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Description and Ecology of A New Cavernicolous, Arachnophilous Thread-legged Bug (Hemiptera: Reduviidae: Emesini) from Kartchner Caverns, Cochise County, Arizona

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Abstract

A new cavernicolous, arachnophilous thread-legged bug (*Phasmatocoris labyrinthicus* **sp. nov.**; Reduviidae: Emesini) is described from Kartchner Caverns, a limestone cavern in Kartchner Caverns State Park near Benson, Arizona, USA. Cavernicolous emesines are recorded from caves in many parts of the world and are distributed across several genera, but are generally uncommon. *P. labyrinthicus* shows no obvious troglomorphy but ecological evidence suggests it is, at minimum, a cave-limited troglophile. The species seems to be low-humidity intolerant, due to its occurrence in a cave within a desert region, effectively confines the population to the cave, and the species may thus actually be troglobitic by default. Arachnophily in emesines is more common, including in *Phasmatocoris* Breddin, but has been previously documented in only a single cavernicolous species, *Bagauda cavernicola* Paiva, reported from India, Malaysia and Sri Lanka. However, unlike *P. labyrinthicus*, *B. cavernicola* is apparently not morphologically adapted for its arachnophilous association. *P. labyrinthicus* is the only known troglophilic emesine that is also a morphologically adapted and behaviorally functional arachnophile. The only other known cavernicolous *Phasmatocoris* (*P. xavieri* Gil-Santana, Alves, Barrett and Costa) is recorded from a sandstone cave in Brazil. *P. xavieri* exhibits morphological features indicative of a potentially arachnophilous habit, but its ecology has not been studied. Adults of *P. labyrinthicus* share characteristics with the species *Phasmatocoris praecellens* Bergroth, *P. minor* McAtee and Malloch, *P. xavieri*, *P. spectrum* Breddin, and *P. rapax* McAtee and Malloch. *Phasmatocoris* is primarily a Neotropical genus and the discovery of *P. labyrinthicus* represents a significant range extension for the genus, being the first Nearctic species identified, with its geographically nearest relative an undescribed species from Mazatlan, Mexico, over 1,000 km to the south.

Key words: Heteroptera, Emesinae, new taxon, systematics, *Phasmatocoris*, troglophile, troglobite, arachnophile, behavior, cave

Introduction—Regional Setting

Kartchner Caverns is located within Kartchner Caverns State Park (KCSP) near the town of Benson, Cochise County, Arizona. The Park lies within the Basin and Range Province physiographic region of the western United States. The cave is contained within a grouping of small hills situated low on the east flank of the Whetstone Mountains. The cave is formed in Escabrosa limestone of Mississippian age (Jagnow 1999), and dating of speleothems from the cave provide a minimum age for the cave of nearly 200 ka (Ford and Hill 1999). The collapse-sink entrance of the cave is located on a southeasterly-facing slope at an elevation of 1,428 m. The vegetation community in the area is dominantly the Semidesert Grassland biome (Fig. 1) as described by Brown (1982). Average annual precipitation recorded at the Park over the last 20 years is 30.2 centimeters. Less than two percent of this water potentially reaches the cave through infiltration as autogenic meteoric drip waters (Buecher 1999). Compared with earlier, more mesic (wetter) periods, the geologically recent desertification of the southwestern United States, beginning approximately 12–10 kya years ago (Van Devender 1990), resulted in less precipitation being available for the meteoric recharge and maintenance of humid cave environments. As a result, many caves in the region, particularly those with multiple entrances that permit significant air exchange with the

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