

# Revision of the odd brachycistidine genus *Acanthetropis* Wasbauer, 1958 (Hymenoptera, Tiphidae, Brachycistidinae)

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## Abstract

The species of the brachycistidine genus *Acanthetropis* are reviewed. A key to the species is provided along with distribution maps. One species, *A. normalis* Malloch, 1926, is relegated to synonymy under *A. aequalis* (Fox, 1899).

## Keywords

*Brachycistis*, *juncea*, *longula*, *petiolata* group

## Introduction

Several species of *Brachycistis* Fox, 1893 were recognized by Bradley (1917) to be closely related as they appeared next to each other in his key. Malloch (1926) grouped these same species (*aequalis* Fox, 1899; *idiotus* Cockerell, 1895; *noctivaga* Bradley, 1917, and *normalis* Malloch, 1926) in what he called the *aequalis* group of *Brachycistis*. Wasbauer (1958) in his preliminary studies of the subfamily Brachycistidinae discovered a new species (*lamellatus* Wasbauer, 1958) from Baja California, Mexico, which because of its unique combination of traits was set aside as representing a possible new genus. When this species was compared to others in the genus *Brachycistis*, the species Malloch had

placed in the *aequalis* group were found to share these same traits. To accommodate these species, Wasbauer proposed the genus *Acanthetropis* and included it in his key to the genera known at that time (Wasbauer 1966). The most recent key to genera can be found in Kimsey and Wasbauer (2006).

## Materials and methods

Type repositories and specimens studied below are indicated by the following acronyms: ANSP – Academy of Natural Sciences of Philadelphia, Philadelphia, Pennsylvania, USA; BME – Bohart Museum of Entomology, University of California, Davis, USA; CAS – California Academy of Sciences, San Francisco, USA; CDFA – California State Collection of Arthropods, California Department of Food and Agriculture, Sacramento, USA; CUIC – Cornell University Insect Collection, Ithaca, New York, USA; EMEC – Essig Museum, University of California, Berkeley, USA; KSBS – University of Kansas, Lawrence, USA; LACM – Los Angeles County Museum of Natural History, California, USA; MCZ – Museum of Comparative Zoology, Harvard University, Cambridge, Massachusetts, USA; UCRC – Entomological Research Museum, University of California, Riverside, USA, and USNM – U.S. National Museum, Washington, D.C., USA.

Morphological terminology follows that of Wasbauer (1966). Of the head, LID = lower interocular distance, the shortest distance between the lower margins of the compound eyes. UID = upper interocular distance, the shortest distance between the upper margins of the compound eyes. The abbreviations L, W and H refer to length, width and height respectively.

## Systematics

### Genus *Acanthetropis* Wasbauer

*Acanthetropis* Wasbauer 1958: 139. Type species: *Acanthetropis lamellatus* Wasbauer 1958: 140. Original designation.

**Diagnosis.** Species of *Acanthetropis* are large, relatively heavy-bodied brachycistidines. The males can be immediately distinguished by the presence of a scrobal sulcus, very long marginal cell of the forewing and metasomal sternum II with a median longitudinal carina or fold. In addition the frons bears a carina above and laterad of the antennal sockets.

**Male description.** *Body length* 6.5–17.0 mm. *Head.* Rounded, broader than long; ocelli enlarged with a transverse sulcus between their posterior margins; compound eyes slightly convergent below, inner margins broadly emarginate; antennal socket rim with broad carina or thickening beneath small carina above and lateral to antennal

socket; clypeus transverse, not projecting apically, clypeal L/W ratio not exceeding 0.4, central part slightly convex, with narrow, apically projecting ledge; mandibles tridentate, weakly developed external carina extending from mandibular base to point just proximad of inner tooth, obsolescent near its middle; maxillary and labial palpi well-developed, conspicuous, 6 and 4 segmented respectively. *Mesosoma*. Robust, moderately long; pronotum narrow, transverse, nearly vertical, humeral angles rounded, not prominent; mesonotum with parapsidal furrows long, strongly impressed; scutellum with or without median longitudinal sulcus; mesepisternum carinately produced or with low, rounded protuberance anterodorsally, irregularly convex; propodeum with dorsomedian longitudinal sulcus, area laterad of sulcus sloping abruptly posteriorly, dorsal and posterior propodeal faces separated by transverse carina; coxae simple, not carinate ventrally, with well-developed admesal stridulatory area; wings long, venation well-developed, forewing with three submarginal and two discoidal cells, third submarginal cell two-thirds or more length of second, first transverse cubital vein arising beyond basal third of first submarginal cell, marginal cell elongate, costa extending distad of stigma a distance greater than half length of stigma; hindwing with radial and cubital veins well-developed, cubitus arcuate, forming angle with transverse cubital of less than 135°, jugal lobe much shorter than submedian cell. *Metasoma*. Segment I narrower than II in dorsal view, sternum I with median sulcus somewhat expanded posteriorly; sternum II with strong basal median longitudinal carina or fold. *Genital capsule*. Paramere broadest subapically, ventrally rounded to acute apex; aedeagus slender, linear or gradually expanded toward apex; volsella with cusp broadly rounded, digitus produced apically into short, blunt point in ventral view, inner margin of volsella with several stout spines and slender setae. *Color*. Reddish brown to dark brown.

**Female.** Unknown, although the female of *Acanthetropis* may well be the “Genus A” described by Kimsey (2005).

**Distribution** (Figs 15–18). *Acanthetropis* is known from geographically scattered records in the USA: Arizona, California, Idaho, Kansas, Nebraska, Nevada, New Mexico, South Dakota, Utah, and in Mexico: Baja California, Baja California Sur, Sonora, Hidalgo and Zacatecas. Further collecting in intervening areas will probably reveal a more widespread fauna.

### Key to the species of *Acanthetropis*

- 1 Mesepisternal prominence high and sharp, often appearing carinate in certain lights (as in Figs 5, 6, 10); mesepisternal carina present; dorsolateral areas of propodeum sharply, carina-margined posteriorly, separated from posterior transverse carina by pronounced sulcus ..... **2**
- Mesepisternal prominence low, rounded, not appearing carinate; mesepisternal carinae absent; dorsolateral areas of propodeum sometimes with a distinct posterior margin but never sharp and carinate ..... **3**
- 2 Second metasomal sternum with a median longitudinal elevation, terminating in a spine (Figs 5, 10); gular carina sharply elevated anteriorly, forming

- a tooth visible behind the posterior mandibular condyle in full lateral view (Figs 3, 4) ..... ***noctivaga* (Bradley)**
- Second metasomal sternum with a longitudinal broad median basal ridge terminating at a transverse ledge (Fig. 6); gular carina low, not visible in full lateral view ..... ***lamellata* Wasbauer**
- 3 Flagellomere I at least 3.5× as long as greatest width (Fig. 8); metasomal segment I long and petiolate, L/H 2.5 or more (Fig. 9) ..... ***idiotes* (Cockerell)**
- Flagellomere I less than 3.0× as long as greatest width (Fig. 7); first metasomal segment shorter, L/H 2.0 or less ..... ***aequalis* (Fox)**

### ***Acanthetropis aequalis* (Fox)**

Figs 7, 11, 15

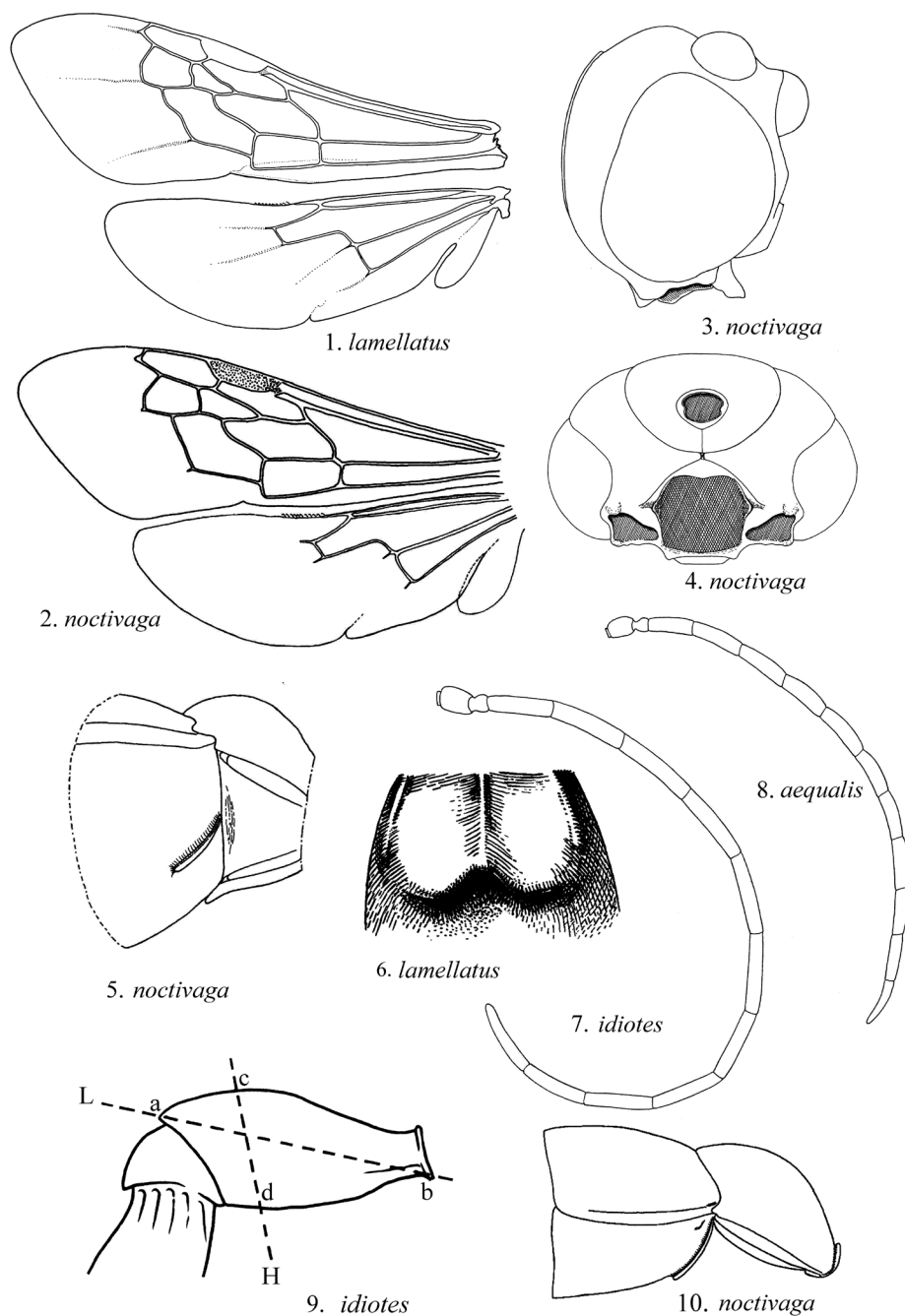
*Brachycistis aequalis* Fox 1899: 284. Syntype males; Nevada (ANSP).

*Brachycistis normalis* Malloch 1926: 8. Holotype male; USA: South Dakota, Jackson Co., Cedar Pass (USNM). **New synonymy.**

**Diagnosis.** This species most closely resembles *A. idiotes*. It can be distinguished by the shorter antennomeres, mesepisternum without vertical or transverse ridge, the shorter first metasomal segment and sharp median longitudinal ridge of metasomal sternum I.

**Male description.** *Body length* 6.5–13.0 mm. *Head.* Flagellum with appressed yellow pubescence; L/W ratio of flagellomere I 2.4–2.9 (Fig. 7); lower rim of antennal socket produced into distinct vertical carina beneath; clypeus with scattered punctures, becoming larger and irregular apically; gular carina elevated for most of length but not produced into an anterior tooth. *Mesosoma.* Pronotum with small punctures medially, larger, coarser laterally; mesepisternum with a low, rounded prominence anteriorly, not carinately produced, mesonotum with small, scattered punctures; propodeum with dorsum finely reticulate, impunctate, dorsal sulcus with edges scarcely or not appearing carinate, posterior transverse sulcus absent or poorly defined, without or with anterior ill-defined carina; posterior transverse carina often incomplete. *Metasoma.* Segment I short and stout, L/H 1.3–1.5 sternum with longitudinal sulcus expanded and deepened posteriorly, tergum heavily punctate; tergum II moderately to lightly punctate, punctures small and shallow; terga III–VII with punctures small, shallow except for row of larger, deeper punctures before apex; sternum II with median basal longitudinal ridge terminating in blunt spine (as in Fig. 6). *Genital capsule* (Fig. 11). *Color.* Uniform medium brown. Entire body clothed with long, golden setae.

**Distribution** (Fig. 15). **MEXICO: Baja California:** Hamilton Ranch (4 km n Punta Gorda); **Baja California Sur:** 15 mi n El Rosario; **Zacatecas:** 10 mi n Fresnillo. **USA: Arizona:** Apache Co.: 14 km nnw Salina; Coconino Co.: Tuba City; **California:** Imperial Co.: Bard; Inyo Co.: Tinemaha Reservoir; Kern Co.: Randsburg; Mono Co.: Benton; Riverside Co.: Chino Canyon; San Bernardino Co.: Zzyzx Springs; Tulare Co.: White River; **Idaho:** Cassia Co.: 5 mi ne Malta; Elmore Co.: Glenns Ferry;



**Figures 1–10.** 1–2 Forewing and hindwing 3 Side view of head, antennae removed 4 Ventral view of head, mouthparts and mandibles removed 5 Oblique ventral view of metasomal sternum I and II 6 Ventral view of metasomal sternum II 7, 8 Antenna 9 Lateral view of metasomal segment I showing measurement points, H = height between points c and d, L = length, between points a and b 10 Lateral view of metasomal segments I and II.

**Kansas:** Cheyenne Co. (no locality given); Decator Co.: 5 mi e. Cedar Bluff; Morton Co. (no locality given); Seward Co. (no locality given); Stanton Co. (no locality given); **Nebraska:** Garden Co.: 8 mi ne Oshkosh; Sioux Co.: Agate; **Nevada:** Churchill Co.: Sand Mountain, 35 km se, 8 mi n Fallon; Blow Sand Mountains, San Mountain, 12 mi ne Stillwater; Elko Co.: Deeth; Esmeralda Co.: Clayton Valley dunes; Eureka Co.: 27.5 and 44 km w Carlin; Humboldt Co.: Golconda Summit, Winnemucca, 10 mi n Winnemucca; Nye Co.: Duckwater; Peavine Cyn.; Pershing Co.: Woolsey; Washoe Co., Fallon, south end Pyramid Lake, 3 mi n Nixon; White Pines Co.: 5 mi w Baker; **New Mexico:** Bernalillo Co.: Albuquerque; Chaves Co. (no locality given); Dona Ana Co.: Las Cruces; Otero Co.; Tularosa, 5 mi w Tularosa, White Sands; San Juan Co.: Chaco Cyn. Nat. Mon.; Taos Co.: Ojo Caliente; Torrance Co. (no locality given); **Oregon:** Malheur Co.: 12 mi s Blue Mt. Pass; **South Dakota:** Jackson Co., Cedar Pass; **Utah:** Emery Co.: Buckskin Springs, n. Goblin Valley; Grand Co.: Arches National Monument; San Juan Co.: Monticello; Weber Co.: Ogden; **Wyoming:** Converse Co.: Douglas; Platt Co.: Ft. Laramie; 723 males were examined including the holotype (BME, CAS, KSBS).

**Seasonal distribution.** This is a summer species, collected from June through September.

**Discussion.** When Malloch proposed *A. normalis* as a new species in *Brachycistis*, he had only seen one specimen of *Brachycistis aequalis* Fox and thus was unaware of the amount of structural variation seen in that species. The differences he perceived in the dimensions of the first metasomal segment proved to fall within the normal range of variation of this trait in *A. aequalis*.

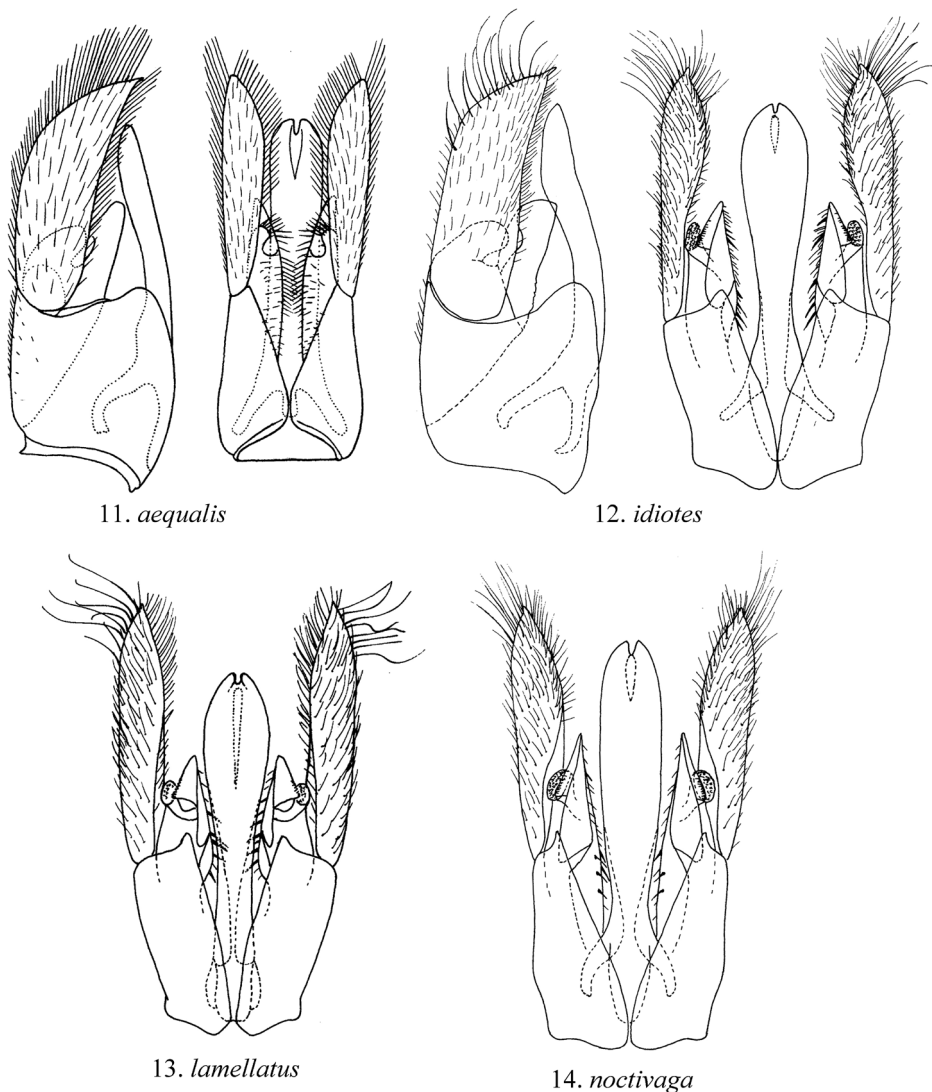
### *Acanthetropis idiotes* (Cockerell)

Figs 8, 9, 12, 16

*Brachycistis idiotes* Cockerell 1895a: 63. Holotype male; USA: New Mexico (Repository unknown).

**Diagnosis.** *Acanthetropis idiotes* is separable from other species in the genus by the rounded, unridged mesepisternum, lack of a gular elevation, long antennae, and long, slender body.

**Male Description.** Body length 12–17 mm. *Head*, with few short to moderately long setae, clypeus and mandibles with more numerous, longer setae; scape with shorter setae; flagellum with tiny, scattered setae, flagellomere I L/W 3.9–4.2 (Fig. 8); lower rim of antennal socket with low carina beneath; clypeus with uniformly scattered punctures; gular carina slightly elevated but not produced into tooth anteriorly. *Mesosoma*. Pronotum with scattered, small punctures medially, larger, denser punctures laterally; mesepisternum with large, scattered punctures, becoming nearly impunctate posteriorly, with low, rounded prominence anteriorly, not carinately produced; mesonotum and scutellum with large, scattered punctures; propodeal dorsum impunctate,



**Figures 11–14.** Male genital capsule. **11, 12** lateral view (left), ventral view (right) **13, 14** Ventral view.

dorsal sulcus not usually carina margined, areas laterad of sulcus poorly defined, posterior transverse sulcus absent or ill-defined without anterior carina, posterior transverse carina complete. *Metasoma*. First segment long and slender, L/H 2.5–4.0 (Fig. 10), sternum with longitudinal sulcus narrow, slightly widened posteriorly; tergum I slightly rugose, with small, irregular punctures laterally; tergum I with small, scattered punctures; terga III–VII nearly impunctate, except for row of shallow, setose punctures apically; sternum II with a median basal longitudinal ridge terminating in blunt spine (as in fig. 9). *Genital capsule* (Fig. 12). *Color*. Uniform medium to chestnut brown, entire body shining, clothed with long golden setae.



**Distribution** (Fig. 17). MEXICO: **Baja California**: 23 mi w Punta Prieta; **Baja California Sur**: 2 mi ne El Rosario, 3.5 mi se San Augustin; **Hidalgo**: Jacala; USA: **Arizona**: Mojave Co.: Oatman; Pima Co.: Growler Valley; **California**: Imperial Co.: Bard, Glamis; Algodones Dunes; Inyo Co.: Saline Valley; Riverside Co.: Cochella, Indian Wells; San Diego Co.: Borrego Springs; **New Mexico**: Dona Ana Co.: Las Cruces; Quay Co.: House; 92 specimens were examined (BME, CAS, CDFA).

**Seasonal distribution.** Specimens of this species have been collected only during the winter months (November through January).

**Discussion.** Collection of desert insects during the winter in temperate areas of the western U.S. has been largely ignored because of assumptions about seasonality. However, a unique fauna of brachycistidine wasps has developed with adult males appearing during the winter. In addition to *Acanthetropis idiotes*, two species of *Brachycistis*, *juncea* Wasbauer, 1966, and *longula* Wasbauer, 1966, in the *petiolata* group are known only from winter collection dates (November and January) (Wasbauer 1966). Interestingly, the habitus of males of these two species is similar to that of *A. idiotes* males. They are longer and more slender than males of other species in their respective groups.

### *Acanthetropis lamellatus* Wasbauer

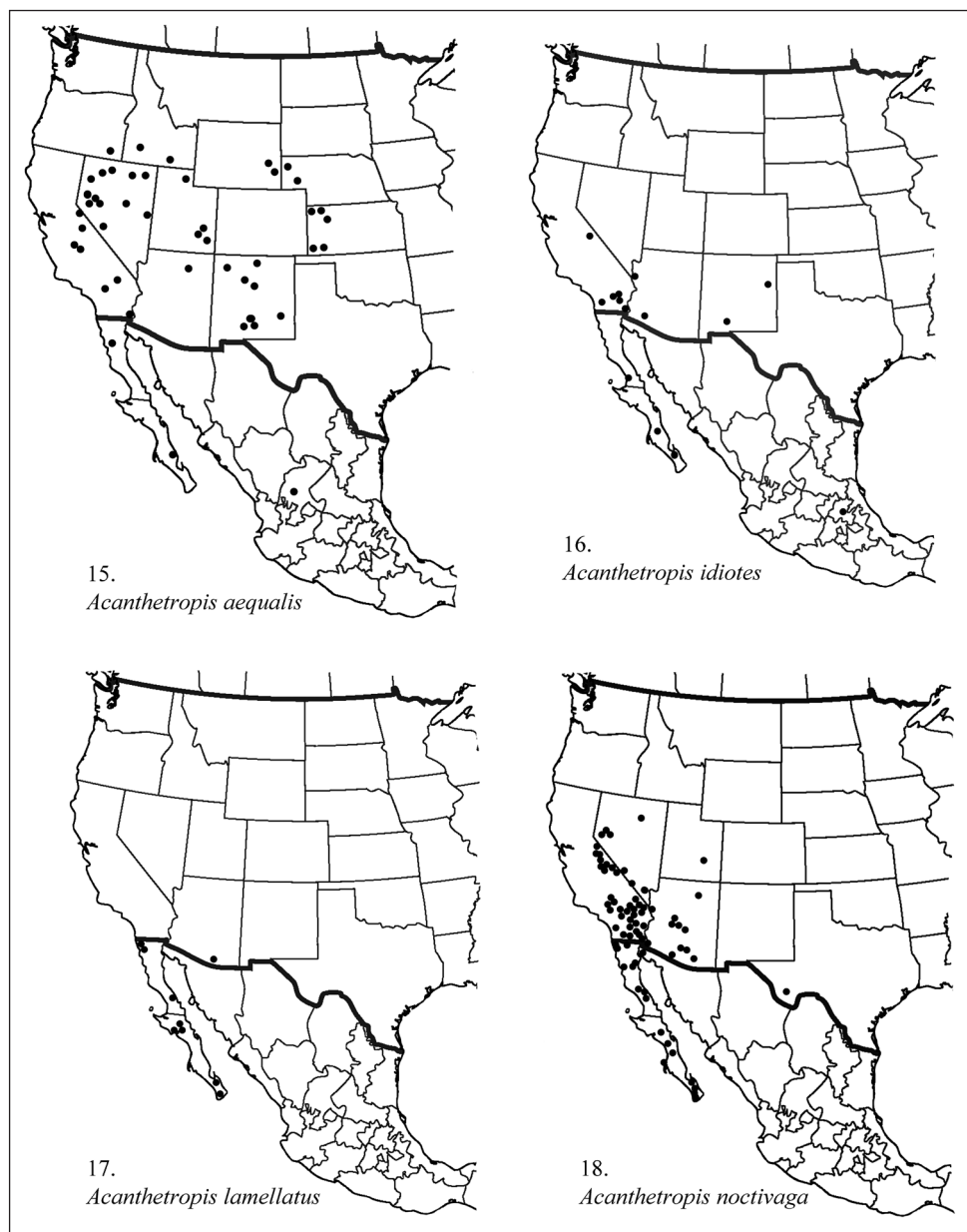
Figs 1, 6, 13, 17

*Acanthetropis lamellatus* Wasbauer 1958: 140. Holotype male; Mexico: Baja California Sur, La Paz (CAS).

**Diagnosis.** The most distinctive feature of *lamellatus* is the elevated transverse ledge on metasomal sternum II. Additional diagnostic features include the high sharp mesepisternal prominence and gular carina not elevated or dentate.

**Male description.** *Body length* 11–14 mm. *Head.* Face shining with few scattered punctures, punctures stronger between lateral ocelli and on occiput; scape with few long, erect setae ventrally; flagellomere I L/W 2.5–3.1; lower rim of antennal socket not sharp or carinate below; basal half of clypeus shining, impunctate, apical half with several irregularly spaced, broad, shallow punctures and long apically directed setae; gular carina not abruptly raised anteriorly, not visible below mandibular condyle in full lateral view; mandibles with several long, stout amber-colored setae on outer surface. *Mesosoma.* Strongly punctured, sparsely clothed with medium to long erect or suberect setae; anterior face of pronotum shining medially, nearly impunctate, lateral surface strongly punctate; mesonotum with punctures smaller, more closely set anteriorly; mesepisternum with strongly raised, ridge-like elevation below anterodorsal protuberance; propodeum with dorsal sulcus strongly impressed, shining, raised area laterad of sulcus finely reticulate, impunctate except for small lateral area, posterior declivity sharp, carinate, sulcus between declivity and posterior transverse carina smooth, shining; posterior propodeal face separated from lateral face by lateral diagonal carina meeting posterior carina dorsally, obsolete before posterior rim. *Metasoma.* Segment





**Figures 15–18.** Distribution maps.

I short, stout, L/W 1.7–2.3 in lateral view; sternum II with basal longitudinal fold, terminating at raised, transverse lamella (Fig. 6). *Genital capsule* (Fig. 13). Aedeagus widest near subapically, narrowed to bluntly pointed apex. *Color*. Uniform medium to chestnut brown, entire body shining, clothed with long golden setae; flagellum sparsely clothed with minute appressed whitish pubescence.

**Distribution** (Fig. 17). Mexico: **Baja California Sur**: 23 mi s San Miguel de Commondu, El Pescadero (Playa Los Cerritos), San Ignacio (15, 20 mi s, 13 mi n, 13 mi e), Palmarito, La Paz, 13 mi w La Paz, Isla Espiritu Santo (Bahia San Gabriel), 26 mi s El Arco; USA: **Arizona**: Santa Cruz Co.: Madera Canyon; 22 specimens were examined including the holotype (BME, CAS, UCR).

**Seasonal distribution.** This is a summer species, collected from June through September.

### *Acanthetropis noctivaga* (Bradley)

Figs 2–5, 10, 14, 18

*Brachycistis noctivaga* Bradley 1917: 272. Holotype male; USA: Nevada, Clark Co., Las Vegas (CUIC).

**Diagnosis.** This species can be distinguished by the rugose ridged mesepisternum, presence of an anterior tooth on the gular carina, medially carinate metasomal sternum II, and short stout body.

**Male description.** *Body length* 12.0–15.4 mm. *Head* (Figs 3, 4), with relatively sparse, short setae, mainly on clypeus and outer surface of mandibles, longest on occiput, scape and inter-antennal area with moderately long setae; clypeus with large, irregular punctures, flagellomere I L/W 3.0–3.5; lower rim of antennal socket with broad carina or swelling beneath; clypeus with large, irregular punctures; gular carina produced into prominent tooth visible below posterior mandibular condyle. *Mesosoma*. Pronotum anterior face with very small punctures, humeral angles and lateral face with large, closely set, irregular punctures; mesepisternum heavily punctate, punctures large, close set, irregular; mesepisternal prominence high and sharp, appearing carinate in certain angles; mesepisternal carina present; mesonotum and scutellum with scattered punctures, scutellum usually with median longitudinal sulcus extending from anterior to posterior margins; propodeal dorsum impunctate, dorsal longitudinal sulcus carinately margined, areas laterad of sulcus well-defined, margins usually appearing carinate, posterior transverse sulcus impunctate, often traversed by longitudinal ridges, posterior transverse carina well-developed, complete. *Metasoma* (Figs 5, 10). Segment I short and stout, L/H 1.5–1.9, sternum I with longitudinal sulcus gradually expanded and deepened posteriorly; tergum I heavily punctate, punctures large, often irregular; terga II–VII with scattered large and small punctures and row of setose punctures before apex of each segment; sternum II with median basal longitudinal ridge terminating in blunt spine (Fig. 5). *Genital capsule* (Fig. 14). *Color*. Uniform medium to dark brown, body shining, heavily punctate, entirely clothed with shiny white to straw-colored setae; flagellum with tiny erect to appressed golden setae.

**Distribution** (Fig. 18). MEXICO: **Baja California**: Bahia de Los Angeles, 2 km s Bahia de Los Angeles, 11 km e Chapala, 10.3 mi sw Los Medanos, San Felipe, 16 mi s San Felipe, 4 mi nw Rancho San Juan, 2 mi n El Porvenir, 1.5 mi n Puertocito, 16

mi e. La Rumorosa, 3 mi n Gonzaga Bay; **Baja California Sur**: La Paz, 13 mi w La Paz, 7 mi sw La Paz, 4.5 mi se La Paz, 3 mi w San Miguel de Comondú, Isla Partida dunes, Sierra Placeres, Bahía Concepción, El Pescadero (Playa Los Cerritos), Puerto Escondido, 20 mi s San Ignacio, El Rosario; **Sonora**: 6 mi n El Golfo; **USA: Arizona**: Coconino Co.: 2 mi s Moenkopi, Maricopa Co.: 3 mi nw Wickenburg, Ness, Pleasant Lake, Coon's Bluff, Mesa; Mojave Co.: Topock; Pima Co.: Organ Pipe Nat. Mon. (Quitobaquito), Sabino Canyon; Pinal Co.: 4 mi se, 24 mi w Casa Grande, Picacho, Picacho Pass, Picacho Peak, 5 mi w Stanfield; Yavapai Co.: 2 mi ne Congress; Yuma Co. 30 mi ne Yuma; **Nevada**: Churchill Co.: Blow Sand Mountains, Sand Mountain; Nye Co.; **California**: Contra Costa Co.: Brentwood; Imperial Co.: Plaster City, 3 mi n Glamis, 3 mi nw Glamis, Heber; Kane Spring; Inyo Co.: Bishop, Inyo, 8 mi e Big Pine, 5 mi w Bishop, Death Valley Nat. Mon., Deep Springs, Eureka Valley dunes, s side Owens Vly., Stovepipe Wells, dunes e Tinemaha Res., Panamint dunes; Kern Co.: Mojave (4 mi e, 0.5 mi ne), Picacho St. Park; Mono Co.: Swall Meadows, 5 mi w Bishop, 3 mi s Benton Insp. Sta.; Riverside Co.: 1 mi w Blythe, Cathedral City, Corn Springs, Dead Indian Creek, Deep Canyon, Desert Center, 16 km e Desert Center, Indian Wells, Indio, Joshua Tree Nat. Mon. (Pinto Wash), Painted Canyon, nr. Mecca, 2 mi s Thermal, 1 mi w Blythe, 3 mi n Mecca, Whitewater Canyon; San Bernardino Co.: Adelanto, 2 km s Afton, Cadiz dunes, Halloran Spring, Kelso dunes, Kramer Junction, Zzyzx Springs, Needles, Adelanto, 10 mi e 29 Palms, 6 mi n Lake Baldwin, Ivanpah; San Diego Co.: Hidden Springs, 1 mi s, 6 mi se Ocotillo Wells; **Nevada**: Churchill Co.: Horse Creek; Sand Mountain dunes; Clark Co., Las Vegas; Nye Co.: Beatty; Lincoln Co.: Game Range dunes, Pahrump; **Utah**: Emery Co.: Buckskin Spring n Goblin Valley; **Texas**: Brewster Co.: Alpine; 620 specimens were examined including the holotype (BME, CAS, CUIC, EMEC, UCR).

**Seasonal distribution.** This species has been collected in the months from February through November. The March and November records are from Mexico (Baja California Sur).

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