WORLD JOURNAL OF PHARMACEUTICAL RESEARCH
SJIF Impact Factor 8.453
Volume 13, Issue 10, 572-577. Research Article ISSN 2277–7105

INSECTICIDAL CONTROL OF GUAVA FRUIT FLY *BACTROCERA DORSALIS* HENDEL IN BIHAR, INDIA

Rahul Kumar[1] and Manendra Kumar[2*]

[1]Research Scholar, University Department of Zoology, B.R.A. Bihar University, Muzaffarpur, Bihar, India.

[2]Former Professor and Head, University Department of Zoology, B.R.A. Bihar University, Muzaffarpur, Bihar, India.

Article Received on
26 March 2024,

Revised on 16 April 2024,
Accepted on 06 May 2024

DOI: 10.20959/wjpr202410-32342

***Corresponding Author**
Dr. Manendra Kumar
Former Professor and Head, University Department of Zoology, B.R.A. Bihar University, Muzaffarpur, Bihar, India.

ABSTRACT

Guava is an important commercial fruit crop of tropical and subtropical regions of India. It is a very good source of pectin, calcium, phosphors and vitamin C. This fruit is infested by a number of insect pests of which *Bactrocera dorsalis* Hendel, formerly known as *Dacus dorsalis* Hendel and commonly called oriental fruit fly is major pest in Bihar, India. Present investigation was carried out to study the insecticidal control of *Bactrocera dorsalis* on guava in Mehsi of East Champaran district of Bihar. The efficacy of seven insecticides against the fruit fly was studied in guava orchards and observed that minimum infestation was found in treated trees by Rogar and malathian followed by carbaryl. These insecticides were highly significant (at 0.001%).

KEYWORDS: *Insecticidal control, Guava fruit fly, Bactrocera dorsalis, Dimethoate, Malathion, Bihar.*

INTRODUCTION

Guava is one of the important tropical and sub-tropical fruits of India. It is a very good source of pectin, calcium, phosphorus and vitamin C. Guava is the fourth most widely grown fruit crop in India. The area under guava cultivation in India is about 0.15 million hectares, producing about 1.80 million tonnes of fruits. Uttar Pradesh, Bihar, Madhya Pradesh, Andhra Pradesh and Maharashtra are leading states known for producing highest quantity of Guava fruits. Different abiotic and biotic factors are responsible for low yield of guava. Out of the biotic factors, the insect pests have been found to attack guava at different stages. Guava is

infested by about 80 species of insect pests like fruit flies, caterpillar capsule borer, mealy bug, hairy caterpillar, bark eating caterpillar and many sucking insect pests. Out of these insect pests, fruit fly (*Bactrocera* spp.) is major injurious pest, causing a heavy loss in guava yield (Butani; 1979; Verghese and Sudhadevi; 1998; Singh et al.; 2003; Atwal and Dhaliwal 2009; Kumar and Kumar, 2023). According to Newell and Haramoto (1968), the oriental fruit fly (*Dacus dorsalis*) attacks over 300 cultivated and wild fruits including avocado, banana, guava, mango, papaya, sugar apple, tomato etc. Fruit fly breeds in all fleshy fruits. It was estimated that 95 percent of the oriental fruit flies develop on guava (Kumar and Kumar 2023).

The female fruit flies puncture the soft and tender fruits by their sharp ovipositor and lay eggs under the soft tissues of guava. After hatching, the maggots feed on the pulp of the fruits and finally they cause rotting of fruits. The present investigation was carried out to control the pests by chemical insecticides in Mehsi of East Champaran district of Bihar.

MATERIALS AND METHODS

Present investigation was carried out at farmer's guava orchard in Mehsi of East Champaran district, Bihar during rainy season of 2023. The variety of guava undertaken in investigation was Harijha, which attains a height of about 3.5 to 4 meters and sparsely branched. Fruits are round greenish yellow in colour with a sweet taste.

To evaluate the comparative efficacy of insecticides to control the infestation of *Bactrocera dorsalis*, an insecticidal trial was conducted on a randomized block design (RBD) in first week of July 2023. The space between plant to plant was 10 meter and row to row was 12 meters. There were eight treatments including check. The treatments included were:

T1	-	Thiodon (Endosulphon) 35 EC	-	0.25%
T2	-	Phosphamidon	-	0.05%
T3	-	Rogar (Dimethoate) 30 E	-	0.05%
T4	-	Malathion 50 EC	-	0.20%
T5	-	Methyl Parathion	-	0.02%
T6	-	Carbaryl	-	0.20%
T7	-	Monocil	-	0.03%
T8	-	Check (Untreated)		

Each treatment was replicated four times. The trees were sprayed with different concentrations of insecticides with the power-sprayer. In the month of August, one hundred guava fruits were picked up from each replicate of all the treatments and brought in the laboratory. Number of healthy and infested fruits were isolated under each treatment. The percentage of infestation was also estimated.

RESULTS AND DISCUSSION

The procedure of the trial is described under the "materials and methods". There were eight treatments including check. Each treatment was replicated four times. Results obtained are summarized and statistically analysed in the Table 1A & 1B and also illustrated by Fig. 1.

For determining the significance of the study, standard error of difference of means was calculated between T8 at one end and T1,T2, T3, T4, T5, T6 & T7 at the other end. Later on 't' test was applied. Analysis of varience and F-ratio were also calculated.

It is evident from the data of the tables 1A & 1B that the fruit infestation of the treated trees were comparatively lower in respect of untreated ones. The minimum infestation was observed under T3 (Rogar) and T4 (Malathion) followed by T6 (Carbaryl). T3, T4 & T6 are highly significant (at 0.001%).

Al brecht and Sharma (1987) reported high toxicity and reproductive inhibitory effect of abamectin against *Bactrocera dorsalis* and *B. Cucurbitae*. Chen etal. (1996) reported the efficacy of neem based biopesticides against fruit flies in terms of fruit infestation reduction. According to kavadia et al. (1977) application of carbaryl followed by endosulfan treatments reduced fruit infestation and increased yield in musk melon. These gave better response than malathion and chlorophyriphos. Bhatnagar and yadava (1992) observed malathhion more effective than carbaryl on boltle gourd and sponge gourd. Oke (2008) reported reduction in *Bactrocera cucurbitae* pupae with spray of lambda cyhalathrin on cucumber. Ravindranath and Pillai (1986) observed synthetic pyrethroids effective against fruit infestation by *B. cucurbitae* on bitter gourd. According to Umesh et al. (2022) methyl eugenol traps +three sprays of 5% NSKE (Neem Seed Kernel Extract) proved most effective against guava fruit fly *Bactrocera* spp.

The differences in result of different Researchers could be attributed to the Variable agro-climatic conditions of experimental fields.

CONCLUSION

On the basis of the findings, it may be concluded that application of Rogor 30E (0.05%) and malathion 50EC (0.20%) minimized guava fruit infestation by *Bactrocera dorsalis* Hendel.

ACKNOWLEDGEMENT

Authors are thankful to the Head, University Department of Zoology, B.R.A.Bihar University, Muzaffarpur-842001, Bihar (India) for providing laboratory facilities.

Table 1A: Comparative efficacy of selected insecticides against *Bactrocera dorsalis.*

Replications	Treatments							
	T1 Thiodon	T2 Phosphamidon	T3 Rogar	T4 Malathion	T5 Methyl Parathion	T6 Carbaryl	T7 Monocil	T8 Untreated Check
	Percentage of Infestation							
I	18	15	8	7	11	8	16	34
II	25	22	6	8	18	11	18	39
III	28	29	11	12	20	13	26	41
IV	29	39	13	10	14	16	28	37
Average fruit infestation	25	24	9.5	9.25	15.75	12.0	22.0	37.75
't' value at 6 d.f.	2.993 (0.05% level)	2.643 (0.05% level)	13.109 * (0.001% level)	15.330** (0.001% level)	8.058 (0.001% level)	11.44* (0.001% level)	3.392 (0.01% level)	

* Significant at 0.01% level

** Highly significant at 0.001% level

Table-1B: Analysis of Variance.

Sources	S.Sq.	D.F.	M.Sq.	F.Ratio
Between Treatment	2660.47	7	380.07	22.79**
Between Replication	541.13	3	180.38	10.82*
Error	350.12	21	16.67	
Total	3551.72	31		

F.05 (For V1 = 7, V2 = 21) = 2.49 < F (Calculated value) 22.79

F.05 (For V1 = 3, V2 = 21) = 3.07 < F (Calculated Value) 10.82

*Significant

** Highly Significant

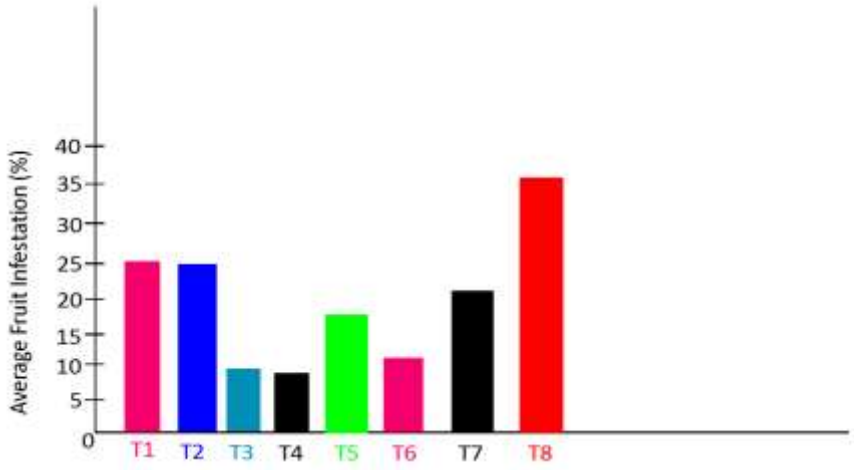

Figure 1: Comparative efficacy of selected insecticides against *Bactrocera dorsalis* on guava fruits.

T1 Thiodon
T2 Phosphamidon
T3 Rogar
T4 Malathion
T5 Methyl Parathion
T6 Carbaryl
T7 Monocil
T8 Check

REFERENCES

1. Albrecht, c.P. and Sherman, M. Lethal and Sublethal effects of avermectin B1 on three fruit fly species (Diptera: Tephritidae). *Journal* of *Economic Entomology*, 1987; 80(2): 344-347.
2. Atwal, A.S. and Dhaliwal, G.S., Agricultural pests of south Asia and their management. *Kalyani Publishers*, 2009; 380.
3. Bhatnagar, K.N. and Yadava, S.R.s. An insecticidal trial for reducing the damage of some cucurbitaceous fruits due to *Dacus cucurbitae* coq. *Indian Journal of Entomology*, 1992; 54(1): 66-69.
4. Butani, D.K. Insects and fruits. *Periodical Expert Book Agency*, New Delhi, 1979; 55.
5. Chen, C.C., Dong, W.J. Cheng, L.L. and Hou, R.F. Different effect of neem seed kernel extract on oviposition of the oriental fruit fly (Diptera : Tephritidae) in guava. *Journal* of *Economic Entomology*, 1996; 89(2): 462-466.

6. Kavadia, V.S. Hupta, H.C.L. and Pareek, B.L. Comparative efficacy of insecticides applied single or in mixture with attractants against fruit fly affecting long melon *(Cucumis utilissimus* Duthie & Fuller). *Indian Journal of Plant Protection*, 1977; 5(2): 183-187.
7. Kumar Rahul and Kumar Mandendra. Life Cycle of Guava fruit fly *Bactrocera diorsalis* Hendel. Advances in bioresearch, 2023; 14(5): 417-419.
8. Netwell, I.M. and Horamoto, F.H. Biotic factors influencing population of *Dacus dorsalis in Hawaii. Proceeding of Hawaiian Entomology Society*, 1968; 20(1): 81-139.
9. Oke, O.A. Effectiveness of two insecticides to control melon fruitfly (*Bactrocera cucurbitae* coq.) in cucumber (cucumis *sativus* L.) cropat Anse Boileau Seychelles. *Eropean Journal of Scientific Research*, 2008; 22(1): 84-86.
10. Ravindranath, K and Pillai, K.S. Control of fruit fly of bittergourd using synthetic pyrethroids. Entoman, 1986; 11(4): 269-272.
11. Singh, G. Misra, A.K., Musarat, H., Tandon, D.K. and Pathak, R.K. *The Guava Central Institute of Subtropical Horticulture*, Lucknow, 2003; 38.
12. Umesh, Rajesh Kumar; S.S.Yadav and Dalip Kumar. Eco-friendly management of Guava fruit fly, *Bactrocera* Spp. *Biological Forum- An International Journal*, 2022; 14(2): 815-819.
13. Verghese, A. and Sudhadevi, K. (1998). Relation between trap catches of *Bactrocera dorsalis* (Hendel) and abiotic factors. *Proceedings of first National symposium on Pest Management in Horticultural crops*, Bangalore, India, 15-18.