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*Florida State Collection of Arthropods*

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A new species of cave inhabiting *Scotoleon* Banks from Baja California  
(Neuroptera: Myrmeleontidae: Brachynemurini)

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A new species of cave inhabiting *Scotoleon* Banks from Baja California  
(Neuroptera: Myrmeleontidae: Brachynemurini)

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**Abstract.** A new species, *Scotoleon stangei* (Neuroptera: Myrmeleontidae: Brachynemurini), is described; it represents the first known species of *Scotoleon* Banks in which the larva inhabits the dark zone of caves. Descriptions are given of the adult, larva, and larval habitat.

**Resumen.** Se describe una nueva especie, *Scotoleon stangei* (Neuroptera: Myrmeleontidae: Brachynemurini), que representa la primera especie de *Scotoleon* Banks que vive en la oscuridad de las cuevas. También, se describe el adulto y la larva además detalles sobre el ambiente larval.

### Introduction

A new species of *Scotoleon* Banks is described from adults reared from larvae collected in the dark zone of a small cave in Baja California. Descriptions are given for the larval habitat, larva, adult, and biology. The larvae were co-existing in the same cave with larvae of *Eremoleon pallens* Banks, but in different micro-habitats. The ocelli of both species of larvae are all transparent, which is typical for larvae living in light deprived areas such as caves or animal burrows, or larvae only surfacing at night after deep diurnal burial.

### Materials and Methods

Larvae were collected with a sieve and shovel from material on the floor of a small cave. Larvae were reared in six-dram snap cap vials containing sand and fed *Ephestia kuehniella* Zeller larvae. Black and white photographs were taken with Fuji Microfilm using a long bellows and multiple flashes. Color photos were taken with an Auto Montage and enhanced in contrast using the Picasa computer program to further delineate structures, especially those associated with the male genitalia.

### Depository

FSCA – Florida State Collection of Arthropods, Gainesville, Florida, U.S.A.

### *Scotoleon stangei* Miller, new species

Fig. 1–10.

**Holotype male.** “MEXICO: Baja California, / 22 miles south Mulege, VI.21.1983, / cave, R. Miller and L. Stange (FSCA)”. Specimen undissected, with #2 gelatin capsule on pin containing cocoon, myconium pellet, pupal skin, and third instar skin.

**Measurements.** Length to apex of tergite IX about 28 mm; wingspan of forewing 45 mm; wingspan of hind wing 42 mm; forewing length 22 mm.; forewing width 6.5 mm; hindwing length 21 mm; hindwing width 5.5 mm; general coloration pale brown, abdomen banded.

**Description.** Holotype male. **Coloration.** General coloration pale brown (Fig. 5); abdomen banded; wing markings brown; scapes pale posteriorly, inner anterior lateral areas of basal one half of scapes dark with narrow dark band toward outer lateral face; pedicel pale, with honey colored apical band; interantennal mark continuous with darker epicranial mark above, below, emarginate with narrow

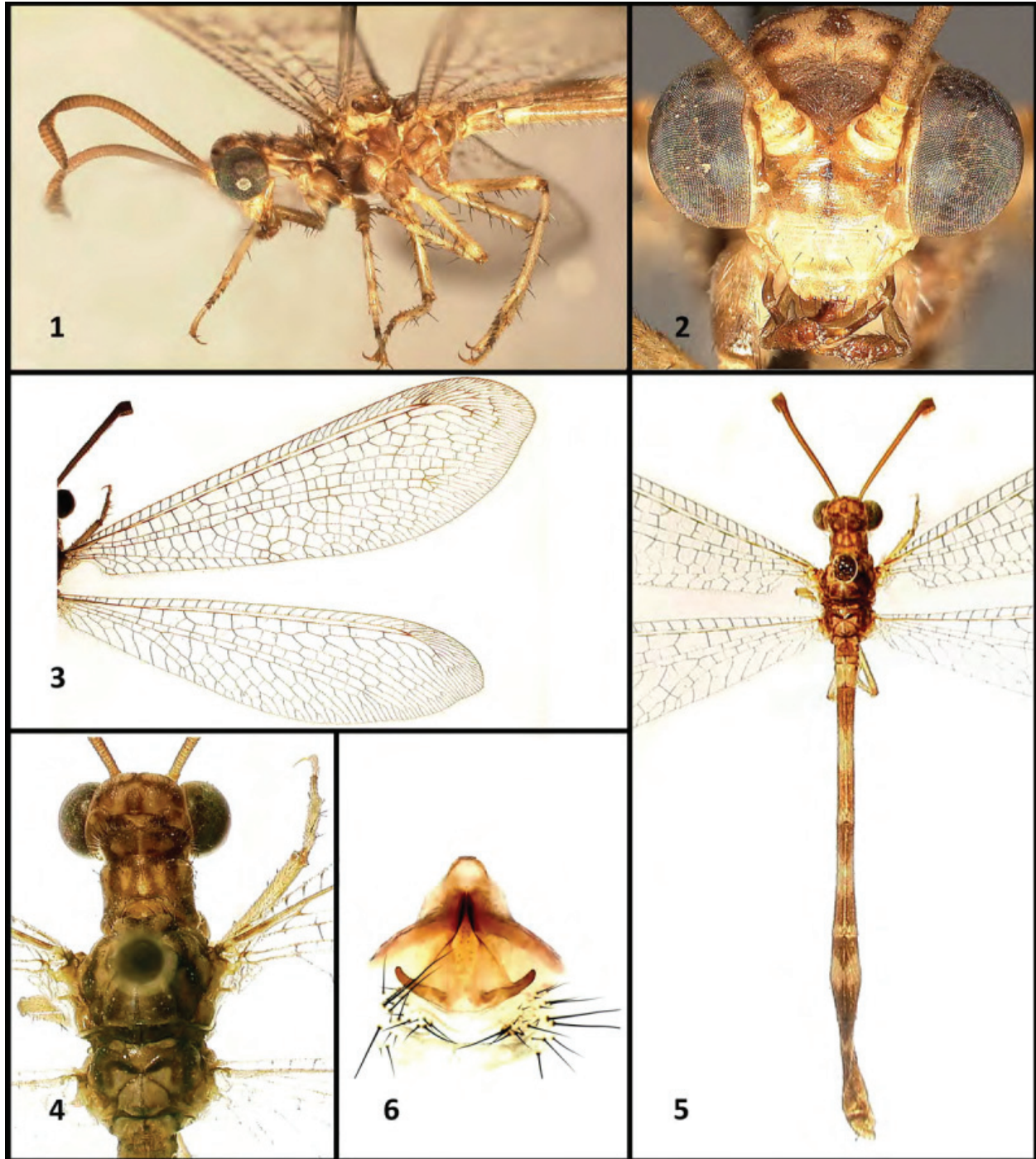
median extension toward clypeus; vertex with anterior row a lateral dash and a median spot which is extended to middle where it flares out and connects to posterior lateral marks (Fig. 4); posteriorly, a triangular dark median mark; pronotum (Fig. 4) with sublateral and submedian stripes connected anteriorly, posteriorly, and at furrow; lateral stripes present; mesoscutellum with a pair of dark spots anteriorly, and a pair of laterally pointing bands beginning submedially and terminating in dark spots in the posterior corners; abdomen banded dorsally (Fig. 5); forecoxae and midcoxae with inner faces pale and outer faces light brown; hindcoxae entirely dark; forefemur with light dorsal stripe, light ventral stripe, and brown apical band; midfemur with ventral stripes and apical band; hindfemur with lateral stripe and apical band; foretibia and midtibia with basal bands, subapical spot, and tiny apical spot; hindtibia banded basally with dorsal subbasal spot and small apical spot; tarsomeres one, two, and five pale, and tarsomeres three and four dark brown on all legs; forewing (Fig. 3) longitudinal veins alternately dark and pale; presectoral crossveins alternately dark and pale; all other crossveins irregularly dark and pale; forewing marked with cloudy brown areas in mediocubital area at rhexma, intersection of hindwing margin and CuP+1A, half way between, and a fourth clouded area at stigma; hindwing with longitudinal and crossveins irregularly dark and pale. **Chaetotaxy.** Pronotum with black or white short stout setae in combination anteriorly, posteriorly, laterally, and along furrow; remainder of body with very small setae; femora with black setae on posterior faces; tibia with black setae longer than width of tibia; forecoxa with fine short black setae; midcoxa and hindcoxa with tiny white setae; forefemoral sense hair a little longer than femoral diameter at origin of sense hair; midfemoral sense hair absent. **Structure.** Ocular width  $2/3$  interocular distance; antenna with about 50 flagellomeres; third flagellomere longer than wide, all others much wider than long; labial palpus short, combined palpomere lengths no longer than greatest head width, distal palpomere moderately swollen, about equal in length to second palpomere (Fig. 2); posterior vein of hindwing not swollen near base, about equal to or smaller than corresponding area of forewing; male without pilula axillaris; posterior area of hindwing twice as wide before medial fork as corresponding area of forewing; presectoral area of forewing with seven cross veins; pretarsal claws not capable of folding against distal tarsomere; basitarsus of all legs twice as long as wide and equal in length to tibial spurs (Fig. 1); abdomen barely extends beyond wings in repose; eighth abdominal segment as long as high; postventral lobe of ectoproct about as long as greatest width, less than one-half length of eighth abdominal segment. **Male genitalia.** Gonarcus with evident medioapical lip; gonarcus not twisted apically; mediuncus high and broad; parameres as in (Fig. 6); setae between parameres very small.

**Larva.** (Fig. 7–10). **Coloration.** Background color dorsally pale with pale brown markings on abdomen and thorax, darker brown markings on dorsal head; ventral head unmarked; pale indistinct brown color pattern on ventral abdomen (Fig. 10); all setae black; all ocelli clear and not pigmented in living specimens. **Structure.** Mandible, measured from tip to where it passes beneath dorsal head capsule, a little shorter than ventral head capsule measured at midline; larva without obvious abdominal or mesothoracic spiracles; eighth sternite without odontoid processes. **Chaetotaxy.** All setae on larva simple; two or three setae present between basal and middle mandibular tooth; seven to nine stout setae on inner mandible between first tooth and mandibular base shorter than one half width of mandible; dorsal surface of mandible without setae; setae on outer lateral edge of mandible present all the way to third tooth; 4 digging setae on rastrum of medium length, very thick, and similar in length; rastrum heavily sclerotized and black (Fig. 9).

**Biology.** The larvae were found in a dark recess, at the back of a small volcanic cave (26° 39' 54" N, 111° 53' 40" W), in coarse decomposed volcanic rock soil in close proximity to deposits of decomposed bat guano. Many larvae of Dermestidae were present and provided a possible food source. The larval *Scotoleon* occupied a separate larval substrate from that of the *Eremoleon pallens* larvae also inhabiting the totally dark zone of the cave, but which were in the loose organic matter, and were therefore coexisting in the cave apparently without competing with the *Eremoleon* species for living space or food.

*Scotoleon stangei* larvae have heavy, highly sclerotized, digging setae (Fig. 9) similar to *Scotoleon* species specialized to live only in coarse, dense, water deposited sands. They are fast diggers, and drag their prey underground to disable them. Larvae were collected as third instars and emerged, after about 30 days, as adults in early August 1983.

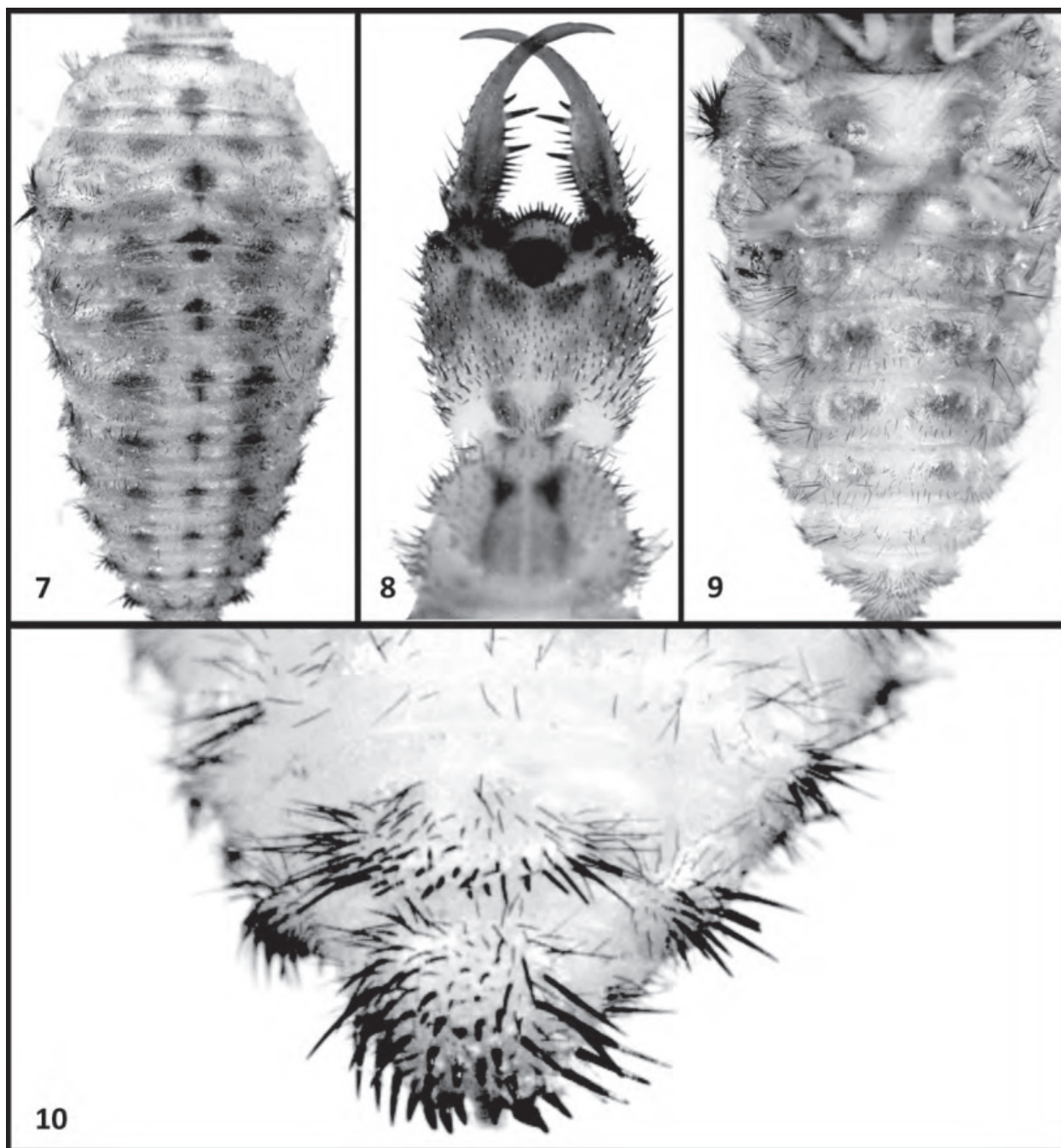




**Figures 1–6.** *Scotoleon stangei* Miller; (1) lateral view; (2) face; (3) wings; (4) dorsal head and thorax; (5) whole body; (6) genitalia.

**Paratype.** 1 male. “MEXICO: Baja California, / 22 miles south Mulege, VI.21.1983, / cave, R. Miller and L. Stange (FSCA)”. Pin has #2 gelatin capsule containing cocoon, myconium pellet, pupal skin, and third instar skin above a genitalia microvial containing genitalia and glycerine.

**Diagnosis.** The broad hindwing area before the medial fork and lack of odontoid processes ventrally on the larval eighth sternite clearly place this species in the genus *Scotoleon* Banks. This species requires altering somewhat the generic keys to the Brachynemurini by Stange (1970, 1994, 2004), due to the



**Figures 7–10.** *Scotoleon stangei* Miller larva; (7) dorsal abdomen and thorax; (8) dorsal head and prothorax; (9) ventral abdomen; (10) digging setae.

presence of a postventral lobe as wide as long, but this is a minor divergence. Superficially, it resembles *Scotoleon eiseni* Banks due to the banded abdomen, but lacks the enlargement of the hindwing posterior vein found in *S. eiseni*, lacks a midfemoral sense hair, possesses the shortest known postventral lobe in the genus, and the banding on the abdomen is of a different pattern. This is the only species of *Scotoleon* where the larva is known to live within the dark zone of caves and has all clear ocelli. The genitalia are similar to that of *S. eiseni* in having a high mediuncus and medioapical lip on the gonarcus, but different in having an untwisted gonarcus, broader mediuncus, and much smaller setae between the parameres. Larvae of the two species differ in color pattern, but are structurally similar, equipping them for life in coarse dense material. Larvae of *Scotoleon eiseni* (Banks) are restricted to well exposed

water deposited sands. Hopefully, further collecting will produce females of *S. stangei* for study. This species has only been found as larvae at one locality on one occasion.

**Etymology.** This species is named for Lionel Alvin Stange in recognition of his contributions to the study of Myrmeleontidae.

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### Literature Cited

- Stange, L. A. 1970.** Revision of the ant-lion tribe Brachynemurini of North America. University of California Publications in Entomology 55: 1–192.
- Stange, L. A. 1994.** Reclassification of the New World antlion genera formerly included in the tribe Brachynemurini. Insecta Mundi 8: 67–119.
- Stange, L. A. 2004.** A systematic catalog, bibliography and classification of the world antlions (Insecta: Neuroptera: Myrmeleontidae). Memoirs of the American Entomological Institute 74: 1–565.

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