

Efficacy of Different Bio-Pesticides against Major Sucking Pests on Brinjal under Field Conditions

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Abstract: A field study was carried out during 2015 at the experimental area of Entomology Section, Agriculture Research Institute, (ARI) Tando Jam to examine the efficacy of different bio-pesticides against major sucking pests on brinjal under field conditions. Four treatments with three replications were applied. The treatments were: T1=Neem (*Azadirachta indica*), T2= Tobacco (*Nicotiana tabacum*), T3= Datura (*Datura stramonium*) and T4=Control (untreated). Three insect pests were found infesting brinjal including white flies, jassid and mites. Pre-treatment and post-treatment observations were recorded. The results revealed that against white fly, the first spray of Neem extract showed highest reduction percent (82.60%) followed by Tobacco extract (75.95%), Datura extract (73.93%), and lowest for untreated control (11.07%); while in the second spray also Neem extract showed highest effect against white fly (67.53%); followed by Tobacco extract (56.43%), Datura extract (42.25%), and least by untreated plot (5.49%). Against jassid, Neem extract showed highest effect (55.95%) as observed during 1st spray, followed by Tobacco extract (53.38%), Datura o extract (63.11%) and untreated control (8.00%), while after second spray also Neem extract showed highest reduction percent (68.73%) followed by Tobacco extract (55.72%), Datura extract (50.66%) and the lowest was resulted by untreated control (13.90%). Against mites population on brinjal the first spray results showed that Neem extract showed highest effect (96.19%) followed by Tobacco extract (95.75%), Datura extract (86.86%) and least population was recorded in untreated control (9.96%). After second spray, Neem extract showed highest reduction percent (98.33%), followed by Tobacco extract (92.85%), Datura extract (88.93%) and the lowest reduction percent was resulted by untreated control (9.14%) respectively. Neem extract showed its superiority in effect to combat sucking insect pests studied in brinjal, followed by, Tobacco extract, Datura extract and untreated control remained the least.

Keywords: Bio-pesticides, Sucking pests of brinjal.

INTRODUCTION

The vegetables are the essential component of human life for livelihood and play vital role in food security and ensure nutritional requirements for the fast growing human population. Among the vegetables, brinjal is an important solanaceous vegetable crop in many countries. Brinjal is named as “poor man’s vegetable” because of its low cost of production, ease of culture and availability throughout the year. Brinjal (*Solanum melongena*) is a member of Solanaceae family. Brinjal crop is attacked by different kind of insect pests from seedling stage up to harvesting. The major and most destructive pests of eggplant in Asia are cotton leaf hopper (*Amrasca biguttula biguttula*) Ishida. The white fly (*bemesia tabaci*) and epilachna beetle, *Henosepilachna (Epilachna) vigintioctopunctata Fabricius*. Rarely, brinjal crop is infested by red spider mite (*Tetranychus macfurlanei*) and aphids (*Aphis gossypii*) Glover, is one of the most important non-insect pest of brinjal [1, 2]. The yield misfortune because of these insects is to the degree of 70-92 percent. Brinjal is predominantly invaded by lepidopteran insect insects which decimate to the new

products of the soil shoot tips, because of this natural product yield lessened [2]. Manufactured pesticides are broadly used to control insect pest’s vermin of brinjal, which might unfavorably influence human wellbeing and there have to present/receive IPM strategies with the end goal of controlling nuisance which is ecofriendly and ecologically protected [3]. The natural plant extracts/botanical pesticides has great importance in agricultural fields because it is very cheap and has low expenditures and also safe, nonhazardous, no residual effect but it has high effect on various insect pests. The bio-pesticides have been utilized for nearly all vegetables and field crops against natural product borers, bollworms, aphids, thrips, jassids, whitefly, and so forth. The state of mind of activity of plant concentrates as against feedant, repellent and its seed contains certain chemicals, which restrains the number of inhabitants in insect pests. The present study will be carried out to effect of plant extracts being used as bio-pesticides against sucking insect pests of Brinjal (*Solanum melongena* L.) crop under field conditions at Tando Jam.

MATERIALS AND METHODS

Efficacy of different bio-pesticides against major sucking pests on brinjal under field conditions was

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carried out throughout the year of 2015. The trial was laid out in a three replicated Randomized Complete Block Design in a sub-plot size of 3m x 3 (9m²). A total of 12 plots were prepared and divided into three separate blocks as replications to manage for treatments.

Land Readiness

The land was readied in off-season. At first, the hard skillet of the test soil was evacuated by running plate furrow and left for 15 days. Later, the blocks were pounded utilizing tractor drawn hunk crusher, and leveling was performed. Subsequent to dousing measurement, when the area came in condition, the plots were at long last arranged by giving partition strips and shaping sustaining channels. The plant-plant separation of 30 cm and column line separation was kept up at 60 cm.

Sowing

The nursery of brinjal assortment "Pusa Purple Round" was acquired by the Sindh Horticulture Research Institute, Mirpurkhas and transplanting was done on 25th April, 2015. The watering system was connected at first just before transplanting and subsequently when required.

Treatments

- T1 Neem (*Azadirachta indica*)
- T2 Tobacco (*Nicotiana tabacum*)
- T3 Datura (*Datura stramonium*)
- T4 Control (untreated)

Preparation of Botanical Extracts

For making plant remove/plant pesticide, we got leaves around 5 kg each of (*Datura stramonium*) Datura, (*Azadirachta indica*) Neem and (*Nicotiana tabacum*) Tobacco, prepared these leaves to get separate. These leaves were bubbled in 10 liters of faucet water. At the point when water remained 5 liters, the readied stock arrangement sifted through muslin fabric. The concentrates of various plants material were splashed with the assistance of knapsack hand sprayer. The two showers were done, and watched their adequacy following 48, 72, 96 hours, 1 week and 2 weeks of splash and contrasted and control. Bio-pesticides 5liter/section of land (12ml/plot) were showered for brinjal sucking insect insects.

The data on the periodical data recording sheets were transferred to the computer to achieve replication-wise average values and in accordance with the replication-wise data the ANOVA and LSD test were performed to examine the significance of treatment and superiority of the treatment means, respectively, using Statistix (ver 8.1) Statistical Package for personal computers.

RESULTS

The experiments were conducted during 2015 at the experimental area of Entomology Section, Agriculture Research Institute (ARI) Tandojam to efficacy of different bio-pesticides against major sucking pests on brinjal under field conditions. Four treatments were formed including a control such as: T1=Neem (*Azadirachta indica*), T2=Tobacco (*Nicotiana tabacum*), T3= Datura (*Datura stramonium*), and T4=Control (untreated). Three insect pests were found infesting brinjal including whiteflies, jassids, mites and the data were observed on these insect pests after treatment and pre-treatment insect count were also recorded.

White Flies (1st Spray)

The data (Table 1) indicated that after first spray against white flies, the neem extract reduced insect infestation 5.92 to 1.03/leaf, tobacco extract 5.49 to 1.32/leaf, datura extract 5.87 to 1.53/plant and control from 5.96 to 5.30/leaf. The overall reduction percent of neem extract, tobacco extract, datura extract and control was 82.60, 75.95, 73.93 and 11.07% respectively. On the basis of effect, neem control ranked 1st, tobacco extract 2nd, datura extract 3rd against sucking insect pests monitored during this study.

White Flies (2nd Spray)

The data (Table 2) reported that after second spray the neem extract reduced white flies from 4.62 to 1.50/leaf, tobacco extract 4.82 to 2.10/leaf datura extract 4.52 to 2.61/leaf and control 4.96 to 4.69/leaf with overall reduction percent of 67.53, 56.43, 42.25 and 5.49% against neem, tobacco, dhatura and control, respectively. On the basis of effect, neem control ranked 1st, tobacco extract 2nd, datura extract 3rd against sucking insect pests monitored during this study.

Jassid (1st Spray)

The data (Table 3) showed that the neem extract after first spray reduced insect population from 5.79 to

Table 1: Effects of Bio-Pesticides against White Fly Infestation on Brinjal as Compared To Control at Different Intervals after First Spray

Plant extracts	Pre-treatment	Post treatment observation/leaf after:					Pest Reduction /leaf	Reduction %
		48hrs	72hrs	96hrs	1week	2week		
Neem extract	5.92	3.23	2.68	2.02	1.72	1.03	4.89	82.60
Tabacco extract	5.49	3.86	2.87	2.71	2.01	1.32	4.17	75.95
Datura extract	5.87	3.93	2.98	2.84	2.23	1.53	4.34	73.93
Control	5.96	5.03	4.92	5.00	5.71	5.30	0.66	11.07
S.E.±	0.4913	0.3608	0.3193	0.2514	0.2245	0.2092		
LSD 0.05	-	0.7861	0.6956	0.5477	0.4891	0.4558		
LSD 0.01	-	1.1060	0.9752	0.7678	0.6857	0.6390		

Table 2: Effects of Different Bio-Pesticides against White Fly Infestation on Brinjal as Compared to Control at Different Intervals after Second Spray

Plant extracts	Pre-treatment	Post treatment observation/ leaf after:					Pest Reduction /leaf	Reduction %
		48hrs	72hrs	96hrs	1week	2week		
Neem extract	4.62	3.89	3.51	3.00	2.96	1.50	3.12	67.53
Tobacco extract	4.82	4.06	3.86	3.59	3.00	2.10	2.72	56.43
Datura extract	4.52	4.29	4.00	3.86	3.41	2.61	1.91	42.25
Control	4.96	4.90	4.00	3.86	4.16	4.69	0.27	5.49
S.E.±	0.2762	0.2272	0.2089	0.2010	0.1845	0.1598	-	-
LSD 0.05	-	0.4950	0.4551	0.4379	0.4020	0.3482	-	-
LSD 0.01	-	0.6939	0.6380	0.6140	0.5635	0.4882	-	-

Table 3: Effects of Different Bio-Pesticides against Jassid on Brinjal as Compared To Control at Different Intervals after First Spray

Plant extracts	Pre-treatment	Post treatment observation/leaf after:					Pest Reduction /leaf	Reduction %
		48hrs	72hrs	96hrs	1week	2week		
Neem extract	5.79	5.00	4.61	3.66	3.13	2.55	3.24	55.95
Tobacco extract	6.20	5.64	5.30	4.61	3.92	2.89	3.31	53.38
Datura extract	6.76	5.95	5.71	4.83	4.00	3.11	3.65	53.99
Control	7.25	7.00	6.93	6.71	6.51	6.67	0.58	8.00
S.E.±	0.4366	0.3546	0.3381	0.2598	0.2311	0.1830		
LSD 0.05	-	0.7727	0.7367	0.5661	0.5035	0.3987		
LSD 0.01	-	1.0832	1.0328	0.7936	0.7059	0.5589		

2.55/plant leaf, tobacco extract 6.20 to 2.89/leaf, datura extract 6.76 to 3.11/leaf and control 7.25-6.67 /leaf while overall reduction percent was 55.95, 53.38, 53.99 and 8.00% against neem, tobacco, datura and control respectively. On the basis of effect, neem control ranked 1st, tobacco extract 2nd, datura extract 3rd against sucking insect pests monitored during this study.

Jassid (2nd Spray)

The data (Table 4) revealed that after second spray, neem extract reduced jassid population from 5.79 to 1.81/leaf, tobacco extract 5.85 to 2.59/leaf, Datura extract 6.00 to 3.05/leaf and control 6.97 to 6.00/leaf with average reduction percent was, 68.73, 55.72, 50.66 and 13.91% against neem, tobacco, datura and

Table 4: Effects of Different Bio-Pesticides against Jassid on Brinjal as Compared to Control at Different Intervals after Second Spray

Plant extracts	Pre-treatment	Post treatment observation/leaf after:					Pest Reduction /leaf	Reduction %
		48hrs	72hrs	96hrs	1week	2week		
Neem extract	5.79	5.33	5.20	3.85	2.86	1.81	3.98	68.73
Tobacco extract	5.85	5.47	5.43	4.06	3.69	2.59	3.26	55.72
Datura extract	6.00	5.61	5.40	5.00	4.11	3.05	3.04	50.66
Control	6.97	6.73	6.26	6.11	5.96	6.00	0.97	13.91
S.E.±	0.4257	0.3828	0.3725	0.2601	0.2206	0.1395	-	-
LSD 0.05	-	0.8341	0.8117	0.5668	0.4807	0.3039	-	-
LSD 0.01	-	1.1694	1.1379	0.7946	0.6739	0.4260	-	-

control, respectively. On the basis of effect, neem control ranked 1st, tobacco extract 2nd, datura extract 3rd against sucking insect pests monitored during this study.

Mite (1st Spray)

The data (Table 5) indicated that the neem extract after first spray reduced pest infestation from 41.78 to

1.59 /leaf, tobacco extract 41.69 to 1.77/leaf, datura extract 42.71 to 5.61/leaf and control 42.85 to 38.58/leaf, respectively; while average reduction percent was 96.19, 95.75, 86.86 and 9.96% against neem, tobacco, datura and control, respectively. On the basis of effect, neem control ranked 1st, tobacco extract 2nd, datura extract 3rd against sucking insect pests monitored during this study.

Table 5: Effects of Different Bio-Pesticides against Mite's Infestation on Brinjal as Compared to Control at Different Intervals after First Spray

Plant extracts	Pre-treatment	Post treatment observation/leaf after:					Pest Reduction /leaf	Reduction %
		48hrs	72hrs	96hrs	1week	2week		
Neem extract	41.78	36.51	33.45	28.31	12.61	1.59	40.19	96.19
Tobacco extract	41.69	38.50	36.12	31.04	3.99	1.77	39.92	95.75
Datura extract	42.71	43.84	41.41	37.2	18.39	5.61	37.1	86.96
Control	42.85	44.23	41.07	40.63	39.44	38.58	4.27	9.96
S.E.±	2.4095	2.1183	2.0490	1.8383	1.1174	1.6750		
LSD 0.05	-	4.6155	4.4644	4.0053	2.4347	3.6494		
LSD 0.01	-	6.4706	6.2588	5.6152	3.4133	5.1162		

Table 6: Effects of Different Bio-Pesticides against Mites Infestation on Brinjal as Compared to Control at Different Intervals after Second Spray

Plant extracts	Pre-treatment	Post treatment observation/leaf after					Pest Reduction /leaf	Reduction %
		48hrs	72hrs	96hrs	1week	2week		
Neem extract	33.63	28.14	27.26	25.87	4.73	0.56	33.07	98.33
Tobacco extract	29.95	24.76	25.50	23.69	5.63	2.14	27.81	92.85
Datura extract	34.90	33.48	32.13	30.72	5.84	3.86	31.04	88.93
Control	37.72	36.36	35.06	33.18	32.40	32.27	3.45	9.14
S.E.±	2.5197	2.3610	2.3184	2.1110	0.8533	0.9502		
LSD 0.05	-	5.1441	5.0514	4.5995	1.8593	2.0703		
LSD 0.01	-	7.2117	7.0816	6.4482	2.6066	2.9025		

Mite (2nd Spray)

The data (Table 6) reported that after second spray, the neem extract reduced mite population from 33.63 to 0.56/leaf, tobacco extract 29.95 to 2.14/leaf, datura extract 34.90 to 3.86/leaf and control 37.72 to 32.27/leaf, respectively with average reduction percent was 98.33, 92.85, 88.93% and 9.14% against neem, tobacco, datura and control respectively. On the basis of effect, neem control ranked 1st, tobacco extract 2nd, datura extract 3rd against sucking insect pests monitored during this study.

DISCUSSION

Generally the vegetables are collected as often as possible and the picked vegetables are showcased for human utilization quickly with no examination for remaining impacts of the pesticides. Be that as it may, poisonous impacts of engineered pesticides are a genuine danger to human wellbeing. The bio-pesticides are sheltered and their application smothers the insect insects successfully, as well as there is no danger of lingering impacts for the customers. Hence, the study was carried out to examine the effect of various bio-pesticides against sucking insect pests of brinjal.

The present study showed that overall reduction percent of white fly population against neem extract, tobacco extract, datura extract and control was 82.60, 75.95, 73.93 and 11.07% and 67.53, 56.43, 42.25 and 5.49% after 1st and 2nd spray, respectively. Similarly, overall reduction percent for jassid was 55.95, 53.38, 53.99 and 8.00% and 68.73, 55.72, 50.66 and 13.90% after 1st and 2nd spray, respectively. However, the overall reduction percentage for mite was 96.19, 95.75, 86.86 and 9.96% and 98.33, 92.85, 88.93% and 9.14% after 1st and 2nd spray, respectively. During the entire experiment neem possess first position in controlling sucking insect pests (whitefly, jassid and mites) against brinjal followed by tobacco and datura, respectively. One spray of neem is required to eliminate the insect pests' problems below ETL level in brinjal crop, there is no need to apply chemical insecticides in brinjal. In view of these present results, the similar reports are reported by Singh and Kumar [4] they argued that neem based products proved to be better in control sucking insect pests in vegetable crops as compared to chemical insecticides like Achok and NSKE (3%). Another findings of [5] talk about the efficacy of bio-pesticides more likely to neem extract which is highly effective against sucking insect pests like whitefly and jassid, respectively. [6] Argued that neem based

products results superior efficacy against whitefly and jassid. Similar results achieved by [7] they tested the neem oil (25) and neem seed (3%) against sucking insect pests, their results showed that both neem oil and neem seed resulted maximum efficacy against whitefly and jassid, respectively. [8] Reported that neem and datura extract are effective for controlling sucking insect pests. [9] Recorded better efficacy against sucking insect pests when he sprayed bio-pesticides against tomato insect pests. [10] analysed the efficacy of bio pesticides for controlling jassid in brinjal, their findings indicated that neem oil ranked 1st in controlling jassid population even after 1st spray followed by tobacco leaves, neem powder, neem oil + B.M. [11] tested six plant extract for control sucking insect pests of cowpea, out of these, neem extract results maximum performance for control of sucking pests. The chemical pesticides demonstrated the highest effects in controlling the tested insects but they reduced significantly the population of the beneficial insects. The bio pesticides seem to be less hazardous to the beneficial insects.

CONCLUSIONS

The neem extract was extremely effective to control jassid, whitefly, and mites on brinjal, tobacco extract showed excellent results for its effect on the target insect pests. Datura extract also showed significant results against brinjal's whiteflies, jassid and mites during both the sprays. By overall effect of bio-pesticides against whiteflies, jassid and mites after 1st and 2nd spray, the treatments ranked as: neem extract first, tobacco second and datura extract third.

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