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Efficacy of selected insecticides and neem oilagainst shoot and fruit borer (*Eariasvittella* Fab.) on okra (*Abelmoschus esculentus* L.)

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Abstract

A field experiment was conducted to evaluate the efficacy of selected insecticides and neem oil against shoot and fruit borer (*Eariasvittella*Fab.) pest of okra at the experimental field of Department of Plant Protection, Sam Higginbottom Institute of Agriculture, Technology and Sciences (SHIATS), Allahabad in kharif season of July to November 2011-2012. Seven treatments including control with three replications were taken up using RBD. Foliar spray of insecticides viz.imidacloprid @ 0.3ml/l,cypermethrin @ 0.5ml/l,emamectin benzoate @ 0.4g/l,neem oil @1ml/l,spinosad@ 0.3ml/l, quinalophos @ 0.3ml/l were given at an interval of 5 , 10 and 15 days while check plots were sprayed with water.Spinosad@ 0.3ml/l proved superior against the larval infestation of shoot and fruit damage percent of fruit borer as compared to other treatment due to *Eariasvittella*Fab.comparison to untreated control.

Key-Words: Insecticides, Neem oil, Shoot and Fruit borer, Okra

Introduction

Okra (*Abelmoschusesculentus* L.) commonly known as lady's finger (Bhindi) belongs to the family Malvaceae. It is a popular fruit vegetable crop (Meena*et al.*,2011). It is a major vegetable being cultivated all over India with a major share in the states of Uttar Pradesh, Madhya Pradesh, Karnataka, Gujarat and Maharashtra (Shinde*et al.*,2007). The major notorious pest of okra is shoot and fruit borer (*Eariasvittella* Fab.) having endemic nature ,inflict direct losses in yield of marketable fruit.The losses in the yield of okra by fruit were 69.0 percent (Rawat and Sahu,1973).Krishnaiah (1980) reported that losses in okra due to fruit borer (*E.vittella*Fab.) was 49 to 74 percent. The damage to the crop is done by two ways. First, the terminal portions of growing shoots are bored by the caterpillars, which move down by making tunnels inside. As a result, the shoots droop downward or dry up. Second, the larvae enter the fruits by making holes, rendering them unfit for human consumption (Gopalan*et al*.,2007). A number of insecticides and bio-pesticides have been found effective and recommended to control this insect (Meena*et al.*, 2011).

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Botanicals like neem (*Azardirachtaindica*) possess desired properties like antifeedant, growth inhibitor, repellent andmoulting disruptor against insect.Keeping the above in view,an experiment was conducted to evaluate the efficacy of some insecticides and neem oil against larval infestation of shoot and fruit borer(*Eariasvittella*Fab.) on okra.

Material and Methods

The trial was laid out in randomized block design (RBD) with three replications and seven treatments including check in the experimental fieldof Department of Plant Protection, Sam Higginbottom Institute of

Agriculture, Technology and Sciences (SHIATS), Allahabad in Kharif season of 2011-2012. Each replication consisted of 21 plots of 2×1m^{2}each. The pea crop cv. "ArkaAnamika" was sown in July with a spacing of 60 × 45 cm. Fertilizers NPK (120:70:60 kg/ha) were applied as per recommended dose. Foliar spray of six insecticides viz. Imidacloprid 200 SL@ 0.3ml/l, Cypermethrin 25 EC @ 0.5ml/l, emamectin benzoate 25 WG @ 0.4g/l, neem oil @ 1ml/l, spinosad 45 SC @ 0.3ml/l and quinalophos25 EC @ 0.3 ml/l as per treatment was applied at the onset of larvae.First spray was done with the initiation of shoot borer (55 DAS) and second spray was given at the initiation of fruit infestation (75 DAS). Theshoot borer population and fruit borer infestation was recorded randomly on five selected tagged plants one day before and 5, 10, and 15 days after treatment. The infection and yield data was subjected to the statistical analysis. Cost benefit ratio was calculated by considering additional cost and benefit (compared to control) in the respective treatments.

Results and Discussion

Shoot borer

The data on surviving larval population (Table 1) indicated that the differences in larval population of shootborer at 5, 10 and 15days after spray(DAS)were significant. All the insecticides recorded significantly lower larval population than untreated control.Spinosad 45SC @ 0.03 ml/l significantly minimized the larval population at 5, 10 and 15 DAS. The mean larval population under spinosad 45 SC @ 0.3 ml/l (0.33, 0.27 & 0.13 larva/5 plants), followed by emamectinbenoate 25 WG @ 0.4g/l (0.40, 0.33&0.20larva/5 plants),cypermethrin 25 EC @ 0.5ml/l (0.47, 0.40 & 0.27larva/5 plants),imidacloprid 200SL @ 0.3ml/l (0.53, 0.47 & 0.33larva/5 plants), quinalphos 25WP @ 0.3ml/l (0.60, 0.53 & 0.40 larva/5 plants) and neem oil (0.73, 0.60 & 0.53 larva/5 plants) as against untreated control of (0.93, 1.00 & 1.07larva/5 plants). These findings are in agreement with Shinde*et al.* (2007), Sharma *et al.* (2007), Mane *et al.* (2010) and Galvan *et al.* (2005)they also reported that spinosadwas the most effective insecticide.

Fruit borer

The data on fruit damage due to fruit borer in various spray schedules are presented in table 2 the treatment spinosad 45SC @ 0.03 ml/l significantly minimized the fruit damage (%) at 5, 10 and 15 DAS. The mean fruit damage (%) under spinosad 45 SC @ 0.3 ml/l (20.85, 23.15 & 23.72%) gave the best protection followed by emamectinbenoate 25 WG @ 0.4g/l (21.64, 26.19&28.27%), cypermethrin 25 EC @ 0.5ml/l (22.63, 28.11 & 30.25%),imidacloprid 200SL @ 0.3ml/l (24.85, 29.92 & 31.35l%), quinalphos 25WP @ 0.3ml/l (25.43, 30.89 & 33.36%) and neem oil (27.31, 31.44 & 35.88 %) as against untreated control of (33.11, 35.24& 40.88%). These findings are in agreement with Shinde*et al.* (2007), Sharma *et al.* (2007), Mane *et al.* (2010) and Galvan *et al.* (2005). They also reported that spinosad was the most effective insecticide.Gupta *et al.* (2005) reported that spinosad protected the cotton crop with minimum incidence of spotted bollworm leading to increased seed cotton production.

The cost benefit ratio (CBR) in various treatments raged from 1:2.73 to 1:1.68. The highest CBR (1:2.73) was observed in the treatment of Emamectin benzoate 25 WG. It was followed by the Cypermethrin 25 EC (1:2.61), Quinalphos 25 EC (1:2.48), Spinosad 45 SC (1:2.02), imidacloprid 200 SL (1:2.02), Neem oil (1:2.00) and compression to control (1:1.68). The highest marketable fruit yield (85.71q/ha) but less CBR (1:2.02) was obtained due to the high cost of spinosad. Shinde (2005), Basavaraj and Gupta (2006) and Mane*et al.* (2010) recorded higher yield of good quality seed cotton from the plots protected byspinosad and the cost benefit ratio was more in Emamectin benzoate followed by spinosad.

Table 1 Efficacy of insecticides and neem oil against *Eariasvittella*Fab.larval population on okra

Treatment	Conc. (%)	Mean larval population			
		1DBS	5 DAS	10 DAS	15 DAS
T_1 Imidaclopried	0.3ml/l	0.60	0.53	0.47	0.33
T_2 Cypermethrin	0.5ml/l	0.60	0.47	0.40	0.27
T_3Emamectin benzoate	0.4g/l	0.67	0.40	0.33	0.20
T_4 Neem oil	1ml/l	0.73	0.73	0.60	0.53
T_5 Spinosad	0.3ml/l	0.53	0.33	0.27	0.13
T_6Quinalphos	0.3ml/l	0.60	0.60	0.53	0.40
T0 control	-	0.87	0.93	1.00	1.07
CD (P=0.05)			0.18	0.09	0.17
S.Ed±			0.08	0.20	0.08
CV%			18.49	21.91	22.50
Result		NS	S	S	S

Table 2: Efficacy of insecticides and neem oil against *Eariasvittella*Fab.fruit damage percent on okra

Treatment	Conc. (%)	Fruit damage percent				
		1 DBS	5 DAS	10 DAS	15 DAS	Benefit cost ratio
T_1 Imidaclopride	0.3ml/l	20.13	24.85	29.92	31.35	1:2.02
T_2 Cypermethrin	0.5ml/l	16.13	22.63	28.11	30.25	1:2.61
T_3Emamectin benzoate	0.4g/l	18.31	21.64	26.19	28.27	1:2.73
T_4 Neem oil	1ml/l	19.09	27.31	31.44	35.88	1:2.00
T_5 Spinosad	0.3ml/l	20.66	20.85	23.15	23.72	1:2.02
T_6Quinalphos	0.3ml/l	19.95	25.43	30.89	33.36	1:2.48
T0 control	-	20.13	33.11	35.24	40.38	1:1.68
CD (P=0.05)			4.09	3.45	3.44	
S.Ed±			1.88	1.59	1.58	
CV%			9.15	6.63	6.06	
Result		NS	S	S	S	

DAS=Days after spray; DBS=Days before spray

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