Research Paper :

Efficacy of indigenous materials and new insecticide molecules against *Maruca testulalis* (Hubner) on blackgram

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SUMMARY

Effect of indigenous materials and new insecticide molecules against *Maruca testulalis* on blackgram revealed that among indigenous materials NSKE recorded comparatively high larval reduction (36.26%) followed by GCK (21.43 %) and Panchagavya (18.35%) whereas GE (11.50%) was recorded lowest larval reduction in first spray. Similarly, NSKE (55.34 %) and Panchagavya (55.34%) recorded comparatively high larval reduction followed by GCK (54.08%), whereas GE (49.13%) was recorded lowest larval reduction in second spray. Among new insecticide molecules flubendiamide 24% + thiacloprid 24-48%SC recorded comparatively high larval reduction (76.56 and 84.45%) followed by emamectin benzoate (66.50 and 80.88%) and indoxacarb (61.55 and 77.94%) lowest larval reduction in I and II spray, respectively.

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Key words : Blackgram, *Maruca testulalis*, NSKE, GCK, Panchagavya, Flubendiamide, Thiacloprid, Emamectin benzoate, Indoxacarb

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Pulses constitute an integral part of Indian Agriculture because of major source of dietary protein of the large section of vegetarian population of the world. Besides their high nutritional value, pulse crops have a unique characteristic of maintaining and restoring soil fertility through biological nitrogen fixation and thus play a vital role in sustainable agriculture (Asthana, 1998). India is the largest producer and consumer of pulses in the world accounting for 33 per cent of world area and 24 per cent of world production. In India, the total area under pulses is 23.86 million hectares with a total production of 15.12 million tonnes and the average productivity is 638 kg per hectare (Anonymous, 2008). The important grain legumes grown in India are Bengalgram, redgram, greeengram, blackgram, cowpea, lentil and pea. Among them, blackgram (*Vigna mungo*) is the ancient and well known leguminous crop of Asia. The origin of cultivated blackgram is India and Central Asia. It is a popular pulse crop because of its superior nutritional quality, both in terms of high protein content (around 24%) and easy digestibility. The low yield of blackgram may be attributed for many reasons, among which damage by insect pests is of paramount importance. The pod borer complex includes *Helicoverpa armigera* (Hubner), *Maruca testulalis* (Geyer), *Lampides boeticus* (Lin.), *Euchrysops cnezus* F. *Etiella zinckenella* Treit and *Apion ampulum* F. which are of regular in occurrence. *Maruca testulalis* is one of the major pest and play an important role in decreasing the crop yield. The literature is scanty on efficiency of insecticides and newer molecules. Hence, the present investigations were undertaken.

MATERIALS AND METHODS

A field experiment was conducted during *Kharif* 2008 to evaluate the efficacy of indigenous materials and new insecticide molecules against pod borer at Agricultural

Research Station, Kathalagere, Davangere by using a blackgram variety Rashmi (LBG-625). The experiment was laid out in Randomized Block Design with twelve treatments and three replications. The crop was sown with a spacing of 30 cm between rows and 10 cm between plants in a plot size of 3 m x 2.5 m with all the agronomic practices as given in package of practices except the plant protection measures.

Application of plant products, Panchagavya and new insecticides were taken up by using high volume knapsack sprayer. The volume of the spray solution used was 400-500 litres per ha. Two sprays were taken up once at 50 per cent flowering and another at seven days after pod setting. Endosulfan 35 EC @ 2 ml/l was used as a standard check. Observations were recorded on number of larvae, a day before, five and ten days after spraying.

RESULTS AND DISCUSSION

Among the indigenous materials, NSKE treatment was found quite effective in reducing the mean larval population of *Maruca testulalis* to the extent of 36.26 per cent with a larval population of 3.90 larvae per plant after first spray (Table 1) followed by GCK with 21.43

Table 1 : Efficacy of indigenous materials and new insecticide molecules against *M. testulalis* (1st spray)

Treatments	Number of larvae per plant					Mean % reduction of larval population
	1DBS	5DAS	% reduction	10DAS	% reduction	
T_1 – NSKE 5%	5.83	3.90 (2.10)^{def}	38.22	4.17 (2.17)^{cde}	34.29	36.26
T_2-GCK (0.5%)	5.87	4.27 (2.32)^{efg}	23.35	5.13 (2.39)^{efg}	19.50	21.43
T_3-GE (1%)	5.83	5.27 (2.40)^{fg}	16.58	5.93 (2.54)^{fg}	6.42	11.50
T_4-Panchagavya	5.83	4.83 (2.31)^{efg}	23.44	5.50 (2.31)^{fg}	13.26	18.35
T_5-Spinosad 45SC (0.2ml/l	5.80	3.20 (1.92)^{cde}	49.02	3.53 (2.50)^{cd}	43.95	46.49
T_6-Emamectin benzoate 5SG (0.2g/l)	5.73	1.93 (1.56)^{ab}	68.84	2.23 (2.05)^{ab}	64.16	66.50
T_7-Flubendiamide 480SC (1ml/l)	5.73	2.80 (1.82)^{cd}	54.87	3.37 (1.66)^{cd}	45.98	50.43
T_8-Indoxacarb 14.5SC (0.3ml/l)	5.83	2.03 (1.59)^{bc}	67.79	2.83 (1.98)^{bc}	55.31	61.55
T_9-Fenvalerate 20EC (0.5ml/l)	5.77	3.73 (2.06)^{cdef}	40.18	3.93 (2.17)^{cde}	37.25	38.72
T_{10}-Endosulfan 35EC (2ml/l)	5.80	4.23 (2.18)^{def}	32.56	4.43 (2.26)^{def}	29.68	31.12
T_{11}-Flubendiamide24%+Thiacloprid24-48%SC (2ml/l)	5.77	1.33 (1.35)^{ab}	78.64	1.60 (1.51)^{a}	74.47	76.56
T_{12}-Untreated control	5.73	6.20 (2.59)^{g}	-	6.43 (2.69)^{g}	-	-

DBS: Day before spray, DAS: Days after spray, Values in parenthesis are $\sqrt{x+0.5}$ transformed

Table 2 : Efficacy of indigenous materials and new insecticide molecules against *M. testulalis* (2nd spray)

Treatments	Number of larvae per plant					Mean % reduction of larval population
	1DBS	5DAS	% reduction	10DAS	% reduction	
T_1 – NSKE 5%	5.23	3.17 (1.91)^{cd}	49.86	2.73 (1.80)^{cd}	60.83	55.34
T_2-GCK (0.5%)	5.40	3.17 (1.91)^{cd}	48.44	2.90 (1.84)^{cd}	59.72	54.08
T_3-GE (1%)	5.27	3.40 (1.97)^{d}	42.89	3.13 (1.91)^{d}	55.38	49.13
T_4-Panchagavya	5.23	3.03 (1.88)^{dc}	49.86	2.73 (1.80)^{cd}	60.83	55.34
T_5-Spinosad 45SC (0.2ml/l	5.20	2.30 (1.67)^{bcd}	61.85	2.07 (1.60)^{bcd}	70.19	66.02
T_6-Emamectin benzoate 5SG (0.2g/l)	5.30	1.37 (1.37)^{ab}	78.26	1.17 (1.29)^{ab}	83.49	80.88
T_7-Flubendiamide 480SC (1ml/l)	5.23	2.13 (1.62)^{bc}	65.15	1.90 (1.55)^{bc}	72.77	68.96
T_8-Indoxacarb 14.5SC (0.3ml/l)	5.17	1.60 (1.45)^{ab}	75.23	1.33 (1.35)^{ab}	80.65	77.94
T_9-Fenvalerate 20EC (0.5ml/l)	4.97	2.67 (1.78)^{de}	52.32	2.47 (1.72)^{cd}	62.75	57.54
T_{10}-Endosulfan 35EC (2ml/l)	5.07	3.07 (1.89)^{cd}	50.74	2.60 (1.76)^{cd}	61.51	56.13
T_{11}- Flubendiamide24%+Thiacloprid24-48%SC (2ml/l)	4.95	1.20 (1.30)^{a}	82.55	0.80 (1.18)^{a}	86.36	84.45
T_{12}-Untreated control	5.34	6.73 (2.69)^{e}	-	6.73 (2.69)^{e}	-	-

DBS: Day before spray, DAS: Days after spray Values in parenthesis are $\sqrt{x+0.5}$ transformed per cent larval population of 4.27 per plant. NSKE and Panchagavya treatment were found quite effective in reducing the mean larval population to the extent of 55.34 per cent with a larval population of 3.17 and 3.03 larvae per plant after second spray followed by GCK with 54.08 per cent larval population of 3.17 per plant (Table 2). Similar studies were conducted by Bhat *et al.* (1988), who have recorded the best results against pod borers.

Among the new insecticide molecules, flubendiamide 24% + thiacloprid 24-48%SC treatment was found quite effective in reducing the mean larval population of *M. testulalis* to the extent of 76.56 and 84.45 per cent with a larval population of 1.33 and 1.20 larvae per plant after first and second spray (Table 1 and 2) followed by emamectin benzoate with 66.50 and 80.88 per cent and larval population 1.93 and 1.37 per plant and indoxacarb with 61.55 and 77.94 per cent larval population 2.03 and 1.60 per plant. Similar studies were conducted by Bhat *et al.* (1988) and Sachan and Lal (1990), who have recorded the best results against pod borers.

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