



The genus *Sigmatoneura* Enderlein (Psocoptera: Psocidae), with two new species from China

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Abstract

The genus *Sigmatoneura* Enderlein is reviewed. Two new species, *S. pinbiensis* **sp. nov.** and *S. aquilis* **sp. nov.**, are described from China. The distribution pattern of the 16 Chinese species is discussed briefly, with a distribution map. Identification keys for males and for females of Chinese species are provided.

Key words: Psocoptera, Psocidae, *Sigmatoneura*, new species, China, key

Introduction

The genus *Sigmatoneura* was erected by Enderlein (1908), characterized by R_{4+5} curving back after radial fork so as to approach M and Subcosta meeting Costa in the fore wings of female specimens. The type species *Cerastipsocus subcostalis* Enderlein (Enderlein, 1903) was described on the basis of female specimens, collected at Singapore. Afterward, Smithers (1976) suggested *Psocus filicornis* Enderlein was the male of *Sigmatoneura subcostalis* and treated it as a synonym. In this genus, the fore wing venation and pigmentation are strongly sexually dimorphic: female fore wings usually with brown wash and vein R_{4+5} strongly curving back; male fore wings hyaline and with venation normal. The connection of Cu_{1a} and M is steady in most genera in Psocidae and sometimes considered to be a valuable taxonomic character at genus level. However, it is variable in *Sigmatoneura*, being either fused for a distance, connected by a crossvein, or meeting at a point, and we also found it showed nonidentity on most specimens. Including the following two new species, 27 species are known in the genus distributed in Palearctic, Afrotropic, Oriental and Australasia Regions. Of these, 14 species have been described from China (Banks, 1937; Li, 2002; Li & Yang, 1987, 1988; New, 1991; Okamoto, 1907), and the 11 non-Chinese species are listed in Table 1 (Banks, 1918, 1920; Endang & Thornton, 1992; Endang *et al.*, 2002; New, 1973, 1975; Okamoto, 1907; Smithers, 1960; Smithers & Thornton, 1981; Yoshizawa *et al.*, 2005).

Enderlein (1908) defined the genus based mainly on fore wing venation, and pointed out that the genus was closely related to an American genus *Cerastipsocus* Kolbe. Previously, *Sigmatoneura* was placed in the tribe Cerastipsocini (Roesler, 1944; Smithers, 1972) and even treated as a subgenus of *Cerastipsocus*. Afterwards, *Sigmatoneura* was assigned to the tribe Metylophorini based mainly on the shape of the dorsal valve of female gonapophyses (Smithers, 1990; Lienhard & Smithers, 2002; Yoshizawa *et al.*, 2005). By studying 12 valid species of Chinese *Sigmatoneura*, Li (2002) established the unique subfamily Sigmatoneurinae and divided genus *Sigmatoneura* into two subgenera: *Sigmatoneura* and *Longifolia*. According to the higher level classification of family Psocidae (Yoshizawa & Johnson, 2008), the independent status of *Sigmatoneura* proposed by Li was justified based both on morphology and molecular analysis.

Problems remain with the subgeneric status in *Sigmatoneura*. In Li's system, subgenus *Longifolia* contained five species, characterized by the egg guide of the female subgenital plate being more than twice as long as wide, and the male hypandrium with a short posterior lobe. However, besides the type species *Sigmatoneura (Longifolia) octofasciata*, three of the five species were each described from single female specimens and one was described only from male specimens. A similar situation is found in subgenus *Sigmatoneura*, with only two of the seven spe-