



Nocturnal velvet ant males (Hymenoptera: Mutillidae) of Deep Canyon, California including four new species and a fifth new species from Owens Lake Valley, California

JAMES P. PITTS¹, JOSEPH S. WILSON, KEVIN A. WILLIAMS & NICOLE F. BOEHME

Department of Biology, Utah State University, 5305 Old Main Hill, Logan, UT 84322

¹Corresponding author. E-mail: jpitts@biology.usu.edu

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Abstract

The diversity of nocturnal velvet ants (Hymenoptera: Mutillidae) at the Philip L. Boyd Deep Canyon Desert Research Center of southern California is investigated. Thirty-five species are found to inhabit areas on and around the canyon. *Odontophotopsis hammetti*, *Sphaerophthalma chandleri*, *S. fergusonii*, and *S. mankelli* are described as **new species**. *Odontophotopsis hammetti* and *S. mankelli* are only known from Deep Canyon. *Sphaerophthalma chandleri* and *S. fergusonii* also are known from Painted Canyon located in the Mecca Hills on east the side of the Coachella Valley and from Corn Springs located east of the Coachella Valley in the Chuckwalla Mountains, respectively. The females of too few of the species are known, so only the males are treated. A key is provided for the males. A new species-group, the *S. fergusonii* species-group is described to house *S. fergusonii* and the **new species** *S. arnalduri*, which is an apterous male described from Owens Lake Valley. Similarities between the fauna of Deep Canyon and the Algodones Sand Dunes are discussed.

Key words: ITS1, ITS2, Sphaerophthalminae, solitary wasp

Introduction

Philip L. Boyd Deep Canyon Desert Research Center, University of California, Riverside, is a 6,100 acre desert canyon and flood plain 25 miles southeast of Palm Springs, California, located in the Coachella Valley of the western Sonoran Desert (Wheeler & Wheeler 1973). This research center is home to nine amphibians, 45 reptiles, 48 mammals, more than 650 species of plants, and countless numbers of insect species. A study of ants alone reviewed 59 species (Wheeler & Wheeler 1973).

A cursory study of specimens of nocturnal velvet ants (Hymenoptera: Mutillidae) from Deep Canyon on loan from the UCR Entomological Teaching and Research Collection, University of California, Riverside, California, revealed 35 species of which four were new to science. The purpose of this study is to describe these new species and to provide a means for future entomologists to identify the nocturnal velvet ants of Deep Canyon. One of the new species is likely the sister species of another undescribed species only known from Owens Lake Valley, California. This Owens Lake Valley species also is described here and a new species-group is designated for these two species.

Lastly, Pitts *et al.* (2009) treated the nocturnal velvet ants species that are found on the Algodones Sand Dunes near Glamis, California. The Algodones Sand Dunes are approximately 90 miles southeast of Deep Canyon and are also in the Coachella Valley of the western Sonoran Desert. We compare the nocturnal mutillid fauna found at each of these sites.

Material and methods

During the summers of 2005–2008, field studies were conducted throughout the Southwestern US to collect fresh specimens of both sexes of nocturnal velvet ants to associate using molecular techniques in the lab. Male and female nocturnal mutillids were collected at 60 field sites, including Owens Lake Valley and Boyd Deep Canyon Desert Research Center near Palm Springs, California, which we will refer to as Deep Canyon throughout this study.

Our collecting was limited to a few locations on two separate dates, the latter half of May and the last week of July 2007. Specimens were collected using black light traps, fluorescent lantern traps, and by hand. Specimens collected with light traps were captured in soapy water and were transferred into 95% ethanol, while all hand-collected specimens were placed directly into 95% ethanol for any subsequent molecular studies. A total of 292 specimens were collected.