

Management of chickpea pod borer, *Helicoverpa armigera* (Hubner) using indigenous materials

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International Journal of Plant Protection (October, 2010), Vol. 3 No. 2 : 194-196

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SUMMARY

Field evaluation of indigenous materials against chickpea pod borer (*Helicoverpa armigera* Hubner) indicated that pongamia leaf extract + NSKE + aloe extract + cow urine combination recorded higher larval reduction (55.71-56.11%). The next best treatments included green chilli aqueous extract [GCA]+ green chilli kerosene extract [GCK] and vitex leaf extract + clerodendron extract + cow urine treatments.

Key words :

Indigenous materials,
Chickpea pod borer,
Helicoverpa armigera

Chickpea [*Cicer arietinum* (L.)] is one of the major pulse crops grown in India. Among the different insect pests that attack the crop, the gram pod borer, *Helicoverpa armigera* (Hub.) is most serious pest distributed all over the country causing 60 to 70 per cent yield loss (Singla *et al.*, 1991). The pest has been effectively controlled by using synthetic insecticides. However, indiscriminate use of these chemicals in crop protection during last few decades resulted into development of pest resistance besides causing disturbance to the agro-ecosystem. Therefore, the present investigation was planned to utilise the alternative methods in which indigenous materials were evaluated against *H. armigera* on chickpea crop.

MATERIALS AND METHODS

An experiment was conducted with fifteen treatments replicated thrice in Randomized Block Design at Main Agricultural Research Station, Dharwad. The crop was sown at a spacing of 30x10cm over a plot size of 4x4m. Recommended agronomic practices were followed in raising the crop except plant protection measures.

The treatments were imposed by using knap sack sprayer @ 400-500 litres of spray solution per ha. The crop received two sprays,

the first being given at 50 per cent flowering stage (40 days after sowing) while, the second spray was imposed 20 days after first spray on ETL basis. The observations on larval population and pod damage were recorded on randomly selected 10 plants in each plot and at harvest, the seed yield was recorded.

RESULTS AND DISCUSSION

The result presented in Table 1 clearly indicate that among the indigenous materials, pongamia leaf extract + NSKE + aloe + cow urine treatment was found to be very effective (55.71 and 56.11% reduction after I and II spray, respectively). The present results are in accordance with the findings of Anonymous (1984) and Barapatre (2001) who reported higher effectiveness of pongamia + aloe + NSKE + cow urine against *H. armigera* in chickpea.

The efficacy of GCA + GCK can be supported by Vijayalakshmi *et al.* (1996) who reported that the garlic alone or in combination with other plant products was quite effective against *H. armigera*. Vitex leaf extract alone or in combination with neem or other plant products and cow urine proved effective against pod borer infesting bhindi, brinjal, tomato and cotton as reported by Vijayalakshmi *et al.* (1998) which confirm the present results

Accepted :
May, 2010

Table 1: Evaluation of indigenous materials against chickpea pod borer, *H. armigera*

Treatments	Mean no. of larvae			% reduction in larval population		Pod damage (%)	Seed yield (q/ha)
	1DBS	I spray	II spray	I spray	II spray		
T ₁ – VLE (20%) + Aloe (2%)	1.57	0.99	0.82	36.62	37.98	22.25	7.78
T ₂ – PLE (10%) + NSKE (10%) + Aloe (5%) + CU (30%)	1.60	0.72	0.53	55.71	56.11	18.73	9.42
T ₃ – VLE (20%) + CE (4%) + CU (17%)	1.57	0.84	0.73	46.39	46.85	20.83	8.45
T ₄ – NO (1%) + GBE (5%)	1.57	0.93	0.75	40.53	44.00	21.45	8.06
T ₅ – NSKE (8%) + CU (17%)	1.53	0.96	0.70	36.66	45.22	26.42	7.83
T ₆ – GBE (10%) + CU (17%)	1.56	0.89	0.80	40.54	39.86	22.35	7.15
T ₇ – GCK (1%) + CU (17%)	1.53	0.81	0.74	48.52	44.54	20.15	8.13
T ₈ – VLE (10%) + lime (2%) + CU (17%)	1.53	0.88	0.78	40.73	29.87	25.48	7.51
T ₉ – TLE (10%) + lime (2%) + CU (17%)	1.57	0.99	0.83	37.07	40.33	21.35	8.11
T ₁₀ – CSO (1%) + CU (17%)	1.53	0.93	0.83	41.93	37.99	26.82	7.87
T ₁₁ – GCA (2%) + GCK (0.5%)	1.53	0.82	0.67	46.79	49.93	19.06	8.62
T ₁₂ – NSKE (2.5%) + GCK (0.5%)	1.53	0.88	0.68	42.77	44.48	21.18	8.16
T ₁₃ – CU (fermented) (17%)	1.60	1.19	1.08	25.08	24.06	28.64	6.82
T ₁₄ – Quinalphos (25 EC) 0.05%	1.53	0.56	0.43	63.29	65.20	16.32	10.36
T ₁₅ – Untreated control	1.53	1.60	1.44	-2.83	-2.23	36.11	5.53
S.E. ±	0.033	0.031	0.034	2.03	1.523	1.672	0.446
C.D. (P=0.05)	NS	0.092	0.096	5.32	4.320	4.846	1.296

VLE - Vitex leaf extract; PLE - Pongamia leaf extract; NSKE - Neem seed kernel extract
 CU - Cow urine; CE - Clerodendron extract; GCK - Garlic chilli kerosene extract
 GBE - Garlic bulb extract; NO - Neem oil; TLE - Tobacco leaf extract
 CSO - Cotton seed oil; DAS - Days after spraying; DBS - Day before spraying

Table 2 : Influence of different indigenous materials on the occurrence of natural enemies in chickpea ecosystem

Treatments	Per cent parasitization of <i>H. armigera</i> by	
	<i>Camponotus chloridae</i>	<i>Eucelatoria bryani</i>
T ₁ – VLE (20%) + Aloe (2%)	13.33c	0.00b
T ₂ – PLE (10%) + NSKE (10%) + Aloe (5%) + CU (30%)	6.67d	0.00b
T ₃ – VLE (20%) + CE (4%) + CU (17%)	6.67d	0.00b
T ₄ – NO (1%) + GBE (5%)	13.33c	6.67a
T ₅ – NSKE (8%) + CU (17%)	13.33c	0.00b
T ₆ – GBE (10%) + CU (17%)	26.67a	0.00b
T ₇ – GCK (1%) + CU (17%)	13.33c	6.67a
T ₈ – VLE (10%) + lime (2%) + CU (17%)	20.00b	0.00b
T ₉ – TLE (10%) + lime (2%) + CU (17%)	13.33a	0.00b
T ₁₀ – CSO (1%) + CU (17%)	20.00b	6.67a
T ₁₁ – GCA (2%) + GCK (0.5%)	13.33c	0.00b
T ₁₂ – NSKE (2.5%) + GCK (0.5%)	20.00b	6.67a
T ₁₃ – CU (fermented) (17%)	26.67a	0.00b
T ₁₄ – Quinalphos (25 EC) 0.05%	0.00d	0.00b
T ₁₅ – Untreated control	26.67a	6.67a

with vitex leaf extract + clerodendron leaf extract + cow urine in reducing the larval population on chickpea.

The combination treatments of pongamia leaf extract + NSKE + aloe + cow urine, GCA + GCK and vitex leaf extract + clerodendron extract + cow urine recorded

lower pod damage and thus resulted in higher yield as reported by several workers (Anonymous, 1984; Vijayalakshmi *et al.*, 1996 and 1998; Barapatre, 2001). The natural enemy activity was not affected in the plots where indigenous materials were applied (Table 2). The

parasitization of the pod borer due to *Campoletis chloridae* varied from 6.67-26.67 per cent in different treatments while, no activity was observed in quinalphos treated plots. The safety of botanicals to natural enemies has been documented by Schumutter (1990).

Conclusion:

The present study revealed higher efficacy of the indigenous materials, pongamia leaf extract + NSKE + aloe + cow urine against chickpea pod borer followed by GCA + GCK and vitex leaf extract + clerodendron leaf extract + cow urine. As the leaf extracts are easily available in and around the farmers field, eco-friendly, easily degradable and safer to the natural enemies apart from being cost effective, they can readily be recommended for field use.

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