



A new species of *Paranthaclisis* Banks (Neuroptera, Myrmeleontidae) from the Peninsula of Baja California, Mexico

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ABSTRACT

Paranthaclisis stangei Marquez, Martins, and Contreras, sp. n., is a new myrmeleontid from Baja California Sur state, Baja California Peninsula, Mexico, which is an important area of endemism. After this new discovery, the genus *Paranthaclisis* is composed by five species, three occurring in Mexico. This new species is easily identified by a rostrum completely yellowish-white, an area of pre-origin of RP with spurial vein on hindwing and with marks; males are easily separated by the conspicuous posterior thinning of the parameres and mediuncus dorsally without teeth and a basomedial split.

Introduction

Paranthaclisis Banks is a myrmeleontid genus with four species distributed in the western and southern United States and northern Mexico, of which only two are recorded in the latter country (Table 1) (Stange, 2004; Diehl, 2012). Currently, *Paranthaclisis* is included within the tribe Acanthaclisini, of which only two genera have been recorded in the New World, *Paranthaclisis* Banks and *Vella* Navás (Machado et al., 2018). Both genera may be distinguished by larval and adult characters (Stange and Miller, 1985 and 2012; Diehl, 2012); larvae of *Paranthaclisis* bear a single tooth in the mandible, while *Vella* larvae have three teeth. Adults of the former genus have tibial spurs bent almost at right angles and tarsal claws are curved, whereas *Vella* species have tibial spurs moderately curved at the end and tarsal claws arched (Stange 1970; Stange and Miller, 1985; Diehl, 2012). Males of *Paranthaclisis* have the lateral processes of the gonarcus reduced and thickened, while *Vella* representatives have these processes elongated and narrow. Females may be identified by characters of venation, coloration, and setal function.

Species of *Paranthaclisis* appear to be associated with arid or semi-desert environments and even coastal dunes and can withstand low temperatures (Stange and Miller, 1985; Diehl, 2012). Larvae do not construct drop traps but inhabit areas with deep sand where they hunt surface-transiting prey (Stange and Miller, 1985; Diehl, 2012). As larvae, they may feed on small caterpillars and can move back and forth, these movements are noticeable during the capture of prey (Stange, 1970; Stange and Miller, 1985; Diehl, 2012). Adults are attracted to light, have a strong and robust flight, and may feed on plant products (Stange and Miller, 1985; Diehl, 2012). Stange and Miller (1985) provided several data on egg laying and morphology, as well as larval development, and Stange and Miller (2012) and Diehl (2012) treated the four species of *Paranthaclisis* taxonomically. Recently, in a scientific expedition to study Neuropterida from the Baja California Peninsula, Mexico, a new species of this genus was discovered – *Paranthaclisis stangei* Marquez, Martins, and Contreras, sp. n. – from Baja California Sur, which herein we describe; an updated key for the species of the genus is provided.

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Table 1
Species distribution of the genus *Paranthaclisis* Banks (after Diehl, 2012; Stange, 2004; Stange and Miller, 2012; provinces after Escalante et al., 2021).

Species	Distribution	Biogeographic provinces
<i>Paranthaclisis congener</i> (Hagen, 1861)	Mexico (Baja California Sur); western United States	Oregonian, Californian, Montanian, Palusian, Artemisian, Coloradan, Navahonian, Sonoran, Chihuahuan, Baja Californian
<i>Paranthaclisis floridensis</i> Stange and Miller, 2012	United States (Florida)	Austroriparian
<i>Paranthaclisis hageni</i> (Banks, 1899)	Mexico (widespread); United States (Arizona, Kansas, Nuevo Mexico, Texas)	Californian, Palusian, Coloradan, Kansas, Navahonian, Chihuahuan, Baja Californian, Illinoian, Texan
<i>Paranthaclisis nevadensis</i> Banks, 1939	United States (California, Nevada)	Californian, Artemisian, Mohavian, Sonoran
<i>Paranthaclisis stangei</i> , new species	Mexico (Baja California, Baja California Sur)	Baja Californian

Materials and methods

A total of 19 specimens of the new species were collected during August and September 2021, in the Baja California Peninsula, Mexico. The specimens were captured on light traps with mercury vapor, metallic additives, and UV lights. Insects were transported in 80% ethylic alcohol and then stored pinned. To study the genitalia morphology the last three abdominal segments were removed and rinsed for 15 minutes in 10% potassium hydroxide (KOH); rinsed with distilled water and, posteriorly stored in microvials with glycerin which were pinned with the respective specimens. All specimens were pinned and their genitalia were dissected.

Habit photographs were taken with a Canon EOS REBEL T7 camera and a 50mm lens, mounted on a copy stand. Genitalia observations were made under a Carl Zeiss Discovery V8 stereomicroscope and images of terminal abdominal structures were taken with a Carl Zeiss AxioZoom V16 stereomicroscope with stacking system. Holotype and paratypes were deposited in Colección Nacional de Insectos of the Instituto de Biología, Universidad Nacional Autónoma de México (CNIN), except one male and one female paratypes deposited at the National Museum of Natural History, Smithsonian Institution, Washington D. C. (NMNH). Specimens of *Paranthaclisis congener*, *P. hageni* and *P. nevadensis* belonging to the California Academy of Sciences (CAS) were studied. The information on the material examined for these specimens is presented as Supplementary material. Regarding *Paranthaclisis floridensis*, the information herein used is based on the original description (Stange and Miller, 2012) and the taxonomic revision made by B. Diehl (2012).

The morphological terminology follows Stange (1970) for genital structures, and Breitzkreuz et al. (2017) for wing venation. It is important to highlight that Stange (2004), the master's thesis of Benjamin Diehl (2012), Stange and Miller (2012), and the Lacewing Digital Library (Oswald, 2021) helped to confidently propose this new species.

Results

Taxonomy

Paranthaclisis Banks

Paranthaclisis Banks, 1907: 275. Type species. *Acanthaclisis congener* Hagen, 1861 by subsequent designation of Banks, 1927: 80 as "*Paranthaclisis congener* (Hagen, 1861)".

Included species: *Paranthaclisis congener* (Hagen, 1861); *Paranthaclisis floridensis* Stange and Miller, 2012; *Paranthaclisis hageni* (Banks, 1899); *Paranthaclisis nevadensis* Banks, 1939; *Paranthaclisis stangei* Marquez, Martins and Contreras, sp. n.

Paranthaclisis stangei Marquez, Martins & Contreras, sp. n.

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Etyymology. We are glad to name this new species after Dr. Lionel A. Stange (*in memoriam*) of the Florida State Collection of Arthropods, as homage to his bright career of research in insects, especially Myrmeleontidae. Lionel helped all of us with Myrmeleontidae doubts and kindly supported YML during her visit to the Florida State Collection of Arthropods in 2019.

Diagnosis. Head mostly yellowish-white with black marks, especially on vertex, antenna yellowish-white with black rings on flagellomeres (Figs. 1C, D). Thorax dark brown, covered by long setae in white or black color, presenting some yellowish spots on dorsal sclerites, scutellum yellow with dark margin and a middle diffuse line brown, pronotum dark brown with two small circular yellow marks on the anterior part, one lateral yellow stripe near lateral margins small (Figs. 1B, C). Male without eversible sacs between segments VI and VII of abdomen; lateral processes of the gonarcus directed laterally, broad and short, and sclerotized as gonarcus; mediuncus without dorsobasal split and without teeth on dorsal surface; parameres with a distal thinning, giving the appearance of being almost disconnected from their hooks, slightly curved dorsally (Figs. 2D, E); hooks of parameres superacute and more sclerotized than basal part (Figs. 2F, G).

Description. Measurements. Forewing length: 29.65–33.08 mm, width: 7.5–8.06 mm, body length: 22.51–24.97 (n=19).

Body color pattern (Figs. 1A, B, C). Dark brown with some yellowish marks on dorsal sclerites; rostrum completely yellowish-white; wing venation alternating black and white.

Head (Figs. 1C, D). Mostly yellowish-white, with shiny black marks. Gray eye and white ocular rim, without setae. Vertex white, covered with short white setae, bearing a complex of black marks, composed by: (1) a broad transverse stripe near the base of scape, (2) one pair of "L" shape marks, with their base located at median region of vertex and disconnected, (3) one pair of semicircular marks located between vertex and eyes, (4) a narrow transverse stripe located at head base, near pronotum. Antennae clavate, mostly yellowish-white; scape trapezoidal, with several white setae; pedicel rectangular, with short setae; flagellomeres have a black ring at their base, covered with rings of tiny black setae, basal flagellomeres are narrower – nearly twice as wide as long – getting thicker towards the apex of the antenna, where they are eight times as wide as long. Rostrum yellowish-white, with many elongated, yellowish setae. mandible elongated, amber; maxillary palpi yellowish-white, with small pale setae; labial palpi yellowish-white, covered with small dark setae, apical palpomere brown.

Thorax (Figs. 1A, B, D). Dark brown with pale yellow marks, especially on the wings base, covered by long setae in white or black

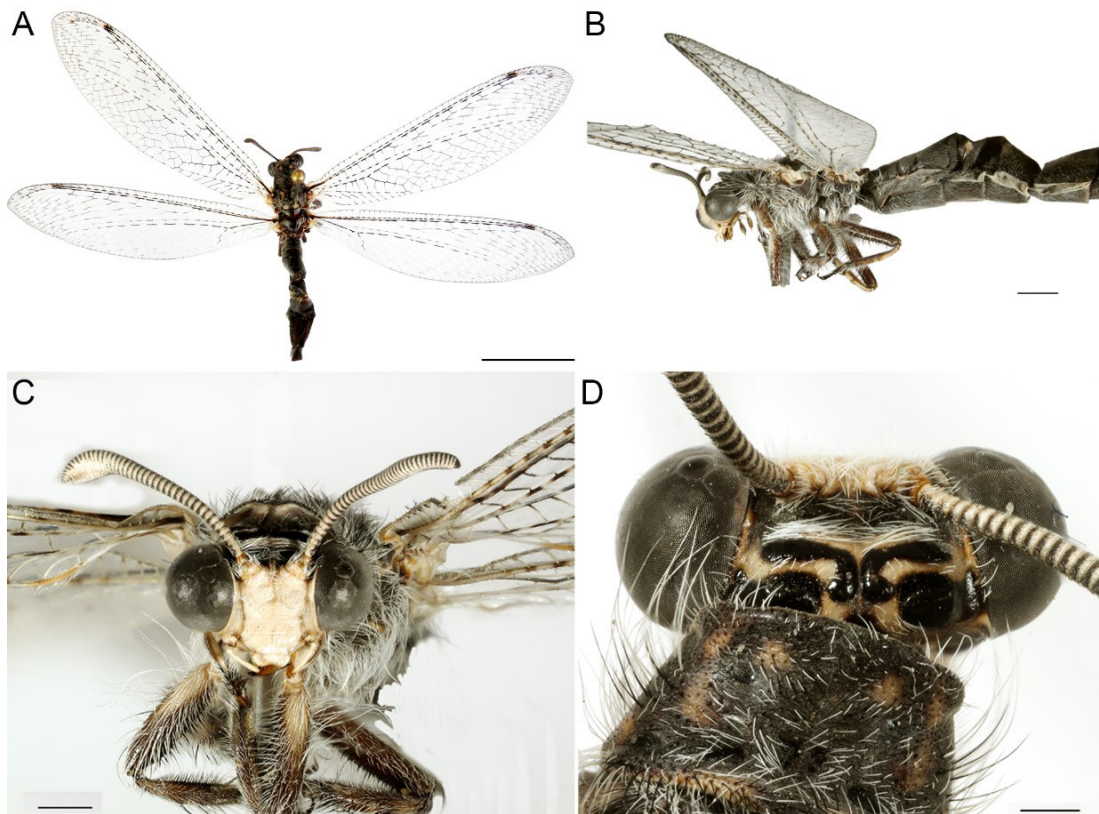


Figure 1 *Paranthaclisis stangei*, sp. n., male holotype. A) Habitus, dorsal; B) Habitus, lateral; C) Head, frontal; D) Vertex, dorsal. Scale bar, habitus = 1 cm; habitus, lateral = 2 mm; rostrum = 1mm; vertex = 0.5 mm.

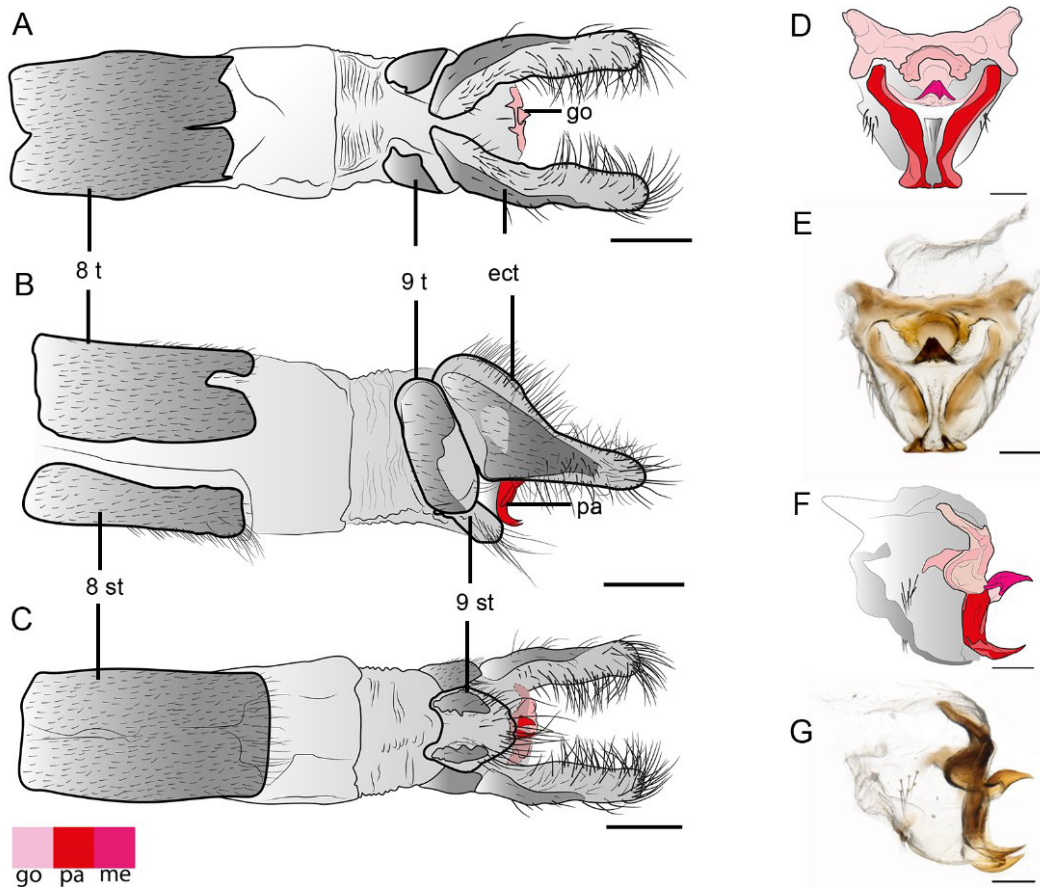


Figure 2 *Paranthaclisis stangei*, sp. n., male. A-C) Genitalia in dorsal, lateral and ventral views; D-E) Gonarcus-parameres complex, caudal; F-G) Gonarcus-parameres complex, lateral. Abbreviations: ect = ectoproct, go = gonarcus, me = mediuncus, pa = parameres, st = sternite, t = tergite. Scale bar, genitalia = 1 mm; gonarcus-parameres complex = 0.5 mm.

color; ventrally dark brown colored. Pronotum dark brown with two small circular yellow marks on the anterior part, one lateral yellow stripe near lateral margins; mesonotum dark brown, mesoscutellum yellow with a middle black spot, posterior margin black and thick; metanotum dark brown, without pale marks. Pteropleura dark brown bearing a large number of long white setae.

Legs (Figs. 1B, C). Mainly dark brown, covered by a dense layer of white or black colored long setae; coxae yellow; femur and tibia long, with a yellow ellipse mark at base of tibia, tibial spurs blackish to dark brown; tarsomeres, especially the apical ones black; claw and spur dark brown.

Wings (Figs. 1A, B and 3A, B). Membrane hyaline; wing venation with an irregular pigmentation pattern, alternating brown and pale yellow, highly setose. Forewing. Slightly longer than the hindwing. Costal field narrow, with more than 45 simple crossveins. Pterostigma conspicuous, with nine crossveins and circular brown mark at basal part. Sc running parallel to RA until their apex fuse before the wing apex. Subcostal field regular, without crossveins. Basal area of pre-origins of RP with eight crossveins. RP originating on the basal 1/3 of the wing length, with 11 branches and several crossveins, including gradates. Radial field with 11 crossveins and elongated apical cell. MA simple, meeting the wing margin at 3/4 of the wing length. MP fused with main branch of CuA; MP with nine branches, CuA with five branches totalizing 14 branches. Cubital field located at wing base, with triangular shape and nine cells. Main branch of CuP straight meeting the wing margin at 1/4 of the wing length, with seven simple branches. Anal vein with three simple branches. Hindwing as forewing, with spurial vein connecting two crossveins on the area of the pre-origins of RP. RP with 10 branches. MP with nine branches. CuA with four branches. Cubital area narrower, with five cells. CuP meeting the wing margin at 1/5 of the wing length,

with four branches. Anal vein with two branches. Presence of pillula axilaris, brown, semicircular and rounded by setae.

Abdomen (Fig. 1B). Mostly dark brown with pleural area pale and thin yellow bands at the end of each segment; intersegmental membrane pale yellow. Male without eversible sac between segments VI-VII. Female abdomen broader and longer than male.

Male (Figs. 2A-G). Eighth tergite rectangular, sclerotized, with small black setae, posterior margin with two pale spots. Eighth sternite rectangular, sclerotized, with a pale midline, bearing several setae, which become longer towards the posterior margin. Ninth tergite divided dorsally compounding two separated semirectangular and irregular plates, bearing few thin and yellow setae. Ninth sternite reduced, subtriangular, with distal margin convex and two elongate spots on lateral margins, basally with thin and short setae and apically with long, thicker setae. Ectoproct tubular, subtriangular in lateral view; posterior lobe well-developed, almost as long as the ninth tergite, sclerotized and ventrally with a pale circular spot, bearing long and thick setae. Gonarcus-parameres complex C-shaped in lateral view, enclosed in a membranous capsule with black and long setae basoventrally, arising from protuberant bases. Gonarcus arched in caudal view, laterodorsally with a short, broad, and basally directed process, which is broadly invaginated medially. Mediuncus highly sclerotized, subtriangular in lateral view, with broad base tapering towards the apex, and without medial division; dorsal margin smooth, without teeth; apex superacute, directed caudally, and slightly darker than base. Parameres, narrow in caudal view, with a strong narrowing before ventral hooks; ventral hooks acute and with irregular dorsal margin, subtriangular in lateral view; almost as long as mediuncus.

Female (Fig. 4). Eighth tergite dorsally fused, rectangular in lateral view, posterior margin irregular. Eighth sternite reduced, bearing small

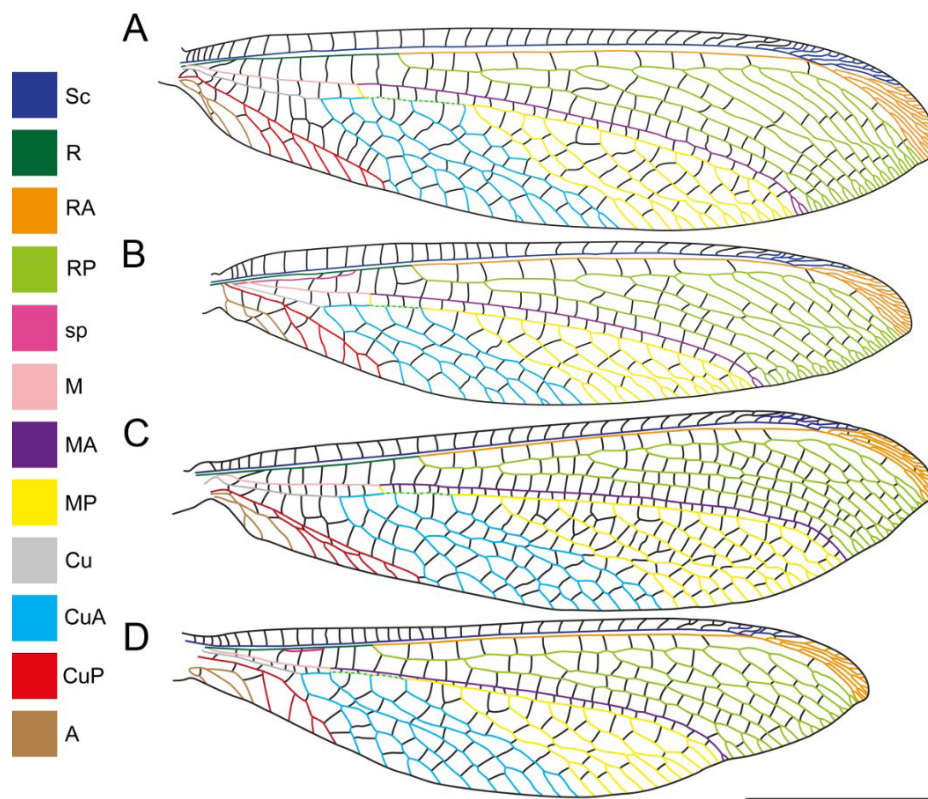


Figure 3 *Paranthalipsis* Banks, wing venation. *Paranthalipsis stangei*, sp. n. A) Forewing; B) Hindwing. *Paranthalipsis congener* (Hagen). C) Forewing; D) Hindwing. Scale bar = 1 cm. Abbreviations: A, anal; Cu, cubitus; CuA, cubitus anterior; CuP, cubitus posterior; M, media; MA, media anterior; MP, media posterior; R, radius; RA, radius anterior; RP, radius posterior; Sc, subcosta; sp, spurial vein. Pillula axillaris not drawn.

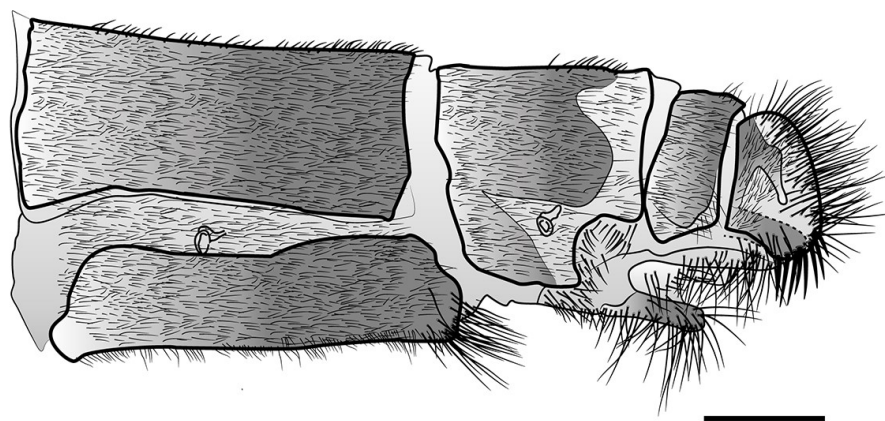


Figure 4 *Paranthaclisis stangei*, sp. n., female genitalia, lateral. Scale bar = 1 mm.

black setae, posterior gonapophyses elongate and medially directed with long and black setae. Ninth tergite, subrectangular, little sclerotized with thin and black setae. Ninth sternite triangular in ventral view, with very small and black setae, lateral gonapophyses thickened and with long excavating setae, which are directed ventral. Ectoproct subtriangular, wider ventrally, sclerotized, and only with a pale circular spot, bearing long, coarse and black setae.

Ecology. All specimens were collected at light traps near the beach in the deserts and at temporary riverbeds in the Municipality of Mulegé in Baja California Sur state, Mexico. These insects present different flight schedules during the period of sampling (approximately 19:00–23:00 p.m.). They have a robust flight and approached the light screen almost at ground level. Other specimens remained on the ground near the trap and were captured with hand nets.

Material examined (all at CNIN, except two paratypes noted as NMNH). HOLOTYPE, male, MEXICO: Baja California Sur, Mulegé, San Bruno, Hotel Costa Serena, terreno aledaño, 27°09.832' N, 112°09.895' W, 6 m, 09/viii/2021, trampa de luz, Contreras, Cancino, Luna, Martins, Marquez (CNIN:NEU:MYR2483). PARATYPES, MEXICO: Baja California Sur, Mulegé, San Bruno, Hotel Costa Serena, terreno aledaño, 27°09.832' N, 112°09.895' W, 6 m, 08/viii/2021, trampa de luz, Contreras, Cancino, Luna, Martins, Marquez, 2♂ (NMNH-CNIN:NEU:MYR1833, CNIN:NEU:MYR3356), 6♀ (NMNH-CNIN:NEU:MYR1834, CNIN:NEU:MYR1835, CNIN:NEU:MYR2485, CNIN:NEU:MYR3353, CNIN:NEU:MYR3354, CNIN:NEU:MYR3355); same but 09/viii/2021, 4♂ (CNIN:NEU:MYR1828, CNIN:NEU:MYR1829, CNIN:NEU:MYR2484, CNIN:NEU:MYR2489), 4♀ (CNIN:NEU:MYR1830, CNIN:NEU:MYR2486, CNIN:NEU:MYR2487, CNIN:NEU:MYR2488). Baja California Sur, Mulegé, Arroyo San José Magdalena, 27°03.731' N, 112°14.066' W, 4 m, 09/viii/2021, trampa de luz, Luna, Contreras, Barba, Ramírez, 1♂ (CNIN:NEU:MYR2491), 1♀ (CNIN:NEU:MYR2492).

Key to species of *Paranthaclisis* Banks

(Modified from Diehl, 2012; Stange and Miller, 2012).

- 1 Vertex with scars shiny black, with few sparse setae (Fig. 1D); mesoscutellum with medial area of posterior margin shiny, dark colored (Figs. 1A, 5D); in males, medial invagination of gonarcus deep in lateral view (Figs. 2F, G; 7D).....2
- 1' Vertex with scars dull brown, densely covered by setae (Figs. 5C, I); mesoscutellum with posterior margin dull (Figs. 5A, G); in males, medial invagination of gonarcus almost inconspicuous in lateral view (Figs. 7B, F).....4
- 2 Scars of the vertex connected sagittal and/or transversally (Fig. 5F; Fig. 1, Stange and Miller, 2012; Fig. 5A, Diehl, 2012); in males, parameres without narrowing before the curvature of the apices; lateral processes of gonarcus narrow and elongated, slightly more sclerotized than gonarcus; mediuncus with teeth on dorsal surface.....3
- 2' Scars of the vertex not connected sagittal and/or transversally (Fig. 1D); in males, parameres with narrowing before the curvature of the apices (Figs. 2D, E); lateral processes of the gonarcus broad and short, sclerotized as gonarcus; mediuncus without teeth on dorsal surface (Figs. 2F, G).....*Paranthaclisis stangei*, new species
- 3 Forewing costal area narrow with cells above pre-origin of RP less than one-third as high as the area of pre-origin of RP area (Figs. 5D, 6A); forewing costal cells without cross veins interconnected before stigma (Figs. 5D, 6A); in males, basidorsal surface of mediuncus with a small split (Fig. 7D).....*Paranthaclisis hageni* (Banks)
- 3' Forewing costal area broad with cells above pre-origin of RP at least one-half as high as area of pre-origin of RP area (Figs. 2, 4, Stange and Miller, 2012); forewing costal cells with several cross veins interconnected before stigma (Figs. 2, 4, Stange and Miller, 2012); in males, basidorsal surface of mediuncus without split (Fig. 6d, Diehl, 2012).....*Paranthaclisis floridensis* Stange & Miller
- 4 Distal tarsomere of hindleg black, longer than other four tarsomeres together (Fig. 5H); male intersegmental membrane between abdominal segments VI and VII without eversible sac; male tergum V with large V-shape emargination posteriorly; postventral lobe of male ectoproct projects downward; gonarcus longitudinally broader in caudal view (Fig. 7E); mediuncus longer than the parameres hooks in lateral view (Fig. 7F).....*Paranthaclisis nevadensis* Banks
- 4' Distal tarsomere of hindleg pale, shorter than other four tarsomeres together (Fig. 5B); male intersegmental membrane between abdominal segments VI and VII with eversible sac; male tergum V with small V-shape emargination posteriorly at most; postventral lobe of male ectoproct bent posteriorly; gonarcus longitudinally reduced in caudal view (Fig. 7A); mediuncus shorter than the parameres hooks in lateral view (Fig. 7B).....*Paranthaclisis congener* (Hagen)

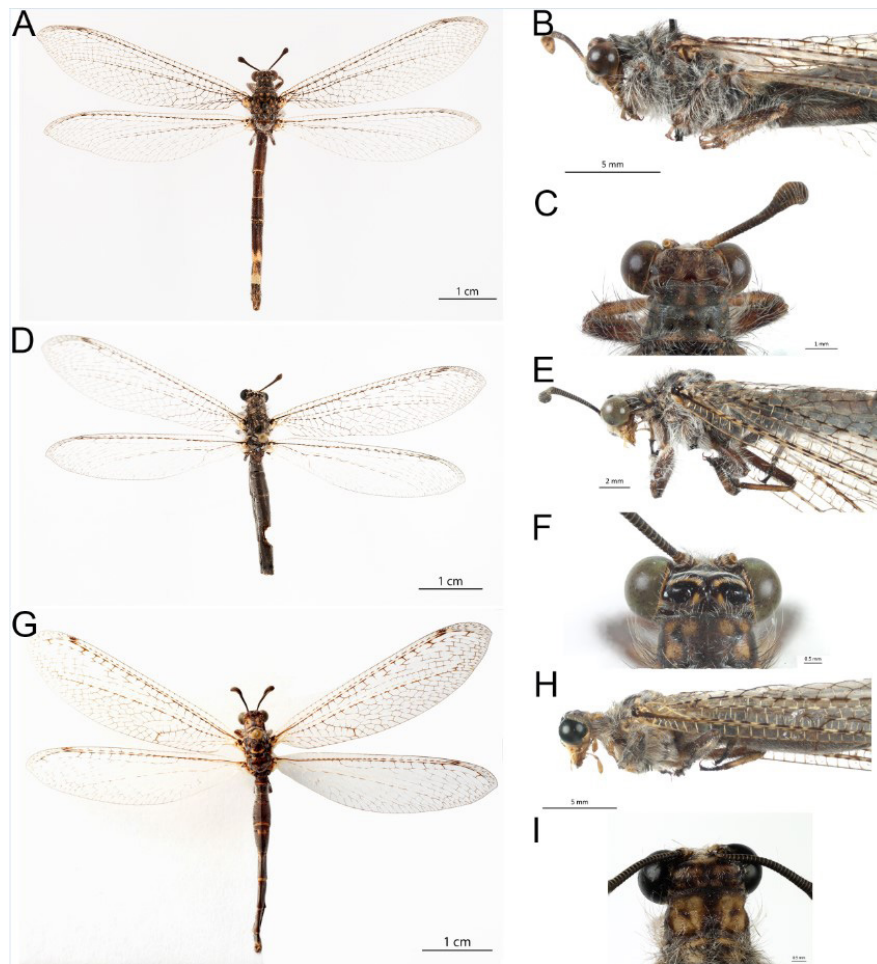


Figure 5 *Paranthaclisis* Banks species. *Paranthaclisis congener* (Hagen). A) Habitus, dorsal; B) Habitus, lateral; C) Vertex, dorsal. *Paranthaclisis hageni* (Banks). D) Habitus, dorsal; E) Habitus, lateral; F) Vertex, dorsal. *Paranthaclisis nevadensis* Banks. G) Habitus, dorsal; H) Habitus, lateral; I) Vertex, dorsal.

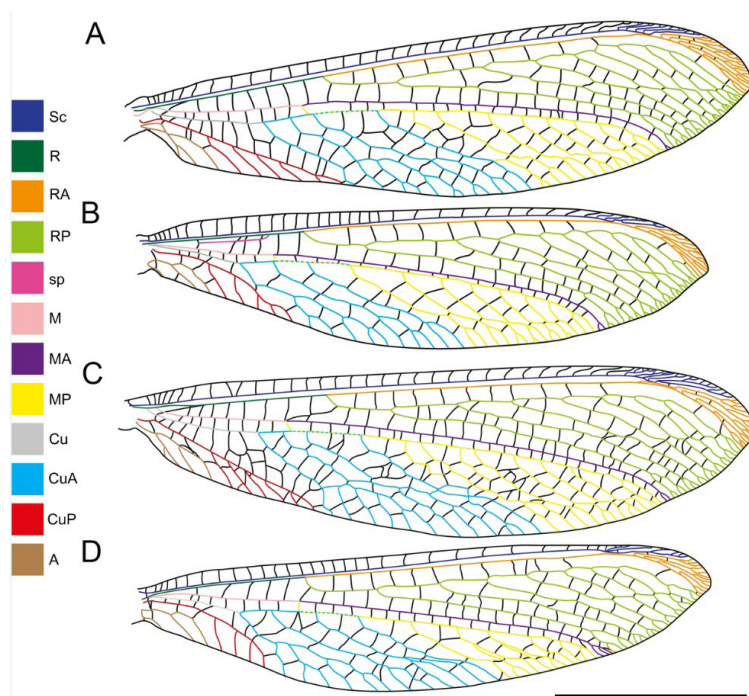


Figure 6 *Paranthaclisis* Banks, wing venation. *Paranthaclisis hageni* (Banks). A) Forewing; B) Hindwing. *Paranthaclisis nevadensis* Banks. C) Forewing; D) Hindwing. Scale bar = 1 cm. Abbreviations: A, anal; Cu, cubitus; CuA, cubitus anterior; CuP, cubitus posterior; M, medial; MA, media anterior; MP, media posterior; R, radius; RA, radius anterior; RP, radius posterior; Sc, subcosta; sp, spurial vein. Pilula axillaris not drawn.

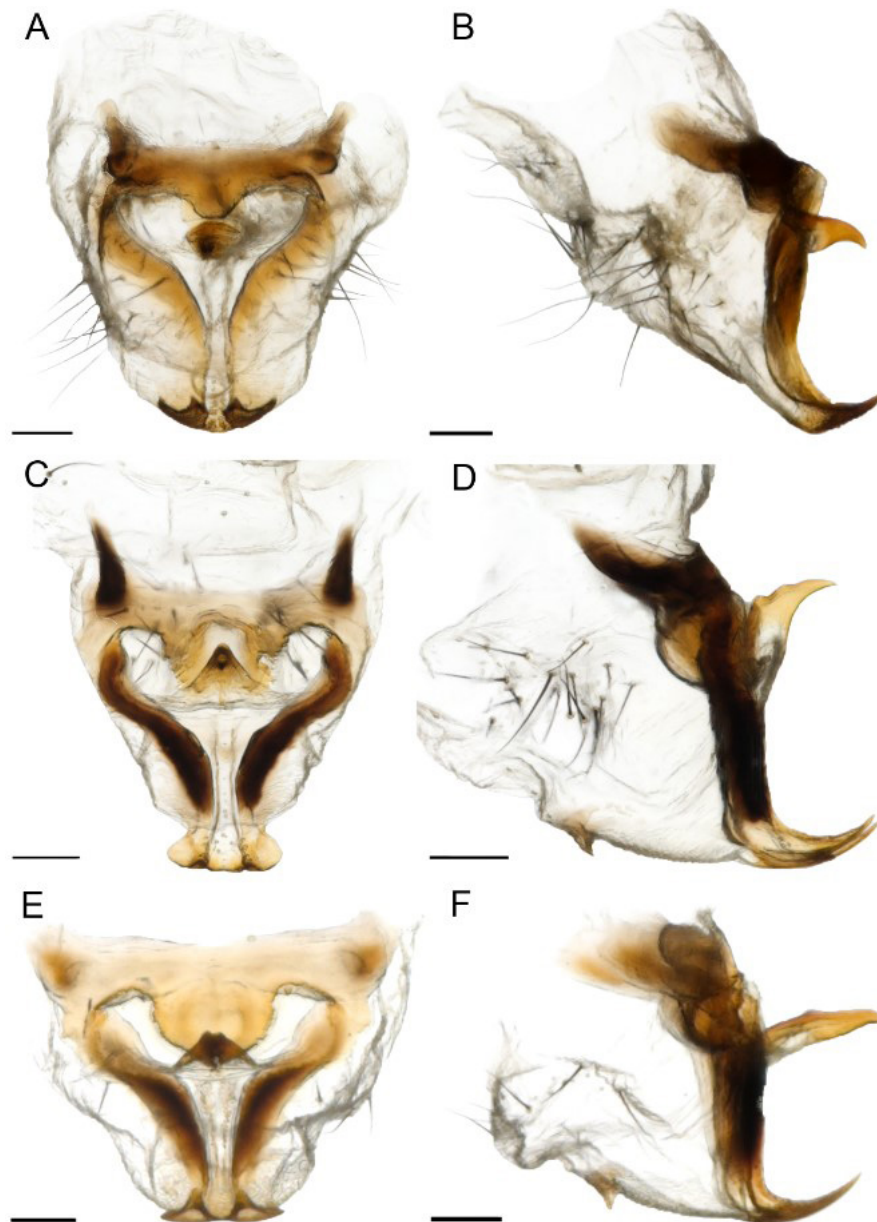


Figure 7 *Paranthaclisis* Banks, gonarcus-parameres complex. *Paranthaclisis congener* (Hagen). A) Caudal; B) Lateral. *Paranthaclisis hageni* (Banks). C) Caudal; D) Lateral. *Paranthaclisis nevadensis* Banks. E) Caudal; F) Lateral. Scale bar = 0.2 mm.

Discussion

Species of the genus *Paranthaclisis* are similar to each other, especially in corporal coloration (Figs. 1, 5; Figs. 1, 2, Stange and Miller, 2012) however, they can be distinguished by other morphological characters, mainly those of internal genital structures. The shape of the gonarcus-parameres complex holds the most important characters for the identification of *Paranthaclisis stangei* (Fig. 2). In the other four *Paranthaclisis* species, the parameres maintain the same width in the posterior part before the curvature of the hooks (Fig. 7; Diehl, 2012, fig. 8), while in the new species they become thinner, appearing to separate into two parts – one dorsal and one ventral – united only by a thin band of membrane (Figs. 2D, E).

Paranthaclisis stangei sp. n., is closely related to *P. floridensis* and *P. hageni* by having similar body coloration and size, but the new species is easily separated from both species by scars of the vertex not

connected sagittal and/or transversally (connected in *P. floridensis* and *P. hageni*) (Figs. 1D, 5F; Fig. 1, Stange and Miller, 2012), and has males with parameres bearing a narrowing before the curvature of the apices (other two species without narrowing), lateral processes of gonarcus broad and short (narrow and elongated on *P. floridensis* and *P. hageni*), mediuncus without teeth on dorsal surface (presence of teeth on the other two species) (Figs. 2D–G, 7C, D; Diehl, 2012, fig. 8).

Other important differences between the new species and *P. floridensis* are the simple venation in the costal area of the wing on *P. stangei* (Figs. 1A; 3A, B), while *P. floridensis* has a complex venation on the same area (Fig. 4, Stange and Miller, 2012); and the presence of black and white long setae on the thorax – especially pronotum – on the new species (Fig. 1D), whereas *P. floridensis* has only white setae (Fig. 1, Stange and Miller, 2012).

Paranthaclisis hageni is sympatric with *P. stangei*, sp. n. and is the closest species to the new one, but they have important differences.

The new species is clearly smaller than *P. hageni*. Both species share the presence of the spurial vein connecting two transversal veins (Figs. 3B, 6B), nevertheless *Paranthaclisis hageni* has the spurial vein arising from the first presectoral vein, while *P. stangei*, sp. n. has it originated from the beginning of Cu. Other important differences are present on the terminalia and genital structures of the male (Figs. 2; 7C, D), the new species has no eversible sacs between segments VI and VII of the abdomen, dorsal surface of mediuncus smooth and without basidorsal division, processes of the gonarcus wide and short, and parameres with narrowing before the curvature of the apex, while *P. hageni* has abdomen with eversible sacs between segments VI and VII, dorsal surface of mediuncus toothed with basidorsal division, processes of the gonarcus narrow and long, and parameres without narrowing before the curvature of the apices.

Paranthaclisis stangei is similar to *P. congener* and *P. nevadensis* in wing vein coloration (Figs. 1A, 3A, B; 5A–C, G–I; 6C, D) but it is separated from these species by the vertex with shiny black scars and few sparse setae (vertex with dull brown scars and densely covered by setae in *P. congener* and *P. nevadensis*) (Figs. 1D; 5C, I), mesoscutellum with medial area of posterior margin shiny and dark colored (dull in *P. congener* and *P. nevadensis*), presence of black and white setae on thorax (only white setae on *P. congener* and *P. nevadensis*), presence of pilula axillaris and spurial vein (absent on *P. congener* and *P. nevadensis*) (Figs. 1A; 5A, G), male with medial invagination of gonarcus deep in lateral view (inconspicuous in *P. congener* and *P. nevadensis*) (Figs. 2F, G; 7B, F).

Concerning the other four species of *Paranthaclisis*, *P. floridensis* and *P. hageni* are very similar in vertex markings and thorax coloration (Fig. 5F; Fig. 1, Stange and Miller, 2012) but differ in many venation characters, for example, the uniaereolate shape of the costa before the pterostigma in the former species, which is simple in the latter one (Fig. 5D; Fig. 4, Stange and Miller, 2012). *Paranthaclisis congener* and *P. nevadensis* are closely related to each other due to similarities in the vertex markings, absence of the pilula axillaris and absence of the spurial vein (Figs. 5A–C, G–I). However, they differ in many characters, *P. nevadensis* has (1) distal tarsomere of hindleg black and longer than other four tarsomeres (*P. congener* distal tarsomere pale and shorter than other four tarsomeres) (Figs. 5B, H); (2) males with eversible sac present between abdominal segments VI and VII (*P. congener* without eversible sac), (3) tergum V with large V-shape emargination posteriorly (V-shape emargination small in *P. congener*), (4) postventral lobe of ectoproct projects downward (bent posteriorly in *P. congener*); (5) mediuncus longer than the hooks in lateral view (shorter than hooks in *P. congener*) (Figs. 7B, F). The genital morphology of the females is unknown, there are no descriptions or images for these species, i.e., it is important to describe the females on future studies to have more information about the genus.

Most of the *Paranthaclisis* specimens have been collected in the larval stage and reared to adulthood; however, based on our scientific expedition on Baja California Peninsula, is possible to highlight that light trapping is very effective for sampling these and other myrmeleontids.

Regarding the distribution of *Paranthaclisis* species, they are restricted to the western United States and northern and western Mexico, possessing Nearctic affinity. The new species, *Paranthaclisis stangei*, was captured in the Central Gulf Coast district and within the Baja Californian province, which is included in the Nearctic Region (Morrone, 2021). This area is a narrow coastal strip that is isolated by a mountain range that separates it from the Vizcaíno Desert and Sierra de la Giganta Districts and it is important for the number of recorded plant endemisms (González-Abraham et al., 2010; Morrone, 2021). *Paranthaclisis congener* is the species with the widest distribution range, covering approximately 15 Nearctic provinces, located in the Western and Alleghany dominions (Table 1) (Diehl, 2012; Escalante et al., 2021;

Morrone, 2021). The distribution of *P. hageni* remains primarily within the Rocky Mountain Dominion, extending into provinces in the western and southern United States and northern Mexico (Table 1) (Diehl, 2012; Escalante et al., 2021) and overlaps a large part of *P. congener* distribution, occurring in nine provinces; nevertheless, the former species is known from the Oregonian province, while the latter one has no records from this province. *Paranthaclisis floridensis* appears to be endemic to the southeastern United States within the Austroriparian Province, comprising the state of Florida (Table 1) (Diehl, 2012; Escalante et al., 2021), while *P. nevadensis* is distributed in only four provinces, belonging to the Western and Rocky Mountain dominions.

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Conflicts of interest

The authors declare no conflicts of interest.

Author contribution statement

YML Conceptualization-equal, investigation-equal, methodology-equal, visualization-equal, writing – original draft-equal, writing – review & editing-equal. CCM Investigation-equal, methodology-equal, validation-equal, visualization-equal, writing – original draft-equal, writing – review & editing-equal. ACR Funding acquisition-equal, supervision-equal, validation-equal, writing – review & editing-equal.

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Supplementary Material

The following online material is available for this article:
Supplementary - Additional material examined.