



The Neotropical Goblin Spiders of the New Genera Ponsoonops and Bipoonops (Araneae, Oonopidae)

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The Neotropical goblin spiders of the new genera *Ponsoonops* and *Bipoonops* (Araneae, Oonopidae)

ANGELO BOLZERN¹

ABSTRACT

Two new genera, *Ponsoonops* and *Bipoonops*, are established for groups of species characterized by sexually dimorphic dorsal abdominal scutum expression (with a scutum present in males but not females), male palps with a separate cymbium and bulb, and a patterned abdomen. Both genera belong therefore to the *Varioonops* complex, represented now by three described Neotropical genera. Members of *Ponsoonops* are united by three putative synapomorphies in males: a “pierlike” dorsal scutum completely fused to the epigastric scutum, a patch of short setae ventrodistally on metatarsi I and II, and a short anteromedian protrusion on the endites. Female *Ponsoonops* specimens differ from other members of the *Varioonops* complex in having small lateral sclerites at the epigynal area and a smooth sternum. Members of *Bipoonops* share a large, irregularly shaped, rather indistinct dark spot posteriorly on the carapace, a putative synapomorphy, and a moderately rugose sternum surface; males are characterized by a distinct, bipartite conductor. A total of 22 *Ponsoonops* species, 21 new to science, are described: *P. duenas*, *P. hamus*, and *P. tacana* from Mexico, Guatemala, and Belize, *P. bilzi*, *P. lucha*, *P. samadam*, *P. sanvito*, and *P. viejo* from Costa Rica, *P. bollo*, *P. boquete*, *P. coiba*, *P. fanselix*, *P. frio*, *P. lerida*, *P. mirante*, *P. panto*, *P. salimsa*, and *P. buena* from Panama, *P. pansedro* from Colombia, *P. micans* (Simon, transferred from *Dysderoides*) from Venezuela, *P. yumuri* from Cuba, and *P. lavega* from the Dominican Republic. *Bipoonops* is described for three new species found on the western slope of the Andes in Ecuador: *B. baobab*, *B. pucuna*, and *B. tsachila*.

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INTRODUCTION

The present work is a further study about Neotropical goblin spider diversity, facilitated through collaboration with the many participants in the goblin spider Planetary Biodiversity Inventory (PBI) project. Apparently, the northern Neotropics possess a very high and micro-distributed oonopid diversity. Commonly, several taxa, even congeneric ones, can be found at a single site (Platnick and Dupérré, 2012; Bolzern and Platnick, 2013; Platnick et al., 2014). Most species placed here as members of the new genera *Ponsoonops* or *Bipoonops* fit that pattern well. Certainly, this pattern is strongly affected by the lack of material, a problematic issue prevalent in both new genera (*Ponsoonops*, 22 species, 108 specimens; *Bipoonops*, 3 species, 5 specimens). Of the *Ponsoonops* species treated below, found from southern Mexico to Venezuela and on two Caribbean Islands, only one, *P. hamus*, has a remarkably wide area of distribution, extending from southern Mexico to Guatemala and Belize. A subgroup of four closely related species, *P. boquete*, *P. lerida*, *P. panto*, and *P. vuena*, have been found in a very narrow area in Chiriquí, Panama, the first two species even sympatrically. The three *Bipoonops* species were each sampled from different sites on the western slope of the central Andes in Ecuador.

Based on the 3-3-2-2 tarsal organ receptor pattern (figs. 56–60, 476–480), the lack of a heavily sclerotized sperm duct in the male palp (figs. 70, 457), and the clumped eye arrangement (figs. 2, 433), *Ponsoonops* and *Bipoonops* belong to the Oonopinae (Burger and Michalik, 2010; Platnick et al., 2012a). Both genera possess a sperm pore located far in advance of the epigastric furrow on the epigastric scutum (figs. 30, 456), a putative synapomorphy of the gamasomorphines (Platnick et al., 2012a), and lack an oblique, unsclerotized strip on the ventral surface of the basal segment of the anterior lateral spinnerets (figs. 17, 68, 456). The presence of that strip may represent a synapomorphy of the superfamily Dysderoidea, a structure that has subsequently been lost in the gamasomorphines, except for *Niarchos* Platnick and Dupérré (see Grismado et al., 2014).

Three genus groups exist within the hard-bodied gamasomorphines, which contain members showing sexually dimorphic dorsal abdominal scutum expression (scutum present in males, absent in females), as occurs in *Ponsoonops* and *Bipoonops*: the *Dysderina* complex (Platnick and Dupérré, 2011a, 2011b), the *Scaphiella* complex (Platnick and Dupérré, 2009b, 2010a, 2010b, 2011c; Bonaldo et al., 2014) and the *Varioonops* complex (Bolzern and Platnick, 2013). Carapace and sternum shape, leg spination, sexually dimorphic scuta, a patterned abdomen (absent only in *P. lavega*, fig. 388) and the well-separated bulb and cymbium in males, are all characters supporting the placement of both new genera in the *Varioonops* complex (Bolzern and Platnick, 2013). All members of this complex share two other unusual characters: the “false claws,” paired setae situated at the tips of tarsi III and IV that have a heavily sclerotized, enlarged, claw-shaped tip (figs. 20, 21, 53, 54, 254, 308, 473, 474), a character quite widespread among oonopids (Platnick et al., 2012b; Bonaldo et al., 2014), and a peculiarly short, modified seta situated distolaterally on metatarsi I–III (figs. 27, 29, 251, 447, 469), a putative synapomorphy of the *Varioonops* complex. In addition to the three genera now placed in this species group, members of an as yet undescribed group of Neotropical oonopids show affinities with this complex (R. Ott, in litt.).

Within this complex, two characters are shared only between members of *Ponsoonops* and *Varioonops*, suggesting a sister-group relationship: a uniquely broad, triangular projection, bearing distally flattened setae, on the anterior portion of the male endites (figs. 8, 296) and a cluster of distally filiform glands situated at the base of the anterior genitalic process of females (figs. 83, 242, 344). In members of *Bipoonops*, the triangular projection on the male endites is missing (fig. 437, 438), and the glands at the base of the anterior genitalic process of females lack filiform elongations (figs. 488, 489, 519).

Males of all species assigned to *Ponsoonops* have a distinct “pierlike” dorsal scutum (figs. 66, 69, 91, 102, 112, 131, 175, 191, 202, 217, 263, 278, 319, 349, 364, 375, 392, 403, 417), which is completely fused to the epigastric scutum, a patch of short setae situated ventrodorsally on metatarsi I and II (figs. 28, 29, 316, 317), and a short, simple protrusion situated anteromedially on the endites (figs. 8, 296, 297). These three characters appear to be unique to this group and thus putative synapomorphies. In contrast to the well-defined males, female *Ponsoonops* specimens lack such characters. The presence of small sclerites laterally of the epigastric sclerites (figs. 78, 110, 123, 141, 155, 161, 185, 212, 226, 272, 285, 340, 359) separates them from other members of the *Varioonops* complex, but similar sclerites are present in more distantly related oonopid groups, such as *Camptoscapphiella* Caporiacco (see Baehr and Ubick, 2010), *Malagiella* Ubick and Griswold (2011), *Ischnothyreus* Simon (see Platnick et al., 2012c), and *Simlops* Bonaldo et al. (2014).

In all three species of *Bipoonops*, both sexes (female of *B. tsachila* unknown) have a large, irregularly shaped, rather indistinct dark spot posteriorly on the carapace (figs. 449, 481, 490, 505, 514). This kind of spot could not be detected on any available image of goblin spider carapaces in the PBI database and is therefore regarded as synapomorphic for this group. The relatively large eyes (figs. 433), the moderately rugose sternum surface (figs. 434, 463), the dorsal scutum anteriorly fused to the epigastric scutum (figs. 453, 494), and the distinctly bipartite conductor in males (figs. 442, 499, 512) are additional features separating this group from related ones.

As far as I was able to determine, only one oonopid species from the region in focus has previously been described: *Ponsoonops micans* (Simon, 1893), a problematic taxon here transferred to the newly described genus. Originally, *P. micans*, known only from its type locality in Venezuela, was placed in *Telchius* Simon, a genus otherwise found only in Africa with *T. barbarus* as the type species from Algeria. It was subsequently transferred to *Dysderoides* Fage (1946), a placement recently rejected by Grismado et al. (2014). As mentioned by the latter authors, the specimens of the type series of *Telchius micans* were considered immature, most probably due to their weak body sclerotization. However, dissection of the female genitalia of the seemingly most sclerotized specimen and subsequent digestion of soft tissue revealed that a sclerotized vulva is present in at least one of the five syntypes (fig. 429). The observed structures differ significantly from all other examined specimens, but all somatic characters (patterned abdomen without dorsal scutum, shape of smooth sternum, leg spination), except the absence of small lateral sclerites at the epigastric area (fig. 428), support the placement of this species in *Ponsoonops*. Unfortunately, no males are available to test this hypothesis.

Based on the shape of the male embolus and conductor, 19 of the 22 *Ponsoonops* species can be assigned to four informal species groups. In only one of those groups, the *hamus* group, do females also show characters allowing a grouping in agreement with the male characters. Group definitions are provided at the beginning of each section below. *Ponsoonops micans*, *P. coiba*, and *P. viejo* could not be affiliated with any of the following groups.

The *duenas* group (containing *P. bilzi*, *P. duenas*, and *P. tacana*) has representatives in Mexico, Guatemala, and Costa Rica. The *hamus* group (containing *P. frio*, *P. hamus*, *P. pansedro*, and *P. samadam*) is a widespread group with the most widespread species, *P. hamus*, in Mexico, Guatemala, and Belize, and one species each in Costa Rica, Panama, and Colombia. The *sanvito* group (containing *P. bollo*, *P. boquete*, *P. mirante*, *P. fanselix*, *P. lerida*, *P. lucha*, *P. panto*, *P. salimsa*, *P. sanvito*, and *P. buena*), the largest group, is restricted to southern Costa Rica and Panama. Within this group, a subgroup of four closely related species (*P. boquete*, *P. lerida*, *P. panto*, and *P. buena*) can be recognized, all of which are distributed in a very narrow area in Chiriquí, Panama. The last group, the *yumuri* group (containing *P. lavega* and *P. yumuri*), is known only from two Caribbean islands, Cuba and the Dominican Republic.

Our methods generally follow those of Platnick and Dupérré (2009a); only differences from the males (other than the obvious lack of male endite, scutal, and seta modifications) are mentioned in the descriptions of the females. Some females were digested with enzymatic contact lens cleaner rather than pancreatin, with comparable results. Scans were taken from coated or uncoated male palps. If the right palp was used the images were flipped for consistency. Scans of male and female *Bipoonops pucuna* were taken from uncoated specimens. All measurements are in mm; high-resolution versions of the images and many additional images, a sortable version of the geocoded locality data, and a distribution map for each species will be available on the PBI website (<http://research.amnh.org/oonopidae>). The species descriptions are arranged by the informal species groups (in the order listed above) and listed geographically within each, from Mexico south to Venezuela. The only exception is the type species, *Ponsoonops sanvito* (belonging to the *sanvito* group), which is treated first.

COLLECTIONS EXAMINED

AMNH	American Museum of Natural History, New York, NY
CAS	California Academy of Sciences, San Francisco, CA
CDU	Darrell Ubick collection, San Francisco, CA
FMNH	Field Museum of Natural History, Chicago, IL
INBIO	Instituto Nacional de Biodiversidad, Santo Domingo, Costa Rica
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge, MA
MIUP	Museo de Invertebrados, Universidad de Panamá, Panama City
MNHN	Muséum National d'Histoire Naturelle, Paris, France
QCAZ	Museum of Invertebrates, Pontificia Universidad Católica del Ecuador, Quito

Ponsoonops, new genus

TYPE SPECIES: *Ponsoonops sanvito*, new species.

ETYMOLOGY: The generic name refers to the “pierlike” dorsal scutum (in dorsal view) of male specimens and is masculine in gender.

DIAGNOSIS: Members of this genus are similar to members of the *Dysderina*, *Scaphiella*, and *Varioonops* complexes in their sexual dimorphism, with a dorsal abdominal scutum present in males, but absent in females. They differ from species of the *Dysderina* and *Scaphiella* complexes, except members of *Pescennina*, in having a highly patterned abdomen (except *P. lavege* with a uniformly pale abdomen, fig. 388). In addition, males differ from those two complexes in having the cymbium and bulb not fused (figs. 10–12, 70–72), and females differ in having a very short postepigastric scutum without extensions, almost as wide as (but not fused to) the epigastric scutum, and an indistinct epigynal area (figs. 42, 80, 81, 110, 359, 413, 428). Both sexes differ from members of the *Scaphiella* complex in having leg spines (fig. 26). *Ponsoonops* specimens differ from the closely related members of the *Varioonops* complex in having a smooth sternum surface (figs. 4, 34, 65, 76, 232, 292). Females differ in having the epigastric scutum surrounding the pedicel completely (figs. 79, 153, 168, 184, 286, 339, 412, 427), and in the presence of small lateral sclerites at the epigastric area (figs. 78, 110; probably not present in *P. micans*, fig. 428). *Ponsoonops* males differ from all known species in having a “pierlike” dorsal scutum, completely fused to the epigastric scutum (figs. 66, 67, 69), and the presence of a patch of short setae distoventrally on metatarsi I and II (figs. 28, 29, 316, 317).

DESCRIPTION: Total length of males 1.0–1.7, of females 1.3–1.9. Carapace, sternum, mouthparts, abdominal scuta typically pale orange to dark red-brown, legs typically pale orange, without any pattern, abdomen soft portions typically with pale yellow-reddish ground color and brown to dark purple-brown spots, indistinct wide netlike pattern, anteriorly often narrowly striped, cardiac mark pale, posteriorly with two pale lines (except in *P. lavege*, which is completely pale without color pattern), females more intensely colored. **Cephalothorax:** Carapace broadly oval in dorsal view (moderately hexagonal in some species), anteriorly narrowed to 0.49 times its maximum width or less, pars cephalica slightly elevated in lateral view, anterolateral corners without extension or projections, with rounded posterolateral corners, without depressions or radiating rows of pits, posterolateral edge without pits, posterior margin not bulging below posterior rim, posterolateral surface without spikes; surface of elevated portion and sides of pars cephalica finely reticulate, sometimes cephalic portion almost smooth; fovea absent, lateral margin undulate, rebordered, without denticles; plumose setae near posterior margin of pars thoracica absent; marginal, nonmarginal pars cephalica, pars thoracica setae needlelike, scattered. Clypeus slightly rebordered, moderately curved downward in front view, vertical in lateral view, ALE separated from edge of carapace by their radius or more, median projection absent; setae needlelike. Chilum absent. Six eyes, in some species moderately reduced, all eyes subequal, ALE oval, PME almost squared, PLE almost oval; posterior eye row typically straight (only moderately pro- or recurved) from above, moderately procurved from front; ALE separated by their radius to diameter, ALE-PLE touching or separated by less than ALE radius, PME

touching from less than half their length to throughout most of their length (except male *P. boquete* separated by less than their radius), PLE-PME separated by less or slightly more than PME radius. Sternum typically slightly longer than wide (as long as wide in *P. duenas*, *P. samadam*, and *P. coiba*), not fused to carapace, surface without transverse ridges or pits, smooth, microsculpture, median concavity and hair tufts all absent, with radial furrows between coxae I–II, II–III, III–IV, furrows smooth, radial furrow opposite coxae III absent, sickle-shaped structures absent, anterior margin unmodified, posterior margin not extending posteriorly of coxae IV, without posterior hump, anterior corner unmodified, lateral margin with infracoxal grooves (scanned only in *P. sanvito*, male *P. vuena*, and female *P. lerida*), distance between coxae approximately equal, extension of precoxal triangles present, lateral margins unmodified; setae sparse, needlelike, evenly scattered, originating from surface. Chelicerae slightly divergent, paturon distal region abruptly narrowed, anterior face unmodified; promargin without teeth, retromargin with field of small teeth (scanned only in *P. sanvito*, male *P. vuena*, and female *P. lerida*); fangs without toothlike projections, directed medially, shape normal, without prominent basal process, tip unmodified; setae needlelike, evenly scattered; paturon inner margin with pairs of enlarged setae, posterior surface unmodified, promargin with row of flattened setae (scanned only in *P. sanvito*, male *P. vuena*, and female *P. lerida*), inner margin unmodified, laminate groove absent. Labium rectangular or trapezoidal, fused to sternum (even though very moderately), not or only moderately indented at middle, same as sternum in sclerotization; with 3–5 setae on anterior margin, subdistal portion with unmodified setae. Endites same as sternum in sclerotization, distally not excavated, in females unmodified, in males anterior portion with anteromedian tip with simple, short protrusion, posteromedian part with broad, triangular projection with moderately flattened setae distally, in both sexes serrula present in single row (scanned only in *P. sanvito*, male *P. vuena*, and female *P. lerida*). Female palp without claw or spines; patella without prolateral row of ridges, tarsus unmodified. **Abdomen:** Ovoid, without long posterior extension, rounded posteriorly, interscutal membrane without rows of small sclerotized platelets. Booklung covers large, ovoid, without setae, anterolateral edge unmodified; only anterior spiracles connected by groove, indistinct (in females, indistinct connecting groove of posterior spiracles is equivalent to posterior rim of postepigastric scutum, connecting groove of anterior spiracles runs into epigastric furrow). Pedicel tube short, ribbed, scutopedicel region unmodified, scutum extending far dorsal of pedicel in males but not females, plumose hairs, matted setae on anterior ventral abdomen in pedicel area, cuticular outgrowths near pedicel all absent. Dorsal scutum present only in males, weakly sclerotized, without color pattern, subrectangular (pierlike) covering $\frac{1}{2}$ to $\frac{3}{4}$ of abdomen length and $\frac{1}{4}$ to $\frac{1}{2}$ of abdomen width, fused to epigastric scutum, middle surface, sides smooth. Epigastric scutum weakly sclerotized, surrounding pedicel completely, not protruding, small lateral sclerites present in females (probably absent in *P. micans*), but absent in males. Postepigastric scutum weakly sclerotized, anterior margin unmodified, without posteriorly directed lateral apodemes, in males covering $\frac{1}{3}$ to $\frac{1}{2}$ of abdomen length, almost rectangular (more semicircular in *P. lavega*), completely fused to epigastric scutum (at least partly unfused in *P. lavega*), in females short, almost rectangular, only around epigastric furrow, not fused to epigastric scutum. Spinneret scutum present, reduced to two elongated platelets, without fringe of setae, supraanal scutum absent. Abdominal setae needlelike, epigas-

tric area setae not basally thickened; dense patch of setae anterior to spinnerets absent, inter-scutal membrane with setae. Colulus present as small plate with pair of setae. Anterior lateral spinnerets bisegmented, basal segment without oblique membranous strip, posterior medians unisegmented, posterior laterals bisegmented; spigots scanned only in males of two species and females of three species, anterior laterals of males and females with one major ampullate gland spigot and two piriform gland spigots, posterior medians of males with two spigots, of females with six spigots, posterior laterals of males with three spigots, of females with nine or 10 spigots. **Legs:** Femur IV not thickened, same size as femora I–III, patella plus tibia I nearly as long as carapace, tibia I unmodified, tibia IV specialized hairs on ventral apex, ventral scopula both absent, metatarsi I, II mesoapical comb absent, distoventrally with patch of short setae in males (absent in females), metatarsi III, IV weak ventral scopula absent. Leg spines present on anterior femora, tibiae, metatarsi plus tibia, metatarsus of leg IV; leg spination: femora: I p0-1-1; II p0-0-1; other segments variable; femoral spines strong, ventral tibial, metatarsal spines long, strong, lateral spines shorter, spines on leg IV smaller, weaker. Tarsi without inferior claw. Superior claws (scanned only in two species), tarsi I, II with zero to four teeth on outer row, zero to five teeth on inner row, tarsi III with zero to four teeth on outer row, zero to three teeth on inner row (males with teeth only at prolateral margins of claws), tarsi IV with one to four teeth medially on claw; pairs of special setae with distinct flattened clawlike apices present on tarsi III, IV. Trichobothrial base longitudinally narrowed, aperture gratelike, hood covered by numerous low, closely spaced ridges. Tarsal organs with three receptors on legs I, II, two on legs III, IV, palps, on palps sometimes with distal receptor appearing partially bifid (scanned only in *P. sanvito*, male *P. vuena*, and female *P. lerida*, male palps scanned for most species). **Genitalia:** Male epigastric region with sperm pore large, situated at level of anterior spiracles, unmodified; furrow without Ω -shaped insertions, without special setae. Male palp of normal size, not strongly sclerotized, right and left palps mirror images, proximal segments, cymbium pale orange to yellow, embolus dark, prolateral excavation absent; trochanter of normal size, unmodified; femur of normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia moderately dorsoventrally enlarged, with three trichobothria; cymbium narrow in dorsal view, not fused to bulb, not extending beyond distal tip of bulb, plumose setae, stout setae, distal patch of setae all absent, usually cone-shaped projection (cymbial cone) present dorsodistally on cymbium, short; bulb 1–1.5 times as long as cymbium, slender to stout, moderately tapering apically. Embolus diverse, usually tube shaped, prolaterally curved, conductor originating prolaterally of embolus. Female genitalia externally typically inconspicuous, usually anterior sclerite and plate somewhat visible through epigastric scutum, internally with large plate with short lateral extensions, medially protruding, covering anterior genitalic process, anterior genitalic process protruding anteriorly, with enlarged apex, originating from smaller plate (anterior wall of uterus externus), cluster of few usually filiform glands present at base of anterior genitalic process, posterior genitalic process diversely shaped.

DISTRIBUTION: Specimens are known from central Central America, northwestern South America, and the Caribbean, including Mexico, Belize, Guatemala, Costa Rica, Panama, Colombia, Venezuela, Cuba, and the Dominican Republic.

Key to Species

1. Males (unknown for *P. frio*, *P. micans*, and *P. pansedro*) 2
 – Females (unknown for *P. coiba*, *P. lavega*, *P. mirante*, *P. salimsa*, and *P. tacana*) 20
2. Embolus distinctly dorsoventrally flattened (figs. 409, 419, 420) 3
 – Embolus not dorsoventrally flattened 4
3. Conductor distally broad lamelliform (fig. 420) *coiba*
 – Conductor distally tapering, triangular (figs. 405, 409) *viejo*
4. Embolus distinctly proretrolaterally flattened, moderately folded (figs. 377–381, 395–399)
 *yumuri* group, 5
 – Embolus different 6
5. Abdomen white, without pattern (figs. 392, 393) *lavega*
 – Abdomen with dark reddish-brown color pattern (fig. 375) *yumuri*
6. Embolus with distinct ventral slit and rebordered opening (figs. 14, 15, 177, 182, 209,
 223, 269, 302, 303, 330, 331, 355, 372) *sanvito* group, 7
 – Embolus without ventral slit, embolus opening different 16
7. Embolus median with dorsoprolateral protrusion, mound or ridge shaped (figs. 208, 219,
 268, 301, 328, 355, 371) 8
 – Embolus without such protrusion 14
8. Embolus tip distinctly tubelike, elongated (figs. 208, 219, 268, 300) 9
 – Embolus tip short (figs. 329, 370) or moderately flattened (fig. 355) 12
9. Conductor longer than embolus, with pointed tip (figs. 208, 300) 10
 – Conductor as long as or shorter than embolus, with truncated tip or tip with short, nar-
 row prolongations (figs. 219, 268) 11
10. Conductor basally broad, embolus broadly tube shaped (fig. 300) *vuena*
 – Conductor basally narrow, embolus narrowly tube shaped (fig. 208) *boquete*
11. Conductor tip truncated, median protrusion moundlike (fig. 219) *lerida*
 – Conductor tip with narrow prolongations, median protrusion ridgelike (figs. 268, 269) ...
 *panto*
12. Embolus tip moderately flattened (fig. 355) *fanselix*
 – Embolus tip short, tubelike (figs. 329, 370) 13
13. Embolus relatively broad, short (fig. 326) *bollo*
 – Embolus relatively slender, long (fig. 368) *salimsa*
14. Conductor strongly fused to embolus, broadly lamelliform (fig. 181) *lucha*
 – Conductor distinctly separated from embolus, narrowly lamelliform 15
15. Conductor sharply pointed (figs. 13, 15) *sanvito*
 – Conductor broadly rounded (figs. 196, 197) *mirante*
16. Bulb subspherical, stout, conductor distinctly enlarged (figs. 94–96, 103–105, 115–117)
 *duenas* group, 17
 – Bulb relatively narrow, tapering apically, conductor not enlarged (figs. 133–135, 148–150)
 *hamus* group, 19
17. Conductor with distinct, longitudinal median rim (fig. 107) *duenas*

- Conductor without rim, lamelliform (figs. 92, 118) 18
- 18. Conductor very broad, straight, distally ragged (figs. 92, 93) *tacana*
- Conductor narrower, moderately surrounding embolus, distally truncated (figs. 118, 119) *bilzi*
- 19. Conductor and embolus basally diverging (figs. 134, 136), embolus tip with hooklike projection (fig. 137)..... *hamus*
- Conductor and embolus parallel (figs. 146, 149), embolus tip with platelike protrusion (figs. 146, 147) *samadam*
- 20. Large genital plate distinctly W-shaped (figs. 138, 156, 163, 170) 21
- Large genital plate different..... 24
- 21. Posterior genitalic process shorter than anterior genitalic process 22
- Posterior genitalic process as long as anterior genitalic process 23
- 22. Posterior genitalic process reaching more posteriorly than large genital plate (fig. 163) ... *frio*
- Posterior genitalic process not reaching posterior rim of large genital plate (figs. 170, 171)..... *pansedro*
- 23. Posterior genitalic process not reaching posterior rim of postepigastric scutum, relatively narrow (fig. 138)..... *hamus*
- Posterior genitalic process reaching beyond posterior rim of postepigastric scutum, relatively broad (figs. 155, 156) *samadam*
- 24. Posterior genitalic process subspherical (figs. 82, 125, 228, 414) 25
- Posterior genitalic process different 28
- 25. Enlarged tip of anterior genitalic process broad (figs. 228, 414)..... 26
- Enlarged tip of anterior genitalic process narrow (figs. 82, 125)..... 27
- 26. Posterior genitalic process with distinct short duct (fig. 228)..... *lerida*
- Posterior genitalic process without remarkable duct (fig. 414)..... *viejo*
- 27. Relatively small posterior genitalic process with distinct, elongated glands (fig. 82) *sanvito*
- Relatively large posterior genitalic process without distinct glands (fig. 125) *bilzi*
- 28. Posterior genitalic process very small, inconspicuous (figs. 111, 360) 29
- Posterior genitalic process larger, pocketlike 30
- 29. Protruding median part of large genital plate trapezoidal (fig. 360) *fanselix*
- Protruding median part of large genital plate inconspicuous (fig. 111) *duenas*
- 30. Anterior genitalic process very narrow, long stalked (fig. 429) *micans*
- Anterior genitalic process broadly stalked 31
- 31. Anterior genitalic process short, broad stalked (fig. 273)..... *panto*
- Anterior genitalic process different..... 32
- 32. Posterior genitalic process moderately shorter than anterior genitalic process, few but distinct glands at base of anterior genitalic process (fig. 387)..... *yumuri*
- Posterior genitalic process distinctly shorter than anterior process 33
- 33. Posterior genitalic process distinctly V-shaped (fig. 186) *lucha*

- Posterior genitalic process pocketlike, rounded (figs. 213, 288, 341) 34
- 34. Distinct, long protruding glands at posterior genitalic process absent (fig. 213).... *boquete*
- Long protruding glands at posterior genitalic process present..... 35
- 35. Long filiform glands at base of anterior genitalic process, almost reaching enlarged part (fig. 288)..... *vuena*
- Short filiform glands at base of anterior genitalic process (figs. 342, 344) *bollo*

***Ponsoonops sanvito*, new species**

Figures 1–84

NOTE: The species belongs to the *sanvito* group (see below).

TYPES: Male holotype and female paratype from a Berlese sample of concentrated floor litter from a slope above a stream taken at an elevation of 1219 m at Estación Biológica Las Cruces, San Vito, 8.76666°N, 82.96666°W, Puntarenas, Costa Rica (Mar. 15, 1973, J. Wagner, J. Kethley), deposited in FMNH (PBI_OON 10646).

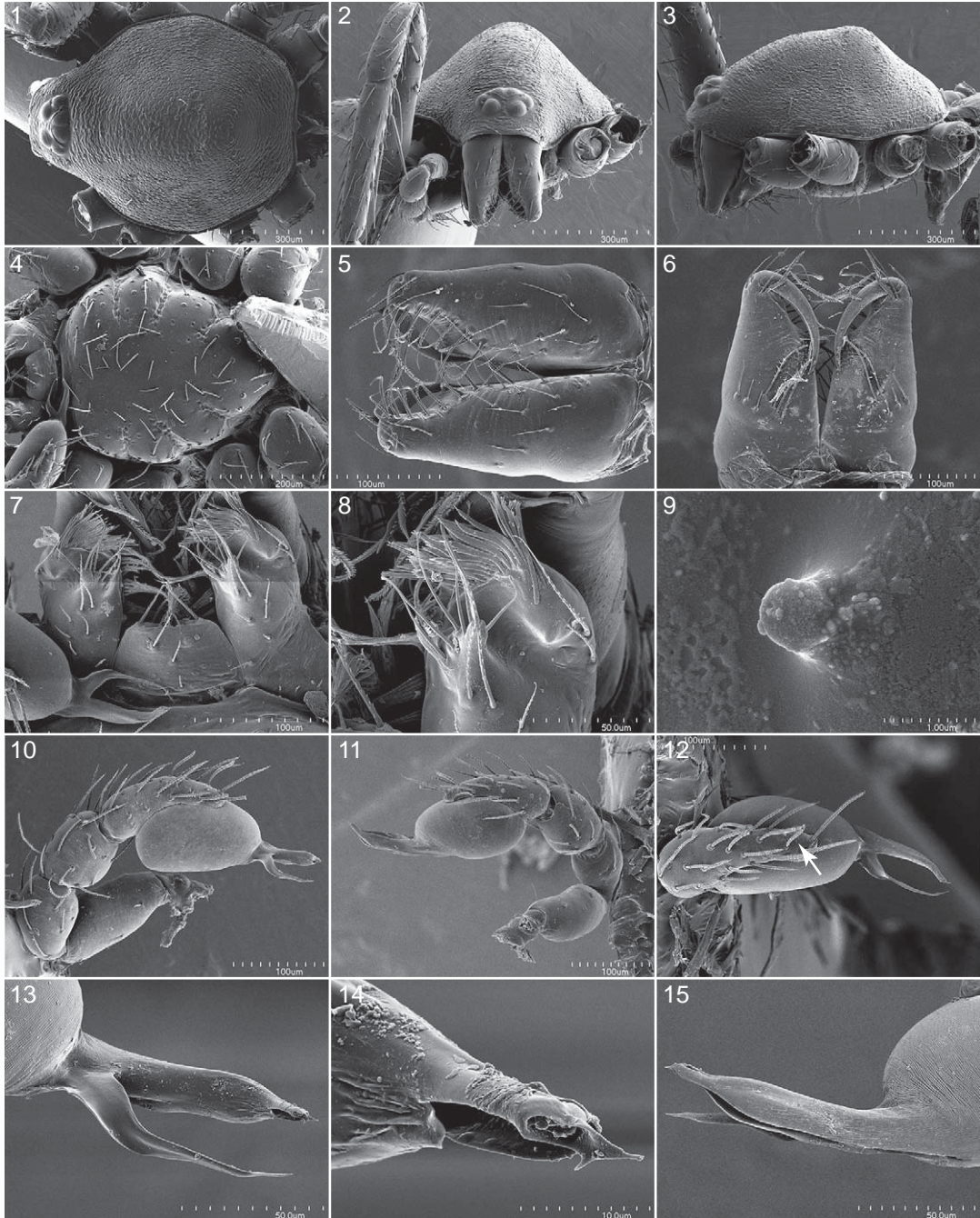
ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males resemble those of the *sanvito* group in having a distinct ventral slit at the embolus (figs. 14, 15). They differ from all those species, except *P. lucha* and *P. mirante*, in lacking a median protrusion at the embolus (figs. 12, 13, 71). They differ from *P. lucha* in having the embolus and conductor well separated, and from *P. mirante* in having a sharply pointed conductor tip (rather than broadly rounded). Females differ from others, except those of *P. bilzi*, in having a relatively small, subspherical posterior genitalic process without distinct duct (with distinct duct in *P. lerida*). They differ from those of *P. bilzi* in having spoon-shaped glands attached to the posterior genitalic process (figs. 45, 82, 84), and only a few short filiform glands at the base of the anterior genitalic process (fig. 83; rather than numerous and long).

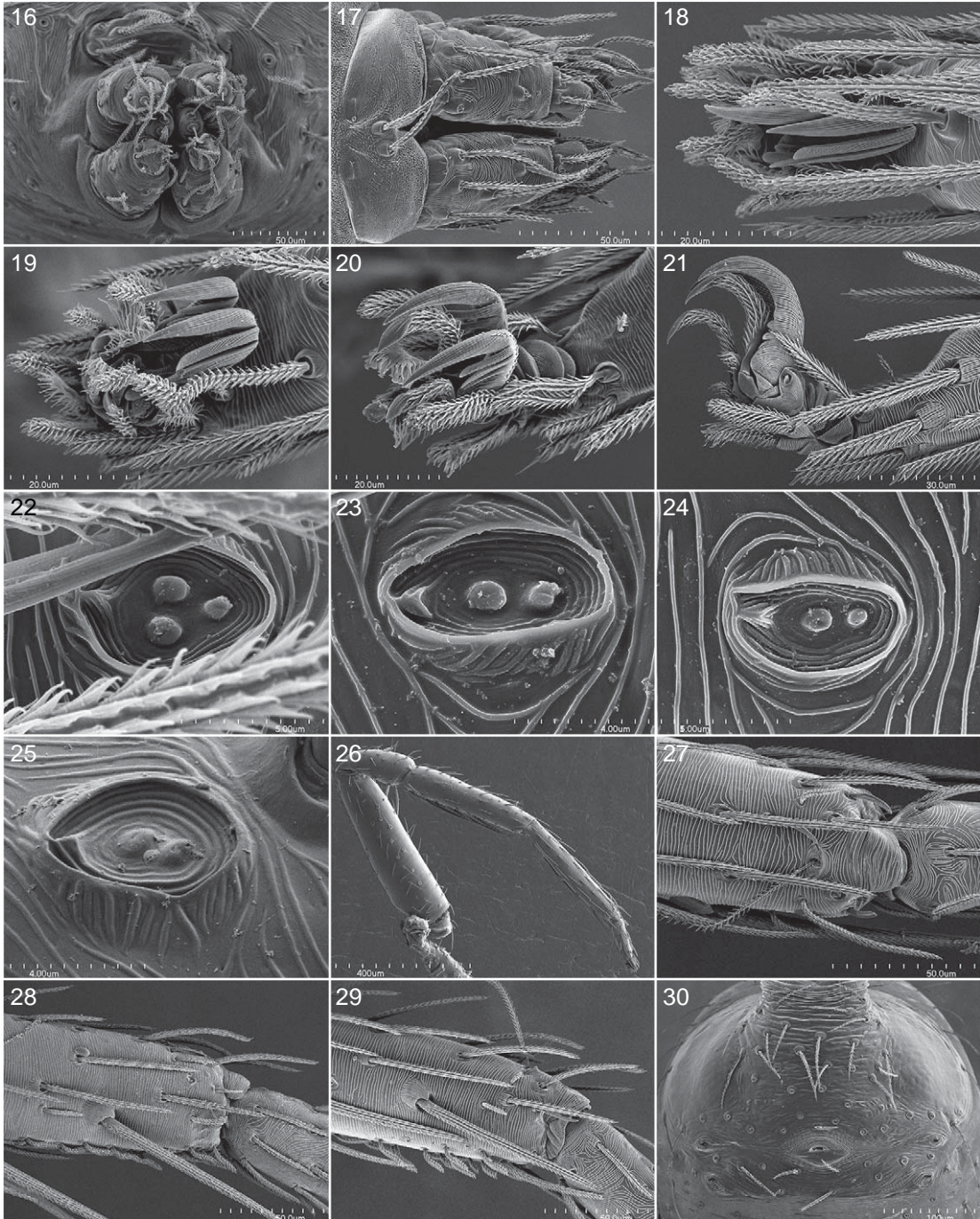
MALE (PBI_OON 10646, figs. 1–30, 61–72): Total length 1.41. Leg spination: tibiae: I v4-2-2; II v4-2-1p; metatarsi: I v2-2-2; II v3-2-2. Sperm pore subcircular. Embolus broad, tube shaped, longitudinally folded, distinct ventral slit with prolateral opening, tip narrowed, elongated, embolus opening oval, distoretrolaterally with small bifid plate; conductor narrow lamelliform, elongated, simply pointed, almost as long as embolus.

FEMALE (PBI_OON 10646, figs. 31–60, 73–84): Total length 1.69. Leg spination: tibiae: I p1-1-0, v4-2-2, r1-0-0; II v4-2-2; IV p0-1-0, v0-0-2, r0-1-0; metatarsi: I p1-0-0, v2-2-2; II p0-1-0, v3-2-2; IV p0-1-0. Median protruding part of large genital plate wider than long; anterior genitalic process narrowly stalked, distinctly enlarged apex; posterior genitalic process subspherical, relatively small, without remarkable duct, weakly sclerotized, distally with spoon-shaped glands.

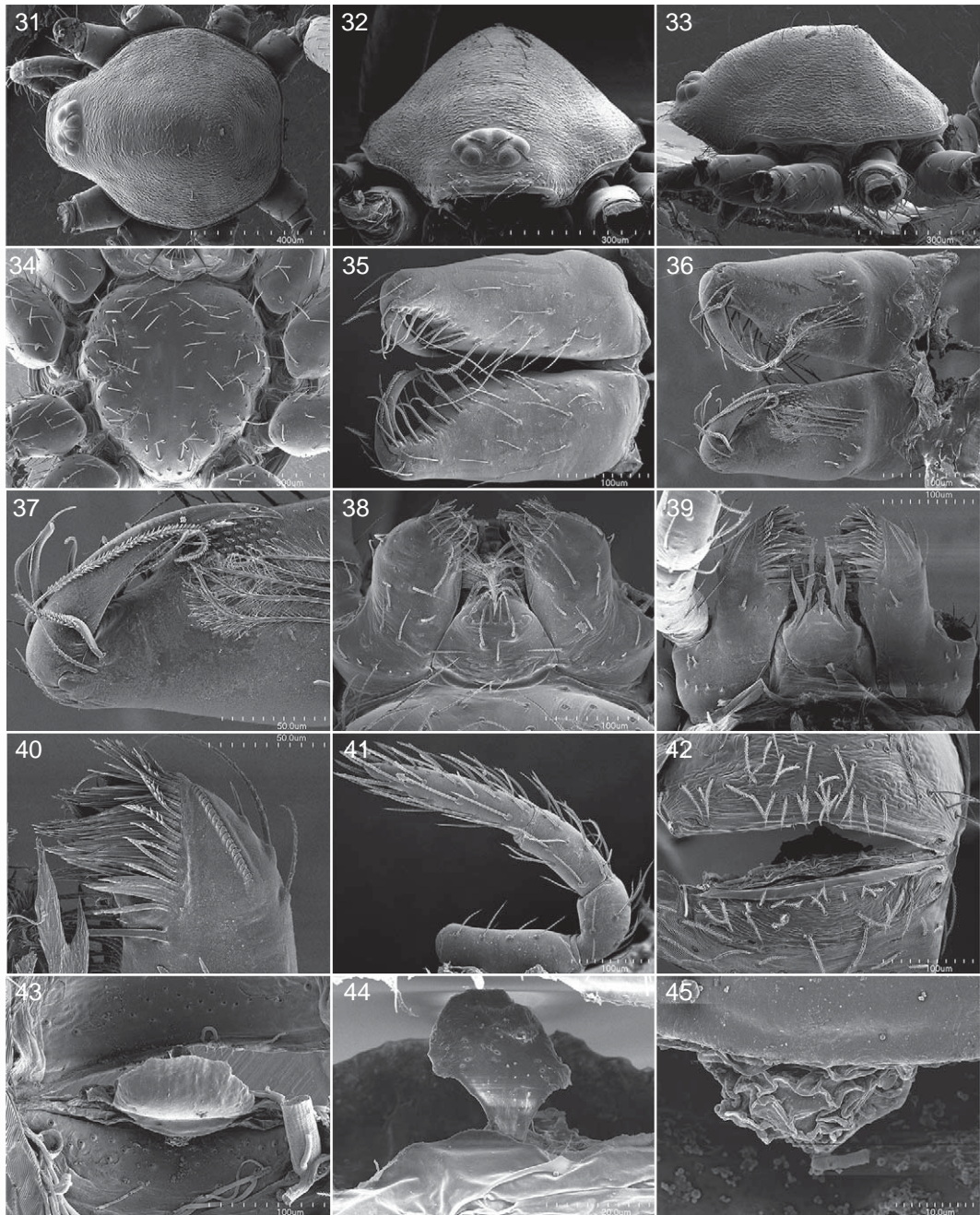
OTHER MATERIAL EXAMINED: COSTA RICA: **Puntarenas:** 13 km SSW Puerto Jiménez, 8.40667°N, 83.32833°W, Mar. 10, 2008, elev. 130 m (J. Longino, MCZ 81414, PBI_OON 36962), 1 ♂; La Fila, 5 km SW Estación Biológica Las Cruces, Mar. 15, 1973, lower 3" leaf litter with root mat, elev. 1433 m (J. Wagner, J. Kethley, FMNH 33513, PBI_OON 10020), 1 ♂; Estación



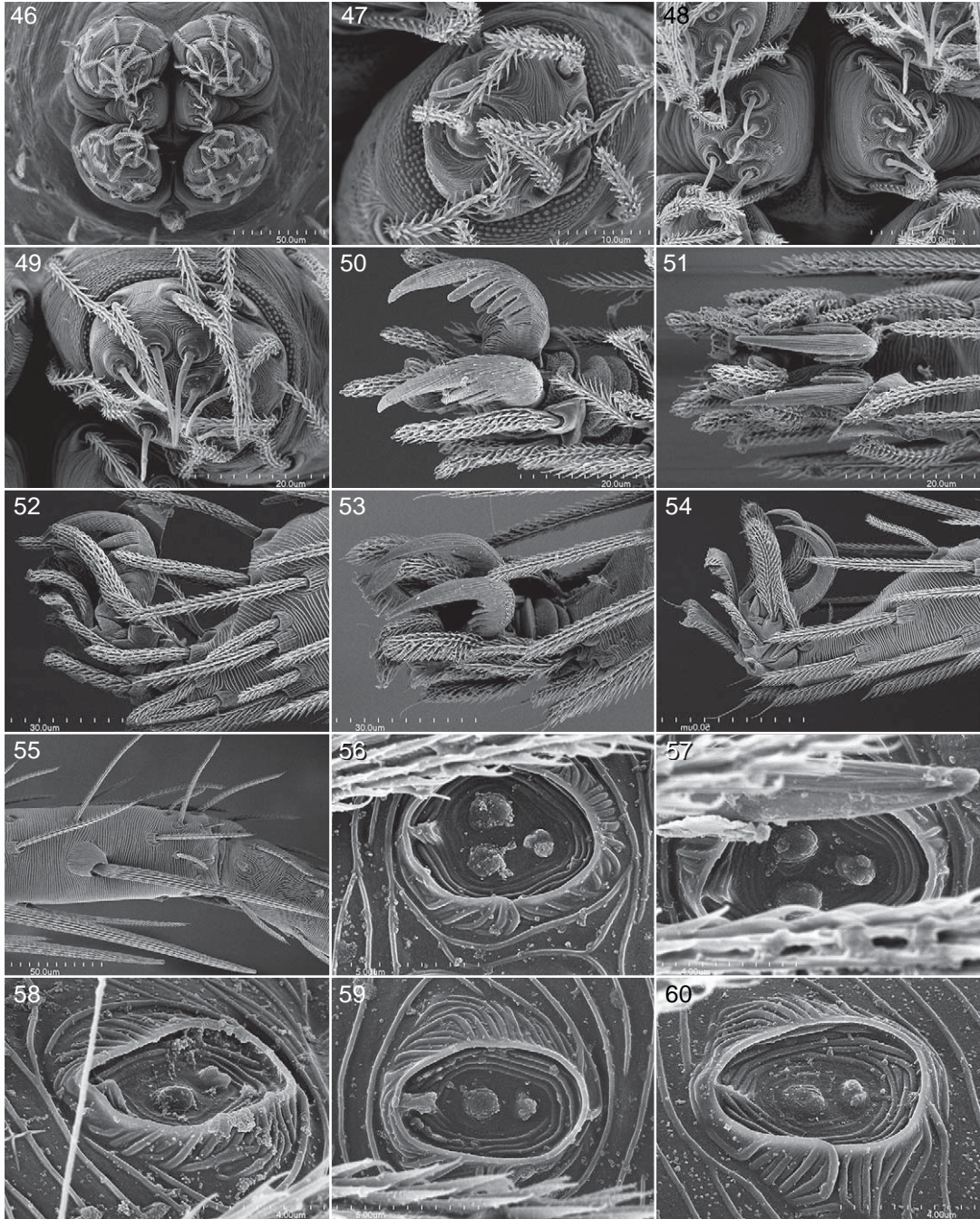
FIGURES 1–15. *Ponsoonops sanvito*, new species, male. 1. Carapace, dorsal view. 2. Same, anterior view. 3. Same, lateral view. 4. Sternum, ventral view. 5. Chelicerae, anterior view. 6. Same, posterior view. 7. Mouthparts, ventral view. 8. Endite, ventral view. 9. Cymbial cone, dorsoretrolateral view. 10. Palp, prolateral view. 11. Same, retrolateral view. 12. Same dorsal view; arrow points to cymbial cone. 13. Embolus and conductor, prolateral view. 14. Embolus opening, prolateral view. 15. Embolus and conductor, retrolateral view.



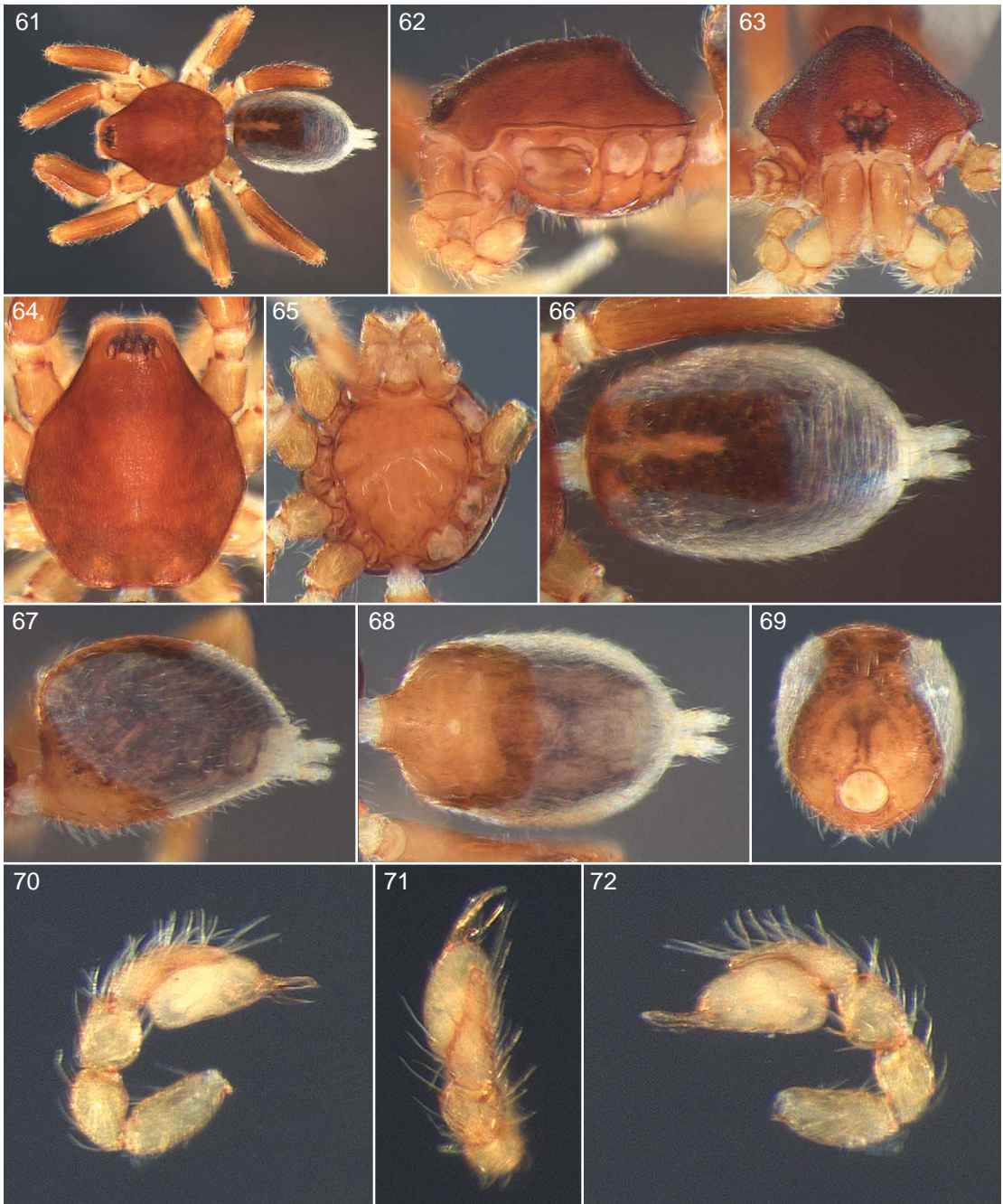
FIGURES 16–30. *Ponsoonops sanvito*, new species, male. 16. Spinnerets, posterior view. 17. Same, ventral view. 18. Claws, leg I, dorsal view. 19. Same, leg II, dorsoprolateral view. 20. Same, leg III. 21. Same, leg IV, lateral view. 22. Tarsal organ, leg II, dorsal view. 23. Same, leg III. 24. Same, leg IV. 25. Same, palp. 26. Leg I, retrolateral view. 27. Metatarsus tip, leg I, dorsal view. 28. Same, lateral view. 29. Same, leg II. 30. Epigastric area, ventral view.



FIGURES 31–45. *Ponsoonops sanvito*, new species, female. 31. Carapace, dorsal view. 32. Same, anterior view (with detached chelicerae). 33. Same, lateral view. 34. Sternum, ventral view. 35. Chelicerae, anterior view. 36. Same, posterior view. 37. Fang, distal setae and field of small teeth on cheliceral retromargin, posterior view. 38. Mouthparts, ventral view. 39. Same, dorsal view. 40. Endite with serrula, dorsal view. 41. Palp, lateral view. 42. Epigastric area (partly opened), ventral view. 43. Genitalia, dorsal view. 44. Anterior genitalic process, ventral view. 45. Posterior genitalic process, dorsal view.



FIGURES 46–60. *Ponsoonops sanvito*, new species, female. 46. Spinnerets, posterior view. 47. Anterior lateral spinneret, same. 48. Posterior median spinnerets, same. 49. Posterior lateral spinneret, same. 50. Claws, leg I, dorsolateral view. 51. Claws, leg II, dorsal view. 52. Same, prolateral view. 53. Claws, leg III, dorsolateral view. 54. Claws, leg IV, lateral view. 55. Metatarsus tip, leg I, lateral view. 56. Tarsal organ, leg I, dorsal view. 57. Same, leg II. 58. Same, leg III. 59. Same, leg IV. 60. Same, palp.



FIGURES 61–72. *Ponsoonops sanvito*, new species, male. **61.** Habitus, dorsal view. **62.** Carapace, lateral view. **63.** Same, anterior view. **64.** Same, dorsal view. **65.** Sternum, ventral view. **66.** Abdomen, dorsal view. **67.** Same, lateral view. **68.** Same, ventral view. **69.** Same, anterior view. **70.** Palp, prolateral view. **71.** Same, dorsal view. **72.** Same, retrolateral view.



FIGURES 73–84. *Ponsoonops sanvito*, new species, female. 73. Habitus, dorsal view. 74. Carapace, lateral view. 75. Same, anterior view. 76. Sternum, ventral view. 77. Abdomen, dorsal view. 78. Same, lateral view. 79. Same, anterior view. 80. Same, ventral view. 81. Epigastric area, dorsal view. 82, 83, 84. Genitalia, dorsal view.

Biológica Las Cruces, San Vito, 8.76666°N, 82.96666°W, Mar. 14, 1973, Berlese, leaf mold on floor, moderately dense forest, elev. 1219 m (J. Wagner, J. Kethley, FMNH PBI_OON 10626), 1 ♀, same, loop road near old sawmill site, sawdust on slabs, under and between 4 m slabs (J. Wagner, J. Kethley, FMNH PBI_OON 10622), 1 ♂, Mar. 16, 1973, banana root litter, West ravine (J. Wagner, J. Kethley, FMNH PBI_OON 10632), 1 ♀, same, forest floor litter above stream (J. Wagner, J. Kethley, FMNH 56586 PBI_OON 10801), 2 ♀, same, forest floor litter on slope, rather dry (J. Wagner, J. Kethley, FMNH PBI_OON 10624), 2 ♂, same, leaf mold (J. Wagner, J. Kethley FMNH 56589 PBI_OON 10804), 1 ♂, Mar. 17, 1973, epiphyte humus 3 mo. old dead fall in West ravine (J. Wagner, J. Kethley FMNH PBI_OON 10487), 2 ♂, Mar. 18, 1973, epiphytic humus 3 mo. old dead fall in West ravine (J. Wagner, J. Kethley, FMNH PBI_OON

10617), 4 ♀, same, sawdust from stump hole and buttress, virgin forest (J. Wagner, J. Kethley, FMNH PBI_OON 10614), 1 ♂, same, floor litter from virgin forest, moderate slope (J. Wagner, J. Kethley, FMNH PBI_OON 10620), 2 ♂, 5 km W Rincón de Osa, Osa Peninsula, 83.53°N, 8.7° W, Mar. 24, 1973, Berlese, primary forest floor litter, recently wet, elev. 50 m (J. Wagner, J. Kethley, FMNH PBI_OON 10612), 1 ♀, same, 500 m elev. high ridge, log bark and root mat (J. Wagner, J. Kethley FMNH 34952 PBI_OON 10623), 2 ♀.

DISTRIBUTION: Costa Rica (Puntarenas).

The *duenas* Group

Males of this group differ from others by the distinctly enlarged, platelike or lamelliform conductor, which is broadly fused to (and longer than) the striated embolus (figs. 92, 93, 106, 107, 118, 119). Characters uniting females have not been found.

The group has one representative each in Mexico, Guatemala, and Costa Rica.

Ponsoonops tacana, new species

Figures 85–96

TYPE: Male holotype from a cloud-forest litter sample taken at an elevation of 1800 m on the lower slope of Volcán Tacaná, ca. 4 km north of Unión Juárez, Chiapas, Mexico (Sep. 18, 1992, R. Anderson), deposited in AMNH (PBI_OON 49417).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: The male resembles those of *P. duenas* and *P. bilzi* in having a distinctly enlarged conductor, broader and longer than the embolus. It differs from *P. duenas* in having a lamelliform, flat conductor (figs. 92, 93; rather than with a distinct, median rim), and differs from *P. bilzi* in having a straight, distally ragged conductor (rather than moderately spiral, distally truncated).

MALE (PBI_OON 49417, figs. 85–96): Total length 1.53. Eyes moderately reduced. Dorsum with indistinct, dark netlike pattern. Distal margin of dorsal scutum rounded. Leg spination: tibiae: I v4-2-2; II v4-2-1p; metatarsi: I p1-0-0, v2-2-2; II v2-2-2. Sperm pore oval. Cymbial cone not detected. Bulb subspherical. Embolus moderately flattened, tube-shaped, longitudinally ribbed, tip irregularly shaped, partly ragged; conductor proximally fused to embolus, distally separated, broad, lamelliform, elongated, with ragged distal end (probably some parts broken off), longer than embolus.

FEMALE: Unknown.

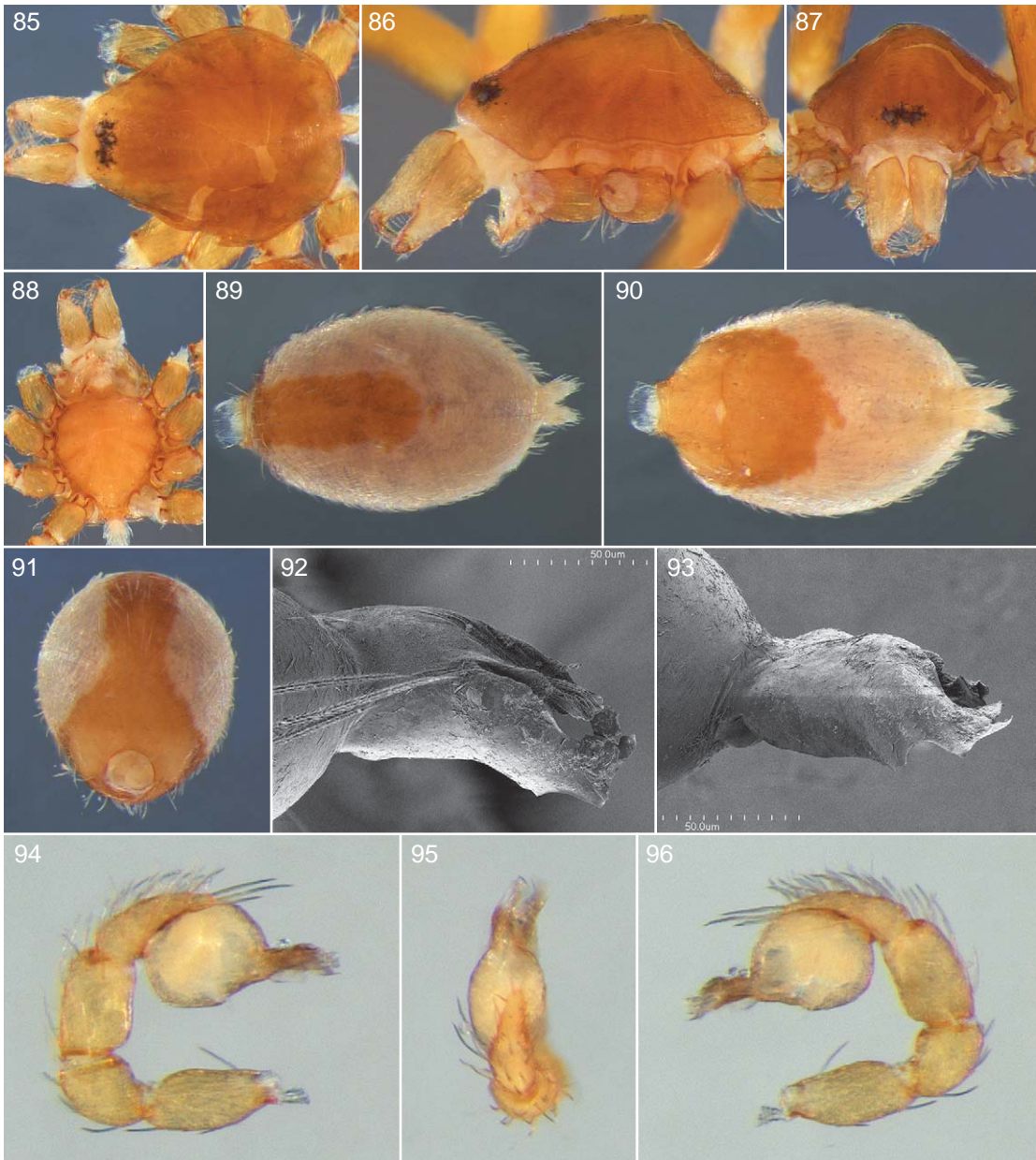
OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Mexico (Chiapas).

Ponsoonops duenas, new species

Figures 97–111

TYPES: Male holotype, one male paratype and two female paratypes from a mesic hardwood forest litter sample taken at an elevation of 1760 m at a site 4.5 km southwest of San



FIGURES 85–96. *Ponsoonops tacana*, new species, male. **85.** Carapace, dorsal view. **86.** Same, lateral view. **87.** Same, anterior view. **88.** Sternum, ventral view. **89.** Abdomen, dorsal view. **90.** Same, ventral view. **91.** Same, anterior view. **92.** Embolus and conductor, dorsal view. **93.** Same, prolateral view. **94.** Palp, prolateral view. **95.** Same, dorsal view. **96.** Same, retrolateral view.

Miguel Dueñas, Sacatepéquez, Guatemala (Jun. 12, 1991, R. Anderson), deposited in AMNH (PBI_OON 21007).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males resemble those of *P. tacana* and *P. bilzi* in having a distinctly enlarged conductor, broader and longer than the embolus. They differ in having a conductor with a distinct, longitudinal median rim (fig. 107). Females differ in having a very short, broad stalked anterior genitalic process with an irregularly serrated tip (fig. 111).

MALE (PBI_OON 21007, figs. 97–107): Total length 1.69. Distal margin of dorsal scutum rounded. Leg spination: tibiae: I v4-2-2; II v4-2-1p; metatarsi: I v2-2-2; II p1-0-0, v2-2-2. Sperm pore oval. Cymbial cone not detected. Bulb subspherical. Embolus moderately flattened, tube shaped, longitudinally ribbed, with irregularly shaped opening; conductor proximally fused to embolus, distally separated, broad, elongated, with distinct longitudinal median rim, broad truncated, longer than embolus (conductor broken off in figs. 103–105).

FEMALE (PBI_OON 21007, figs. 108–111): Total length 1.84. Leg spination: tibiae: I p1-0-0, v4-2-2; II v4-2-1p; IV p0-1-0, v0-0-1, r0-1-0; metatarsi: I v2-2-2; II p1-0-0, v2-2-2; IV p0-1-0. Female genitalia externally conspicuous, anterior sclerite and plates well visible through epigastric scutum. Internally, large genital plate with distinct lateral extensions, medially protruding part wider than long (folded down in figs. 110, 111); small genitalic plate W-shaped; anterior genitalic process broadly stalked, apex with irregularly serrated tip; posterior genitalic process not detectable (probably very weakly sclerotized or even absent).

OTHER MATERIAL EXAMINED: GUATEMALA: **Sacatepéquez:** 4 km S Volcan Atitlán, 14.5491476°N, 91.19054782°W, Jun. 14, 2009, mini-Winkler, sifted leaf litter, elev. 1625 m (Leaf Litter Arthropods of Mesoamerica [LLAMA-Project], MCZ PBI_OON 49212), 1 ♂.

DISTRIBUTION: Guatemala (Sacatepéquez).

Ponsoonops bilzi, new species

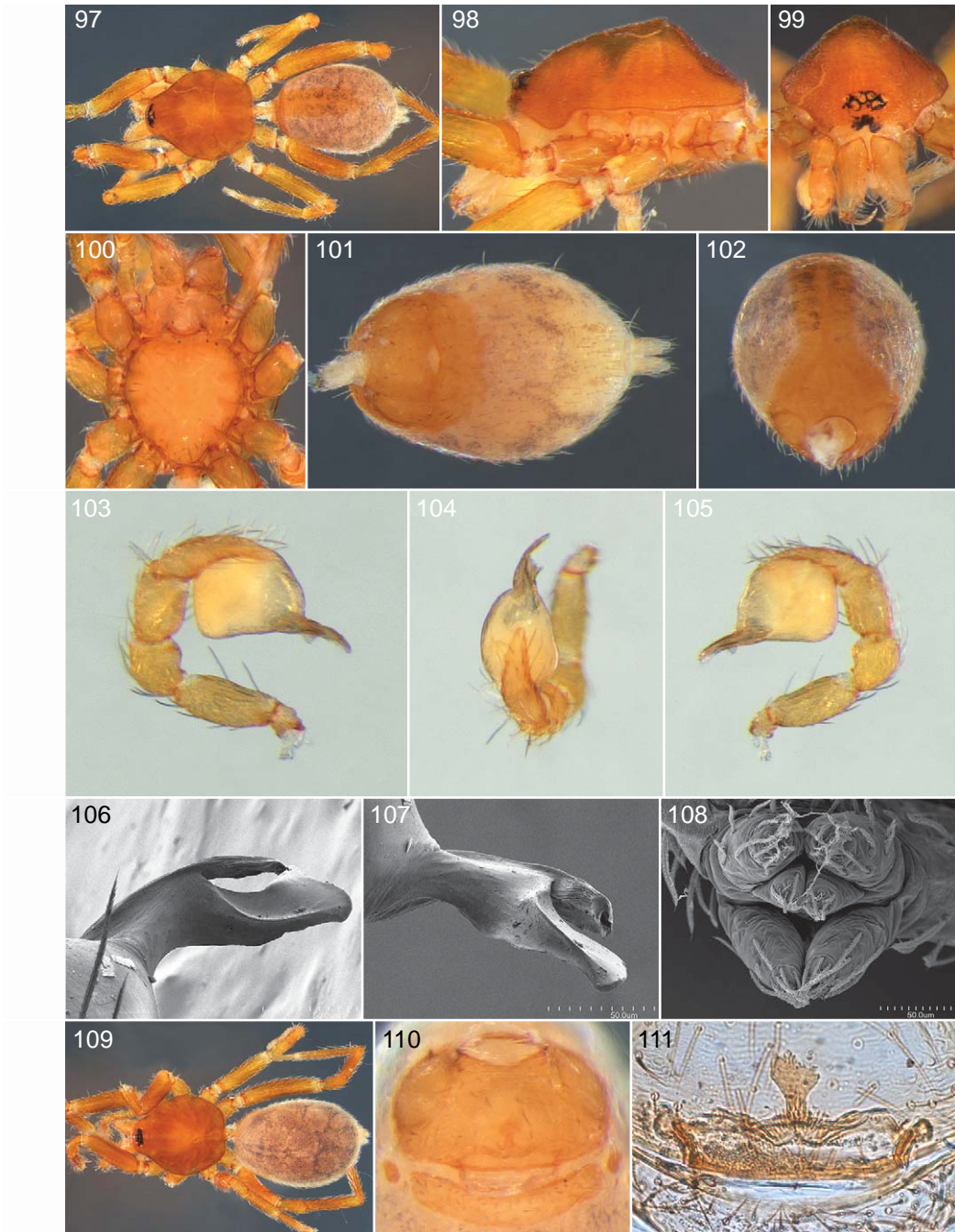
Figures 112–126

NOTE: The male and female have not been collected together, show some somatic differences (e.g., leg spination), and may be mismatched.

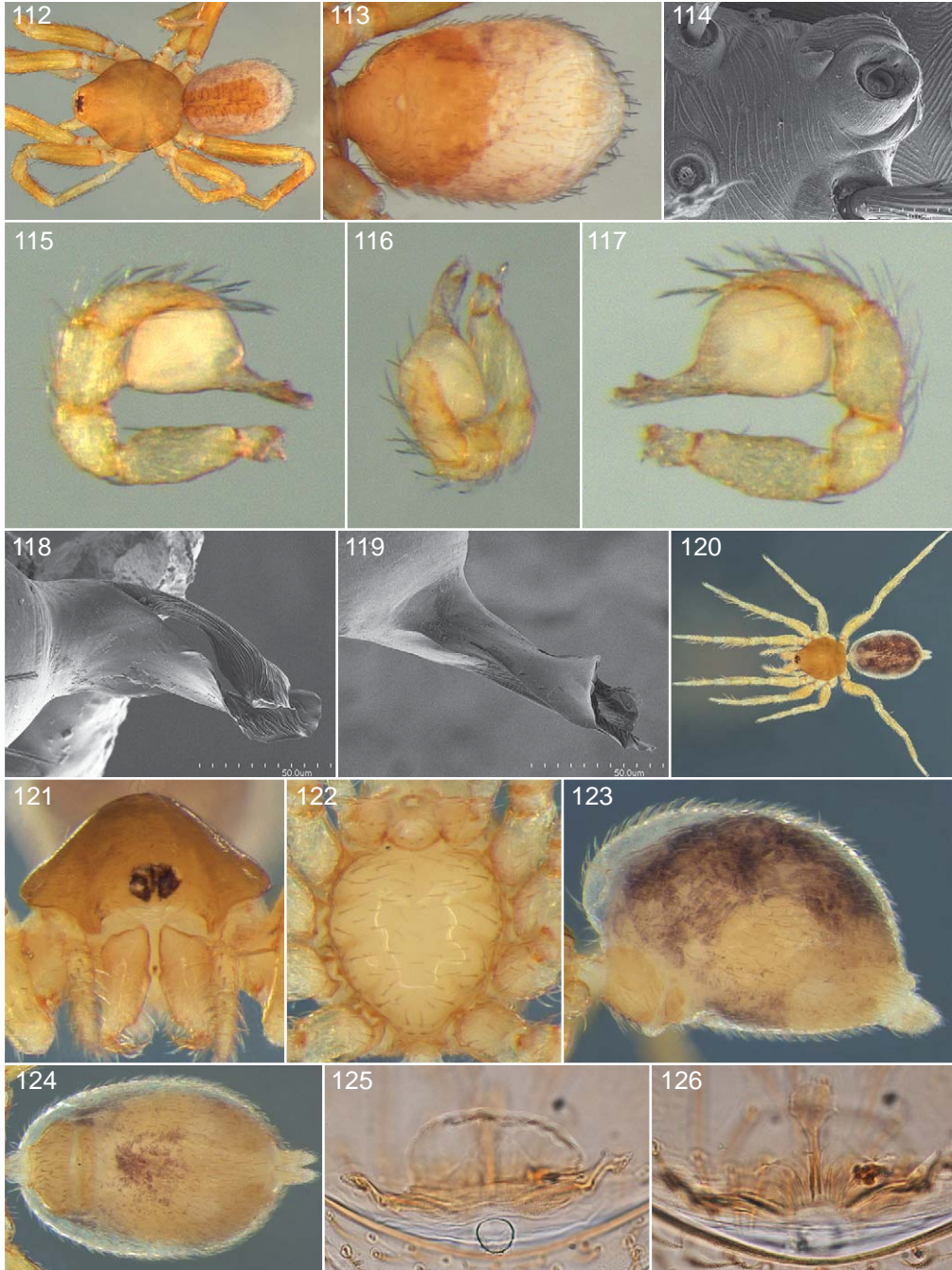
TYPE: Male holotype from a transect sample (INBio-OET-ALAS) taken at an elevation between 1450–1550 m at a site 9 km northeast of Vara Blanca, 10.23333°N, 84.1°W, Heredia, Costa Rica (Apr. 15, 2005), deposited in INBIO (PBI_OON 31107).

ETYMOLOGY: The specific name is a patronym in honor of Joanna Bilz, a “behind the scenes” supporter of different aspects of this work.

DIAGNOSIS: The male resembles those of *P. duenas* and *P. tacana* in having a distinctly enlarged conductor, broader and longer than the embolus. It differs from *P. duenas* in having a lamelliform, flat conductor (figs. 118, 119; rather than a distinct, longitudinal median rim), and differs from *P. tacana* in having a moderately spiral, distally truncated conductor (rather than straight, distally ragged). Females differ, except for those of *P. sanvito*, in having a relatively small, subspherical posterior genitalic process without distinct duct (with distinct duct in *P.*



FIGURES 97–111. *Ponsoonops duenas*, new species, male (97–107) and female (108–111). **97.** Habitus, dorsal view. **98.** Carapace, lateral view. **99.** Same, anterior view. **100.** Sternum, ventral view. **101.** Abdomen, ventral view. **102.** Same, anterior view. **103.** Palp (conductor broken off), prolateral view. **104.** Same, dorsal view. **105.** Same, retrolateral view. **106.** Embolus and conductor, dorsal view. **107.** Same, prolateral view. **108.** Spinnerets, posterior view. **109.** Habitus, dorsal view. **110.** Epigastric area, ventral view. **111.** Genitalia, dorsal view.



FIGURES 112–126. *Ponsoonops bilzi*, new species, male (112–119) and female (120–126). **112.** Habitus, dorsal view. **113.** Abdomen, ventral view. **114.** Cymbium tip with cymbial cone, dorsal view. **115.** Palp, prolateral view. **116.** Same, dorsal view. **117.** Same, retrolateral view. **118.** Embolus and conductor, dorsal view. **119.** Same, prolateral view. **120.** Habitus, dorsal view. **121.** Carapace, anterior view. **122.** Sternum, ventral view. **123.** Abdomen, lateral view. **124.** Same, ventral view. **125, 126.** Genitalia, dorsal view.

lerida). They differ from those of *P. sanvito* in having indistinct glands attached to the posterior genitalic process (fig. 125), and numerous, long, filiform glands at the base of the anterior genitalic process (fig. 126; rather than only a few short ones).

MALE (PBI_OON 31107, figs. 112–119): Total length 1.26. Eyes moderately reduced. Distal margin of dorsal scutum rounded. Leg spination: tibiae: I v4-2-2; II v4-2-1p; metatarsi: I v2-2-2; II v3-2-2; IV p0-1-0. Sperm pore triangular with rounded angles. Bulb subspherical. Embolus flattened, tubelike, elongated, throughout longitudinally ribbed, tip irregularly formed, opening simple; conductor originates at embolus base, broad, lamelliform, elongated, spiral surrounding embolus, inner surface transversally ribbed, longer than embolus.

FEMALE (PBI_OON 49228, figs. 120–126): Total length 1.46. Leg spination: tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-2; IV p0-1-0, v1-0-2, r0-1-0; metatarsi: I p1-1-0, v2-2-2, r1-0-0; II p1-0-0, v2-2-2; IV p0-1-0, r0-1-0. Median protruding part of large genital plate wider than long; anterior genitalic process long, narrowly stalked, apex distinctly enlarged, patch of numerous, long, filiform glands present at base of anterior genitalic process; posterior genitalic process subspherical, without remarkable duct, weakly sclerotized.

OTHER MATERIAL EXAMINED: COSTA RICA: **Limón**: Parque Nacional Tortuguero, Apr. 17–23, 1983, Sendero natural, wet forest, second growth (D. Ubick, CDU PBI_OON 49228), 1 ♀.

DISTRIBUTION: Costa Rica (Heredia and Limón).

The *hamus* Group

Males of this group differ from others by the simple, tubelike embolus with platelike or hooklike distal appendages (figs. 136, 137, 146, 147), but without a ventral slit or rebordered opening as present in the *sanvito* group. Females of this group are united by the presence of a distinctly W-shaped large genital plate with an oval, moderately to strongly elongated posterior genitalic process (figs. 138, 156, 163, 170). The group has one representative each in Mexico, Guatemala, Belize, Costa Rica, Panama, and Colombia.

Ponsoonops hamus, new species

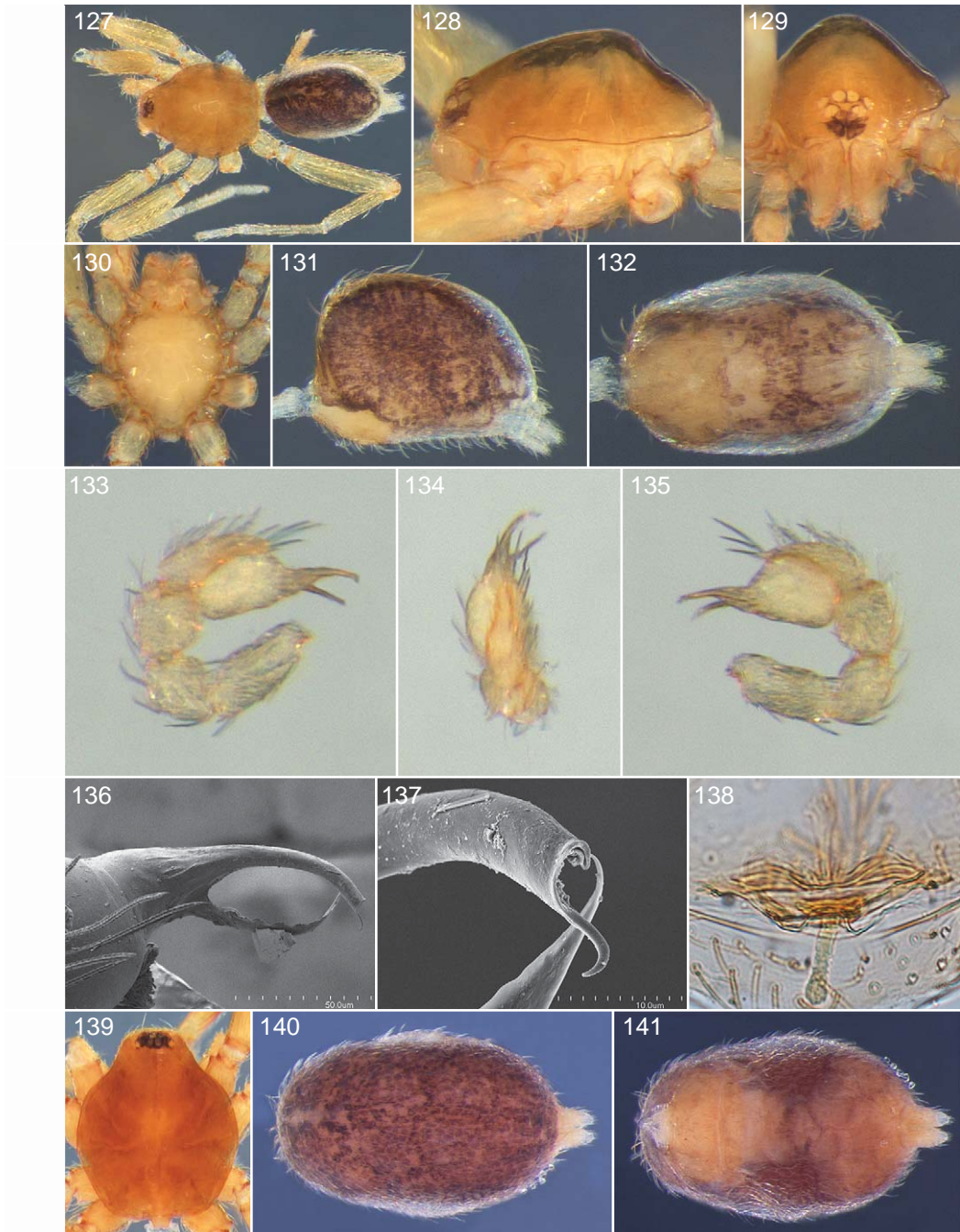
Figures 127–141

NOTE: Males and females have not been collected together, show some somatic differences (e.g., carapace color), and may be mismatched.

TYPES: Male holotype and one male paratype from a Berlese sample from forest litter on limestone taken at a site 2.5 mi south of Belmopan, Cayo, Belize (Aug. 4, 1972, S. and J. Peck), deposited in FMNH (PBI_OON 38345).

ETYMOLOGY: The specific name is a Latin noun referring to the hook-shaped appendage at the embolus tip.

DIAGNOSIS: Males resemble those of *P. samadam* in having a simple, tubelike embolus (fig. 136). They differ in having a basally diverging conductor and embolus (fig. 134, 136; rather than parallel), and a hooklike projection at the embolus tip (fig. 137; rather than a platelike



FIGURES 127–141. *Ponsoonops hamus*, new species, male (127–137) and female (138–141). 127. Habitus, dorsal view. 128. Carapace, lateral view. 129. Same, anterior view. 130. Sternum, ventral view. 131. Abdomen, lateral view. 132. Same, ventral view. 133. Palp, prolateral view. 134. Same, dorsal view. 135. Same, retrolateral view. 136. Embolus and conductor, dorsal view. 137. Embolus tip, prolateral view. 138. Genitalia, dorsal view. 139. Carapace, dorsal view. 140. Abdomen, dorsal view. 141. Same, ventral view.

protrusion). Females resemble those of *P. samadam* in having a tubelike, elongated posterior genitalic process (fig. 138). They differ in having a sclerotized, moderately enlarged anterior genitalic process tip (rather than membranous, lamelliform enlarged), and a moderately shorter and narrower posterior genitalic process.

MALE (PBI_OON 38345, figs. 127–137): Total length 1.17. Surface of elevated portion of pars cephalica appears smooth. Leg spination: tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II v2-2-2. Sperm pore circular. Embolus tube shaped, distally collapsed, with inverted U-shaped opening, prolaterally with hook-shaped projection; conductor originates at embolus base, narrow, lamelliform, elongated, simply pointed, as long as embolus.

FEMALE: (PBI_OON 1858, figs. 138–141): Total length 1.51. Carapace orange-brown. Leg spination: tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-2; III p0-1-0, r0-1-0; IV p1-1-0, v0-0-2, r1-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p1-1-0, r1-1-0. Large genital plate W-shaped, median protruding part wider than long; anterior genitalic process club shaped; posterior genitalic process elongated, tube shaped, apex moderately enlarged, moderately longer than anterior genitalic process.

OTHER MATERIAL EXAMINED: GUATEMALA: **Petén**: Tikal, Dec. 30, 1973, ex. nest T-821 of termites (*Nasutitermes corniger* (Motschulsky)), (D.H., A.C. Kistner, AMNH PBI_OON 1858), 1 ♀. MEXICO: **Chiapas**: Finca El Real, Ocosingo Valley, Jul. 1–7, 1950 (C., M. Goodnight, L. Stannard, AMNH PBI_OON 31139), 1 ♂; Nututun Road, ca. 12 mi from Palenque, Jan. 20, 1976, Berlese of leaves and dirt (C. Alteri, AMNH PBI_OON 31144), 2 ♂; Palenque, Mar. 2–24, 1975, Berlese (C. Alteri, AMNH PBI_OON 1716), 1 ♂, Jan. 29, 1976, cacao grove, Berlese of leaves, humus (C. Alteri, AMNH PBI_OON 37522), 1 ♂.

DISTRIBUTION: Mexico (Chiapas), Guatemala (Petén) and Belize (Cayo).

Ponsoonops samadam, new species

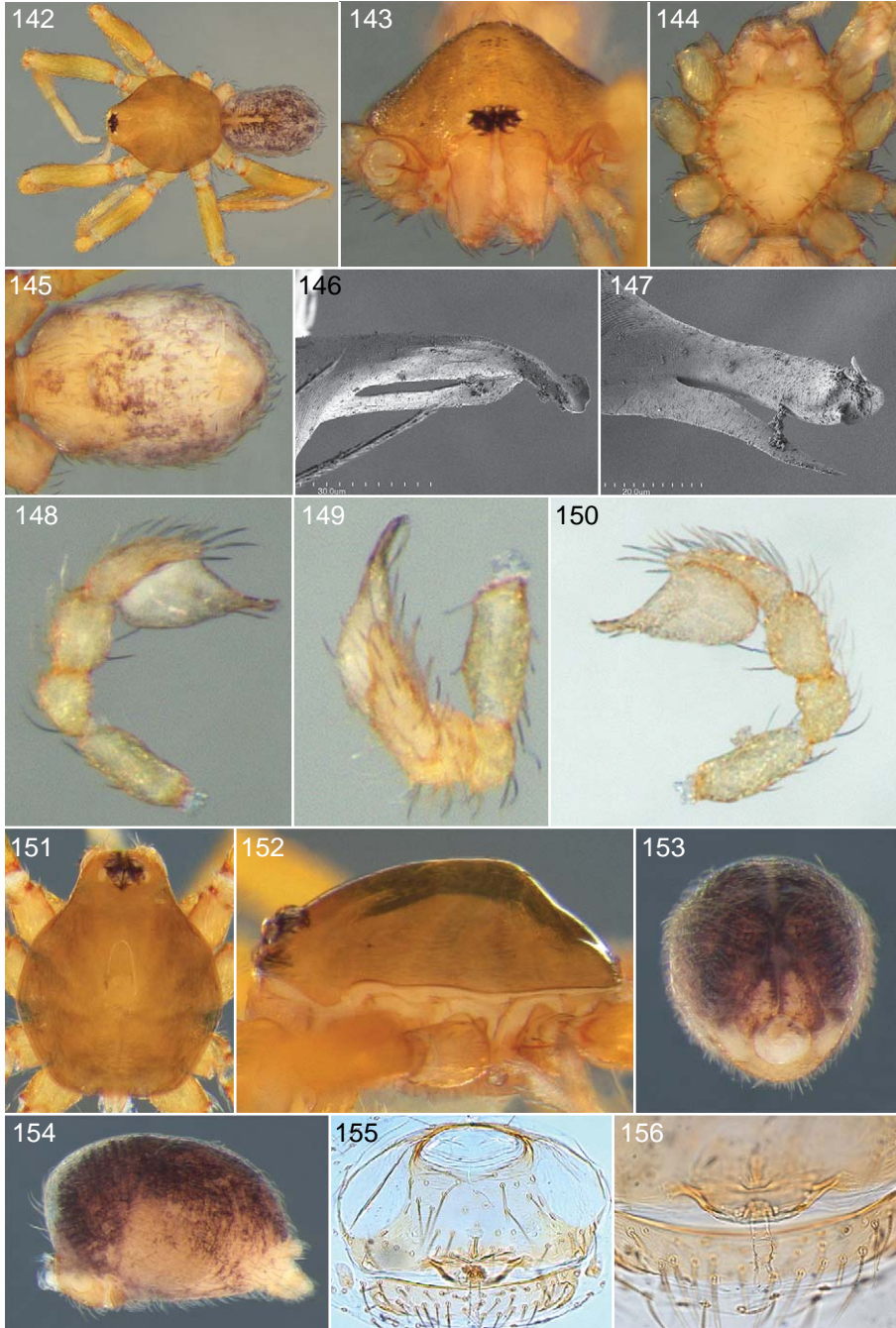
Figures 142–156

NOTE: Males and female have not been collected together, show some somatic differences (e.g., eyes, leg spination), and may be mismatched.

TYPES: Male holotype and one male paratype from a transect sample (INBio-OTS) taken at an elevation between 1050–1150 m at a site 16 km south southeast of La Virgen, 10.26666°N, 84.08333°W, Heredia, Costa Rica (Mar. 15, 2001, C. Viquez), deposited in INBIO (PBI_OON 31097).

ETYMOLOGY: The specific name is a noun in apposition taken from the brand name of a great brewed beverage.

DIAGNOSIS: Males resemble those of *P. hamus* in having a simple tubelike embolus (figs. 146, 147). They differ in having the conductor and embolus almost parallel (rather than basally diverging), and a platelike protrusion at the embolus tip (fig. 146; rather than a hooklike projection). Females resemble those of *P. hamus* in having a tubelike, elongated posterior genitalic process (fig. 156). They differ in having a membranous, lamelliform, enlarged anterior genitalic



FIGURES 142–156. *Ponsoonops samadam*, new species, male (142–150) and female (151–156). 142. Habitus, dorsal view. 143. Carapace, anterior view. 144. Sternum, ventral view. 145. Abdomen, ventral view. 146. Embolus and conductor, dorsal view. 147. Same, prolateral view. 148. Palp, prolateral view. 149. Same, dorsal view. 150. Same, retrolateral view. 151. Carapace, dorsal view. 152. Same, lateral view. 153. Abdomen, anterior view. 154. Same, lateral view. 155. Epigastric area, dorsal view. 156. Genitalia, dorsal view.

process tip (rather than sclerotized, moderately enlarged), and a moderately longer and broader posterior genitalic process.

MALE (PBI_OON 31097, figs. 142–150): Total length 1.12. Eyes moderately reduced. Leg spination: tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II v2-2-2. Sperm pore triangular with rounded angles. Cymbial cone not detected. Embolus broad, tube shaped, distal part narrowed, tip irregularly platelike, enlarged; conductor originates at embolus base, narrow, lamelliform, elongated, simply pointed, as long as embolus.

FEMALE (PBI_OON 49182, figs. 151–156): Total length 1.36. Eyes well developed. Leg spination: tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-2; IV p1-1-0, v0-0-2, r1-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p1-1-0, r1-1-0. Large genital plate W-shaped with short, broad lateral extensions, median protruding part wider than long; anterior genitalic process narrowly stalked, apex membranous, lamelliform, enlarged; posterior genitalic process long, ductlike, ribbed, weakly sclerotized.

OTHER MATERIAL EXAMINED: COSTA RICA: **Alajuela**: Melo (5.2), Upala, date unknown (C. Viquez, INBIO PBI_OON 49182), 1 ♀.

Ponsoonops frio, new species

Figures 157–163

TYPE: Female holotype from leaf litter at Estación Rancho Frío, Pirre, Parque Nacional Darién, Darién, Panama (Jul. 30 – Aug. 8, 2002, R. Miranda, A. Santos), deposited in MIUP (PBI_OON 37746).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

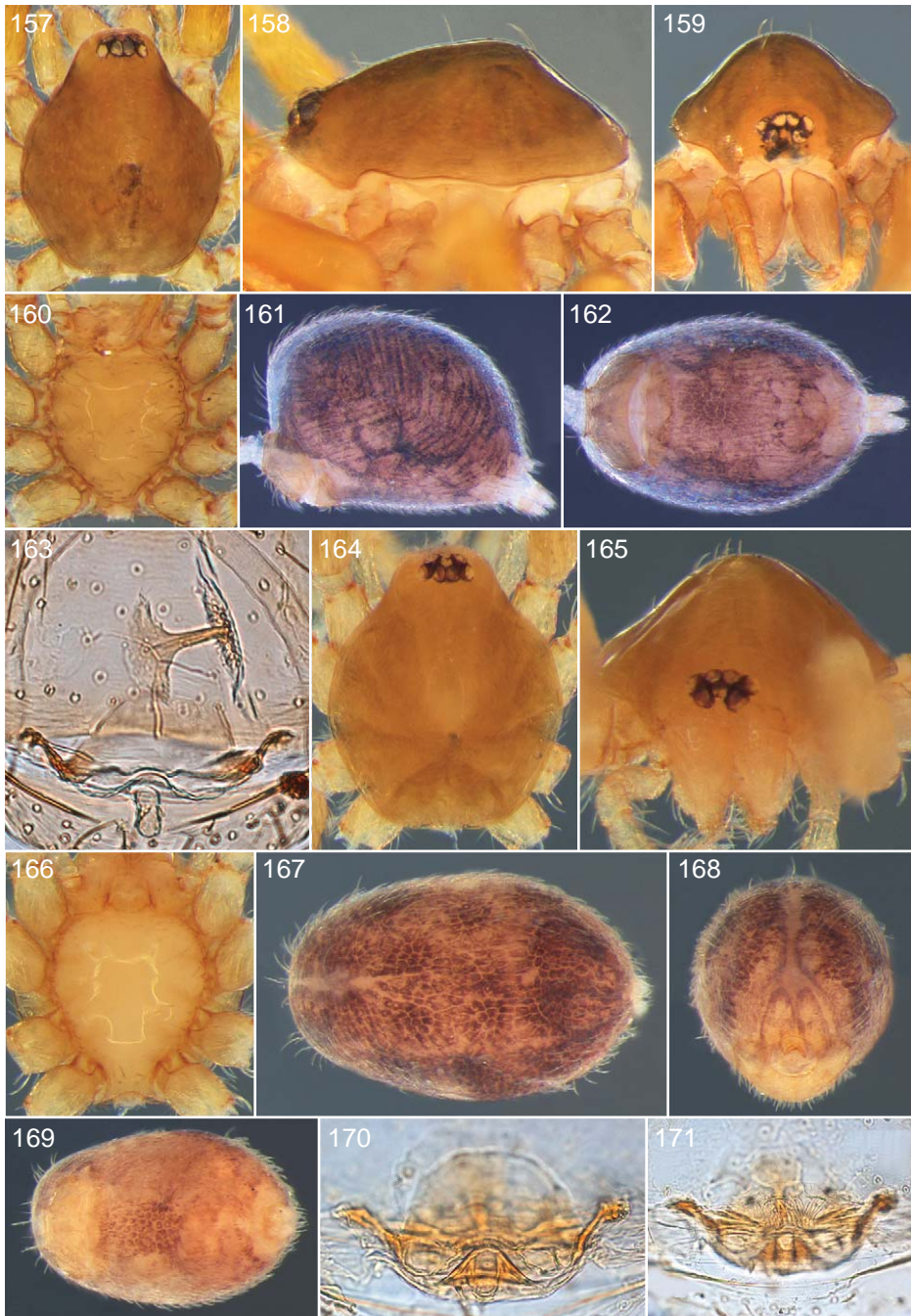
DIAGNOSIS: Female resembles those of *P. pansedro* in having a distinctly W-shaped large genital plate in combination with a short posterior genitalic process (fig. 163). It differs in having the enlarged tip of the anterior genitalic process broader than the process length (rather than narrower than the process length), and in having the posterior genitalic process reaching more posteriorly than the large genital plate (rather than not reaching the posterior rim).

MALE: Unknown.

FEMALE (PBI_OON 37746, figs. 157–163): Total length 1.55. Abdomen with distinct lateral stripes. Leg spination: tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-2; IV p1-1-0, v0-0-2, r1-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p1-1-0, r1-1-0. Large genital plate W-shaped, distinct lateral extensions, median protruding part trapezoidal, wider than long; anterior genitalic process narrowly stalked, apex distinctly enlarged, broader than process length (whole process and plate are broken off in fig. 163); posterior genitalic process oval without remarkable duct, weakly sclerotized.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Panama (Darién).



FIGURES 157–171. *Pansoonops frio*, new species, female (157–163) and *Pansoonops pansedro*, new species, female (164–171). **157.** Carapace, dorsal view. **158.** Same, lateral view. **159.** Same, anterior view. **160.** Sternum, ventral view. **161.** Abdomen, lateral view. **162.** Same, ventral view. **163.** Genitalia, dorsal view. **164.** Carapace, dorsal view. **165.** Same, anterior view. **166.** Sternum, ventral view. **167.** Abdomen, dorsal view. **168.** Same, anterior view. **169.** Same, ventral view. **170, 171.** Genitalia, dorsal view.

Ponsoonops pansedro, new species

Figures 164–171

TYPE: Female holotype from sifted leaf litter taken at an elevation of 960 m at San Pedro, Sierra Nevada de Santa Marta, Magdalena, Colombia (May 19, 1975, J.A. Kochalka), deposited in AMNH (PBI_OON 37053).

ETYMOLOGY: The specific name is a noun in apposition, an anagram taken from the type locality.

DIAGNOSIS: Female resembles those of *P. frio* in having a distinctly W-shaped large genital plate in combination with a short posterior genitalic process (figs. 170, 171). It differs in having the enlarged tip of the anterior genitalic process narrower than the process length (rather than broader), and in having the posterior genitalic process not reaching the rim of the large genital plate (rather than reaching more posteriorly).

MALE: Unknown.

FEMALE (PBI_OON 37053, figs. 164–171): Total length 1.52. Leg spination: tibiae: I p1-1-0, v4-2-2; II v4-2-2; IV v0-0-2; metatarsi: I, II p1-0-0, v2-2-2; IV p1-1-0, r1-1-0. Large genital plate W-shaped, median protruding part moderately wider than long; anterior genitalic process narrowly stalked, apex distinctly enlarged, subrectangular; posterior genitalic process suboval, pocketlike, without remarkable duct, not reaching more posterior than genitalic plate.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Colombia (Magdalena).

The *sanvito* Group

Males of this largest group of *Ponsoonops* species differ from others by the distinct ventral slit at the embolus (ventral folding of lateral outgrowths of the embolus, figs. 15, 177, 197, 223, 269, 302, 303, 330, 331, 372; reduced in *P. fanelix*, fig. 355), and the distinctly rebordered embolus opening (figs. 14, 182, 209, 223, 269, 303, 331, 355, 372). *Ponsoonops sanvito* is a member of this group, but is treated at the beginning of the taxonomic section because it is the type species of the genus. A character separating females from others has not been found.

A subgroup of probably closely related species can be recognized within the *sanvito* group: *Ponsoonops boquete*, *P. lerida*, *P. panto*, and *P. buena* have a very similar embolus with a median protrusion that is mound or ridge shaped, and a narrowed, distinctly elongated embolus tip (figs. 208, 219, 268, 301).

The group has two representatives in Costa Rica and eight in Panama.

Ponsoonops lucha, new species

Figures 172–186

TYPES: Male holotype, one male paratype, and two female paratypes taken from a rock outcrop on “sendero a la fila” at an elevation of 1500 m at the base camp of the “Darwin proj-

ect,” 9.114388°N, 83.093426°W, Cerro Amuo, La Lucha, Puntaneras, Costa Rica (Feb. 19–27, 2008, C. Viquez), deposited in INBIO (PBI_OON 49189).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males can easily be separated from all other *Ponsoonops* males by the uniquely (distally incomplete) fusion of the broad lamelliform conductor with the flattened embolus (figs. 177–182). Females differ in having a distinctly V-shaped posterior genitalic process (fig. 186).

MALE (PBI_OON 49189, figs. 172–182): Total length 1.46. Leg spination: tibiae: I v4-2-2; II v4-2-1p; IV p0-0-1, v0-0-2, r0-0-1; metatarsi: I v2-2-2; II p1-0-0, v2-2-2; IV p0-0-1, r0-0-1 (inconsistent pattern of spines on left and right tibiae and metatarsi of leg IV). Sperm pore oval. Cymbial cone not detected. Embolus flattened, broadly folded, with longitudinal ventral slit, embolus opening small, oval, rebordered, ventrally with spurlike projection; conductor basally strongly fused with embolus, only distal part separated, very broad, lamelliform, ventrally lamelliform, elongated, distal margin irregularly indented, as long as embolus.

FEMALE (PBI_OON 49189, figs. 183–186): Total length 1.65. Leg spination: tibiae: I p1-1-0, v4-2-2, r0-1-0; II p0-1-0, v4-2-2; IV p0-0-1, v0-0-2, r0-0-1; metatarsi: I, II v3-2-2; IV p0-1-0. Median protruding part of large genital plate as long as wide; anterior genitalic process narrowly stalked, apex distinctly enlarged; posterior genitalic process V-shaped, without remarkable duct, weakly sclerotized, distally with filiform glands.

OTHER MATERIAL EXAMINED: COSTA RICA: **Limón:** Valle del Silencio, Cerro Hoffman (9.07805°N, 82.97666°W), Feb. 26–27, 2005, forest litter, elev. 2307 m (R. Anderson, INBIO PBI_OON 30997), 1 ♂. **Puntarenas:** 5 km SW Estación Biológica Las Cruces, “La Fila,” Mar. 21, 1973, Berlese, concentrate of mixed floor litter (leaf litter, palm fibers, log mold), elev. 1433 m (J. Wagner, J. Kethley, FMNH PBI_OON 49214), 1 ♀.

DISTRIBUTION: Costa Rica (Limón and Puntarenas).

Ponsoonops mirante, new species

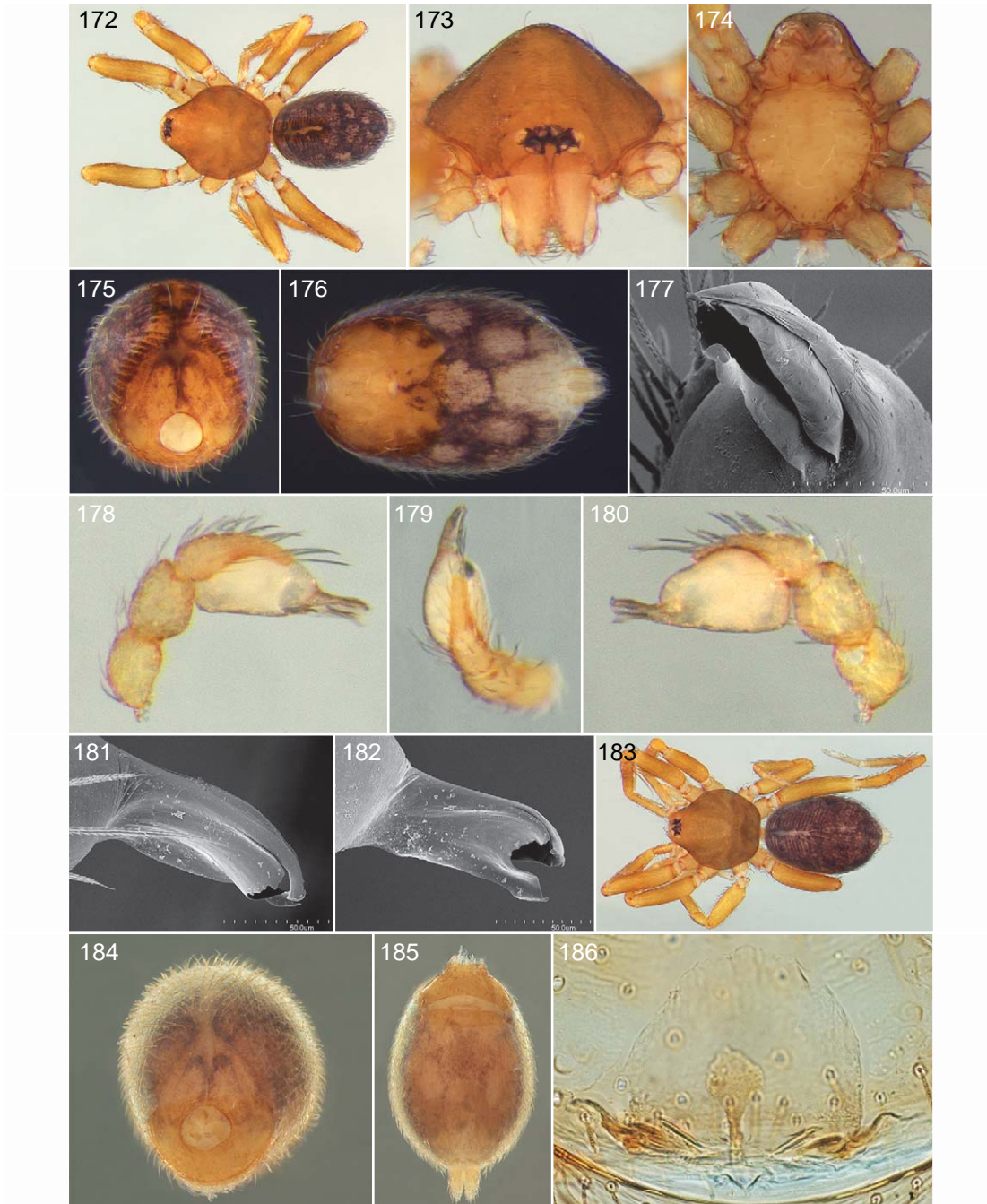
Figures 187–198

TYPES: Male holotype and one male paratype from a Berlese sample of floor litter taken at Almirante, Bocas del Toro, Panama (Mar. 27, 1959, H.S. Dybas), deposited in FMNH (PBI_OON 10400).

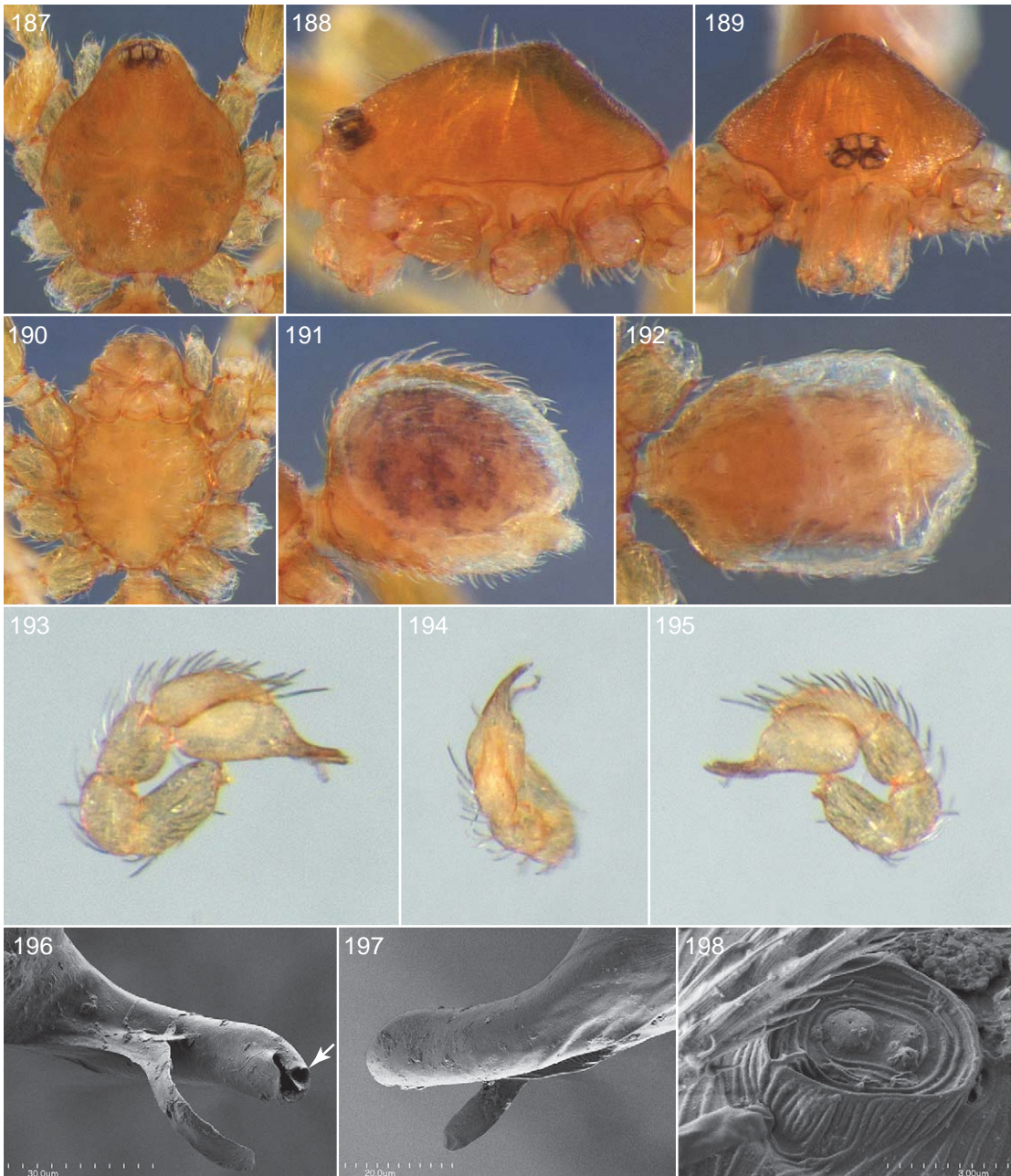
ETYMOLOGY: The specific name is a noun in apposition taken from the shortened name of the type locality.

DIAGNOSIS: Males resemble those of the *sanvito* group in having a distinct ventral slit at the embolus (figs. 196, 197). They differ from all those species, except *P. lucha* and *P. sanvito*, in lacking a median protrusion at the embolus (fig. 328). They differ from those of *P. lucha* by the well-separated embolus and conductor, and from those of *P. sanvito* in having a broadly rounded conductor tip (rather than sharply pointed).

MALE (PBI_OON 10400, figs. 187–198): Total length 1.06. Leg spination: tibiae: I v4-2-2; II v4-2-1p; IV p0-1-0; v0-0-2, r1-1-0; metatarsi: I, II v2-2-2; IV p0-1-0, r0-1-0. Sperm pore oval. Cymbial cone not detected. Tarsal organ on palpal cymbium with distal receptor appearing bifid.



FIGURES 172–186. *Ponsoonops lucha*, new species, male (172–182) and female (183–186). **172.** Habitus, dorsal view. **173.** Carapace, anterior view. **174.** Sternum, ventral view. **175.** Abdomen, anterior view. **176.** Same, ventral view. **177.** Embolus and conductor, ventral view. **178.** Palp, prolateral view. **179.** Same, dorsal view. **180.** Same, retrolateral view. **181.** Embolus and conductor, dorsal view. **182.** Same, prolateral view. **183.** Habitus, dorsal view. **184.** Abdomen, anterior view. **185.** Same, ventral view. **186.** Genitalia, dorsal view.



FIGURES 187–198. *Ponsoonops mirante*, new species, male. **187.** Carapace, dorsal view. **188.** Same, lateral view. **189.** Same, anterior view. **190.** Sternum, ventral view. **191.** Abdomen, lateral view. **192.** Same, ventral view. **193.** Palp, prolateral view. **194.** Same, dorsal view. **195.** Same, retrolateral view. **196.** Embolus and conductor (embolus tip broken off, indicated by arrow), prolateral view. **197.** Same, retrolateral view. **198.** Tarsal organ, palp, dorsal view.

Embolus broad, tube shaped, longitudinally folded, with ventral slit and distoprolateral opening, tip narrowed (broken off in fig. 196, indicated by arrow), elongated; conductor originates at embolus base, narrow, bandlike, elongated, tip broadly rounded, as long as embolus.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Panama (Bocas del Toro).

Ponsoonops boquete, new species

Figures 199–213

NOTE: Males and females have not been collected together, show some somatic differences (e.g., leg spination), and may be mismatched.

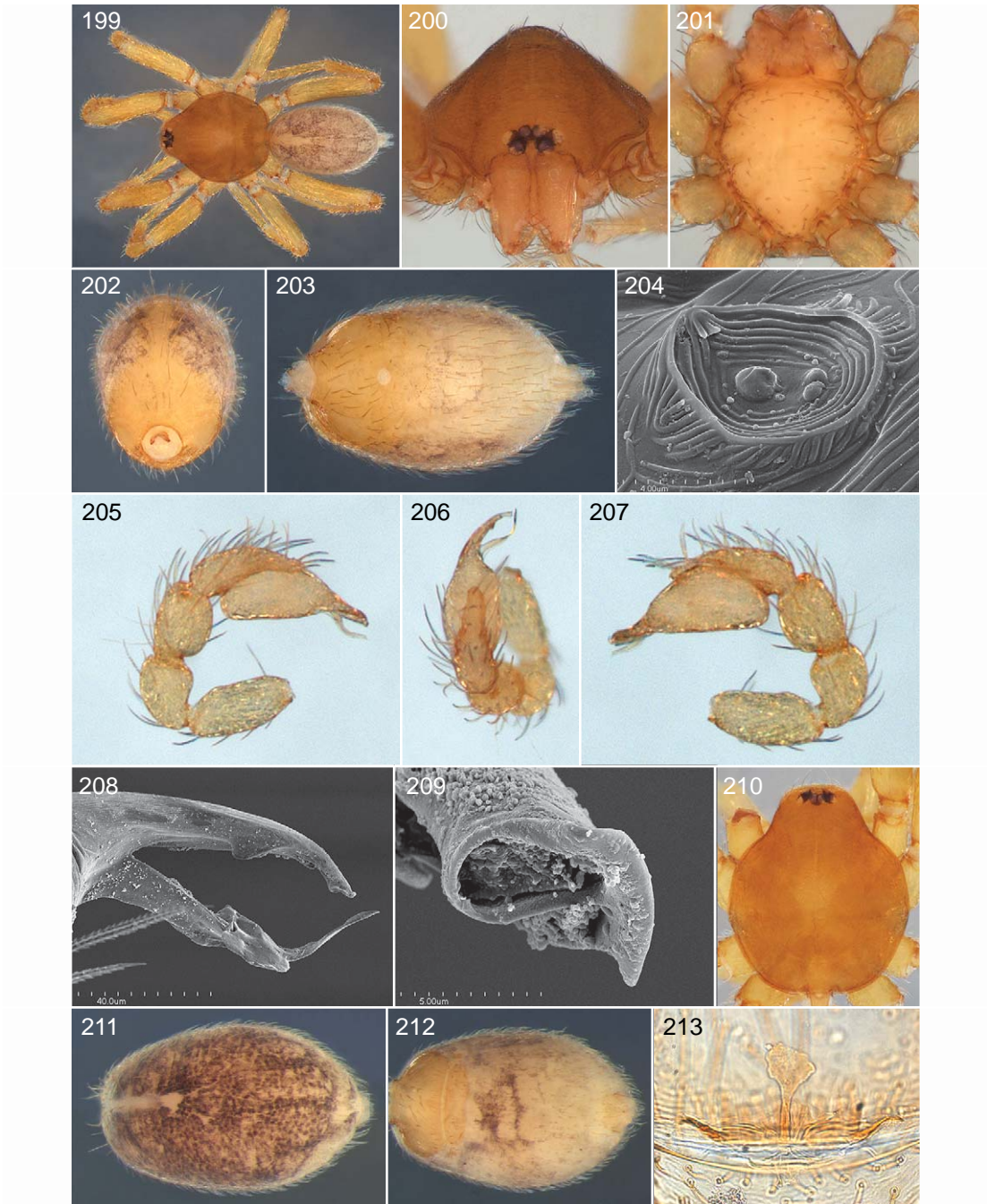
TYPE: Male holotype from a Berlese sample of concentrated forest floor litter taken at an elevation of 1722 m at a site at “Barca Area” at Finca Lérída near Boquete, Chiriquí, Panama (Mar. 15, 1959, H.S. Dybas), deposited in FMNH (56547 PBI_OON 10765).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: Males resemble those of *P. lerida*, *P. panto*, and *P. vuena* in having an embolus with a median protrusion, and a narrowed, distinctly elongated embolus tip (fig. 208). They differ from *P. lerida* and *P. panto* in having a distally pointed conductor that is longer than the embolus (rather than truncated or with short narrow projections and shorter), and from *P. vuena* in having a narrow conductor base, a relatively narrow embolus, and a ridge-shaped median protrusion (rather than a broad conductor base and embolus, and a mound-shaped median protrusion). Females resemble those of *P. bollo* and *P. vuena* in having a narrow, long-stalked anterior genitalic process with enlarged apex (fig. 213). They differ from *P. bollo* in having distinct, long, filiform glands at the base of the anterior genitalic process, reaching almost to the enlarged part (rather than short ones), and from *P. vuena* in the absence of distinctly long protruding glands at the posterior genitalic process (rather than present).

MALE (PBI_OON 10765, figs. 199–209): Total length 1.39. Leg spination: tibiae: I v4-2-2; II v4-2-1p; IV p0-1-0, v1-0-2, r0-1-0; metatarsi: I v2-2-2; II p1-0-0, v2-2-2; IV p0-1-0. Sperm pore circular. Tarsal organ on palpal cymbium with distal receptor appearing bifid. Embolus tube shaped, longitudinally folded, with ventral slit and prolateral opening, midway with dorso- and prolateral elevated ridge, embolus tip moderately narrowed, elongated, opening rebordered, retrolaterally platelike with indistinct, ventral protrusion; conductor originates at embolus base, narrow, lamelliform, elongated, midway twisted, tip simple, pointed, longer than embolus.

FEMALE (PBI_OON 49195, figs. 210–213): Total length 1.68. Leg spination: tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-2; IV p0-1-0, v1-0-2, r0-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p1-1-0. Large genital plate moderately W-shaped, median protruding part wider than long; anterior genitalic process narrow, long stalked, apex distinctly enlarged; cluster of few, long, filiform glands present at base of anterior genitalic process; posterior genitalic process pocketlike, without remarkable duct, weakly sclerotized.



FIGURES 199–213. *Ponsoonops boquete*, new species, male (199–209) and female (210–213). **199.** Habitus, dorsal view. **200.** Carapace, anterior view. **201.** Sternum, ventral view. **202.** Abdomen, anterior view. **203.** Abdomen, ventral view. **204.** Tarsal organ, palp, dorsolateral view. **205.** Palp, prolateral view. **206.** Same, dorsal view. **207.** Same, retrolateral view. **208.** Embolus and conductor, dorsal view. **209.** Embolus tip, prolateral view. **210.** Carapace, dorsal view. **211.** Abdomen, dorsal view. **212.** Same, ventral view. **213.** Genitalia, dorsal view.

OTHER MATERIAL EXAMINED: PANAMA: **Chiriquí:** Finca Lérída near Boquete, "Barca Area," Mar. 14, 1959, Berlese, concentrated litter with chips at base of cut stump, elev. 1722 m (H.S. Dybas, FMNH 56539 PBI_OON 49254), 1 ♂, same, "Casita Alta," Mar. 17, 1959, Berlese, forest floor litter, elev. 2286 m (H. Dybas, FMNH 59273 PBI_OON 49195), 2 ♀; near Bajo Boquete, "Paté de Machu Mountain," Aug. 11, 1983, sifted moss and leaf litter above stream (L.N. Sorkin, AMNH PBI_OON 1778), 1 ♂.

DISTRIBUTION: Panama (Chiriquí).

Ponsoonops lerida, new species

Figures 214–258

NOTE: Even though male and female are from the same sample, the match is uncertain because males of *P. boquete* were also taken at the same locality and time.

TYPE: Male holotype from a Berlese sample of forest floor litter taken at an elevation of 2377 m at Finca Lérída near Boquete, Chiriquí, Panama (Mar. 17, 1959, H. Dybas), deposited in FMNH (PBI_OON 49187).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

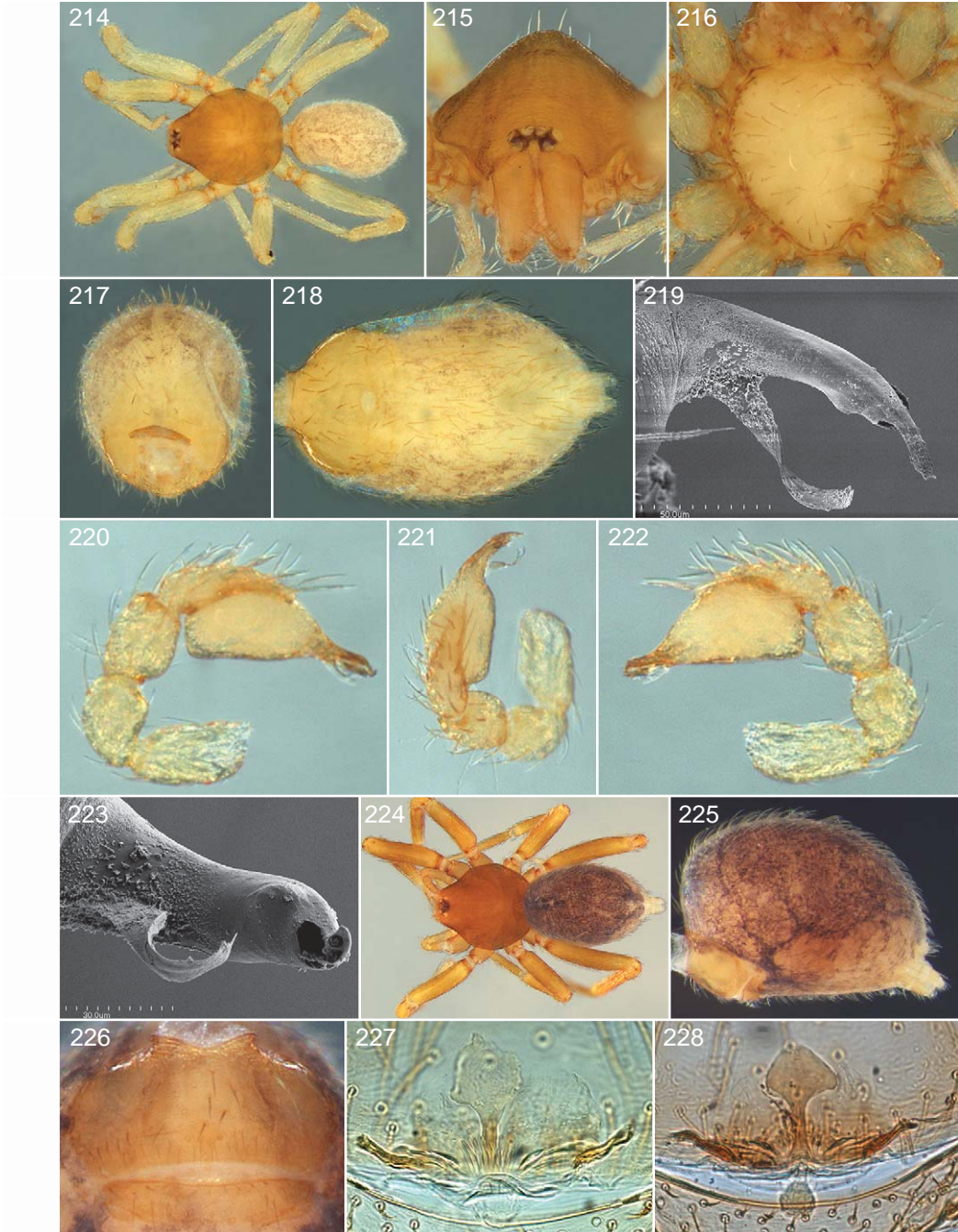
DIAGNOSIS: Males resemble those of *P. boquete*, *P. panto*, and *P. vuena* in having an embolus with a median protrusion, and a narrowed, distinctly elongated embolus tip (figs. 219, 223). They differ in having a distally truncated conductor, which is shorter than the embolus (rather than with short narrow projections in *P. panto*, pointed and longer than embolus in *P. boquete* and *P. vuena*). In addition, they differ from *P. panto* in having a mound-shaped median protrusion at the embolus (rather than a ridge-shaped one). Females differ in having a quite broad, enlarged anterior genitalic process (figs. 227, 228, 241), and a subspherical, moderately sclerotized posterior genitalic process with a distinct short duct (figs. 227, 228, 243).

MALE (PBI_OON 49187, figs. 214–223): Total length 1.51. Dorsal scutum very weakly sclerotized. Leg spination: tibiae: I v4-2-2; II v4-2-1p; IV v0-0-2; metatarsi: I v2-2-2; II p1-0-0, v2-2-2; IV p0-1-0. Sperm pore oval. Cymbial cone not detected. Tarsal organ on palpal cymbium with distal receptor appearing bifid. Embolus broad, tube shaped, longitudinally folded, with ventral slit and distoprolateral opening, midway with dorsal hump, tip narrowed, elongated, opening distoretrolaterally rebordered, platelike; conductor originates at embolus base, narrow, bandlike, elongated, distally truncated, almost as long as embolus.

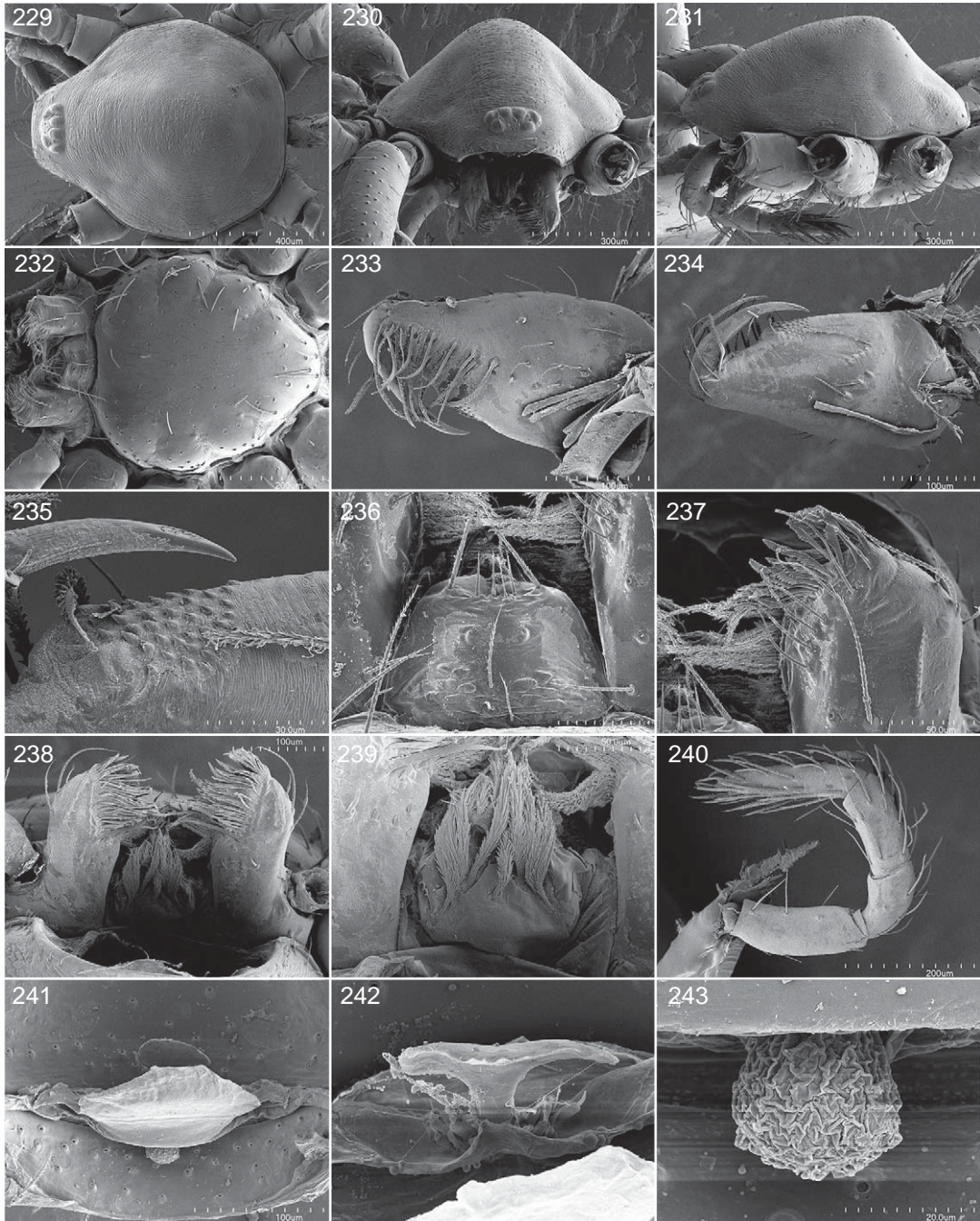
FEMALE (PBI_OON 49187, figs. 224–258): Total length 1.71. Leg spination: tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-2; IV p0-1-0, v1-0-2, r0-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p0-1-0. Large genital plate W-shaped, median protruding part wider than long; anterior genitalic process narrowly stalked, apex enlarged; posterior genitalic process subspherical with short duct, weakly sclerotized, distally with spoon-shaped glands (fig. 243).

OTHER MATERIAL EXAMINED: PANAMA: **Chiriquí:** same as holotype (H. Dybas, FMNH PBI_OON 49187), 2 ♀, Finca Lérída near Boquete, "Barca Area," Mar. 14, 1959, Berlese, litter, chips at base of cut stump, elev. 1722 m (H.S. Dybas, FMNH 56539 PBI_OON 10761), 2 ♀.

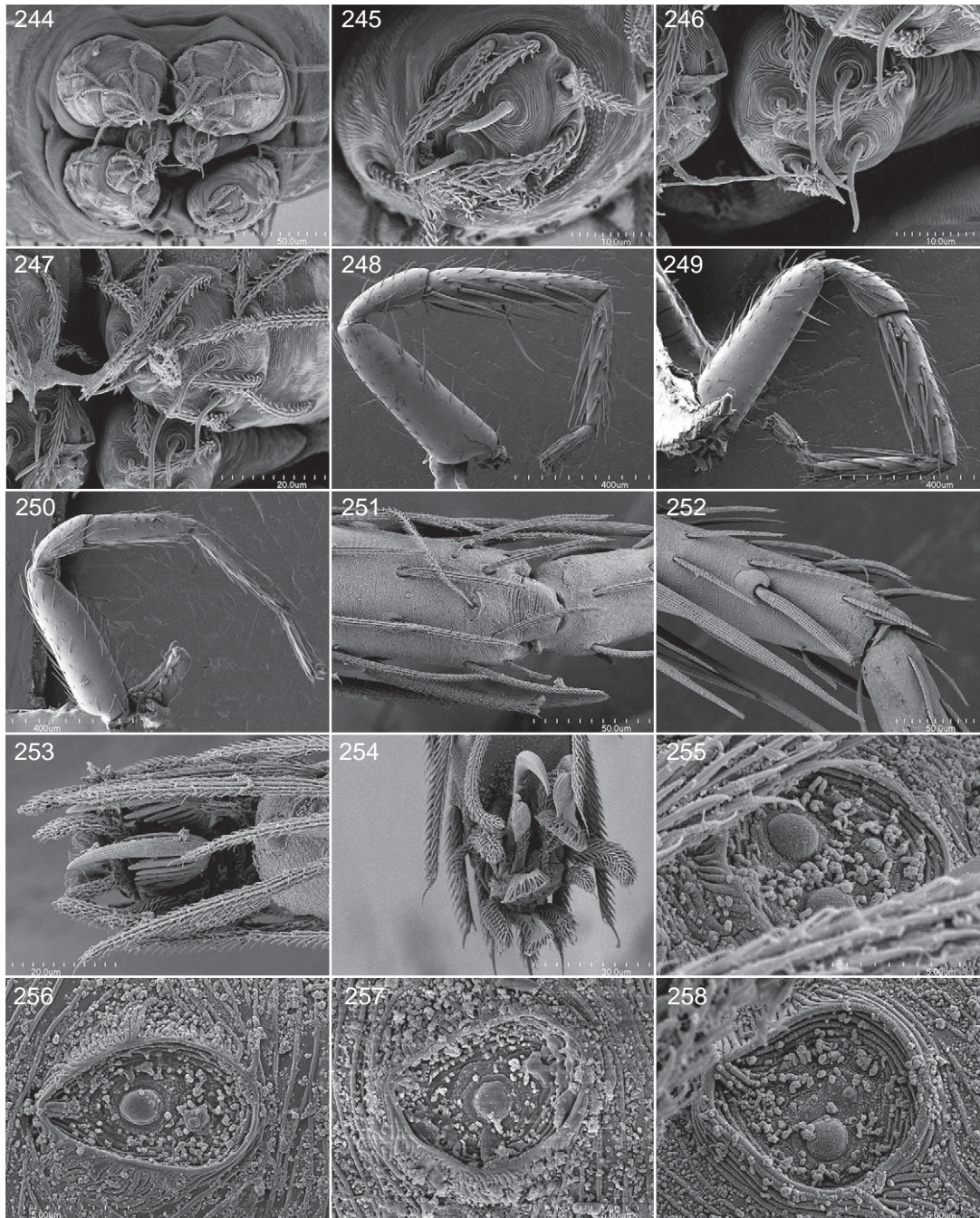
DISTRIBUTION: Panama (Chiriquí).



FIGURES 214–228. *Ponsoonops lerida*, new species, male (214–223) and female (224–228). 214. Habitus, dorsal view. 215. Carapace, anterior view. 216. Sternum, ventral view. 217. Abdomen, anterior view. 218. Same, ventral view. 219. Embolus and conductor, dorsal view. 220. Palp, prolateral view. 221. Same, dorsal view. 222. Same, retrolateral view. 223. Embolus and conductor, prolateral view. 224. Habitus, dorsal view. 225. Abdomen, lateral view. 226. Epigastric area, ventral view. 227, 228. Genitalia, ventral view.



FIGURES 229–243. *Ponsoonops lerida*, new species, female. 229. Carapace, dorsal view. 230. Same, anterior view (with detached chelicerae). 231. Same, lateral view. 232. Sternum, ventral view. 233. Chelicera, anterior view. 234. Same, posterior view. 235. Field of small teeth on cheliceral retromargin, posterior view. 236. Labium, ventral view. 237. Endite tip, ventral view. 238. Mouthparts, dorsal view. 239. Labrum, dorsal view. 240. Palp, lateral view. 241. Genitalia, dorsal view. 242. Anterior genitalic sclerite, dorsoanterior view. 243. Posterior genitalic sclerite, dorsal view.



FIGURES 244–258. *Ponsoonops lerida*, new species, female. 244. Spinnerets, posterior view. 245. Anterior lateral spinneret, same. 246. Posterior median spinnerets, same. 247. Posterior lateral spinnerets, same. 248. Leg I, prolateral view. 249. Leg II, same. 250. Leg III, lateral view. 251. Metatarsus tip, dorsal view. 252. Same, prolateral view. 253. Claws, leg I, dorsal view. 254. Same, leg III, anterior view. 255. Tarsal organ, leg I, dorsal view. 256. Same, leg III. 257. Same, leg IV. 258. Same, palp.

Ponsoonops panto, new species

Figures 259–273

NOTE: Males and females have not been collected together, but are generally a good match. It must be pointed out that the female epigyne and vulva seem to be moderately deformed (figs. 272, 273).

TYPES: Male holotype and one male paratype from a Berlese sample of concentrated floor litter at base of log and cut stump taken at an elevation of 1524 m at a site west of Nueva California, Finca Palo Santo, Chiriquí, Panama (Mar. 10, 1959, H.S. Dybas), deposited in FMNH (56513 PBI_OON 10747).

ETYMOLOGY: The specific name is a noun in apposition, a shortened anagram taken from the type locality.

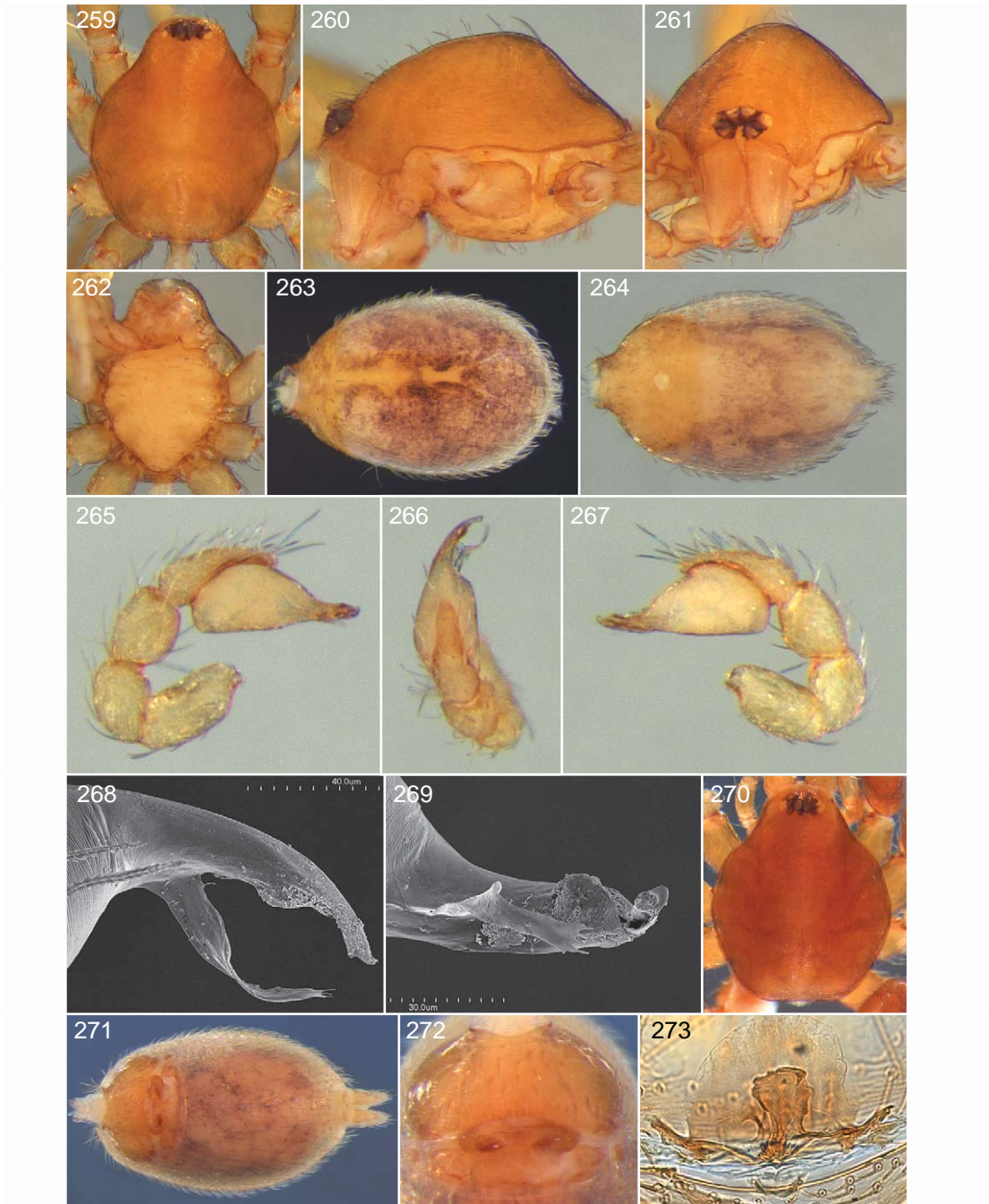
DIAGNOSIS: Males resemble those of *P. boquete*, *P. lerida*, and *P. vuena* in having an embolus with a median protrusion, and a narrowed, distinctly elongated embolus tip (fig. 268). They differ in having a conductor that is shorter than the embolus with short, narrow distal projections (rather than distally truncated in *P. lerida*, pointed and longer than embolus in *P. boquete* and *P. vuena*). In addition, they differ from *P. lerida* in having a ridge-shaped median protrusion at the embolus (rather than mound-shaped). The female diagnosis is problematic due to possible deformation of the epigynal area. It seems to differ in having a relatively short and broad-stalked anterior genitalic process (figs. 273), and an indistinctly pocketlike, broad posterior genitalic process.

MALE (PBI_OON 10747, figs. 259–269): Total length 1.42. Leg spination: tibiae: I v4-2-2; II v4-2-1p; IV p0-1-0, v0-0-2, r0-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p0-1-0. Sperm pore circular. Tarsal organ on palpal cymbium with distal receptor appearing bifid. Embolus broad, tube shaped, longitudinally folded, with ventral slit and ventroprolateral opening, midway with distinct rounded ridge, prolaterad protruding, tip narrowed, elongated, opening retrolaterally rebordered, platelike with small ventral protrusion; conductor originates at embolus base, bandlike elongated, midway moderately twisted, broad ending with several short, narrow prolongations, as long as embolus.

FEMALE (PBI_OON 21112, figs. 270–273): Total length 1.79. Leg spination: tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-1p; IV p0-1-0, v1-0-2; r0-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p0-1-0. Genitalia externally probably partly distorted (e.g. postepigastric scutum, fig. 272); internally with median protruding part of large genital plate wider than long; anterior genitalic process broad and relatively short stalked, apex enlarged; posterior genitalic process indistinct, pocketlike, broad, weakly sclerotized.

OTHER MATERIAL EXAMINED: PANAMA: **Chiriquí**: 2 km W Cerro Punta, Baldwin forest, May 30 – Jun. 8, 1977, elev. 1760 m (S. Peck, AMNH PBI_OON 38010), 1 ♂, 2 km E Cerro Punta, Jun. 8, 1977, dung trap, elev. 2000 m (S. Peck, AMNH PBI_OON 21112), 1 ♀.

DISTRIBUTION: Panama (Chiriquí).



FIGURES 259–273. *Ponsoonops panto*, new species, male (259–269) and female (270–273). 259. Carapace, dorsal view. 260. Same, lateral view. 261. Same, anterior view. 262. Sternum, ventral view. 263. Abdomen, dorsal view. 264. Same, ventral view. 265. Palp, prolateral view. 266. Same, dorsal view. 267. Same, retrolateral view. 268. Embolus and conductor, dorsal view. 269. Same, prolateral view. 270. Carapace, dorsal view. 271. Abdomen, dorsal view. 272. Epigastric area, ventral view. 273. Genitalia, dorsal view.

Ponsoonops vuena, new species

Figures 274–318

NOTE: Males and females have not been collected together. Overall, they are a good match but still may be mismatched.

TYPE: Male holotype from a Berlese sample of floor litter from a deep ravine taken at an elevation of 1494 m at site W of Finca Palo Santo, near Nueva California, Chiriquí, Panama (Mar. 9, 1959, H.S. Dybas), deposited in FMNH (34859 PBI_OON 10576).

ETYMOLOGY: The specific name is a noun in apposition, a shortened anagram taken from the type locality.

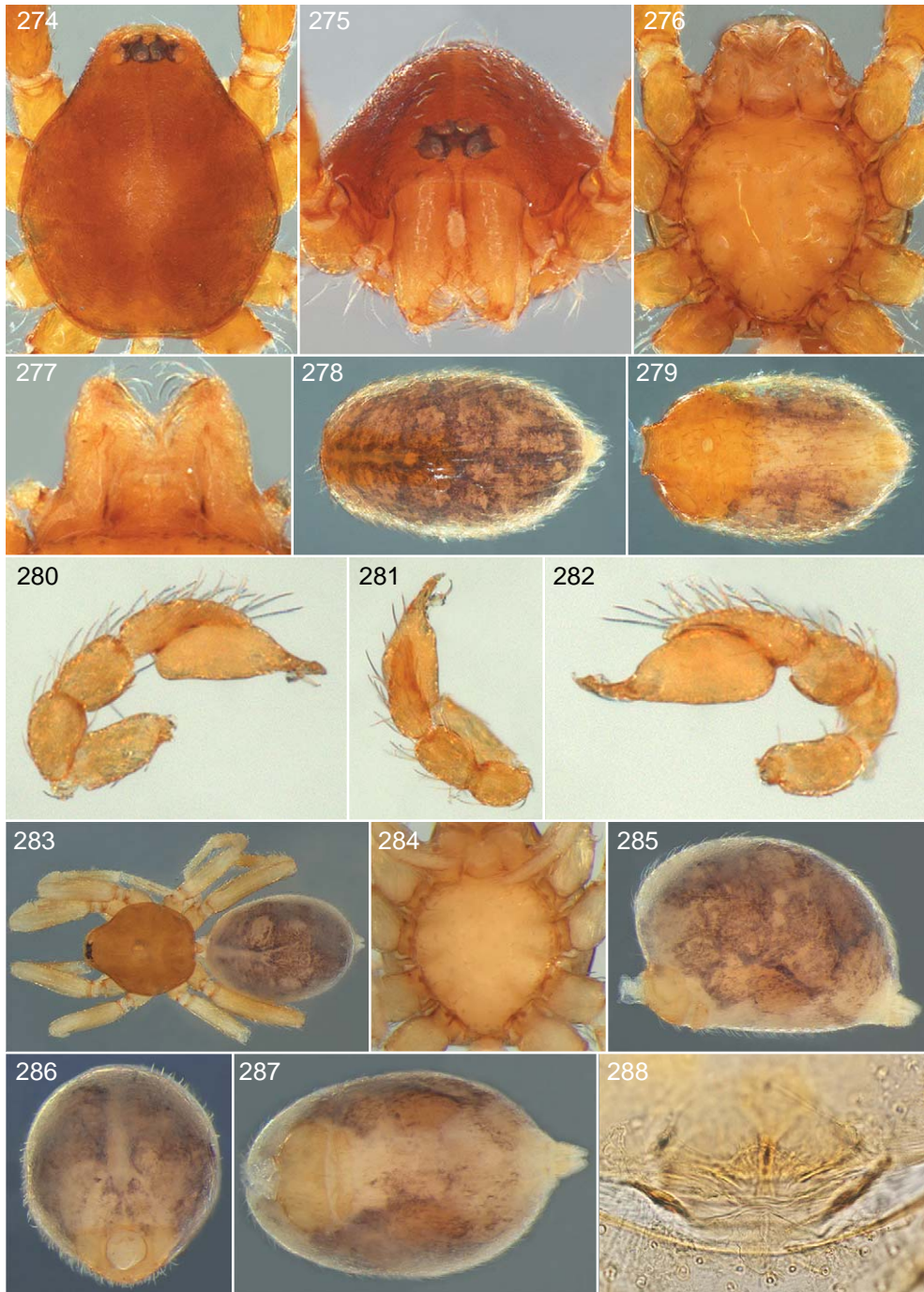
DIAGNOSIS: Males resemble those of *P. boquete*, *P. lerida*, and *P. panto* in having an embolus with a median protrusion and a narrowed, distinctly elongated embolus tip (figs. 300–303). They differ from *P. lerida* and *P. panto* in having a distally pointed conductor that is longer than the embolus (rather than truncated, or with short narrow projections, and shorter), and from *P. boquete* in having a broad conductor base, a relatively broad embolus, and a mound-shaped median protrusion (rather than a narrow conductor base, a relatively narrow embolus, and a ridge-shaped median protrusion). Females resemble those of *P. bollo* and *P. boquete* in having a narrow, long-stalked anterior genitalic process with enlarged apex (fig. 213, 288). They differ from *P. bollo* in having long, filiform glands at the base of the anterior genitalic process, reaching almost the enlarged part (rather than short ones), and from *P. boquete* in the presence of distinctly long, protruding glands at the posterior genitalic process (rather than absent)

MALE (PBI_OON 10576, figs. 274–282, 289–318): Total length 1.37. Leg spination: tibiae: I v4-2-2; II v4-2-1p; metatarsi: I v2-2-2; II p1-0-0, v2-2-2. Sperm pore oval. Embolus broad, tube-shaped, longitudinally folded, with ventral slit and prolaternal opening, midway with distinct dorsal mound, tip narrowed, elongated, embolus opening retrolaterally rebordered, ventrally with spikelike projection; conductor originates at embolus base, broad, lamelliform elongated, distally narrowed, twisted, tip simple, pointed, moderately longer than embolus.

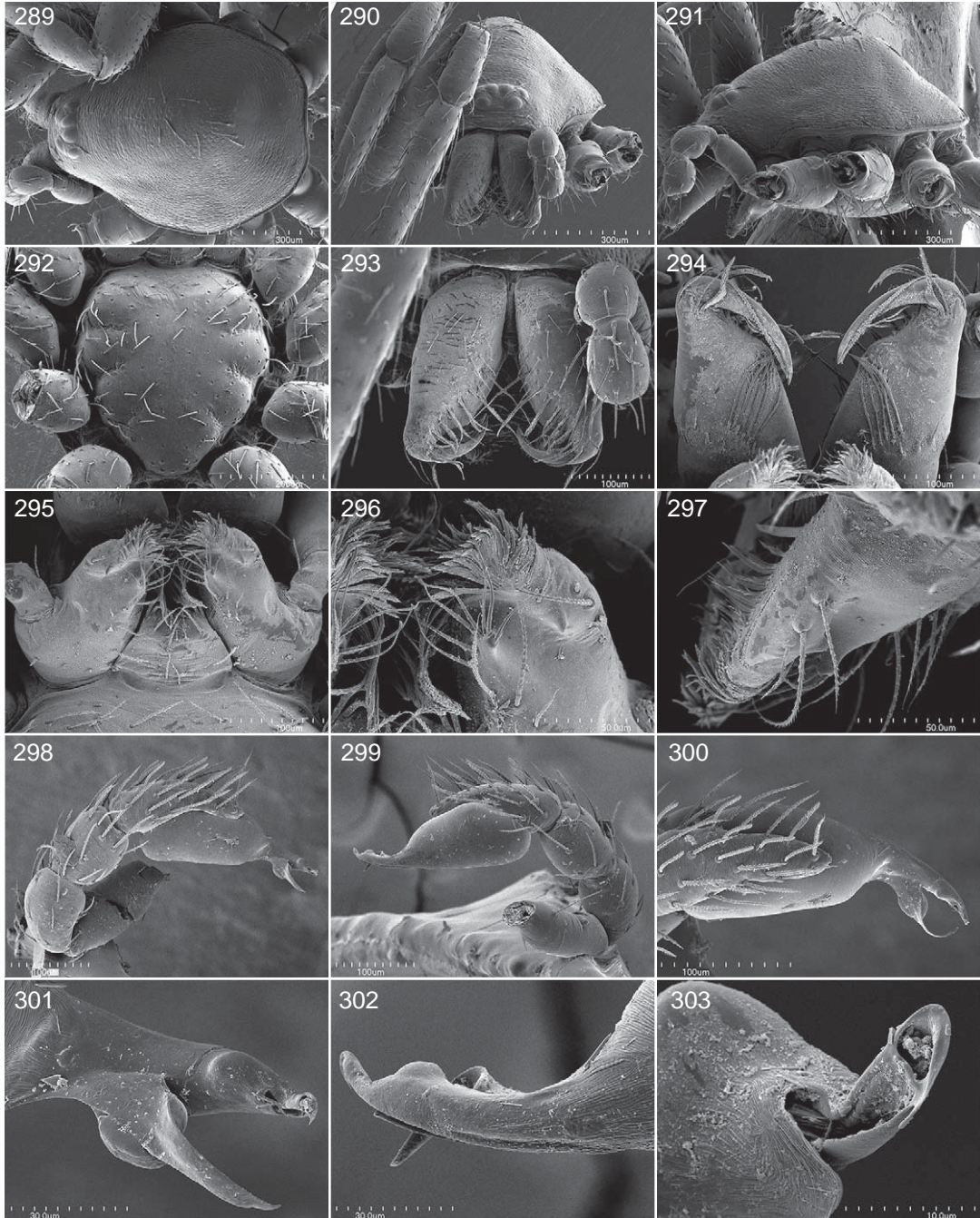
FEMALE: (PBI_OON 5689, figs. 283–288): Total length 1.80. Leg spination: tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-1p; IV p0-1-0, v1-0-2, r0-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p0-1-0. Large genital plate W-shaped, median protruding part wider than long; anterior genitalic process long, narrowly stalked, apex enlarged; cluster of few, distinctly long filiform glands present at base of anterior genitalic process; posterior genitalic process pocketlike, without remarkable duct, weakly sclerotized, distally with distinct, long glands.

OTHER MATERIAL EXAMINED: PANAMA: **Chiriquí**: W Finca Palo Santos, Mar. 5, 1959, Berlese, chips, leaf mold, etc., at base of cut stump, elev. 1448 m (H. Dybas, FMNH PBI_OON 10403), 2♂; El Volcán, Aug. 9–14, 1950 (A. Chickering, MCZ 72228 PBI_OON 5689), 2♀.

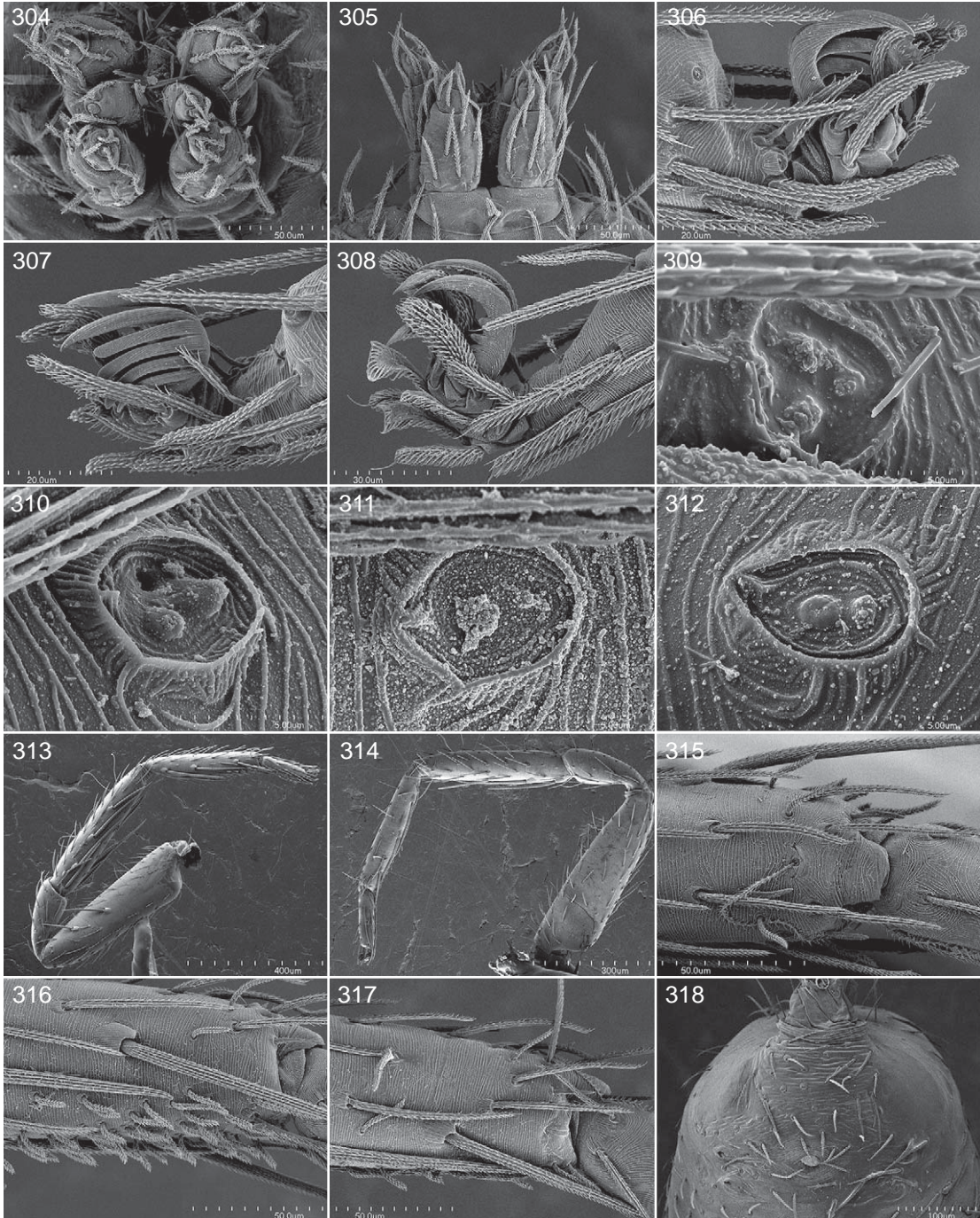
DISTRIBUTION: Panama (Chiriquí).



FIGURES 274–288. *Ponsoonops vuena*, new species, male (274–282) and female (283–288). 274. Carapace, dorsal view. 275. Same, anterior view. 276. Sternum, ventral view. 277. Mouthparts, ventral view. 278. Abdomen, dorsal view. 279. Same, ventral view. 280. Palp, prolateral view. 281. Same, dorsal view. 282. Same, retrolateral view. 283. Habitus, dorsal view. 284. Sternum, ventral view. 285. Abdomen, lateral view. 286. Same, anterior view. 287. Same, ventral view. 288. Genitalia, dorsal view.



FIGURES 289–303. *Ponsoonops vuena*, new species, male. 289. Carapace, dorsal view. 290. Same, anterior view. 291. Same, lateral view. 292. Sternum, ventral view. 293. Chelicerae, anterior view. 294. Same, posterior view. 295. Mouthparts, ventral view. 296. Endite tip, ventral view. 297. Same, lateral view. 298. Palp, prolateral view. 299. Same, retrolateral view. 300. Same dorsal view. 301. Embolus and conductor, prolateral view. 302. Same, retrolateral view. 303. Embolus tip, prolateral view.



FIGURES 304–318. *Ponsoonops vuena*, new species, male. **304.** Spinnerets, posterior view. **305.** Same, ventral view. **306.** Claws, leg II, retrolateral view. **307.** Same, prolateral view. **308.** Same, leg IV. **309.** Tarsal organ, leg II, dorsal view. **310.** Same, leg III. **311.** Same, leg IV. **312.** Same, palp. **313.** Leg I, prolateral view. **314.** Leg II, retrolateral view. **315.** Metatarsus tip, leg I, dorsal view. **316.** Same, lateral view. **317.** Same, leg II. **318.** Epi-gastric area, ventral view.

Ponsoonops bollo, new species

Figures 319–345

NOTE: Male and females have been collected from different locations, show some somatic differences (e.g., carapace color), and may be mismatched.

TYPE: Male holotype from a Berlese sample of epiphytic root mat and soil from Cerro Bollo cloud forest, taken at an elevation of 1856 m at a site 3.5 km east of Escopeta, 8.56666°N, 81.83333°W, Chiriquí, Panama (Jun. 20, 1980, J. Wagner), deposited in FMNH (33623 PBI_OON 10131).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: The male resembles those of *P. boquete*, *P. fanselix*, *P. lerida*, *P. panto*, *P. salimsa*, and *P. vuena* in having an embolus with a median protrusion (fig. 328). It differs clearly from all those but *P. salimsa* in having an embolus tip that is only moderately elongated (figs. 326, 329). It differs from *P. salimsa* in having a relatively short and broad embolus (fig. 326; rather than a long and slender one). Females resemble those of *P. boquete* and *P. vuena* in having a narrow, long-stalked anterior genitalic process with enlarged apex (figs. 341–343). They differ in having short filiform glands at the base of the anterior genitalic process, not reaching to the enlarged part (figs. 343, 344; rather than distinct, long ones), and differ at least from *P. boquete* in having spoon-shaped projections (glands) at the posterior genitalic process (fig. 345; rather than no or indistinct glands).

MALE (PBI_OON 10130, figs. 319–333): Total length 1.45. Leg spination: tibiae: I p1-0-0, v4-2-2; II v4-2-2; IV p0-1-0, v0-0-2, r0-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p0-1-0. Sperm pore oval. Embolus broad, tube shaped, longitudinally folded, with ventral slit and ventropro-lateral opening, tip narrowed, only moderately elongated, embolus opening subcircular, strongly rebordered, retroventrally with pointed projection; conductor basally fused to embolus base, broad, lamelliform elongated, bandlike, tip truncated, longer than embolus.

FEMALE (PBI_OON 49188, figs. 334–345): Total length 1.58. Leg spination: tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-2; IV p0-1-0, v1-0-2, r1-1-0; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genital plate wider than long; anterior genitalic process narrowly stalked, apex distinctly enlarged; posterior genitalic process pocketlike, without remarkable duct, weakly sclerotized, distally covered with distinct spoon-shaped projections (glands).

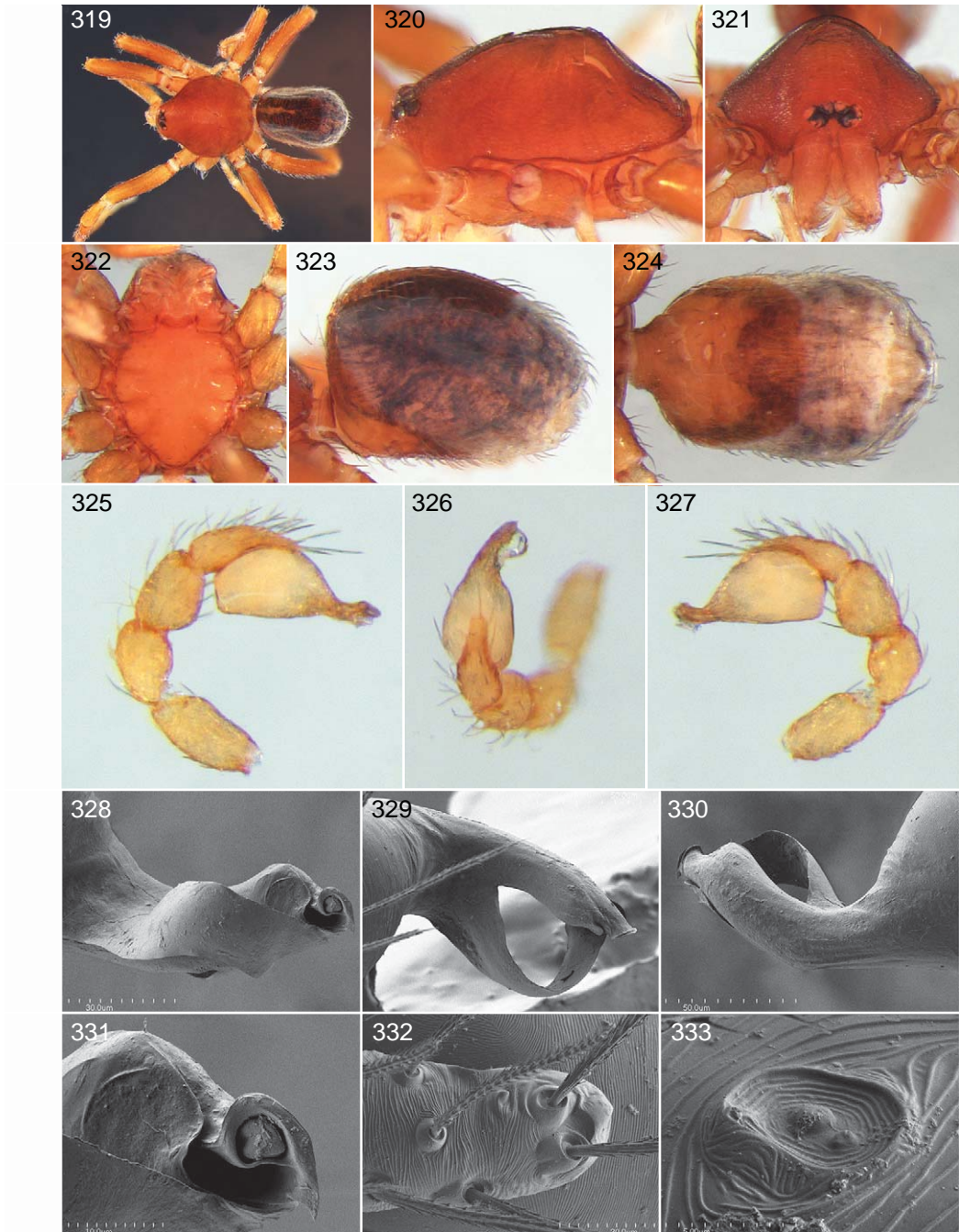
OTHER MATERIAL EXAMINED: PANAMA: **Chiriquí**: La Fortuna near Finca La Suisse, Jun. 10, 1995, Berlese, Oak forest litter, elev. 1200 m (R. Anderson, AMNH PBI_OON 49188), 2 ♀.

DISTRIBUTION: Panama (Chiriquí).

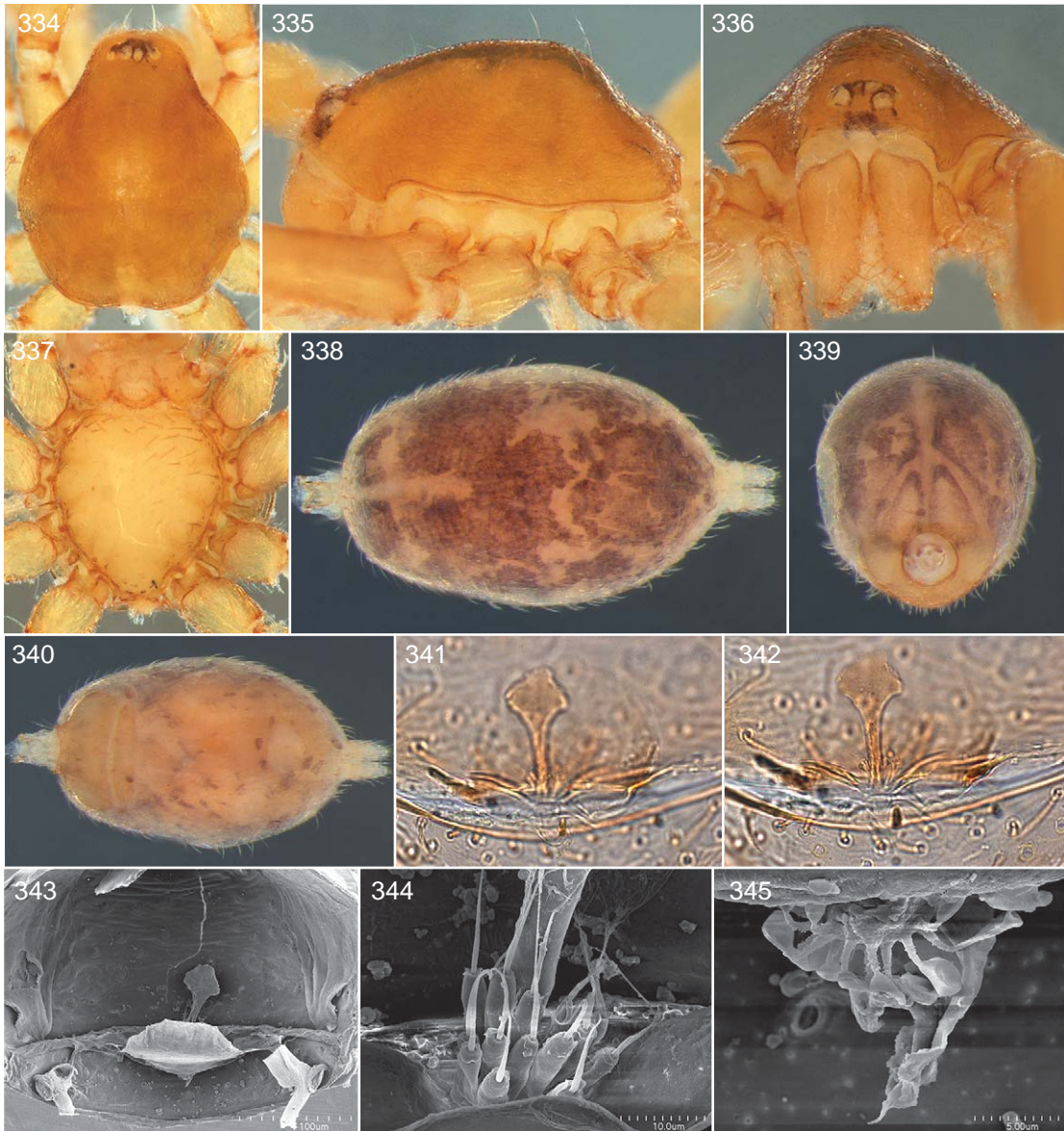
Ponsoonops fanselix, new species

Figures 346–360

TYPES: Male holotype, one male paratype, and two female paratypes from a Berlese sample of epiphytic soil from root mat on log in Quebrada Alicia cloud forest taken at an elevation of 1500 m at a site 25 km north northeast of San Felix, 8.56666°N, 81.83333°W, Bocas del Toro, Panama (Jun. 17, 1980, J. Wagner), deposited in FMNH (33622 PBI_OON 10130).



FIGURES 319–333. *Ponsoonops bollo*, new species, male. 319. Habitus, dorsal view. 320. Carapace, lateral view. 321. Same, anterior view. 322. Sternum, ventral view. 323. Abdomen, lateral view. 324. Same, ventral view. 325. Palp, prolateral view. 326. Same, dorsal view. 327. Same, retrolateral view. 328. Embolus and conductor, prolateral view. 329. Same, dorsal view. 330. Same, retrolateral view. 331. Embolus tip, prolateral view. 332. Cymbium tip, dorsal view. 333. Tarsal organ, palp, dorsolateral view.



FIGURES 334–345. *Ponsoonops bollo*, new species, female. 334. Carapace, dorsal view. 335. Same, lateral view. 336. Same, anterior view. 337. Sternum, ventral view. 338. Abdomen, dorsal view. 339. Same, anterior view. 340. Same, ventral view. 341, 342, 343. Genitalia, dorsal view. 344. Field of glands at base of anterior genitalic process, anterodorsal view. 345. Posterior genitalic process tip, dorsal view.

ETYMOLOGY: The specific name is a noun in apposition, an anagram taken from the type locality.

DIAGNOSIS: Males resemble those of *P. bollo*, *P. boquete*, *P. lerida*, *P. panto*, *P. salimsa*, and *P. vuena* in having an embolus with a median protrusion (figs. 353, 355). They differ clearly in having the longitudinally folding of the lateral protrusions at the embolus reduced (figs. 355, 356), and by a distinct ventrodorsal undulation of the embolus (figs. 352, 354, 356). Females

can easily be separated from all other species by the distinct, trapezoidal median protruding part of the large genital plate (fig. 360).

MALE (PBI_OON 10130, figs. 346–356): Total length 1.50. Leg spination: tibiae: I v4-2-2; II v4-2-1p; IV v0-0-2, r0-1-0; metatarsi: I v2-2-2; II p1-0-0, v2-2-2; IV p0-1-0. Sperm pore oval. Cymbial cone not detected. Embolus basally broad, flattened, longitudinal folding reduced, no ventral slit observable, midway with broad dorsoventral convolution, with prolateral projection, moderately folded dorsad, tip moderately narrowed, flattened, embolus opening oval, strongly rebordered, lamelliform; conductor basally fused with embolus base, broad, distally narrowed, lamelliform, elongated, curved ventroretrolaterad, blunt tip, almost as long as embolus.

FEMALE (PBI_OON 10130, figs. 357–360): 1.75. Leg spination: tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-2; IV v0-0-2, r0-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p0-1-0. Large genital plate broad, U-shaped, median protruding part distinctly trapezoidal, moderately wider than long; anterior genitalic process short stalked, apex distinctly enlarged; posterior genitalic process small pocketlike without remarkable duct, weakly sclerotized.

OTHER MATERIAL EXAMINED: PANAMA: **Bocas del Toro:** 25 km NNE San Felix, 8.56666°N, 81.83333°W, Jun. 4, 1980, Berlese, floor litter on slopes, Quebrada Alicia cloud forest, elev. 1500 m (J. Wagner, FMNH 33650 PBI_OON 10152), 1 ♀, Jun. 5, 1980 (J. Wagner, FMNH 33651 PBI_OON 10153), 1 ♀, 1 ♂, Jun. 17, 1980, soil under litter and roots (J. Wagner, FMNH 33640 PBI_OON 10142), 1 ♀. **Chiriquí:** Cerro Colorado, W flank, “Qda. 1w,” Jan. 8, 1981, buttress of large tree along slope, elev. 1450 m (W. Suter, FMNH 33689 PBI_OON 10191), 1 ♀, “Qda. 3w,” Jan. 11, 1981, woody slash, small clearing, elev. 1490 m (W. Suter, FMNH 33690 PBI_OON 10192), 1 ♀, trail to peak, Jan. 28, 1981, litter at burn tree fern, elev. 1475 m (W. Suter, FMNH 33670 PBI_OON 10177), 1 ♂.

DISTRIBUTION: Panama (Bocas del Toro and Chiriquí).

Ponsoonops salimsa, new species

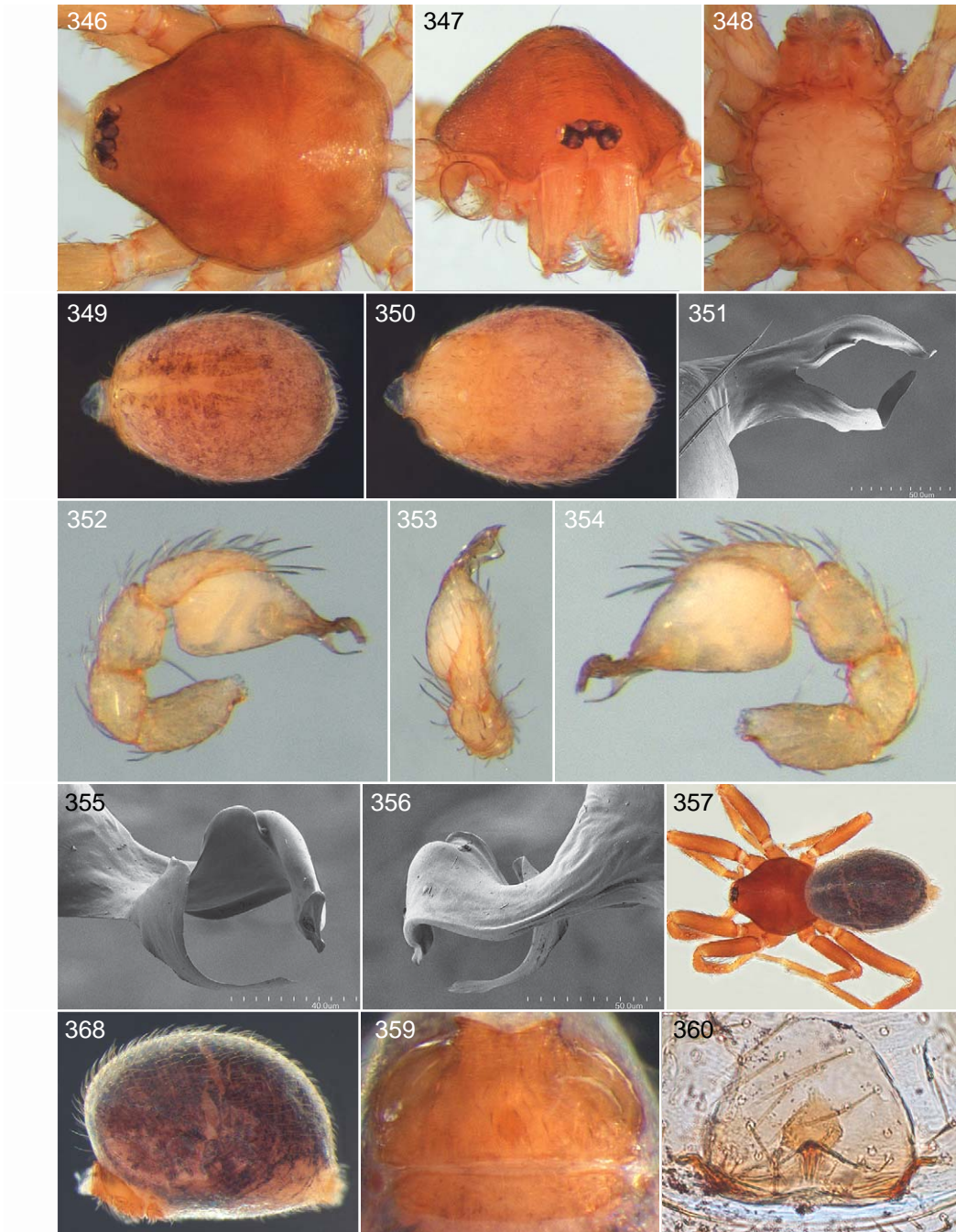
Figures 361–372

TYPE: Male holotype from a Berlese sample of a bird nest hanging from a *Heliconia* leaf in a glen taken at an elevation between 732–792 m at a site at trail to Las Minas, El Valle, Coclé, Panama (Feb. 23, 1959, H.S. Dybas), deposited in FMNH (33886 PBI_OON 10388).

ETYMOLOGY: The specific name is a noun in apposition, a shortened anagram taken from the type locality.

DIAGNOSIS: The male resembles those of *P. bollo*, *P. boquete*, *P. fanselix*, *P. lerida*, *P. panto*, and *P. vuena* in having an embolus with a median protrusion (figs. 371, 372). It differs clearly from all those but *P. bollo* in having a very short, elongated embolus tip (figs. 326, 329). It differs from *P. bollo* in having a relatively long and slender embolus (fig. 368; rather than a short and broad one), and in showing distinct, short longitudinal ridges at the tapering point on the embolus (fig. 372).

MALE (PBI_OON 10388, figs. 361–372): Total length 1.22. Leg spination: tibiae: I, II v4-2-2; IV p0-1-0, v0-0-2, r0-1-0; metatarsi: I, II v2-2-2; IV p0-1-0, r0-1-0. Sperm pore oval. Cymbial cone indistinct, cone shaped. Embolus broad, tube shaped, longitudinally folded, with ventral



FIGURES 346–360. *Ponsoonops fanselix*, new species, male (346–356) and female (357–360). 346. Carapace, dorsal view. 347. Same, anterior view. 348. Sternum, ventral view. 349. Abdomen, dorsal view. 350. Same, ventral view. 351. Embolus and conductor, dorsal view. 352. Palp, prolateral view. 353. Same, dorsal view. 354. Same, retrolateral view. 355. Embolus and conductor, prolateral view. 356. Same, retrolateral view. 357. Habitus, dorsal view. 358. Abdomen, lateral view. 359. Epigastric area, ventral view. 360. Genitalia, dorsal view.

slit, prolateral opening indistinct, tip narrowed, short, at tapering point with distinct, short longitudinal ridges, embolus opening circular, rebordered with short retrolateral projection; conductor originates at embolus base, lamelliform, elongated, twisted to embolus tip, simply pointed, longer than embolus.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Panama (Coclé).

The *yumuri* Group

Males of this Caribbean group are separated from other males by the moderately proretrolaterally flattened embolus with an unclosed ventroprolateral folding, and an almost orthogonally bent, flat tip (figs. 377, 378, 396). No character could be found for assigning females to this species group.

The group has one representative each in Cuba and the Dominican Republic.

Ponsoonops yumuri, new species

Figures 373–387

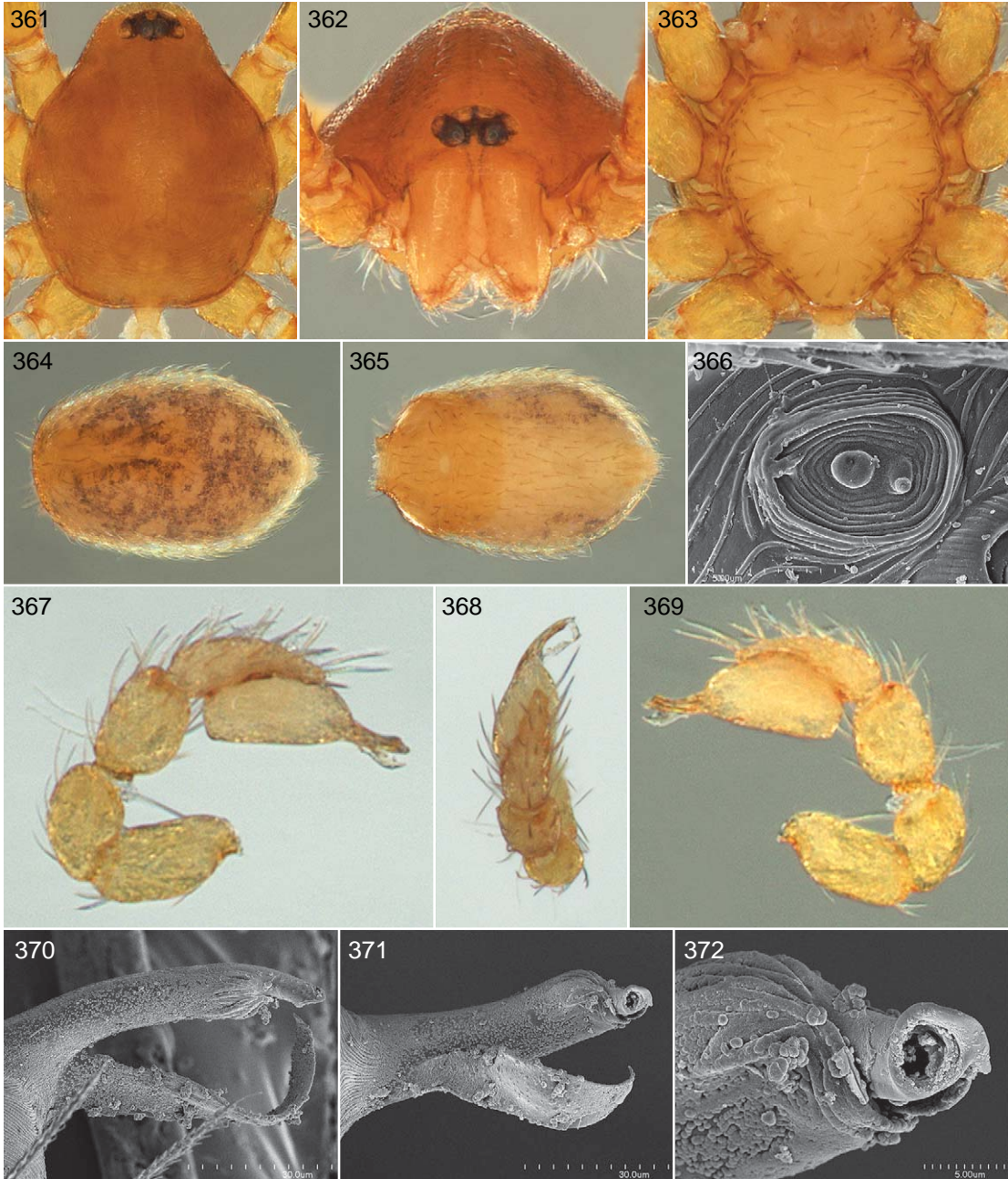
TYPES: Male holotype and female paratype taken at a site near the pier at Rio Yumurí, 20.30027°N, 74.29361°W, Guantánamo, Cuba (May 12, 2010, N. Platnick, A. Pérez, A. Sánchez, G. Alayón), deposited in AMNH (PBI_OON 49213).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

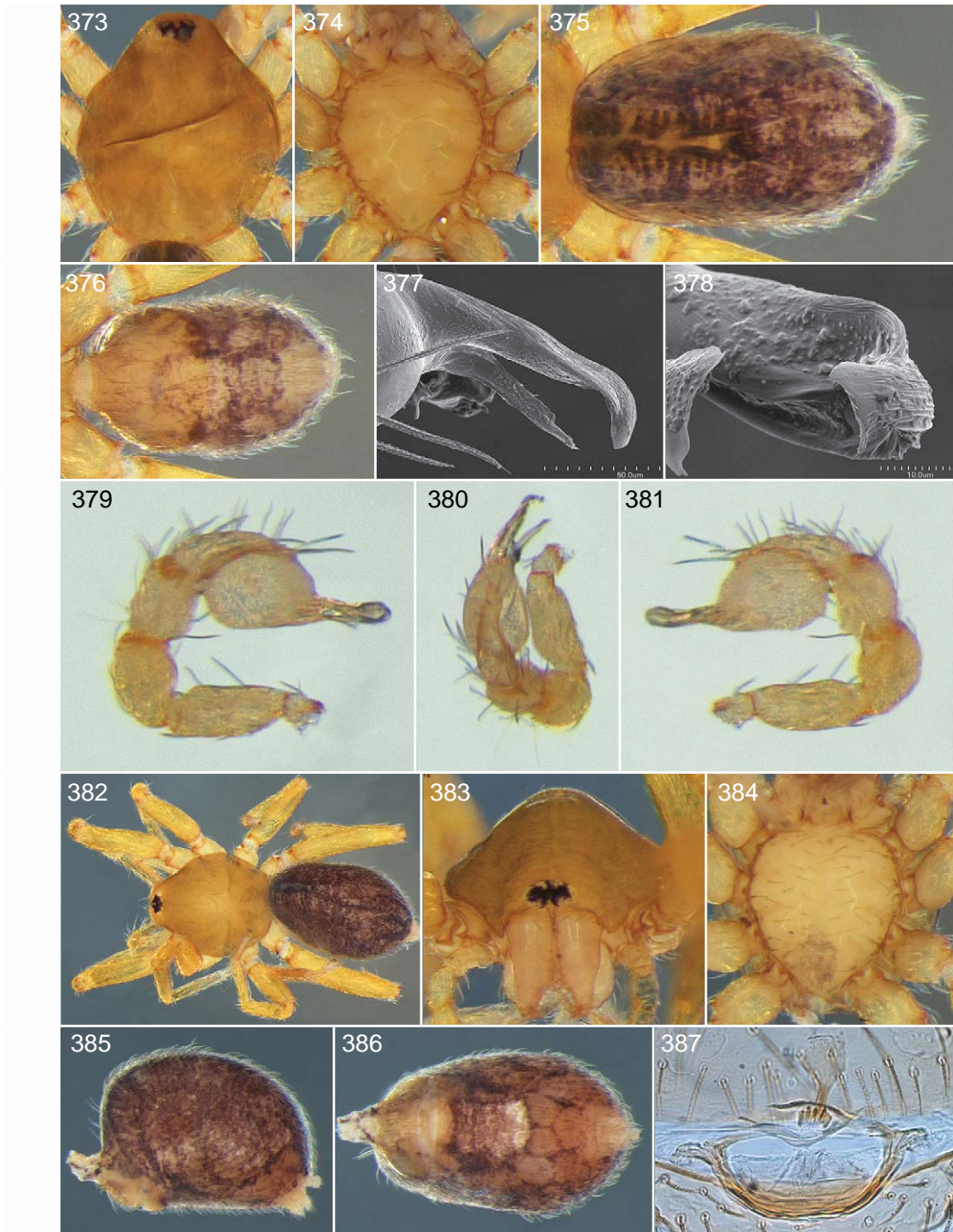
DIAGNOSIS: The male resembles only those of *P. lavega* in having a moderately flattened embolus with an unclosed ventroprolateral folding, and an almost orthogonally bent, flat tip. It differs in having a patterned abdomen (fig. 375; rather than white, without any pattern), and the conductor basally attached to the embolus (figs. 377, 380; rather than well-separated conductor and embolus). Female differs from other members of the genus by the relatively short-stalked anterior genitalic process with only few but distinct glands at its base, and the moderately shorter, weakly sclerotized posterior genitalic process (fig. 387).

MALE (PBI_OON 49213, figs. 373–381): Total length 1.07. Eyes reduced, tiny, all eyes oval; PME touching for less than half their length. Endites anteromedially with simple, stronger sclerotized protrusions, less-sclerotized median part, posteromedian part with very broad triangular projection with distal setae. Leg spination: tibiae: I v4-2-2; II v4-2-1p; IV p1-1-0, v0-0-2, r1-1-0; metatarsi: I, II v2-2-2; IV p0-1-0, r1-1-0. Sperm pore oval. Embolus proretrolaterally flattened, ventrally moderately folded, tip distinctly curved prolaterad, longitudinally ripped, embolus opening covered by platelike protrusion; conductor originates at embolus base, narrow, lamelliform, elongated, median of retrolateral margin with two fragile spikes, distally flat, enlarged, shorter than embolus.

FEMALE (PBI_OON 49213, figs. 382–387): Total length 1.31. Sternum posteriorly with dark spot (artificially?). Leg spination: tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-2; III p0-1-0,



FIGURES 361–372. *Ponsoonops salimsa*, new species, male. **361.** Carapace, dorsal view. **362.** Same, anterior view. **363.** Sternum, ventral view. **364.** Abdomen, dorsal view. **365.** Same, ventral view. **366.** Tarsal organ, palp, dorsal view. **367.** Palp, prolateral view. **368.** Same, dorsal view. **369.** Same, retrolateral view. **370.** Embolus and conductor, dorsal view. **371.** Same, prolateral view. **372.** Embolus tip, prolateral view.



FIGURES 373–387. *Ponsoonops yumuri*, new species, male (373–381) and female (382–387). 373. Carapace, dorsal view. 374. Sternum, ventral view. 375. Abdomen, dorsal view. 376. Same, ventral view. 377. Embolus and conductor, dorsal view. 378. Embolus tip, prolateral view. 379. Palp, prolateral view. 380. Same, dorsal view. 381. Same, retrolateral view. 382. Habitus, dorsal view. 383. Carapace, anterior view. 384. Sternum, ventral view. 385. Abdomen, lateral view. 386. Same, ventral view. 387. Genitalia, dorsal view.

r0-1-0; IV p1-1-0, v0-0-2, r1-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p1-1-0, r0-1-0. Median protruding part of large genital plate wider than long (skewed posteriad in fig. 387), anterior genitalic process narrow, short stalked, apex distinctly enlarged; field of only a few distinct glands at base of anterior genitalic process present; posterior genitalic process elongated, pock-like, weakly sclerotized, moderately shorter than anterior genitalic process.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Cuba (Guantánamo).

Ponsoonops lavega, new species

Figures 388–399

TYPE: Male holotype from a Berlese litter sample taken at an elevation of 1124 m at a site near Concepción de la Vega, 19.06727°N, 70.86353°W, Parque Nacional José Armando Bermúdez, La Vega, Dominican Republic (May 1–2, 2010, N. Platnick, A. Pérez-González), deposited in AMNH (PBI_OON 49416).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.

DIAGNOSIS: The male resembles only those of *P. yumuri* in having a moderately proroetro-laterally flattened embolus with an unclosed ventroprolateral folding, and an almost orthogonally bent, flat tip. It differs in having a white, unpatterned abdomen (figs. 392, 393; rather than patterned), and a well-separated conductor and embolus (figs. 396, 398; rather than a conductor basally attached to the embolus).

MALE (PBI_OON 49416, figs. 388–399): Total length 1.20. Eyes reduced, tiny, all eyes oval. Endites anteromedially with simple, stronger sclerotized protrusion, less sclerotized median part, posteromedian part with very broad triangular projection with distal setae. Abdomen white, color pattern absent. Postepigastric scutum only partly fused to epigastric scutum. Leg spination: tibiae: I v4-2-2; II v4-2-1p; IV p1-1-0, v1-0-2, r1-1-0; metatarsi: I, II v2-2-2; IV p1-1-0, r1-1-0. Sperm pore oval. Cymbial cone not examined. Embolus proroetrolaterally flattened, ventrally moderately folded, tip distinctly curved prolaterad, embolus opening covered by platelike protrusion; conductor originates well separated from embolus base, narrow, bandlike, elongated, tip sharply pointed, shorter than embolus.

FEMALE: Unknown.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Dominican Republic (La Vega).

Ungrouped species

Ponsoonops viejo, new species

Figures 400–414

TYPES: Male holotype from a primary-forest sample taken at an elevation between 50–150 m at Estación Biológica La Selva, 10.43333°N, 84.01666°W, Heredia, Costa Rica (Apr. 1, 1993,



FIGURES 388–399. *Ponsoonops lavega*, new species, male. **388.** Habitus, dorsal view. **389.** Carapace, anterior view. **390.** Sternum, ventral view. **391.** Mouthparts, ventral view. **392.** Abdomen, anterodorsal view. **393.** Same, lateral view. **394.** Same, ventral view. **395.** Bulb, prolateral view. **396.** Same, ventral view. **397.** Palp, prolateral view. **398.** Same, dorsal view. **399.** Same, retrolateral view.

C. Viquez), deposited in INBIO (CR1001274620 PBI_OON 29695); also one male and one female paratypes from a Berlese sample of *Terminalia* taken at a site 4 km southeast of Puerto Viejo de Sarapiquí, Finca la Selva, Heredia, Costa Rica (Oct. 1981, C. Griswold), deposited in CAS (CASENT 9025887 PBI_OON 2401).

ETYMOLOGY: The specific name is a noun in apposition, taken from the shortened name of the paratype locality.

DIAGNOSIS: Males resemble only those of *P. coiba* in having the embolus basally dorsoventrally flattened (figs. 405, 409), and a conductor basally strongly fused with the embolus base. They differ by the relatively broad distal part of the embolus with a large opening (probably collapsed in SEM, fig. 409), a prolateral broad, massive projection (some parts broken off in figs. 405, 409), and the distally tapering, triangular conductor (fig. 409; rather than distally broad, lamelliform in *P. coiba*). Females differ in having indistinct lateral extensions at the large genital plate, a distinct wide field of glands at the base of the anterior genitalic process, and a relatively large, broad, subspherical posterior genitalic process (fig. 414).

MALE (PBI_OON 2401, figs. 400–409): Total length 1.07. Leg spination: tibiae: I, II v4-2-2; IV p0-1-0, v0-0-2, r0-1-0; metatarsi: I, II v2-2-2; IV p0-1-0, r0-1-0. Sperm pore oval. Embolus broad, tube shaped, dorsoventrally flattened, tip with large opening (probably collapsed in SEM fig. 409), prolateral with broad, massive projection (some parts broken off in fig. 405, 409); conductor originates at embolus base, basally very broad, lamelliform, elongated, distal half tapering, longitudinally ripped, tip profile triangular (broken off in figs. 405, 409), as long as embolus.

FEMALE (PBI_OON 2401, figs. 410–414): Total length 1.33. Leg spination: tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-2; III p0-1-0, r0-1-0; IV p0-1-0, v0-0-2, r1-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p0-1-0, r0-1-0. Large genital plate with indistinct lateral extensions, median protruding part wider than long, anterior genitalic process narrowly stalked, apex distinctly enlarged; distinct wide field of glands present at base of anterior genitalic process; posterior genitalic process pocket shaped, broadly rounded, without remarkable duct, weakly sclerotized, distally with glands.

OTHER MATERIAL EXAMINED: COSTA RICA: **Heredia:** Estación Biológica La Selva, Puerto Viejo de Sarapiquí, Rio Puerto Viejo, 10.43333°N, 83.98333°W, Mar. 6, 1973, Berlese, buttress litter in old cacao plantation (unknown collector, FMNH 33518 PBI_OON 10025), 1 ♀; La Selva, 10.422139°N, 84.001523°W, unknown date, lot #99383 (unknown collector, INBIO PBI_OON 49171), 1 ♀.

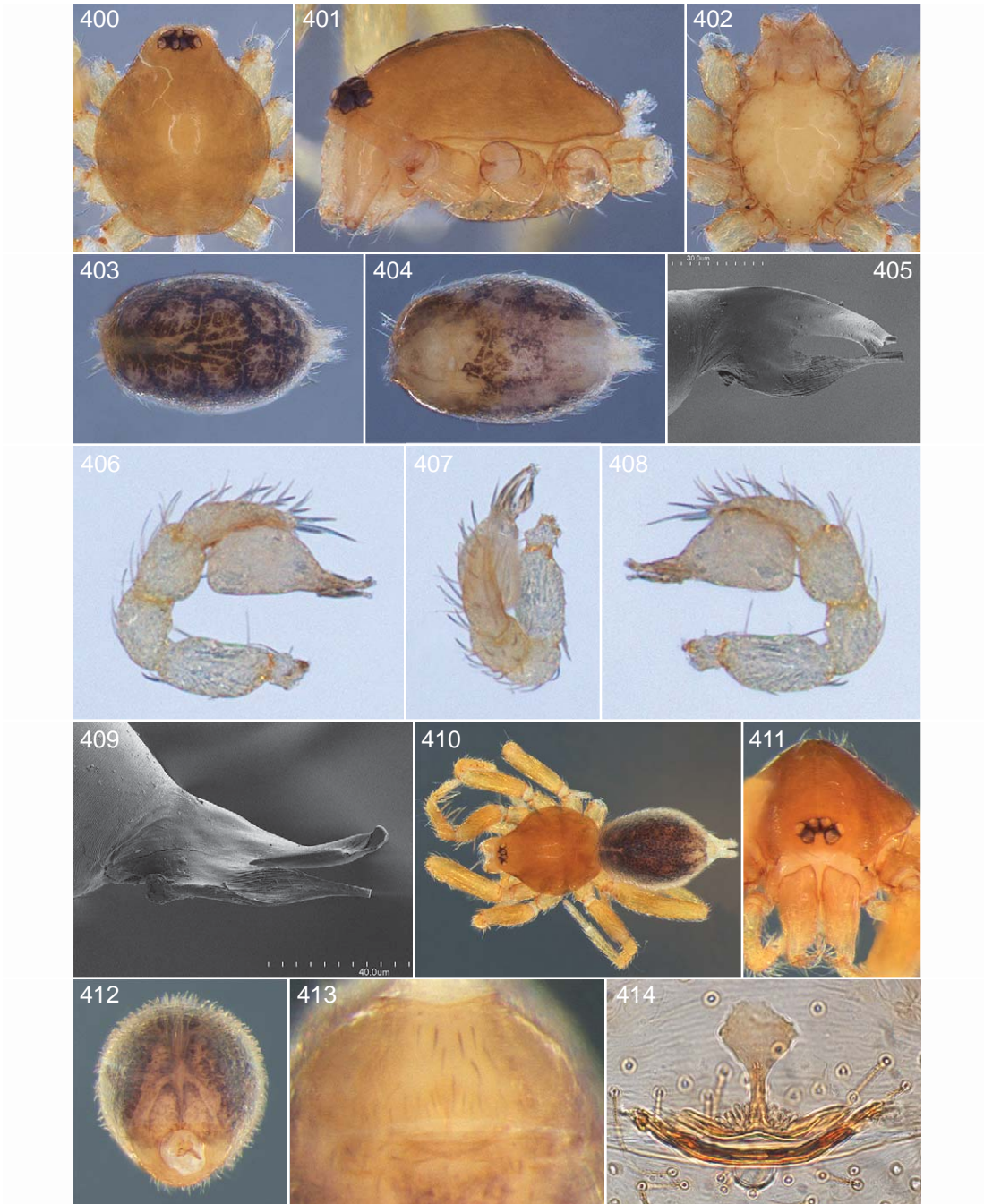
DISTRIBUTION: Costa Rica (Heredia).

Ponsoonops coiba, new species

Figures 415–423

TYPE: Male holotype from a litter sample taken at Isla Coiba, Veraguas, Panama (Aug. 18, 1983, H. Cuadra), deposited in MIUP (PBI_OON 37747).

ETYMOLOGY: The specific name is a noun in apposition taken from the type locality.



FIGURES 400–414. *Ponsoonops viejo*, new species, male (400–409) and female (410–414). **400.** Carapace, dorsal view. **401.** Same, lateral view. **402.** Sternum, ventral view. **403.** Abdomen, dorsal view. **404.** Same, ventral view. **405.** Embolus and conductor, dorsal view. **406.** Palp, prolateral view. **407.** Same, dorsal view. **408.** Same, retrolateral view. **409.** Embolus and conductor, prolateral view. **410.** Habitus, dorsal view. **411.** Carapace, anterior view. **412.** Abdomen, anterior view. **413.** Epigastric area, ventral view. **414.** Genitalia, dorsal view.

DIAGNOSIS: The male resembles only those of *P. viejo* in having the embolus basally moderately dorsoventrally flattened (figs. 419, 420), and a conductor base strongly fused with the embolus base. They differ by the longitudinally moderately folded embolus with a distinct retrolateral rim (figs. 419, 420; both characters absent in *P. viejo*), and the distally broad and lamelliform conductor (fig. 420; rather than distally tapering and triangular in *P. viejo*).

MALE (PBI_OON 37747, figs. 415–423): 1.24. Patch of short setae distoventrally on metatarsi I and II not detectable (missing leg part). Leg spination: tibiae: I v4-2-2; II v4-2-1p; IV v0-1-2, r1-1-0; metatarsi II v2-2-2; (leg I: other leg segments missing, leg IV: uncertain due to broken-off spines and missing leg segments). Sperm pore oval. Cymbial cone not detected. Tarsal organ on palpal cymbium with distal receptor appearing bifid. Embolus basally broad, moderately dorsoventrally flattened, distally narrow tube shaped, longitudinally moderately folded with ventral cavity, retrolaterally with distinct rim (tip broken off in SEM figs. 419, 420); conductor basally fused to embolus, broad lamelliform elongated, bent, tip broad truncated, as long as embolus.

FEMALE: UNKNOWN.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Panama (Veraguas).

Ponsoonops micans (Simon, 1893), new combination

Figures 424–429

Telchius micans Simon, 1893: 446 (one female and four probably juvenile syntypes from Colonia Tovar, Aragua, Venezuela, in MNHN; examined).

Dysderoides micans, Fage, 1946: 384, figs. 1d, e.

DIAGNOSIS: Females can easily be separated from all other *Ponsoonops* females by having a very narrow and long-stalked anterior genitalic process, and a pocketlike posterior genitalic process, that is two times wider than long (fig. 429).

MALE: Unknown.

FEMALE (PBI_OON 49229, figs. 424–429): Total length 1.93. Clypeus low, ALE separated from edge of carapace by less than their radius. Small lateral sclerites at epigastric sctutum absent (or not detectable). Leg spination: tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Large genital plate moderately W-shaped, median protruding part as long as wide; anterior genitalic process very narrowly long stalked with distinctly enlarged apex; posterior genitalic process two times wider than long, pocketlike, without remarkable duct, weakly sclerotized.

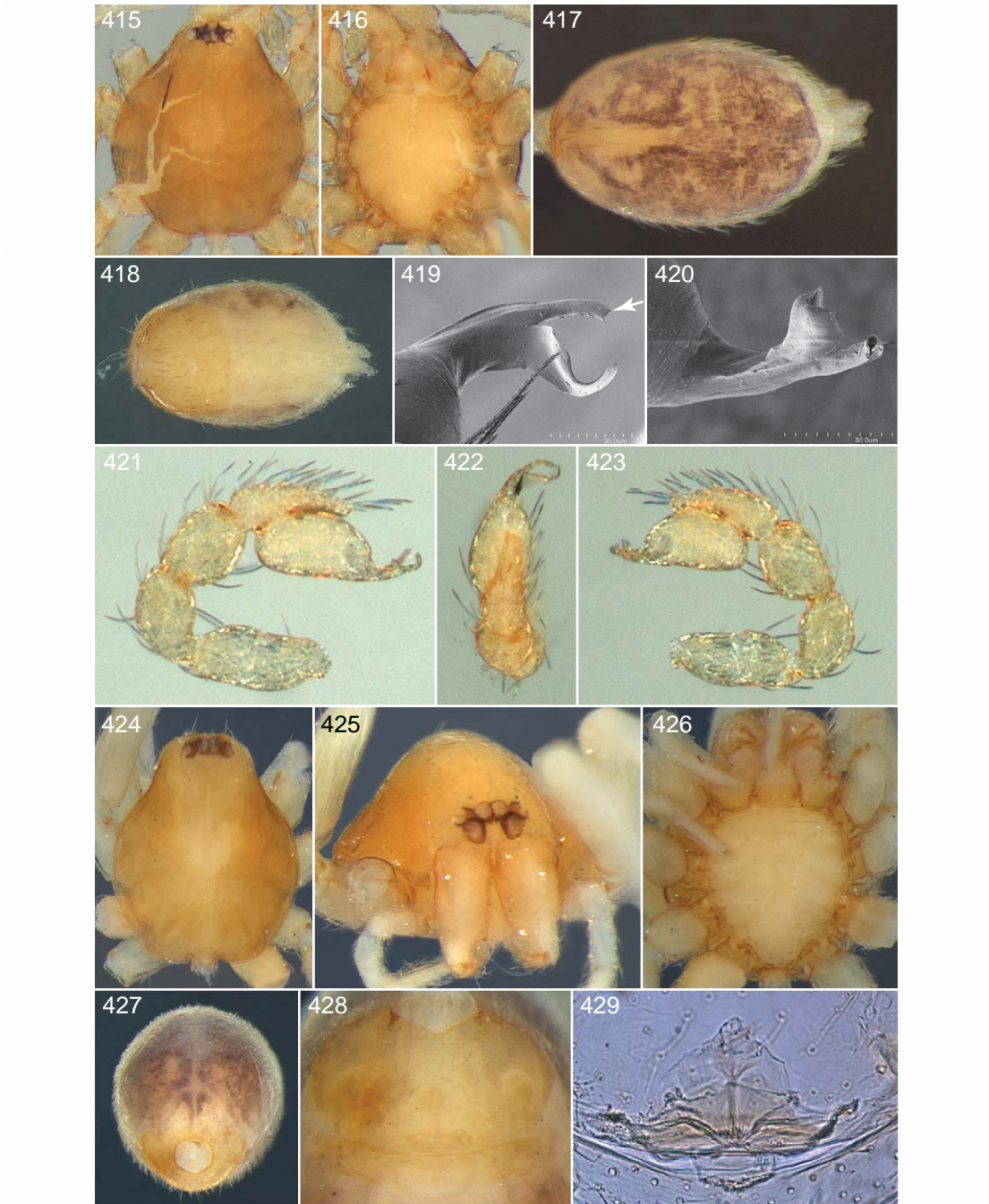
OTHER MATERIAL EXAMINED: Only the syntypes (MNHN 1506, PBI_OON 49229).

DISTRIBUTION: Venezuela (Aragua).

Bipoonops, new genus

TYPE SPECIES: *Bipoonops pucuna*, new species.

ETYMOLOGY: The generic name refers to the distinctly bipartite conductor and is masculine in gender.



FIGURES 415–429. *Ponsoonops coiba*, new species, male (415–423) and *P. micans* (Simon), new combination, female (424–429). **415.** Carapace, dorsal view. **416.** Sternum, ventral view. **417.** Abdomen, dorsal view. **418.** Same, ventral view. **419.** Embolus and conductor (embolus tip broken off, indicated by arrow), dorsal view. **420.** Same, prolateral view. **421.** Palp, prolateral view. **422.** Same, dorsal view. **423.** Same, retrolateral view. **424.** Carapace, dorsal view. **425.** Same, anterior view. **426.** Sternum, ventral view. **427.** Abdomen, anterior view. **428.** Epigastric area, ventral view. **429.** Genitalia, dorsal view.

DIAGNOSIS: Members of this genus are similar to species of the *Dysderina*, *Scaphiella*, and *Varioonops* complexes in their sexual dimorphism, with a dorsal abdominal scutum present in males, but absent in females. They differ from species of the *Dysderina* and *Scaphiella* complexes, except members of *Pescennina*, in having a highly patterned abdomen. In addition, males differ from those two complexes in having the cymbium and bulb not fused (figs. 457, 496, 508), and females differ in having a very short postepigastric scutum without extensions, almost as wide as (but not fused to) the epigastric scutum, and an indistinct epigynal area (figs. 483, 518). Both sexes differ also from members of the *Scaphiella* complex in having leg spines (fig. 468). *Bipoonops* specimens differ from members of the closely related *Varioonops* complex in having a moderately rugose sternum surface (figs. 434, 463; medially and in furrows, other parts appear to be smooth). Males differ in having the large dorsal scutum anteromedially fused to the epigastric scutum (figs. 453, 494), and in having a bipartite conductor (figs. 442, 499, 512). Females differ in having the epigastric scutum surrounding the pedicel (figs. 482, 516) and in lacking small lateral sclerites at the epigastric area (figs. 485, 517). In addition, *Bipoonops* specimens differ from all species by having an indistinct, dark spot on the posterior half of the carapace (figs. 449, 481, 490, 505, 514).

DESCRIPTION: Total length of males 1.4–1.6, of females 1.5–1.9. Carapace, sternum, mouthparts, male abdominal scuta typically pale orange-brown to brown, female abdominal scuta, legs typically pale orange; large, moderately darkened spot on posterior half of carapace, other parts without any pattern, abdomen soft portion with pale yellow-red ground color and brown to dark purple-brown spots, indistinct wide netlike pattern, cardiac mark pale, posteriorly with two pale lines. **Cephalothorax:** Carapace broadly oval in dorsal view, anteriorly narrowed to 0.49 times its maximum width or less, pars cephalica slightly elevated in lateral view, anterolateral corners without extension or projections, with rounded posterolateral corners, without depressions or radiating rows of pits, posterolateral edge without pits, posterior margin not bulging below posterior rim, posterolateral surface without spikes; surface of elevated portion and sides of pars cephalica finely reticulate; fovea absent, lateral margin undulate, rebordered, without denticles; plumose setae near posterior margin of pars thoracica absent; marginal, nonmarginal pars cephalica, pars thoracica setae needlelike, scattered. Clypeus margin unmodified, straight or moderately curved downward in front view, vertical in lateral view, high, ALE separated from edge of carapace by their radius or more, median projection absent; setae needlelike. Chilum absent. Six eyes, well developed, all subequal, ALE oval, PME squared, PLE oval; posterior eye row straight from above, procurved from front; ALE separated by less or slightly more than their radius, ALE-PLE separated by less than ALE radius, PME touching throughout most of their length, PLE-PME separated by less than PME radius. Sternum as wide as long or slightly wider than long, not fused to carapace, surface without transverse ridges or pits, moderately rugose (most parts appear to be smooth), microsculptures medially and in furrows, median concavity and hair tufts absent, with radial furrows between coxae I–II, II–III, III–IV, furrow smooth, radial furrow opposite coxae III absent, sickle-shaped structures absent, anterior margin unmodified, posterior margin not extending posteriorly of coxae IV, without posterior hump, anterior corner unmodified, lateral margin with infracoxal grooves (scanned only in *B. pucuna*), distance between coxae approximately equal, extensions of precoxal triangles

present, lateral margins unmodified; setae sparse, needlelike, evenly scattered, originating from surface. Chelicerae slightly divergent, paturon distal region abruptly narrowed, anterior face unmodified, anterior face unmodified; promargin without teeth, retromargin with field of small teeth (scanned only in *B. pucuna*); fangs without toothlike projections, directed medially, shape normal, without prominent basal process, tip unmodified; setae needlelike, evenly scattered; paturon inner margin with pairs of enlarged setae, posterior surface unmodified, promargin with row of flattened setae (scanned only in *B. pucuna*), inner margin unmodified, laminate groove absent. Labium rectangular, fused to sternum, not or only moderately indented at middle, same as sternum in sclerotization; with 3–5 setae on anterior margin, subdistal portion with unmodified setae. Endites same as sternum in sclerotization, distally not excavated, in female unmodified, in male anterior portion with anteromedian tip with simple ridge and posteromedian part variable (without projection in *B. pucana*, with indistinct, moderately stepped projection in *B. baobab*, with narrow cone-shaped projection with distal setae in *B. tsachila*), in both sexes serrula present in single row (scanned only in *B. pucana*). Female palp without claw or spines; patella without pro-lateral row of ridges, tarsus unmodified. **Abdomen:** Ovoid, without long posterior extension, rounded posteriorly, interscutal membrane without rows of small sclerotized platelets. Book lung covers large, ovoid, without setae, anterolateral edge unmodified; only anterior spiracles connected by groove, indistinct (in females, indistinct connecting groove of posterior spiracles is equivalent to posterior rim of postepigastric scutum, connecting groove of anterior spiracles runs into epigastric furrow). Pedicel tube short, ribbed, scutopedicel region unmodified, scutum extending far dorsal of pedicel in males but not females, plumose hairs, matted setae on anterior ventral abdomen in pedicel area, cuticular outgrowths near pedicel all absent. Dorsal scutum present only in males, strongly sclerotized, without color pattern, covering more than $\frac{3}{4}$ of abdomen length and most of abdomen width, anteriorly fused to epigastric scutum, middle surface, sides smooth. Epigastric scutum strongly sclerotized in males, weakly in females, surrounding pedicel completely, not protruding, small lateral sclerites absent. Postepigastric scutum strongly sclerotized in males, weakly in females, anterior margin unmodified, without posteriorly directed lateral apodemes, in males covering $\frac{3}{4}$ to nearly full abdomen length, almost semicircular, completely fused to epigastric scutum, in females short, only around epigastric furrow, not fused to epigastric scutum. Spinneret scutum present, reduced to two elongated platelets, without fringe of setae, supraanal scutum absent. Abdominal setae needlelike, epigastric area setae not basally thickened; dense patch of setae anterior to spinnerets absent, interscutal membrane with setae. Colulus present as small plate with pair of setae. Anterior lateral spinnerets bisegmented, basal segment without oblique membranous strip, posterior median unisegmented, posterior laterals bisegmented; spigots scanned only in a female of *B. pucuna*, anterior laterals with one major ampullate gland spigot and four piriform gland spigots, posterior medians with seven spigots, posterior laterals with 11 spigots. **Legs:** Femur IV not thickened, same size as femora I–III, patella plus tibia I near as long as carapace, tibia I unmodified, tibia IV specialized hairs on ventral apex and ventral scopula absent, metatarsi I, II mesoapical comb absent, metatarsi III, IV weak ventral scopula absent. Leg spines present on anterior femora, tibiae, metatarsi, sometimes on tibia and metatarsi of leg IV; leg spination: femora: I p0-1-1; II p0-0-1; other segments variable; femoral spines strong, ventral tibial, metatarsal spines long, strong,

lateral spines shorter, spines on leg IV smaller and less strong. Tarsi without inferior claw. Superior claws (scanned only in *B. pucuna*), tarsi I, II with zero to five teeth on outer row, one to four (one to eight in female) teeth on inner row, tarsi III with zero to four teeth on outer row, zero to four teeth on inner row (males with teeth only at prolateral margins of claws), tarsi IV with two teeth median of claw; pairs of special setae with distinct flattened clawlike apices present on tarsi III, IV. Trichobothria base longitudinally narrowed, aperture gratelike, hood covered by numerous low, closely spaced ridges. Tarsal organs with three receptors on legs I, II; two on legs III, IV, palps (scanned only in *B. pucuna* and male palps of *B. tsachila* and *B. baobab*). **Genitalia:** Male epigastric region with sperm pore small, oval, situated at level of anterior spiracles, unmodified; furrow without Ω -shaped insertions, without special setae. Male palp normal size, not strongly sclerotized, right and left palps mirror images, proximal segments, cymbium yellow to pale orange, bulb yellow, embolus dark, prolateral excavation absent; trochanter of normal size, unmodified; femur normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia as long as patella, not enlarged, with three trichobothria (scanned only in males of *B. tsachila* and *B. baobab*); cymbium narrow in dorsal view, not fused with bulb, not extending beyond distal tip of bulb, plumose setae, stout setae, distal patch of setae all absent, usually cone-shaped projection (cymbial cone) present dorsodistally on cymbium, short; bulb, 1 to 1.5 times as long as cymbium, stout, spherical. Embolus basally broad tubelike, moderately dorsoventrally flattened, distally narrowing, tip abruptly bent prolaterad, simple pointed, conductor originates ventroprolaterally, well separated from embolus base, short base, dividing into two diverse, flattened projections. Female genitalia externally inconspicuous, anterior sclerite and plate somewhat visible through epigastric scutum, internally with large plate with inconspicuous lateral extensions, medially protruding, covering anterior genitalic process, anterior genitalic process protruding anteriorly, with enlarged apex, originating from smaller plate, cluster of glands present at base of anterior genitalic process, posterior genitalic process (receptaculum) diversely shaped.

DISTRIBUTION: Specimens are only known from three provinces on the western slope of the central Andes in Ecuador.

Key to Species

1. Males with prolateral part of divided conductor almost as long as retrolateral part (figs. 442, 458), females with posterior genitalic process strongly sclerotized, subspherical, bent posteriad (figs. 487–489)..... *pucuna*
 - Males with prolateral part of divided conductor distinctly shorter than retrolateral part (figs. 497, 499, 509, 512), females with posterior genitalic process triangular (fig. 519, female of *B. tsachila* unknown) 2
2. Males with prolateral part of divided conductor reaching $\frac{2}{3}$ length of retrolateral part (figs. 509, 512), females with anterior genitalic process very broadly stalked (fig. 519) ... *baobab*
 - Males with prolateral part of divided conductor less than $\frac{1}{2}$ length of retrolateral part (figs. 497, 499, 500), female unknown..... *tsachila*

***Bipoonops pucuna*, new species**

Figures 430–489

TYPES: Male holotype and one female paratype from a ridgetop montane forest litter sample from a mixed *Cecropia* cloud forest taken at an elevation of 1600 m at Reserva Biológica Maquipucuna, 0.09277°N, 78.62694°W, Pichincha, Ecuador (Dec. 29, 1999, R. Anderson), deposited in AMNH (PBI_OON 49209).

ETYMOLOGY: The specific name is a noun in apposition taken from the shortened type locality.

DIAGNOSIS: Males differ from the other species by the relatively slender embolus (figs. 441, 458; rather than a basally broad embolus in *B. tsachila*), the relatively long proateral part of the conductor, reaching almost the length of the retrolateral part (figs. 442, 458; distinctly shorter in both *B. tsachila* and *B. baobab*), and the shape of the retrolateral part of the conductor (figs. 442–444). Females can easily be recognized by the strongly sclerotized subspherical posterior genitalic process that is bent dorsad (figs. 488, 489).

MALE (PBI_OON 49209, figs. 430–459): Total length 1.50. Endites posteromedian without projection. Leg spination: tibiae: I v4-2-2; II v4-2-1p; metatarsi: I, II p1-0-0, v2-2-2. Basal half of embolus indistinctly broadened; conductor dividing into ventroproateral part, broad plate-like, leaf shaped, and retrolateral part, moderately flattened, narrow, elongated, moderately longer than proateral part, as long as embolus.

FEMALE (PBI_OON 49209, figs. 460–489): Total length 1.91. Leg spination: tibiae: I p1-0-0, v4-2-2, r1-0-0; II v4-2-1p; metatarsi: I, II p1-0-0, v2-2-2; IV p0-1-0; r0-1-0. Median protruding part of large genital plate longer than wide; anterior genitalic process narrowly stalked, apex distinctly enlarged; cluster of few glands present at base of anterior genitalic process; posterior genitalic process subspherical, strongly sclerotized, with indistinct duct, bent dorsad, covered with glands.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Ecuador (Pichincha).

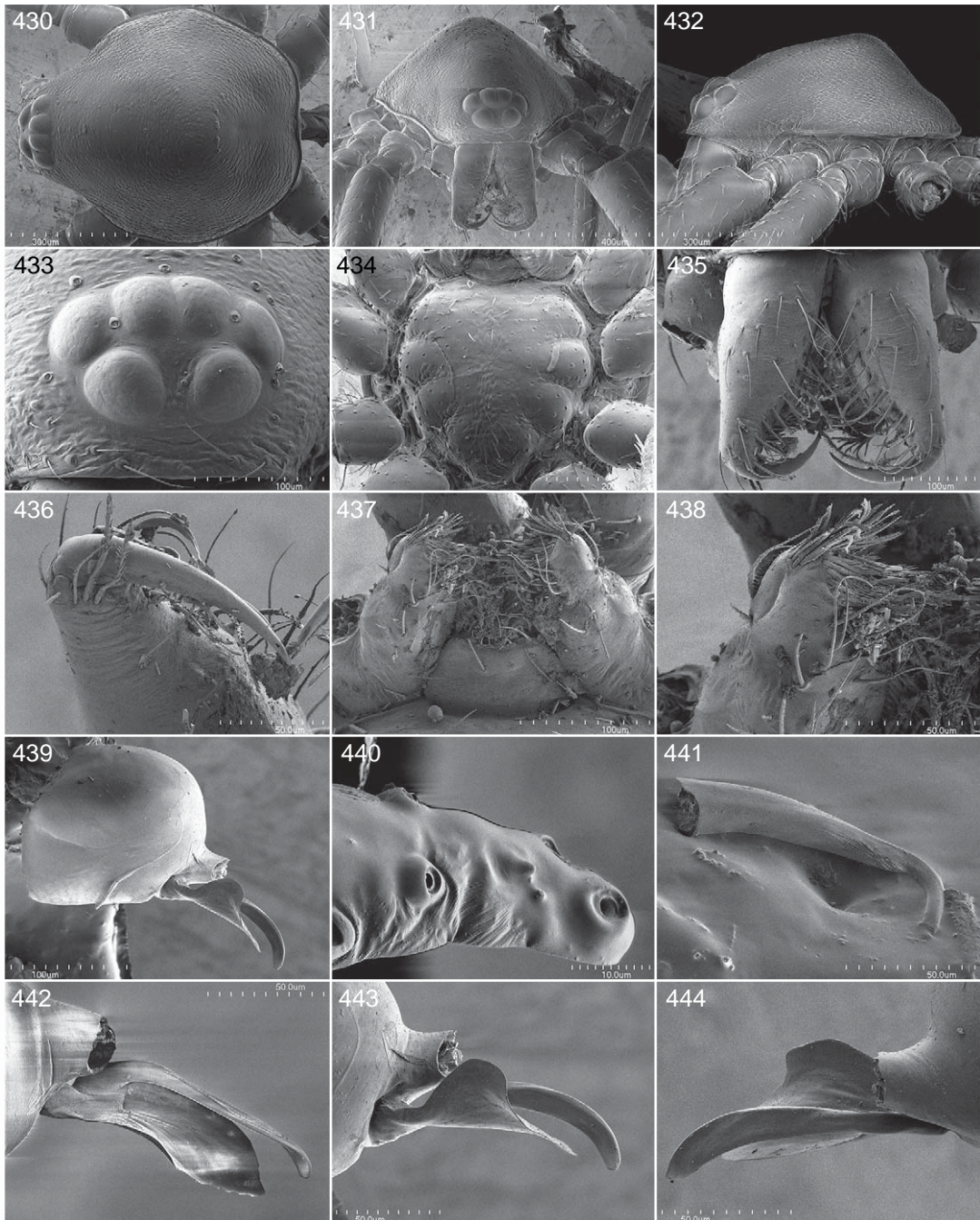
***Bipoonops tsachila*, new species**

Figures 490–504

TYPE: Male holotype collected by hand from a forest litter sample at an elevation of 721 m at Tinalandia, 0.29888°S, 79.05250°W, Santo Domingo de los Tsáchilas, Ecuador (Dec. 6, 2009, N. Dupérré, E. Tapia), deposited in QCAZ (PBI_OON 49202).

ETYMOLOGY: The species name is a noun in apposition taken from the shortened name of the province of the type locality.

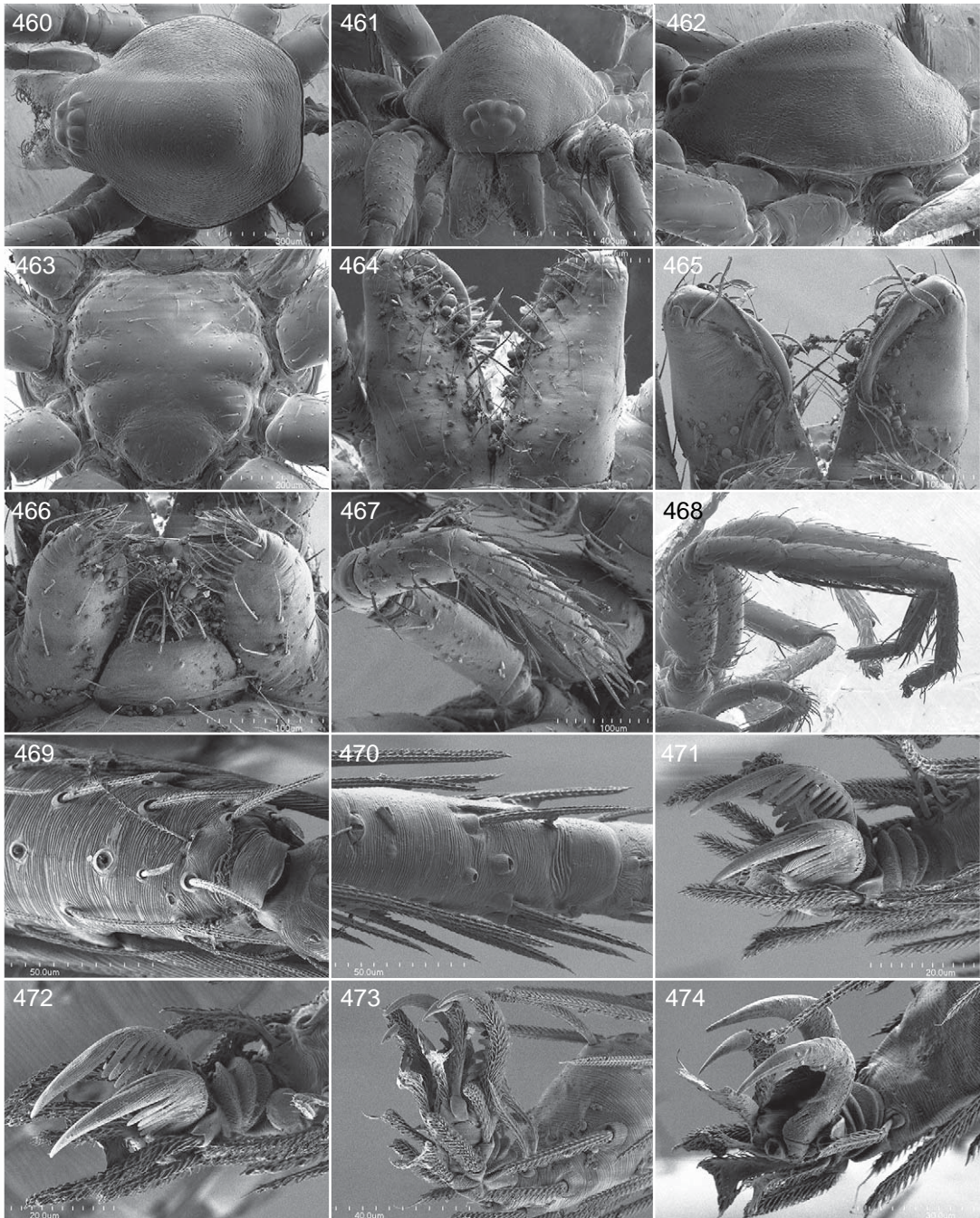
DIAGNOSIS: Males differ from the other species by the basally broad embolus (figs. 497, 500; rather than the relatively slender embolus in *B. pucuna*), the relatively short proateral part of the conductor, reaching less than half the length of the retrolateral part (figs. 496, 497, 499, 500; almost as long as retrolateral part in *B. pucuna*, reaching $\frac{2}{3}$ length of retrolateral part in *B. baobab*), and the shape of the retrolateral part of the conductor (figs. 449–501).



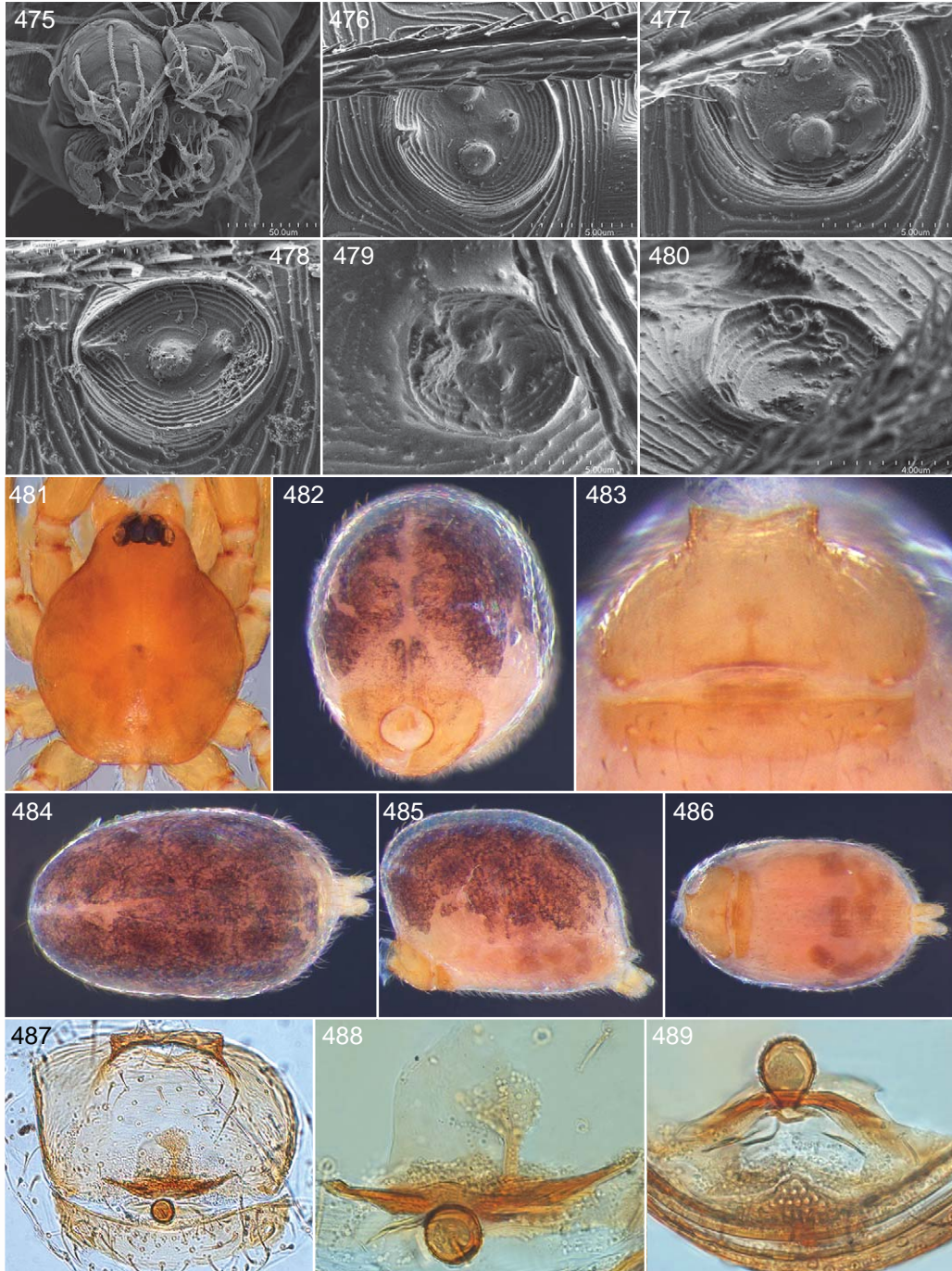
FIGURES 430–444. *Bipoonops pucuna*, new species, male. **430.** Carapace, dorsal view. **431.** Same, anterior view. **432.** Same, lateral view. **433.** Eyes, anterior view. **434.** Sternum, ventral view. **435.** Chelicerae, anterior view. **436.** Same, posterior view. **437.** Mouthparts, ventral view. **438.** Endite tip, ventral view. **439.** Bulb (crashed and detached from cymbium), prolateral view. **440.** Cymbium tip, dorsal view. **441.** Embolus (broken off), prolateral view. **442.** Conductor (embolus broken off), dorsal view. **443.** Same, prolateral view. **444.** Same, retrolateral view.



FIGURES 445–459. *Bipoonops pucuna*, new species, male. 445. Claws, leg I, dorsoprolateral view. 446. Same, leg III, retrolateral view. 447. Metatarsus tip, leg I, dorsal view. 448. Habitus, dorsal view. 449. Carapace, dorsal view. 450. Same, lateral view. 451. Same, anterior view. 452. Sternum, ventral view. 453. Abdomen, anterior view. 454. Same, dorsal view. 455. Same, lateral view. 456. Same, ventral view. 457. Palp, prolateral view. 458. Same, dorsal view. 459. Same, retrolateral view.



FIGURES 460–474. *Bipoonops pucuna*, new species, female. **460.** Carapace, dorsal view. **461.** Same, anterior view. **462.** Same, lateral view. **463.** Sternum, ventral view. **464.** Chelicerae, anterior view. **465.** Same posterior view. **466.** Mouthparts, ventral view. **467.** Palp, dorsal view. **468.** Leg I, dorsoprolateral view. **469.** Metatarsus tip, leg I, dorsal view. **470.** Same, leg IV. **471.** Claws, leg I, dorsoprolateral view. **472.** Same, leg II. **473.** Same, leg III, lateral view. **474.** Same, leg IV, dorsolateral view.



FIGURES 475–489. *Bipoonops pucuna*, new species, female. 475. Spinnerets, posterior view. 476. Tarsal organ, leg I, dorsal view. 477. Same, leg II. 478. Same, leg III. 479. Same, leg IV. 480. Same, palp. 481. Carapace, dorsal view. 482. Abdomen, anterior view. 483. Epigastric area, ventral view. 484. Abdomen, dorsal view. 485. Same, lateral view. 486. Same, ventral view. 487. Epigastric area, dorsal view. 488. Genitalia, dorsal view. 489. Same, posterior view.

MALE (PBI_OON 49202, figs. 490–504): Total length 1.52. Endites median with narrow cone-shaped projection with distal setae. Leg spination: tibiae: I v4-2-2; II v4-2-1p; IV p0-1-0, v0-0-2, r0-1-0; metatarsi: I, II p1-0-0, v2-2-2; IV p0-1-0, r0-1-0. Cymbial cone crater shaped. Basal half of embolus distinctly broadened; conductor dividing into prolateral part, broad, platelike, leaf shaped, with two pointed tips, retrolateral part, flattened, narrow elongated, distally platelike with moderately pointed tip, bent prolaterad, more than twice as long as prolateral part, longer than embolus.

FEMALE: UNKNOWN.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Ecuador (Santo Domingo de los Tsáchilas).

Bipoonops baobab, new species

Figures 505–519

NOTE: Male paratype with missing abdomen and legs I, II, and broken-off embolus. Due to the distinct conductor, *B. baobab* is clearly separable from the other described species.

TYPES: Female holotype and one male paratype from a forest sample taken at a location at Centro Científico Río Palenque (CCRP), Los Ríos, Ecuador (Dec. 23, 1980, S. Sandoval), deposited in QCAZ (PBI_OON 10774).

ETYMOLOGY: The specific name is a noun in apposition referring to the shape of the anterior genitalic process of female internal genitalia, which is extraordinarily broad stalked and resembles baobab trees (*Adansonia* sp.).

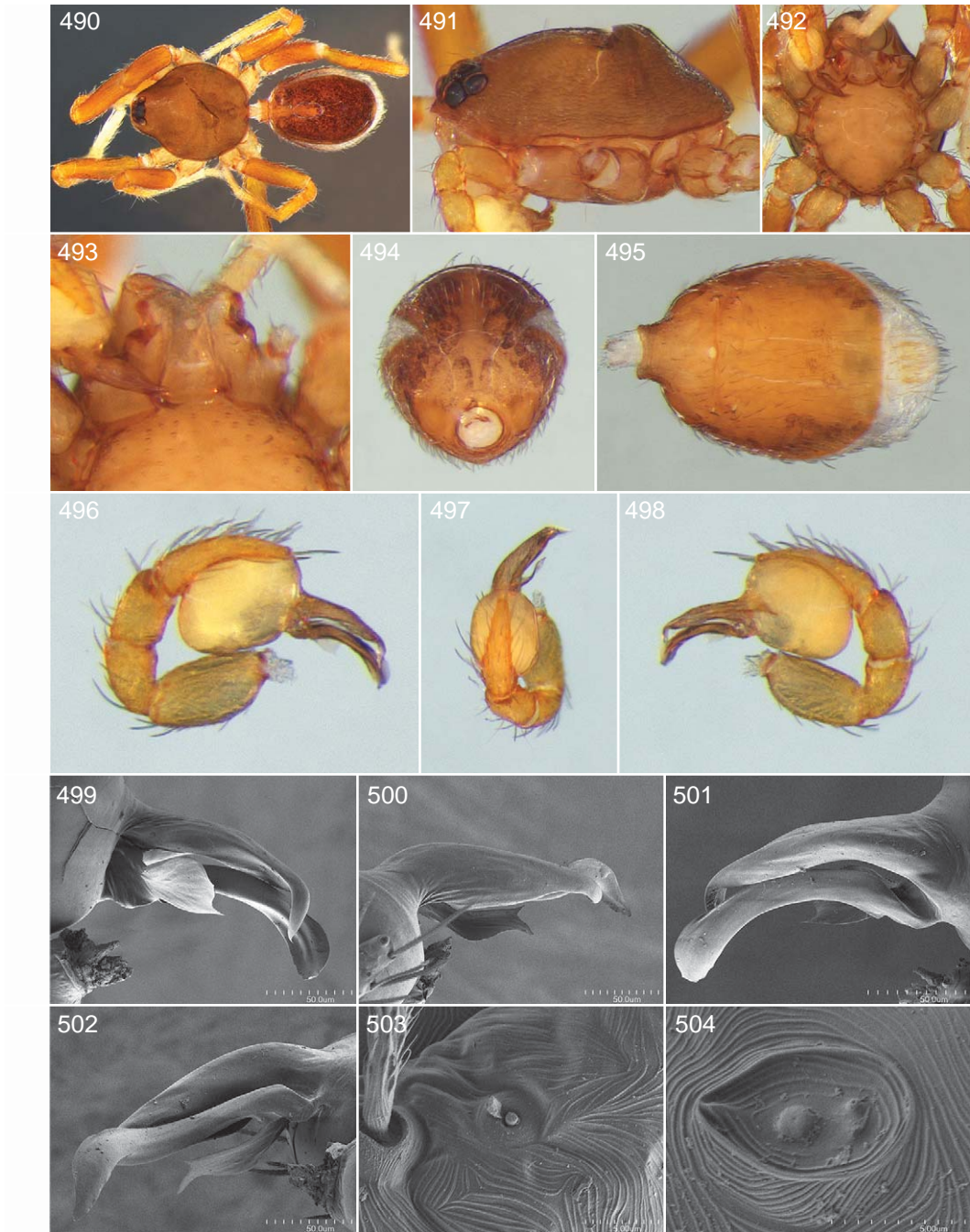
DIAGNOSIS: Males differ from the other species by the intermediate length of the prolateral part of the conductor, reaching $\frac{2}{3}$ the length of the retrolateral part (figs. 509, 511, 512; distinctly shorter in *B. tsachila*, almost as long as retrolateral part in *B. pucuna*), and the shape of the retrolateral part of the conductor (figs. 511, 512). Females can easily be recognized by the very broadly stalked anterior genitalic process (fig. 519).

MALE (PBI_OON 10774, figs. 505–513): Carapace length 0.68 (abdomen is missing). Endites median part with indistinct, moderately stepped projection. Leg spination (legs I, II missing): tibiae IV p0-1-0, r0-1-0; metatarsi IV p0-1-0, r0-1-0. Conductor dividing into ventroprolateral part, flat, broad platelike, distally truncated, and retrolateral part, narrow elongated, dorsodistally with distinct rim, ventroporlateral part reaching $\frac{2}{3}$ length of retrolateral part.

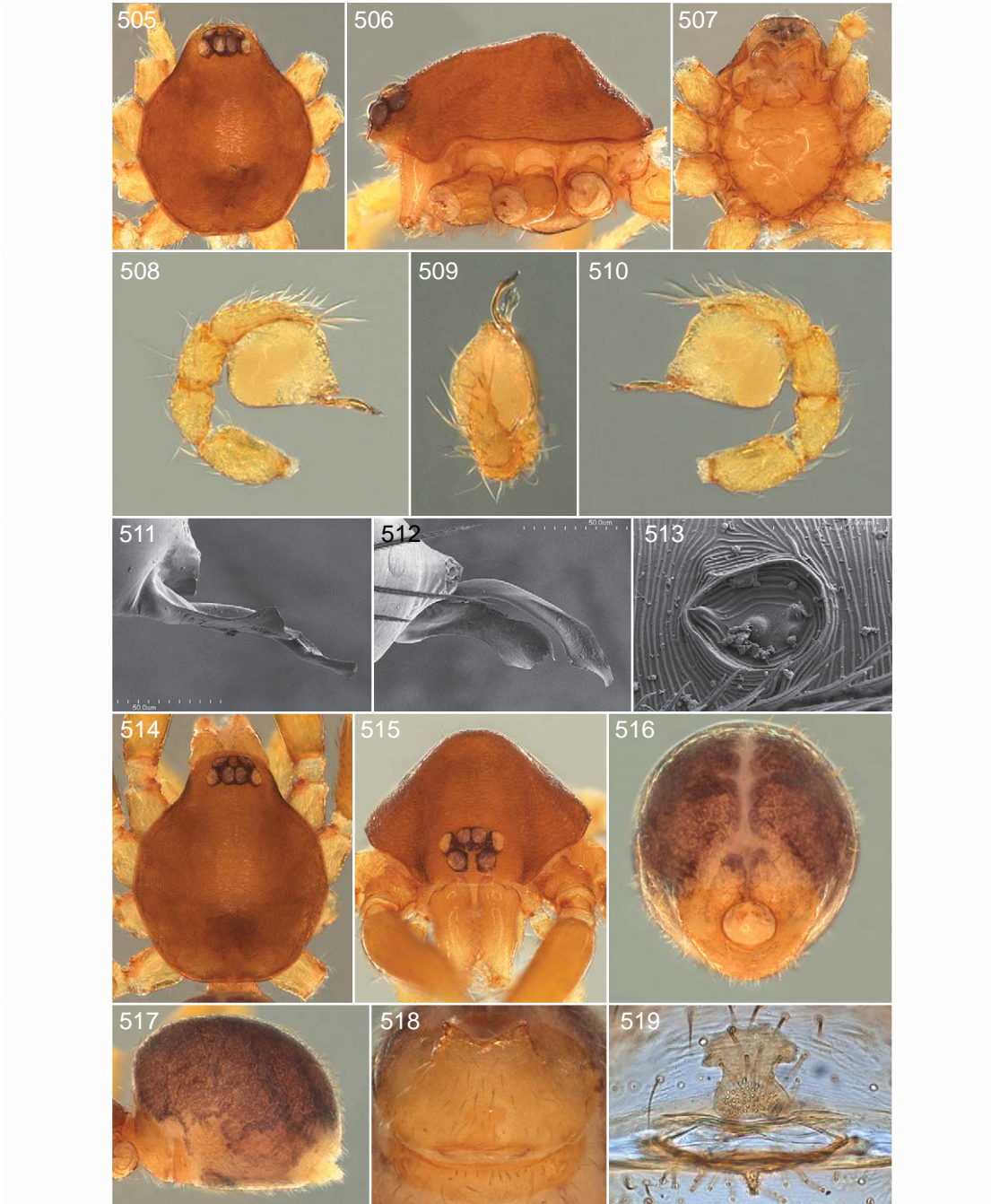
FEMALE (PBI_OON 10774, figs. 514–519): Total length 1.54. Leg spination: tibiae: I p1-0-0, v4-2-2; II v4-2-1p; IV v0-0-2; metatarsi: I, II p1-0-0, v2-2-2; IV p1-1-0, r1-0-0. Median protruding part of large genital plate wider than long; anterior genitalic process very broadly stalked, apex distinctly enlarged; cluster of numerous glands present at base of anterior genitalic process; posterior genitalic process very small, triangular without remarkable duct, distally and laterally with glands.

OTHER MATERIAL EXAMINED: None.

DISTRIBUTION: Ecuador (Los Ríos).



FIGURES 490–504. *Bipoonops tsachila*, new species, male. **490.** Habitus, dorsal view. **491.** Carapace, lateral view. **492.** Sternum, ventral view. **493.** Mouthparts, ventral view. **494.** Abdomen, anterior view. **495.** Same, ventral view. **496.** Palp, prolateral view. **497.** Same, dorsal view. **498.** Same, retrolateral view. **499.** Embolus and conductor, prolateral view. **500.** Same, dorsal view. **501.** Same, retrolateral view. **502.** Same, ventral view. **503.** Cymbial cone, dorsal view. **504.** Tarsal organ, palp, dorsal view.



FIGURES 505–519. *Bipoonops baobab*, new species, male (505–513) and female (514–519). **505.** Carapace, dorsal view. **506.** Same, lateral view. **507.** Sternum, ventral view. **508.** Palp (embolus broken off), prolateral view. **509.** Same, dorsal view. **510.** Same, retrolateral view. **511.** Conductor (embolus broken off), prolateral view. **512.** Same, dorsal view. **513.** Tarsal organ, palp, dorsal view. **514.** Carapace, dorsal view. **515.** Same, anterior view. **516.** Abdomen, anterior view. **517.** Same, lateral view. **518.** Epigastric area, ventral view. **519.** Genitalia, dorsal view.

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