

A Review of *Pseudacteon* (Diptera: Phoridae) That Parasitize Ants of the *Solenopsis geminata* Complex (Hymenoptera: Formicidae)

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ABSTRACT Some phorid flies of the genus *Pseudacteon* Coquillett parasitize workers of *Solenopsis geminata* (F.) complex fire ants. The group is found to comprise at least 21 species of flies, of which 11 are new to science and described here: *P. amuletum*, *P. andinus*, *P. annulus*, *P. catarinae*, *P. deltoides*, *P. hippeus*, *P. kungae*, *P. laticarinatus*, *P. palomita*, *P. quinni*, and *P. robustus*. An identification key to the females is included. This expansion of known *Pseudacteon* species parasitizing the *S. geminata* complex makes it an interesting system for comparison with *Pseudacteon* flies that parasitize fire ants of the *S. saevissima* (Smith) complex.

KEY WORDS fire ant, phorid, parasitoid, *Pseudacteon*, *Solenopsis*

The genus *Pseudacteon* Coquillett is a group of phorid flies that attack and parasitize ants, causing decapitation of the host worker ants during pupariation. *Pseudacteon* flies can be broadly grouped by host associations, and this review covers the species that are parasitoids of the *Solenopsis geminata* (F.) complex (Trager 1991, Pitts 2002) from northern South America through North America. The *S. geminata* complex of fire ants is host to at least 21 species of *Pseudacteon* flies, compared with 22 known species of *Pseudacteon* hosted by the *Solenopsis saevissima* (Smith) complex in South America (Porter and Pesquero 2001, Brown et al. 2003, Calcaterra 2007). The radiation and diversity of these two groups of phorids poses questions about their evolutionary origins, patterns of host switching and the coexistence of multiple species of flies in local communities. The *Pseudacteon* species hosted by *S. geminata* may be of interest for biocontrol applications in other countries where *S. geminata* has become an invasive pest (Feener and Brown 1992), but a thorough understanding of their systematics and relationships is needed as a basis for working with this system.

The assemblage of *Pseudacteon* species hosted by *S. geminata* exhibits a variety of oviscape morphologies. Several broad groups of similar species are apparent, but the relationship between the various groups awaits a phylogenetic analysis. Similarly, a phylogeny of the host *S. geminata* complex could lead to a better understanding of the interacting phylogenetic and biogeographic patterns of the hosts and parasitoids. The limited distributions of some *Pseudacteon* species may

track the distributions of cryptic *Solenopsis* host species, presently assigned to *S. geminata*.

The importance of establishing *Pseudacteon* species identifications and host associations arises when assessing the risks of host switching for *Pseudacteon* species used in biological control programs for invasive fire ants, such as *S. invicta* Buren (Gilbert and Morrison 1997, Porter and Pesquero 2001, Porter and Gilbert 2004). Introductions should not include species that could potentially attack native fire ants and cause harm to endemic ant communities.

The earliest studies in this group of *Pseudacteon* included descriptions of *P. crawfordi* (Coquillett 1907), *P. spatulatus* (Malloch 1912), and *P. antiguensis* (Malloch 1912). All of these early works documented the associations with *S. geminata*. Further species were described in subsequent years for a total of seven described species by 1991. Reviews by Borgmeier and Prado (1975) and Disney (1991) provided useful summaries of the group. However, Disney's study of the bilobed group was found to have several issues that may have arisen through the lack of review of some type material and the nature of specimen preparation by microscope slide-mounting, which may distort the oviscapes of the bilobed species. Here, we attempt to resolve some of these taxonomic issues, and we provide a key that could be used in the field or laboratory without need for slide-mounting of specimens.

Materials and Methods

During field surveys of the distribution and phenology of phorid flies in Texas, several undescribed species were encountered, some of which had previously been misidentified, whereas others were found for the first time. These surveys included collections of flies attacking ant workers at disturbed nests, flies

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attacking ants foraging at baits, or from trays of ants set out to attract flies. The fire ants were either *S. geminata* or *S. geminata* × *xyloni* McCook hybrids. However some flies, especially those found infrequently, may have other host ant species such as *S. xyloni*, *S. aurea* Wheeler, or *S. amblychila* Wheeler.

Perusal of unidentified specimens in the Natural History Museum of Los Angeles County (LACM) collection revealed further undescribed species associated with *S. geminata* complex fire ants. Additional specimens, caught in Malaise traps, were included in this review if they clearly belonged to species found parasitizing *S. geminata* complex workers. Given the difficulty in separating the ant species, some host records attributed to *S. geminata* may refer to other species in the complex.

The males of most species are unknown and are not treated here. Males are often encountered alongside females, but in many sites multiple species are present, which precludes validating the species identifications. Identification of males will be an important further step, based on breeding or molecular tools.

Terms are those of the Manual of Nearctic Diptera (McAlpine et al. 1981). We use the term oviscape in place of ovipositor to describe the structures associated with oviposition on segment 7. In the species group with bilobed oviscapes, the lobe opening is measured between tips of lobes; width is the widest point of the lobe at the base; and lobe length is along the inner margin from tip to point of lobe separation. Measurements of shape are scaled using lobe length as a reference so that shapes are based on ratios, independent of size.

Material was referenced from the following collections. Unfortunately, several key specimens were not available for examination from MZSP: CUMZ, Cambridge University Museum of Zoology, United Kingdom; IEXA, Instituto de Ecología, Xalapa, Veracruz, Mexico; INBC, Instituto Nacional de Biodiversidad, Costa Rica; LACM, Los Angeles County Museum, USA; MZSP, Museu de Zoologia, Universidade de Sao Paulo, Brazil; ROME, Royal Ontario Museum, Canada; TAMU, Texas A&M University Insect Collection, USA; UNCB, Universidad Nacional de Colombia, Bogota, Colombia; USDA, United States Department of Agriculture, Gainesville, FL, USA; USNM, United States National Museum, USA; and UTIC, University of Texas at Austin Insect Collection, USA.

Results

We identify a total of 21 species of *Pseudacteon* as parasitoids of *S. geminata* complex fire ants. Eleven of these species are described for the first time here. Species were omitted from this review where their host association was uncertain. Several additional undescribed species in the LACM collection may later be shown to be parasitoids of *S. geminata* complex fire ants.

Species are reported in four groups for diagnostic convenience:

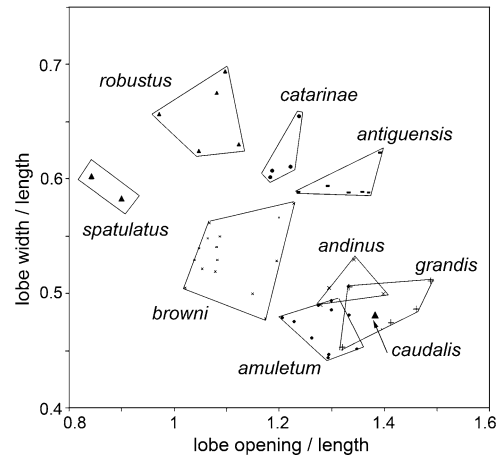


Fig. 1. Shapes of bilobed oviscapes. The approximate shape of *P. caudalis* is based on the illustration from the type description (Borgmeier 1923).

1. Arched bilobed oviscape group. *P. amuletum*, *andinuis*, *antiguensis* (Malloch), *browni* Disney, *catarinae*, *grandis* Greene, *robustus*, *spatulatus* (Malloch).
2. Long oviscape group. *annulus*, *crawfordi* Coquillett, *hippeus*, *longicauda* Borgmeier & Prado.
3. Short, forked oviscape group. *P. bifidus* Brown and Morrison, *bispinosus* Borgmeier & Prado, *deltoides*, *palomita*, *quinni*.
4. Ornate oviscape group. *P. arcuatus* Borgmeier, *fowleri* Pesquero, *kungae*, *laticarinatus*.

Group 1: Arched Bilobed Oviscapes

The bilobed group of species was previously reviewed by Disney (1991). This species group has had a complex taxonomic history, arising from the loss of the holotype of *P. caudalis* (Borgmeier 1923), along with the designation of a male as holotype of *P. antiguensis* with no female described. Borgmeier (1963) synonymized *P. antiguensis*, *caudalis*, and *grandis*, but Disney (1991) modified this by maintaining *P. antiguensis*, reinstating *P. grandis*, and sustaining the synonymy between *P. antiguensis* and *P. caudalis*. Further confusion arose through the misidentification of some specimens as *P. spatulatus* (see below). *P. spatulatus* differs most from the remainder of the group by its small size and parallel-lobed oviscape.

P. caudalis remains available as a valid name if the holotype is found, or additional material from the type locality (Brazil, Rio de Janeiro, Pernambuco) is found to be distinct and matches the type description. The shape of the *P. caudalis* oviscape, as measured from the illustration of the type, seems to have a similar opening/length ratio to either *P. antiguensis* or *grandis*, but the lobe width/length ratio better matches *P. grandis* (Fig. 1). Neither the type drawing nor description depict any projection of the oviscape dorsal plate at the tip, and this lack of projection would place the specimen closer to *P. antiguensis*. The type locality of *P. caudalis* is

>2,500 km from the nearest collections of *P. antiguensis* (Guyana: Berbice), whereas *P. grandis* has been collected even further afield (Colombia and West Indies) with no collections from the intervening region.

The bilobed species differ in fine details of the oviscape, and these features are evident in specimens preserved in alcohol or critical-point dried but are distorted in slide-mounted specimens. The key features are the shapes of the lobes and the relative overlap of the tips of the Ventral Plates (VP) and Dorsal Plates (DP). A thin median plate is also present and exposed along the lower outer margin, but is of less diagnostic use. Disney (1991) pointed out how the extent and intensity of shagreen differed between some species when viewed under high magnification. These species also differ in the shapes of the arches in the degree of opening, and the width of the lobes (Fig. 1).

Pseudacteon amuletum, New Species
(Fig. 9)

Pseudacteon antiguensis, Feener 1987: 148–151, fig. 1.
Pseudacteon spatulatus, Disney 1991: 283–297, figs. 7 and 9; Morrison et al. 1999: 198–207.

Species Recognition. Females: Similar to *P. antiguensis* but differ in having lobes narrower and less tapered than *P. antiguensis*. The two species are widely separated geographically. Males: Illustrated as “*P. spatulatus*,” Disney 1991, fig. 9.

Female. Body length 1.13–1.61 mm, thorax width 0.41–0.53 mm. Wing length 1.20–1.42 mm, width 0.48–0.58 mm, costal index 0.33–0.38. Body color dark brown above with abdomen light brown below, frons dark gray. Palpus pale yellow. Flagellomere 1 brown, oval, flat, microscopically pubescent. Arista equal length to flagellomere 1. Frons with 2–4–4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior twice length of anterior. Costa with \approx 17 pairs of short 0.03-mm setae. Halter yellowish white. Legs pale yellowish brown. Dorsal setal palisade terminates approximately three fourths along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 evenly broad, with five bristles on each posterior lateral margin, longest bristle 0.11 mm. Sternite 6 with two pairs of long medial bristles and four to five shorter lateral bristles on each side. Oviscape bilobed, arched, dark brown, glossy. Lobe length 0.29 mm, lobe length inner margin 0.19 mm, opening between tips 0.27 mm, lobe width 0.09 mm. Median node at top of arch with two long and two short fine bristles. Inner margin of arch curved. DP tip translucent or darkened, evenly rounded, usually extends slightly beyond VP. DP with row of four fine hairs on inner base of lobe. VP with fine shagreen along outer basal margin, row of three to four fine hairs at outer margin of base.

Geographic Distribution. Found in western USA from Texas, Arizona, California to Utah, and in the Tamaulipas region of Mexico, mainly in the range of *S. xyloni* and *S. geminata* \times *xyloni*. There may be several

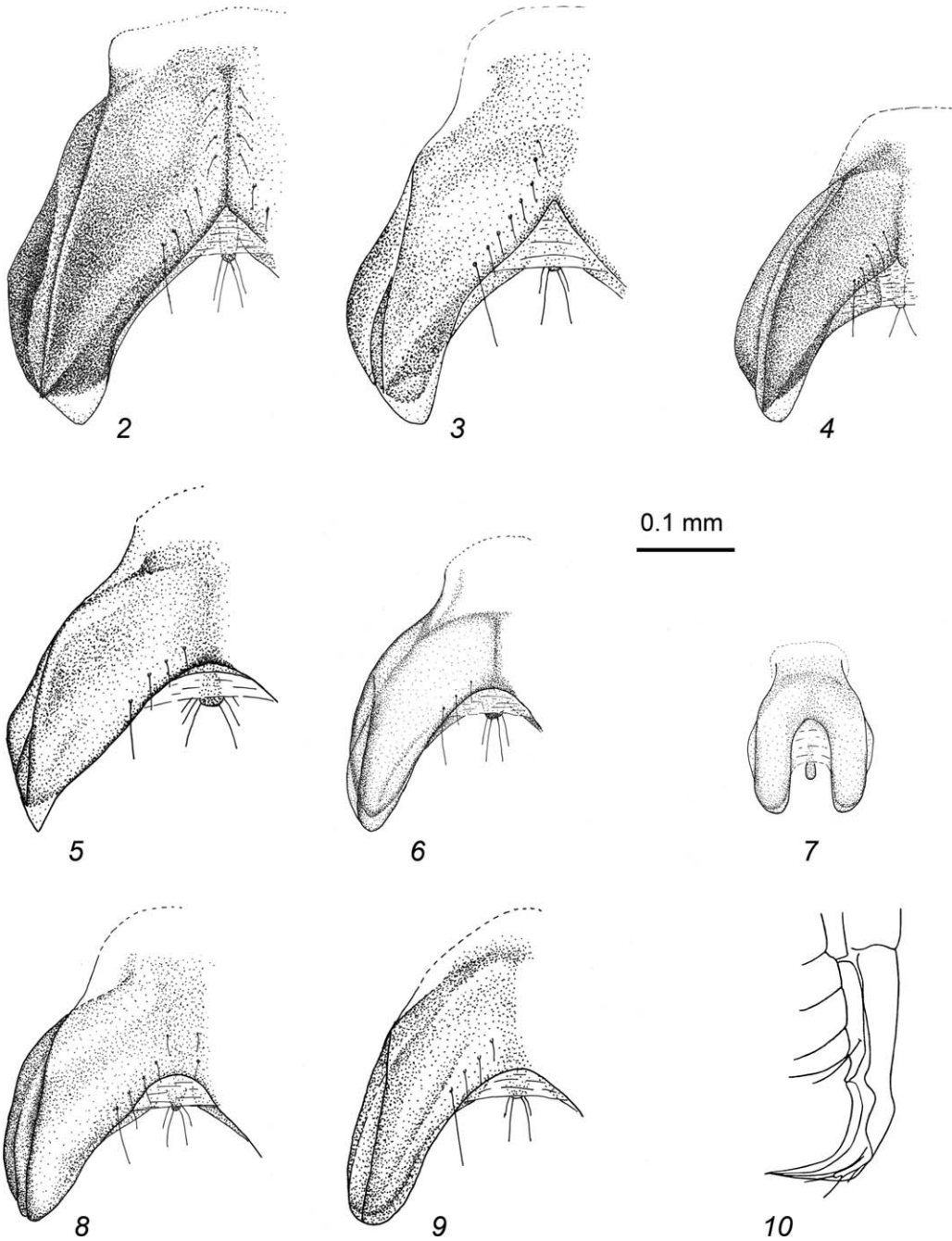
distinct populations as some variations are seen in oviscape shape.

Etymology. The species name means “amulet” in Latin, so named for the horseshoe charm shape of the oviscape. The name “amuletum” is used as a noun in apposition.

Biology. Most often found attacking *Solenopsis* workers at disturbed mounds, but will also come to workers in trays. Has not been found at foraging trails. Host records include *S. geminata*, *S. xyloni*, or *S. geminata* \times *xyloni*.

Holotype. ♀, USA: TEXAS: Kenedy Co., La Paloma Ranch, Transect 061, 27.19° N, 97.96° W, 16-V-2007, R. Plowes, over *S. geminata* \times *xyloni* nest (LACM).

Paratypes. MEXICO: TAMAULIPAS: Rd to Soto La Marina, 23.61° N, 98.63° W, 1 ♀, 29-XII-2006, E. LeBrun, over *Solenopsis* (IEXA); Rd to La Pesca km 16, 23.8° N, 98.05° W, 1 ♀, 30-XII-2006, E. LeBrun, over *Solenopsis* (IEXA); USA: ARIZONA: Cochise Co., Ash Cyn., 3 ♀, VIII-1993, N. McFarland, Malaise trap (LACM); Cochise Co., 5 km E Portal, 1 ♀, 26-VII-1988, B. Brown, over *S. xyloni* (LACM); Maricopa Co., Greater Phoenix, 33.44° N, 112.07° W, 4 ♀, VI-1998, N. Cohen, over *Solenopsis xyloni* (LACM); Pima Co., 16 km W Tucson, 32.24° N, 111.13° W, 2 ♀, 14–22-VI-1995, S. Prchal, Malaise trap (LACM); Pinal Co., Peppersauce Cmpgd., 32.54° N, 110.71° W, 1 ♀, J. O'Hara, Malaise trap (LACM); Santa Cruz Co., Nogales, Sycamore Canyon, 2 ♀, 27-V-1991, B. Brown white pan trap (LACM); Santa Cruz Co., Patagonia, 31.53° N, 110.77° W, 1 ♀ on 24-VI-1994, 2 ♀ on 14-X-1994, 1 ♀ on 15-VII-1995, B. Brown, E. Wilk, Malaise trap (LACM); Santa Cruz Co., Upper White Rock Cmpgd, 31.39° N, 111.08° W, 1 ♀, 19–21-IX-1997, B. Brown, G. Kung, J. Paldi, Malaise trap (LACM); CALIFORNIA: Riverside Co., Univ. of California, 2 ♀, 7–12-VI-1983, D. Yu, Malaise trap (LACM slide mount by Disney); Riverside Co., 10 km south of Palm Desert along Highway 74, 2 ♀, 23-VI-1980, D. Feener #0163, over *Solenopsis xyloni* (LACM); Riverside Co., Pinyon Flat Cmpgd, 33.58° N, 116.45° W, 6 ♀, 10-VIII-1993, B. Brown, over *Solenopsis xyloni* (LACM); Yolo Co., 11 km W Winters, 38.52° N, 122.1° W, 3 ♀, 23-IX-1993, P. Ward #12131, over *S. xyloni* (LACM); TEXAS: Dimmit Co., Chaparral WMA, 28.35° N, 99.42° W, 1 ♀, 6-V-2008, R. Plowes, RP335, over *S. geminata* \times *xyloni* tray (UTIC); Edwards Co., HW377, 29.99° N, 100.52° W, 1 ♀, 19-V-2008, R. Plowes, RP371, over *S. geminata* \times *xyloni* tray (UTIC); Frio Co., HW57 west Moore, 28.94° N, 99.35° W, 1 ♀, 5-V-2008, R. Plowes, RP315, over *S. geminata* \times *xyloni* tray (UTIC); Hidalgo Co., Monte Cristo WR, 26.41° N, 98.26° W, 2 ♀, 15-IV-2006, E. LeBrun, over *S. geminata* \times *xyloni* nests (UTIC); Jeff Davis Co., Davis Mts. Resort, D. Marqua residence, 2 ♀, 12–19-VII-1993 and 21–28-VI-1993, D. Marqua, Malaise traps (TAMU); Kenedy Co., La Paloma Ranch, Fossil Lake, 27.16° N, 97.96° W, 2 ♀, 16-V-2007, R. Plowes, over *S. geminata* \times *xyloni* nests (UTIC); Kenedy Co., La Paloma Ranch, Transect 059, 27.19° N, 97.96° W, 1 ♀, 16-V-2007, R. Plowes, over *S. geminata* \times *xyloni* nests (UTIC); Kenedy Co., La Paloma Ranch, 27.16° N, 97.96° W, 10 ♀, 17-IV-2007, R. Plowes, over *S. geminata* \times *xyloni*



Figs. 2-10. Oviscapes, 2. *Pseudacteon robustus* new species. 3. *Pseudacteon browni* Disney. 4. *Pseudacteon catarinae* new species. 5. *Pseudacteon grandis* Greene. 6. *Pseudacteon andinus* new species. 7. *Pseudacteon spatulatus* (Malloch). 8. *Pseudacteon antiguensis* (Malloch). 9. *Pseudacteon amuletum* new species. 10. *Pseudacteon longicauda* Borgmeier & Prado, (copied from Borgmeier and Prado 1975, not to scale).

nests (UTIC); Kinney Co., HW 90, 29.39° N, 100.71° W, 1 ♀, 20-V-2008, R. Plowes, RP381, over *S. geminata* × *xyloni* trays (UTIC); Maverick Co., HW 57, La Pryor, 28.89° N, 100.17° W, 1 ♀, 31-V-2008, R. Plowes, RP397, over *S. geminata* × *xyloni* trays (UTIC); Presidio Co., Big Bend SNA, 30.0° N, 104.3° W, 2 ♀, 26-28-IV-1991,

G. Zolnerowich, Malaise trap (LACM); Real Co., HW 41, 30.06° N, 99.81° W, 1 ♀, 19-V-2008, R. Plowes, RP369, over *S. geminata* × *xyloni* trays (UTIC); Starr Co., Rio Grande City, Reynaldo Gomez Dr., 26.36° N, 98.78° W, 2 ♀, 14-V-2008, R. Patrock, RJP117, over *S. geminata* × *xyloni* trays (UTIC); Travis Co., BFL Fire-

fly meadow, 30.29° N, 97.78° W, 3 ♀, 14-IV-2008, R. Plowes, RP282, over *S. geminata* mounds (UTIC); Uvalde Co., Frio Riv. nr Uvalde, 29.23° N, 99.68° W, 13 ♀, 21-IV-2008, R. Plowes, E. LeBrun, RP288, over *S. geminata* × *xyloni* trays (UTIC); Valverde Co., Del Rio, HW 277N, 29.26° N, 100.75° W, 1 ♀, 20-V-2008, R. Plowes, RP378, over *S. geminata* × *xyloni* trays (UTIC); Zavala Co., El Mirador Ranch, La Pryor, 28.9° N, 99.82° W, 14 ♀, 8-IV-2008, R. Plowes, RP268, over *S. geminata* × *xyloni* trays (UTIC); UTAH: Washington Co., Lytle Ranch, 37.18° N, 114.0° W, 8 ♀, 4-7-VII-1992, D. Feener, over *S. xyloni* (LACM).

Pseudacteon andinus, New Species

(Fig. 6)

Species Recognition. Females: distinguished from similar species by ovicape which has evenly tapered, rounded, slightly translucent tips to DP, which extend inwardly beyond similarly shaped VP. Males: unknown.

Female. Body length 1.25–1.46 mm, thorax width 0.43–0.48 mm. Wing length 1.20–1.46 mm, width 0.43–0.53 mm, costal index 0.36–0.37. Body color dark brown with narrow light band ventrally on abdomen, frons dark gray-brown. Palpus pale yellow. Flagellomere 1 yellowish brown, oval, flat, microscopically pubescent, slight distal fringe. Arista slightly longer than flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior twice length of anterior. Costa with ≈16 pairs of dark 0.05-mm setae. Halter whitish yellow. Legs pale yellowish brown. Dorsal setal palisade extends two thirds along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 brown, even width, transverse row of four setae on each lateral margin, outer bristle longest, 0.11 mm. Sternite 6 with two pairs of strong medial bristles and five to six shorter bristles on each side toward lateral margin. Ovicape bilobed, arched, dark brown, glossy. Lobe length 0.29 mm, lobe length inner margin 0.21 mm, opening between tips 0.27 mm, lobe width 0.09 mm, median node at top of arch with four fine bristles. Inner margin of arch slightly curved. DP tip evenly tapered, rounded, translucent, extends beyond VP toward inner edge of arch, with row of six fine hairs on inner base of lobe. VP with fine shagreen mostly along outer half, with row of three to four fine hairs at outer margin at base.

Geographic Distribution. Western Amazon Basin of South America, from Ecuador to Peru and Bolivia.

Etymology. Named for the Andes Mountain range along the home range of this species.

Biology. Collected over *Solenopsis electra* Forel in Beni, Bolivia (det. J.P. Pitts) and *S. geminata* in Yasuni NP, Ecuador (det. R. Snelling).

Holotype. ♀, PERU: MADRE DE DIOS: Manu NP, Cocha Cashu Biol. Stn., 11.92° S, 77.30° W, 29–30-VIII-1986, D.C. Darling, Malaise trap, ROM#863573 (LACM).

Paratypes. BOLIVIA: BENI: 5 km N Rurrenabaque, 14.43° S, 67.51° W, 1 ♀, 25-IV-2003, B. Brown, S. Mar-

cotte, E. Zumbado, Malaise trap (LACM); 5 km N Rurrenabaque, 14.43° S, 67.51° W, 10 ♀, 26-IV-2003, B. Brown, S. Marcotte, over *Solenopsis* ants (LACM); COLOMBIA: AMAZONAS: Amacayacu NP, 3.82° S, 70.26° W, 12 ♀ on 27-VII–2-IX-1997, 9 ♀ on 3–5-IX-1997, M. Sharkey, Malaise trap (LACM); ECUADOR: NAPO: Yasuni Biol. Res. Stn., 0.67° S, 76.39° W, 2 ♀ on 22-V-1996, 25 ♀ on 24-V-1996, B. Brown, over *S. geminata* (LACM); SUCUMBIOS: Sacha Lodge, 0.5° S, 76.5° W, 3 ♀ on 12–22-II-1994, 3 ♀ on 4–14-III-1994, 6 ♀ on 14–24-III-1994, 1 ♀ on 13–23-IV-1994, 1 ♀ on 23-IV–3-V-1994, 5 ♀ on 3–13-VII-1994, P. Hibbs, Malaise trap (LACM); PERU: MADRE DE DIOS: Manu NP, Cocha Cashu Biol. Stn., 11.92° S, 77.30° W, 8 ♀ on 29–30-VIII-1986, 1 ♀ on 23–30-IX-1986, D.C. Darling, Malaise trap, ROM#863573, 868005 (LACM, ROME).

Pseudacteon antiguensis (Malloch)

(Fig. 8)

Plastophora antiguensis Malloch 1912: 502, pl.39, fig. 11.

Pseudacteon antiguensis (Malloch), Borgmeier 1963: 200, figs. 185, 196, 197.

Pseudacteon caudalis, Borgmeier 1963: 200; Disney 1991: 287 + 332.

Pseudacteon grandis, Borgmeier 1963: 200.

Pseudacteon antiguensis, Disney 1991: 287–291, figs. 4, 10, misspelling corrected p. 332.

Holotype. ♂, ANTIGUA: (USNM, examined).

Remarks. Although no females were included in the type series from Antigua, specimens examined from nearby Dominica, Barbados, Colombia, and Guyana are all very similar and seem to represent a single species ranging through the West Indies and adjacent mainland. Borgmeier and Prado (1975) include a series from La Lima, Honduras, D. & R. Williams, 1973. Given the disjunct distribution it is likely that these are not *P. antiguensis* and may instead be *P. browni*.

Species Recognition. Females: Most similar to *P. amuletum* from which it differs in the shape of ovicape lobes. In *P. antiguensis*, the lobes are broader at the base and taper toward the tips. The two species are well separated geographically. Males: see Disney 1991.

Female. Body length 1.20–1.49 mm, thorax width 0.41–0.50 mm. Wing length 1.18–1.30 mm, wing width 0.46–0.55 mm, costal index 0.37–0.39. Body color dark brown above with abdomen light brown below, frons dark gray brown. Palpus pale yellow. Flagellomere 1 brown, oval, flat, microscopically pubescent. Arista slightly longer than flagellomere. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior almost twice length of anterior. Costa with ≈16 pairs of dark 0.04-mm setae. Halter yellowish brown. Legs pale yellowish brown. Dorsal setal palisade terminates approximately three fourths along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 broad, widest medially, with strong bristles (0.18 mm) on each lateral margin alongside a row of four to six shorter hairs. Sternite 6 with two pairs of strong medial bristles (0.18 mm) and four

to five lateral bristles on each side. Oviscape bilobed, arched, dark brown, glossy. Lobe length 0.30 mm, lobe length inner margin 0.22 mm, opening between tips 0.30 mm, lobe width 0.11 mm. Median node at top of arch with two fine bristles. Inner margin of arch curved. DP evenly rounded at tip, uniformly dark, obscuring view of VP in dorsal view. DP with row of four fine hairs at base where lobes join. VP with extensive fine shagreen, row of three fine hairs at outer margin of base.

Geographic Distribution. West Indies and northern South America.

Biology. Type series of males captured over *S. geminata*.

Other Material Examined. BARBADOS: Hometown, 1 ♀, 22-IV-1978, K.N. Barber, Pan trap (LACM); COLOMBIA: VICHADA: PNN El Tuparro, Bosque Sabana, 5.35° N, 67.85° W, 1 ♀ on 5-14-I-2001, 1 ♀ on 8-14-XII-2000, W. Villalba, Malaise trap CAP-1058, 1384 (LACM); PNN El Tuparro, Centro Admin., 5.35° N, 67.86° W, 6 ♀ on 29-VI-15-VII-2000, 2 ♀ on 17-26-XII-2000, W. Villalba, Malaise trap CAP-269, 1382 (LACM); PNN El Tuparro, Cerro Tomás, 5.35° N, 67.85° W, 13 ♀ on 15-19-VII-2000, 11 ♀ on 29-VII-8-VIII-2000, 5 ♀ on 8-28-VIII-2000, 6 ♀ on 18-28-VIII-2000, 2 ♀ on 8-17-XII-2000, 1 ♀ on 29-XI-8-XII-2000, 1 ♀ on 20-29-XII-2000, 2 ♀ on 5-14-I-2001, 12 ♀ on 21-31-I-2001, W. Villalba, Malaise traps CAP-506, 512, 513, 516, 1054, 1056, 1059, 1381, 1383 (LACM, UNCB); PNN El Tuparro, 5.35° N, 67.86° W, 2 ♀, 15-19-VI-2000, M. Sharkey, G. Kung, Malaise trap #11 (LACM); DOMINICA: Clark Hall, 1 ♀, 11-20-I-1965, W.W. Wirth, Malaise trap (USNM); GUYANA: BERBICE: War-naibo Creek, Dubulay Ranch, 5.66° N, 57.88° W, 2 ♀, 16-20-I-1999, B. Brown & M. Sharkey, Malaise trap #9 (LACM); Dubulay Ranch, 5.68° N, 57.86° W, 8 ♀, 15-23-I-1999, B. Brown & M. Sharkey, Malaise traps #1,4 (LACM); SURINAME: BROKOPONDO: Brownsberg Nature Park, Visitor Ctr, 4.95° N, 55.18° W, 2 ♀ on 27-VIII-2007, 14 ♀ on 30-VIII-2007, 1 ♀ on 31-VIII-2007, 5 ♀ on 1-IX-2007, G. Kung, A. Kreuter, attr. to tuna baits (LACM); TRINIDAD: Arima Vly, Simla Stn, 4 ♀, 2-10-VI-1977, P. Feinsinger (LACM slide mount).

Pseudacteon browni Disney

(Fig. 3)

Pseudacteon browni Disney 1991: 291-296, figs. 1-3, 5; Feener and Brown 1992: 80-84.

Holotype. ♀, COSTA RICA: HEREDIA: La Selva Biological Station, Puerto Viejo de la Sarapiquí, II-1980, W. Mason (CUMZ, not examined).

Species Recognition. Females: Similar to *P. robustus* but differ in having more elongate, narrower lobes, with differences in the shapes of the tips. *P. browni* oviscapes are less heavily chitinized with less contrast between the translucency of DP and VP tips compared with *P. robustus*. Males: see Disney 1991.

Female. Body length 1.42-1.63 mm, thorax width 0.48-0.58 mm. Wing length 1.37-1.56 mm, width 0.50-

0.59 mm, costal index 0.34-0.35. Body color dark brown with narrow light brown band ventrally on abdomen, frons dark brown. Palpus pale yellow with six short bristles. Flagellomere 1 brown, oval, flat, length 0.18 mm, microscopically pubescent. Arista similar length to flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior $\approx 1.5\times$ length of anterior. Costa with ≈ 17 pairs of dark, long 0.06-mm setae. Halter whitish yellow. Legs pale yellowish brown. Dorsal setal palisade terminates approximately three fourths along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 broad, with two transverse rows of short setae toward lateral margins, anterior row of four small hairs, posterior row of four hairs increasing to longest bristle (0.16 mm) on lateral margin. Sternite 6 with three pairs of strong medial bristles (0.20 mm) and six to seven lateral bristles on each side. Oviscape bilobed, arched, dark brown, glossy. Lobe length 0.37 mm, lobe length along inner margin 0.27 mm, opening between tips 0.27 mm, lobe width 0.15 mm. Median node at top of arch with four fine bristles. DP tip somewhat elongate, pointed inward, extending as a clear process along inner margin. DP with row of seven fine hairs on inner base of lobes. VP tip rounded, pointed inward, seen in dorsal view through tip of DP. Inner margin of arch curved. In dorsal view, base of VP seen as a slight bulge at top of inner margin. VP with extensive deep shagreen, row of four fine hairs at outer margin at base.

Geographic Distribution. Central America: Columbia to Honduras. The series collected by D. & R. Williams at La Lima, Honduras in 1973 was assigned to *P. antiguensis* by Borgmeier and Prado (1975). Given the geographic ranges of this revised species group, it is likely that these specimens are *P. browni*, but unfortunately they were not available for examination.

Biology. Both female and male flies were attracted to recruitment trails of *S. geminata* in Costa Rica (Feener and Brown 1992). Ants responded to the presence of hovering flies by taking a defensive posture with abdomens curled forward under the thorax. A further interesting record was made by C. Rettenmeyer, who found the species on a *Neivamyrmex adnepsos* (Wheeler) raid column, possibly while raiding a *Solenopsis* colony.

Material Examined. COLOMBIA: CAUCA: Isla Gorgona, 2.97° N, 78.18° W, 3 ♀, 3-III-2000, B. Brown, G. Kung, over *Solenopsis* on baits (LACM); Isla Gorgona, El Saman, 2.97° N, 78.18° W, 1 ♀, 9-27-VIII-2001, H. Torres, Malaise trap CAP-2120 (LACM); Isla Gorgona, Mancora, 2.97° N, 78.18° W, 1 ♀, 1-5-III-2000, M. Sharkey, Malaise trap CAP-3307 (LACM); Isla Gorgona, 2.97° N, 78.18° W, 1 ♀, 1-III-2000, D. Campos, sweep sample (LACM); Isla Gorgona, 2.97° N, 78.18° W, 8 ♀ on 1-5-III-2000, 3 ♀ on 1-4-III-2000, B. Brown, G. Kung, M. Sharkey, Malaise trap #10,11 (LACM); CHOCO: PNN Utria, Centro Visit., 6.02° N, 77.33° W, 2 ♀, 26-XII-1-II-2001, J. Perez, Malaise trap CAP-1343 (LACM); PNN Utria, Centro Visit., 6.02° N, 77.35° W, 12 ♀, 19-27-VII-2000, J. Perez, Malaise trap CAP-333

(LACM); PNN Utria, Centro de Visitantes, 6.02° N, 77.33° W, 3♀, 1-15-XI-2000, J. Perez, Malaise trap CAP-1341 (LACM); PNN Utria, Centro de Visitantes, 5.35° N, 67.86° W, 1♀, 30-VI-2000, B. Brown (LACM); PNN Utria, Sendero Boroboro, 6.02° N, 77.33° W, 4♀, 26-XII-1-II-2001, J. Perez, Malaise trap CAP-1465 (UNCB); PNN Los Katios, Centro Admin., 7.85° N, 77.13° W, 2♀, 29-V-13-VI-2003, P. Lopez, Malaise trap CAP-3757 (LACM); COSTA RICA: ALAJUELA: Los Chiles, 10.4° N, 84.33° W, 15♀, I-1990, P. Hanson, Malaise trap (LACM); San Pedro la Tigra, 10.37° N, 83.92° W, 6♀, II-1990, P. Hanson, Malaise trap (LACM); Alberge de Heliconia, 10.71° N, 85.04° W, 1♀, 16-17-VI-2000, B. Brown, Malaise trap (LACM); CARTAGO: Turrialba, 9.93° N, 83.67° W, 1♀, 15-19-VII-1965, P. Spangler (LACM); GUANACASTE: Res. Priv. Karen Mogensen, 9.87° N, 85.06° W, 1♀, 31-III-4-IV-2005, B. Brown, Porras, E. Zumbado, Malaise trap (LACM); Santa Rosa NP, 10.95° N, 85.62° W, 3♀ on 27-IX-18-X-1986, 1♀ on 18-X-8-XI-1986, 2♀ on 21-II-14-III-1987, I. Gauld, D. Janzen, Malaise trap H.3.0, H.4.C (LACM); HEREDIA: La Selva Biological Station, 10.43° N, 84.02° W, 1♀ on 15-III-1993, 1♀ on 2-IV-1993, 2♀ on 2-IV-1993, 1♀ on 16-IV-1993, 1♀ on 2-V-1993, 2♀ on 3-V-1993, 4♀ on 3-V-1993, 2♀ on 18-V-1993, 2♀ on 1-VI-1993, 2♀ on 1-VI-1993, 1♀ on 1-VI-1993, 1♀ on 2-VI-1993, 2♀ on 14-VI-1993, 4♀ on 15-VI-1993, 4♀ on 1-VII-1993, 6♀ on 15-VII-1993, 1♀ on 3-VIII-1993, 1♀ on 15-XI-1993, 2♀ on 1-II-1994, 2♀ on 15-III-1994, 9♀ on 4-IV-1994, 1♀ on 17-VII-1995, 1♀ on 1-VIII-1995, 2♀ on 14-IX-1995, 2♀ on 16-XI-1995, 4♀ on 15-IV-1996, 1♀ on 2-V-1996, 2♀ on 31-V-1996, 6♀ on 3-IV-2000, 2♀ on 17-IV-2000, 2♀ on 1-V-2000, 2♀ on 15-V-2000, ALAS, Malaise trap M-01/32, 11/58, 13/60, 13/76, 1/80, 11/90, 13/92, 9/103, 10/116, 11/117, 13/119, 14/120, 01/124, 11/133, 13/147, 1/152, 1/173, 13/275, 1/332, 11/381, 11/389, 01/399, 01/411, 01/447, 11/480, 11/624, 11/636, 1/651, 19/745, 19/746, 19/747, 19/748 (INBC, LACM); Puerto Viejo, 10.26° N, 83.59° W 1♀, 1♂, 3-VIII-1965, C.W. Rettenmeyer, over *Neivamyrmex adnepos* E-425 raid column (CUMZ); Puerto Viejo de la Sarapiquí, La Selva Biological Station, 10.43° N, 84.02° W, 6♀ on 22-IV-1989, 6♀ on 3-6-V-1989, B. Brown & D. Feener, over *S. geminata* (LACM); Puerto Viejo de la Sarapiquí, La Selva Biological Station, 10.43° N, 84.02° W, 4♀ on 26-VI-1-VII-1993, B. Brown & D. Feener, Malaise trap #1 (LACM); Puerto Viejo de la Sarapiquí, La Selva Biological Station, 5♀ on 24-25-V-1988, 2♀ on 26-V-1988, B. Brown, on *S. geminata* (LACM); LIMON: 16 km W Guapiles, 10.15° N, 83.92° W, 5♀ on II-1989, 2♀ on III-IV-1990, P. Hanson, Malaise trap (LACM); 4 km N Bribri, 9.63° N, 82.82° W, 2♀, XII-1989-III-1990, P. Hanson, Malaise trap (LACM); 7 km SW Bribri, 9.58° N, 82.88° W, 3♀, IX-X-1989, P. Hanson, Malaise trap (LACM); PUNTARENAS: 3 km SW Rincon, 8.68° N, 83.48° W, 5♀, III-1989, P. Hanson, Malaise trap (LACM); 5 km SW Rincon, 8.70° N, 83.51° W, 4♀, 31-V-7-VI-1998, B. Brown, V. Berezovskiy, Malaise trap (LACM); Rd to Rincon, 24 km W Pan American Highway, 5♀, III-IV-1989, P. Hanson, I. Gauld, Malaise trap (LACM); 5 km W Piedras Blancas, 8.77° N, 83.28°

W, 1♀, VIII-1991, P. Hanson, Malaise trap (LACM); 24 km W Piedras Blancas, 8.77° N, 83.4° W, 11♀ on X-1990, 6♀ on XII-1990, P. Hanson, Malaise trap (LACM); Las Alturas, 8.95° N, 82.83° W, 2♀, 11-13-VI-1998, B. Brown, V. Berezovskiy, Malaise trap (LACM); Las Alturas, 8.95° N, 82.83° W, 1♀, III-1992, P. Hanson, Malaise trap (LACM); Puerto Jimenez, 8.53° N, 82.32° W, 1♀, I-1991, P. Hanson, Malaise trap (LACM); 5 km NW Puerto Jimenez, 8.55° N, 82.35° W, 5♀, XI-XII-1990, P. Hanson, Malaise trap (LACM); San Pedrillo, 8.62° N, 83.73° W, 1♀, I-1-1982, J. Longino, attacking *S. geminata* (LACM); Tropical Youth Center, 8.70° N, 83.51° W, 6♀ on 23-26-VII-2002, 1♀ on 16-21-VII-2002, L. Gonzalez, Malaise trap #2,4 (LACM); SAN JOSE: Escazu, 9.9° N, 84.15° W, 1♀, IV-1989, W. Eberhard, Malaise trap (LACM); GUATEMALA: SACATEPÉQUEZ: Sumpango, Durwest Farm, 14.67° N, 90.72° W, 2♀ on 21-28-I-2007, 8♀ on 27-I-3-II-2007, 4♀ on 2-10-II-2007, 14♀ on 18-II-4-III-2007, 4♀ on 10-23-II-2007, 4♀ on 17-20-III-2007, 11♀ on 10-16-III-2007, M. Hoddle, Malaise trap (LACM); SUCHITEPÉQUEZ: San Antonio de Suchitepéquez, 14.53° N, 91.42° W, 1♀, 6-VII-1965, P. Spangler, Malaise trap (LACM); HONDURAS: CATACAMAS: Olancho, 15.38° N, 85.85° W, 6♀, 21-IV-1995, R. Cordero, Malaise trap (LACM); NICARAGUA: RIO SAN JUAN: Refugio Bartola, 16 km ESE El Castillo, 10.98° N, 84.34° W, 1♀, 22-IV-10-V-1999, L. LaPierre, Malaise trap (LACM); GRENADA: Volcan Mombacho Santa Ana #3, 11.83° N, 85.97° W, 1♀, 2-VI-1998, J. Maes, Malaise trap (LACM); PANAMA: DARIEN: Cruce de Mono. Est. Inrenare, 7.92° N, 77.62° W, 1♀, 6-II-4-III-1993, R. Cambra, J. Coronado, Malaise trap (LACM); VERAGUAS: 7.3° N, 80.7° W, 21♀, 22-25-IV-1997, J. Deago, Malaise trap (LACM).

Pseudacteon catarinae, New Species

(Fig. 4)

Pseudacteon browni Disney 1991: 283-297 (in part: specimens from USA: Texas); Morrison et al. 1997: 716-724; Morrison et al. 1999: 198-207.

Species Recognition. Females: Distinguished from similar species by the tips of the bilobed ovicape which have a darkened, pointed medial projection to the DP well beyond the VP. The base of the VP extends as a strong bulge on inner margin at top of arch. Males: unknown.

Female. Body length 1.01-1.49 mm, thorax width 0.36-0.48 mm. Wing length 0.94-1.44 mm, wing width 0.34-0.50 mm, costal index 0.33-0.37. Body color dark brown, abdomen light brown below, frons gray black. Palpus pale yellow with six short bristles. Flagellomere I brown, oval, flat, microscopically pubescent. Arista slightly longer than flagellomere I. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior almost twice length of anterior. Costa with ≈ 17 pairs of dark 0.05-mm setae. Halter whitish yellow. Legs pale yellowish brown. Dorsal setal palisade terminates approximately

three fourths along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 broad, with two transverse rows of short setae toward lateral margins, anterior row of four small hairs, posterior row of four hairs increasing to longest bristle (0.13 mm) on lateral margin. Sternite 6 with three pairs of strong medial bristles (0.20 mm) and four to six lateral bristles on each side. Oviscape bilobed, arched, dark brown, glossy. Lobe length 0.34 mm, lobe length inner margin 0.27 mm, opening between tips 0.30 mm, lobe width 0.11 mm, median node at top of arch with two fine bristles. Outer edge of DP forming a ridge between median and outer margin of the lobe, ending in a darkened fold projecting at median of tip. DP tip extending as a clear angular process pointed inward. DP with row of five fine hairs at base where lobes join. Base of VP with a strong bulge at inner margin of arch. Inner margin of arch slightly curved. VP tip evenly rounded, barely seen dorsally through clear tip of DP. VP with extensive deep shagreen, row of five fine hairs on outer margin at base.

Geographic Distribution. Southwestern Texas to Belize.

Etymology. Named for the type locality, Catarina, Dimmit Co., TX.

Biology. In Texas, frequently encountered attacking *S. geminata* and *S. geminata* × *xyloxi* at disturbed mounds or at trays of worker ants. Rarely found attacking foraging workers at baits. Ovipositions often resulted in worker ants being stunned or knocked on their sides followed by allogrooming (Morrison et al. 1999).

Holotype. ♀, USA: TEXAS: Dimmit Co., Catarina, El Regalo Ranch, 28.50° N, 99.63° W, 2-VI-2008, R. Plowes, RP409, over *S. geminata* × *xyloxi* tray (LACM).

Paratypes. BELIZE: CAYO DISTR: El Pilar, 1♀, 29-XI-1998, L. Morrison (LACM); MEXICO: TAMAULIPAS: Villa de Casas, 23.73° N, 98.73° W, 1♀ on 2-XII-2006, 1♀ on 29-XII-2006, E. LeBrun (IEXA); USA: TEXAS: Blanco Co., Pedernales Falls, 30.33° N, 98.26° W, 1♀, 29-V-2008, J. Romine, on *S. geminata* mound (UTIC); Cameron Co., 26.06° N, 97.57° W, 1♀, 1-V-2008, R. Patrock, RJP62, over *S. geminata* × *xyloxi* tray (UTIC); Dimmit Co., Catarina, El Regalo Ranch, 28.50° N, 99.63° W, 34♀, 8-X-2008, R. Plowes, RP564, over *S. geminata* × *xyloxi* tray (UTIC); Guadalupe Co., Starke Park, Seguin, 29.55° N, 97.98° W, 4♀, 2-V-2008, S. Gibson, over *S. geminata* nest (UTIC); Kenedy Co., La Paloma Ranch, 27.19° N, 97.97° W, 2♀, 16-V-2007, R. Plowes, Trans 059, on *S. geminata* × *xyloxi* mound (UTIC); Kenedy Co., La Paloma Ranch, 27.16° N, 97.96° W, 1♀, 15-V-2007, R. Plowes, on *S. geminata* × *xyloxi* mound (UTIC); Kenedy Co., La Paloma Ranch, 27.22° N, 97.96° W, 1♀, 17-IV-2007, R. Plowes, E. LeBrun, on *S. geminata* × *xyloxi* nest (UTIC); Kerr Co., Coolwater, 29.99° N, 99.36° W, 1♀, 15-VII-2008, R. Plowes, RP473, over *S. geminata* × *xyloxi* tray (UTIC); La Salle Co., Walker Ranch, Nueces Riv., 28.43° N, 99.29° W, 17♀, 8-IV-2008, R. Plowes, RP264, over *S. geminata* × *xyloxi* tray (UTIC); Maverick Co., HW 57, nr Eagle Pass, 28.89° N, 100.17° W, 34♀, 31-V-2008, R.

Plowes, RP397, over *S. geminata* × *xyloxi* tray (UTIC); McMullen Co., HW72, 28.49° N, 98.73° W, 1♀, 3-VI-2008, R. Plowes, RP421, over *S. geminata* × *xyloxi* tray (UTIC); Medina Co., Natalia I35, 29.20° N, 98.82° W, 2♀, 5-V-2008, R. Plowes, RP312, over *S. geminata* × *xyloxi* tray (UTIC); Starr Co., Rio Grande City, 26.36° N, 98.78° W, 1♀, 14-V-2008, R. Patrock, RJP117, over *S. geminata* × *xyloxi* tray (UTIC); Travis Co., Austin, 30.30° N, 97.78° W, 1♀ on 19-V-1995, 5♀ on 1-VIII-1995, L. Morrison, over *S. xyloxi* nest (LACM); Travis Co., Circle C, Austin, 30.20° N, 97.89° W, 8♀, 19-IX-1996, L. Morrison, over *S. geminata* nest (UTIC); Uvalde Co., Concan, Annandale, 29.47° N, 99.7° W, 7♀, 20-V-2008, R. Plowes, RP390, over *S. geminata* × *xyloxi* tray (UTIC); Webb Co., Retama Ranch, 27.75° N, 99.51° W, 3♀, 7-IV-2008, R. Plowes, RP259, over *S. geminata* × *xyloxi* tray (UTIC); Willacy Co., Laguna Atascosa, 26.18° N, 97.35° W, 1♀, 1-V-2008, R. Patrock, RJP67, over *S. geminata* × *xyloxi* tray (UTIC); Zavala Co., El Mirador Ranch, La Pryor, 28.9° N, 99.82° W, 10♀, 8-IV-2008, R. Plowes, RP268, over *S. geminata* × *xyloxi* tray (UTIC).

Pseudacteon grandis Greene

(Fig. 5)

Pseudacteon grandis Greene 1941: 183–184, fig. 1; Disney 1991: 296, figs. 6 and 8.

Pseudacteon antiguensis, Borgmeier 1963: 200, figs. 185 and 196–197.

Holotype. ♀, JAMAICA: Negril Point, Station 583, 19-V-1941, E.A. Chapin (USNM, examined).

Species Recognition. Females. This large species is distinguished by the oviscape lobes which have a long, sharply-pointed membranous extension to the DP at the inside edge of the lobe tips. Males: see Disney 1991.

Female. Body length 1.27–1.73 mm, thorax width 0.34–0.46 mm. Wing length 1.08–1.46 mm, width 0.41–0.53 mm, costal index 0.36–0.38. Body color dark brown above with abdomen light brown below, frons dark brown. Palpus pale yellow. Flagellomere 1 yellowish brown, oval, flat, microscopically pubescent. Arista slightly longer than flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, anterior 0.10 mm, posterior 0.18 mm. Costa with ≈17 pairs of 0.05-mm setae. Halter whitish yellow. Legs pale yellowish brown. Dorsal setal palisade terminates approximately two thirds along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 widest medially, with two rows of short setae toward posterior lateral margins, anterior row of four small hairs, posterior row has two small hairs medially then three strong hairs laterally. Sternite 6 with two pairs of strong medial bristles (0.13 mm) and four to five lateral bristles on each side. Oviscape bilobed, arched, dark brown, glossy. Lobe length 0.29 mm, lobe length inner margin 0.22 mm, opening between tips 0.34 mm, lobe width 0.11 mm, median node at top of arch with four fine bristles.

Inner margin of arch nearly straight. DP extends beyond VP at inner angle of tip forming a clear, sharply pointed extension, DP has row of five fine hairs on inner base of lobe. VP has fine shagreen in small area near basal hairs, row of four fine hairs at outer margin at base.

Geographic Distribution. Caribbean and northern South America. (The paratypes from State College, MS are lost. Based on their distribution, those specimens were possibly *P. catarinae*, *P. amuletum*, or *P. robustus*.)

Biology. Type specimen from Jamaica taken in association with *S. geminata*. Collected from a disturbed *S. geminata* nest on Puerto Rico.

Other Material Examined. BAHAMAS: San Salvador Island, 7♀, 9-15-V-1982, D. Bowen (LACM); BRITISH VIRGIN ISLANDS: Guana Island, Beach Woods, 18.48° N, 64.58° W, 1♀, 1♂, 15-20-IV-2001, R. Snelling, Malaise trap (LACM); Guana Island, 18.47° N, 64.57° W, 1♀, 11-20-X-2002, W.P. Liao, Malaise trap (LACM); Guana Island, 18.49° N, 64.58° W, 1♀, 11-20-X-2002, R. Snelling, Malaise trap #3 (LACM); COLOMBIA: BOLIVAR: SFF Los Colorados, Villa Roca, 9.90° N, 75.12° W, 2♀, 3-18-VIII-2001, E. Deulfeut, Malaise trap CAP-2047 (LACM); SFF Los Colorados, El Mirador, 9.90° N, 75.12° W, 2♀, 22-IX-7-X-2001, E. Deulfeut, Malaise trap CAP-2165 (LACM); MAGDALENA: PNN Tayrona, Zaino, 11.33° N, 74.03° W, 2♀ on 13-30-V-2000, 2♀ on 29-V-14-VI-2000, 7♀ on 14-29-VI-2000, 12♀ on 29-VI-17-VII-2000, 6♀ on 30-VIII-20-IX-2000, 1♀ on 20-29-IX-2000, 1♀ on 29-IX-17-X-2000, 1♀ on 3-22-XI-2000, 4♀ on 29-I-21-II-2001, R. Henriquez, Malaise trap CAP-136, 241, 301, 624, 625, 793, 941, 1349 (LACM, UNCB); PNN Tayrona, Pueblito, 11.33° N, 74.03° W, 1♀ on 30-IX-26-X-2000, 1♀ on 31-I-21-II-2001, R. Henriquez, Malaise trap CAP-790, 1348 (LACM); PNN Tayrona, Neguanje, 11.33° N, 74.03° W, 1♀, 21-II-5-III-2001, R. Henriquez, Malaise trap CAP-1351 (LACM); DOMINICAN REP: LA CUMBRE: Puerto Plata, 4♀, 21-24-III-1978, L. Masner, Malaise trap (LACM slide mount); JAMAICA: Milk River Bank, 2♀, 11-III-1970, W. Wirth & Farr, Malaise trap (USNM); Runaway Bay, 2♀, 1-8-III-1970, W. Wirth, Malaise trap (USNM); PUERTO RICO: Salinas, Road 712, Albergue Olimpico, 18.04° N, 66.24° W, 1♀, 13-IX-2007, S. Cruz, on disturbed *S. geminata* nest (USDA); VENEZUELA: Zulia Rosalia, 1♀, 14-VI-1976, A.S. Menke, D. Vincent (USNM); Zulia, 6 km W La Concepcion, 1♀, 18-VI-1976, A.S. Menke, D. Vincent (USNM).

Pseudacteon robustus, New Species

(Fig. 2)

Species Recognition. Females: This is one of the largest species in the bilobed-oviscape group, distinguished by having broader, robust, darkly chitinized lobes with clear DP tips, and by differences in the shape of the lobe tips. Males: unknown.

Female. Body length 1.32–1.80 mm, thorax width 0.48–0.60 mm. Wing length 1.37–1.70 mm, width 0.58–0.62 mm, costal index 0.34–0.38. Body color dark brown with abdomen light brown below. Frons gray-

black. Palpus pale yellow. Flagellomere 1 yellowish brown, broadly oval, flat, microscopically pubescent, slight distal fringe. Arista slightly longer than flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior twice length of anterior. Costa with ≈19 pairs of dark 0.05-mm setae. Halter whitish yellow. Legs pale yellowish brown. Dorsal setal palisade extends three fourths along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 brown, broad, even width, transverse row of five to six short hairs and four long bristles (0.17 mm) on each lateral margin. Sternite 6 with three pairs of strong medial bristles (0.20 mm) and 4-5 shorter bristles toward each lateral margin. Oviscape bilobed, arched, dark brown, glossy. Lobe length 0.38 mm, lobe length inner margin 0.24 mm, opening between tips 0.26 mm, lobe width 0.14 mm. Median node at top of arch with four fine bristles. Inner margin of arch curved. Outer margin of VP broad along basal two-thirds, then bends and tapers toward tip. Tip of DP clear, extending to a rounded point on inner half of terminus. VP tip evenly rounded, seen as a dark feature through clear DP tip. DP with row of seven hairs on inner base of lobe. VP with extensive deep shagreen, row of five fine small hairs at outer margin at base of lobe.

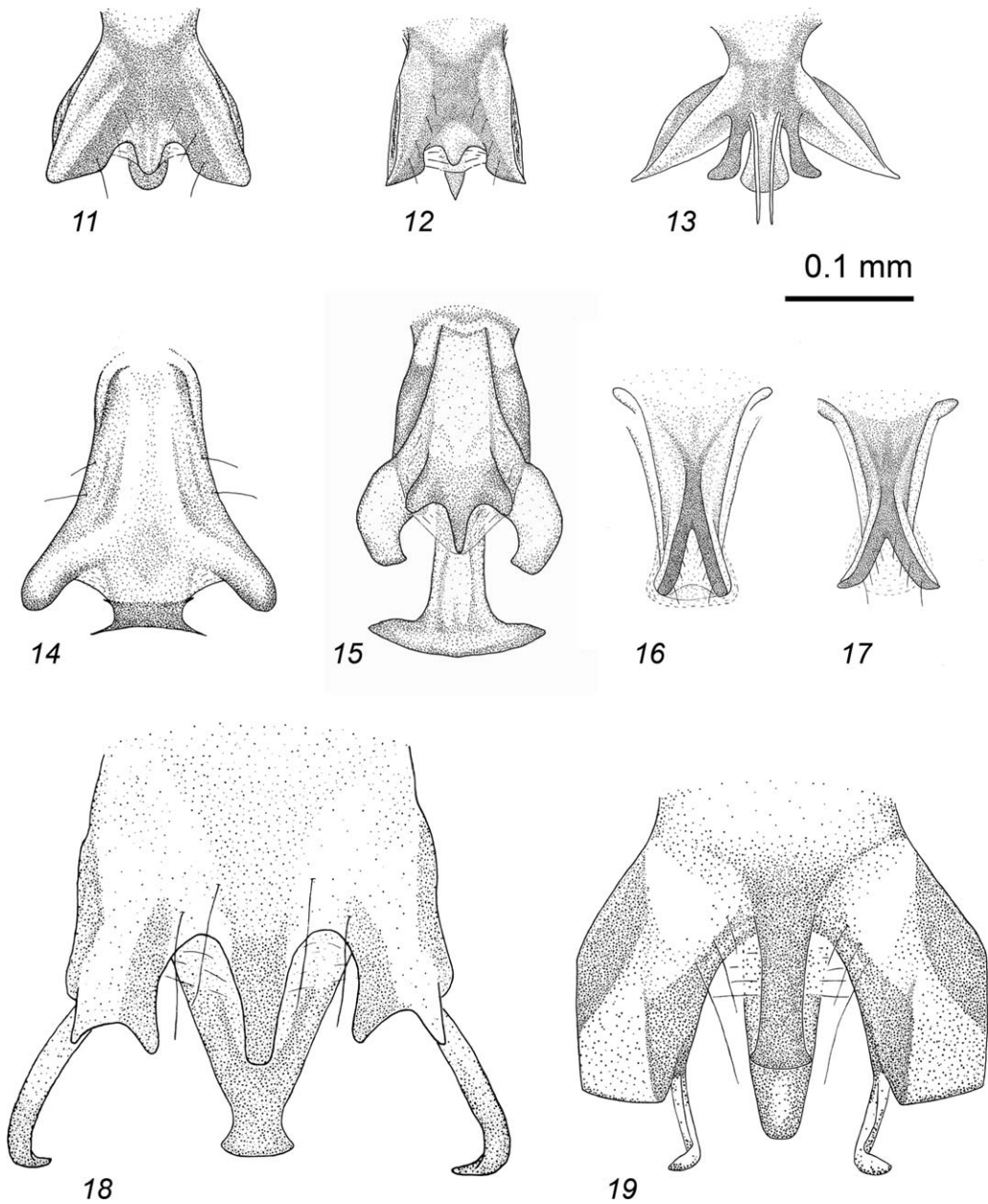
Geographic Distribution. From southwestern Texas to Central America.

Etymology. The name "*robustus*" is a Latin reference to the large size of this species.

Biology. In southwestern Texas, often encountered attacking *S. geminata* and *S. geminata* × *xyloni* hybrids at disturbed mounds and trays of workers. Occasionally found attacking foraging workers at baits. Larger sized workers are preferentially attacked. Ants respond with alarm postures.

Holotype. ♀, USA: TEXAS: Dimmit Co., San Roque Riv., Catarina, 28.28° N, 99.61° W, 21-IV-2008, R. Plowes, E. LeBrun, RP290, over *S. geminata* × *xyloni* tray (LACM).

Paratypes. BELIZE: CAYO DISTR: nr. El Pilar, 1♀, 29-XI-1998, L. Morrison (LACM); MEXICO: VERACRUZ: Catemaco, Los Tuxtlas, Estacion de Biologica, 1♀, 18-IV-1980, D. Waller over *Solenopsis* sp. attracted to tuna bait (CUMZ); TAMAULIPAS: Villa de Casas, 23.73° N, 98.73° W, 7♀, 2-XII-2006, E. LeBrun (IEXA, LACM); Gomez Farias Est., Los Cedros, 23.05° N, 99.15° W, 1♀, 23-IV-2002, S. Triapitsyn, V. Berzovskiy, Malaise trap (LACM); USA: TEXAS: Dimmit Co., San Roque Riv., Catarina, 28.28° N, 99.61° W, 18♀, 21-IV-2008, R. Plowes, E. LeBrun, RP290, over *S. geminata* × *xyloni* tray (UTIC); Dimmit Co., HW190, Nueces Riv., 28.50° N, 99.68° W, 11♀, 9-X-2008, R. Plowes, RP575, over *S. geminata* × *xyloni* tray (UTIC); Dimmit Co., Chaparral WMA, Blocker Tank, 28.33° N, 99.42° W, 7♀, 6-IV-2008, R. Plowes, RP243, over *S. geminata* × *xyloni* tray (UTIC); Dimmit Co., El Regalo Ranch, Nueces Riv., 28.50° N, 99.63° W, 5♀, 8-X-2008, R. Plowes, RP568, over *S. geminata* × *xyloni* tray (UTIC); Hidalgo Co., Monte Cristo Wildlife Refuge, 26.41° N, 98.26° W, 8♀, 15-IV-2006, E. LeBrun, over *S.*



Figs. 11–19. Oviscapes. 11. *Pseudacteon deltoides* new species. 12. *Pseudacteon palomita* new species. 13. *Pseudacteon bispinosus* Borgmeier and Prado. 14. *Pseudacteon laticarinatus* new species. 15. *Pseudacteon arcuatus* Borgmeier. 16. *Pseudacteon quinni* new species. 17. *Pseudacteon bifidus* Brown and Morrison. 18. *Pseudacteon fowleri* Pesquero. 19. *Pseudacteon kungae* new species.

geminata × *xyloni* tray (UTIC); Maverick Co., HW 57, Eagle Pass, 28.89° N, 100.17° W, 13♀, 5-V-2008, R. Plowes, RP324, over *S. geminata* × *xyloni* tray (UTIC); Travis Co., Austin, 30.30° N, 97.78° W, 1♀, 10-VII-1995, L. Morrison, over *S. geminata* mounds (LACM); Webb Co., HW 83, 28.10° N, 99.58° W, 5♀, 2-VI-2008, R. Plowes, RP410, over *S. geminata* × *xyloni* tray (UTIC); Webb Co., Retama Ranch, 27.75° N, 99.51° W, 12♀, 7-IV-2008, R. Plowes, RP259, over *S. geminata* × *xyloni*

tray (UTIC); Webb Co., Retama Ranch, 27.75° N, 99.50° W, 1♀, 11-VI-1999, R. Patrock, #1685, over *S. geminata* × *xyloni* (LACM).

Pseudacteon spatulatus (Malloch)
(Fig. 7)

Plastophora spatulata Malloch 1912: 502, pl. 39, fig. 7; Smith 1928: 105.

Pseudacteon spatulatus (Malloch), Borgmeier 1963: 199, fig. 189.

Holotype. ♀, USA: TEXAS: Dallas, J.C. Crawford; attacking *Solenopsis geminata* (USNM, examined).

Remarks. In his 1991 review of the *P. spatulatus* complex, Disney did not examine the type specimen, nor give sufficient weight to the description and figures that depict the oviscapes. Disney assigned specimens from California, USA, to *P. spatulatus*, but these California specimens were examined and found to match *P. amuletum*.

Species Recognition. Females differ from all other species with bilobed arch-shaped oviscapes in being much smaller, and with the two oviscapes lobes being subparallel and narrowly separated. Males: unknown.

Female. Body length 0.79 mm, thorax width 0.31 mm. Wing length 0.78 mm, width 0.34 mm, costal index 0.31. Body color light brown, frons light gray-brown. Palpus whitish yellow. Flagellomere 1 yellowish brown, oval, flat, microscopically pubescent. Arista length equal to flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior twice the length of anterior. Costa with ≈ 10 pairs of short 0.03-mm setae. Halter whitish yellow below, gray above. Legs pale yellowish brown. Dorsal setal palisade with weak, sparse bristles along entire mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 brown, short, with transverse row of two to three short posterior setae. Sternite 6 with two strong medial bristles and three lateral bristles on each side. Oviscape dark brown, glossy, broad, strongly curved downward into bilobed arch 0.13 mm wide. Lobe length 0.14 mm, inner margin 0.10 mm, distance between tips 0.07 mm, lobe width 0.04 mm; lobes subparallel. Four fine short hairs at base of each lobe on dorsal plate.

Geographic Distribution. Dallas and southwestern Texas.

Biology. Type series from Dallas, TX, was collected attacking *S. geminata*. Females from southern Texas were collected at *S. geminata* \times *xyloini* workers exposed in trays during the late afternoon or evening.

Other Material Examined. USA: TEXAS: Dimmit Co., San Roque River HW83, 6 km S Catarina, 28.28° N, 99.61° W, 1 ♀, 1-VI-2008, R. Plowes, RP404, over *S. geminata* \times *xyloini* tray (LACM); Maverick Co., HW57, 35 km NE Eagle Pass, 28.89° N, 100.17° W, 1 ♀, 5-V-2008, R. Plowes, RP324, over *S. geminata* \times *xyloini* tray (UTIC).

Group 2: Long Oviscapes

This group of *Pseudacteon* includes three closely related species (*P. annulus*, *crawfordi* and *hippeus*) with long oviscapes bearing side lobes that arise immediately proximal to the downcurved tip. A fourth species, *P. longicauda*, is included with the group but seems to differ in having a simple oviscapes lacking side lobes ahead of the apex. No material of *P. longicauda* was examined and a detailed description of the ovis-

cape is not available. Two species (*P. crawfordi* and *P. hippeus*) have been observed alighting on target ants before oviposition and this may be a common feature of the group. Despite the long oviscapes, there are no evident differences in simple measures of body allometry (wing length: width and wing: body length) to compensate for flight dynamics when compared with other *Pseudacteon* species.

Pseudacteon annulus, New Species

(Figs. 23–25)

Species Recognition. Females: oviscapes morphology resembles *P. crawfordi* and *hippeus*. This species differs by having a strong constriction immediately proximal to the expanded terminal lobes. Like *P. hippeus*, females bear large lobes on each side of the apex of the oviscapes; however, these lobes are not laterally expanded. Males: unknown.

Female. Body length 1.28–1.33 mm. Thorax width 0.40 mm. Wing length 1.18 mm, width 0.55 mm, costal index 0.38. Body color dark brown, frons dark gray-brown. Palpus pale yellow. Flagellomere 1 yellowish brown, oval, flat, with slight apical point, microscopically pubescent. Arista slightly longer than flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior 1.8 \times length of anterior. Costa with ≈ 16 pairs of short 0.04-mm setae. Halter whitish yellow. Legs pale yellowish brown. Dorsal setal palisade terminating approximately two thirds along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 brown, short, with fine hair at each posterior lateral margin. Sternite 6 with four to six pairs of fine hairs. Oviscape projects directly behind abdomen in line with main axis of body and turns downward at tip. Oviscape dark brown, and glossy, length 0.33 mm, subcylindrical, tapering from 0.13 mm wide to narrow constriction 0.055 mm wide, before widening to 0.09 mm across lobed tip. Dorsal surface of lobed tip varying from dark brown to yellowish brown seeming longitudinally striped. In profile, tip curved down at a slightly $>90^\circ$ angle. Viewed from behind, oviscapes is trilobed. Medial lobe is longer than lateral lobes which end shortly after oviscapes curves downward. Immediately after constriction, lateral lobes are expanded on the exterior margin forming a semicircular edge. After curving downward, lateral lobes become subcylindrical tapering to the tip. Projecting from tips of lateral lobes is a pair of long, fine hairs. Hairs sometimes singular or missing from one or both tips.

Geographic Distribution. Known only from Puerto Vallarta and Chamela, Jalisco, Mexico.

Etymology. *Annulus* is the Latin word for “ring.” The name refers to the ring like constriction around the oviscapes immediately proximal to the expanded terminal lobes.

Biology. This species uses *S. geminata* as its host, preferentially attacking large workers. At two sites in Jalisco, Mexico, sampling from a combination of



Figs. 20–28. Oviscapes: dorsal, lateral & terminal views. 20–22. *Pseudacteon crawfordi* Coquillett. 23–25. *Pseudacteon annulus* new species. 26–28. *Pseudacteon hippeus* new species.

disturbed mounds and foraging trails, this species was collected only at disturbed mounds. Attack by this species did not elicit the characteristic defensive posturing on the part of the host as seen with some *Pseudacteon* parasitoids (Feener and Brown 1992).

Holotype. ♀, MEXICO: JALISCO: Puerto Vallarta, Conchas Chinas, 20.58° N, 105.24° W, 26-XII-2007, E. LeBrun (IEXA).

Paratypes. MEXICO: JALISCO: Estacion de Biologia Chamela Building C, 4♀, 27-VII-1984, D.H. Feener #787, over *S. geminata* (LACM); Puerto Vallarta, Con-

chas Chinas, 20.58° N, 105.24° W, 14 ♀, 26–27-VII-2008, E. LeBrun (IEXA, LACM, UTIC).

Pseudacteon crawfordi Coquillett

(Figs. 20–22)

Pseudacteon crawfordi Coquillett 1907: 208; Borgmeier 1963: 202, figs. 188 and 193–195; Feener 1987: 148–151, fig. 1; Pitts and Pitts-Singer 2001: 310.

Plastophora crawfordi (Coquillett), Brues 1907: 430; Malloch 1912: 501, pl. 39.

Remarks. This is the type species of the genus *Pseudacteon*.

Holotype. ♀, USA: TEXAS: Dallas, 17-VI-1906, J.C. Crawford (USNM, examined).

Species Recognition. Females. Oviscape differs from those of *P. hippeus* and *P. annulus* in having small, clear side lobes at the apex, whereas the side lobes of the other species are darker and larger. Males: unknown.

Female. Body length 1.20–1.22 mm, thorax width 0.41–0.43 mm. Wing length 1.07–1.13 mm, width 0.48–0.53 mm, costal index 0.34–0.35. Body color dark brown with abdomen light brown below, frons gray-black. Palpus whitish yellow with four short bristles. Flagellomere 1 brown, oval with slight apical point, flat, microscopically pubescent. Arista equal length to flagellomere 1, wider along basal one third. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior twice length of anterior. Costa with ≈16 pairs of 0.04-mm setae. Halter pale yellow-white. Legs pale yellowish brown. Dorsal setal palisade extends midway along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 broad, with 2–3 fine hairs on posterior margin. Sternite 6 elongate with 10–12 fine hairs medially. Oviscape dark brown, glossy, subcylindrical, length 0.24 mm, width 0.08 mm, with strongly downcurved apex. Small, pale side lobes arise at point of curvature. Side lobes 0.04 mm, light brown, with fine hair on tip.

Geographic Distribution. USA: Arizona, Oklahoma, western Texas. Specimens from Austin, TX mentioned in Feener (1987) are most likely *P. hippeus*, whereas Arizona specimens are *P. crawfordi*.

Biology. The type series was collected by J.C. Crawford in Dallas, TX, attacking *S. geminata*. Feener (1987) described size selective oviposition behavior where females tended to attack larger workers along foraging trails. Females landed on a worker's back for 1–2 s and oviposited in the ant's pronotum. The presence of flies elicited a defensive posture from ants, where the workers curled the abdomen forward under the thorax and extended their mandibles. During a wide ranging survey of southwestern Texas, we collected this species on trays of *S. geminata* and *S. geminata* × *xyloxi*, but not at disturbed mounds. Given the distribution of the species, it is likely that the primary host is *S. xyloxi* and some records may have incorrect ant identifications. Pitts and Pitts-Singer (2001) found *P. crawfordi* attacking *Solenopsis aurea* at dusk near Portal, AZ.

Other Material Examined. USA: ARIZONA: Cochise Co., 5 km E Portal, 13 ♀, 26-VII-1988, B. Brown, over *S. geminata* (LACM); Pima Co., 16 km W Tucson, 32.24° N, 111.13° W, 1 ♀ on 22–30-IV-1995, 2 ♀ on 30-IV–10-V-1995, S. Prchal, Malaise trap (LACM); OKLAHOMA: Bryan Co., Caddo, 34.12° N, 96.26° W, 1 ♀, S. Porter, over *S. xyloxi* (USDA); TEXAS: Dimmit Co., Catarina, 28.34° N, 99.62° W, 1 ♀, 7-IV-2008, R. Plowes, RP248, over *S. geminata* × *xyloxi* tray (UTIC); Dimmit Co., Chaparral WMA, Blocker Tank, 28.33° N, 99.42° W, 3 ♀, 6-IV-2008, R. Plowes, RP243, over *S. geminata* × *xyloxi* tray (UTIC); Dimmit Co., El Regalo, Nueces Riv., 28.5° N, 99.63° W, 6 ♀, 2-VI-2008, R. Plowes, RP409, over *S. geminata* × *xyloxi* tray (UTIC); Dimmit Co., San Roque Riv., Catarina, 28.28° N, 99.61° W, 6 ♀, 21-IV-2008, R. Plowes, E. LeBrun, RP290, over *S. geminata* × *xyloxi* tray (UTIC); Edwards Co., Rock Springs, 30.05° N, 99.84° W, 1 ♀, 13-V-2008, S. Gibson, over *S. geminata* × *xyloxi* tray (UTIC); Maverick Co., Eagle Pass, 28.78° N, 100.47° W, 1 ♀, 1-VI-2008, R. Plowes, RP398, over *S. geminata* × *xyloxi* tray (UTIC); Real Co., HW 41, 30.06° N, 99.81° W, 1 ♀, 19-V-2008, R. Plowes, RP369, over *S. geminata* × *xyloxi* tray (UTIC); Schleicher Co., Eldorado, 30.71° N, 100.64° W, 5 ♀, 13-V-2008, S. Gibson, over *S. geminata* × *xyloxi* tray (UTIC); Sutton Co., Sonora, 30.58° N, 100.65° W, 2 ♀, 13-V-2008, S. Gibson, over *S. geminata* × *xyloxi* trays (UTIC); Valverde Co., Del Rio, HW 377, 29.6° N, 100.89° W, 5 ♀, 19-V-2008, R. Plowes, RP376, over *S. geminata* × *xyloxi* tray (UTIC); Webb Co., Retama Ranch, 27.75° N, 99.51° W, 12 ♀, 7-IV-2008, R. Plowes, RP259, over *S. geminata* × *xyloxi* tray (UTIC).

Pseudacteon hippeus, New Species

(Figs. 26–28)

Pseudacteon crawfordi Feener 1987: 148–151 (specimens from Austin, TX, likely to be this new species based on range distributions); Morrison et al. 1999: 198–207.

Species Recognition. Females: similar to other *P. crawfordi* group species with long oviscapes, but differ by having a broad, two-lobed process on each side of the apex of the oviscape. Males: unknown.

Female. Body length 1.32–1.56 mm. Thorax width 0.42–0.48 mm. Wing length 1.32–1.42 mm, width 0.50–0.62 mm, costal index 0.34–0.37. Body color dark brown, frons dark gray-brown. Palpus pale yellow. Flagellomere 1 yellowish brown, oval, flat, microscopically pubescent. Arista length equal to flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior 1.8× length of anterior. Costa with ≈17 pairs of short 0.04-mm setae. Halter yellow-white. Legs pale yellowish brown. Dorsal setal palisade terminating at middle of mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 brown, short, fine hair 0.07 mm at posterior lateral margin. Sternite 6 elongate, with four to six pairs of fine hairs. Oviscape dark brown, glossy, subcylindrical, length 0.38 mm, tapering from 0.13 to 0.09 mm, before widening to 0.16 mm across lobed tip. Apex beak-shaped in profile. In

dorsal view, apex has triangular processes at each side. Side process broadens into two lobes; the inner lobe bearing two fine hairs at tip is curved to follow oviscape; the outer lobe in dorsal view bent away from the median line.

Geographic Distribution. One of the most widespread *Pseudacteon* species associated with *S. geminata* complex, ranging from central Texas to northern South America.

Etymology. *Hippeus* is a Greek word for a horse rider. The name alludes to the manner of the fly alighting on the back of the ant during oviposition, evoking the skills of horse riders.

Biology. In Texas, females found most often in morning and late afternoons at trays of *S. geminata* or *S. geminata* × *S. xyloni* workers. Rarely found at disturbed nests. Female alights on the alitrunk of a target worker ant and remains on the ant for up to 15 s during oviposition. In several attacks involving only this species of *Pseudacteon*, the attacked ants showed little response to the presence of the fly and nearby ants did not exhibit an alarm response. This oviposition behavior is similar to that of *P. crawfordi* described by Feener, although in that study, the oviposition attacks elicited an alarm response from the ants.

Holotype. ♀, USA: TEXAS: Dimmit Co., San Roque Riv., Catarina, 28.28° N, 99.61° W, 21-IV-2008, R. Plowes, E. LeBrun, RP290, on *S. geminata* × *xyloni* tray (LACM).

Paratypes. COLOMBIA: META: PNN Macarena, Caño Curia, 3.35° N, 73.93° W, 1 ♀, 26–30-XII-2001, A. Hererra, Malaise trap CAP-2606 (LACM); PNN La Tuparro, Centro Admin., 5.35° N, 67.85° W, 1 ♀, 17–26-XII-2000, W. Villalba, Malaise trap CAP-1382 (LACM); PNN La Tuparro, Cerro Tomás, 5.35° N, 67.85° W, 1 ♀, 5–14-I-2001, W. Villalba, Malaise trap CAP-1383 (LACM); COSTA RICA: GUANACASTE: Santa Rosa NP, 10.95° N, 85.62° W, 3 ♀ on 18-X-8-XI-1986, 5 ♀ on 27-IX-18-X-1986, I. Gauld, D. Janzen, Malaise trap H.3.0 (LACM); LIMON: 16 km W Guapiles, 10.15° N, 83.92° W, 1 ♀, II-1989, P. Hanson, Malaise trap (LACM); PUNTARENAS: 3 km SW Rincon, 8.68° N, 83.48° W, 1 ♀ on III-1989, 1 ♀ on VI-VIII-1989, 1 ♀ on III-IV-1991, 1 ♀ on VIII-1991, P. Hanson, Malaise trap (LACM); 5 km SW Rincon, 8.70° N, 83.51° W, 8 ♀ on 31-V-7-VI-1998, B. Brown, V. Berezovskiy, Malaise trap #5 (LACM); 5 km W Piedras Blancas, 8.77° N, 83.28° W, 2 ♀ on VI-VIII-1989, 1 ♀ on X-XI-1990, 3 ♀ on VIII-1991, 2 ♀ on I-1993, P. Hanson, Malaise trap (LACM); 24 km W Piedras Blancas, 8.77° N, 83.4° W, 1 ♀ on IX-XI-1989, 6 ♀ on X-1990, 3 ♀ on XII-1990, P. Hanson, Malaise trap (LACM); Las Alturas, 8.95° N, 82.83° W, 1 ♀ on 9–10-VI-1998, 1 ♀ on 11–13-VI-1998, B. Brown, V. Berezovskiy, Malaise trap #2 (LACM); Monteverde, 10.32° N, 83.8° W, 1 ♀, 7–12-V-1989, E. Fuller, Malaise trap (LACM); Rd to Rincon, 24 km W Pan American Highway, 4 ♀ on III-IV-1989, P. Hanson, I. Gauld, Malaise trap (LACM); Rios Paraisos, Alberge de Pecori, 9.56° N, 84.12° W, 1 ♀, 15–17-II-2003, B. Brown, E. Zumbado, Malaise trap #3 (LACM); Tropical Youth Center, 8.70° N, 83.51° W, 1 ♀, 20–23-VII-2002, L. Gonzalez, Malaise trap #2 (LACM); SAN

JOSE: Escazu, 9.90° N, 84.15° W, 1 ♀, IV-1996, C. Flores, Malaise trap (LACM); ECUADOR: NAPO: Yasuni Biol. Res. Stn., 0.67° S, 76.39° W, 1 ♀ on 22-V-1996, 4 ♀ on 24-V-1996, B. Brown, over *S. geminata* (LACM); Yasuni Biol. Res. Stn., 0.67° S, 76.39° W, 1 ♀ on 22–26-V-1996, B. Brown, Hibbs, Cantley MT at *Cephalotes* site (LACM); SUCUMBOS: Sacha Lodge, 0.50° S, 76.5° W, 1 ♀ on 3–13-VI-1994, 3 ♀ on 22-II-4-III-1994, 1 ♀ on 4–14-III-1994, 3 ♀ on 12–22-II-1994, P. Hibbs, Malaise trap (LACM); GUATEMALA: SACATEPÉQUEZ: Sumpango, Durwest Farm, 14.67° N, 90.72° W, 1 ♀ on 18-II-4-III-2007, 1 ♀ on 10–23-II-2007, M. Hoddle, Malaise trap (LACM); HONDURAS: CATACAMAS: Olancho, 15.83° N, 85.85° W, 3 ♀ on 21-IV-1995, 2 ♀ on 9-VI-1995, R. Cordero, Malaise trap (LACM); TRINIDAD: Arima Vly., Simla Stn., 2 ♀, 2–10-VI-1977, P. Feinsinger, Malaise trap (LACM); USA: TEXAS: Brazoria Co., 4 miles S West Columbia, 29.11° N, 95.71° W, 1 ♀, 11–15-VII-1976, L. Gilbert, D. Feener (UTIC); Dimmit Co., Catarina, 28.34° N, 99.62° W, 11 ♀, 7-IV-2008, R. Plowes, RP248, on *S. geminata* × *xyloni* tray (UTIC); Dimmit Co., Chaparral WMA, Blocker Tank, 28.33° N, 99.42° W, 3 ♀, 6-IV-2008, R. Plowes, RP243, on *S. geminata* × *xyloni* tray (UTIC); Dimmit Co., El Regalo, Nueces Riv., 28.5° N, 99.63° W, 14 ♀, 2-VI-2008, R. Plowes, RP409, on *S. geminata* × *xyloni* tray (UTIC); Dimmit Co., Espantoza Lake CR 1433, 28.58° N, 99.81° W, 2 ♀, 22-IV-2008, R. Plowes, E. LeBrun, RP293, on *S. geminata* × *xyloni* trays (UTIC); Dimmit Co., San Roque Riv., Catarina, 28.28° N, 99.61° W, 7 ♀, 21-IV-2008, R. Plowes, E. LeBrun, RP290, on *S. geminata* × *xyloni* tray (UTIC); La Salle Co., Walker Ranch, Nueces Riv., 28.43° N, 99.29° W, 16 ♀, 8-IV-2008, R. Plowes, RP264, on *S. geminata* × *xyloni* tray (UTIC); Maverick Co., HW 57, La Pryor, 28.89° N, 100.17° W, 1 ♀, 31-V-2008, R. Plowes, RP397, on *S. geminata* × *xyloni* tray (UTIC); Starr Co., RR 755 nr 490, 26.51° N, 98.7° W, 1 ♀, 14-V-2008, R. Patrock, RJP116, on *S. geminata* × *xyloni* tray (UTIC); Starr Co., Rio Grande City, Reynaldo Gomez Dr., 26.36° N, 98.78° W, 2 ♀, 14-V-2008, R. Patrock, RJP117, on *S. geminata* × *xyloni* tray (UTIC); Travis Co., Austin, 30.3° N, 97.78° W, 2 ♀, 20-VI-1997, L. Morrison, attacking *S. geminata* (LACM); Travis Co., Austin, 2 ♀, 4 ♀, VII-1997, L. Morrison, lab-reared (LACM); Travis Co., Emma Long Park, 30.33° N, 97.84° W, 2 ♀, 3-X-2006, E. LeBrun, on *S. geminata* nests (UTIC); Uvalde Co., Frio Riv. nr Uvalde, 29.23° N, 99.68° W, 1 ♀, 21-IV-2008, R. Plowes, E. LeBrun, RP288, on *S. geminata* × *xyloni* tray (UTIC); Webb Co., Retama Ranch, 27.75° N, 99.51° W, 5 ♀, 7-IV-2008, R. Plowes, RP259, on *S. geminata* × *xyloni* tray (UTIC); Zavala Co., Crystal City, 28.66° N, 99.8° W, 1 ♀, 30-VI-2008, R. Plowes, RP451, on *S. geminata* × *xyloni* tray (UTIC).

Pseudacteon longicauda Borgmeier & Prado
(Fig. 10)

Pseudacteon longicauda Borgmeier and Prado 1975: 75, figs. 134–136.

Holotype. ♀, HONDURAS: La Lima, 11-XII-1973, R.N. Williams (MZSP, not examined).

Species Recognition. Females: Borgmeier and Prado (1975) state that it comes close to *P. simplex* but differs by oviscapae structure, sixth tergite, and venational characters. The illustration in the species description (copied here as Fig. 10) lacks dorsal and terminal views of the oviscapae tip needed to distinguish this from similar species such as *P. crawfordi*, *hippeus* and *annulus*. The lateral view shows a small side lobe on the downcurved apex with two setae, although this feature is not visible in the ventral view. The side lobes of the other species arise before the apex curves downward. Males: unknown.

Female. See Borgmeier and Prado (1975).

Geographic Distribution. Only reported from the type locality in Honduras.

Biology. Type series was collected over *S. geminata*.

Material Examined. No specimens were located in the LACM collection that matched this species. The holotype was not available for loan from MZSP.

Group 3: Short, Forked Oviscapae

This species group includes five small species: *P. bifidus*, *bispinosus*, *deltooides*, *palomita*, and *quinni*. The oviscapae are short, downcurved and contain a dark internal medial structure, visible in dorsal view, which splits into two short lobes or forks. Differences between species occur in the shape of this forked process and the elaboration of the lobes that enclose it.

Pseudacteon bifidus Brown & Morrison (Fig. 17)

Pseudacteon crawfordi Morrison et al. 1997: 716–724.

Pseudacteon sp. B, Porter 1998: Table 1.

Pseudacteon sp. A, Morrison et al. 1999: 198–207.

Pseudacteon bifidus Brown and Morrison 1999: 308–311, figs. 1–5.

Holotype. ♀, USA: TEXAS: Travis Co., Austin, X-1996, laboratory reared, L. Morrison (LACM, examined).

Species Recognition. Females: A small species close to *P. quinini*, recognized by the downcurved oviscapae that bifurcates into dark slender lobes with outwardly curved tips. Males: See Brown and Morrison 1999.

Female. Body length 0.77–0.91 mm, thorax width 0.29–0.36 mm. Wing length 0.77–0.94 mm, width 0.36–0.41 mm, costal index 0.32–0.40. Body color light brown, frons dark gray-brown. Palpus whitish yellow. Flagellomere 1 yellowish brown, oval with slight apical point, flat, microscopically pubescent. Arista length slightly shorter than flagellomere 1. Frons with 2–4–4–4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior twice length of anterior. Costa with ≈12 pairs of short 0.02-mm setae. Halter pale yellow brown. Legs pale yellowish brown. Dorsal setal palisade extends two thirds along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 brown, short, with posterior row of short setae. Sternite 6 with 10–12 moderately strong bristles. Oviscapae dark brown, glossy, 0.16 mm long, tubular, then flattened at bifurcated lobes. Tapered along length from 0.09 to 0.04 mm and then widening to 0.07 mm across tips. Lobes ≈0.04 mm long, parallel-sided, curved outwardly. Three to four fine hairs on dorsal surface of each lobe.

Geographic Distribution. Central and southwestern Texas to Tamaulipas, Mexico.

Biology. Females, but not males, have been caught at disturbed ant mounds and trays of *S. geminata* and *S. geminata* × *xyloini* workers. During attacks at disturbed mounds, females harassed target worker ants before oviposition, seeming to disrupt the common defense posture of the ants and encourage them to remain active making it potentially easier to oviposit (Morrison et al. 1999). Development time from oviposition to pupariation was ≈13 d, whereas time to emergence was a further 15.6 d (Brown and Morrison 1999).

Other Material Examined. (Only one record shown for each Texas county; other specimens are held in UTIC). MEXICO: TAMAULIPAS: Villa de Casas, 23.73° N, 98.73° W, 3♀, 2-XII-2006, E. LeBrun, on *S. geminata* at nest disturbance (IEXA); 23.61° N, 98.63° W, 1♀, 29-XII-2006, E. LeBrun, on *S. geminata* at nest disturbance (UTIC); USA: TEXAS: Kenedy Co., La Paloma Ranch, 27.12° N, 97.94° W, 16♀, 17-IV-2007, R. Plowes, PC 14 016, on *S. geminata* × *xyloini* mound (UTIC); Kenedy Co., La Paloma, 27.22° N, 97.97° W, 2♀, 17-IV-2007, R. Plowes, E. LeBrun, on *S. geminata* × *xyloini* mound #P1 (UTIC); Kenedy Co., La Paloma, 27.11° N, 97.94° W, 1♀, 17-IV-2007, R. Plowes, E. LeBrun, on *S. geminata* × *xyloini* mound #PC12-GF6 (UTIC); Cameron Co., 26.06° N, 97.57° W, 1♀, 1-V-2008, R. Patrock, RJP62, on *S. geminata* × *xyloini* tray (UTIC); Dimmit Co., HW190, Nueces Riv., 28.5° N, 99.68° W, 22♀, 9-X-2008, R. Plowes, RP575, on *S. geminata* × *xyloini* tray (UTIC); Frio Co., Pearsall, 28.93° N, 99.05° W, 1♀, 7-V-2008, R. Plowes, RP352, on *S. geminata* × *xyloini* tray (UTIC); Hidalgo Co., Monte Cristo WR, 26.41° N, 98.26° W, 5♀, 15-IV-2006, E. LeBrun, on *S. geminata* × *xyloini* mound (UTIC); La Salle Co., Walker Ranch, Nueces Riv., 28.43° N, 99.29° W, 13♀, 8-IV-2008, R. Plowes, RP264, on *S. geminata* × *xyloini* tray (UTIC); Maverick Co., Rd2644 El Indio, 28.5° N, 100.19° W, 22♀, 6-V-2008, R. Plowes, RP328, on *S. geminata* × *xyloini* tray (UTIC); Maverick Co., Eagle Pass, 28.73° N, 100.46° W, 11♀, 5-V-2008, R. Plowes, RP325, on *S. geminata* × *xyloini* tray (UTIC); San Saba Co., Colorado Bend, 31.05° N, 98.51° W, 1♀, 29-V-2008, J. Romine, on *S. geminata* × *xyloini* tray (UTIC); Starr Co., Rio Grande City, Reynaldo Gomez Dr., 26.36° N, 98.78° W, 12♀, 14-V-2008, R. Patrock, RJP117, on *S. geminata* × *xyloini* tray (UTIC); Travis Co., Circle C, Austin, 30.18° N, 97.88° W, 15♀, 10-X & 19-IX-1996, L. Morrison, E. Kawazoe on *S. geminata* nests (UTIC, LACM); Uvalde Co., Concan, Annandale Ranch, 29.47° N, 99.7° W, 1♀, 21-X-2008, R. Plowes, RP628, on *S. geminata* × *xyloini* tray (UTIC); Uvalde Co., Frio Riv. nr Uvalde, 29.23° N, 99.68° W, 1♀, 21-IV-2008, R. Plowes, E. LeBrun, RP288, on *S. geminata* × *xyloini* tray

(UTIC); Willacy Co., HW106 Lake Atascosa, 26.19° N, 97.36° W, 2 ♀, 1-V-2008, R. Patrock, RJP64, on *S. geminata* × *xyloini* tray (UTIC); Zavala Co., Crystal City, 28.66° N, 99.8° W, 3 ♀, 21-IV-2008, R. Plowes, E. LeBrun, RP289, on *S. geminata* × *xyloini* tray (UTIC).

Pseudacteon bispinosus Borgmeier & Prado

(Fig. 13)

Pseudacteon bispinosus Borgmeier and Prado 1975: 74, figs. 132–133.

Remarks. This species is included in this review, given the likelihood that the host ant is in the *S. geminata* complex. Host ant is given as “hormiga brava negra,” which is a colloquial term for black fire ants (*S. geminata*).

Holotype. ♀, HONDURAS: La Lima, 7–11-XII-1973, R.N. Williams, “over hormiga brava negra” (MZSP, not examined).

Species Recognition. Females: readily identified by the ovicape shape, which has translucent side lobes that curl outward to end in thin points, each side lobe subtended with a small dark lobe along the inner margin. Two strong bristles on medial dorsal face project well beyond the ovicape. Males: unknown.

Female. Body length 0.90–1.00 mm, thorax width 0.32–0.33 mm. Wing length 0.88–1.05 mm, width 0.35–0.43 mm, costal index 0.35–0.37. Body color dark brown, venter light brown, frons dark brown. Palpus yellow with one bristle. Flagellomere 1 yellowish brown, oval, flat, with slight apical point, microscopically pubescent. Arista length equal to flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior double length of anterior. Costa with ≈12 pairs of short setae. Halter brown, darker dorsally. Legs pale yellowish brown. Dorsal setal palisade terminating ≈two-thirds along mid-tibia, setal palisade of hind tibia complete.

Abdomen. Tergite 6 brown, broad, with two setae on lateral hind margin. Sternite 6 with two strong medial bristles pointed rearward and two sets of three lateral hairs on each side. Ovicape glossy, overall light brown with dark medial section. Ovicape with terminal lateral blade-shaped projections that are twisted through ninety degrees ending in thin points. Each lateral process is subtended by a small dark lobe on the terminal margin. Two strong bristles on medial dorsal face project well beyond the ovicape, these bristles situated above a short medial projection.

Geographic Distribution. Central America from Costa Rica to Chiapas, Mexico.

Biology. The type series was collected in Honduras at the same date and site as *P. longicauda*, whose host was given as *S. geminata*. These *P. bispinosus* specimens were reported as being collected on “hormiga brava negra” which is the colloquial term for *S. geminata*. This is a rare species, seldom taken even in Malaise traps.

Material Examined. The type material was not available for loan from MZSP. COSTA RICA: GUANACASTE: Res. Priv. Karen Mogensen, 9.87° N,

85.06° W, 1 ♀, 31-III–4-IV-2005, B. Brown, Porras, E. Zumbado, Malaise trap (LACM); SAN JOSE: Ciudad Colon, 9.92° N, 84.25° W, 1 ♀, III–IV-1990, P. Hanson, Malaise trap (LACM); EL SALVADOR: LA LIBERTAD: Finca La Giralda, 13.66° N, 89.68° W, 1 ♀, 14–17-X-2000, J. Donahue, Malaise trap (LACM); MEXICO: CHIAPAS: Palenque, 1 ♀, 2–23-VII-1983, S. & J. Peck (LACM).

Pseudacteon deltooides, New Species

(Fig. 11)

Species Recognition. Females: separated from *P. palomita* in being slightly larger, having wider lobes to the bifurcated ovicape, with rounded tips and generally lacking an upturned outer margin to the lobes. In *P. deltooides* the lobes are more widely splayed than *P. palomita*, such that the width across the tips is almost double the narrowest width at the base, whereas in *P. palomita* the width across the tips is ≈1.5× the narrowest width. Males: unknown.

Female. Body length 0.85–1.02 mm, thorax width 0.29–0.38 mm. Wing length 0.83–0.95 mm, width 0.39–0.44 mm, costal index 0.35–0.38. Body color light brown, pale venter, frons dark gray-brown. Palpus white each with two setae. Flagellomere 1 yellowish brown, oval, flat, with slight apical point, microscopically pubescent, longer hairs on apical margin. Arista length equal to flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior double length of anterior. Costa with ≈10 pairs of short setae. Halter pale white-brown. Legs pale yellowish brown. Dorsal setal palisade extending midway along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 brown, broader medially, with transverse row of short posterior setae. Sternite 6 with two strong medial bristles and three lateral hairs on each side. Ovicape dark brown, glossy, tubular, then flattened at bifurcate tip. Width broadening evenly from 0.09 mm at base to 0.17 mm across open tips. Distal quarter of ovicape lobes with lightly chitinized, translucent slightly upturned outer margin. Outer tip of lobe rounded, extending beyond tip of darkened inner margin. Sharp stylus visible in semicircular concave opening between tips, giving trilobed appearance. Two pairs of long, fine hairs and several smaller hairs on dorsal surface between tips.

Geographic Distribution. Occurs in northern South America from Colombia to Guyana, Suriname and Ecuador.

Etymology. The name conveys the expanding triangular shape of the ovicape.

Biology. Collected at foraging trails of *S. geminata* and in Malaise traps.

Holotype. ♀, SURINAME: BROKOPONDO: Brownsberg Nature Park, Visitor Ctr, 4.95° N, 55.18° W, 31-VIII-2007, G. Kung, A. Kreuter, over *S. geminata* attr. to tuna baits (LACM).

Paratypes. COLOMBIA: MAGDALENA: PNN Tayrona, Zaino, 11.33° N, 74.03° W, 1 ♀ on 30-VIII-20-IX-2000, 3 ♀ on 13–30-V-2000, 2 ♀ on 14–29-VI-2000, R.

Henriques, Malaise trap CAP-624,136, 240 (LACM, UNCB); VICHADA: PNN El Tuparro, Bosque Sabana, 5.35° N, 67.85° W, 1 ♀ on 8-14-XII-2000, 1 ♀ on 5-14-I-2001, W. Villalba, Malaise trap CAP-1058 (LACM); PNN El Tuparro, Centro Admin., 5.35° N, 67.86° W, 1 ♀, 29-VI-15-VII-2000, W. Villalba, Malaise trap CAP-269 (LACM); ECUADOR: NAPO: Yasuni Biol. Res. Stn., 0.67° S, 76.39° W, 4 ♀, 24-V-1996, B. Brown, over *S. geminata* (LACM); SUCUMBIOS: Sacha Lodge, 0.5° S, 76.5° W, 3 ♀ on 12-22-II-1994, 1 ♀ on 22-II-4-III-1994, 3 ♀ on 4-14-III-1994, 6 ♀ on 14-24-III-1994, 1 ♀ on 24-III-3-IV-1994, 1 ♀ on 13-23-IV-1994, 5 ♀ on 3-13-VI-1994, 1 ♀ on 23-VI-3-VII-1994, P. Hibbs, Malaise trap (LACM); GUYANA: BERBICE: Dubulay Ranch, 5.68° N, 57.86° W, 2 ♀, 15-23-I-1999, B. Brown, M. Sharkey, Malaise trap #4 (LACM); SURINAME: BROKOPONDO: Brownsberg Nature Park, Visitor Ctr, 4.95° N, 55.18° W, 5 ♀ on 27-VIII-2007, 10 ♀ on 30-VIII-2007, 1 ♀ on 31-VIII-2007, 7 ♀ on 1-IX-2007, G. Kung, A. Kreuter, over *S. geminata* attracted to tuna baits (LACM).

Pseudacteon palomita, New Species
(Fig. 12)

Species Recognition. Females: This species resembles *P. deltooides* with a short bifurcated oviscape. In lateral view, the outer edges of the oviscape lobes are upturned creating a distinct membranous sidewall, whereas in *P. deltooides* the outer margins of the lobes are only slightly upturned if at all. In *P. palomita*, the tips of the lobes come to a point at the outer margin, whereas in *P. deltooides* the tips are rounded. The medial stylet often projects between the two bifurcated tips giving it a trilobed appearance. Males: unknown.

Female. Body length 0.72–0.88 mm, thorax width 0.26–0.32 mm. Wing length 0.72–0.88 mm, width 0.30–0.41 mm, costal index 0.35–0.37. Body color light brown, frons dark gray-brown. Palpus white. Flagellomere 1 yellowish brown, oval, flat, with slight apical point, microscopically pubescent. Arista length equal to flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior double length of anterior. Costa with ≈11 pairs of short 0.02-mm setae. Halter light in color with bulb ranging from yellowish white to light brown, and stem darker, usually brown. Legs pale yellowish brown. Dorsal setal palisade terminating about midway along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 brown, short, with transverse row of short posterior setae. Sternite 6 with two strong medial bristles and three lateral hairs on each side. Oviscape dark brown, glossy, 0.136 mm long, tubular, then flattened at bifurcate tip. Width broadening evenly from 0.075 mm at base to 0.10 mm across open tips. Lightly chitinized, and translucent upturned outer edge along the distal quarter of oviscape lobes forming a sidewall along margin. Outer apex of each lobe ends in a small point at tip of forked darkened medial process. Lobes curved downward in profile, ≈0.035 mm long, with flat-ended base. Sharp stylus

visible in semicircular concave opening between tips, giving trilobed appearance. Two to four pairs of fine hairs on dorsal surface between tips.

Geographic Distribution. This species is known from southern Texas, Tamaulipas, Mexico, and from Costa Rica.

Etymology. The epithet derives from the Spanish word for little dove: palomita. This species was first recognized in collections from La Paloma Vieja Ranch, Kenedy County, TX.

Biology. Collected at mound disturbances and foraging trails of *S. geminata* × *xyloni* and *S. geminata*.

Holotype. ♀, USA: TEXAS: Kenedy Co., La Paloma Ranch, 27.12° N, 97.94° W, 22-V-2005, E. LeBrun, on *S. geminata* × *xyloni* nests (LACM).

Paratypes. COSTA RICA: ALAJUELA: San Pedro de la Tigra, 10.37° N, 83.92° W, 1 ♀, II-1990, P. Hanson, Malaise trap (INBC, LACM); GUANACASTE: Santa Rosa NP, 10.95° N, 85.62° W, 1 ♀, 18-X-8-XI-1986, I. Gauld, D. Janzen, Malaise trap H.3.0 (INBC, LACM); HEREDIA: La Selva Biol. Stn., 10.43° N, 84.82° W, 2 ♀, 2-III-1993, ALAS, Malaise trap M/1/16 (INBC, LACM); MEXICO: TAMAULIPAS: Rd to Soto La Marina, 23.61° N, 98.63° W, 6 ♀, 29-XII-2006, E. LeBrun, on disturbed *S. geminata* mound (IEXA, LACM); Villa de Casas, 23.73° N, 98.73° W, 1 ♀, 2-XII-2006, E. LeBrun, on disturbed mound (IEXA); USA: TEXAS: Hidalgo Co., Monte Cristo WR, 26.41° N, 98.26° W, 2 ♀, 15-IV-2006, E. LeBrun, on *S. geminata* nest disturbance (LACM); Jim Hogg Co., nr Hebbronville, 27.28° N, 98.74° W, 1 ♀, 15-V-2008, R. Patrock, RJP131, on *S. geminata* × *xyloni* tray (UTIC); Kenedy Co., La Paloma Ranch, 27.12° N, 97.94° W, 13 ♀, 17-IV-2007, R. Plowes, PC14, on *S. geminata* × *xyloni* nests (10 ♀ in UTIC, 3 ♀ in LACM); Kenedy Co., La Paloma Ranch, 27.19° N, 97.96° W, 2 ♀, 16-V-2007, R. Plowes, Trans 061, on *S. geminata* × *xyloni* nests (UTIC); Kenedy Co., La Paloma Ranch, 27.16° N, 97.96° W, 1 ♀, 20-VI-2007, R. Plowes, F033, on *S. geminata* × *xyloni* nests (UTIC); Maverick Co., Eagle Pass, 28.73° N, 100.46° W, 1 ♀, 5-V-2008, R. Plowes, RP325, on *S. geminata* × *xyloni* tray (UTIC); Starr Co., Rio Grande City, Reynaldo Gomez Dr., 26.36° N, 98.78° W, 13 ♀, 14-V-2008, R. Patrock, RJP117, on *S. geminata* × *xyloni* tray (UTIC); Uvalde Co., HW 90, 29.32° N, 99.57° W, 1 ♀, 21-X-2008, R. Plowes, RP628, on *S. geminata* × *xyloni* tray (UTIC); Uvalde Co., Concan town, 29.5° N, 99.71° W, 1 ♀, 21-X-2008, R. Plowes, RP598, on *S. geminata* × *xyloni* tray (UTIC); Webb Co., N of Las Blancas, Laredo, 27.49° N, 99.32° W, 9 ♀, 20-V-2008, R. Patrock, RJP142, on *S. geminata* × *xyloni* tray (UTIC); Zapata Co., HW 16 N, 26.94° N, 99.22° W, 1 ♀, 15-V-2008, R. Patrock, RJP125, on *S. geminata* × *xyloni* tray (UTIC); Zavala Co., Crystal City, 28.66° N, 99.8° W, 3 ♀ on 21-IV-2008, 2 ♀ on 22-IV-2008, R. Plowes, E. LeBrun, RP289, 294, on *S. geminata* × *xyloni* tray (UTIC).

Pseudacteon quinni, New Species
(Fig. 16)

Species Recognition. Females: resemble *P. bifidus* with short downturned bifurcated oviscapes, but have

straight-edged tips to oviscape lobes, lacking outward curvature. The setae on abdominal sternite 6 are stronger and more numerous. Males: unknown.

Female. Body length 0.85–0.97 mm, thorax width 0.31–0.38 mm. Wing length 0.90–1.01 mm, width 0.36–0.48 mm, costal index 0.33–0.44. Body color light brown, frons dark gray brown. Palpus whitish yellow. Flagellomere 1 yellowish brown, oval, flat, with slight apical point, microscopically pubescent. Arista length $0.7\times$ length of flagellomere 1. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior almost double length of anterior. Costa with ≈ 12 pairs of short 0.02-mm setae. Halter pale yellow brown. Legs pale yellowish brown. Dorsal setal palisade terminating approximately two thirds along mid-tibia, setal palisade of hind tibia complete, sinuous.

Abdomen. Tergite 6 brown, short, with transverse posterior row of short setae. Sternite 6 with outer setae arranged in pairs, increasing in length from margin to interior. Inner setae are much stronger than outer and not arranged in pairs. The relative physical arrangement is: 2-2-2-1-1-2-2-2. Oviscape dark brown, glossy, 0.16 mm long, tubular, then flattened at bifurcate lobes. Tapered along length from 0.09 to 0.045 mm, then widening to 0.07 mm across tips. Lobes ≈ 0.04 mm long, parallel-sided, splayed outward from center-line with little curvature. In some specimens, the tips are slightly blunted, but still lack outward curvature. Three to four fine hairs on dorsal surface of lobes.

Geographic Distribution. Known from Jalisco, Mexico, Costa Rica and Colombia.

Etymology. Named after the late Thomas Quinn LeBrun who provided material support for the investigation leading to the discovery of this species and assisted in the efforts to collect additional paratype material.

Biology. This species was collected attacking *S. geminata*. At two sites in Jalisco, Mexico, sampling from a combination of disturbed mounds and foraging trails, this species was collected only at foraging trails. Attack by this species did not elicit the characteristic defensive posturing behavior on the part of the host as seen with some *Pseudacteon* parasitoids (Feener and Brown 1992).

Holotype. ♀, COSTA RICA: GUANACASTE: Santa Rosa NP, 10.95° N, 85.62° W, 11-14-III-1987, I. Gauld, Malaise trap SE8C (LACM).

Paratypes. COLOMBIA: MAGDALENA: PNN Tayrona, Zaino, 11.33° N, 74.03° W, 16 ♀ on 13-30-V-2000, 5 ♀ on 28-VI-17-VII-2000, 6 ♀ on 30-VIII-20-IX-2000, R. Henriques, Malaise trap CAP-301,136, 240,624 (LACM); VICHADA: PNN, El Tuparro, Centro Admin., 5.35° N, 67.86° W, 1 ♀, 29-VI-15-VII-2000, W. Villalba, Malaise trap CAP-269 (LACM); COSTA RICA: GUANACASTE: Santa Rosa NP, 10.95° N, 85.62° W, 1 ♀, 18-X-i8-XI-1986, I. Gauld, D. Janzen, Malaise trap H.3.0 (LACM); HEREDIA: La Selva Biological Station, 10.43° N, 84.02° W, 1 ♀, 3-V-1993, ALAS, Malaise trap M/16/95 (INBC, LACM); MEXICO: JALISCO: Conchas Chinas, Puerto Vallarta, 20.58° N, 105.24° W, 2 ♀, 26-XII-2007, E. LeBrun (IEXA, LACM); Conchas Chinas, Puerto Vallarta, 20.58° N, 105.24° W, 3 ♀, 26-VII-2008, E. LeBrun (IEXA, UTIC).

Group 4: Ornate Oviscapes

The fourth group of species (*P. arcuatus*, *fowleri*, *kungae*, and *laticarinatus*) seem to have closely related sister species among *Pseudacteon* that are hosted by *S. saevissima* complex ants (*P. disneyi*, *cultellatus*, *dentiger*, *fowleri*, and *pradei*). It is likely that sister species within these groups share common ancestry and that some aspect of their host location cues or oviposition behaviors predisposes them to host switching. These species should therefore be excluded as candidates for biocontrol if there is a possibility of switching to the alternate host species. No morphological differences were evident between *P. fowleri* hosted by *S. geminata* or *S. saevissima* complex ants, although the populations are disjunct, and these may be cryptic species.

Pseudacteon arcuatus Borgmeier

(Fig. 15)

Pseudacteon arcuatus Borgmeier 1969: 42, fig. 133; Feener and Brown 1992: 80–84.

Holotype. ♀, DOMINICA: Clarke Hall, XI-1964, T.J. Spilman, light trap (USNM 70274 on slide, examined).

Species Recognition. Females: The general structure of the oviscape is similar to *P. pradei* Borgmeier and *P. disneyi* Pesquero (hosted by *Solenopsis saevissima* complex). The oviscape comprises two processes, the proximal process having two thin lateral expansions, and the distal process extending medially to terminate in an arc-shaped process. Males: unknown.

Female. Body length 0.91–1.02 mm, thorax width 0.27–0.30 mm. Wing length 0.89–0.97 mm, width 0.35–0.38 mm, costal index 0.33–0.38. Body color light brown, frons dark gray-brown. Palpus yellow. Flagellomere 1 brown, flat, elongate, tapering to a point with long setae, lacking arista. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, anterior about half the length of posterior. Costa with ≈ 14 pairs of short setae. Halter yellowish brown, darker dorsally. Legs pale yellowish brown. Dorsal setal palisade terminating approximately three fourths along mid-tibia, setal palisade of hind tibia complete.

Abdomen. Tergite 6 brown, broad, with two setae laterally. Sternite 6 with two strong medial bristles and two lateral hairs on each side. Oviscape dark brown, glossy, comprising two processes. The proximal (dorsal) section has lateral lobes, oval-shaped from above, declining ventrally; the distal section projects ventrally from the dorsal process and terminates with an arc-shaped apical piece. The stylet projects through an aperture between the dorsal and ventral processes.

Geographic Distribution. Northern South America to Central America.

Biology. Over *S. geminata* in Costa Rica (Feener and Brown 1992), Nicaragua and Suriname.

Other Material Examined. COLOMBIA: MAGDALENA: PNN Tayrona, Zaino, 11.33° N, 74.02° W, 11 ♀, 28-VI-17-VII-2000, R. Henriques, Malaise trap CAP-301 (LACM); PNN Tayrona, Zaino, 11.33° N, 74.03° W, 1 ♀ on 29-V-14-VI-2000, 4 ♀ on 13-30-V-

2000, 6 ♀ on 14–29-VI-2000, R. Henriquez, Malaise trap CAP-241, 136, 240 (LACM); PNN Tayrona, Canaveral, 11.33° N, 74.03° W, 3 ♀, 26-IV–12-V-2000, R. Henriquez, Malaise trap CAP-131 (LACM); VICHADA: PNN El Tuparro, Cerro Tomás, 5.35° N, 67.85° W, 5 ♀ on 15–19-VII-2000, 1 ♀ on 18–28-VIII-2000W. Villalba, Malaise trap CAP-512, 516 (LACM); PNN El Tuparro, 5.35° N, 67.86° W, 1 ♀, 15–19-VI-2000, M. Sharkey, G. Kung, Malaise trap #3 (LACM); PNN El Tuparro, Centro Admin., 5.35° N, 67.86° W, 2 ♀, 29-VI–15-VIII-2000, W. Villalba, Malaise trap CAP-269 (LACM); COSTA RICA: HEREDIA: La Selva Biol. Stn., 10.43° N, 84.02° W, 1 ♀ on 22-IV-1989, 1 ♀ on 3–6-V-1989, B. Brown, D. Feener on *Solenopsis geminata* (LACM); Puerto Viejo de la Sarapiquí, LA Selva Biol. Stn., 10.43° N, 84.02° W, 1 ♀, II-1980, W.R. Mason (LACM); ECUADOR: SUCUMBIOS: Sacha Lodge, 0.5° S, 76.5° W, 1 ♀ on 4–14-III-1994, 1 ♀ on 3–13-IV-1994, P. Hibbs, Malaise trap (LACM); NICARAGUA: 12 km N Matagalpa, Selva Negra, 12.98° N, 85.91° W, 1 ♀, 28-XII-2007, C. Rabeling, CR071228–02, over *S. geminata* workers (UTIC); SURINAME: BROKOPONDO: Brownsberg Nature Park, Visitor Ctr., 4.95° N, 55.18° W, 2 ♀, 30-VIII-2007, G. Kung, A. Kreuter, over *S. geminata* attracted to tuna baits (LACM).

Pseudacteon fowleri Pesquero
(Fig. 18)

Pseudacteon fowleri Pesquero 2000: 245–246, figs. 3–4.

Holotype. ♀, BRAZIL: GOIAS, Goiania, 17° S, 49° W, 15-XI-1996, M.A. Pesquero (MZSP, not examined).

Species Recognition. Females: this large species is nearest to *P. kungae*, from which differs in having a broad medial process, a tooth on the inner margin of the lobes, and tailed extensions arising from the outer margins of the side lobes. The specimens found in French Guiana and Guyana are morphologically very similar to those found in Brazil on *S. saevissima* complex ants. Pending further resolution, we include the specimens from the *S. geminata* host range as *P. fowleri*. Males: unknown.

Female. Body length 1.55 mm. Wing length 1.50 mm, width 0.65 mm, costal index 0.40. Body color light brown, frons dark gray-brown. Palpus yellow, two setae. Flagellomere 1 brown, oval, flat, with slight apical point, microscopically pubescent. Arista length equal to flagellomere 1. Frons with 2-2-4-4 setae, one pair of supra-antennal setae. Scutellum with two pairs of setae, anterior approximately two thirds length of posterior. Costa with ≈14 pairs of short setae. Halter yellowish brown. Legs orange-brown. Dorsal setal palisade terminating approximately two thirds along mid-tibia, setal palisade of hind tibia complete.

Abdomen. Tergite 6 brown, broad medially tapering to thin laterally, with four small setae on each posterior lateral margin. Sternite 6 with eight to 10 setae. Oviscape dark brown, glossy, broad with lateral and medial expansions. Side lobe expansions ending with dark colored rounded tooth on inner margin and light colored short rounded tooth on outer margin. Outer margin of each side lobe carries a thin “tail-like”

process, darker distally, ending with an inward bend. Side lobes with pale base, dark panels along outer and inner margins. Three fine setae along the inner basal margin of each side lobe. Medial dorsal process dark narrow, overlying a tapering dark ventral process that terminates with small side projections.

Geographic Distribution. Specimens from within the range of *S. geminata* in French Guiana and Guyana are outside the reported range of *S. saevissima* ants (Pitts 2002).

Biology. To date, specimens have only been collected in Malaise traps.

Material Examined. FRENCH GUIANA: Regina Kaw Mountains, Point Rd 40, 4.56° N, 52.21° W, 16 ♀, 24-XI–1-XII-2002, V. Soon, Malaise trap FG/2002/014 (LACM); GUYANA: BERBICE: Dubulay Ranch, 5.68° N, 57.86° W, 4 ♀, 15–23-I-1999, B. Brown & M. Sharkey, Malaise trap #4 (LACM).

Pseudacteon kungae, New Species
(Fig. 19)

Pseudacteon dentiger Borgmeier and Prado 1975: 76–78, figs. 142–143.

Species Recognition. Females: distinguished from other *Pseudacteon* in this group in having multicolored side lobes bearing thin tail-like extensions on the inner margin, and a narrow dark medial process. Differs from related *P. dentiger* Borgmeier, associated with the *S. saevissima* complex, in lacking the distinct inward facing tooth at the terminus of each side lobe shown in the type description of *P. dentiger* (Borgmeier 1962, fig. 8). In a later article, Borgmeier and Prado (1975) depict the species described here but have placed it under *P. dentiger*. Males: unknown.

Female. Body length 1.33–1.49 mm, thorax width 0.43–0.52 mm. Wing length 1.19–1.46 mm, width 0.51–0.62 mm, costal index 0.38–0.40. Body color dark brown, frons dark gray-brown. Palpus yellow, two setae. Flagellomere 1 yellowish brown, oval, flat, with slight apical point, microscopically pubescent. Arista length equal to flagellomere 1. Frons with 2-4-4-4 setae, one pair of supra-antennal setae. Scutellum with two pairs of setae, posterior about double length of anterior. Costa with ≈14 pairs of short setae. Halter yellowish brown. Legs orange-brown. Dorsal setal palisade terminating approximately two thirds along mid-tibia, setal palisade of hind tibia complete.

Abdomen. Tergite 6 brown, broad medially tapering to thin laterally, with four small setae on each posterior lateral margin. Sternite 6 with six setae. Oviscape dark brown, glossy, bilobed with narrow medial process. Side lobes evenly curved ending with truncated, flat edged tips. Inner margin of each side lobe carries a pale thin “tail-like” process ending with an outward bend. Side lobes with pale base, dark panels along outer and inner margins. Three fine setae along the inner basal margin of each side lobe. Medial dorsal process dark, narrow, overlying a dark, narrow ventral process that is ventrally curved along distal third.

Geographic Distribution. Northern Brazil (Pará) and Suriname.

Etymology. The species is named for Ms. Giar-Ann Kung in recognition of her extensive work resulting in the discovery of this species.

Biology. Collected on *S. geminata* at disturbed nests and at foraging sites.

Holotype. ♀, SURINAME: SIPALIWINI: Centraal Suriname Nature Res. airstrip, 4.72° N, 56.21° W, 18-VIII-2007, G. Kung, A. Kreuter, attracted to tuna baits (LACM).

Paratypes. BRAZIL: PARÁ: Caxiuaña Stn., 1.73° S, 51.45° W, 2♀, 4-X-2001, B. Brown, over disturbed *Solenopsis* nest (LACM); SURINAME: SIPALIWINI: Centraal Suriname Nature Res. airstrip, 4.72° N, 56.21° W, 2♀, 18-VIII-2007, G. Kung, A. Kreuter, attracted to tuna baits (LACM).

Pseudacteon laticarinatus, New Species
(Fig. 14)

Species Recognition. Females. This species comes close to *P. cultellatus* Borgmeier, a parasitoid of the *S. saevissima* complex, from which it differs in the oviscapae having a broad medial ridge with side lobes depressed only slightly below the plane of this ridge. *P. cultellatus* has a narrow medial ridge falling away sharply to the side lobes. Males: unknown.

Female. Body length 0.86–1.08 mm, thorax width 0.29–0.32 mm. Wing length 0.88–0.94 mm, width 0.37–0.44 mm, costal index 0.33–0.35. Body color light brown, frons gray-brown. Palpus yellow, 1–2 small fine setae. Flagellomere I brown, flat, elongate, tapering to a point with long setae on margin, lacking arista. Frons with 2-4-4-4 setae and one pair of supra-antennal setae. Scutellum with two pairs of setae, anterior about half the length of posterior. Costa with ≈14 pairs of short setae. Halter yellowish brown, darker dorsally. Legs pale yellowish brown. Dorsal setal palisade terminating approximately three fourths along mid-tibia, setal palisade of hind tibia complete.

Abdomen. Tergite 6 brown, broad, with a small seta on each lateral margin. Sternite 6 with two strong medial setae and two lateral setae on each side. Oviscape dark brown, glossy, comprising a broadly rounded central ridge with deflexed side lobes that splay outward giving a triangular shape to the entire oviscapae in dorsal view, overall width 0.20 mm. The central lobe ends in a flattened terminus with tips projecting laterally into long sharp points. There are two small setae at the base of each side lobe where it joins the central ridge.

Geographic Distribution. A scarce species only known from Costa Rica. This species is related to *P. cultellatus*, which is a parasitoid of the *S. saevissima* complex from southern Brazil to Argentina.

Etymology. The name is Latin for “broad ridged” to describe the distinctive rounded medial ridge of the oviscapae.

Biology. Collected on *S. geminata* at La Selva Biological Station in Costa Rica.

Holotype. ♀, COSTA RICA: LIMON: 7 km SW Bribri, 9.58° N, 82.88° W, IX-X-1989, P. Hanson, Malaise trap (LACM).

Paratypes. COSTA RICA: HEREDIA: La Selva Biol. Stn., 10.43° N, 84.02° W, 1♀ on 3-V-1993, 1♀ on 15-I-1994, 1♀ on 14-IX-1995, 1♀ on 31-V-1996, 1♀ on 15-V-2000, ALAS, Malaise traps M/13/92, M/11/329, M/01/447, M/1/651, M19/748 (INBC, LACM); Puerto Viejo de la Sarapiquí, LA Selva Biol. Stn., 10.43° N, 84.02° W, 1♀, II-1980, W.R. Mason (LACM); LIMON: 4 km NE Bribri, 9.63° N, 82.82° W, 1♀, XII-1989 – III-1990, P. Hanson, Malaise trap (LACM); PUNTARENAS: Rd. to Rincon, 24 km W Pan-American Hwy, 1♀, III-IV-1989, P. Hanson, I. Gauld, Malaise trap (LACM).

Key to Females

This key covers females of *Pseudacteon* species associated with *Solenopsis geminata* complex fire ants. Specimens are described as seen in alcohol or critical-point dried, but not slide-mounted as this distorts the alignment of the features. The key is based on features of the oviscapae seen under low magnification to facilitate use as a field key. Oviscapes of arched bilobed species have two plates: DP, dorsal plate and VP, ventral plate. Shagreen on ventral face of arched bilobed species is only visible with a high-powered microscope.

- 1 Oviscape arch-shaped, bilobed (Figs. 2–9) . . . 2
 - Oviscape simple, bifurcate or with complex lobes (Figs. 10–28) 9
- 2 (1) Small (body length ≈0.8 mm), with oviscapae lobes subparallel and narrowly separated (0.13 mm wide) (Fig. 7) (Texas). *spatulatus*
 - Larger species (>1.0 mm body length), broadly open lobes (0.26–0.34 mm between tips) (Figs. 2–6, 8, 9) 3
- 3 (2) Tip of lobe dark, no clear projection of DP beyond VP (Figs. 8 and 9) 4
 - Tip of lobe with DP projecting as a clear extension (Figs. 2–6) 5
- 4 (3) Broad oviscapae lobes (width:length ≈0.65), tapering toward tip. DP and VP overlay closely and edges match well. Extensive light shagreen on VP (Fig. 8) (Caribbean, northern S. America) *antiguensis*
 - Narrow oviscapae lobes (width:length ≈0.5), slightly tapering. Minimal clear portions where rounded tips of lobes overlap. Light shagreen on outer edge of VP (Fig. 9) (Southwestern USA, Mexico) *amuletum*
- 5 (3) DP terminates with darkened, pointed medial projection well beyond VP, and a clear rounded extension toward inner margin at tip. Base of VP extends as a strong bulge on inner margin at top of arch (Fig. 4) (Texas, Mexico) *catarinae*

- DP tip clear, extending on inner margin beyond dark rounded terminus of lobe, no medial projection. Base of VP remains parallel with inner curve of arch, not strongly bulging (Figs. 2, 3, 5, 6) 6
- 6 (5) DP with distinctly pointed, elongate tip as a clear projection on inner margin. (Fig. 5) (Caribbean, northern S. America) *grandis*
- DP tip rounded or slightly pointed, clear (Figs. 2, 3, 6) 7
- 7 (6) Small species (body length 1.25–1.46 mm). Oviscape lobes with smoothly curved outer margin, red brown. Rounded DP tip slightly translucent, extends medially or inwardly beyond rounded VP tip. Light shagreen across outer half of VP (Fig. 6) (Western Amazon basin) *andinus*
- Large species (body length up to 1.8 mm). Oviscape lobes large, dark, outer margin bulged, DP lobe tip clear, extends toward inner margin. Extensive deep shagreen on VP (Figs. 2, 3) 8
- 8 (7) Oviscape very dark brown/black, broad (width:length 0.62–0.7) with thin clear triangular-shaped DP tip projecting beyond inner half of terminus (Fig. 2) (Texas, Mexico, Central America) *robustus*
- Oviscape brown, somewhat broad (width:length 0.48–0.58) with translucent, elongate, rounded DP tip, projecting along inner margin (Fig. 3) (Central America, northern S. America) *browni*
- 9 (1) Long, tubular oviscape (>0.2 mm) with apex curved downward. Simple or with small side lobes at apex (Figs. 10 and 20–28) 10
- Oviscape short (<0.2 mm) and bifurcate or broad with complex lobes (Figs. 11–19) 13
- 10 (9) Oviscape downcurved apex simple with small side bristles (Fig. 10) (Honduras) *longicauda*
- Oviscape apex has side lobes evident in dorsal view before downward curve at apex (Figs. 20–28) 11
- 11 (10) Oviscape apex has side process that each have two tips. In dorsal view, oviscape broadens to triangular shape across the side lobes (Figs. 26–28) (Texas to northern S. America) *hippeus*
- Side lobes of apex each with single tips, in dorsal view (Figs. 20–25) 12
- 12 (11) Oviscape tip with small, pale side lobes. Slight or no constriction of oviscape before side lobes (Figs. 20–22) (Texas, Arizona, Oklahoma) *crawfordi*
- Oviscape with darkened side lobes. Oviscape strongly constricted immediately proximal to expanded side lobes (Figs. 23–25). (Western Mexico) *annulus*
- 13 (9) Oviscape short, bifurcate with darkened, forked medial process. Medial stylet may be projected giving trilobed appearance (Figs. 11–13, 16, 17) 14
- Oviscape broad with side lobes and elaborate central process (Figs. 14 and 15, 18, 19) 18
- 14 (13) Oviscape broadens toward bifurcated tips (Figs. 11–13) 15
- Oviscape tapers before bifurcating at simple tips (Figs. 16 and 17) 17
- 15 (14) Bifurcated lobes clear, strongly pointed outward with pointed tips. Darkened medial forked process projects terminally. Two strong medial bristles (Fig. 13) (Costa Rica to Chiapas, Mexico) *bispinosus*
- Bifurcated lobes translucent, containing a darkened medial forked process, without strong medial bristles (Figs. 11–12) 16
- 16 (15) Bifurcated lobes narrowly expanded (\approx 1.5 width at base) or subparallel, with upturned outer margins. Outer apex of each lobe ends in a small point at tip of forked darkened medial process (Fig. 12) (Texas to Costa Rica) *palomita*
- Bifurcated lobes expanded broadly at tips (>1.8 width at base), with only slightly upturned outer margins. Outer apex of each lobe extends to a rounded tip beyond end of darkened medial process (Fig. 11) (northern S. America) *deltoides*
- 17 (14) Bifurcated tips curved outward (Fig. 17) (Texas, eastern Mexico) *bifidus*
- Oviscape tips remain parallel, not outwardly curved (Fig. 16) (Western Mexico to Colombia) *quinni*
- 18 (13) Large species (body length 1.3–1.5 mm) with side lobes bearing a slender “tail-like” extension (Figs. 18, 19) 19
- Smaller species (body length 0.8–1.1 mm) with small, simple side lobes (Figs. 14 and 15) 20
- 19 (18) Oviscape broad, with a tooth on the inner margin of the lobes, and tailed extensions arising from the outer margins of the side lobes. Medial dorsal process dark narrow, overlying a tapering dark ventral process that terminates with small side projections (Fig. 18) (French Guiana and Guyana) *fowleri*
- Oviscape with multicolored side lobes bearing thin tail-like extensions on the inner margin. A narrow, dark medial dorsal process overlies a narrow tapering ventral process (Fig. 19) (northern Brazil, Suriname) *kungae*

- 20 (18) Central lobe with flattened terminus, laterally ending in long sharp spines. Side lobes depressed ventrally with rounded tips (Fig. 14) (Costa Rica) *laticarinatus*
 - Central lobe anchor-shaped, extended from basal process which has rounded side lobes (Fig. 15) (Central America to northern S. America) *arcuatus*

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