

New species and immatures of crane flies of subgenus *Formotipula* Matsumura from Taiwan (Diptera: Tipulidae: *Tipula*)

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Abstract

Taiwanese species of the crane fly subgenus *Tipula* (*Formotipula*) Matsumura, 1916, are reviewed. *Tipula* (*Formotipula*) *argentea*, **new species**, is described and figured. The only other previously known Taiwanese species, *Tipula* (*Formotipula*) *holoserica* (Matsumura, 1916), is redescribed. The external anatomy of the last instar larva and pupa of *T. (F.) holoserica* is described and illustrated, with a brief discussion of the biology of the larva.

Key words: Diptera, *Formotipula*, larva, new species, pupa, Taiwan, *Tipula*, Tipulidae

Introduction

Formotipula was first proposed by Matsumura (1916) as a genus for the type species *Formotipula holoserica*. Alexander (1920) placed *Tipula nigrorubra* (Riedel, 1917) and *Tipula rufomedia* (Edwards, 1916) as synonyms of *Tipula holoserica* (Matsumura, 1916). Edwards (1931) recognized *Formotipula* as a subgenus of *Tipula* Linnaeus and characterized *Formotipula* morphologically by the following features: spur formula is 1–1–2; claws of male toothed; Rs short or of moderate length (1–1.5 times m-cu); M4 arising near middle of discal cell; hairs on branches of M usually few or absent; squama quite bare; thorax nearly bare and uniformly dull black or red; abdomen short, ovipositor always short, fleshy.

Additional characters were recognized for the subgenus in a summary publication on the 18 species of *Formotipula* in Asia (Alexander 1935), and Savchenko (1961) presented a tentative key to the species of *Formotipula* found in the Palearctic. The diagnostic characteristics, including external sexual characters that separate *Formotipula* from other subgenera, are: body coloration contrasting, black and orange; thorax either chiefly velvety black or a shade of orange or reddish orange; no setae on mesopleura; tibial spur formula 1–1–2; abdomen short, compact; hypopygium strongly tilted upward in male; ovipositor with both cerci and hypovalvae greatly reduced in size, fleshy in female. These characters of the female ovipositor are shared with females in species of *Arctotipula* Alexander, and some species of *Lunatipula* Edwards, but specimens can be easily separated by the tibial spur formula of 1–1–2 in *Formotipula*. The present study has demonstrated that the characters on the male hypopygium and female ovipositor are the most diagnostic features and have been used to characterize this subgenus.

The current Catalogue of the Craneflies of the World (Oosterbroek 2009) placed *Formotipula* as a subgenus of *Tipula* and recognized 27 valid species. *Formotipula* has a predominantly Oriental