

Post Abdominal Structures, A New Facet in Tephritid Taxonomic Research: A Case Study of The Genus *Dacus* Fabricius (Diptera: Tephritidae: Dacinae: Dacini)

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ABSTRACT

Post abdominal structures of seven species of *Dacus* Fabricius were examined, illustrated and described. Phylogenetic analysis revealed genus *Dacus* to be a monophyletic clade though the subgeneric branching was not in concordance with the present sub-generic classification.

WITH more than 4500 described species, Tephritidae represent one of the most diverse acalyptate dipterans of superfamily Tephritoidea (Freidberg, 2006). Tribe Dacini, predominantly frugivorous, belongs to subfamily Dacinae with three genera *Bactrocera* Macquart, *Dacus* Fabricius and *Monacrostichus* Bezzi. *Dacus* is primarily African, represented by 195 species from Africa (White, 2006; White & Goodger, 2009) and 75 species from Indo-Australasian region (Drew & Romig, 2013). Ten species of *Dacus* are known from India (Agarwal & Sueyoshi, 2005; David & Ramani, 2011). Most of the taxonomic studies on tribe Dacini and genus *Dacus* in particular were purely based on external morphology without much attention to genitalia characters. An attempt is made here to study seven species of *Dacus* viz., *D. (Callantra) longicornis* Wiedemann, *D. (Didacus) ciliatus* Loew, *D. (Leptoxyda) persicus* Hendel, *D. (Mellesis) crabroniformis* (Bezzi), *D. (M.) discophorus* (Hering), *D. (M.) insulosus* Drew & Hancock and *D. (M.) ramanii* Drew & Hancock based on post abdominal structures.

Specimens deposited in following museums were examined for the present study: ICAR-NBAIR-National Bureau of Agricultural Insect Resources, Bengaluru and Department of Agricultural Entomology, University of Agricultural Sciences, Bengaluru; images of genitalia were acquired using a Leica DFC 425 camera mounted on a Leica DMLB 1000S microscope; the images were stacked and combined to a single image using Combine ZP (Hadley, 2011). Measurements of male and female genitalia were taken using a calibrated ocular micrometer fixed on a Leica DM1000 microscope. The terminology adopted here follows White *et al.* (1999). Male post

abdominal structures (epandrium, lateral surstylus, medial surstylus, prensisetae, proctiger, aedeagus, glans) of six species and female genital characters (aculeus shape, shape of spicules of eversible membrane, number and shape of spermatheca) of four species were studied and illustrated. Phylogenetic analysis of all the ten species of *Dacus* along with four species of *Bactrocera* Macquart, two each from subgenus groups viz., *Bactrocera* group [*B. dorsalis* (Hendel)] and *B. correcta* (Bezzi)) and *Zeugodacus* group (*B. tau* (Walker) and *B. cucurbitae* (Coquillett)) were performed by selecting *Gastrozona fasciventris* Macquart (Tribe: Gastrozonini) as the outgroup taxon. Though specimens of *D. (M.) icariiformis* (Enderlein), *D. (M.) polistiformis* (Senior-White) and *D. (Neodacus) sphaeroidalis* (Bezzi) were not available for the present study, they were scored based on the original descriptions and examination of digital images of the types. Morphological matrix generated from 18 characters of 15 taxa were analysed using TNT software (Tree Analysis Using New Technology) (Goloboff *et al.*, 2008).

Post abdominal structures: Comparative analysis of the genitalia characters of six species for male (Table I) and four species for female (Table II) of *Dacus* studied is presented below:

Strict consensus tree for tribe Dacini with mapped synapomorphies and bootstrap values (Fig. 1).

Phylogenetic analysis: Analysis revealed fourteen most parsimonious trees of 28 steps. Consensus tree (Figure 11) generated, revealed *Dacus* to be a monophyletic clade (bootstrap value=99) with following synapomorphies viz., fused abdominal