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A New Species of the Mealybug Genus *Eumyrmococcus* Silvestri (Hemiptera: Pseudococcidae, Rhizoecinae) Associated with the Ant *Acropyga* (*Rhizomyrma*) *kinomurai* Terayama et Hashimoto (Hymenoptera: Formicidae) in the Ryukyu Islands, Japan

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Abstract. A new mealybug species, *Eumyrmococcus kinomurai* sp. nov., is described from the Ryukyu Islands, Japan. It was collected from a nest associated with the ant *Acropyga kinomurai*. The mealybug has some unusual characters and possesses the longest antennae of any known species of *Eumyrmococcus*. It resembles some species of the New World genus *Neochavesia* Williams & Granara de Willink but lacks the protuberant anal lobes, one of the main distinguishing characters of that genus.

Key words: Pseudococcidae, mealybug, new species, *Eumyrmococcus kinomurai*, *Acropyga*, Ryukyu Islands, Japan.

Introduction

The following mealybug was first mentioned as a species of Rhizoecinae by Terayama & Hashimoto (1996) when describing the ant *Acropyga* (*Rhizomyrma*) *kinomurai*. It was found in the nest associated with the ant under a stone by Mr. K. Kinomura in the Ryukyu Islands. The mealybug is an undescribed species of *Eumyrmococcus* with some striking characters. In a recent publication, Williams (1998) discussed 17 species of *Eumyrmococcus*, mostly from South-East Asia, southern Asia and Australasia with one species from Greece and another from South Africa. The new species has the longest antennae of any known species of the genus. In some characters it resembles the related New World genus *Neochavesia* but the anal lobes are not protuberant as in *Neochavesia*. This new *Eumyrmococcus* species is the third to be recorded from Japan.

Abbreviations of the depositories are as follows: BMNH, The Natural History Museum, London, UK; NIAS, National Institute of Agro-Environmental Sciences, Tsukuba, Japan; USNM, National Museum of Natural History, Beltsville, Maryland, USA.

***Eumyrmococcus kinomurai* sp. nov.**

(Fig. 1)

Adult female on microscope slide elongate-pyriform, membranous, largest specimen 1.70 mm long, 0.65 mm wide, cephalothorax dilated, widest at mesothorax then gently tapering to abdominal segment VII, with a small constriction between abdominal segments II and III and a deeper constriction between abdominal segments VII and VIII. Base of abdominal segment VII about 200–235 μm wide; anal lobes not projecting, posterior end almost straight across, position of each lobe with numerous long slender setae, longest about 100 μm long. Antennae unusually long for genus, situated on lateral margins of head, slightly dorsal in position, each 520–620 μm long with 4 segments; segment 1 50–70 μm long, segment 2 250–325 μm long, segment 3 70–90 μm long, segment 4 135–150 μm long; segments 2 and 3 widest distally, last segment widest at about mid point. All antennal segments with moderate numbers of setae, these mostly about 50 μm long on leading edge, 65–75 μm long on last segment; antennal pore or Johnston's organ varying slightly in position near middle of segment but always situated on distal half. Legs well developed; hind trochanter + femur 245–262 μm long, hind tibia + tarsus 175–180 μm long. Ratio of lengths of hind tibia + tarsus to hind trochanter + femur

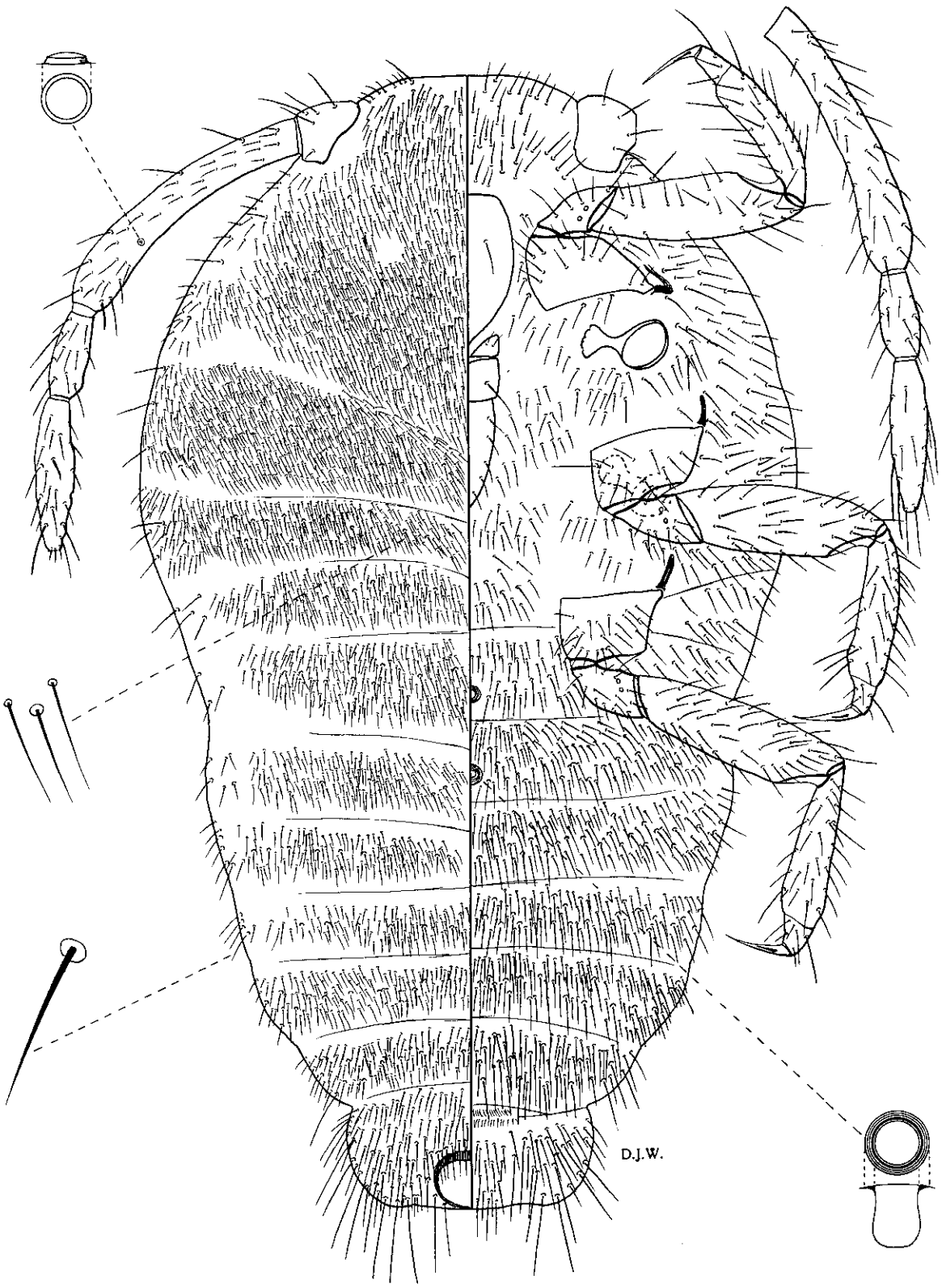

Fig. 1. *Eumyrmococcus kinomurai* sp. nov., ♀.

0.68–0.71. Ratio of lengths of hind tibia to tarsus 5.0–6.0; tibia widest towards distal end, then tapering to unusually short tarsus, which is almost triangular in shape. Claw well developed and conspicuous, elongate and pointed distally, about 70 μm long, with a pair of short setose digitules, both wide at base. All leg segments with long slender setae, longest setae 55–60 μm long. Labium 150–155 μm long, 70–85 μm wide, longer than clypeolabral shield, ratio of length to width 1.82–2.10; widest near base, with distal segment elongate, sides rounded and setae well separated. Circuli numbering 2, situated towards posterior edges of abdominal segments II and III respectively but well within their borders; each circulus round, 25–30 μm in diameter, deeply cupped, deeper than wide. Anal ring without cells, lying at apex of abdomen, subcircular, about 75 μm long, 85–95 μm wide, anal ring setae difficult to discern because of surrounding setae. Ostioles, trilocular pores, multilocular disc pores and tubular ducts absent as in genus.

Dorsal surface with crowded slender setae, all flagellate, mostly 25–40 μm long on posterior abdominal segments, present in wide bands but leaving intersegmental areas bare; anterior abdominal segments, head and thorax with much more densely crowded setae, mostly 20–25 μm long, but with bare areas around lateral margins of anterior abdomen and head; setal collars of most setae very small but a few setae on all segments with larger setal collars.

Ventral surface with crowded setae on abdomen, mostly 25–60 μm long, longest on posterior segments. Setae on head and thorax less crowded leaving many bare areas.

Material

Holotype. Adult ♀, Yoshina, Ishigaki-jima, Ryukyu Islands, Japan, associated with *Acropyga* (*Rhizomyrma*) *kinomurai*, 16. viii. 1985 (K. Kinomura) (BMNH).

Paratypes. Same data as holotype, 10 adult ♀♀ (BMNH), 1 adult ♀ (NIAS), 1 adult ♀ (USNM).

Comments

One of the specimens originally preserved in spirit was held in the mandibles of the ant at the constriction between abdominal segments II and III.

In possessing 4-segmented antennae, *E. kinomurai* is easily separable from *E. nipponensis* Terayama and *E. smithii* Silvestri, both of which have 2-segmented antennae and already known from Japan. For the distribution of these two species and their associated ants in Japan see Terayama (1988). The antennae of *E. kinomurai* are 520–620 μm long and are the longest known in any species of *Eumyrmococcus*. Among the species with 4-segmented antennae, *E. kinomurai* comes closest to *E. neoguineensis* Williams, a species with antennae up to 440 μm long. In both of these species, the second segment is by far the longest but in *E. neoguineensis* the setae on the leading edge of the second segment are conical whereas they are flagellate in *E. kinomurai*. Furthermore, the last 2 antennal segments of *E. neoguineensis* possess setae that are nearly as long as each antenna but in *E. kinomurai* they are much shorter than a third or fourth segment. An unusual feature of the antennae of *E. kinomurai* is the position of the antennal pore or Johnston's organ on the second segment. Normally in mealybugs this occurs near the distal end of the segment but in *E. kinomurai* it lies nearer the middle but, nevertheless, on the distal half of the segment. This suggests that the long second segment may have resulted in the fusion of 2 segments and that the pore has retained its normal position for the second segment. The pore has not been observed in other species of *Eumyrmococcus*, except in *E. corinthiacus* Williams, where it is situated a short distance from the base of the second segment but this long segment may also be a fusion of 2 segments.

Another striking character of the new species is the very short tarsus compared with the length of the tibia, which is 5–6 times as long as the tarsus. In other species of *Eumyrmococcus* the tibia and tarsus are subequal in length. Although the setae on the anal lobes of *E. kinomurai* are longer than the other body setae, they do not form a group of 3 at the apex of each lobe as in most other species of *Eumyrmococcus*. In *E. lanuginosus* Williams, the setae on the anal lobes are similar to those of *E. kinomurai* but the antennae of *E. lanuginosus* are tubercle-like.

Despite the long antennae and unusual legs, *E. kinomurai* has undeveloped anal lobes and an anal ring at the apex of the abdomen. The species, therefore, belongs to the genus *Eumyrmococcus* as defined recently by Williams (1998). In the second couplet of the key to species, *E. kinomurai* can be separated easily from other species of *Eumyrmococcus* by the anal lobe setae not being differentiated from other setae on the anal lobes and in lacking clearly defined anal ring setae.

Some species of the New World genus *Neochavesia* also possess long antennae and tarsi shorter than the tibiae but in all species of *Neochavesia*, the anal open-

ing is located at the base of well-developed protuberant anal lobes. Anal lobes are not protuberant in *Eumyrmococcus* and the anal ring is situated at the apex of the abdomen. Nevertheless, in most other characters, *Neochavesia* appears to be closely related to *Eumyrmococcus*.

Present records indicate that each species of *Eumyrmococcus* and the related genus *Xenococcus* Silvestri may be attended by a different species of *Acropyga* (Williams, 1998). However, there are no special mealybug characters connected with any of the 4 subgenera of *Acropyga* listed by Bolton (1995). At present there is no link between any species of the Old World genus *Eumyrmococcus* (associated with *Rhizomyrma*) and with *Neochavesia*, (a genus also associated with *Rhizomyrma*), the only subgenus of *Acropyga* known in the New World. It is still not clear whether every species of *Acropyga* lives in symbiotic association with a mealybug species, although present records indicate that this may be possible. *E. kolombangarae* Williams, *E. kusiacus* Williams, and *E. smithii* Silvestri are reported from nests and in the mandibles of ant queens in flight (Terayama, 1988; Williams, 1998). *E. scorpioides* (De Lotto) is reported from nests and ant mandibles (Prins, 1982). So far, *E. corinthiacus* has not been found in nests and is known only from the mandibles of ant queens in flight. Evidence suggests that species of *Eumyrmococcus* are obligate myrmecophiles and species of *Acropyga* are obligate coccidophiles but many of the mealybug species have been recorded as living merely with unspecified ants or the species of *Acropyga* have not been identified. Moreover, some other mealybug species are known only from extractions from Berlese funnel apparatus and hence are without ant records.

The new species is named after Mr. K. Kinomura, the collector, who kindly made the specimens available for study.

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