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ONTGENY OF THE TIBIAL SPUR IN MEGAMELUS DAVISI
(HOMOPTERA: DELPHACIDAE) AND ITS BEARING ON
DELPHACID CLASSIFICATION

S. W. Wilson¹ and J. E. McPherson²

ABSTRACT

The forms of the nymphal tibial spur in Megamelus davisi Van Duzee, and their relation to
Muir's classification of delphacid subfamilies and tribes, are discussed.

The evolutionary relationships among fulgoroid taxa, in our opinion, are not clearly un-
derstood. Although some attempts have been made to clarify these relationships on the basis
of adult morphology (e.g., Muir 1930), the morphology of nymphs, including the ontogeny of
anatomical features, has been virtually ignored.

The delphacid tibial spur has been used in taxonomic treatments of members of this family
(Muir 1915, 1923, 1930). Delphacid nymphs and adults are distinguished from other plant-
hoppers by the presence of a metatibial spur, which appears to have developed from an
apical tibial spine (Metcalfe 1969). Muir (1915) based his arrangement of the delphacid
subgroups on the different forms of the spur, which he felt represented a sequence of
primitive to advanced states (i.e., thick and spike-like to thin and flattened). The subfamily
Asiracinae is characterized by a spike-like spur that lacks teeth (Fig. 1), and the subfamily
Delphacinae by a flattened spur with or without teeth (Figs. 2-4). Within the Delphacinae,
the tribe Aloahini is characterized by a thickened spur convex on both sides (Fig. 2), the tribe
Tropidocophalinia by a thinner spur convex on one side and concave on the other (Fig. 3),
and the tribe Delphacini by a laminate spur (Fig. 4). Muir (1915) considered the Asiracinae
primitive and the Delphacinae advanced; within the Delphacinae, he felt the Aloahini, Tro-
pidocophalinia and Delphacini to be progressively more advanced.

During a study of the biology of Megamelus davisi Van Duzee conducted from February
through November 1979 (see Wilson 1980), we obtained specimens of all nymphal instars
of this planthopper; M. davisi is a member of the Delphacini, and occurs on waterlily (Nuphar
advena [Aiton]). The spur forms mentioned above appear to be present in these instars. The
spur of 1st instars (Fig. 5) is similar in size and shape to the apical tibial spine. Second instars
(Fig. 6) have a spike-like spur similar to that found in the Asiracinae. Third, 4th and 5th
instars (Figs. 7-9) have spurs somewhat similar to those found in the Aloahini, Tropidocoph-
alinia, and Delphacini, respectively. Thus, there is a progression of forms in M. davisi from
a spike-like to a laminate spur. During nymphal development of more primitive delphacids, it
is probable that the spur develops to a particular stage that is retained by adults. If so, then
the ontogeny of the spur would support the evolutionary relationships reflected in Muir's
(1915, 1923, 1930) classification of delphacid subfamilies and tribes.

LITERATURE CITED

Metcalfe, J. R. 1969. Studies on the biology of the sugar cane pest Saccharosyden sacchari-

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Figs. 1–9. Ventral view (a) and cross-section (b) of metathibial spur (mts) of: (1) Pentagramma variegata Penner (Asiracinae); (2) Stobaera tricarinata (Say) (Delphacinae: Alophini); (3) Liburniella ornata Sád (Delphacinae: Tropidocephalini); (4) Prokelisia crocea (Van Duzee) (Delphacinae: Delphacini); M. davisi (Delphacinae: Delphacini), (5) 1st instar, (6) 2nd instar, (7) 3rd instar, (8) 4th instar, (9) 5th instar.


