Research Paper

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Toxic Effect of Neem Based Formulation Against *Earias vitella* and *Dysdercus koenigii* Fabr

Zoology

KEYWORDS : TOXICITY, MORTALITY, EARIAS , DYSDERCUS , PESTICIDES

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ABSTRACT

Experiment were conducted to study the bioefficacies of different neem based pesticides that affected the larval and the nymph development of E. vitella and D.koenigii fed on okra fruits. Neem based pesticides (neemazal, neemarine, bioneem, neemgold, nimbicidine and achook) direct toxicity effect on E. vitella and D.koenigii . The result on insecticidal properties of six neem based pesticides against E. vitella and D.koenigii have shown that neemazal at the dose 2% was mast effective in resulting the mortality percentage of 94.97 and 86.14 in E. vitella and D.koenigii respectively . However achook shows low mortality in 60.27 and 61.77 in higher percentage(2%). The toxicity effectiveness on the basis of the mortality thus could be arranged in descending oder of follows neemazal>neemarine> bioneem> neemgold> nimbicidine and achook.

INTRODUCTION

The ***E. vitella*** and ***D.koenigii*** is a major pest of okra. Lady's finger or Bhindi is one of the most common vegetables grown extensively all over India. It's original home is Africa. It is a warm season crop. Okras is rich in vitamins, calcium, potassium and other mineral matter. Okra is also used for cleaning the cane juice for gur or juggery prepared (Chauhan, 1972). The low yield of Bhindi is due to insect pest such as fruit and shoot borer (***E. vitella***), red cotton bug (***D.koenigii***), leaf roller and red spider mites Rawat and Sahu(1973). Moreover, they causes a great damage up to 60-70% in optimal conditions (Salim, 1999). To prevail over the threat of food contamination, diverse sources of bio-insecticides are being sought to replace the synthetic insecticides. Hence, plant derivatives being environment friendly having good potential (Grainge and Ahmad, 1988; Dhingra *et al*., 2008) as insect control agent. The neem based insecticides in the form of neemoil extract provided a good source for the control of different insect (Jacobson, 1988). Keeping in view the dietary and economic importance of okra crop and detrimental effects of synthetic insecticides on human health, the present study was premeditated; to evaluate the effectiveness of bio-insecticides in comparison with synthetic insecticides against ***E. vitella*** and ***D.koenigii*** on okra crop. In conclusion to establish the suitability of bio-insecticides as a safe and environment friendly pest management tool for sustainable vegetable production.

MATERIAL OF MATHODS

The last instar larvae of ***E. vitella*** in the present investigation were obtained from a laboratory culture maintained at 27± 2^0 and 65-70 percent RH. The excised fruits of hosts under study were dipped in given dosages separately for a few seconds and there after hanged vertically to remove excess of pesticidal emulsion. Dipped okra fruits were dried in shade and under the fan. Treated fruits kept in a Petridis (10 cm diameter) having blotting paper over moist cotton wool in order to avoid desiccation of fruits. Each treatment replicated three times 8-10 hours starved larva were released on the treated fruits. In case of control treatment the fruits dipped in water only. The numbers of living larva were counted after 24 - 28 hours of release in each case to work out percent mortality reduction. The last instar nymph (4th instar) of ***D.koenigii*** culture in laboratory at 27 ± 10 and 50-60 percent RH. The process was same as above and nymph released on experimental okra plant twings (with flower, leaves and fruits)

Different concentration of neem products neemazal, neemarine, neemgold, nimbicidine, bioneem and achook were prepared by adding desired quality of distilled water. The amount of water and neem products was calculated as per formula given below.

$$\text{Amount of test compound} = \frac{\text{Quantity of solution required} \times \text{Percent of solution desired}}{\text{Strength of formulation available}}$$

Desired concentration of neemazal, neemarine, neemgold, nimbicidine, bioneem and achook were prepared at

2.50, 2.00, 1.00, 0.5, 0.25, 0.125, 0.06, 0.03 and 0.015 per dosage from stock solution.

RESULTS AND DISCUSSION

Results on insecticidal properties of six neem based pesticides against ***E. vitella*** and ***D.koenigii*** have shown that neemazal at the dose of 2% was most effective in resulting the mortality percentage of 94.97 and 80.14 in ***E. vitella*** and ***D.koenigii*** respectively table 1&2. Toxicity effect (mortality) was visible in the treated insect within 24-28 hours of the treatment. The larvae become shriveled constricted and some time oozing of fluid from larvae could be seen. Moreover, this was common almost in all the neem formulation tested with exception to potent in respect of eliciting toxicity effect in the form of larval mortality. It appear that neemazal and neemarine must have some active toxic constituents that led to mortality effect against ***E. vitella*** and ***D.koenigii***. The mortality effect of neem of neem formulations may be due to pesticidal constituent including triterpenoid, vermicilin, salannia, neemol, nimidin, vepacide (from neemoil), ninabiol, nimibidin, nirabinec acid, meliantriol and most of found in leaves, fruit seed and bark. All these compound have been found to elicit mortality effect in their treated insect as reported by Urs and Srilatha (1990). It seems that due presence of these toxic constituents present in the formulation i.e. neemazal, neemarin, bioneem, neemgold, nimbicidine and achook may have caused larval (63.39 & 94.97) and nymph (75.10 & 80.14) mortality at higher concentration 1 & 2 % within 1and 2 days of treatment. Similar result have also been reported by Gujar & Mehrotra (1990) who have reported toxicity

TABLE NO.1: TOXICITY EFFECT OF NEEM FOERMULATIONS AGAINST *E. VITELLA*.

S. N.	CONC. USED (%)	NO. OF LARVAE TREATED	L.M. NEEMAZAL (AV.)%	L.M. NEEMARINE (AV.)%	L.M. BIONEEM (AV.)%	L.M. NEEMGOLD (AV.)%	L.M. NIMBICIDINE (AV.)%	L.M. ACHOOK (AV.)%
1	2.00	30	94.87(76.97)	78.97(62.71)	72.02(58.07)	68.50(55.86)	64.03(53.15)	60.27(50.93)
2	1.00	30	63.39(52.77)	60.00(50.77)	56.68(48.84)	53.34(46.92)	49.87(44.93)	46.63(43.07)
3	0.5	30	53.34(46.92)	50.00(45.00)	46.63(43.04)	43.16(41.07)	39.84(39.14)	36.58(37.22)
4	0.25	30	43.16(41.07)	39.84(39.14)	36.58(37.22)	33.24(35.24)	29.66(33.00)	25.49(30.29)

5	0.125	30	33.24(35.21)	29.99(33.21)	26.51(30.99)	23.17(28.78)	19.31(26.07)	16.34(23.85)
6	0.06	30	15.58(23.25)	13.00(21.14)	9.99(18.43)	4.52(12.28)	1.14(6.14)	0.00(0.00)
7	0.03	30	4.52(12.28)	1.14(6.14)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)
8	0.015	30	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)
9	CONTROL	30	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)
10	S.E. (M) ± C.D.at 5%		7.76 16.31	5.20 10.93	5.10 10.92	5.39 11.39	4.96 10.43	4.41 9.26

CONC. =CONCENTRATION; L.M. = LARVAL MORTALITY

TABLE NO.2: TOXICITY EFFECT OF NEEM FOERMULATIONS AGAINST *D.koenigii*.

S.N.	CONC. USED (%)	NO. OF LARVAE TREATED	N.M NEEMAZAL (AV.)%	N.M. NEEMARINE (AV.)%	N.M. BIONEEM (AV.)%	N.M. NEEMGOLD (AV.)%	N.M. NIMBICIDINE (AV.)%	N.M. ACHOOK (AV.)%
1	2.00	30	80.14(63.54)	76.80(61.21)	73.36(58.93)	70.08(56.84)	66.82(54.83)	61.77(51.81)
2	1.00	30	75.10(60.07)	71.71(57.87)	68.35(55.77)	65.05(53.76)	61.77(51.81)	56.68(48.96)
3	0.5	30	70.08(56.84)	66.73(54.78)	63.34(52.74)	60.03(50.79)	56.71(48.86)	33.17(35.17)
4	0.25	30	65.05(53.76)	61.70(51.77)	58.33(49.80)	50.00(45.00)	46.63(43.07)	18.27(25.31)
5	0.125	30	60.03(50.79)	56.66(48.83)	53.33(46.91)	26.64(31.08)	22.31(28.87)	0.00(0.00)
6	0.06	30	39.96(39.21)	34.93(36.23)	29.91(33.16)	1.44(6.14)	0.00(0.00)	0.00(0.00)
7	0.03	30	9.59(18.04)	6.32(14.75)	2.01(8.61)	0.00(0.00)	0.00(0.00)	0.00(0.00)
8	0.015	30	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)
9	CONTROL	30	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)	0.00(0.00)
10	S.E. (M) ± C.D.at 5%		2.50 5.25	2.33 4.90	2.44 5.12	3.35 7.05	2.52 5.30	2.53 5.32

CONC. =CONCENTRATION; N.M. = NYMPH MORTALITY

effect of neemoil and it was dose depended D.koenigii mortality in last instar nymphs of was due to treatment of residual film techniques. Most of the nymphs were found to be shriveled and dehydrated at the time of death 24 hours of the treatment. Commercial neem formulation like nimbicidine 0.03%, neemazal 1.0%, neemgold 0.15% and rakshak 0.15% were assessed against maggots of moringa fruit fly and it was found that neem formulation were toxic matured maggots of moringa fruit fly Ragumoorthi and Subarao (1997). These finding are very much similar to the finding of present author who has reported mortality effect of experimental neem formulation against E. vitella and D.koenigii. Neem formulations are consider safe pesticides. Among these six formulation, neemazal containing 2% Azadiractin had given better performance than neemarine 2% while achook 2% was least effective. Sharma and Lal,(2003); Singh and Kumar (2003) also reported neem products to effective against leafhopper, okra fruit borer.

However, contrary results were reported by Bindu et al. (2003) and Singh & Sharma (2007) where they in found that achook was more toxic than nimbicidine against E. vittella and Amrasca biguttulla bigittula Ishid on okra. In present investigation, nimbicidine and achook was least effective. The difference in toxicity of achook and nimbicidine due to difference in active ingredient (Azadirachtin in PPM).

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