E-ISSN: 2663-1075
P-ISSN: 2663-1067
IJHFS 2019; 1(1): 01-03
Received: 01-11-2018
Accepted: 05-12-2018

SK Dehariya
Department of Entomology, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur Madhya Pradesh, India

Kamlesh Ahirwar
Jawaharlal Nehru Krishi Vishwa Vidyalaya, Krishi Vigyan Kendra Chhatarpur Madhya Pradesh, India

Uttam Kumar Tripathi
Jawaharlal Nehru Krishi Vishwa Vidyalaya, Krishi Vigyan Kendra Chhatarpur Madhya Pradesh, India

Rajiv Kumar Singh
Jawaharlal Nehru Krishi Vishwa Vidyalaya, Krishi Vigyan Kendra Chhatarpur Madhya Pradesh, India

Manoj Kumar Ahirwar
Jawaharlal Nehru Krishi Vishwa Vidyalaya, Krishi Vigyan Kendra Damoh Madhya Pradesh, India

Correspondence
SK Dehariya
Department of Entomology, Jawaharlal Nehru Krishi Vishwa Vidyalaya, Jabalpur Madhya Pradesh, India

Effective of botanical pesticides against sucking serious insects pests in brinjal

SK Dehariya, Kamlesh Ahirwar, Uttam Kumar Tripathi, Rajiv Kumar Singh and Manoj Kumar Ahirwar

Abstract
The experiment was conducted in randomized block design with 7 treatments and 4 replications, to evaluate the performance of some botanical products against the sucking pest of brinjal. The treatment included Triazophos 40E.C. 0.04%, Neem oil 1et al, Achook 5et al,NSKE 5%, Karanj oil 1%,Eucalyptus oil 1% and an untreated control. Four spraying of each treatment were conducted starting 30 days after transplanting, at an interval of 15 days. Observation on population of suking pests (aphids and jassids) were recorded before treatment and 3,7and 10 days after each sprying. The results revealed that Triazophos 40E.C. 0.04% was significantely superior over all the botanical treatments. did not significantly shoot damage in different treatments ranged between 3.9 to 10.1%.Highest healthy fruits yield (24.76q/ha) was recorded in the treatment of Triazophos 40E.C. 0.04% followed by the treatment of neem oil 1% (20.54 q/ha healthy fruits), and both the treatments were statistically at par Yields in remaining treatments were at par and ranged between 19.57 and 15.23 q/ha. Lowest yield (10.50 q/ha healthy fruits) was registered in untreated control. Highest cost benefit ratio of 1:6. 31 was in treatment of Triazophos 40 EC 0.04%. Application of neem oil 1% registered the cost benefit ratio of 1:1.79 and found was most economical.

Keywords: Brinjal, neem, botanicals, jassids, aphids

Introduction
Brinjal (*Solanum melongena* Linn.) is an important vegetable crop, in almost all parts of our country. The crop is generally sown twice or thrice in a year, depending upon the irrigation facilities. Many insect pests damage and affect the yield of brinjal crop to a great extent. Singh *et al*., (1984) [9] have listed about 25 insect pests of brinjal, of which some major insect pests are brinjal shoot and fruit borer (*Leucinodes orbonalis* Gu.), Epilachna beetle (*Epilachna vigintioctopunctata* F.), aphids (*Aphis gossypi* Glower), stem borer (*Euzophera perticella* Rag.) and jassid (*Amrasca biguttula*).
Sucking insects pests are the serious pest of brinjal. The losses caused by various pests were estimated to be ranging from 28-85% (Ahmed, 1974) [1].
Suitable insecticides used for the control of brinjal pests are the important. However these insecticides cause the problem of resistance and resurgence of pests (Mehrotra, 1990) [5]. These toxic insecticides pollute environment and also adversely affect the natural enemies of pests. Several non-chemical means of pest management have been proposed for brinjal and other crops, like the manipulation of cultural practices, nutrient management, use of biological agents, etc.
To reduce pesticide hazards, one of the resorts is the application of insecticides of plant origin which are cheaper, easily available and safer to mankind. Neem plant has proved itself as a wonderful insecticide of plant origin, which is harmless to higher animals including man (Walunj *et al*., 1996) [15]. Plant products like Eucalyptus, Calotropis, Pongamia, Annona and Neem have been found effective in controlling for brinjal pests in green house. Hence in present experiment meat the botanical product were tested. *tabaci* is another serious and Polyphagous sucking pest of tomato crop. The damage is caused by both nymphs and adults. They suck the plant sap from lower Surface of leaves. Severe infestation results in premature defoliation and plant unable to produce flowers and fruit

Materials and Methods

The experiment was conducted to evaluate efficacy of botanical products against the major insect pest complex of brinjal at Vegetable Research Farm of College of Agriculture, JNKVV Jabalpur. The brinjal crop (Variety Pusa Purple Round) was raised by transplanting 26 days old seedlings in 4 x 4 meter plots with plant to plant and row to row distances of 45 x 60 cm. The crop was transplanted in the third week of April. Normal horticultural practices were followed to raise the crop. Experiment was planned with seven treatments and four replications following Randomized Block Design (RBD). Spacing of rows and plants distance was kept 60 x 45 cm. Four sprayings were done starting from 30 days after transplanting at an interval of 15 days. The spraying solution were taken @ of 500 liters water / ha. and spray using hand compression sprayer. Due care was exercised to eliminate the drift of spray maetrial from one plot to.

Population of sucking pests (aphids and jassids) were recorded before treatment and 3,7and 10 days after each sprying. Three leaves of a single plant (upper. middle and lower) were observed to record the sucking pests Five random plants were observed in each treatment and replication throughuot the crop season. Data of sucking pests was analysed using statistical analysis of varience at 5% level of significance. Suitable tranfomations were adopted before analysis of varience.

Results and Discussion

Jassids:

The results are depicted in Table – 1. the basis of 10 days after fourth spray the overall jassid population, found significantly superior over untreated control (27.75 per 15 leaves). However, among the botanicals, neem oil 1% (13.25/15 leaves), found superior over all the botanicals which at par with karanj oil 1% (14.25) and NSKP 5et al (14.5/15 leaves) proved superior to rest of the botanical treatments. However Triazophos 40% EC found superior over all the treatments. The next better treatment was eukalyptus oil 1% (15.25 /15 leaves) and it was followed by Achook neem 0.5et al (17 /15 leaves). Earlier workers also tested the plant products against jassids and found reduction in the pest population by two plant extracts neem and karanj derivatives also obtained population reduction of jassids in neem treated plots which also produced higher yield than other treatments. Some findings were reported by previous workers Dimetry *et al*., 1996 [3], Sabillon and Bustamante (1995) [8] Somsekhara, *et al*. 1997 [11], Singh *et al*. 2006 [10].

Aphids

The results are depicted in Table – 2.All the treatments had less leaf infestation than untreated control (25.75 mean aphid population / 15 leaves) Among all the treatments triazophos 40% EC found superior over all the treatments.(7.00 mean aphid population / 15 leaves), among botanicals neem oil 1% (13.00/15 leaves), found superior over all the botanicals which at par with karanj oil 1% (13.50) and NSKP 5et al (16.00 /15 leaves) proved significantly superior than other treatments. The next better treatment was Achook neem 0.5et al (21.00/ 15 leaves). The above finding was found more or less similarly to the prvious workers Trinidade *et al.* (2000) [12] also reported 82 to 94.7 per cent mortality of eggs and larvae of tomato leaf miner fourth day after the treatment of neem seed kernel extract (NSKE). However, 100 per cent mortality was caused by all the concentrations after sixth day of the treatment. Jayakumar and Uthamasamy (1997) [4] also reported that neem oil 3% and mahua oil 3% caused 93.3 per cent and 90 per cent larval mortality of *Myzus persicae*. Viraktamath *et al.* (1993) [13] also reported the effectiveness of neem seed kernel extract 4% against *Liriomyza trifolii* on tomato. Azam (1991) [2] reported that the neem oil 1.0 and 1.25 per cent caused more than 80 per cent mortality of the larvae and pupae of *L. trifolii* and other similar findings were reported by Murthy and Prasad (1996) [7] Wankhede *et.al.,* (2007) [14] Mishra and Shantipriya (2008) [6]. The maximum healthy fruit yield was recorded in Triazophos 40% EC (24.76 Quintal/ha) neem oil 1% (20.54 q/ha) which was at par with eukalyptus oil 1% (19.5 q/ha) proved significantly superior to other treatments. The Minimum fruit yield was rerecorded in untreated control plot (10.5 q/ha) it is two times less than neem oil 1%

Table 1: Evaluation of different botanical products against jassids in brinjal crop

S. No.	Treatments	Dose	Mean jassids population per 15 leaves, day after													
			pre-treatment	First spray			Second spray			Third spray			Fourth spray			
				3 days	7 days	10 days	3 days	7 days	10 days	3 days	7 days	10 days	3 days	7 days	10 days	
1.	Triazophos 40 EC 0.04%	1 ml/lit.	23.50 (4.819)	9.00 (2.988)	13.00 (3.599)	15.00 (3.859)	6.75 (2.593)	11.00 (3.308)	16.00 (3.982)	8.00 (2.789)	8.00 (2.814)	14.00 (3.736)	3.00 (1 720)	7.00 (2642)	9.00 (2998)	
2.	Neem oil 1%	10 ml/lit.	22.50 (4.742)	11.00 (3.294)	12.00 (3.449)	18.75 (3.859)	7.25 (4.327)	7.25 (2.669)	17.00 (4.109)	15.00 (3.885)	7.00 (2.628)	10.00 (3.152)	16.00 (2.428)	9.00 (2.998)	13.25 (3.634)	
3.	Achook 05%	5 ml/lit.	21.75* (4.663)	13.00 (3.599)	16.00 (3.971)	16.75 (4.089)	11.00 (3.304)	17.00 (4.093)	15.25 (3.881)	1100 (3.308)	12.50 (3.532)	17.00 (4.119)	8.00 (2.826)	13.00 (3.599)	17.00 (4.119)	
4.	N.S.K.E 5%	50gm/lit.	26.75 (5.121)	21.00 (4.569)	18.75 (4.325)	17.00 (4.122)	9.00 (2.988)	12.00 (3.453)	18.00 (4.239)	9.00 (2.998)	1100 (3.313)	15.75 (4.030)	11.00 (3.315)	12.50 (3.535)	14.50 (3.803)	
5.	Karanj oil 1%	10 ml/lit.	23.75 (4.873)	12.00 (3.444)	17.00 (4.108)	18.00 (4.231)	15.00 (3.868)	15.50 (3.934)	15.00 (3.868)	15.00 (3868)	17.00 (4.122)	17.50 (4.183)	11.75 (3.419)	14 .25 (3.773)	14.25 (3.747)	
6.	Eucalyptus oil 1%	10 ml/lit.	20.25 (4.495)	10.00 (3.142)	17.00 (4111)	19.00 (4.355)	8.75 (2.948)	13.00 (3.597)	13.25 (3.633)	9.00 (2.985)	17.00 (419)	17.75 (4.213)	11.00 (3.315)	14.50 (3.749)	15.25 (3.880)	
7.	Untreated	-	25.00 (4.999)	27.00 (5.196)	27.00 (5.190)	29.00 (5.385)	29.00 (5.385)	27.75 (5.266)	29.25 (5.407)	25.75 (5.024)	28.00 (5.291)	28.00 (5.291)	24.50 (4.898)	29.00 (5.194)	27.75 (5.243)	
8.	CD 5%		0. 238	0.546	0.456	0.352	0.427	0.500	0.541	0.701	0.339	0.302	0.344	0.374	0.453	
	SEm±		0.006	0.033	0.023	0.014	0.020	0.028	0.033	0.055	0.013	0.010	0.013	0.015	0.023	

*Square root transformation

Table 2: Evaluation of different botanical products against aphids in brinjal crop

S. No.	Treatments	Dose	pre-treatment	Mean aphids population per 15 leaves, day after											
				First spray			Second spray			Third spray			Fourth spray		
				3 days	7 days	10 days	3 days	7 days	10 days	3 days	7 days	10 days	3 days	7 days	10 days
1	Triazophos 40 EC 0.04%	1 ml/lit.	23.50 (4.845)	7.00 (2.628)	11.00 (3.308)	15.25 (3.904)	6.00 (2.438)	10.00 (3.160)	10.25 (2..201)	4.00 (1.992)	7.00 (2.628)	7.00 (2. 628)	4.00 (1.958)	6.00 (2428)	7.00 (2.628)
2	Neem oil 1%	10 ml/lit.	24.75 (4.974)	13.00 (3.602)	17.00 (4.119)	19.50 (4.414)	11.00 (3.308)	11.25 (2.998)	13.75 (3.706)	10.00 (3.160)	14.25 (3.770)	17.25 (4.149)	7.50 (2.731)	10.00 (3.152)	13.00 (3.604)
3	Achook 05%	5 ml/lit.	26.00 (5.147)	12.00 (3.457)	15.50 (3.931)	21.00 (4.580)	12.00 (3.463)	13.00 (3.599)	19.00 (4.358)	14.00 (3.740)	19.00 (4.358)	23.00 (4.793)	9.75 (3.114)	13.00 (3.599)	21.25 (4.605)
4	N.S.K.E 5%	50gm/lit.	27.00* (5.94)	13.75 (3.703)	12.00 (3.461)	24.00 (4.896)	17.00 (4.119)	19.00 (4.358)	21.00 (4.582)	12.00 (3.463)	13.50 (3.737)	16.00 (3.995)	9.00 (2.988)	16.00 (3.995)	16.00 (4.056)
5	Karanj oil 1%	10 ml/lit.	24.5 (4.948)	10.00 (3.154)	13.00 (3.604)	19.00 (4.358)	13.00 (3.599)	16.75 (4.089)	20.00 (5.383)	8.00 (2.826)	15.00 (3.675)	21.80 (4.581)	7.00 (2.628)	8.00 (2.814)	13.50 (3.666)
6	Eucalyptus oil 1%	10 ml/lit.	25.5 (5.049)	15.75 (4.062)	18.75 (4.327)	20.50 (4.526)	13.00 (3.604)	17.00 (4.119).	21.00 (4.579)	11.00 (3.315)	9.00 (3.036)	13.00 (3.599)	10.00 (3.152)	15.25 (3.897)	18.75 (4.324)
7	Untreated	-	28.00 (5.289)	26.00 (5.097)	26.00 (5.097)	29.00 (5.383)	30.00 (5.477)	30.75 (5.544)	33.00 (5.744)	29.00 (5.384)	32.00 (3.657)	29.00 (5.385)	24.75 (4.974)	25.50 (3.049)	25.75 (3.073)
	CD 5%		0.232	0.370	0.283	0.222	0.287	0.275	0.183	0.162	0.450	0.332	0.417	0.379	0.360
	SEm±		0.006	0.015	0.009	0.005	0.009	0.008	0.003	0.003	0.023	0.012	0.019	0.16	0.14

Table 3: Economics of control operations by various botanical products

S. No.	Treatments	Yields of healthy fruits (q/ha)	Increase in yield over untreated control	Value of increased yield (%)	Cost of treatment/ha (Rs.) (labour + material cost for 4 sprays) (%)	Cost benefit ratio
1.	Triazophos 40 EC 0.04%	24.76	14.26	9982	1580	1:6.31
2.	Neem oil 1%	20.54	10.04	7028	5960	1:1.79
3.	Achook 0.5%	15.23	4.73	3311	4700	1:0.70
4.	N.S.K.E. 3%	17.28	6.78	4746	12560	1:0.37
5.	Karanj oil 1%	17.81	7.31	5117	5360	1:0.95
6.	Eucalyptus oil1%	19.57	9.07	6349	22160	1:0.28
	Untreated control	10.50	-	1050	7350	

References

1. Ahmad R. Studies on the pests of brinjal and their control with special reference to fruit borer, *Leucinodes orbonalis* Guen (Pyralidae: Lepidoptera). Entomologist's News Letter. 1974; 1(4):2-3
2. Azam KM. Txicity of neem oil against leafminer (*Liriomyza sativa.* Burgass) on cucumber. Pl. Prot. Qtly. 1991; 6(4):196-197
3. Dimetry NZ, Gomaa AA, Salem AA, Abd-El-Moniem ASH. Bioactivity of some formulations of neem seed extracts against the white fly *Bemisia tabacii* (Genn.). Anzeiger-Fur-Schadlingshunde, - Pflanzenschutz, Umweltschutz. 1996; 69(6):140-141.
4. Jayakumar P, Uthamasamy S. Bio-efficacy of some synthetic insecticides and botanicals against Liriomyza trifolii Indian. J Ent. 1997; 59(4):347-350.
5. Mehrotra KN. Pyrethroids resistance in pest management. Indian Experience Pestic. Res. J. 1990; 2(1):44-52.
6. Mishra HP, Shantipriya B. Mangement of serpentine leaf miner *Liriomyza trifolii* in okra using bio-pesticides. Indian J Plant Prot. 2008; 36(1):130-131
7. Murthy KS, Prasad YG. Management of serpentine leaf miner on caster. Insect Environment. 1996; 2(1):4-5
8. Sabillon A, Bastamante M. Evaluation of botanical extracts for the control of tomato pests (*Lycopersicon esculentum* Mill.). CETBA. 1995; 36(2):179-187.
9. Singh H. Household and kitchen garden pests, principles and practices, Kalyani Publications, Daryaganj, New Delhi, 1984, 168-169.
10. Singh Swaroop, Choudhary DP, Mathur YS. Effect of plant extract against white fly (*Bemisia tabaci* Genn.) on tomato. Indian J. Entomology. 2006; 68(1):71-73
11. Somsekhara YM, Nateshan HM, Muniyappa V. Evaluations of neem products and insecticides against white fly (*Bemisia tabaci* Genn.) a vector of tomato leaf curl gemini virus disease. Indian Journal Plant Prot. 1997; 25(1):56-59
12. Trinidade RCP, Marques IMR, Xavier HS, Oliveira JV, de-Oliveira JV. Neem seed kennel extract and the tomato leaf miner egg and larval mortality. Scientia – Agricola. 2000; 57(3):407-419.
13. Vikraktamath CA, Tiwari GC, Srinivasan K, Gupta M. American serpentine leaf miner is a new threat to crops. Indian Fmg. 1993; 43:10-12.
14. Wankhede SM, Deotale VY, Undirwade DB, Mane PN, Deotale RO, Khare RN. Performance Performance of some insecticides and bio-pesticides against tomato leaf miner (*Liriomyza sativa.* Burgass) J. Soils and Crops. 2007; 17:136-138
15. Walunj AR, Mote UN, Desai AC, Parikh KM. Efficacy of 29-199, a Neem based insecticide against brinjal shoot and fruit borer. Pestology. 1996; 20(1):7-9.