



A new trapdoor spider species from the southern Coast Ranges of California (Mygalomorphae, Antrodiaetidae, *Aliatypus coylei*, sp. nov.), including consideration of mitochondrial phylogeographic structuring

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Abstract

The trapdoor spider genus *Aliatypus* (Araneae, Mygalomorphae, Antrodiaetidae) includes 11 described species, 10 of which are endemic to California. *Aliatypus* species are known from most physiographic provinces in California, with the noticeable absence of described species from the southern Coast Ranges. This paper describes a new species (*Aliatypus coylei*, sp. nov.) that is shown to occur at more than 20 locations, most of which are in the southern Coast Ranges. This species is morphologically most similar to members of the *A. erebus* species group (*A. erebus* Coyle and *A. torridus* Coyle), but males differ from those of these latter species in several features. Female specimens are more difficult to distinguish from *A. erebus* and *A. torridus*, but can be easily separated using DNA characters. Collection of mitochondrial DNA sequence data from 21 sites shows that *A. coylei* is genetically very divergent from all described *Aliatypus* species, and reveals extreme population subdivision across the fragmented southern Coast Range landscape.

Key words: Population subdivision, spermathecal variation, California biodiversity, mygalomorph spider

Introduction

Mygalomorph spiders comprise a distinct clade of the Order Araneae, and include the trapdoor spiders, tarantulas, and kin (Raven 1985, Hedin & Bond 2006). The mygalomorph spider fauna of California is one of the richest in the northern hemisphere, with the highest familial, generic, and species-diversity in the United States. Members of the families Antrodiaetidae (Coyle 1968, 1971, 1974; Coyle & Icenogle 1994; Ramirez & Chi 2004; Starrett & Hedin 2007) and Cyrtauchenidae (Bond *et al.* 2001; Bond & Opell 2002; Stockman & Bond 2007; Bond & Stockman 2008) comprise the great bulk of this species diversity, and both families include genera that have radiated extensively and almost exclusively in California. An example is the antrodiaetid genus *Aliatypus*, which includes eleven described species, ten of which are endemic to California. *Aliatypus* are stocky, medium-sized (6–20 mm) ground-dwelling spiders that cover their burrows with a thin, flap-like trapdoor (Fig. 1A, B). Most species in the genus occur in chaparral or mid-elevation forest habitats, although some species are also found in redwood forest or high-elevation pine forests (Coyle 1974, Coyle & Icenogle 1994).

When Coyle (1974) revised *Aliatypus*, he studied material from most physiographic provinces in California, but had few specimens available from the southern Coast Ranges. These ranges include a relatively low-lying set of north to south trending uplands, occupying a region from the San Francisco Bay south to the confluence with the Transverse Ranges at the southern terminus of the Central Valley (Fig. 1C; Schoenherr 1992). The southern Coast Ranges are bounded on the east by the Central Valley, and extend from here westward to the coast. The present-day highlands are potentially young (~0.4 Ma, Page *et al.* 1998), and the region is still very geologically active, as it is bisected by the San Andreas fault. Older Pliocene seaways also once fragmented the region (Hall 2002; Bowersox 2005). Modern upland habitats are characterized by standard California Floristic Province vegetation, including chaparral, oak woodlands, and limited conifer woodlands. Higher western ranges (e.g., Santa Lucia Range) create a severe rain shadow and correspondingly steep environmental gradient, with desert-like eastern habitats (along the southwestern edge of the Central Valley) much drier than coastal habitats. Many endemic taxa have evolved in this