

MANAGEMENT STRATEGIES FOR GRAPE STEM BORER *CELOSTERNA SCRABRATOR* FABR. (COLEOPTERA: CERAMBYCIDAE)

S.B. Jagginavar, N.D. Sunitha and D.R. Paitl

Department of Agricultural Entomology,
College of Agriculture, Bijapur-586 101, India

ABSTRACT

An experiment on management of stem borer, *Celosterna scabrator* Fabr. on grape was conducted for over two years from 2004-05 to 2005-06 at Horticulture Research Station, Bijapur and one large scale trial for two years (2004 and 2005). The investigation clearly indicated the superiority of 8% dichlorvos 76EC (80 ml /litre) stem injection which recorded hundred per cent reduction of live tunnels whereas, in demonstration plot the live tunnel reduction was 90.95 per cent.

INTRODUCTION

Grape is an important fruit crop of Northern Karnataka and neighbouring states. It is attacked by nearly 100 insect pests, which inflict different types of injuries to the host. Among these the stem borer of grape *Celosterna scabrator* is a serious pest and becoming one of the limiting factor in grape cultivation and attaining a major pest status in the recent past in grape growing areas of northern Karnataka particularly in Bijapur District. The species was identified as *Celosterna scabrator*, Adults of *C. scabrator* are 20-28 mm in size, have mottled gray elytra, metathorax on each of its sides and has a small projection pointing forward. Female adults lay eggs below loose bark of stem and inside the old tunnels. Both adults and grubs cause damage to grape. Adult beetles gnaw the shoots of girth size between 1.4 to 2 cm leading to drying from the injury point whereas, shoots with girth size more than 2 cm tolerated the injury and recouped (Jagginavar, *et al.* 2006). Grubs bore into the main stem and branches. Initially reddish sap oozes from the wound and chewed material of wood and excreta are seen below the damaged plants. Sap translocation is affected and plants and branches wither and die (Gour *et al.*; 2000). This beetle also attacks pomegranate where in detailed management strategies have been studied (Birader *et al.* 2005). Owing to the serious magnitude of damage and limited work

carried out on this insect in grape ecosystem, an experiment was laid out to evaluate some insecticides and chemicals so the effective management strategies can be worked out.

MATERIAL AND METHODS

Experiment was carried out for two years during 2004-05 and 2005-06 at Horticultural Research Station (HRS) Tidagundi, Bijapur and large scale demonstration in 2.4 ha of a four year old grape garden (Thompson seedless variety). The treatments included stem injection with squeeze bottle with different chemicals having various degrees of fumigant activity (Table-1) GKK (Garlic-Chilli-Kerosene extract was prepared by taking 2.5 kg garlic and 5 kg green chilli ground into paste and soaked in 250 ml of kerosene overnight. Extract collected was made to 3l of stock solution which was directly injected into tunnels without dilution). For imposing each treatment, six stem borer infested plants (showing live holes) were selected and replicated thrice in randomized block design. Before injecting into the live bored holes, the tunnels were cleaned or loosened with the help of hard metal wire. For injecting insecticidal solution, 250 ml sized squeeze bottle was used. Insecticide quantity used was in proportion with the tunnel length i.e solution is injected till the tunnel got filled up. After injecting in to the tunnels, the bored holes were plugged with wet mud. Pre-treatment

observations on live tunnels and post treatment observations on live and dead tunnels were taken at one, two, three and four weeks after treatment. Finally, per cent reduction in live holes was calculated, subjected to statistical analysis after arc sin transformation. Cost benefit ratio was worked out by taking local market cost of grape fruits, insecticide price and labour charges etc.

RESULTS AND DISCUSSION

Observations (Table 1) made on per cent reduction in live bored holes indicated that among eight treatments, stem injection with 8% dichlorvos 76 EC (80 ml/litre) was significantly superior over other treatments by recording hundred per cent reduction in live tunnels for both the years. This was followed by 6% dichlorvos 76 EC (60ml/l) with 76.42 per cent live tunnels reduction, which is significantly superior to rest of the treatments. Superiority of both these treatments may be due to higher dose having good fumigant action. Treatment with garlic and

chilli in kerosene (GCK) extraction recorded 59.17 per cent reduction in live tunnels. The lower dose with 4% dichlorvos 76 EC (40 ml/l) recorded 57.77 per cent reduction in live tunnels made by the cerambycid borer. Carbon disulphide, kerosene or petrol alone and monocrotophos 36 SL (100 ml/l) recorded 49.89, 49.33, 46.47 and 45.37 per cent reduction in live tunnels, respectively. The differential effect of various treatments can be attributed due to the fumigant action of the insecticides. The results are in agreement with the findings of Gour *et al.*, (2000) and Biradar *et al.*, (2005).

In large scale demonstration 8% dichlorvos 76 EC (80 ml/l) treatment recorded 92.42 per cent and 90.95 per cent reduction in live tunnels during 2004 and 2005 respectively (Table 2).

Good CB ratio (1:26.09) with net returns of Rs. 30424.75 was also obtained with the best treatment (Table 3). Thus stem injection of 8%

Table 1. Effect of different treatments on per cent reduction in live holes by grape stem borer.

Treatments (Stem injection with)	Percent reduction in live holes at 7 DASI		
	2004-05	2005-06	Mean
Monocrotophos 36 SL @ 100 ml/lit	41.70 (40.00)	49.05 (49.03)	45.37 (42.30)
DDVP 76 EC @ 40 ml/lit	60.00 (51.00)	55.55 (48.16)	57.77 (49.43)
DDVP 76 EC @ 60 ml/lit	76.50 (61.30)	76.34 (60.87)	76.42 (60.94)
DDVP 76 EC @ 80 ml/lit	100.0 (90.00)	100.0 (90.00)	100.0 (90.00)
Petrol	44.50 (41.50)	48.45 (44.08)	46.47 (42.94)
Kerosene	50.00 (43.90)	48.66 (44.20)	49.33 (44.60)
GCK extract	60.00 (51.10)	58.35 (49.78)	59.17 (50.24)
Carbon disulphide	50.00 (45.00)	49.79 (44.94)	49.89 (44.89)
Untreated Check	0.10 (1.83)	0.10 (1.83)	0.10 (1.83)
S. Em. ±	7.42	4.62	5.92
C.D. (0.5)	22.22	13.83	17.03

Average tunnel length = 40.66 cm, Average tunnel diameter = 0.75 cm, Average quantity of solution used = 22.5 ml/tunnel, DASI = Days after stem injection, Figures in the parenthesis are the arc sine transformed values

Table 2. Impact of stem injection with DDVP 76 EC @ 80 ml/l.

Particulars	Year	Total Number of plants	Infested Plants	Per cent Reduction
Before Stem Injection	2003	16200	2916	-
After Stem Injection	2004	16200	221	92.42
After Stem Injection	2005	4884	20	90.95

Table 3. Cost : Benefit ratio of different treatments

Treatments (Stem injection)	Qty of Chem/ acre (lit)	Yield (t/acre)	Gross Returns (Rs.)	Cost of Production (Rs.)	Cost of protection (Rs.)	Total cost (Rs.)	Net returns (Rs.)	IBC ratio
Monocrotophos 36 SL @ 100 ml/lit	2.45	2.58	33551.70	30000	1276.25	31276.25	2275.45	1.78
DDVP 76 EC @ 40 ml/lit	0.98	3.16	41196.37	30000	823.00	30823.0	10373.37	12.60
DDVP 76 EC @ 60 ml/lit	1.47	3.65	47567.00	30000	994.50	30994.5	16572.50	16.66
DDVP 76 EC @ 80ml/lit	1.96	4.73	61590.75	30000	1166.00	31166.0	30424.75	26.09
Petrol	24.50	2.39	31145.40	30000	1950.00	31950.0	-804.60	-0.41
Kerosene	24.50	2.24	29113.42	30000	1215.00	31215.0	-2101.58	-1.72
GCK extract	24.50	3.23	42046.29	30000	2205.00	32205.0	9841.29	4.46
Carbon disulphide	24.50	3.10	40344.85	30000	9055.00	39055.0	1289.85	0.14
Untreated Check	-	0.56	7220.07	30000	-	-	-22779.9	-
S.Em.±	-	0.36	-	-	-	-	-	-
C.D. (0.5)	-	1.11	-	-	-	-	-	-

Rates (Rs) : Mono = 325, DDVP = 350, Petrol = 60, Kerosene = 30, GCK = 90, CS = 350,
Appln. Cost = 480, Grape rate = Rs. 13.0/kg

DDVP 76 EC (80 ml/l) can be recommended for the effective management of grape stem borer to the farmers, as the damaging state of the pest is not always amenable for direct application of insecticides.

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