

## **FORMOSOZOROS NEWI, A NEW GENUS AND SPECIES OF ZORAPTERA (INSECTA) FROM TAIWAN**

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*Abstract.*—A new genus and species of Zoraptera (Insecta), *Formosozoros newi* NEW GENUS and NEW SPECIES, is described from female specimens collected on Taiwan. Zoraptera is newly recorded from Taiwan.

*Key Words.*—Insecta, *Formosozoros*, Zorotypidae, Zoraptera, Taxonomy, Taiwan.

The zorapterans are minute insects that live in moist tropical and warm temperate forested habitats. Since the order was established by Silvestri (1913), only 30 living and 1 amber fossil species have been described (Poinar 1988, Hubbard 1990, New 1995). All these species are traditionally placed in the single genus *Zorotypus* belonging to the single family Zorotypidae. Kukalova-Peck & Peck (1993) erected 6 new genera, i.e., *Brazilozoros*, *Centrozoros*, *Floridazoros*, *Latinozoros*, *Meridozoros*, and *Usazoros*, for New World zorapterans on the basis of characters of wing venation. When Silvestri (1913) first described and proposed the name for the order Zoraptera, he thought that they were apterous insects. However, adults may develop either with or without wings (Caudell 1920, Gurney 1938, Riegel 1987). Although we can treat the taxonomy of Zoraptera with the characters of wing venation, these characters are known for very few species and apterous individuals often cannot be placed in a genus (New 1995). All Old World species of the order are currently retained in *Zorotypus*, pending discovered and appraised of winged forms.

Recently, five specimens of Zoraptera were found in Taiwan. It is the first record of the order in Taiwan. The tarsi are different from any other recorded species in the world. The Taiwan species is therefore considered to be a new genus of Zoraptera, which is described in this paper. Any additional records of this poorly understood insect order are valuable in documenting its distribution and diversity. All specimens are deposited in the Department of Biology, Tunghai University, Taiwan.

### **FORMOSOZOROS NEW GENUS**

*Type species.*—*Formosozoros newi* NEW SPECIES

*Description.*—Apterous female, similar in general appearance to *Zorotypus*. Epicranial suture weakly developed. Antenna 9-segmented. Apical segment of labial palpus and maxillary palpus with elongate, narrowed apex respectively. Hind tarsi 2-segmented; first segment and second segment almost equal in length; first segment with a row of 5–6 pairs of short thickened setae. Abdomen 11-segmented. Cerci very long; apical seta absent.

*Etymology.*—A combination from the words *Formosa* and *Zorotypus*; masculine.

*Remarks.*—The major diagnostic characters of this new genus to *Zorotypus* are:

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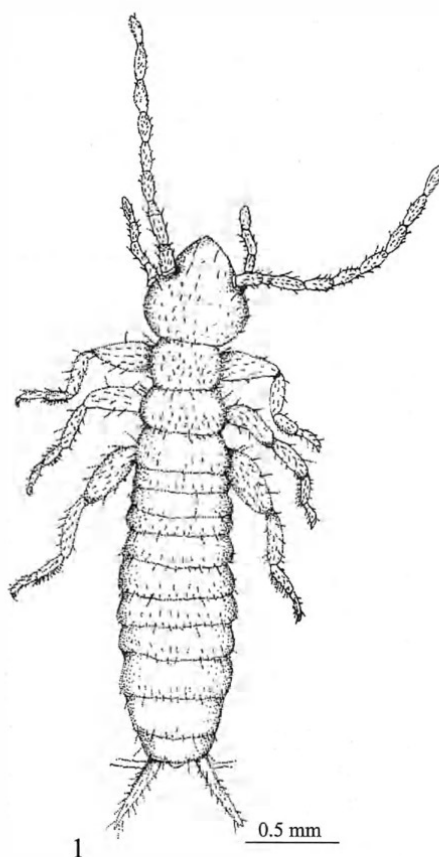


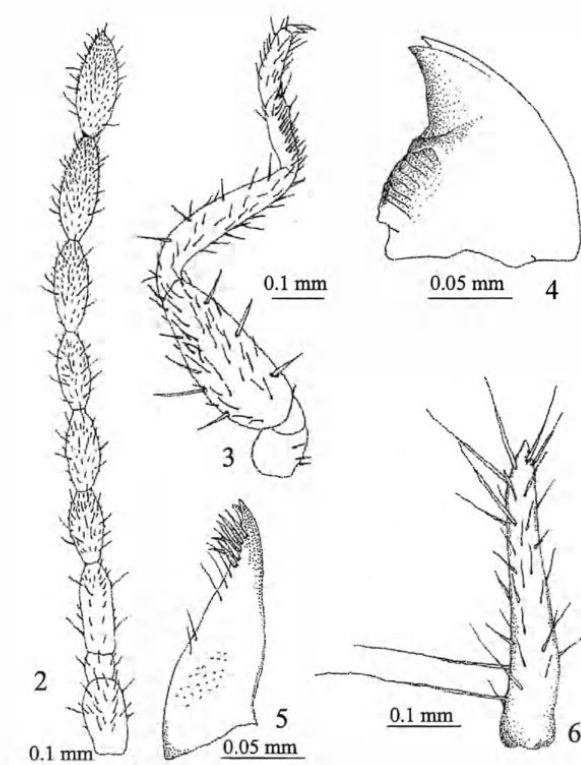
Figure 1. *Formosozoros newi*, n. sp., dorsal view.

(1) the strongly contracted apex of the apical segment of labial palpus and maxillary palpus; (2) first segment and second segment of hind tarsus almost subequal in length; (3) the 5–6 pairs of short thickened setae in first-segment of tarsus; and (4) the greatly enlarged cerci. Additionally, all known zorapterans have an apical seta in cerci except *Zorotypus longicercatus* Caudell, 1927 (Caudell 1927) and *Z. palaeus* Poinar, 1988 (Poinar 1988); the new genus also lacks apical seta in cerci. A small first-segment of the tarsus is common in other living zorapterans and in fossil species (Poinar 1988). The longer first-segment of the tarsus of *Formosozoros* may be an advanced character for Zoraptera. As the specimens of *Formosozoros* lack winged individuals, we cannot discuss the evolutionary relationship among genera by wing venation.

#### FORMOSOZOROS NEWI NEW SPECIES

(Figs. 1–6)

*Apterous female*.—Body length 2.88–3.14 mm ( $n = 3$ ). Head: pear-shaped; length 0.57–0.58 mm; width 0.50–0.52 mm. Eyes and ocelli none. Frons with 6 macrochaetae. Antenna 9-segmented; second segment short; segment length (I–IX, mm) 0.12, 0.05, 0.18, 0.16, 0.16, 0.17, 0.18, 0.18, 0.19. Labial 3-segmented; apical segment with a nipple seta. Maxillary 5-segmented; apical segment with a nipple seta. Thorax: pronotum breadth longer than length ( $0.34 \times 0.25$  mm). Hind legs: femur strongly expanded, length 0.37–0.38 mm, width 0.25–0.26 mm, with 3 posterior spines on the inner margin; tibia with a row of 5 short thickened setae and 1 short apical spur; first-segment of tarsus 0.18 mm in length, with a row of 5–6 pairs short thickened setae; second-segment length 0.17 mm, without any thickened setae but with 2 claws. Abdomen: tergite I–X with 2 medial posterior macrochaetae



Figures 2–6. *Formosozoros newi*, n. sp. 2. Antenna; 3. Hind leg; 4. Mandible; 5. Maxilla; 6. Cercus.

and 2 lateral posterior macrochaetae; tergite XI small. Sternite I–IV with 4 posterior macrochaetae; sternite V–IX with 6 posterior macrochaetae; sternite X–XI macrochaetae absent. Cerci long, length 0.41–0.43 mm, with 3–4 preapical long setae, apical seta absent. 2 spermathecae, connected by a long slender duct.

*Male and larva*.—Unknown.

*Material examined*.—Holotype ♀, Taiwan, *Hualien Hsien*, *Nanan* 300 m, 23°19' N, 121°15' E, 25 August 1994, R. F. Chao, leaf and humus. Paratypes: 2 ♀♀, same data as holotype; 2 ♀♀, 28 August 1996, same habitat as holotype.

*Etymology*.—The name is dedicated to the entomologist, Dr. T. R. New who has worked extensively on Zoraptera.

*Remarks*.—Because the most distinct species characters of many Zoraptera occur in the male genitalia, specific diagnosis of female Zoraptera is often difficult (New 1978). The hind femur of the new species resembles *Zorotypus lawrencei* New, 1995 from Christmas Island, Indian Ocean (New 1995), but can be differentiated in the number of posterior spines. In this case, *Z. palaeus* has 4 spines on the inner hind femora, but *Formosozoros newi* has only 3, whereas all other species of Zoraptera have more than 5 posterior spines in the hind femur. However, the full extent of variability in this feature cannot yet be determined. The cerci of the new species resemble *Z. longicercatus* Caudell, 1927 (Caudell 1927), but lack the apical seta. There are no posterior spines on the hind femur of *Z. longicercatus*. The other characters are in agreement with the description of the genus *Zorotypus*.

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