following schedule of treatments for the control of stem borer and earhead bugs of irrigated *Vellai cholam* can be recommended for adoption by the ryots in the southern districts of Tamil Nadu.

1. Spray two rounds of BHC 0.05% at fortnightly interval commencing a month after sowing.
2. Dust twice with BHC 10% at 25 kg/ha at an interval of ten days, the first round synchronising with the milky stage of the crop.
3. Dust sulphur as and when mite infestation is noticed.

Acknowledgement: The authors are thankful to the Entomologist and Associate Professor of Entomology for guidance and to the Crop Specialist, Regional Research Station, Kovilpatti for the facilities and encouragement in the conduct of the experiments.

REFERENCES

- Anon. 1964. *Progress Report of the Accelerated hybrid Sorghum Project and the Millet Improvement Programme.* pp 36-37.
- Kushwana, K. S., J. C. Sharma and L. S. Sharma. 1961. Preliminary trials in the control of the Maize Borer, (*Chilo zonellus* (Swinhoe) and *Sesamia inferens* Wlk.) in Rajasthan. *Curr. Sci.*, 30 : 247-84.
- Sivagami, R. and B. Sulochana Bai. 1965. Experiments on the control of the Cholam stem-borer *Chilo zonellus*, Swinh. *Indian J. Ent.*, 27 : 249-52.
- Young, W. R. 1962. Insect control studies. *Sorghum News letter*, 5 : 63-4.