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A New Genus, *Idatenopsocus*, of the Family Mesopsocidae (Insecta: Psocoptera) and Its Phylogenetic Position*

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A new genus, *Idatenopsocus*, represented by *Idatenopsocus orientalis* (Vishnyakova, 1986), comb. nov., is described and the species is redescribed. Within the family Mesopsocidae, this new genus is considered as the sister group of a monophyletic group composed of the genera *Mesopsocus*, *Microtrichipsocus*, *Metapsocus*, *Cyrtopsocus*, *Hexacyrtoma*, and *Rhinopsocus*.

Key Words: *Idatenopsocus* gen. nov., *Idatenopsocus orientalis* comb. nov., Mesopsocidae, Psocoptera, Phylogeny.

Introduction

Vishnyakova (1986) described *Labocoria orientalis* from Kunashiritô Island, Chishima (Kuril) Isls. This species is a medium-sized mesopsocid, and due to its having the eyes weakly stalked, Vishnyakova placed it in the genus *Labocoria* Enderlein, 1910. In 1988, Badonnel and Lienhard synonymized *Labocoria* with the genus *Mesopsocus* because the two genera share an apomorphic character state, the basal fusion of veins R and M+Cu in the hindwing, and the former genus differs from the latter only in the stalked eyes, which these authors did not consider to be a generic character. In combining the two genera, they also automatically assigned *L. orientalis* to *Mesopsocus*.

However, this species distinctly differs from the other species of *Mesopsocus*, including those that had been assigned to the *Labocoria*, in some important characters. Thus, in this paper, we redescribe *L. orientalis* as the type species of a new genus, *Idatenopsocus*, and discuss its phylogenetic position within the family Mesopsocidae.

The depositories of the specimens are abbreviated in the text as follows: BLKU: Biosystematics Laboratory, Kyushu University, Fukuoka; MHNG: Muséum d'Histoire naturelle, Genève; TC: Tomita collection, Nara.

Descriptions

Idatenopsocus gen. nov.

Type species: *Labocoria orientalis* Vishnyakova, 1986

Head capsule (Fig. 1) with short dorso-lateral extensions, on which compound eyes are situated; ocelli present in both sexes. Sixth flagellar segment of antenna with

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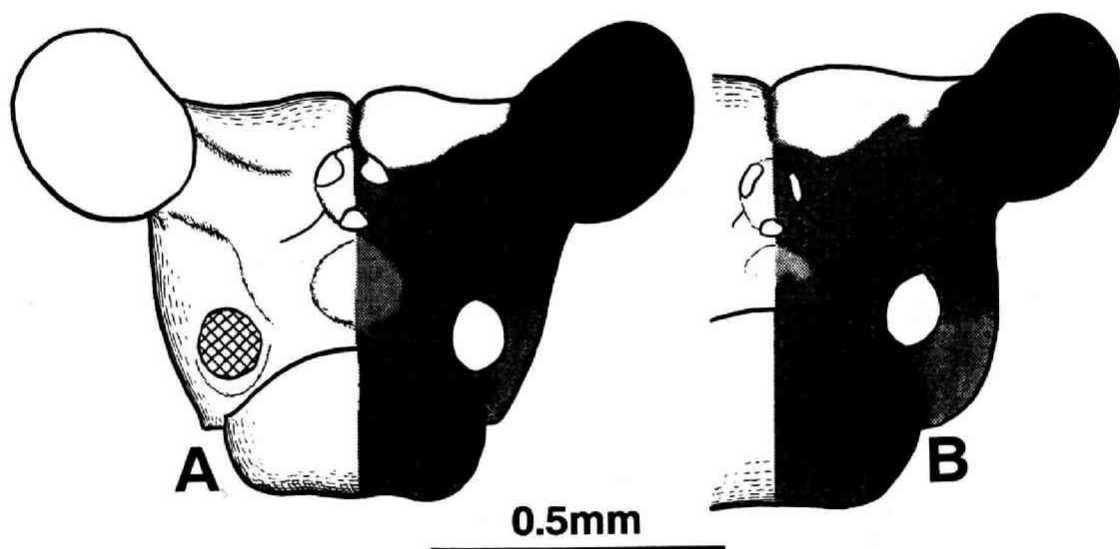


Fig. 1. Head of *Idatenopsocus orientalis*. A, male; B female.

a subapical placoid sensillum. Pterostigma with hind angle (Fig. 2A, C). In hindwing (Fig. 2B, D) vein Sc reduced to short, fine vein; veins R and M+Cu separated from each other basally (Fig. 2E); vein An long. Pulvillus setiform, slightly wavy, with apex somewhat enlarged. Phallosome (Fig. 3D) with a triangular sclerite dorsal to apex of aedeagus (Fig. 3F). External valve of gonapophyses small (Fig. 4D); dorsal and ventral valves of gonapophyses relatively short; ventral valve only weakly broadened apically (Fig. 4E). Egg guide of female subgenital plate small, with distinct neck (Fig. 4B, C). Wall of spermathecal sac thickened.

Etymology. "Idaten" means very fast runner in Japanese. The type species of the genus, *I. orientalis*, inhabits tree trunks or stone surfaces and runs very rapidly.

***Idatenopsocus orientalis* (Vishnyakova, 1986) comb. nov.**

Labocoria orientalis Vishnyakova, 1986, p.344; type locality: Kunashiritô Is., Chishima (Kuril) Isls.

Mesopsocus orientalis: Badonnel and Lienhard, 1988, pp. 400, 402, 411.

Mesopsocus sp.: Tomita and Haga, 1991, pp. 41, 51.

Male. Head (Fig. 1A) almost black; vertex white; gena variable in color, black to pale yellowish-white; frons with a circular paler portion; eye black, IO/D=1.7; ocelli pale; postclypeus black; anteclypeus white. Antenna brown; pedicel and scape white; first flagellar segment pale brown. Mouthparts black; maxillary palpus white except apical half of fourth segment brown; labium pale. Thorax: Prothorax white; ventral margin of pleuron and whole sternum brown. Meso- and metapleuron uniformly dark blackish-brown except for membranous regions. Meso- and metanotum dark blackish-brown with white areas on posterior region of lateral lobes and posterior to anterior lobes of meso- and metascutum; meso- and metascutellum entirely white. Legs white to pale brown in ground color; basal half of middle and hind coxae, distal end of each femur, basal 1/3 and distal end of all tibiae, and all tarsi dark brown; first

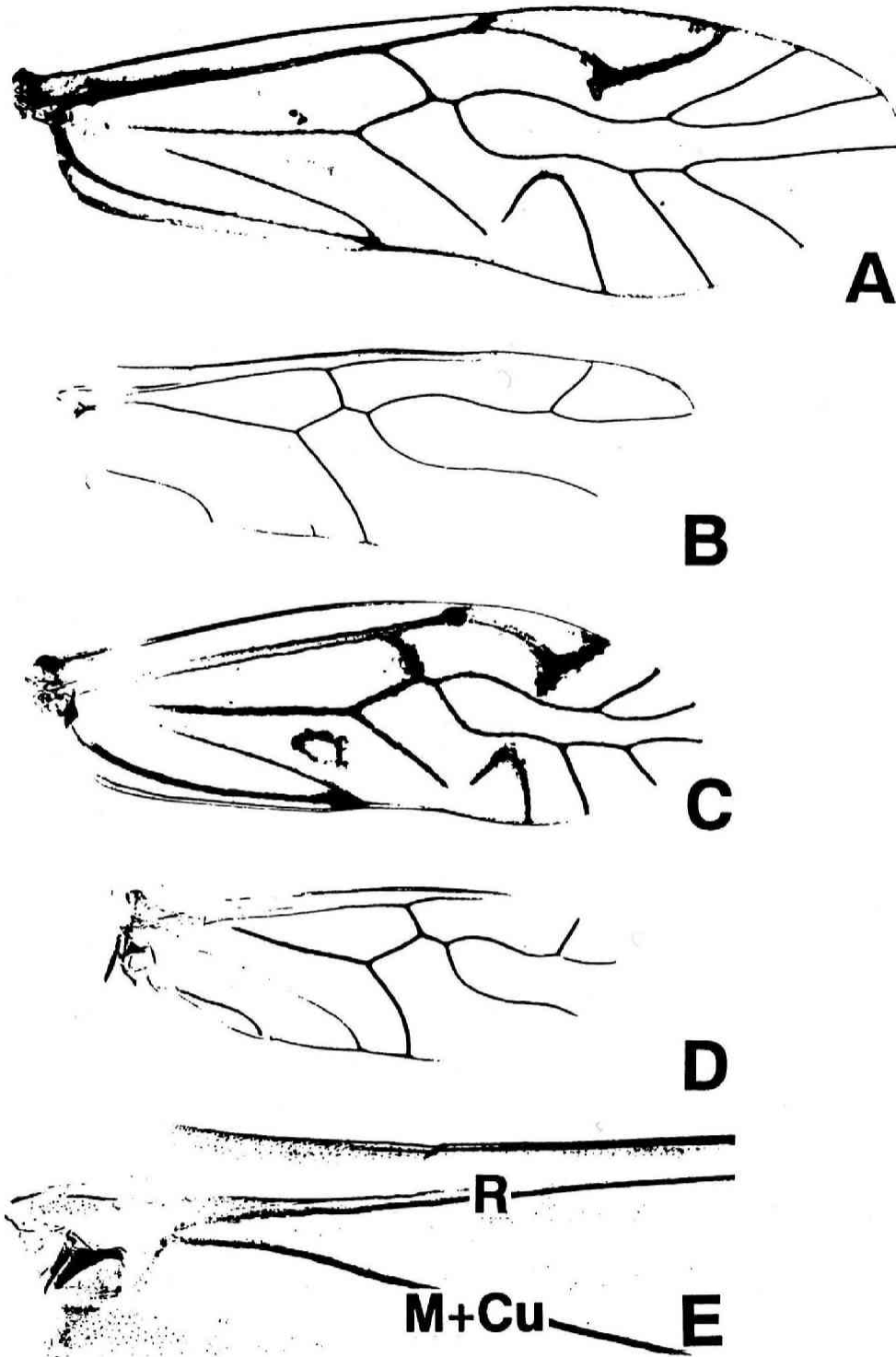


Fig. 2. Wings of *Idatenopsocus orientalis*. A, male forewing; B, ditto, hindwing; C, brachypterous form female forewing; D, ditto, hindwing; E, base of hindwing of male.

tarsomere of hind leg with 26-29 ctenidiobothria. Forewing (Fig. 2A) hyaline, with pale brown markings in basicubital cell, at top of areola postica, and at middle of cell r5; pterostigma white, its distal half with brown posterior margin; veins dark brown, Rs and M fused for a short distance. Hindwing (Fig. 2B) hyaline; veins blackish-brown. Abdomen white in ground color with irregular blackish-brown markings. Genitalia (Fig. 3): Hypandrium widely sclerotized; posterior region strongly curved, and emarginate in posterior aspect (Fig. 3C). Phallosome (Fig. 3D) with a triangular sclerite just dorsal to apex of aedeagus (Fig. 3F), its surface covered with papillae, center of the sclerite with a longitudinal internal ridge; aedeagus strongly pointed at apex in ventral aspect (Fig. 3E), broad and strongly sinuous in lateral aspect; parameres arched in lateral aspect; phallobase pointed anteriorly.

Length (in mm). Body 3.3-3.6; forewing 3.6-3.9; hindwing 2.8-3.1; 1st flagellar segment 0.67-0.71; 2nd flagellar segment 0.60-0.71; hind femur 1.0-1.3; hind tibia 1.9-2.2; hind 1st tarsomere 0.65-0.74; hind 2nd tarsomere 0.09-0.10; hind 3rd tarsomere 0.11-0.12.

Female. Almost as in male, differing in the following features. Paler portion in frons semicircular with a pair of ventral incisions (Fig. 1B). Eye IO/D=1.9. Antenna

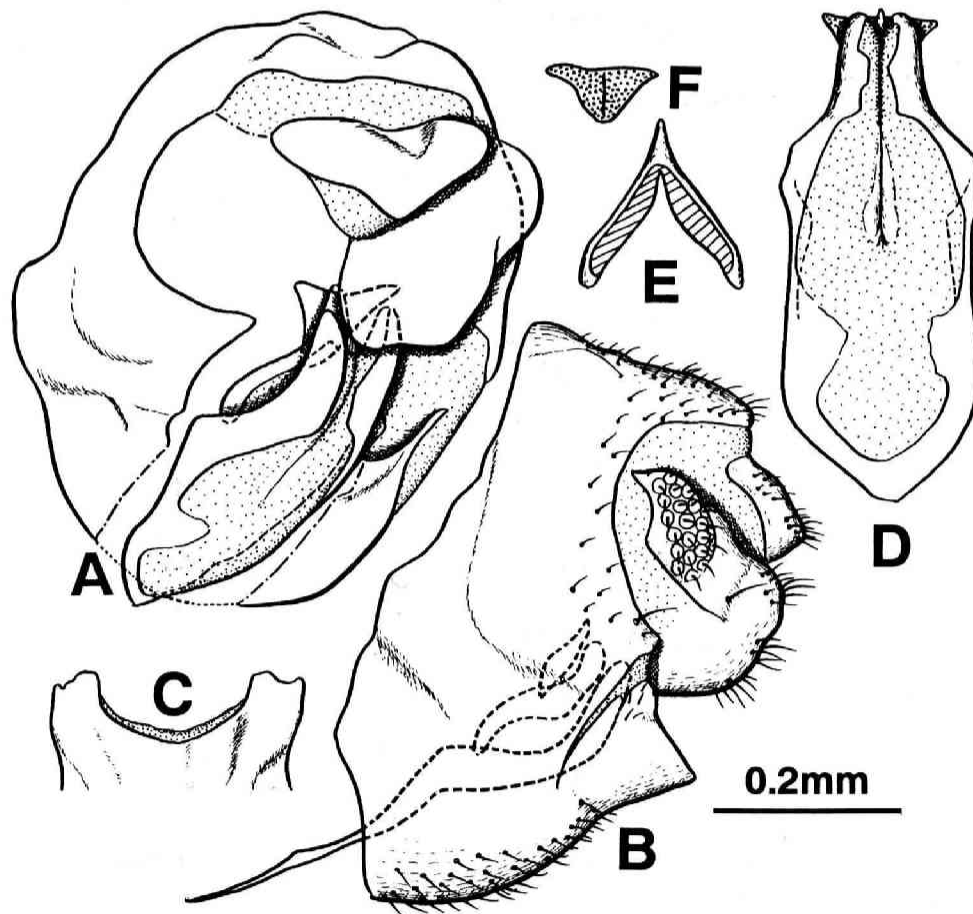


Fig. 3. Male genitalia of *Idatenopsocus orientalis*. A, terminalia, postero-lateral aspect; B, ditto, lateral aspect; C, hypandrium, posterior aspect; D, phallosome, ventral aspect; E, aedeagus, ventral aspect; F, triangular sclerite, ventral aspect.

white except both ends of all flagellar segments black. First tarsomere of hind leg with 25-28 ctenidiobothria. Wing dimorphism present: Macropterous form as in male; forewing of brachypterous form (Fig. 2C) almost the same as that of macropterous form in coloration and branching pattern of veins, except brown marking around proximal section of vein Rs. Hindwing of brachypterous form (Fig. 2D) same as macropterous form in coloration and branching pattern of veins. Genitalia (Fig. 4): Paraproct with large, strongly extended ventral lobe (Fig. 4A). Subgenital plate (Fig. 4B, C): egg guide small, rounded at apex, its neck region narrow and, in lateral aspect, strongly bent; pigmented arms narrow, directed antero-laterally in ventral aspect. Gonapophyses (Fig. 4D, E): Ventral valve relatively short, only weakly broadened apically and with a small apical process. Dorsal valve broad, with a large apical lobe and a small subapical process. External valve small and rounded.

Length (in mm). Body 3.4-4.7; forewing 3.9-4.1 (macropterous form), 2.4-2.9 (brachypterous form); hindwing 2.8-3.1 (macropterous form), 1.6-2.1 (brachypterous

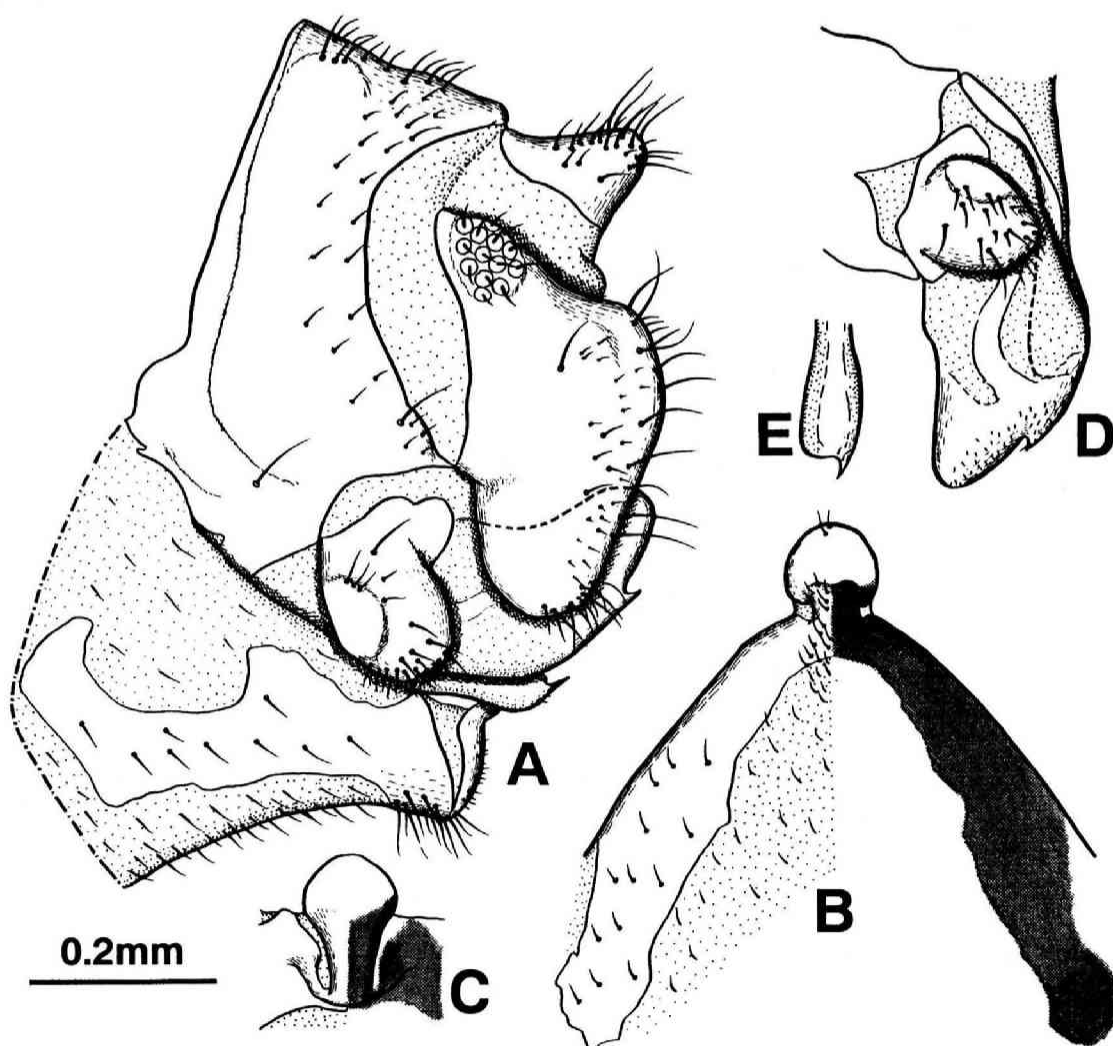


Fig. 4. Female genitalia of *Idatenopsocus orientalis*. A, terminalia, lateral aspect; B, subgenital plate, ventral aspect; C, apex of subgenital plate, posterior aspect; D, gonapophyses, ventro-lateral aspect; E, apex of ventral valve, ventro-lateral aspect.

form); 1st flagellar segment 0.57-0.67; 2nd flagellar segment 0.52-0.55; hind femur 1.1-1.2; hind tibia 2.0-2.1; hind 1st tarsomere 0.65-0.68; hind 2nd tarsomere 0.09-0.10; hind 3rd tarsomere 0.12-0.13.

Specimens examined. [Hokkaido] 8 males, 3 females, Kamishihoro, 26. viii. 1995, K. Yoshizawa (BLKU); 1 male, Jôzankei, 16. viii. 1994, K. Yoshizawa (BLKU); 2 females, Kucchan, 15. viii. 1994, K. Yoshizawa (BLKU); 1 female, Mt. Daisengendake, 19. viii. 1994, K. Yoshizawa (BLKU); 1 male, 2 females, Kikonai, 22. viii. 1994, K. Yoshizawa (BLKU); [Honshu] 1 female, Itsutsuka, Ojiya City, Niigata Prefecture, 22. vii. 1992, K. Yoshizawa (BLKU); 1 male, Tsukuba City, Ibaraki Pref., 7. xi. 1990, R. Tsutsumi (TC); 3 females, Mt. Kiyomizuyama, Kyoto City, Kyoto Pref., 15. xi. 1992, Y. Tomita (TC); 3 males, 2 females, Koyama, Asuka Village, Nara Pref., 4. xii. 1992, Y. Tomita (TC); 1 female, Kusama, Niimi City, Okayama Pref., 4. xi. 1995, R. Matsumoto (BLKU); 11 males, 6 females, Geihoku Town, Hiroshima Pref., 11. vii. 1994, K. Yoshizawa (BLKU); [Kyushu] 1 male, 1 female, chip factory in Hisayama Town, Fukuoka Pref., 16. vi. 1992, T. Nakamura (BLKU); 1 male, same locality, 15. vi. 1994, K. Yoshizawa (BLKU); 23 males, 23 females, same locality, 22. vi. 1994, K. Yoshizawa (BLKU and MHNG); 1 male, 26 females, same locality, 5. vii. 1994, K. Yoshizawa (BLKU).

Distribution. Kunashiritô Is., Hokkaido, Honshu, Kyushu. (Latter three islands representing new records.)

Discussion

Taxonomic treatment of *Idatenopsocus orientalis*.

The type species of the genus, *I. orientalis*, was first described within the genus *Labocoria*. Badonnel and Lienhard (1988) placed it in the genus *Mesopsocus* when they synonymized *Labocoria* with *Mesopsocus* because of their sharing an apomorphic character state, the basal fusion of veins R and M+Cu in the hindwing, and the former genus has no autapomorphy. Stalked eyes, which were regarded as a diagnostic character of *Labocoria* by Enderlein (1910), do not characterize this genus because intermediate forms between normal eyes and stalked ones can be seen in some species of *Mesopsocus*, such as *M. laticeps* (Kolbe, 1880). However, *I. orientalis* differs from the other species of *Mesopsocus*, including those that had been assigned to *Labocoria*, in the following features: 6th flagellar segment of antenna with a small placoid sensillum; pterostigma with hind angle; hindwing vein Sc reduced; hindwing veins R and M+Cu separated from each other basally; phallosome with a triangular sclerite just above apex of aedeagus; egg guide of female subgenital plate small; external valve of gonapophyses small. In *Mesopsocus*, veins R and M+Cu fuse with each other at their bases in the hindwing, and this was regarded as an autapomorphy of the genus by Badonnel and Lienhard (1988). Therefore, *I. orientalis* lacks the autapomorphy of *Mesopsocus*. In contrast, within the family Mesopsocidae, the angled pterostigma and the triangular sclerite in the male phallosome are apomorphic and unique to *I. orientalis*. Judging from these morphological features, this species has to be excluded from *Mesopsocus*. Additionally, the combination of the above-mentioned characters exhibited by *I. orientalis* is not found in any other known genus of the family Mesopsocidae. Thus, this species has to be placed in a new genus, which is described here under the name *Idatenopsocus*. Both the adults and

nymphs of this species often stay under roughly woven webs on tree bark. This behavior is also unique in the family Mesopsocidae.

Phylogenetic position of the genus.

The following discussion is mainly based on the phylogenetic analysis of the family Mesopsocidae made by Badonnel and Lienhard (1988). *Idatenopsocus orientalis* has a distinct neck at the base of the egg guide. This apomorphic character state supports a monophyletic group composed of *Mesopsocidus*, *Mesopsocus*, *Microtrichipsocus*, *Metapsocus*, *Cyrtopsocus*, *Hexacyrtoma*, and *Rhinopsocus*. Additionally, *I. orientalis* has a long anal vein in the hindwing and a thickened wall of the spermathecal sac. These two apomorphic character states support a monophyletic group composed of the aforementioned genera except *Mesopsocidus*. However, *I. orientalis* lacks another synapomorphy which these other genera share, namely, absence of the subapical placoid sensillum on 6th flagellar segment. Furthermore, *I. orientalis* lacks a synapomorphy, neoteny of the female, which is present in the last five of the aforementioned genera. Thus, we consider the genus *Idatenopsocus* as the sister group of a monophyletic group composed of *Mesopsocus*, *Microtrichipsocus*,

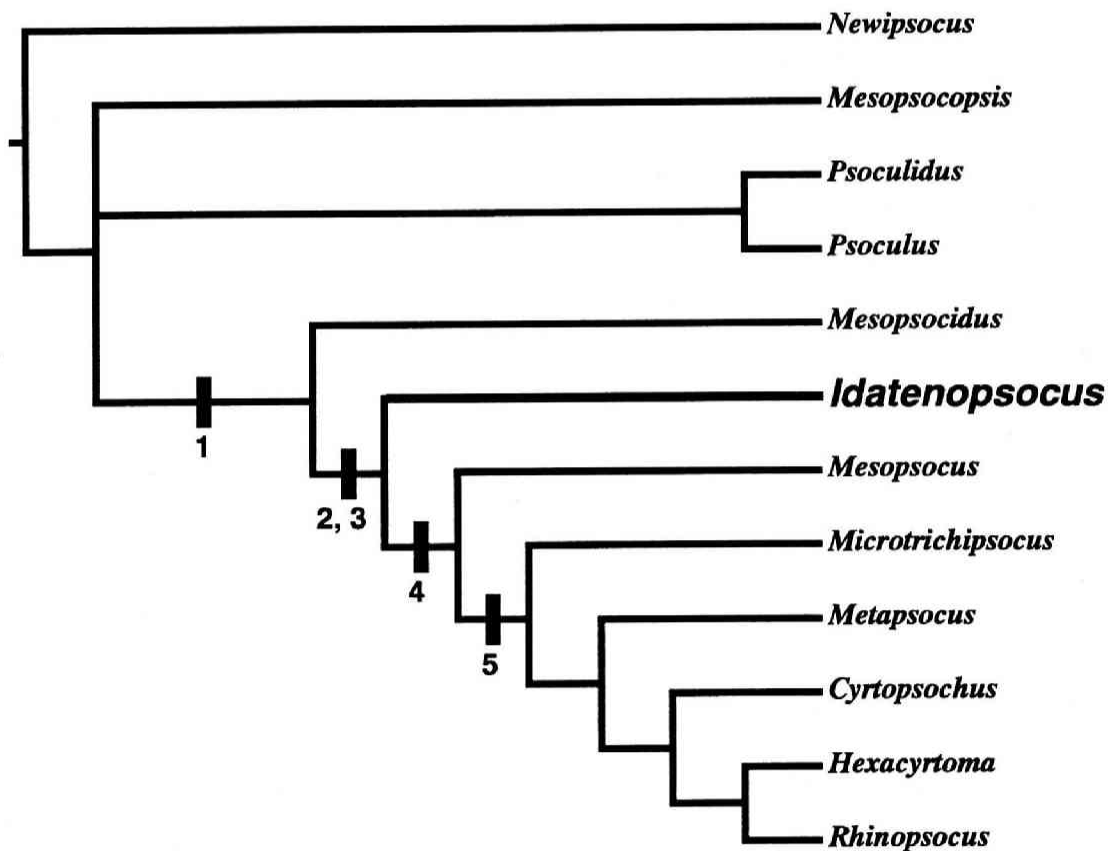


Fig. 5. Inferred phylogenetic position of *Idatenopsocus orientalis* in the family Mesopsocidae. Tree modified from Badonnel and Lienhard (1988). The numbered shaded squares indicate following apomorphic character states: 1, distinct neck at base of egg guide; 2, long anal vein in hindwing; 3, thickened wall of spermathecal sac; 4, loss of subapical placoid sensillum on 6th flagellar segment; 5, neoteny of female.

Metapsocus, *Cyrtopsochus*, *Hexacyrtoma*, and *Rhinopsocus* (Fig. 5).

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