



Title	First description of the male of <i>Manicapsocus</i> (Psocodea: ' Psocoptera ' : Electrentomidae)
Author(s)	Yoshizawa, Kazunori
Citation	Insecta matsumurana. New series : journal of the Faculty of Agriculture Hokkaido University, series entomology, 72, 95-100
Issue Date	2016-09
Doc URL	http://hdl.handle.net/2115/62830
Type	bulletin (article)
File Information	5 Yoshizawa.pdf



[Instructions for use](#)

**FIRST DESCRIPTION OF THE MALE OF MANICAPSOCUS
(PSOCODEA: 'PSOCTERA': ELECTRENTOMIDAE)**

By KAZUNORI YOSHIZAWA

Abstract

YOSHIZAWA, K. 2016. First description of the male of *Manicapsocus* (Psocodea: 'Psocoptera': Electrentomidae). *Ins. matsum. n. s.* 72: 95–100, 2 figs.

The male of *Manicapsocus alettae* Smithers was recorded for the first time and its genital morphology was described and illustrated. This also represented the first report of the male of the genus. The highly specialized phallosome of *M. alettae* supported its close relationship with *Epitroctes* Mockford and *Nothoentomum* Badonnel, as previously suggested from general and female genital characters.

Author's address. Yoshizawa, K.: Systematic Entomology, School of Agriculture, Hokkaido University, Sapporo, 060-8589 Japan (psocid@res.agr.hokudai.ac.jp).

INTRODUCTION

The genus *Manicapsocus* Smithers, 1966 was erected for a new species, *M. alettae*, from Zimbabwe, which was assigned to Electrentominae of Amphientomidae (suborder Troctomorpha), together with *Electrentomum* Enderlein, 1911 (Eocene amber) and *Parelectrentomum* Roesler, 1940 (Eocene amber). Until now, *M. alettae* is known only from two female specimens. Mockford (1967) erected a new family, Manicapsocidae, and assigned *Manicapsocus* and *Epitroctes* Mockford, 1967, the latter from the Neotropics, to this family based on some synapomorphies. Smithers (1972: p. 75) accepted this treatment and further added *Nothoentomum* Badonnel, 1967 and *Phallopsocus* Badonnel, 1967, both known from the Neotropics, to the family. This expanded family concept was accepted by Mockford (1996). The synonymy between *Nothoentomum* and *Epitroctes* was independently proposed by Badonnel (1972) and Smithers (1972: p. 82), the former also noted in a footnote that Mockford initially suggested this synonymy in a personal communication to him (Badonnel, 1972: p. 9). However, Mockford (1996) finally rejected the synonymy between *Nothoentomum* and *Epitroctes* based on detailed morphological assessments. Three fossil genera, *Manicapsocidus* Baz & Ortuño, 2001 from Cretaceous amber, *Eomanicapsocus* Nel, Prokop, De Ploëg & Millet, 2005, and *Eoproctroctopsocus* Nel, Prokop, De Ploëg & Millet, 2005, both from Eocene amber, were subsequently assigned to Manicapsocidae.

In contrast, Smithers (1972: p. 338) proposed the synonymization of Manicapsocidae with Electrentominae of the Amphientomidae. The possibility of their close relationship had already been stated by Mockford (1967). This synonymy was accepted by Lienhard & Smithers (2002) and Mockford *et al.* (2013), the former proposing a new family status (Electrentomidae). The fossil family Paramesopsocidae (assigned to the suborder Psocomorpha by its authors), with *Paramesopsocus* Azar, Hajar, Indary & Nel, 2009 (Jurassic to Cretaceous) as the type genus, was also synonymized with Electrentomidae (Mockford *et al.*, 2013). The distant placement of Electrentomidae from Amphientomidae was corroborated by molecular phylogeny (Yoshizawa & Johnson, 2014).

So far, *Manicapsocus* is known only from two female specimens, and the above-mentioned taxonomic proposals related to the genus have been made without knowing male genital morphology, although this character system is highly relevant taxonomically and phylogenetically.

In this paper, I report the first male of the genus *Manicapsocus*. Based on the new observation of male genital morphology, I also discuss the phylogenetic placement of the genus. Genital structures are illustrated and described after dissection and slide mounting (methods described in Yoshizawa, 2002). Terminology follows Yoshizawa (2005), but that for the phallosomal structures follows Yoshizawa & Johnson (2006).

DESCRIPTION

Manicapsocus alettae Smithers (Figs 1–2)

Manicapsocus alettae Smithers, 1966: 46, figs 1–3, 5.

Description of male genitalia. Clunium (Fig. 2A) with pair of deep V-shaped

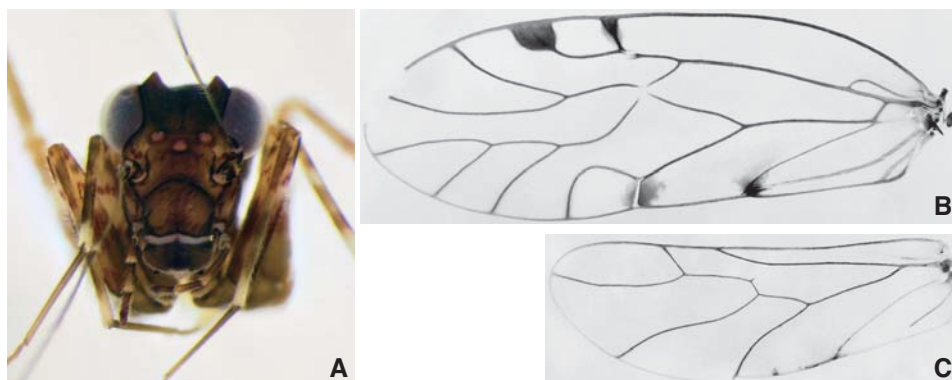


Fig. 1. *Manicapsocus alettae*, male. A. Head, anterior view. B. Forewing. C. Hindwing.

notches dorsolaterally. Epiproct (Fig. 2A) flat dorsally; basally broad, slightly constricted distally, with smoothly rounded distal margin. Paraproct (Fig. 2A) with membranous region on outer surface; trichobothrial field well swollen, sparsely with trichobothria, also with some normal setae medially. Hypandrium (Fig. 2B) with smoothly rounded distal margin; posterolaterally angled; anteriorly with shallow concavity medially. Phallosome (Fig. 2C): basal apodeme very long; basal plate short; paramere indistinct; ventral plates with pair of anterior projections, lateral one articulated with basal plate, internal one bifurcated apically; mesomere weakly sclerotized, posterior region wrinkled.

Length. Body 3.6 mm; forewing 4.5 mm; hindwing 3.2 mm.

Specimen examined. 1 male, KENYA, Rundo, Kakamega, 30.i–13.ii.2001, leg. Minakawa *et al.* (Malaise trap).

Remarks. Judging from its peculiar head structures (horns on vertex and elongated gena: Fig. 1A) and wing venations (including broadly expanded distal end of R1 vein), the present male specimen obviously belongs to *Manicapsocus*. Because the only known species of the genus *M. alettae* is known only from the females, it is difficult to decide if the present male should be considered as conspecific with *M. alettae* or not. Some differences can be detected in the forewing markings between the illustration of *M. alettae* and the present specimen: faint brown markings were drawn in the forewing cells *rs*, *m*, and *cua* in the original description of *M. alettae* whereas these are not so clearly seen in the present male (Fig. 1B). However, such differences can sometimes be seen as intra-specific variations. In addition, apart from these wing markings, other general characters are in good agreement between the original description of the female of *M. alettae* and the present male. The differences in the forewing markings may indicate their different species status, but it is obvious from the morphological agreements that *M. alettae* and the present male specimen are very closely related to each other. Therefore, to avoid creation of synonymy, I identified the present male specimen as *M. alettae*. To confirm this identification, observation of the females from Kakamega (Kenya) or of the males from the type locality of *M. alettae* (Zimbabwe: Chirinda forest) is needed.

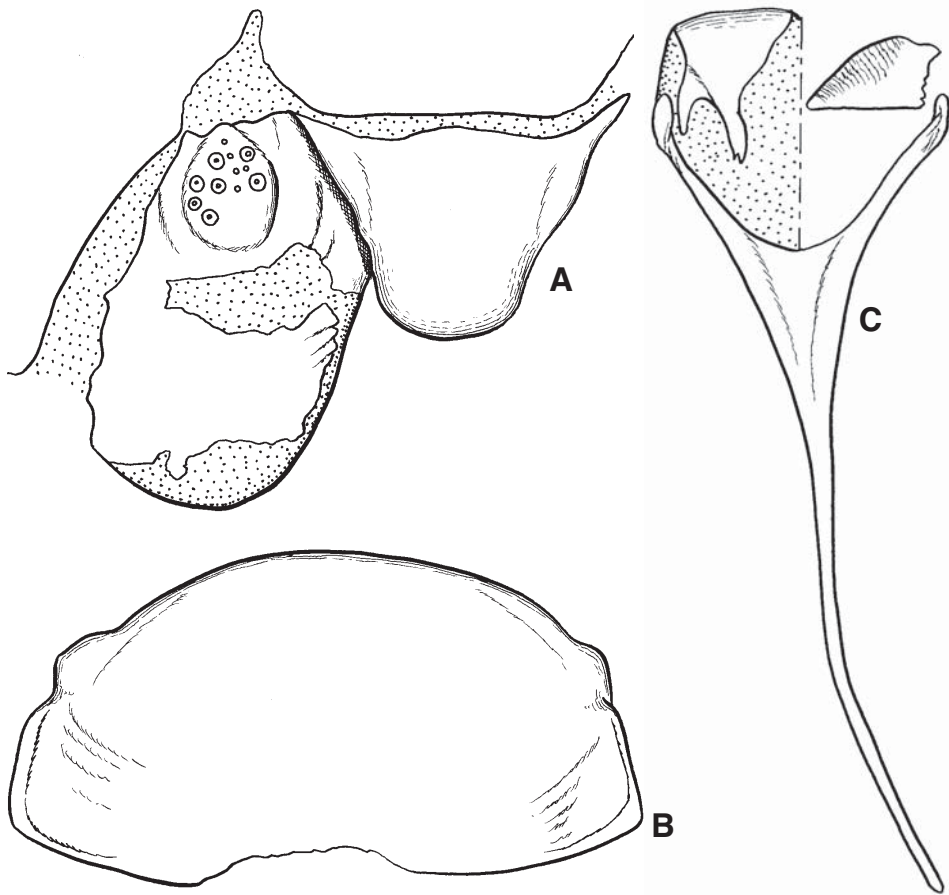


Fig. 2. Male terminal structures of *Manicapsocus alettae*. A. Clunium, epiproct, and paraproct. B. Hypandrium. C. Phallosome. Left side shows the ventral and right side shows the dorsal structures.

DISCUSSION

The male genital structures of *Manicapsocus* are described and illustrated here for the first time. The elongated basal apodeme of the phallosome observed in the male of *Manicapsocus* is a very striking apomorphy (derived from a short basal apodeme, as present in *Phallopsocus* and most of electrentomoids, see Yoshizawa & Johnson, 2006: p. 354) shared also by *Epitroctes* and *Nothoentomum*. Distal phallosomal structures are also very similar between them (detailed genital structures of the fossil electrentomid genera are unknown to date). These observations corroborate the close affinity of these genera, as previously estimated by Mockford (1967) and Smithers (1972). Although some peculiarities of *Manicapsocus* have also been pointed out (e.g., horns on vertex, elongated gena, apically broadened R1 vein: Fig. 1AB), these are interpreted as

autapomorphic specializations with no phylogenetic relevance for the placement of the genus. In contrast, the condition of the A_2 vein as observed in *Manicapsocus* (distally separated from A_1 and usually reaching the wing margin, as also observed in the fossil electrentomid genera *Eomanicapsocus*, *Manicapsocidus*, and *Paramesopsocus*: Fig. 1B) may contradict the above hypothesis: this character state represents a more plesiomorphic condition compared to that observed in *Eoprotoctopsocus*, *Electrentomum*, *Parelectrentomum* (all from Eocene amber), *Epitroctes*, and many other electrentomoids (Musapsocidae, Troctopsocidae, Proctroctopsocidae and Compsocidae) where A_2 is distally fused to A_1 (wings are reduced in *Nothoentomum* and absent in *Phallopsocus*: Mockford, 1996). This situation may suggest the basal divergence of *Manicapsocus* from the rest of Electrentomoidea, contrary to the evidence from male genitalia. However, the condition of the A_2 vein may be somewhat homoplasious because it is variable at least in one electrentomoid genus (*Musapsocus* Mockford, 1967). Some homoplasy concerning the elongated basal apodeme of the phallosome as observed in *Manicapsocus*, *Epitroctes* and *Nothoentomum* cannot be excluded, too. Clearly homoplasious development of elongated phallosome apodemes have also been observed in several families of the suborder Psocomorpha (e.g., *Lachesilla* of Lachesillidae, *Camelopsocus* of Psocidae, *Lichenomima* of Myopsocidae). Thus, further morphological and molecular analyses based on broad taxon sampling are needed for deciding the systematic placement of *Manicapsocus* and estimating the phylogeny of Electrentomoidea.

ACKNOWLEDGMENTS

I thank the following persons: Noboru Minagawa (Nagasaki University) for collecting the specimen examined here, which was sorted out and supplied to the author by Takuma Yoshida (formerly Hokkaido University, now Okinawa Institute of Science and Technology); Charles Lienhard (Natural History Museum of Geneva) reviewed the paper and provided valuable comments, including information on the taxonomic history of Manicapsocidae and Electrentomidae.

REFERENCES

- Azar, D., Hajar, L. Indary, C. & Nel, A. 2009. Paramesopsocidae, a new Mesozoic psocid family (Insecta: Psocodea: "Psocoptera": Psocomorpha). *Annales de la société entomologique de France* 44 (2008): 459–470 (published Jan. 31, 2009).
- Badonnel, A. 1967. Psocoptères édaphiques du Chili (2e note). *Biologie de l'Amérique australe* 3: 541–585.
- Badonnel, A. 1972. Psocoptères édaphiques du Chili (3e note) (Insecta). *Bulletin du Muséum national d'Histoire naturelle* (3)(1)(1971), *Zoologie* 1: 1–38 (published Feb. 25, 1972).
- Baz, A. & Ortuño, V. M. 2001. A new electrentomoid psocid (Psocoptera) from the Cretaceous amber of Alava (Northern Spain). *Mitteilungen aus dem Museum für Naturkunde Berlin, Deutsche entomologische Zeitschrift* 48: 27–32.
- Enderlein, G. 1911. Die fossilen Copeognathen und ihre Phylogenie. *Palaeontographica* 58: 279–360.
- Lienhard, C. & Smithers, C. N. 2002. Psocoptera (Insecta): World Catalogue and Bibliography. Instrumenta Biodiversitatis 5. Muséum d'Histoire Naturelle, Genève.
- Mockford, E. M. 1967. The electrentomoid psocids (Psocoptera). *Psyche* 74: 118–165.

- Mockford, E. M. 1996. Character analysis of the Western Hemisphere genera of family Manicapsocidae (Psocoptera): genus *Epitroctes* reinstated with descriptions of four new species. *Insecta Mundi* 10: 169–180.
- Mockford, E. L., Lienhard, C. & Yoshizawa, K. 2013. Revised classification of 'Psocoptera' from Cretaceous amber, a reassessment of published information. *Insecta matsumurana, new series* 69: 1–26.
- Nel, A., Prokop, J., De Ploëg, G. & Millet, J. 2005. New Psocoptera (Insecta) from the lowermost Eocene amber of Oise, France. *Journal of Systematic Palaeontology* 3: 371–391.
- Roesler, R. 1940. Neue und wenig bekannte Copeognathengattungen. I. *Zoologischer Anzeiger* 129: 225–243.
- Smithers, C. N. 1966. Descriptions and new records of Atropetae, Psocatropetae and Amphientometae (Psocoptera) from Africa. *Journal of the Entomological Society of Southern Africa* 28: 44–49.
- Smithers, C. N. 1972. The classification and phylogeny of the Psocoptera. *Memoirs Australian Museum* 14: 1–349.
- Yoshizawa, K. 2002. Phylogeny and higher classification of suborder Psocomorpha (Insecta: Psocodea: "Psocoptera"). *Zoological Journal of the Linnean Society* 136: 371–400.
- Yoshizawa, K. 2005. Morphology of Psocomorpha (Psocodea: "Psocoptera"). *Insecta matsumurana, new series* 62: 1–44.
- Yoshizawa, K. & Johnson, K. P. 2006. Morphology of male genitalia in lice and their relatives and phylogenetic implications. *Systematic Entomology* 31: 350–361.
- Yoshizawa, K. & Johnson, K. P. 2014. Phylogeny of the suborder Psocomorpha: congruence and incongruence between morphology and molecular data (Insecta: Psocodea: 'Psocoptera'). *Zoological Journal of the Linnean Society* 171: 716–731.