



## A study of the subfamily Archoleptonetinae (Araneae, Leptonetidae) with a review of the morphology and relationships for the Leptonetidae

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## Abstract

Detailed examination of the spinning organs and legs of *Archoleptoneta schusteri* Gertsch (1974) has revealed a cribellum and calamistrum, which represents the discovery of the first cribellate member of the Leptonetidae. Subsequent examination of all other described *Archoleptoneta* species has confirmed the presence of a rectangular colulus similar to other leptonetids. A comparative review of the characters used to support the Leptonetidae is presented, including a discussion of their phylogenetic implications. The distribution of several features of the spinning organs, respiratory system, and genitalia suggests that the phylogenetic position of the Leptonetidae needs to be reevaluated, and makes their position within the Haplogynae uncertain. Illustrations and detailed discussion of characters in the Archoleptonetinae and Leptonetinae are provided. *Archoleptoneta schusteri* Gertsch is redescribed including detailed images of its spinning organs and genitalia. All ecribellate archoleptonetines are transferred to the new genus *Darkoneta* gen. nov. based on the loss of the cribellum, giving the following new combinations: *Darkoneta arganoi* (Brignoli, 1974) comb. nov., *Darkoneta garza* (Gertsch, 1974) comb. nov., *Darkoneta obscura* (Gertsch, 1974) comb. nov., and *Darkoneta stridulans* (Platnick, 1994) comb. nov. Three new species are described: *Archoleptoneta gertschi* **sp. nov.** from Eastern California, *Darkoneta reddelli* **sp. nov.** from Puebla, Mexico, and *Darkoneta quetzal* **sp. nov.** from San Lorenzo, Guatemala. Dichotomous keys are provided with a discussion of problems with the diagnosis of females. Distribution maps for each species are shown with a discussion of areas that require additional sampling in order to resolve species limits.

**Key words:** Spider phylogeny, Haplogynae, cribellum, caves

## Introduction

California is renowned for biodiversity, particularly with respect to its endemic plants and invertebrates (Myers *et al.*, 2000). Several recent studies highlight the evolutionary significance of the Californian spider fauna (Bond *et al.*, 2001; Hedin, 2001; Ramirez & Chi, 2004), which contains a large number of relatively ancient lineages often characterized by morphological homogeneity and the retention of ancestral character states, such as the cribellum. The Californian leptonetid fauna is no exception, and until recently (Ledford, 2004; Ledford *et al.*, 2005), has remained largely unexplored.

In this paper, we report on the discovery of a cribellum in *Archoleptoneta schusteri* Gertsch, a spider from California that is recognized as a basal leptonetid (Brignoli 1979; Gertsch, 1974; Platnick 1986, 1994). The phylogenetic implications of the leptonetid cribellum are addressed in the context of a review of the characters used to support relationships within the Leptonetidae. *Archoleptoneta schusteri* is redescribed including detailed images of its spinning organs and genitalia. We provide detailed discussions of the Archoleptonetinae and Leptonetinae, and illustrate *Leptoneta infuscata* Simon 1872 as an exemplar of the latter subfamily. Ecribellate archoleptonetines are transferred to the new genus *Darkoneta* gen. nov. based on the loss of the cribellum giving the new combinations: *Darkoneta arganoi* (Brignoli, 1974) comb. nov., *Darkoneta garza* (Gertsch, 1974) comb. nov., *Darkoneta obscura* (Gertsch, 1974) comb. nov., and *Darkoneta stridulans* (Platnick, 1994) comb. nov. Three new species are described, *Archoleptoneta gertschi* **sp. nov.** from Eastern California, *Darkoneta reddelli* **sp. nov.** from Puebla, Mexico, and *Darkoneta quetzal* **sp. nov.** from San Lorenzo, Guatemala. Dichotomous keys are provided with a discussion of problems with the diagnosis of females. We also provide distribution maps for each species, highlighting areas that need additional sampling to resolve species limits.

Taxonomic background: Gertsch (1974) revised the North American leptonetids and described the genus *Archoleptoneta* to contain four species diagnosed by having six eyes in a single group (Figs. 7, 13, 25) and characteristics of the male genitalia (Figs. 76–78). Although the genus was only based on symplesiomorphies, he argued that this suite of characters placed *Archoleptoneta* as the sister group of all other leptonetids for which he erected the new subfamily Archoleptonetinae. Platnick (1986) corroborated Gertsch's hypothesis through an examination of the tibial and patellar glands, and described a new species, *Archoleptoneta stridulans*, from Panama (Platnick, 1994). Whereas images of the spinning organs and male genitalia for *A. stridulans* are provided in Platnick (1994), no comparative images for other *Archoleptoneta* species exist aside from the simple line drawings in Gertsch (1974). The small size and delicate nature of *Archoleptoneta*, and