



Pretarsal structures in the family Parastrachiidae (Hemiptera: Heteroptera: Pentatomoidea)

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Parastrachiidae, for a long time regarded as a subfamily within the Cydnidae (e.g., Schaefer *et al.* 1988; Schuh and Slater 1995; Gapud 1991), was raised to family level by Sweet and Schaefer (2002), and this position was then accepted by many heteropterists (e.g., Lis and Heyna 2001; Lis and Schaefer 2005; Hironaka *et al.* 2007; Schaefer and Kikuhara 2007; Lis 2010).

Until not long ago, this taxon (despite its taxonomic, subfamilial or familial, level) included only a single genus, namely *Parastrachia* Scott, with two species, i.e., *P. japonensis* (Scott), and *P. nagaensis* Distant. Recently, a study on the spermathecae of the Cydnidae *sensu lato* and its related families (Pluot-Sigwalt and Lis 2008) showed that the spermatheca of *Parastrachia japonensis* is very similar to that of *Dismegistus sanguineus* de Geer. A close relationship of these genera was also confirmed by results of studies based on their DNA sequences (Grazia *et al.* 2008).

The aim of this paper is to describe the pretarsal structures in species of the genera (*Parastrachia* and *Dismegistus*) included presently in Parastrachiidae, and compare them to those recently described in the Cydnidae *s.l.* (Lis and Ziaja 2010).

Material and methods

The following species were examined using the SEM technique: *Parastrachia nagaensis* Distant, 1908 [Japan], *P. japonensis* (Scott, 1880) [Japan], *Dismegistus binotatus* (Westwood, 1837) [Ethiopia], and *D. fimbriatus* (Thunberg, 1783) [Republic of South Africa]. The SEM micrographs were taken with a Hitachi S-3000N microscope. Morphological nomenclature follows Goel and Schaefer (1970), Weirauch (2005), and Lis and Ziaja (2010). All studied specimens are preserved in the collection of the Department of Biosystematics, Opole University (Poland).

Results and conclusions

The pretarsal structures in the Parastrachiidae are rather uniform. The shape of the *claws* and *parempodia* (*parempodial setae*) are typical pentatomoid: *claws* (Figs 1–4)—slightly flattened, tapering from base to apex, as was already noticed by Grazia *et al.* (2008); *parempodia* (Figs 1, 3–4)—slightly shorter (*Dismegistus*) or longer (*Parastrachia*) than half the length of the claws. The surface of different parts of the claws in all studied species are characteristically reticulated (Figs 1–4; reticulations indicated by arrows); claws reticulated in the same way were recently found in species of *Garsauria* Walker and *Garsauriella* Linnavuori (Cydnidae *s.l.*: Garsauriinae) (Lis and Ziaja 2010).

The *pulvilli* in all studied species of Parastrachiidae are also typically pentatomoid, i.e., they are divided into *basi-* and *distipulvillus* (Figs 1–4). Nevertheless, they are very large and robust, and such a stoutness was not reported for Heteroptera in the past.

The *unguigractor plate* (Figs 4–6) is uniform in structure, as in the Cydnidae *s.l.* (Lis and Ziaja 2010), and in other Heteroptera (e.g., Dashman 1953; Goel and Schaefer 1970; Goel 1972; Vásárhelyi 1986; Hasan and Kitching 1993; Hasan and Nasreen 1994; Gorb 1996; Lis *et al.* 2002; Weirauch 2005). The plate is shield-shaped, clearly tripartite, as was already shown for *Dismegistus sanguineus* de Geer by Hasan and Nasreen (1994); the median *ventral surface* is edged by a pair of *lateral surfaces* (Figs 5–6); its exocuticular layer forms the median and lateral rows of transverse placoid scales, as in the Cydnidae *s.l.* (Lis and Ziaja 2010).