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MANAGEMENT OF CHICKPEA POD BORER, *HELICOVERPA ARMIGERA* (HUBNER) USING INDIGENOUS MATERIALS

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ABSTRACT
A field experiment was conducted in Rabi, 2003 at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad to evaluate the bioefficacy of some indigenous products against Chickpea pod borer, *Helicoverpa armigera* Hubner. Different indigenous products like NSKE (10%), Pongamia leaf extract (10%), Aloe (0.5%), Cow urine (30%), vitex leaf extract (20%), Clerodendron extract (4%), Cow urine (17%), Vitex (20%) Vitex leaf extract (10%), Neem oil(1%), Garlic extract (5%), Garlic bulb extract (10%) , Garlic Chilli Kerosene (GCK extract) (1%) , Lime (2%) Tobacco leaf extract(10%), Cotton seed oil (1%), Garlic chilli aqueous extract (GCA) (2%), Cow urine (fermented) (17%) tried in combinations along with Quinalphos 25 EC(0.05%) and untreated control. Among the treatments Pongamia leaf extract (10%) + NSKE (10%) + aloe (0.5%) + Cow urine (30%), GCA (2%) +GCK(0.5%) and vitex leaf extract (20%) + Clerodendron extract (4%) + Cow urine (17%) by recording maximum reduction in larval population (56.11, 46.85 and 46.85% respectively) with higher pod yield (9.42, 8.62 and 8.45 q/ha, respectively).

KEYWORDS: Chickpea, *H. armigera*, Indigenous products, bio efficacy.

INTRODUCTION

Chickpea, (*Cicer arietinum* L.). there are many constraints in the production of the crop, of which pod borer, *Helicoverpa armigera* Hubner cause both quantitative and qualitative losses. The failure of modern tactics has compelled the scientific community to go back to the traditional and indigenous products for tackling the pest problem. Indigenous agriculture is the agriculture system that has developed over time with cropping pattern and status of pest, based on traditional knowledge and experience of the native people (Warren, 1986). Pradhan *et al.* (1962) discovered the antifeedent properties of neem, *Azadirachta indica* against locust swarms. Cow urine and cow dung were reported to be effective for insect control as reported by Peries (1985) and Rankin (1986), respectively. Lakshmanan (2001) reported effectiveness of garlic bulb extract alone or in combination with other plant extracts in managing lepidopteran pests *H. armigera* and *S. litura*. There is a vast potential in the traditional methods practiced in rural India that can be included for combating the pest problems. In view of this the present studies were planned to evaluate the performance of indigenous products.

MATERIAL AND METHODS

Experiment was conducted to evaluate indigenous technologies on chickpea pod borer *H. armigera* during Rabi 2003 at the Main Agricultural Research Station (MARS), University of Agricultural Sciences, Dharwad, under partial irrigated conditions. The experiment was laid out in Randomized block design with 15 treatments replicated thrice in 4 X 4m plot size. The chickpea (Annigeri-1 variety) was raised as per the recommended package of practices except plant protection measures. The details of treatment are given in table 2. The treatments were imposed by using knapsack sprayer @ 400-500 liters of spray solution/hectare depending on stage of crop. The crop received two sprays, the first being given at 50 per cent flowering stage (i.e., 40 days after sowing) when the population crossed Economic Threshold Level (one larva/plant) while the second spray was imposed 20 days after first spray. The number of *H. armigera* larvae was counted on 10 randomly selected plants in each plot. The pre-treatment count was made a day before the first and second spray whereas, the post-treatment counts were made on 2nd, 7th and 15th day after each spray. At harvest the observations were made on total number of pods and the affected ones on five randomly selected plants in each treatment in order to determine the per cent pod damage. The data obtained were subjected for arcsine transformation and statically analyzed. Finally the pod yield was recorded for net plot area and then converted to q/ha and analyzed statically for variance to compare the treatment means.

RESULTS AND DISCUSSION

Percent reduction of *H. armigera* population due to application of indigenous materials (1st spray).

The larval population prior to treatment imposition was uniform in all the treatments as indicated by the non-significant differences among the different treatments (Table 1). After two days of application, the standard check brought about maximum larval reduction (66.12%) but however, the treatment was found on par with Pongamia leaf extract + NSKE + Aloe + Cow urine (57.82%). In other treatments, the reduction in larval population ranged from 38.82 to 53.33 percent. While, the

natural decline was 4.58 percent as recorded in the untreated plots. A similar trend noticed in 7 and 15DAS.

TABLE 1. Percent reduction of *H. armigera* population due to application of indigenous materials 1st and 2nd spray

Treatments	1 DBS	% Reduction of larval population over pre-count @ 1st Spray				1 DBS	% Reduction of larval population over pre-count @ 2nd Spray			
		2 DAS	7 DAS	15 DAS	Mean		2 DAS	7 DAS	15 DAS	Mean
Vitex (20%) + Aloe (2%)	1.57a	38.82d	48.30d	22.74de	36.62	1.33a	38.19e	46.23bc	31.52efg	37.98
Pongamia extract (10%)+Neem seed Kernel Extract(NSKE) (10%)+ Aloe(5%)+cow urine (30%)	1.60a	57.82ab	66.78ab	42.53b	55.71	1.27a	56.22b	66.10a	46.02b	56.11
Vitex leaf extract (20%)+Clerodendron extract (4%) + cow urine (17%)	1.57a	53.33bc	55.52bcd	30.32bcd	46.39	1.33a	47.58cd	56.31b	36.67cde	46.85
Neem oil(1%)+ Garlic extract (5%)	1.57a	46.73bcd	50.92d	23.93cde	40.53	1.33a	44.38cde	51.21bc	36.41cde	44.00
NSKE (8%)+ cow urine (17%)	1.53a	40.31cd	42.78d	26.89cd	36.66	1.27a	41.92cde	54.05bc	39.70bcd	45.22
Garlic bulb extract (10%) + cow urine (17%)	1.56a	45.52bcd	52.68cd	23.43cd	40.54	1.33a	43.32cde	45.88bc	30.38feg	39.86
Garlic Chilli Kerosene(GCK extract) (1%)+ cow urine (17%)	1.53a	50.89bcd	64.62abc	30.04bcd	48.52	1.33a	42.60cde	52.61bc	38.41cd	44.54
Vitex leaf extract (10%)+Lime (2%)+cow urine (17%)	1.53a	45.60bcd	51.08d	25.51cd	40.73	1.27a	40.34de	45.92bc	28.80fgh	29.87
Tobacco leaf extract(10%)+ Lime (2%)+cow urine (17%)	1.57a	41.10cd	46.32d	23.75cde	37.07	1.40a	38.45de	49.35bc	33.18def	40.33
Cotton seed oil (1%)+cow urine (17%)	1.53a	48.55bcd	50.43d	26.82cd	41.93	1.33a	40.86de	47.42bc	25.70gh	37.99
Garlic chilli aqueous extract (GCA) (2%)+GCK (0.5%)	1.53a	52.45bc	55.80bcd	32.12bc	46.79	1.33a	51.10bc	56.40b	42.30bc	49.93
NSKE (2.5%)+ GCK (0.5%)	1.53a	47.28bcd	52.78cd	28.25cd	42.77	1.33a	43.45cde	51.48bc	38.52cd	44.48
Cow urine (fermented) (17%)	1.60a	42.88cd	21.63e	10.74f	5.08	1.40a	35.71e	19.73d	16.73f	24.06
Quinalphos 25 EC(0.05%)	1.53a	66.12a	72.71a	51.03a	63.29	1.27a	68.05	71.60a	56.08a	65.20
Untreated control	1.53a	-4.58e	-6.98f	+3.84g	-	1.43a	-10.27f	+3.53e	+4.75	-

Means followed by same letter in the column do not differ significantly by DMRT (p=0.05)
DBS=Day before spray
DAS= Days after spray

TABLE 2. Influence of indigenous materials on pod damage and yield in chickpea

Treatments	Pod damage (%)	% decrease in pod damage Over control	Yield (q/ha)	% increase in yield over control
Vitex (20%) + Aloe (2%)	22.25bc	38.38	7.78cd	40.69
Pongamia extract (10%)+Neem seed Kernel Extract(NSKE) (10%)+ Aloe(5%)+cow urine (30%)	18.73bcd	48.13	9.42ab	70.34
Vitex leaf extract (20%)+Clerodendron extract (4%) + cow urine (17%)	20.83bcd	42.31	8.45bc	52.80
Neem oil(1%)+ Garlic extract (5%)	21.45bcd	40.51	8.06bcd	45.75
NSKE (8%)+ cow urine (17%)	26.42bc	35.14	7.83cd	41.59
Garlic bulb extract (10%) + cow urine (17%)	22.35bc	38.11	7.15cd	29.29
Garlic Chilli Kerosene(GCK extract) (1%)+ cow urine (17%)	20.15bcd	44.20	8.13bcd	40.02
Vitex leaf extract (10%)+Lime (2%)+cow urine (17%)	25.48ab	29.43	7.51cd	35.80
Tobacco leaf extract(10%)+ Lime (2%)+cow urine (17%)	21.35bcd	40.88	8.11bcd	46.65
Cotton seed oil (1%)+cow urine (17%)	26.82ab	25.73	7.87cd	42.31
Garlic chilli aqueous extract (GCA) (2%)+GCK (0.5%)	19.06bcd	47.21	8.62bc	55.87
NSKE (2.5%)+ GCK (0.5%)	21.18bcd	41.35	8.16bcd	47.56
Cow urine (fermented) (17%)	28.64ab	20.69	6.82de	23.33
Quinalphos 25 EC(0.05%)	16.32d	54.80	10.36a	87.37
Untreated control	36.11a	-	5.53e	-

Percent reduction of H. armigera population due to application of indigenous materials (2nd spray)

The non-significant difference among the various treatments prior to application of treatments indicated the uniform distribution of the pest in the experimental area. However after two days of spraying, the quinolphos treatment could eliminated 68.05 per cent of larval population, proving its superiority over the indigenous materials. Pongamia leaf extract + NSKE + Aloe + Cow urine application resulted in significantly higher reduction (56.22%). The larval mortality was increased to 71.60 per cent within the 7 days in quinolphos treated plots and equally effective was the application of pongamia leaf extract + NSKE +Aloe + Cow urine (66.10%). Barring cow urine treatment, all other indigenous materials proved similar efficacy in reducing the larval population. A similar trend noticed in 7 and 15 DAS (Table 1). The

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, cow urine and kerosene were quite

The pod damage and yield

A minimum of 16.32 per cent pod damage was recorded in quinalphos, the treatment being statically superior over other treatments (Table 2). Among the indigenous products, pongamia leaf extract + NSKE +Aloe + Cow urine treatment registered lowered pod damage (18.73%) followed by GCA +GCK (19.06%) and vitex leaf extract + Clerodedron leaf extract + Cow urine (20.83%). These findings are in close agreement with Anonymous (1984), Vijayalakshmi *et al.,* (1996), Vijayalakshmi *et al.,* (1998) and Barapatre (2001).Similarly with the highest pod yield of 10.36q/ha, the quinalphos treatment distinguished itself as the most superior followed by pongamia leaf extract + NSKE + Aloe + Cowurine (9.42 q/ha), GCA + GCK (8.62q/ha) and Vitex leaf extract + Colerodendron leaf extract + Cow urine (8.45q/ha). The untreated plots recorded a very low low yield of 5.53 q/ha.

CONCLUSION

The indiscriminate use of insecticides has lead to insecticide resistance, pest resurgenece and environmental pollution besides upsetting the natural eco-system. This is an era of organic farming involving several ecofriendly approaches. The use of indigenous pest management practices not only helps in rich harvest from the land but also ensures the environmental safety.

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effective against *H. armigera*. Vitex leaf extract alone or in combination with neem or other plant products and cow urine proved by Vijayalakshmi *et al.,* (1998) which confirms the present results with vitex leaf extract + Clerodendron leaf extract + Cow urine in reducing the larval population on chickpea.