

## SHORT COMMUNICATION

# Life Cycle of Guava Fruit Fly *Bactrocera dorsalis* Hendel

Rahul Kumar and Manendra Kumar

Department of Zoology, B.R.A. Bihar University, Muzaffarpur, Bihar

### ABSTRACT

Guava fruit is a very healthy fruit containing sufficient amount of pectin, calcium, phosphors and vitamin C. This fruit is infested by a number of insect pests of which *Bactrocera dorsalis* (Hend), formerly known as *Dacus dorsalis* (Hend.) and commonly called oriental fruit fly is major pest in Bihar. Present investigation was carried out to study the life cycle duration and longevity of guava fruit fly *Bactrocera dorsalis* in Muzaffarpur, Bihar during rainy season and winter seasons of 2022-2023. This was observed that the life cycle duration of the oriental fruit fly on guava averaged 25.3 days and 28.3 days respectively during rainy and winter season. The longevity of the fly was observed 31.4 days and 33.5 days during rainy and winter season in case of male adults while 46.6 days and 49.4 days during rainy and winter season in case of female adults.

**Keywords:** Lifecycle, Fruit fly, *Bactrocera dorsalis*, *Dacus dorsalis*, guava.

Received 11.08.2023

Revised 21.09.2023

Accepted 25.10.2023

### How to cite this article:

Rahul K and Manendra K. Life Cycle of Guava Fruit Fly *Bactrocera dorsalis* Hendel. Adv. Biores. Vol 14 [5] September. 2023. 417-419.

### INTRODUCTION

Guava (*Psidium guajava* L.) is the fourth most widely grown fruit crop in India. The area under guava is about 0.15 million hectares producing 1.80 million tonnes of fruits. Uttar Pradesh, Bihar, Madhya Pradesh, Andhra Pradesh and Maharashtra are leading states known for producing the highest quantity of this fruit in large cultivable land areas. During 2021-22, more than 434 thousand metric tonnes guava produced in Bihar. Guava fruit is a very good source of pectin, Calcium, Phosphorus and Vitamin C. *Bactrocera dorsalis* (Hendel), formerly known as *Dacus dorsalis* and commonly called oriental fruit fly is a major insect pest of guava fruits. According to Newell and Haramoto [5], the oriental fruit fly attacks over 300 cultivated and wild fruits including sugar apple, avocado, banana, guava, mango, papaya, tomato etc. This pest apparently breeds in all fleshy fruits. It was estimated that 95 percent of the oriental fruit flies develop on guava. The colour of the fly is highly variable but mostly yellow with dark markings on the thorax and abdomen. Steiner [9] reported that adult flies may live for many months. He stated that females start to lay eggs about 8 days after emergence from the puparium. Under optimum conditions, a female can lay more than 3000 eggs during her life time, but under field conditions, about 1200 to 1500 eggs per female. Lal [4] reported six species of fruit fly (*Dacus* spp.) attacking fruits and vegetables in Bihar. According to Bess and Haramoto [2] *Dacus dorsalis* was found to infest guava, mango, banana, papaya, peach and coffee. According to Kumar & Lall [3], this pest was found to infest litchi fruits in Bihar also. The present investigation was carried out to study the life cycle duration and longevity of *Bactrocera dorsalis* on guava fruits in different seasons (Rainy season and winter season) during 2022-2023 at Muzaffarpur, Bihar.

### MATERIAL AND METHODS

The study on life cycle duration of fruit fly (*Bactrocera dorsalis*) was carried in rainy (July to September) and winter (December-February) seasons during 2022-23 on guava fruits under laboratory conditions. Infested guava fruits were collected from field of Bela, Kanhauli & Rohua of Muzaffarpur. Twenty-five freshly laid eggs were separated from infested fruits by means of a camel hair brush and kept on pieces of fresh ripe guava fruits inside a circular glass dish (10 × 15 cms) containing a layer of moist sand. The glass dish in turn was covered by a wire gauze lid. Proper moisture inside the glass dish was maintained by adding few drops of distilled water in the sand layer from time to time. The larvae on hatching were found

to feed and develop on the pulp of guava fruits. The fresh guava fruits were provided in the glass dish from time to time to ensure the larval growth of the fruit fly. As soon as the larvae were found to pupate in the glass dish, the pupae were isolated and kept inside the petridishes (diameter 10 cms) under a moist sand to avoid desiccation. The flies on emergence were removed from petridishes and kept in another glass dish and provided artificial diet of yeast hydrolysate and sucrose (1:3) together with distilled water. After seven days, sexually matured ten pairs of male and female fruit flies were kept in separate glass dishes containing a layer of moist sand and pieces of ripe guava fruits. The experiment was carried out throughout the rainy and winter seasons. The date of hatching, moulting, pupation and emergence of adults was recorded to determine the period of different immature stages and longevity of adults.

## RESULTS AND DISCUSSION

Fertilized female fruit flies were found to puncture the ripe guava fruits with their long ovipositor and lay eggs lower portion of the fruit epidermis. The larvae feed on the pulp of guava fruit. Single female laid eggs in groups of 5-40 under the skin of host fruits. There were three instars of larvae. Fully grown larvae were found to pupate in moist sand layer. After, some time, the adult emerged from the pupa. Observation on life cycle duration was summarized in table-1. From the data of the table this is evident that the average incubation period during rainy season was 1.8 days while during winter season 2.1 days. The total larval period during rainy season was averaged 25.3 days and during winter season was 28.3 days. The average prepupal and pupal period during rainy season was 1.4 days and 11.2 days respectively and during winter season was 1.6 days and 12.8 days respectively. The data of the table-1 reveals that the total life cycle duration of *B. dorsalis* was averaged 25.3 days during rainy season and 28.3 days during winter season. The longevity of male was averaged 31.4 days and 33.5 days respectively during rainy and winter season while the longevity of female was averaged 46.6 days and 49.4 days respectively during rainy and winter season. The eggs were shiny, white & rice shaped. The first instar larva was transparent and creamy in colour, second instar larva was elongated in shape and creamy in colour and the fully grown third instar larva was dark creamy in colour with black mole an anterior and caudal part. Pre-pupae were yellowish in colour. Pupae were segmented and cylindrical in shape with dark brown puparium.

Bess and Horamoto [2] reported that all stages viz. eggs, larvae, pupae and adults occur throughout the year in warm areas. According to them, the lowest average temperature at which the immature stages can develop is about 14°C temperature and above 21°C temperature are necessary for the fruit fly to attain sexual maturity without under prolongation in the preoviposition period. Aman et.al. [1] reported that the female fruit fly laid eggs in groups ranging from 3-20 in number and the total life cycle duration was 1-3 months. According to present findings the larval period averaged 10.9 days and 11.8 days during rainy and winter season respectively, but different workers [6] recorded 5 to 22 days, [8] 5 to 11 days, [7] 15 days on mango fruits. This variation in larval period may be due to variation of the host, different species of *Dacus* and difference in ecological factors such as temperature and relative humidity.

**Table-1: Life cycle duration of *B.dorsalis* in different seasons on guava during 2022-23**

Life Stages	Rainy Season	Winter Season
	Average period (Days)	Average period (Days)
Incubation period	1.8	2.1
<b>Larval period</b>		
1 <sup>st</sup> instar	2.4	2.7
2 <sup>nd</sup> instar	4.2	4.5
3 <sup>rd</sup> instar	4.3	4.6
Total larval period	10.9	11.8
Prepupal period	1.4	1.6
Pupal period	11.2	12.8
Total life cycle duration	25.3	28.3
Longevity (male)	31.4	33.5
Longevity (Female)	46.6	49.4

## ACKNOWLEDGEMENT

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

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