



## New monotypic genera of Epipsocidae (Psocoptera: Epipsocidae) from Belize and Thailand

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### Abstract

Two new monotypic genera are described and illustrated, *Edmockfordia* for *E. chiquibulensis* **sp.n.** from the Chiquibul Forest Reserve, Belize, and *Phallofractus* for *P. thailandensis* **sp.n.** from Chiang Mai Province, Thailand. The former is close to *Mesepipsocus*, and the later is the sister group to the assemblage *Goja-Rogojiella-Ianthorntonia*.

**Key words:** Epipsocetae, Epipsocidae, Chiquibul Forest Reserve, Belize, Chiang Mai Province, Thailand, new genera

### Introduction

Within the infraorder Epipsocetae (Yoshizawa 2002), the family Epipsocidae constitutes a large assemblage of 24 described genera (Casasola González 2006, García Aldrete & Casasola González 2008). I here describe two additional genera, one from Belize, related to *Mesepipsocus*, and other from Thailand, that holds a sister group relation to the cluster *Goja-Rogojiella-Ianthorntonia* (see Fig. 124 in Casasola González 2006).

The specimens available for study were dissected in 80% ethyl alcohol, and their parts (head, right antenna, right wings and legs and genitalia), were mounted on slides in Canada Balsam. Before dissecting the specimens, they were placed in 80% ethyl alcohol under a dissecting microscope illuminated with white cold light at 80X, to record the coloration. Measurements, in  $\mu\text{m}$ , of parts on the slides, were taken with an AO filar micrometer whose measuring unit is 1.36  $\mu\text{m}$  for wings, and 0.53  $\mu\text{m}$  for other parts. Abbreviations of parts measured, or counted, are as follows: FW and HW: lengths of right fore- and hind- wings, F, T, t1, and t2: lengths of femur, tibia and tarsomeres 1 and 2 of right hind leg, ctt1: number of ctenidobothria on t1, Mx4: length of fourth segment of right maxillary palp, IO, D, and d respectively: minimum distance between compound eyes, antero-posterior diameter and transverse diameter of right compound eye in dorsal view of head, PO: d/D. The location of the types is indicated in each description.

### *Edmockfordia* gen. n.

Type species. *Edmockfordia chiquibulensis* **sp. n.**

**Diagnosis.** Belonging in the Epipsocidae. Five distal labral sensilla, one central placoid, flanked by a pair trichoid-placoid. Without row of cuticular cones on setal bases of fore femora (hind legs missing). Forewing Rs 2 branched, M dichotomously branched, resulting in 4 M veins; hindwing Rs 2 branched, M unbranched (Fig. 1). Phallosome open anteriorly, broadly shaped like an inverted V, with side struts stout, curved anteriorly, each mesally on outer edge with a broad, rounded external paramere. Aedeagal arch extended posteriorly to form a stout, blunt cone. Endophallus membranous, not bearing sclerites (Phallosome: Fig. 2).

Paraprocts (Fig. 5) with a distinct, sclerotized band partially enclosing the sensory field, a curved, sclerotized band over the area of the sensory field, and a sclerotized band along the posterior border. Epiproct (Fig. 5) broad, trapeziform, setose, with a large field of warts in the middle.

***Edmockfordia chiquibulensis* sp. n.**

(Figs. 1–5)

**Color.** Body pale brown, with ochre areas as indicated below. Compound eyes black, ocelli hyaline, with strong, ochre centripetal crescents, particularly the two upper ones. A broadly triangular ochre band from third ocellus to each compound eye and postclypeus, not reaching the antennal fossae. Antennal flagella missing, scape and pedicel dark brown. Maxillary palps pale brown. Tergal lobes of meso- and metathorax dark brown; pleura with an ochre band near the tergum. Only one front leg present, all others missing, the remaining one pale brown. Coxae and trochanters dark and pale brown, almost white, respectively. Wings hyaline, veins orange, membrane with a tenuous orange hue. Abdomen pale brown, with ochre, transverse subcuticular bands, less visible ventrally.

**Morphology.** As in generic diagnosis, plus the following. Forewing pterostigma narrow anteriorly, widest a little posterior to the middle. Areola postica wide, rounded posteriorly (Fig.1). Hindwing with Rs-M joined basally for a length (Fig.1). Five distal labral sensilla: one central placoid, flanked by a pair trichoid-placoid. Pretarsal claw with a small preapical denticle (Fig.3). Lacinial tip with outer cusp broad, bearing six denticles (Fig. 4). Hypandrium broad, setose, approximately rectangular, with a field of setae on each postero-lateral corner. Paraprocts robust, setose; sensory fields elliptic, bearing 23–24 trichobothria, issuing from basal rosettes (Fig.5).

**Measurements.** FW: 3020, HW: 2180, Mx4: 145, IO: 302, D: 230, d: 155, IO/D: 1.31, PO: 0.67.

**Material studied.** Holotype male, BELIZE, Cayo District, Chiquibul Forest Reserve, in malaise trap 13 (week 66), 7–10.ii.1996 (Howe & King). Paratypes, 1 male, same data except, in malaise trap 13 (week 24), 1–4.iv.1996; 1 male, in malaise trap 11 (week 74), 1–4.iv.1996; deposited in the National Collection of Insects, Instituto de Biología, Universidad Nacional Autónoma de México (coden CNIN), México City, México.

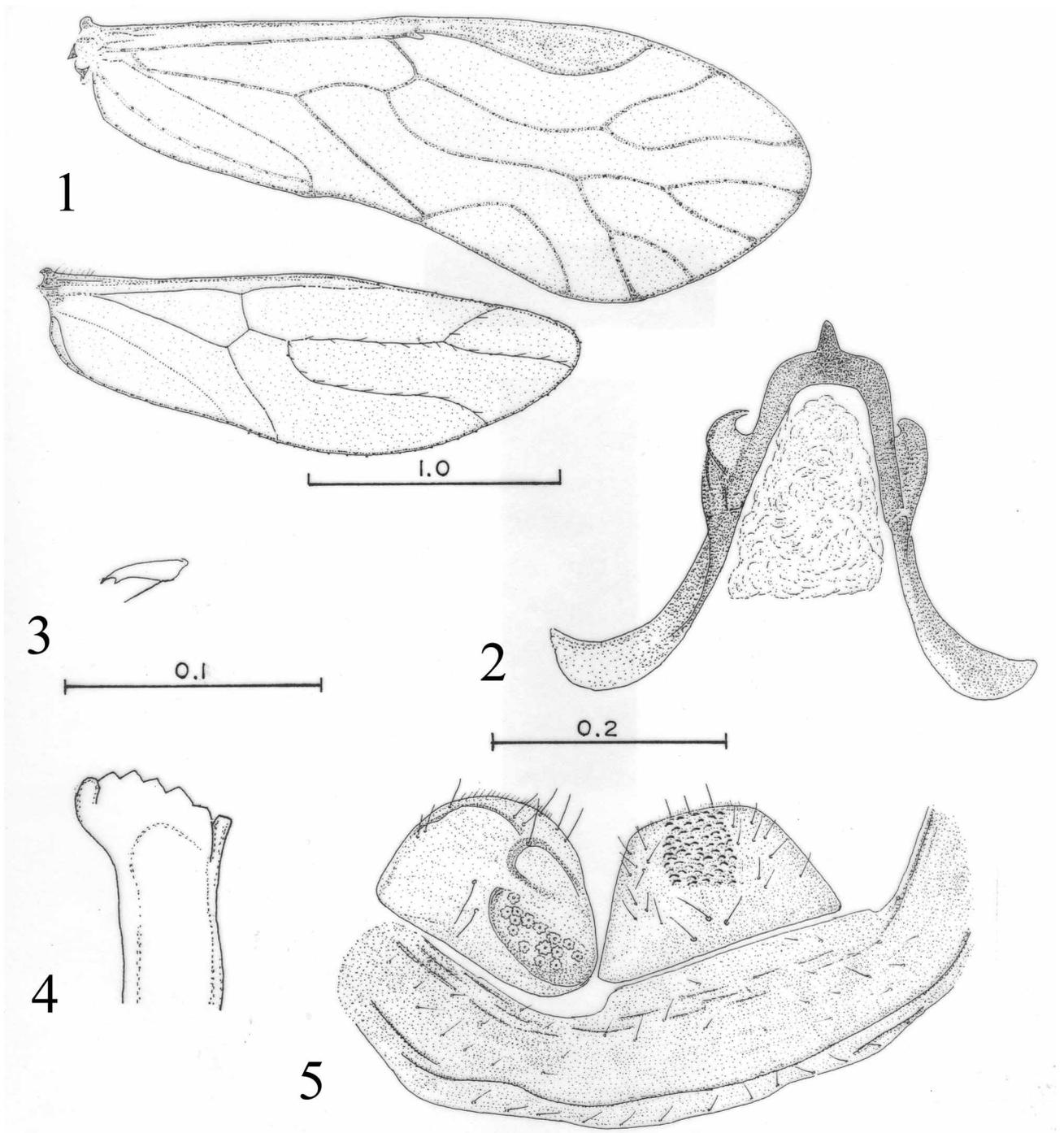
**Etymology.** The generic name is derived from the name of Dr. Edward L. Mockford; it is a tribute to his leadership in the field of psocidology, and a recognition to his many ground breaking contributions on the taxonomy of the Psocoptera. The specific name refers to the locality in Belize where the specimens were found.

**Remarks.** Among the genera of the family Epipsocidae, wing venation with supernumerary veins has been observed in species of *Cubitiglabra* Li Fasheng, *Goja* Navás, *Ianthorntonia* García Aldrete, *Incapsocus* García Aldrete, *Mesepipsocus* Badonnel (in which some species also present caeciliusid venation), *Mesepipsocoides* García Aldrete & Casasola González, and *Dicropsocus* Smithers & Thornton, but only in species of *Mesepipsocus* the character state of forewing M dichotomously branched has been observed, pointing to possible closeness with *Edmockfordia*.

In species of *Mesepipsocus*, as defined by Mockford (1998), the male phallosome has a simple structural plan, consisting of two side struts, aedeagal arch, and endophallus without sclerites; this type of phallosome, with small variations is seen in species of *Epipsocus*, *Incapsocus*, *Mesepipsocus*, and *Neurostigma* (see Fig. 7 in Mockford 1998, Fig. 74 in Casasola González 2006, Fig. 3 in García Aldrete 2005, Fig. 118 in Mockford 1991, and Fig. 134 in Mockford 1991); it is open anteriorly, with rudimentary or no external parameres. The phallosome of *Edmockfordia* presents the same plan, but it is rather stout, with distinct, well developed external parameres.

As for the male epiproct and paraprocts, the field of warts in the former, and the sclerotized bands in the later, shown by *E. chiquibulensis*, are unique in the whole family.

The above characters justify the creation of a genus distinct from *Mesepipsocus*, sharing with it the forewing venation with 4 M veins.



FIGURES 1–5. *Edmockfordia chiquibulensis* sp. n. Male. 1. Fore- and hindwing. 2. Phallosome. 3. Pretarsal claw. 4. Lacinial tip. 5. Clunium, right paraproct and epiproct. Scales in mm. Figures 2 and 5 to common scale.

***Phallofractus* gen. n.**

Type species. *Phallofractus thailandensis* sp. n.

**Diagnosis.** Belonging in the Epipsocidae. Without row of cuticular cones on setal bases of fore- and hind femora. Wing venation caeciliusid, hindwing Rs-M fused for a short distance. Phallosome simple, closed anteriorly. Side struts straight, slender. Aedeagal arch interrupted apically, each arm stout. External parameres broad, membranous lobes, not bearing pores. One pair of endophallic sclerites, each “J” shaped, short stem

distally blunt, long stem distally acuminate. For differences from *Goja*, *Ianthorntonia* and *Rogojiella*, see Table 1.

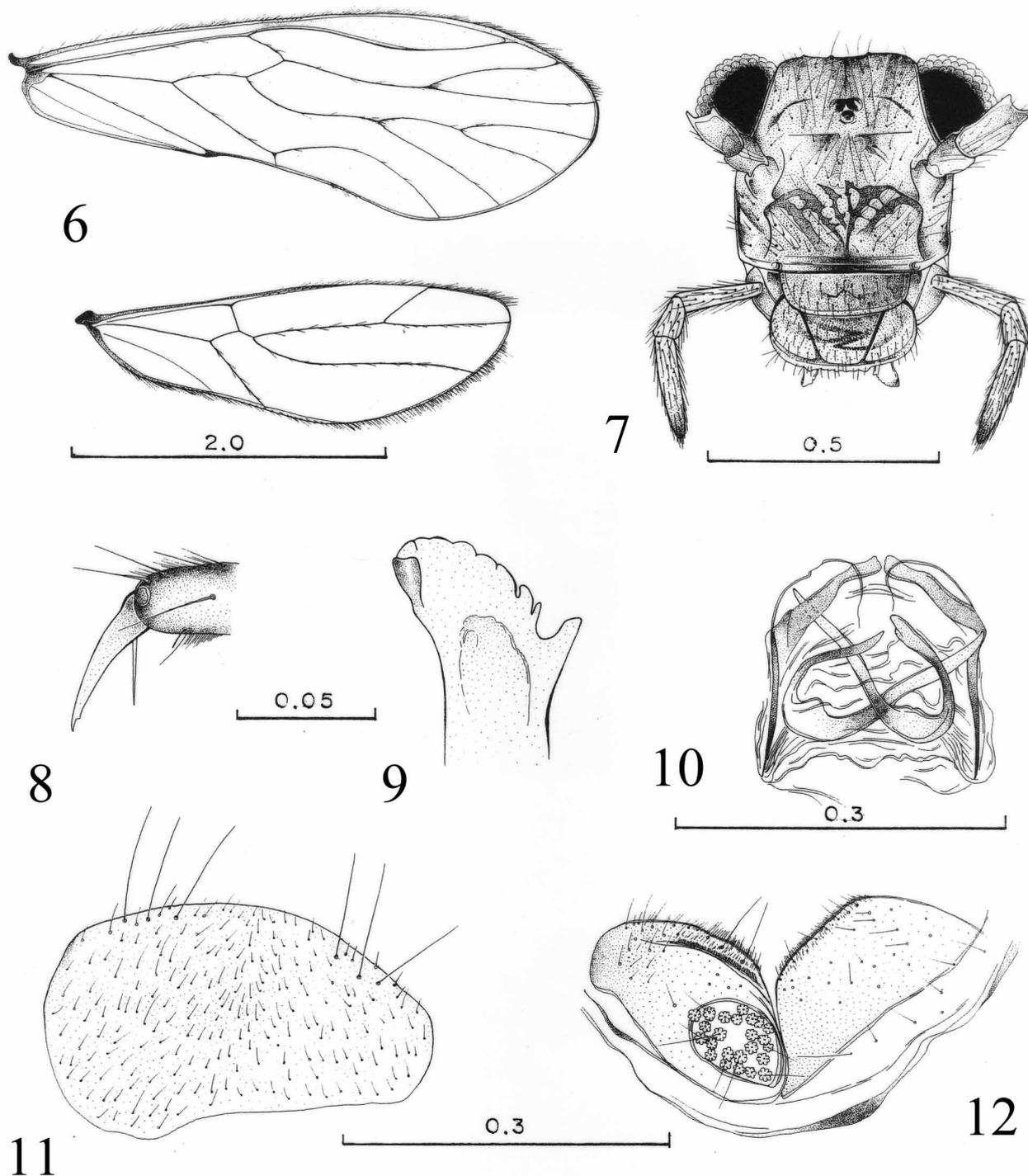
**TABLE 1.** States of eight male characters in the four genera of Epipsocidae conforming the clade sp4 THAI-*Goja*-*Rogojiella*-*Ianthorntonia* (Casasola González 2006, Fig. 124).

Character state	Genera			
	<i>Phallofractus</i>	<i>Goja</i>	<i>Rogojiella</i>	<i>Ianthorntonia</i>
Forewing venation: Caeciliusid (0) or with supernumerary veins (1)	0	0,1	0	1
Hindwing venation: Caeciliusid (0) or with supernumerary veins (1)	0	0,1	0	1
Hindwing Rs-M: fused (0) or joined by a crossvein (1)	0	1	0	0
Phallosome with (0) or without (1) external parameres	0	0,1	0	0
External parameres as m membranous lobes (0) or as long, slender projections (1)	0	0	1	1
Aedeagal arch complete (0) or interrupted apically (1)	1	0	0	0
Phallosome with (0) or without (1) sclerotized band next external parameres (1)	1	1	0	1
Endophallic sclerites: one pair (0), two pairs (1), or three pairs (2)	0	0,1	2	1

***Phallofractus thailandensis* sp. n.**  
(Figs. 6–12)

**Color** (after 21 years in 80% ethyl alcohol). Body orange brown. Compound eyes black, ocelli hyaline, with thick, ochre centripetal crescents. Head pattern (Fig.7). Maxillary palps and legs pale brown (antennal flagella missing). Wings hyaline, with a slight orange hue. Abdomen pale brown.

**Morphology.** As in generic diagnosis, plus the following. Outer cusp of lacinial apices broad, with eight denticles (Fig. 9). Pretarsal claws slender, with a small preapical denticle (Fig. 8). Forewing pterostigma long, wider in the middle (Fig. 6). Areola postica long, approximately shaped like an scalene triangle (Fig. 6). Hypandrium (Fig. 11) broad, setose, rounded posteriorly, with one conspicuous field of three macrosetae on each postero-lateral corner. Phallosome (Fig. 10). Paraprocts (Fig. 12) robust, almost elliptic, with setae as illustrated and a field of small setae along posterior border, sensory fields large, elliptic, with 24–26 trichobothria issuing from basal rosettes. Epiproct (Fig. 12) trapeziform, setae as illustrated, with a field of small setae along posterior border.



**FIGURES 6–12.** *Phallofractus thailandensis* sp. n. Male. 6. Fore- and hindwings. 7. Front view of head. 8. Pretarsal claw. 9. Lacinial tip. 10. Phallosome. 11. Hypandrium. 12. Clunium, right paraproct and epiproct. Scales in mm. Figures 8–9 to common scale. Figures 11–12 to common scale.

**Measurements.** FW: 3480, HW: 2584, F: 850, T: 1476, t1: 660, t2: 202, ctt1: 30, Mx4: 230, IO: 279, D: 222, d: 145, IO/D: 1.25, PO: 0.653.

**Material studied.** Holotype male, THAILAND, Chiang Mai Province, Doi Suthep (Chiang Mai District) at 1180 m., 1–30.i. 1987 (P. Schwendinger). Deposited in the Muséum National D’histoire Naturelle, Genève, Suisse.

**Etymology.** The generic name is derived from the Greek, and means “fractured phallus”, in reference to the apical interruption of the aedeagal arch, resulting in two distinct arms. The specific name refers to the country of origin of this species.

**Remarks.** In a recent study on the phylogenetic relationships of the genera of Epipsocetae (Casasola González 2006), the American epipsocid genera *Goja* Navás, *Rogojiella* García Aldrete and *Ianthorntonia* García Aldrete, grouped together in a clade, having as sister group an undescribed genus from Thailand, represented by one male. That male has here been described as *Phallofractus*; it presents an autapomorphy that separates it from the other epipsocid genera: the aedeagal arch is apically interrupted, so there are two distinct arms, each associated with the side strut of the phallosome. Since it is the sister group to the cluster *Goja*, *Rogojiella* and *Ianthorntonia* (Casasola González 2006) and since in the first and third of these genera the females are neotenic (females unknown in *Rogojiella*), it is predictable that the female of *Phallofractus* be also neotenic.

Table 1 presents the distribution of eight character states in *Phallofractus*, *Goja*, *Rogojiella* and *Ianthorntonia*. The former genus differs from *Goja* in having caeciliusid venation, in having hindwing veins Rs-M fused, and in having the aedeagal arch incomplete. It differs from *Rogojiella* in having external parameres as membranous lobes, in having the aedeagal arch incomplete, in lacking a sclerotized band next each external paramere, and in having one pair of endophallic sclerites. It differs from *Ianthorntonia* in having wing venation caeciliusid, in having external parameres as membranous lobes, in having the aedeagal arch incomplete, and in having one pair of endophallic sclerites.

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## References

- Casasola González, J.A. (2006) Phylogenetic relationships of the genera of Epipsocetae Psocoptera: Psocomorpha). *Zootaxa*, 1194, 1–32.
- García Aldrete, A.N. (2005) Three new monotypic genera of Epipsocidae (Psocoptera) from Peru and Brazil. *Zootaxa*, 1077, 51–60.
- García Aldrete, A.N. & Casasola González J.A. (2008) A new epipsocid genus (Psocoptera: Epipsocidae) from the Dominican Republic. *Proceedings of the Entomological Society of Washington*, 110(1), 218–222.
- Mockford, E.L. (1991) New species and records of Psocoptera (Insecta) from Roraima state, Brazil. *Acta Amazonica*, 21, 211–317.
- Mockford, E.L. (1998) Generic definitions and species assignments in the family Epipsocidae (Psocoptera). *Insecta Mundi*, 12 (1 & 2), 81–91.
- Yoshizawa, K. (2002) Phylogeny and higher classification of suborder Psocomorpha (Insecta: Psocodea: ‘Psocoptera’). *Zoological Journal of the Linnean Society*, 136, 371–400.