



## NEW DISTRIBUTION RECORDS OF *BACTROCERA* SPP. FROM HIMACHAL PRADESH

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### ABSTRACT

Survey undertaken to assess the distribution of fruit fly fauna in Himachal Pradesh revealed new distribution records of two species viz., *Bactrocera watersi* (Hardy) and *Bactrocera zahadi* (Mahmood) observed on cucurbitaceous crops. *Bactrocera zahadi* a member of the *B. tau* complex is a serious pest in the mid and low hills of Himachal Pradesh covering the districts of Una, Hamirpur, Solan, Sirmaur, Chamba and Shimla. It was observed both on fruit and exfruit, while *B. watersi* was observed only from Solan region in traps.

**Key words:** *Bactrocera* spp., fauna, new distribution records, *Bactrocera zahadi*, *Bactrocera watersi*, cucurbits, Himachal Pradesh, fruit and exfruit, traps

Fruit flies belong to the family Tephritidae (Diptera) and these occur as pests on horticultural crops. *Bactrocera tau*, *B. cucurbitae*, *B. dorsalis*, *B. zonata* and *B. correcta* are the major pests of fruits and vegetables (Kapoor, 2002). *Bactrocera* Macquart is a diversified genus of tribe Dacini with several cryptic species which are pests. Cucurbits are infested by a number of fruit fly species, of which *B. tau* is observed as a major pest throughout the country and its incidence has been serious in Himachal Pradesh (Gupta and Verma, 1991); and *B. tau* and *B. zahadi* (Mahmood) are similar in their morphological features, and also in their host range and distribution, and hence are often confused with each other. This study explored the *Bactrocera* spp., from the mid and high hills of Himachal Pradesh, which resulted in bringing out the new distribution records of *B. zahadi* and *B. watersi* (Hardy) have been recorded.

### MATERIALS AND METHODS

Flies were trapped using insecticide-based attractant (cuelure) fruit fly traps installed at Una, Hamirpur, Solan, Sirmaur, Chamba and Shimla. The trap consisted of a polyurethane bottle (250 ml), to which a metal canopy was attached with an aluminium wire; a wooden block of 7.5x 2.5x 2.5 cm size was impregnated with ethanol: methyl eugenol: malathion solution in the ratio 6:4:1 for 48 hr and placed inside the bottle. Another aluminium wire was used to install the bottle trap. In addition, cucurbits with fruit punctures were brought to the laboratory and reared up to adult emergence. The egg laying females were captured from the cucurbits and later the cucumber slices were provided

in glass jar, for egg laying in the laboratory, and these were reared to adult. Specimens were side mounted on 00 size entomological pins using glue, and were identified based on keys provided by Drew and Raghu (2002), David and Ramani (2011; 2019), and Drew and Romig (2013). Images of the wings were obtained using ISH1000 camera mounted on Olympus SZX10 binocular microscope in the Department of Entomology, Dr. Yashwant Singh Parmar University of Horticulture and Forestry, Nauni, Solan, Himachal Pradesh. Virgilo et al. (2015) uplifted this to genus level based on their molecular phylogenetic studies but this study follows Hancock and Drew (2018) and considers the *Zeugodacus* as subgenus of *Bactrocera*.

### RESULT AND DISCUSSION

The two new records of the *Bactrocera* observed now are given below:

***Bactrocera (Zeugodacus) watersi* (Hardy, 1954)** (Fig. 1)

It is a large sized (9.1 mm) species, reddish-brown, and can be identified by a broad costal band and broad round apical spot on the wing apex. Scutum bears two lateral and one medial post sutural vittae, median vitta tapering toward both ends, black apical spot is present on scutellum. Narrow black T pattern is present on abdominal tergites, otherwise abdominal tergites reddish-brown. Only one specimen was captured from Solan district in cuelure trap. Earlier it was recorded from Karnataka and Tamil Nadu (Agarwal and Sueyoshi, 2005; David and Ramani, 2011)



Fig. 1. Habitus of *B. (Zeugodacus) watersi*



Fig. 2. Habitus of *B. (Zeugodacus) zahadi*

***Bactrocera (Zeugodacus) zahadi* (Mahmood, 1999)**  
(Fig. 2)

It is a medium sized ( $6.1 \pm 0.062$  mm) reddish brown species with irregular to round facial black spot. Scutum is reddish-brown, few specimen with dark patches at laterally. Both lateral and median postsutural vittae present. Supernumerary lobe is strong, depressed and keel shaped. *B. zahadi* is similar to *B. tau*, but can be differentiated by the presence of prominent black markings on apex of all femora and wing with depressed keel shapes strongly developed anal lobe while *B. tau* have round to keel shaped medium developed anal lobe (Fig. 1). Glans densely covered with vasica in case of *B. zahadi*. It has been trapped in large number from Himachal Pradesh with the maximum trap catch being from Solan district ( $32 \pm 3.14$ ) and minimum being from Chamba ( $8.4 \pm 1.93$ ) district, as compared to Una ( $22.4 \pm 2.97$ ), Hamirpur ( $13.8 \pm 3.23$ ), Shimla ( $8.4 \pm 1.93$ ) and Sirmaur ( $24.2 \pm 1.98$ ); *B. zahadi* can be easily mistaken as *B. tau* but can easily be differentiated by depressed keel shaped anal lobe in *B. zahadi* whereas the anal lobe is round keel like and weak in *B. tau* (Fig. 1). There is confusion between *B. tau* and *B. zahadi* but with the help of some peculiar characters such as wing and genitalia morphology (David Ramani, 2019) both the species can be differentiated. Infuscation of costal band below the vein  $R_{2+3}$  is considered as different from the *B. tau* but it is generally variable in both the species and the infuscation can be seen in both, it may depend on environment. Earlier it was recorded from Karnataka, Kerala, Tamil Nadu and Tripura (Agarwal and Sueyoshi, 2005; David and Ramani, 2011; David and Ramani, 2019).

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