

Taxonomic Discovery in *Cyphalonotus*: Phylogenetic Evidence for an Independent Origin of Extreme Sexual Size Dimorphism in the Araneid Spider *Poltys* †

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Abstract: *Cyphalonotus* is a poorly studied, Old World araneid spider genus whose phylogenetic proximity remains unknown due to the paucity of morphological and molecular data. We here report on a taxonomic and evolutionary research on these spiders with three main objectives: (i) to test the taxonomic composition of *Cyphalonotus*; (ii) to test its phylogenetic placement; and (iii) to place the male and female size variation of *Cyphalonotus* and related genera in an evolutionary context. Our original collection and field observations from Taiwan and China facilitated description of a new and a known species, and newly provided sequence data enable species delimitation, and phylogenetic analyses. The phylogenetic results reject all four classification hypotheses from the literature, and instead recover a well-supported clade *Cyphalonotus* + *Poltys*. We review the male and female size variation in *Cyphalonotus*, *Poltys*, and related genera. These data reveal that all known species of *Poltys* are extremely sexually size dimorphic (eSSD = females over twice the male size) reaching values exceeding 10-fold differences, while *Cyphalonotus* and other genera in their phylogenetic proximity are relatively sexually monomorphic (SSD < 2.0). This confirms an independent origin of eSSD in *Poltys*, one of multiple convergent evolutionary outcomes in orbweb spiders.

Keywords: sexual size dimorphism; eSSD; sexual size monomorphism; Araneidae; orb-web spiders; body size evolution

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