

First report of *Bactrocera dorsalis* (Hendel) (Diptera, Tephritidae) on the white - fleshed dragon fruit *Selenicereus undatus* (Haworth) D.R. Hunt (Cactaceae) in India

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ABSTRACT: The oriental fruit fly *Bactrocera dorsalis* (Hendel) has been reported on the white fleshed dragon fruit *Selenicereus undatus* (Haworth) D.R.Hunt for the first time in India. Symptoms of infestation and the duration of all life stages were observed. Females laid eggs just beneath the mature fruit skin. The tissue surrounding the egg mass turned light yellow. Oviposition punctures were visible on the fruit rind and the feeding of the maggots led to decay of internal contents, foul smell and the fruit turned in to a discolored semi liquid mass. Full grown maggots exited the fruit and entered a period of inactivity before pupation in moist soil. The egg, maggot and pupal stages lasted for 1.6 ± 0.40 , 8.0 ± 0.40 and 8.0 ± 0.31 days, respectively under laboratory conditions. Adult longevity was 9.6 ± 0.5 days in the case of females and 6.4 ± 0.50 days for males. © 2024 Association for Advancement of Entomology

KEY WORDS: Pest, symptoms, development, life history, longevity

The white fleshed dragon fruit, *Selenicereus undatus* (Haworth) D.R. Hunt (= *Hylocereus undatus* (Haworth) Britton & Rose) (Cactaceae), native to Mexico, Central and South America, is a trailing, epiphytic cactus widely cultivated in the tropics and subtropics for its fruit. Introduced into India in the 1990s, this exotic fruit is gaining popularity among farmers for its fast growth, suitability for varied agro-climatic conditions including arid and barren soils, high profitability and low input requirement (Nangare *et al.*, 2020). Globally dragon fruit is cultivated in 1.12 lakh hectares, with a production of over 2.1 million tons in 2017–18. In India, the crop is cultivated in 3,000–4,000ha and the production is over 12,000 metric tons in 2000 (Wakchaure *et al.*, 2020). The crop is

largely free of insect pests in India, except for minor pests such as ants, scale insects and mealy bugs (Wakchaure *et al.*, 2020) and the caterpillar *Spodoptera litura* (F.) (Prathapan and Santhoshkumar, 2022).

The Oriental fruit fly *Bactrocera dorsalis* (Hendel) (Diptera, Tephritidae), originally described from the erstwhile Formosa in 1912 by Friedrich Hendel, is one among the most destructive five fruit flies in the World (Wei *et al.*, 2017). Currently it is distributed across 75 countries in four continents viz. Africa, Asia, North America and South America and Oceania (Zeng *et al.*, 2018). USDA (2016) listed 436 plant species as hosts for *B. dorsalis*. According to Liquido *et al.* (2019), it has been

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recorded on 488 species in 215 genera belonging to 80 families. EPPO (2024) provided a list of 475 species of host plants worldwide, belonging to 80 plant families. *Selenicereus undatus*, listed amongst the host plants of *B. dorsalis* (USDA, 2016; EPPO, 2024), infested 76.9 per cent of fruits in the La Reunion in the Pacific Ocean (Moquet *et al.*, 2021). The earliest record of *B. dorsalis* in India is that of Fabricius (1764), under the disused

name '*Musca ferruginea*'. It was reported on mango at 'Mozafferpore' in June 1890 and July 1891 by E.C. Cotes (1891, 1893) as *Dacus ferrugineus*. The main host of *B. dorsalis* in India is mango followed by many other fruit crops including guava, loquat, pear, fig, persimmon, banana, pomegranate, oranges, avocade, sapota, rose apple, Singapore cherry, sour cherry and star fruit (Kapoor, 1993). David and Ramani (2011)



Figs 1a-f. Life stages of *Bactrocera dorsalis* and its damage on *Selenicereus undatus*: a. egg, b. maggot feeding on the decayed fruit, c. pupae d. adult, female, d. oviposition punctures on mature fruit, e. feeding symptoms of maggots

provided check-list and illustrated key to the fruit flies of Peninsular India and the Andaman and Nicobar Islands. *Bactrocera dorsalis* can be differentiated from other common fruit flies by the following characters: abdominal tergites separate; anterior supra-alar seta present; acrostichal seta present; scutum without medial postsutural vitta; costal band of almost uniform width; all femora yellow; scutum predominantly reddish-brown with dark fuscous markings; costal band confluent with R2+3; and lateral postsutural vitta uniform in width and reaches intra alar seta. Males of *B. dorsalis* are attracted to methyl eugenol. Infestation of *B. dorsalis* was noticed on the white-fleshed dragon fruit *S. undatus* in the Instructional Farm, College of Agriculture, Vellayani, Thiruvananthapuram, Kerala (8° 25' 46" N; 76° 59' 24" E, 29m above mean sea level) during August, 2023. Two fully mature fruits were found infested. The affected fruits were brought to the laboratory and kept in glass containers till pupation and adult emergence. Two pairs each of the newly emerged adults were released in five plastic containers. Honey was provided as food for the adults and mature fruits of *S. undatus* were provided for oviposition. Symptoms of infestation and the duration of all life stages were observed. Voucher specimens of *B. dorsalis* will be deposited in the ICAR - National Bureau of Agricultural Insect Resources, Bengaluru.

Females laid eggs just beneath the mature fruit skin. The tissue surrounding the egg mass turned light yellow. These eggs were seen in clusters just beneath the rind (Fig. 1a). Oviposition punctures were visible on the fruit rind (Fig. 1e) and the feeding of the maggots led to decay of internal contents, foul smell and the fruit turned in to a discolored semi liquid mass. Maggots fed voraciously within the pulp of the fruit, creating tunnels and holes in both the pulp and peel (Figs. 1b, f). Full grown maggots exited the fruit and entered a period of inactivity before pupation in moist soil. The newly formed pupa was yellowish-brown that gradually changed to dark brown over time (Fig. 1c). The egg, maggot and pupal stages lasted for 1.6 ± 0.40 , 8.0 ± 0.40 and 8.0 ± 0.31 days, respectively under laboratory conditions. The adult

longevity was 9.6 ± 0.5 days in the case of females and 6.4 ± 0.50 days for males. Moquet *et al.* (2021) reported 76.9 per cent infestation of *B. dorsalis* on cultivated varieties of *S. undatus* in the La Reunion in the Pacific Ocean. *Ceratitidis capitata* (Wiedemann) was also reported on dragon fruit in Hawaii (USDA-APHIS, 2006). In Vietnam and elsewhere, *B. dorsalis* and *B. correcta* (Bezzi) are major pests (Nangare *et al.*, 2020). This is the first report of *B. dorsalis* on *S. undatus* in India.

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