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Comparative Toxicity of Some Insecticides against Brinjal Fruit Borer (*Leucinodes Orbonalis*), under Field

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Abstract:

The test on the toxicity of some chemicals against eggplant Leucinodes orbonalis under field was done at Kathor, Tehsil Bela, District Lasbela, Balochistan, amid kharif season 2015. The trial was composed in (RCBD) with five applications and four replications.

"Dark beauty" line was cultivated for this trial. A few insecticides at various applications viz., T1= Curacuron 50EC (Profenofos) 800ml/acre (standard), T2= Lorsban 40EC (Chlorpyrifos) 750ml/acre (standard), T3= Match (Lufenuron) 200ml/acre (standard), T4= Belt (Flubendiamide) 50ml/acre and T5= control was applied four times against brinjal (Leucinodes orbonalis). The data indicates that the mean per plant count of brinjal fruit borer (Leucinodes orbonalis) after first spray of a few insecticides (Treatments) were (5.7, 4.8, 4.19 and 3.87) though for the second spray, 5.72, 4.73, 4.15 and 3.79, for the third spray 5.71, 4.72, 4.19 and 3.97 and fourth treatments, the mean population were (5.68, 4.56, 4.19 and 3.8) separately, when equated with the control of a few chemicals spray (7.27, 7.34, 7.37 and 8). The ANOVA results after every spray indicated that, pest population of brinjal fruit borer on brinjal vary significantly at (P=>0.0000) with a few insecticides after 24hrs, 72hrs, 168hrs and 336hrs. Accordingly, in this trial there are numerous chemicals for brinjal fruit borer while our study means that the Belt 50ml/acre was find out to be the more successful to reduce the population of fruit borer (Leucinodes orbonalis) under field.

Key words: Toxicity, insecticides, Brinjal, Fruit borer, field condition.

INTRODUCTION

The eggplant (*Solanum melongena* L.) is famously known as brinjal. In Asia it is the most fabulous and economical vegetable. It is cultivated throughout the world [2]. It is most useful vegetable in the Indian subcontinent [10] and as well used in large amounts in South and South-East Asia [4]. Eggplant faces many insect pests [8]. The most harmful insect pests of brinjal are fruit and shoot borer, whitefly, leaf hopper, and other red spider mite. One of the most damaging insect pests of brinjal is fruit borer in its whole life cycle. The pest has been reported in Germany, Burma, USA, Sirilanka and India throughout the world. In all stages of egg plants insect

damaging the shoots and fruits. Approximately 70-92 % yield loss was observed by different insect pests [7] [3] [6]. The infected fruits become unuseful for utilizing and loss in quality and loose in market value has been observed. Reduction of vitamin C content was found at 68% in infected fruits [5].

The numerous effects of many insecticides have revealed in controlling the population of pest. Though reckless use of insecticides resulted in many problems i.e. death of beneficial insects, insecticidal resistance, increasing the number of pests and plant becomes more sensitive to diseases. Therefore the above results indicate that the use of large number of different synthetic insecticides has very effective tool for controlling the different kind of pests.

MATERIALS AND METHODS

The trial was carried out at Kathor, Tehsil Bela, District Lasbela, Balochistan to compare the toxicity of some chemicals against eggplant fruit borer *Leucinodes orbonalis* Guenee under field on variety Black beauty sown on 15-04-2015. The trial was laid out in Randomized Complete Block Design (RCBD). There were five applications viz, T1= Curacuron 50 EC (Profenofos) 800ml/acre, T2= Lorsban 40 EC (Chlorpyrifos) 750 ml/acre, T3= Match (Lufenuron) 200ml/acre, T4=Belt (Flubendiamide) 50ml/acre including a un-treated (T5) and each application was replicated four times. Having plot size of 80x60sqft, respectively.

All agricultural practices were maintained when required, the treatments were adjusted at par with the plot size, and insecticides were calibrated and applied when pest appeared. Five plants were selected randomly from each subplot of different treatments to observe the effectiveness of some insecticides against brinjal fruit borer from brinjal fruit. For the pest counting pre-treatment observations were taken 24

hours before the spray and post treatment observations were recorded after 24hrs, 72 hrs, 168hrs and 336hrs at the application of different insecticides. The data was collected analyzed statistically through Statistics-8.1 software.

LAYOUT PLAN OF THE EXPERIMENT

Design: Randomized Complete Block Design (RCBD)

Numbers of Treatment: 5

Numbers of Replication: 4

Plot size: 80ft x 60ft=4,800sqft

1 meter: 3.3 feet

T1: Curacuron 50EC 800ml/acre
T2: Lorsban 40EC 750mlacre
T3: Match 200ml/acre
T4: Belt 50ml/acre
T5: Control
80ft
60ft

R-1		R-II		R-III		R-IV
T1	Sub-Channel	T3	Walking Path	T4	Sub-Channel	T1
T2		T1		T3		T2
T3		T4		T2		T3
T4		T2		T1		T4
T5		T5		T5		T5
Main Channel						

RESULTS

The experiment was carried out during kharif season, 2015. To assess the toxicity of some chemicals on eggplant *Leucinodes orbonalis* Guenee under field conditions. The experiment was

conducted at the Kathor, Tehsil Bela, District Lasbela, and Baluchistan. The treatments included four different insecticides viz., T1=curacuron 50EC 800ml/acre, T2=Lorsban 40EC 750ml/acre, T3=Match 200ml/acre, T4=Belt 50ml/acre and T5=control. The post-treatment observations were recorded on total number of pest population after 24hrs, 72hrs, 168hrs and 336hrs. The pre-treatment observation was also recorded before the spray.

Mean population of brinjal fruit borer after first spray

Table-1: showed the pre-treatment observations of brinjal fruit borer on sub plots were (7.5, 7.36, 7.22, 7.07 and 7.13) per fruit, respectively. The observation after 72hrs of the treatment showed that the mean pest count in T1, T2, T3, T4 and T5 (treatments) were (4.84, 3.53, 2.97, 2.5 and 7.48) per fruit respectively, which signifies that the effect of some chemicals against eggplant (*Leucinodes orbonalis*) from maximum level was T1 (Curacuron50EC 800ml/acre), T2 (Lorsban 40EC 750ml/acre), T3 (Match 200ml/acre), T4 (Belt 50ml/acre) and T5 (control). The data shows that after 72hrs that the applied some insecticides, T4 (Belt 50ml/acre) was proven to be more effective on brinjal fruit borer (*Leucinodes orbonalis*) than the others. The after spray effect of some insecticides with the different durations and showed the reoccurrence of the pest (7.4) after 336hrs respectively. The overall performance of the all insecticides showed that T4=Belt 50ml/acre performed well, followed by T1 (Curacuron50EC 800ml/acre), T2 (Lorsban 40EC 750ml/acre) and T3 (Match 200ml/acre). The average population of brinjal fruit borer (*Leucinodes orbonalis*) was (5.7, 4.8, 4.19 and 3.87) per fruit respectively.

Table 1 Mean population of brinjal fruit borer (*Leucinodes orbonalis*) after 1st spray with some insecticides under field conditions

Treatments	Pre-treatment	Post-treatment				Mean
		24 hrs	72 hrs	168 hrs	336 hrs	
T1/Curacuron 50Ec 800ml/acre	7.5	5.31	4.84	5.25	7.4	5.7
T2/Lorsban 40EC 750ml/acre	7.36	4.61	3.53	3.82	7.26	4.8
T3/Match 200ml/acre	7.22	3.22	2.97	3.47	7.12	4.19
T4/Belt 50ml/acre	7.07	2.88	2.5	3.15	6.95	3.87
T5/Control	7.13	7.28	7.48	7.29	7.03	7.27

Mean population of brinjal fruit borer after second spray

The pre-treatment perceptions of brinjal fruit borer on sub plots were (7.45, 7.36, 7.22, 7.15 and 7.3) per fruit, individually (Table: 2). The perception after 72hrs of the treatment indicated that the mean pest population in T1, T2, T3, T4 and T5 (applications) were (4.88, 3.35, 2.73, 2.22 and 7.37) per fruit individually, which implies that the impact of a chemicals against brinjal fruit borer (*Leucinodes orbonalis*) from most extreme level was T1 (Curacuron50EC 800ml/acre), T2 (Lorsban 40EC 750ml/acre), T3 (Match 200ml/acre), T4 (Belt 50ml/acre) and T5 (control). The result indicates that after 72hrs that the some insecticides, T4 (Belt 50ml/acre) was more successful on brinjal fruit borer (*Leucinodes orbonalis*) than the others. The after spray impact of a few chemicals with the diverse lengths of time and indicated the reoccurrence of the pest (7.35) after 336hrs individually. The general execution of the all insecticides reveled that T4=Belt 50ml/acre performed very much, subsequent by T1 (Curacuron50EC 800ml/acre), T2 (Lorsban 40EC 750ml/acre) and T3 (Match 200ml/acre). The population of brinjal fruit borer (*Leucinodes orbonalis*) was (5.72, 4.73, 4.15 and 3.79) per fruit individually. The ANOVA critical that after the second spray pest population of fruit borer *Leucinodes orbonalis* on brinjal vegetable vary critically,

(P<0.0000) with a few insecticides. The F values for the second spray after 24hrs, (F= 462.42), 72hrs (F= 144.20), 168hrs (F= 145.46) and 336hrs (F=4.86) individually.

Table 2 Mean population of brinjal fruit borer (*Leucinodes orbonalis*) after 2nd spray with some insecticides under field conditions

Treatments	Pre-treatment	Post-treatment				Mean
		24 hrs	72 hrs	168 hrs	336 hrs	
T1/Curacuron 50EC 800ml/acre	7.45	5.29	4.88	5.26	7.35	5.72
T2/Lorsban 40EC 750ml/acre	7.36	4.6	3.35	3.61	7.26	4.73
T3/Match 200ml/acre	7.22	3.28	2.73	3.4	7.12	4.15
T4/Belt 50ml/acre	7.15	2.73	2.22	3.09	7.05	3.79
T5/Control	7.3	7.34	7.37	7.38	7.39	7.34

Mean population of brinjal fruit borer after third spray

Exhibited the pre-treatment view of brinjal fruit borer on sub plots were (7.49, 7.36, 7.24, 7.22 and 7.33) per fruit, separately. The data after 72hrs of the treatment reveled that the mean count in T1, T2, T3, T4 and T5 (treatments) were (4.86, 3.34, 2.85, 2.6 and 7.37) per fruit independently, which signifies that the effect of a many insecticides against brinjal fruit borer (*Leucinodes orbonalis*) from most amazing level was T1 (Curacuron50EC 800ml/acre), T2 (Lorsban 40EC 750ml/ acre), T3 (Match 200ml/ acre), T4 (Belt 50ml/ acre) and T5 (control). The data exhibits that after 72hrs that the insecticide, T4 (Belt 50ml/ acre) was wound up being more effective on brinjal fruit borer (*Leucinodes orbonalis*) than the others. The after spray effect of a many insecticides with the assorted time frames and exhibited the reoccurrence of the pest (7.39) after 336hrs independently. All insecticides exhibited that T4=Belt 50ml/ acre performed all that much, followed by T1 (Curacuron50EC 800ml/ acre), T2 (Lorsban 40EC 750ml/ acre) and T3 (Match 200ml/ acre). The typical population of brinjal fruit borer (*Leucinodes orbonalis*) was (5.71, 4.72, 4.19 and 3.97) per fruit independently (Table: 3). The ANOVA suggests that after the

third spray insect count of fruit borer *Leucinodes orbonalis* on brinjal vegetable difference significantly, (P<0.0000) with a few insecticides. The F values for the third spray after 24hrs, (F= 396.84), 72hrs (F= 373.03), 168hrs (F= 147.62) and 336hrs (F=4.16) independently.

Table 3 Mean population of brinjal fruit borer (*Leucinodes orbonalis*) after 3rd spray with some insecticides under field conditions

Treatments	Pre-treatment	Post-treatment				Mean
		24 hrs	72 hrs	168 hrs	336 hrs	
T1/Curacuron 50Ec 800ml/acre	7.49	5.28	4.86	5.21	7.39	5.71
T2/Lorsban 40EC 750ml/acre	7.36	4.6	3.34	3.58	7.26	4.72
T3/Match 200ml/acre	7.24	3.25	2.85	3.45	7.14	4.19
T4/Belt 50ml/acre	7.22	2.89	2.6	3.19	7.12	3.97
T5/Control	7.33	7.39	7.37	7.4	7.43	7.37

Mean population of brinjal fruit borer after fourth spray

Table-4 shown the pre-treatment results of brinjal fruit borer on sub plots were (7.49, 7.36, 7.22, 7.31 and 7.19) per fruit, independently. The count after 72hrs of the treatment showed that the mean of pest in T1, T2, T3, T4 and T5 (meds) were (4.83, 3.15, 3.02, 2.24 and 7.99) per fruit freely, which signifies that the impact of all insecticides against brinjal fruit borer (*Leucinodes orbonalis*) from most stunning level was T1 (Curacuron50EC 800ml/acre), T2 (Lorsban 40EC 750ml/ acre), T3 (Match 200ml/ acre), T4 (Belt 50ml/ acre) and T5 (control). The result displays that after 72hrs that the related insecticide, T4 (Belt 50ml/ acre) was being more successful on brinjal fruit borer (*Leucinodes orbonalis*) than the others. The after spray impact of a many insecticides with the grouped time periods and showed the reoccurrence of the pest (7.39) after 336hrs freely. The general execution of the all insecticide spray indicated that T4=Belt 50ml/ acre performed well, subsequent by T1 (Curacuron50EC 800ml/ acre), T2 (Lorsban 40EC 750ml/ acre) and T3 (Match 200ml/ acre). The pest count of brinjal fruit

borer (*Leucinodes orbonalis*) was (5.68, 4.56, 4.19 and 3.8) per fruit autonomously. The ANOVA recommends that after the fourth spray individuals pest count of fruit borer *Leucinodes orbonalis* on brinjal vegetable differ critically, (P<0.0000) with a insecticides. The F values for the fourth spray after 24hrs, (F= 457.71), 72hrs (F= 307.66), 168hrs (F= 111.98) and 336hrs (F=61.37) autonomously.

Table 4 Mean population of brinjal fruit borer (*Leucinodes orbonalis*) after 4th spray with some insecticides under field conditions

Treatments	Pre-treatment	Post-treatment				Mean
		24 hrs	72 hrs	168 hrs	336 hrs	
T1/Curacuron 50Ec 800ml/acre	7.49	5.29	4.83	5.22	7.39	5.68
T2/Lorsban 40EC 750ml/acre	7.36	4.57	3.15	3.29	7.26	4.56
T3/Match 200ml/acre	7.22	3.23	3.02	3.42	7.12	4.19
T4/Belt 50ml/acre	7.31	2.68	2.24	3.08	7.21	3.8
T5/Control	7.19	7.97	7.99	7.94	8.1	8

DISCUSSION

The study was conducted to observe the comparative toxicity of some insecticides having recommended doses as per/acre against eggplant (*Leucinodes orbonalis*), under field conditions. The study showed that there was high effect of some chemicals against reduction of brinjal fruit borer (*Leucinodes orbonalis*), population density. Over evaluation further showed that T4=Belt 50ml/acre proved the maximum effect on population reduction, followed by T1 (curacuron50ec 800ml/acre), T2 (lorsban 40ec 750ml/acre), T3 (match 200ml/acre). The overall effect on pest population reduction was significant than control. The present work further verified that effect of T4= Belt 50ml/acre was continued till 72hrs after that the pest population density started increasing and the all applications were significantly different.

Correspondingly [9] evaluated ten mixes of chemicals (carbofuran 3G at 0.5 kg a.i./ha, malathion at 0.1%, quinalphos at 0.05% and teepol at 0.4%) and plant isolates (neem [Azadirachtaindica] cake at 20 q/ha, karanj [Pongamiapinnata] cake at 20 q/ha, neem oil at 3% and karanj oil at 3%) against the eggplant [aubergine] fruit and shoot borer, *Leuonodes orbonalis*, in the midst of 1997-98 and 1998-99 under agro-air of Santhal Parganas (Bihar, India). The foliar usage of quinalphos with basal utilization of neem cake diminished the reoccurrence of borer and increased the production of brinjal. The rate and production recorded in usage of neem cake with foliar spray of neem oil was at standard with insecticides sprays. From biological pollution point of view, neem things alone or in mix with conventional chemicals were maintained.

Similarly work was done by [1] recorded six synthetic chemicals and their eight mixes were against brinjal foods grown from the ground borer, *Leucinodes orbonalis*. Thiodan + pyrethroid (0.07%, 0.0025%) and thiodan + fenvalerate (0.07% + 0.005%) were significantly against *Leucinodes orbonalis* that recorded only 13.3% damage when stood out from 69.8% in control. The other applications which inside and out decreased the fruit damage over the control were in the solicitation: naphthyl methylcarbamate + fenvalerate = vapona + fenvalerate (14.9%) > organophosphate + fenvalerate (16.4%) > fenvalerate + pyrethrins (16.6%) > Vapona = naphthyl methylcarbamate + pyrethrins = organophosphate = Vapona + pyrethrins = malathion + pyrethrins (18.3%) > thiodan (20.0%) > naphthyl methylcarbamate (21.6%) with mean rate of mischief 14.9, 16.4, 18.3, 20.0, 21.6 and 69.8%, independently. Naphthyl methylcarbamate was smallest fruitful, yet its blends with pyrethroids were exhibited better over naphthyl methylcarbamate alone. Gotten - advantage extent went from no less than 1: 5.10 (naphthyl methylcarbamate) to a most amazing of 1: 20.44 (fenvalerate). Vapona + fenvalerate mix

gave the most shocking yield of 263.45 q/ha, however naphthyl methylcarbamate was scarcest convincing giving 225.7 q/ha, with a net expansion of Rupees 42,443.00 (US$ 886.00) and 28,141.00 (US$ 587.49), separately. Interchange applications were center between the two concoction organizations. In any case, each one of the applications was better over the controls which made 113.58q/ha with a net expansion of Rupees 340.00 in a manner of speaking.

CONCLUSION

It is concluded that the most effective selected insecticide was Belt 50ml/per plot size to suppress the brinjal fruit borer population. Although, some insecticides applied fortnightly, the eggplant fruit borer (*Leucinodes orbonalis*) population was reducing up to 72hrs after each spray and later started rising after 336hrs.

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