

Revision of the genus *Paramarpissa* F.O.P.-Cambridge, 1901 (Araneae, Salticidae)

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The genus *Paramarpissa* is redefined. The functional tegulum in *Paramarpissa* consists of two separate sclerites, the tegulum in the restricted sense and the salticid radix. The new term, salticid functional tegulum, is defined. Six species, of which three are new, are included in the genus, and two new combinations are established. One species, *P. albopilosa* is revalidated. All species are described and illustrated.

KEYWORDS: *Paramarpissa*, Nearctic *Pseudicius*, salticid functional tegulum.

Introduction

The genus *Paramarpissa* was erected by F.O.P.-Cambridge in 1901 for *P. tibialis*. Banks (1929) described a second species, *P. insignis*. However, as was correctly recognized by Chickering (1946), the latter species is not congeneric with *P. tibialis* and was placed in the genus *Carabella* Chickering (Chickering's specimens re-examined). Peckham and Peckham (1909) synonymized *Marpissa albopilosa* Banks with *Pseudicius piraticus* Peckham and Peckham. Consequently most specimens in this genus have been treated as *Pseudicius piraticus*. Further, *P. tibialis*, the type species of *Paramarpissa* was found by Peckham and Peckham (1909) to be a junior synonym of *Pseudicius piraticus*. Thus doubt was cast on the validity of *Paramarpissa* (Peckham and Peckham, 1909; Prószyński, 1990). In reality, *M. albopilosa* and *Paramarpissa tibialis* are good species in *Paramarpissa*. However, it is common knowledge among some salticid workers that *P. piraticus* does not actually belong to *Pseudicius* Simon (Maddison, 1987). In the course of investigation of the correct placement of *P. piraticus*, a noteworthy morphological structure was discovered in the male palpal bulb of this and related species, which redefines the genus *Paramarpissa*.

Morphological terminology

Terminology and nomenclature for the genitalia follows Comstock (1910), Merrett (1963), Saaristo (1971) and Coddington (1990). Abbreviations used: AG, accessory glands; AME, anterior median eyes; ap., apically; BH, basal haematodocha; C, cymbium; CP, cymbial process; DH, distal haematodocha; d., dorsally; DTA, dorsal tibial apophysis; E, embolus; FD, fertilization duct; Fm., femur; ID, insemination duct; LTA, lateral tibial apophysis; Mt, metatarsus; pr., prolaterally; Pt., patella; RX, salticid radix; RC, receptacle; rt., retrolaterally; ST, subtegulum; T, tegulum; TA, terminal apophysis; Tb, tibia; v, ventrally. The sequence of leg segments: femur + patella + tibia + metatarsus + tarsus. For leg spination the system is that used by Ono (1988). All measurements are in millimetres.

Depositories

AMNH, American Museum of Natural History, New York, NY, USA, curator N. I. Platnick; BC, personal collection of Bruce Cutler, Lawrence, KS, USA; BMNH, The Natural History Museum, London, UK, curator P. D. Hillyard; CAS, California Academy of Sciences, San Francisco, CA, USA, curator C. E. Griswold; FSCA, Florida State Collection of Arthropods, Gainesville, FL, USA, curator G. B. Edwards; ISE, Zoological Museum, Institute for Systematics and Ecology of Animals, Novosibirsk, Russia, curator D. V. Logunov; MCZ, Museum of Comparative Zoology, Harvard University, Cambridge, MA, USA, curator H. W. Levi; NMSU, New Mexico State University, Las Cruces, NM, USA, curator D. B. Richman.

Paramarpissa F.O.P.-Cambridge, 1901.

Type species: Paramarpissa tibialis, F.O.P.-Cambridge, 1901 by monotypy. *Eremattus* Banks 1904. Type species: *Marpissa albopilosa*, Banks 1902 by designation.

Medium size jumping spiders from 5 to 7 mm total length. Sexes alike in general body form and size, but showing a clear sexual dimorphism in colour. Males have a wide pale longitudinal dorsal band on both carapace and opisthosoma (figures 1 and 24). Females are covered with a dense layer of scales forming a mottled grey coloration. Carapace: low and wide (figures 1, 2 and 24); fovea present behind posterior lateral eye row. Eyes: AME largest, PME about midway between ALE and PLE, ocular quadrangle between 41% and 47% of carapace length. Clypeus: very low, almost absent. Chelicerae: moderate size, vertical, promargin with longitudinal ridge (arrowed in figures 3 and 17), retromargin without teeth. Maxillae: elongate, usually convergent. Labium: subtriangular, longer than wide. Sternum: elongate, slightly pointed anteriorly. Pedicel: short, not usually visible in dorsal view. Opisthosoma: elongate, with length 1.7–2.1 times the width; a small rounded scutum about 25% of the opisthosoma length usually occurs anteriorly on dorsum but is normally obscured by a dense cover of setae and scales. Scales: grey body scales (flattened ornamental setae) have distinct marginal teeth, a median keel, fine oblique striae extending from the keel to the lateral margins, and the distal tips are bent, some nearly perpendicularly to the long axis (figures 6–8). Legs: leg I very heavy and long (figures 1 and 2); leg I in males shows two specializations—tarsus short, bearing a distal pair of ventral/apical spine-like bulges (arrowed in figure 5); and metatarsal ventral spine socket well developed, flanges elevated, spines appearing bisegmented. Leg formula: males I, IV, III, II; females IV, I, III, II. Leg spination: uniform in both sexes, pattern: leg I—Tb. v/pr. 0–1; Mt. v. 2–2 ap.; leg II—Mt. pr.

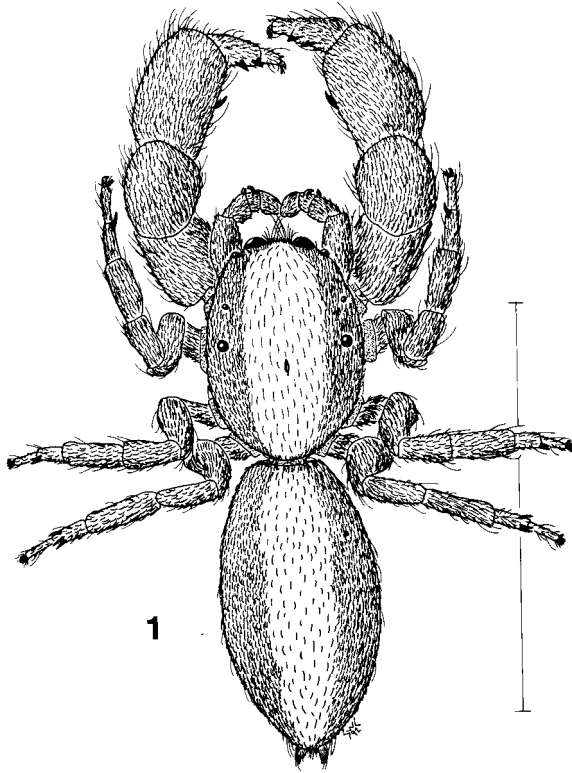


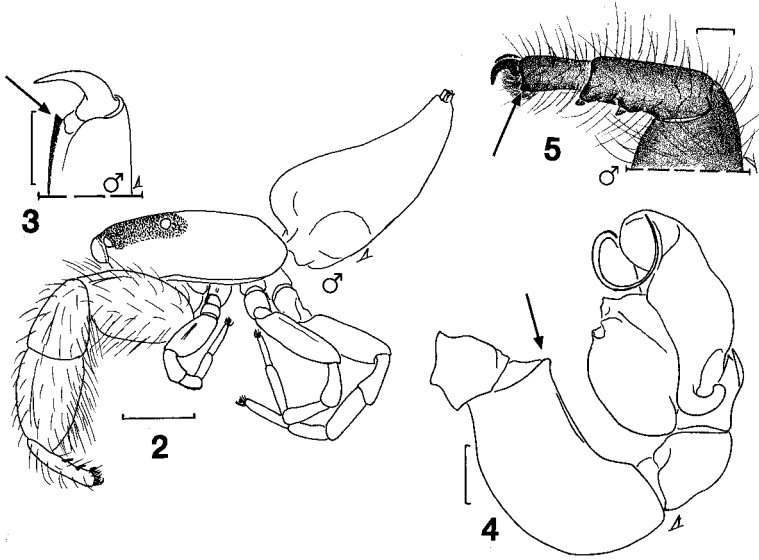
FIG. 1. *Paramarpissa laeta* new species, male body, dorsal view (by S. W. Lingafelter). Scale bar = 4.75 mm.

1 ap.; v. 2–2 ap.; leg III—Tb. v. 1 ap.; Mt. pr. and rt. 2 ap., v. 1–2 ap. Female palpus: slender with single small apical claw. Male palpus: femur heavy and broad with projection basally (arrowed in figure 4); tibia with lateral (LTA) and dorsal (DTA) apophyses (figures 21 and 22); cymbium with curved lateral process; functional tegulum complex consisting of the tegulum *sensu stricto* and the salticid radix (see below); embolus curved, sometimes sinuate. Female genitalia: simple, epigynum a flat plate with a pair of copulatory pores often separated by a narrow medial ridge (figure 18); insemination ducts translucent tubes, broad at entrance and narrow distally before receptacles (figure 19).

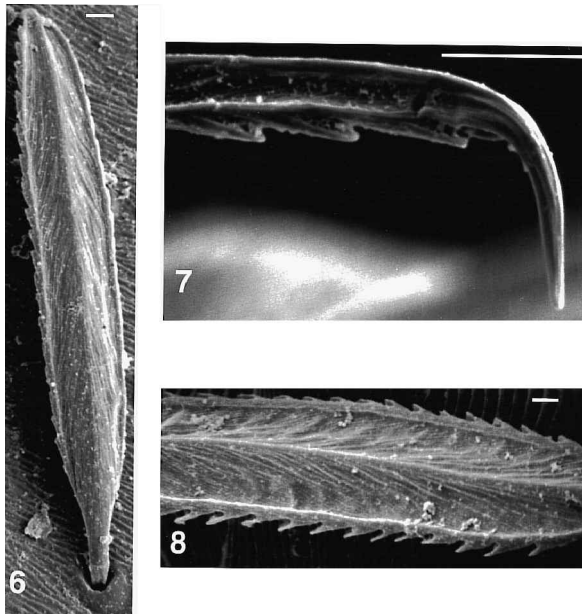
Male palpal morphology

Examination of the male genitalia of *Paramarpissa* uncovered a unique character in the Salticidae. The functional tegulum consists of two separated sclerites. One of the two appears to be the true tegulum (*sensu* Comstock, 1910), i.e. it is the ring-shaped sclerite that usually forms the wall of the middle division of the bulb. The other sclerite is now difficult to homologize accurately, but it is clear that it cannot be homologous to either the araneid conductor nor the araneid median apophysis, as neither of them have so far been reported to contain the sperm duct (Comstock, 1910; Grasshoff, 1968; Coddington, 1990; Scharff and Coddington, 1997).

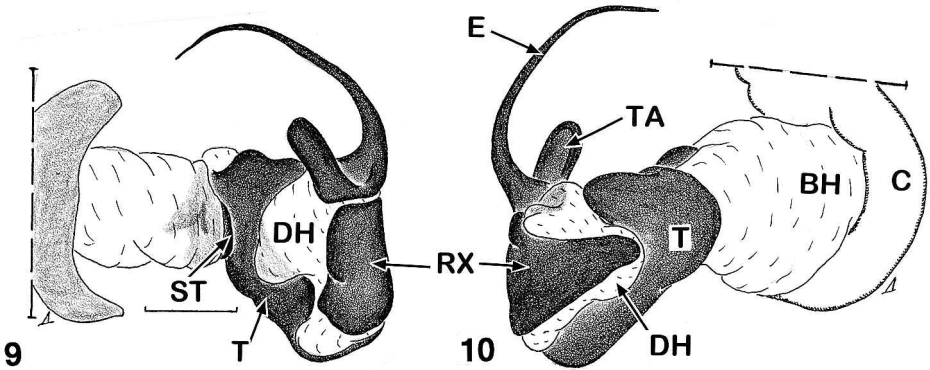
At least, two alternatives are possible. First, this sclerite could be homologous to the suprattegulum (*sensu* Saaristo, 1971, 1977; = the linyphiid median apophysis,



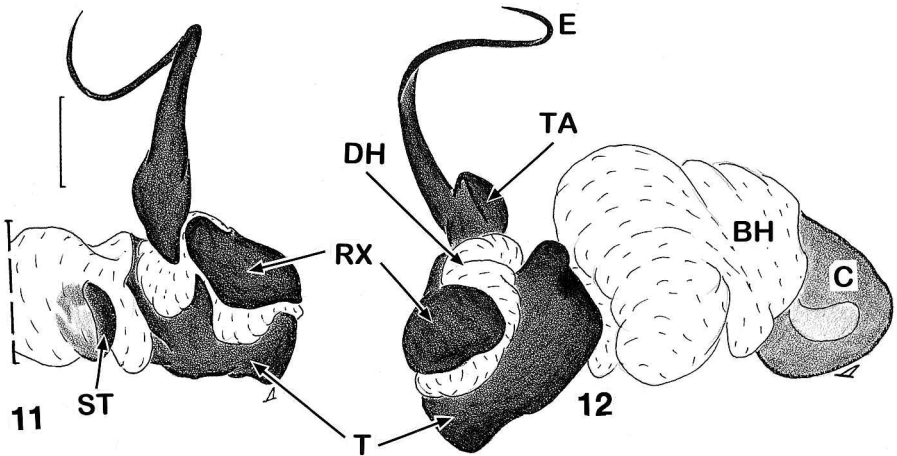
FIGS 2–5. *Paramarpissa piratica* (Peckham and Peckham), male, New Mexico: Lea Co. (2) Left side; (3) left chelicera, arrow points to promarginal keel; (4) male palpus, arrow points to projection on proximal ventral edge of femur; (5) first leg, metatarsus and tarsus, arrow points to projections at distal ventral edge of tarsus. Scale bars, 2 = 2.0 mm, 3–5 = 0.25 mm.



FIGS 6–8. *Paramarpissa albopilosa* (Banks), immature. Grey scales. (6) Prosomal scale; (7) opisthosomal scale tip, lateral view; (8) opisthosomal scale, dorsal view detail. Scale bar = 5 μ m.



FIGS 9–10. *Paramarpissa albopilosa* (Banks), male, expanded palpus. (9) Mesial view; 10, lateral view. Scale bar = 0.25 mm.



FIGS 11–12. *Paramarpissa piratica* (Peckham and Peckham), male, expanded palpus. (11) Mesial view; (12) lateral view. Scale bar = 0.25 mm.

sensu Merrett, 1963; = the araneid radix, *sensu* Comstock, 1910 and Grasshoff, 1968), which was originally defined as a distal prolongation of the linyphiid tegulum (Saaristo, 1971). However, Coddington (1990: 15) noted that it has never been clear whether the suprategulum is articulated (and thus more like a true apophysis), or simply the elaborated end of a tegular projection. As in the case of *Paramarpissa* it is a distinguishable sclerite (figures 9–12), we should accept the latter assumption, which was shown by Coddington (1990) to be most often the case. The important evidence supporting this idea is that the sperm duct passes through this sclerite, thus probably pointing to its homology with the tegulum.

However, the second alternative remains possible that the sclerite at hand is homologous to the linyphiid radix (*sensu* Merrett, 1963; = the araneid stipes, *sensu* Comstock, 1910, Grasshoff, 1968 and Coddington, 1990). As in the suprategulum, the linyphiid radix has been reported to have the sperm duct running inside it and, what is even more important for us, connected to both the tegulum and the remaining sclerites of the embolic division via the membrane, i.e. it is in fact a true sclerite. Thus, if one accepts the second sclerite in *Paramarpissa* to be the radix, we do not

need an additional assumption that the sclerite is an elaborated and separated distal prolongation of the tegulum (as in the case of the suprategulum). Therefore, until more detailed work on salticid genitalia is carried out, as a simplest solution, it is better to consider this sclerite to be a radix. Since the exact homology is uncertain, we are calling this sclerite the salticid radix. This sclerite was described by Logunov (1998) in *Pseudeuophrys* and called the radix in that paper.

Furthermore, we conclude that there are at least two types of tegulum in the Salticidae, a simple tegulum that corresponds to the original meaning of the term (*sensu* Comstock, 1910) and a complex one that involves also one to several additional sclerites, e.g. the radix. In the case of the salticid 'tegulum', we face an analogous problem as that of the term 'conductor', where the name accounts for a sclerite function, but not a specific sclerite composition. Consequently, we propose that the tegulum in descriptions of jumping spiders be used in the restricted sense, as in *Paramarpissa*. Otherwise it may be called the functional salticid tegulum, reflecting the fact that the correct sclerite composition is unknown or unstudied in most of the Salticidae.

Scale morphology

The grey body scales (modified setae) of an immature *P. albopilosa* were examined by scanning electron microscopy. The scales have distinct marginal teeth with a median keel, and fine oblique striae extending from the keel to the lateral margins. The tips are often bent down perpendicularly to the scale's long axis (figures 6–8). These scales most resemble those of *Menemerus* and especially *Platycryptus* (Hill, 1979).

Diagnosis and provisional affinities

The general appearance of the spermathecae in *Paramarpissa* is similar to the spermathecal structure in the genera in the so-called *Icius–Pseudicius* complex; e.g. the *cinctus* or *encarpatus* species groups (Andreeva *et al.*, 1984: 35–45; Žabka, 1993: figure 4E, F). The scale morphology shows a close resemblance to those of *Menemerus* and especially those of *Platycryptus* (Hill, 1979). Since few salticids have had their scales studied, compared to study of the genitalia, the affinities here are less certain. For the moment we believe it is safest to consider *Paramarpissa* as being associated with the *Icius–Pseudicius* generic complex. From the other genera in the *Icius–Pseudicius* complex, *Paramarpissa* differs in having the tegulum and radix as distinctly separated sclerites (figures 9–12), a promarginal ridge on the chelicerae (figures 3 and 17), a DTA (figure 18), paired small conical projections on tarsus I in males (figure 5), strongly developed spine socket flanges (figure 5 arrowed), and in lacking tubercules on femora I.

The males of the Neotropical genus *Helvetia* Peckham and Peckham bear a remarkable superficial resemblance to male *Paramarpissa*. In female *Helvetia* this resemblance is much less marked. Males of *Helvetia* lack the ventral apical bulges of leg I, lack the cheliceral keel and have a retromarginal tooth, the palpus lacks the salticid radix and the DTA, and has femoral tubercules (Galiano, 1963, 1976 and examination of male *Helvetia zonata* Simon and female *H. albovittata* Simon).

Distribution. Southwestern region of the USA, and Mexico (Map 1).

Natural History

Very little information is available on the biology of members of this genus. In the vicinity of Las Cruces, New Mexico, *P. albopilosa* is not uncommon on desert



MAP 1. Distribution of *Paramarpissa*. Solid circles = *P. piratica*, open circle = *P. tibialis*, solid triangles = *P. albopilosa*, open triangles = *P. griswoldi*, solid squares = *P. sarta*, open square = *P. laeta*.

shrubs such as the creosote bush, *Larrea tridentata* (D.C.) Cov., and especially mesquite, *Prosopis glandulosa* Torr. Habitat records for *P. piratica* include cultivated grape, oaks (*Quercus* spp.), mesquite and possibly *Juniperus* spp.

Cutler (1992) observed that penultimate and antepenultimate specimens of *P. albopilosa* (reported as *Pseudicius piraticus*) preferred to reside on branches of mesquite rather than on foliage.

A male *P. albopilosa* was taken from a mud dauber's nest (Sphecidae, *Trypoxylon* sp.) in southeastern Arizona.

Key to species

- | | |
|---------------------------------------------------------------|---------------------|
| 1 Males | 2 |
| - Females | 7 |
| 2 LTA forked with two subequal branches (figure 32) | <i>laeta</i> n. sp. |
| - LTA not forked | 3 |

- 3 Embolus long, the tip as seen in ventral view points prolaterally (figure 35)
 *piratica* (Peckham and Peckham)
 – Tip of embolus in ventral view points retrolaterally or distally 4
- 4 LTA short and thick (figure 45) *sarta* n. sp.
 – LTA long and slender 5
- 5 DTA in dorsal view large forming a broad right triangle (figure 14)
 *tibialis* F.O.P.-Cambridge
 – DTA smaller and not forming a right triangle 6
- 6 DTA in dorsal view with three small points; embolus longer, as seen in prolateral view
 embolus base removed from cymbium edge (figures 21 and 23) *albopilosa* (Banks)
 – DTA in dorsal view with two points; embolus shorter, as seen in prolateral view
 embolus base close to edge of cymbium (figures 26 and 28) *griswoldi* n. sp.
- 7 ID long forming 1.5–1.8 loops before entering RC (figures 41 and 42)
 *piratica* (Peckham and Peckham)
 – ID shorter forming 1 loop before entering RC 8
- 8 RC removed from posterior border of epigynum (figure 49) *sarta* n. sp.
 – RC at posterior border of epigynum 9
- 9 ID forming smooth open loop (figure 30) *griswoldi* n. sp.
 – ID forming angular tight loop (figure 19) *albopilosa* (Banks)

***Paramarpissa tibialis* F.O.P.-Cambridge, 1901**
 (figures 13–16)

Paramarpissa tibialis F.O.P.-Cambridge, 1901: 252, P 1.22, f. 11 (male).

Pseudicus piraticus: Peckham and Peckham, 1909: 494 (in error).

Holotype. Mexico: Tabasco: Teapa (BMNH), male, examined.

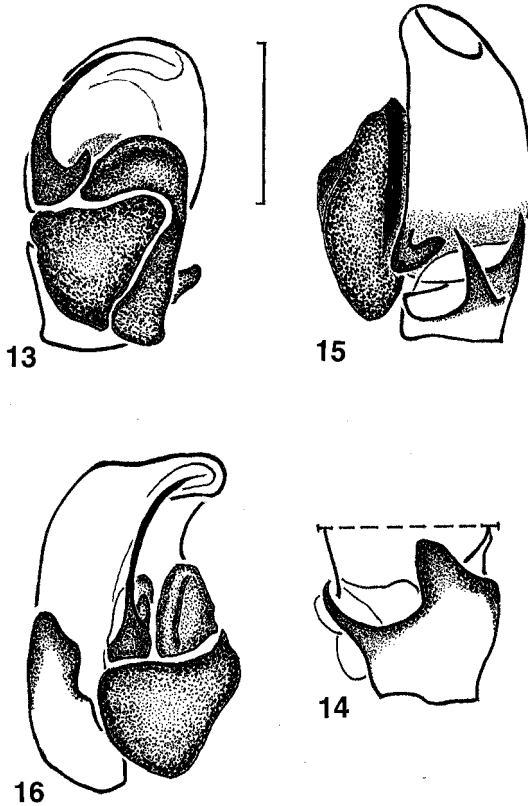
Diagnosis. Close to *P. albopilosa*, *P. laeta* and especially *P. griswoldi*. Distinguished from all species by the broad right triangle shape of DTA (figure 14).

Description. Male.

Measurements. Carapace 2.65 long, 1.90 wide, 0.83 high at PLE. Ocular area 1.18 long, 1.40 wide anteriorly, 1.51 wide posteriorly. Diameter of AME 0.39. Opisthosoma shrivelled and misshapen, about 3.5 long. Chelicera 0.80 long (right chelicera missing). Clypeus 0.05 high. Length of leg segments: I—1.63+0.80+1.12+0.60+0.55; II—1.12+0.62+0.65+0.51+0.40; III—1.23+0.62+0.63+0.54+0.43; IV—1.33+0.65+0.61+0.55+0.45. Leg spination. I—Fm. d. 0–1; Tb. pr./v. 0–1, Mt. v. 2–2 ap. II—Fm. d. 1–1; Mt. pr. 1. ap.; v. 2–2 ap. III and IV—Fm. d. 1–1–1; Tb. v. 1 ap.; Mt. pr. and rt. 2 ap., v. 1–2 ap.

Coloration. Carapace dark brown with patchy white setae along sides. Black around eyes. White setae near eyes. Sternum, maxillae, labium and chelicera brown. Opisthosoma with dark subcuticular marks in heart region, two parallel longitudinal rows of red-brown setae on dorsum, scattered black subcuticular marks on sides ectal to red setae rows, venter pale. Book lung covers pale. Leg I dark brown with long protruding white setae. Legs II–IV pale brown with white setae. Palpus as in figures 13–16.

Notes. This specimen is the type species of *Paramarpissa*. F.O.P.-Cambridge's figures (1901) show a more sinuate embolus as in *P. laeta*, but the specimen has a simple curve as in *P. albopilosa* or *P. griswoldi*. The right chelicera is missing, the opisthosoma is shrivelled and the specimen looks rubbed with many setae missing. It also appears bleached or faded in colour. Despite earlier opinions, the specimen is a distinct valid species and certainly not conspecific with *P. piraticus*.



FIGS 13-16. *Paramarpissa tibialis* F.O.P.-Cambridge, male holotype, palpus. (13) Ventral view; (14) dorsal view of tibia; (15) retrolateral view; (16) prolateral view. Scale bar = 0.3 mm.

Distribution. Known only from the type locality in southern Mexico (Map 1).

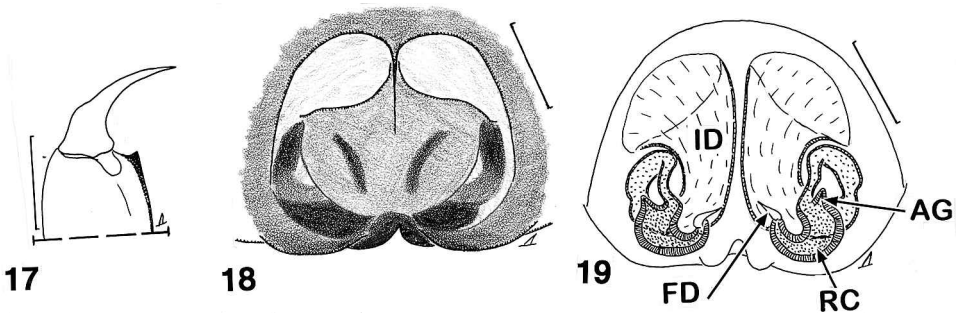
***Paramarpissa albopilosa* (Banks, 1902), n. comb.**

(figures 9, 10, 17-23)

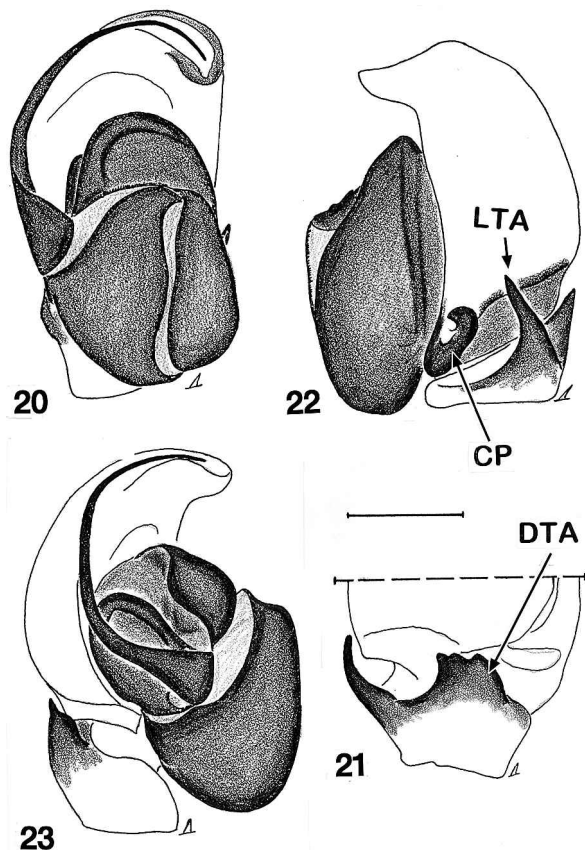
Marpissa albopilosa Banks, 1902: 219, pl. 7, figures 2, 3 and 9 (female).

Eremattus albopilosa: Banks 1904: 117.

Pseudicius piraticus: Peckham and Peckham 1909: 494 (in error).



FIGS 17-19. *Paramarpissa albopilosa* (Banks). Female holotype; (17) chelicera; (18) epigynum; (19) internal genitalia. Scale bar = 0.25 mm.



FIGS 20–23. *Paramarpissa albopilosa* (Banks). Male from New Mexico: Dona Ana Co., palpus; (20) ventral view; (21) dorsal view of tibia; (22) retrolateral view; (23) prolateral view. Scale bar = 0.25 mm.

Holotype. USA: Arizona: Coconino Co., Williams (MCZ) female, examined.

Diagnosis. Morphologically most similar to *P. griswoldi*, *P. laeta* and *P. tibialis*. Distinguished by the shape of the DTA being a low rectangle with a few shallow points (figure 21). Females most similar to those of *P. griswoldi*, insemination duct with angular loops (figure 19); only one mature female is known (the holotype) and the match of males and females is provisional, although likely.

Description. Male (New Mexico: Dona Ana Co.).

Measurements. Carapace 2.73 long, 1.93 wide, 0.78 high at PLE. Ocular area 1.15 long, 1.43 wide anteriorly, 1.55 wide posteriorly. Diameter of AME 0.50. Opisthosoma 3.80 long, 2.10 wide, 0.78 high at PLE. Chelicera 0.78 long. Clypeus 0.05 high. Length of leg segments: I—1.50+1.03+1.43+0.85+0.45; II—1.08+0.68+0.68+0.50+0.45; III—1.28+0.65+0.73+0.70+0.48; IV—1.45+0.75+0.85+0.78+0.53. Leg spination: I—Tb. pr./v. 0–1; Mt.v. 2–2 ap.; II—Fm. d. 0–1; Mt. pr. 1 ap.; v. 2–1 ap.; III and IV—Fm. d. 0–1–1, Tb. v. 1 ap.; Mt. pr. and rt. 2 ap.; v. 1–2 ap.

Coloration. Carapace dark brown, with sides densely covered with black appressed setae and a wide longitudinal band of white appressed setae. Black around eyes. Sternum, maxillae, labium and chelicerae dark brown. Opisthosoma: dorsum

with wide longitudinal band of white setae bordered by a pair of dark brown stripes, sides and venter brownish yellow. Book lung covers yellow. Spinnerets dark brown. Leg I dark brown, densely covered with protruding pale setae. Legs II–IV brownish yellow densely covered with pale setae. Palpus as in figures 9, 10, 20–23.

Female holotype of *Eremattus albopilosus*.

Measurements. Carapace 2.63 long, 1.73 wide, 0.78 high at PLE. Ocular area 1.23 long, 1.40 wide anteriorly, 1.54 wide posteriorly. Diameter of AME 0.48. Opisthosoma 3.90 long, 1.85 wide. Chelicera 0.60 long. Clypeus 0.05 high. Length of leg segments, I—1.25+0.70+0.93+0.63+0.44; II—0.98+0.63+0.58+0.48+0.38; III—1.13+0.60+0.58+0.61+0.48; IV—1.43+0.58+0.75+0.75+0.48. Leg spination: I—Tb. pr. 0–1–0, Mt. v. 2–2 ap; II—Mt. pr. 1 ap., v. 2–1 ap.; III and IV—Mt. pr. and vt. 2 ap, v. 1–2 ap.

Coloration. Carapace red-brown, covered with white scales. Black around eyes. Sternum, maxillae, labium and chelicerae yellow-brown. Opisthosoma yellow-brown with venter paler, rubbed. Book lung covers yellow-brown. Spinnerets brownish. Leg I red-brown covered with pale protruding setae. Legs II–IV yellow-brown. Epigynum and spermathecae as in figures 18 and 19.

Notes. A single male palpus is known from USA: California: Colusa Co., sites, 12 September 1955, R. O. Schuster. This is almost certainly a mislabelled specimen as this is from a locality of *P. griswoldi*, as no other species is reliably known from central California. Cutler's (1992) observations on microhabitat choice in *P. piratica* really apply to *P. albopilosa*.

Material examined. Mexico: Sonora: 6 miles E of Cananea, 17 September 1970 (K. Stephan) (FSCA), one male. USA: Arizona: Cochise Co., NE Portal, *Trypoxylon* spiders, 11 spiders stored, #15 cell 2, 18 June 1961 (AMNH), one male; Portal, 5 September 1982 (B. K. Dozier) (FSCA), one male; 19 July 1970 (K. Stephan) (FSCA), one female. California: San Diego Co., 6 miles E of Jacumba, 30 July 1982 (B. K. Dozier) (FSCA), one male, two immature males. New Mexico: Catron Co., Gila Cliff Dwellers National Monument, 9 September 1970 (AMNH), one male; Dona Ana Co., 15 miles N of Las Cruces, Issacks Lake, sweeping creosote bush, 26 June 1988 (B. Cutler) (BC), one male, matured 9 September 1988, two immatures; (G. B. Edwards) (FSCA), one male, one female, one immature; Sandoval Co., 9 miles SE of Bernalillo, 17 August 1947 (Mulaik) (AMNH), one male.

Distribution. Mexico: Sonora; USA: Arizona, southern California, New Mexico (Map 1).

Paramarpissa griswoldi sp. n.

(figures 24–30)

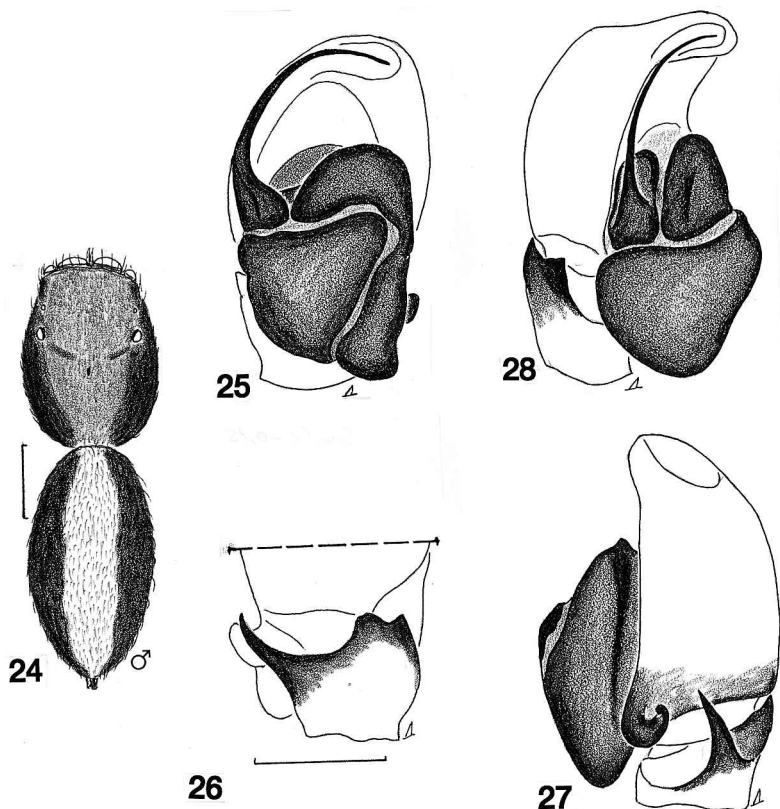
Holotype. USA: California: Yolo Co., Putah Creek, 25 April 1948 (E. I. Schlinger) (AMNH) male.

Etymology. Named after the American arachnologist, Dr Charles Griswold, who had earlier recognized the California specimens as a new species.

Diagnosis. Closely related to *P. albopilosa*, *P. laeta* and *P. tibialis*. Separated from *P. laeta* by simple LTA, males of *P. albopilosa* and *P. tibialis* by the low bipartite DTA (figure 26). The ID of the female is smoothly curved, not angulate (figure 30).

Description. Male, California: Colusa Co.

Measurements. Male carapace 2.33–2.50 long, 1.50–1.80 wide, 0.80–0.83 high at PLE. Ocular area 1.00–1.10 long, 1.23–1.25 wide anteriorly and 1.35–1.43 wide



FIGS 24–28. *Paramarpissa griswoldi* n. sp., California: Colusa Co. Male. (24) Body, dorsal view; (25–28) palpus; (25) ventral view; (26) dorsal view of tibia; (27) retrolateral view; (28) prolateral view. Scale bar = 0.25 mm.

posteriorly. Diameter of AME 0.38–0.40. Opisthosoma 2.95–3.00 long, 1.40–1.73 wide. Chelicera 0.53–0.60 long. Clypeus 0.03–0.04 high.

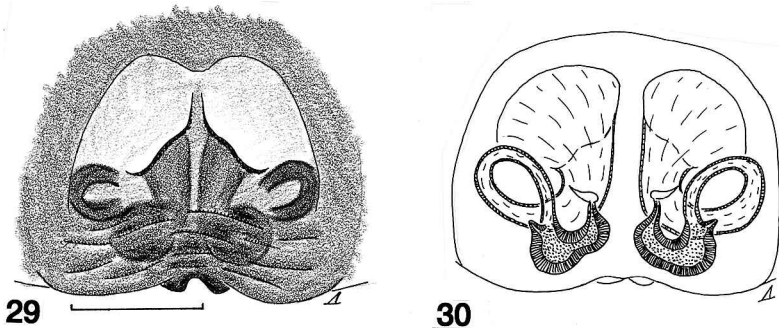
Length of leg segments. I—1.38–1.48+0.88–1.00+1.15–1.38+0.59–0.75+0.34–0.34; II—0.83–1.03+0.54–0.60+0.60–0.63+0.45–0.53+0.33–0.38; III—1.08–1.10+0.60–0.65+0.55–0.63+0.55–0.59+0.45–0.58; IV—1.25–1.33+0.65+0.75–0.78+0.68–0.70+0.46–0.55.

Leg spination. I—Tb. pr./v. 0–1; Mt. v. 2–2 ap., II—Fm. d. 1–1; Mt. pr. 1 ap., v. 2–1 ap.; III and IV—Fm. d. 0–1–1 or 1–1–1; Mt. pr. and rt. 2 ap., v. 1–2 ap.

Coloration. Carapace brown, with sides densely covered with black appressed setae and a wide longitudinal band of white appressed setae. Black pigment around eyes. Sternum, maxillae, labium yellow-brown. Chelicerae dark brown. Opisthosoma: dorsum with wide longitudinal stripe of white setae bordered by a pair of dark brown stripes, sides and venter yellow (figure 24). Leg I dark brown, densely covered with long pale protruding setae. Legs II–IV brownish yellow, densely covered with pale setae and appressed white scales. Palpus as in figures 25–28.

Female paratype, California: Colusa Co.

Measurements. Carapace 1.33 long, 1.58 wide, 0.70 high at PLE. Ocular area 1.10 long, 1.25 wide anteriorly, 1.38 wide posteriorly. Diameter of AME 0.41. Opisthosoma 2.75 long, 1.45 wide. Chelicera 0.65 long. Clypeus 0.06 high.



FIGS 29–30. *Paramarpissa griswoldi* n. sp., California: Colusa Co. Female. (29) Epigynum; (30) internal genitalia. Scale bar = 0.25 mm.

Length of leg segments. I—1.15+0.68+0.80+0.55+0.35; II—0.90+0.45+0.50+0.40+0.38; III—1.00+0.45+0.55+0.48+0.43; IV—1.25+0.55+0.68+0.68+0.43.

Leg spination. I—tb. pr. 0–1–0; Mt. v. 2–2 ap.; II—Mt. pr. 1 ap.; III and IV—Mt. pr. and rt. 2 ap.; v. 1–2 ap. Coloration as described for male, except: longitudinal white stripe absent, clypeus densely covered with white hairs. Epigynum and spermathecae as in figures 29 and 30.

Material examined. Paratypes: USA: California: Colusa Co., Sites, 12 September 1955 (R. Schlinger) (AMNH) three males, one female; Contra Costa Co., Danville, near Blackhawk Road, 25 February 1977, oak galls (K. Bales) (CAS) one female; Shasta Co., Redding, July 1967 (H. Van Duzee) (CAS), one male, one immature.

Distribution. Northern and central California (Map 1).

Paramarpissa laeta sp. n.

(figures 1 and 31–34)

Holotype. Male from Mexico: Chihuahua: Llano de Rio de Santa Clara, 27 miles W of Parrita, 12 August 1950 (R. Smith) (AMNH).

Etymology. Derived from the Latin word meaning well fed, fattened.

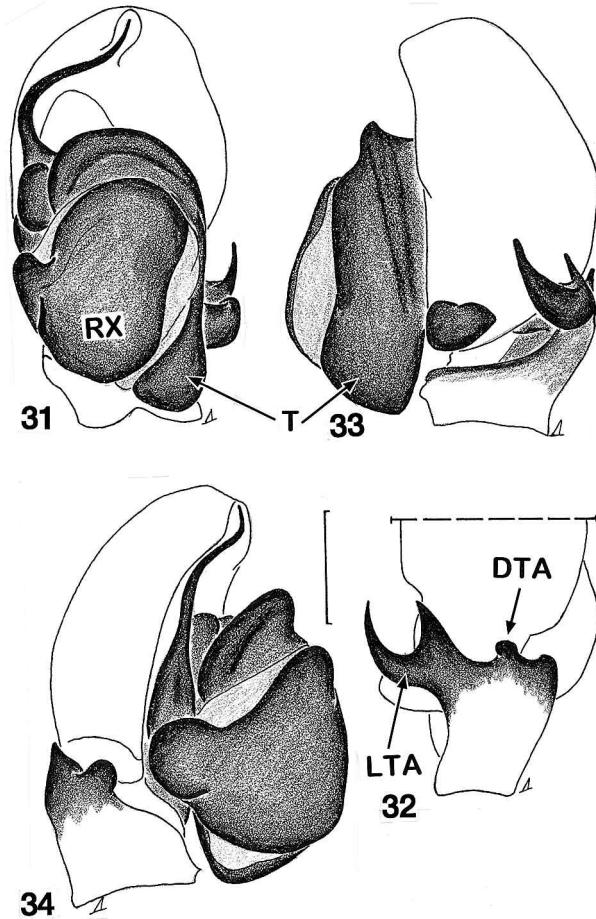
Diagnosis. The palpus has a unique forked LTA, a small knob-like DTA (figure 32), and a short sinuate embolus (figure 31).

Description. Male carapace 2.75 long, 1.95 wide, 0.90 high at PLE. Ocular area 1.23 long, 1.40 wide anteriorly, 1.50 wide posteriorly. Diameter of AME 0.50. Opisthosoma 3.28 long, 1.88 wide. Chelicera 0.88 long. Clypeus 0.03 high.

Length of leg segments. I—1.63+0.98+1.50+0.80+0.45; II—1.18+0.70+0.70+0.58+0.45; III—1.33+0.68+0.73+0.71+0.53; IV—1.55+0.75+0.88+0.73+0.55.

Leg spination. I—Tb. pr./v. 0–1; Mt. v. 2–2 ap.; II—Mt. pr. 1 ap., v. 2–1 ap.; III and IV—Mt. pr. and rt. 2 ap., v. 1–2 ap.

Coloration. Carapace dark brown, with sides densely covered with black appressed setae and a wide longitudinal band of white appressed setae. Black pigment around eyes. Clypeus densely covered with black setae. Sternum, maxillae, labium and chelicerae dark brown. Opisthosoma: dorsum with a wide longitudinal band of white appressed setae, bordered by a pair of dark brown stripes; sides and venter yellow. Book lung covers brown-yellow. Spinnerets brown. Leg I red-brown, densely



FIGS 31–34. *Paramarpissa laeta* n. sp., male holotype, palpus. (31) Ventral view; (32) dorsal view of tibia; (33) retrolateral view; (34) prolateral view. Scale bar = 0.25.

covered with long protruding pale setae. Legs II–IV brownish yellow, densely covered with pale setae.

Palpus as in figures 31–34.

Distribution. Known only from the type locality in northern Mexico (Map 1).

Paramarpissa piratica (Peckham and Peckham, 1888), n. comb.
(figures 11, 12 and 35–43)

Icius piraticus: Peckham and Peckham, 1888: 49, pl. 1, f. 35, pl. 4, f. 35, 35a (male).

Pseudicius piraticus: Peckham and Peckham, 1894: 110.

Pseudicius piraticus: Peckham and Peckham, 1909: 494–495, pl. 39, f. 10 (female); 10a, b (male).

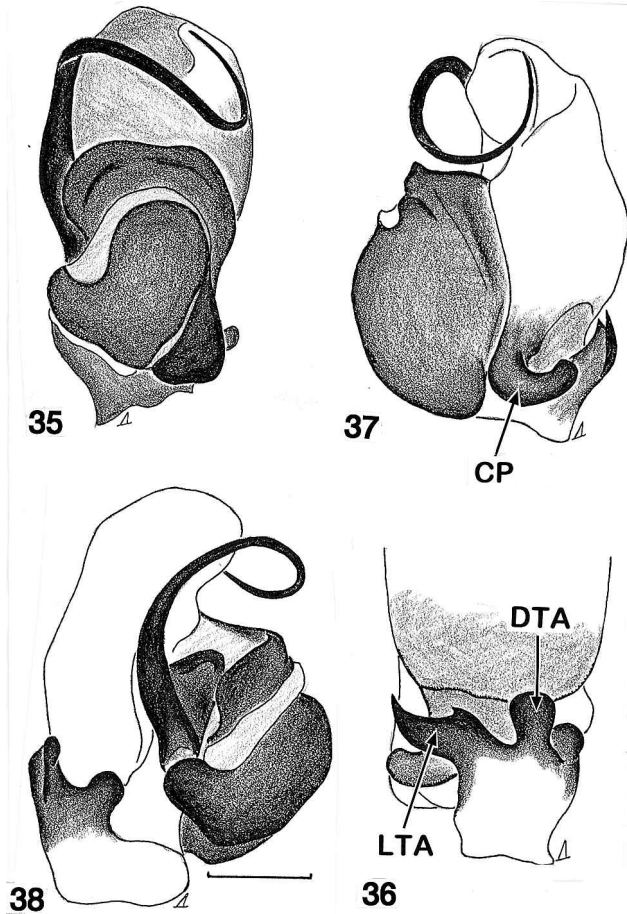
Pseudicius piraticus: Hoffmann, 1976: 66.

Pseudicius piraticus: Richman and Cutler, 1978: 98.

'Pseudicius' piraticus: Maddison, 1987: 104.

Pseudicius piraticus: Richman and Cutler, 1988: 78.

Syntypes. Texas, 1888 (MCZ), two males, examined, both males lack palpi.



FIGS 35–38. *Paramarpissa piratica* (Peckham and Peckham), New Mexico: Lea Co. Male palpus; (35) ventral view; (36) dorsal view of tibia; (37) retrolateral view; (38) prolateral view. Scale bar = 0.25 mm.

Diagnosis. This species has the longest embolus in the genus, curving back towards its origin (figure 35). The insemination ducts are correspondingly the longest in the genus, with a double loop (figures 41 and 42).

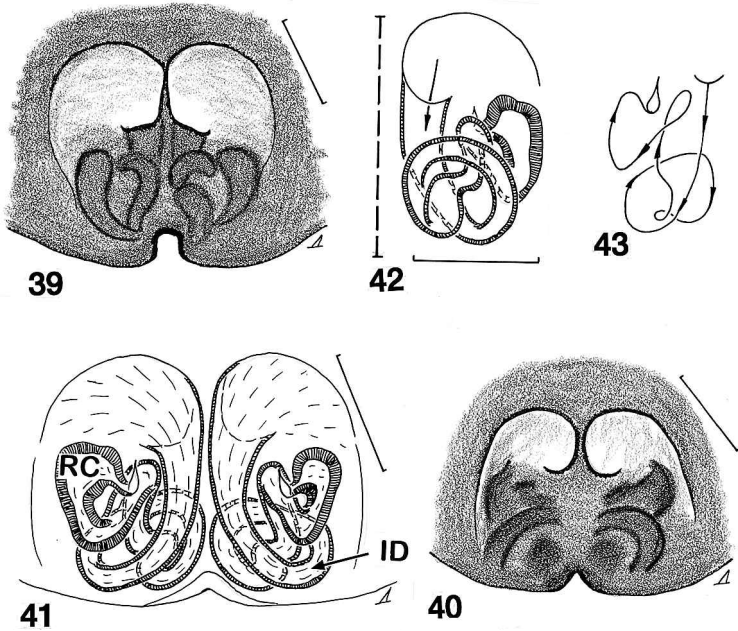
Description. New Mexico: Lea Co. specimens.

Measurements. Male carapace 2.65 long, 1.80 wide, 0.78 high at PLE. Ocular area 1.08 long, 1.29 wide anteriorly, 1.48 wide posteriorly. Diameter of AME 0.41. Opisthosoma 3.30 long, 1.70 wide. Chelicera 0.65 long. Clypeus 0.04 high.

Length of leg segments. I—1.50+0.85+1.40+0.80+0.45; II—1.08+0.60+0.65+0.53+0.43; III—1.20+0.55+0.65+0.65+0.48; IV—1.40+0.68+0.80+0.78+0.55.

Leg spination. I—Tb. pr./v. 0–1; Mt. v. 2–2 ap.; II—Mt. pr. 1 ap., v. 2–1 ap.; III and IV—Fm. d. 1–1–1; Mt. pr. and rt. 2 ap., v. 1–2 ap.

Coloration. Carapace dark brown, with sides densely covered with black appressed setae and a wide longitudinal band of white appressed setae. Eye field black. Clypeus densely covered with black setae. Sternum, maxillae, labium, chelicerae dark brown. Opisthosoma: dorsum with a wide longitudinal stripe of white



FIGS 39–43. *Paramarpissa piratica* (Peckham and Peckham). (39) Female from Arizona: Santa Cruz Co., epigynum. (40–43) Female from Texas: Lubbock Co. (40) Epigynum; (41) internal genitalia; (42) detail of ID, arrow indicates entrance for embolus; (43) diagram of path of ID to RC. Scale bar = 0.25.

setae, bordered by a pair of dark brown stripes; sides and venter yellow. Book lung covers yellow. Spinnerets brown. Leg I with femur yellow proximally and dark brown distally, remaining segments dark brown. Leg I densely covered with long protruding pale setae. Legs II–IV brownish yellow, densely covered with pale setae.

Palpus as in figures 11, 12 and 35–38.

Female measurements. Carapace 2.70 long, 1.88 wide, 0.93 high at PLE. Ocular area 1.20 long, 1.38 wide anteriorly, 1.58 wide posteriorly. Diameter of AME 0.40. Opisthosoma 3.75 long, 2.00 wide. Chelicera 0.63 long. Clypeus 0.05 high.

Length of leg segments. I—1.30 + 0.75 + 1.00 + 0.63 + 0.50; II—1.05 + 0.63 + 0.59 + 0.50 + 0.43; III—1.25 + 0.70 + 0.63 + 0.64 + 0.53; IV—1.50 + 0.75 + 0.78 + 0.78 + 0.48.

Leg spination. I—Tb. pr./v. 0–1; Mt. v. 2–2 ap.; II—Fm. d. 0–1; Mt. pr. 1 ap., v. 2–1 ap.; III and IV—Fm. d. 1–1–1; Mt. pr. and rt. 2 ap.; v. 1–2 ap. Coloration as described for male; except as follows: longitudinal white stripe absent, carapace evenly covered with white setae, clypeus with dense white setae. Epigynum and spermathecae as in figures 40–43.

Notes. *P. albopilosa* and *P. griseoldi* have been consistently confused with this species. It is quite likely that other members of this genus in unexamined collections are still labelled as *Pseudicius piraticus* and should be restudied. Cutler's (1992) observations on microhabitat choice apply to *P. albopilosa*, not this species.

Material examined. Mexico: D.F.: Padregal San Angel, 17 August 1946, Goodnight (AMNH), one male; JALISCO: Tepatitlan, 3 August 1954 (W. V. Gertsch) (AMNH), one female. USA: Arizona: Cochise Co., Carr Canyon, Huachuca Mts, 1660 m, 22 August 1951 (W. S. Creighton) (AMNH), one female;

Chiracahua Mts, 18 July 1936, (Knull) (AMNH), two females; Southwestern Research Station, Chiracahua Mts, 1660 m on tyre swing under juniper (D. R. Richman) (NMSU), one male; Navaho Co., 6 miles SW Whiteriver, 1660 m, August 1936 (H. H. Door and F. G. Walson) (AMNH), one male; Santa Cruz Co., Canelo Pass, 1630 m (W. S. Creighton) (AMNH), one female. New Mexico: Lea Co., 3 miles N of Eunice, 16 August 1984, on tall shin oak (D. R. Richman) (NMSU), one male matured 31 August 1989; 2 miles SE of Lovington, 8 May 1991, beating mesquite (D. R. Richman) (NMSU), one male, one female, (ISE), one male, three immature (BC); Texas: Hidalgo Co., Edinburg (Mulaik) (AMNH), one male; Lubbock Co., Texas A & M Univ. Expt. Sta., 1 mile N Lubbock Co. Airport, on grapecanes in Vinyard, June 1988 (Doug Paxton) (BC) one female; Wichita Co., Iowa Park, beating mesquite, salt cedar, 4 October 1967 (R. M. Carpenter) (FSCA), one male.

Distribution. Central Mexico, in the USA south and west Texas, southeast New Mexico, and southeast Arizona (Map 1).

***Paramarpissa sarta* sp. n.**

(figures 44–50)

Holotype. Male from Mexico: Nayarit: Jesus Maria, 22–30 June 1995 (B. Malkin) (AMNH).

Etymology. From the Latin meaning in good condition.

Diagnosis. The LTA is thick and short rather than slender (figure 45), unlike the other members of the genus with a simple LTA. Epigynum with RC removed from posterior border and ID forming a single loop.

Description. Male carapace 2.63 long, 1.80 wide, 0.75 at PLE. Ocular area 1.23 long, 1.38 wide anteriorly, 1.50 wide posteriorly. Diameter of AME 0.48. Opisthosoma 3.30 long, 1.70 wide. Chelicera 0.50 long. Clypeus 0.03 high.

Length of leg segments. I—1.50+1.00+1.25+0.89+0.39; II—1.08+0.63+0.68+0.55+0.38; III—1.15+0.70+0.63+0.65+0.48; IV—1.40+0.73+0.79+0.75+0.45.

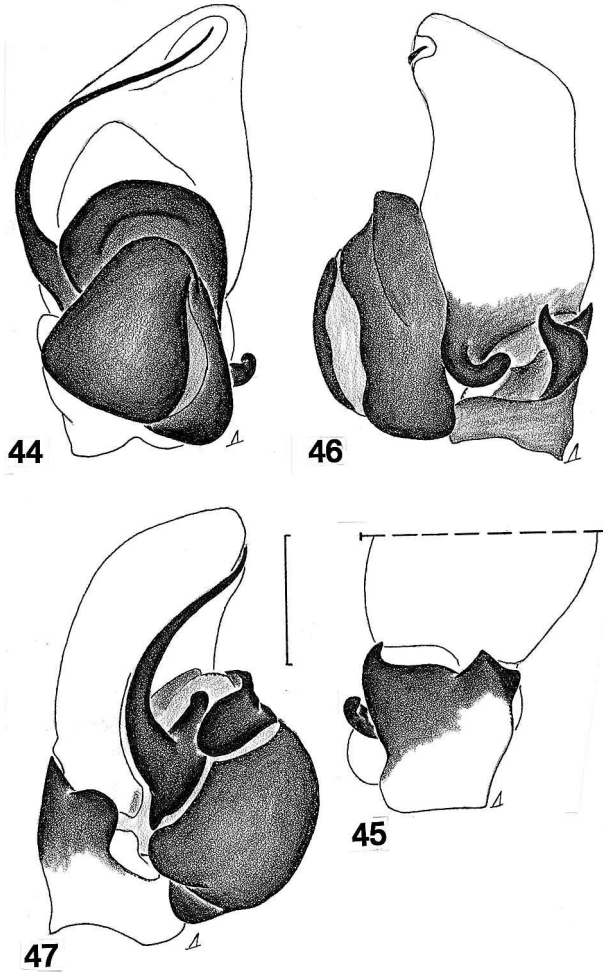
Leg spination. I—Fm. d. 0–1; Tb. pr./v. 0–1; Mt. v. 2–2 ap.; II—Fm. d. 0–1; Mt. pr. 1 ap., v. 2–1 ap.; III and IV—Fm. d. 1–1; Mt. pr. and rt. 2 ap., v. 1–2 ap.

Coloration. Carapace dark brown, not covered with coloured setae as in other *Paramarpissa* species. Eye field black. Clypeus densely covered with black setae. Sternum, maxillae, labium and chelicerae dark brown. Opisthosoma rubbed, setae missing. Book lung covers yellow. Spinnerets brown. Leg I dark brown, densely covered with long protruding pale setae. Legs II–IV brownish yellow, densely covered with pale setae.

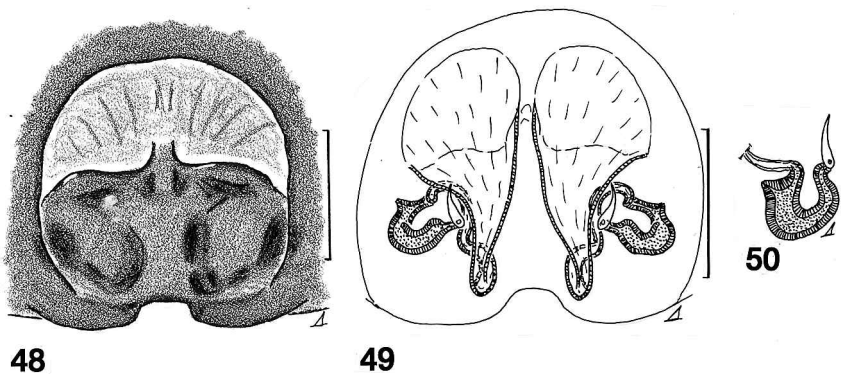
In the CAS specimen, the carapace is sparsely covered with pale appressed setae, the clypeus has brown setae, and the opisthosoma dorsum has a wide longitudinal stripe of white setae bordered by a pair of dark brown stripes.

Palpus as in figures 44–47.

Female measurements. Carapace 2.93 long, 1.85 wide, 0.88 high at PLE. Ocular area 1.25 long, 1.41 wide anteriorly, 1.63 wide posteriorly. Diameter of AME 0.50. Opisthosoma 3.50 long, 1.60 wide. Cheliceral length 0.65. Clypeal height 0.08. Length of leg segments: I—1.33+0.78+1.05+0.63+0.43; II—1.05+0.60+0.60+0.40+0.38; III—1.25+0.63+0.63+0.63+0.50; IV—1.45+0.63+0.78+0.75+0.50.



FIGS 44–47. *Paramarpissa sarta* n. sp., male holotype, palpus. (44) Ventral view; (45) dorsal view of tibia; (46) retrolateral view; (47) prolateral view. Scale bar = 0.25.



FIGS 48–50. *Paramarpissa sarta* n. sp., female paratype from Mexico: Michoacan. (48) Epigynum; (49) internal genitalia; (50) receptacle. Scale bar = 0.25 mm.

Leg spination. I—Fm. d. 0–1–0; Tb. Pr/v. 0–1–0; Mt. v. 2–2 ap.; II—Fm. d. 0–1–0; Tb. Pr. and v. 0–1; Mt. v. 2–1 ap.; III—Fm. d. 1–1–1; Tb. v. 1 ap.; Mt. pr. and rt. 2 ap.; IV—Fm. d. 1–1–1; Tb. v. 1 ap.; Mt. pr. and rt. 2 ap., v. 2–2 ap.

Coloration. Carapace dark brown, eye field black, densely covered with appressed elongated white scales. Palpi yellow with dense white setation. Sternum, maxillae and labium light brown. Opisthosoma greyish yellow, venter yellow, dorsum and sides densely covered with appressed white, red and brown setae and scales forming a pattern of eight chevrons. Book lung covers and spinnerets yellow tinged with brown. Legs yellow brown (leg I darker), with dense white setation.

Epigynum and spermathecae as in figures 48–50.

Material examined. Paratypes: Mexico: Michoacan: 10–12 miles S Capirio, 21 July 1984 (R. K. Dozier) (FSCA), three males, five females, two immature males, one immature; Puebla: 8 miles S Ixvar de Matamoras, 10 December 1948 (H. B. Leach) (CAS), one male.

Distribution. Central Mexico (Map 1).

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