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The Neotropical goblin spiders of the new genus *Varioonops* (Araneae, Oonopidae)

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ABSTRACT

A new genus, *Varioonops*, is established for a group of species characterized by sexual dimorphism in abdomen morphology (with a dorsal scutum present in males but not females), male palps with a separate cymbium and bulb, and a patterned abdomen. The closest relatives of the new genus appear to be three similar, but as yet undescribed, Neotropical genera that share those characters, but the members of *Varioonops* are united by a putative synapomorphy that does not seem to occur in those undescribed groups: a granulated sternum. Attention is drawn to the cymbial cone, a structure (possibly a receptor) found near the tip of the cymbium in *Varioonops*, members of the Orchestininae, and at least some soft-bodied members of the Oonopinae. A total of 23 new species are described: *V. cafista* (the type species), *V. velsala, V. montesta, V. spatharum, V. poas, V. varablanca, V. tortuguero, V. veragua, V. heredia*, and *V. girven* from Costa Rica, *V. ramila* and *V. sansidro* from Costa Rica and Panama, *V. funator* and *V. cerrado* from Panama, *V. edvardi* and *V. sinesama* from Colombia, and *V. yacambu, V. trujillo, V. pittieri, V. chordio, V. parlata, V. potaguo*, and *V. grancho* from Venezuela.

INTRODUCTION

Through focused investigations of the spider family Oonopidae by the many participants in the goblin spider Planetary Biodiversity Inventory (PBI) project, several new genera and numerous new species have recently been described from the Neotropics. The northern Neotropics clearly constitute one of the hotspots of oonopid diversity, and most of the ground-dwelling species found there are microdistributed (i.e., are short-range endemics). Multiple

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taxa, including even congeneric species, can often be found at a single site (Platnick and Dupérré, 2012), and the taxa placed here as members of the new genus *Varioonops* fit that pattern well. Of the 23 species treated below, found from Costa Rica to Venezuela, only four have been collected in more than two provinces. Multiple species of *Varioonops* have been found sympatrically at several localities; in most cases, the sympatric species belong to different species groups within the genus, but there is one exception. Two members of the *tortuguero* group, the new species *V. ramila* and *V. veragua*, have both been taken in the Veragua Rainforest at Los Gigantea in Limón, Costa Rica.

Recent considerations of oonopid monophyly and interrelationships (Burger and Michalik, 2010; Platnick et al., 2012a) have resulted in the recognition of three subfamilies of goblin spiders, the Orchestininae, Sulsulinae, and Oonopinae. Based on the 3-3-2-2 tarsal organ receptor pattern (figs. 23–27), the lack of a heavily sclerotized sperm duct in the male palp (fig. 129), and the clumped eye arrangement (fig. 123), *Varioonops* belongs to the Oonopinae. Basal interrelationships within that huge subfamily remain poorly resolved, but one large group of genera, the gamasomorphines, are united by the putatively synapomorphic presence of a sperm pore on the epigastric scutum, far in advance of the epigastric furrow (Platnick et al., 2012a). That character is present in *Varioonops*. Most gamasomorphines also differ from the soft-bodied, non-gamasomorphine members of the Oonopinae in having lost an oblique, unsclerotized strip on the ventral surface of the basal segment of the anterior lateral spinnerets. The presence of that strip may be a synapomorphy of the entire superfamily Dysderoidea, but if so it has apparently been lost in all gamasomorphines other than *Niarchos* Platnick and Dupérré (see Grismado et al., in press); that strip is not found in the members of *Varioonops*.

Although most gamasomorphines are hard bodied, with dorsal abdominal scuta present in adults of both sexes (although not in juveniles), the members of *Varioonops* are sexually dimorphic in that respect; males have a dorsal scutum on their patterned abdomen, but females do not (figs. 126, 137). This kind of sexual dimorphism has been reported in two groups of gamasomorphines. It is found in some members of the *Dysderina* complex (Platnick and Dupérré, 2011a, 2011b), and in all members of the *Scaphiella* complex (Platnick and Dupérré, 2009b, 2010a, 2011b, 2011c; Bonaldo et al., in press), and even in one genus of the related family Orsolobidae (Ott et al., 2013). However, *Varioonops* does not appear to be a member of either of those gamasomorphine complexes. The carapace shape, sternum shape, and leg spination suggest a closer relationship to the *Dysderina* complex, whereas the patterned abdomen is shared only with *Pescennina* Simon, a member of the *Scaphiella* complex (Platnick and Dupérré, 2011c). The members of both the *Dysderina* and *Scaphiella* complexes, however, all share an apomorphic feature of palpal morphology, the fusion of the palpal bulb with the cymbium. This feature has seemingly been acquired independently in some soft-bodied oonopines (Platnick and Berniker, 2013a, 2013b), but it does not occur in *Varioonops*.

However, there are three other new Neotropical groups that are currently being described (Bolzern, in prep.; R. Ott, in litt.) whose members share at least the following characters with those of *Varioonops*: sexually dimorphic scuta (with females lacking dorsal abdominal scuta),

a patterned abdomen, and a separate palpal cymbium and bulb. Thus, these groups together seem to constitute a third complex of sexually dimorphic Neotropical gamasomorphines.

Within this complex, the members of *Varioonops* share two features also found in one of the undescribed genera that is likely to represent their sister group: a uniquely broad, triangular projection, bearing distally flattened setae, on the anterior portion of the male endites (figs. 7, 67–69) and a cluster of distally filiform glands situated at the base of the anterior genitalic process of females (figs. 44, 103, 157, 305, 472, 488). The species assigned here to *Varioonops*, however, all have a distinctly granulated sternum (figs. 4, 34, 64, 94, 378, 415, 462, 484) that appears to be unique to, and synapomorphic for, this group alone.

While studying the male palps of *Varioonops* with scanning electron microscopy, we noted a peculiar structure near the tip of the cymbium (figs. 9, 70, 285, 363, 411, 458). It was detected in almost all the species, but on some specimens, in some positions, it can be fully obscured by the surrounding setae. This cymbial cone is situated on the dorsoretrolateral side of the cymbial tip. It may be a receptor, or a secretory structure, as there is often an opening visible at the tip. In previously published illustrations, we have detected the cymbial cone only in two African species of *Orchestina* Simon described by Henrard and Jocqué (2012: figs. 165, 166, 252, 253), but it is also apparent in images of an as yet undescribed South American species of *Orchestina* and members of two undescribed groups, as well as possibly in members of the soft-bodied oonopine genus *Neotrops* Grismado and Ramírez (2013). Given this relatively widespread distribution within the family, the cymbial cone is unlikely to be a synapomorphy of an oonopid subgroup, but the presence or absence of the character needs to be documented in other oonopid genera, especially those of the subfamily Sulsulinae, as well as in the other families of dysderoids.

Among other unusual characters of *Varioonops* are the "false claws," paired setae situated at the tips of tarsi III and IV that have a heavily sclerotized, enlarged, claw-shaped tip (figs. 21, 54, 448). Similarly modified setae have been found in several other groups, including some rather distantly related genera (Grismado et al., 2011; Ubick and Griswold, 2011; Platnick et al., 2012b; Bonaldo et al., in press). Also notable is a peculiarly short, modified seta situated distolaterally on metatarsi I–III (figs. 56, 88, 117). The position of these setae suggests that they may be involved in proprioception; differently shaped, modified setae can be found in the same position on members of other genera, including *Orchestina* (see Henrard and Jocqué, 2012: figs. 559, 560), *Melchisedec* Fannes (2010: figs. 42, 43), and *Escaphiella* Platnick and Dupérré, (2009b: fig. 42), but setae with this particular shape have been detected to date only in *Varioonops* and a closely related, undescribed group of species.

So far as we have been able to determine, no oonopids previously described from the areas occupied by *Varioonops* appear to belong to the genus; apparently members of the group were never found by Arthur Chickering during his extensive fieldwork in Panama, and no specimens are known from the areas in southern Panama where most of his collections were made. Some informal species groups can be recognized, based primarily on the shape of the male embolus and conductor, but we are able to assign only 14 of the species to such groups; the groups are reflected in the key to species provided below.

The *cafista* group (containing *V. cafista* and *V. velsala*) and the *montesta* group (containing *V. montesta*, *V. poas*, and *V. spatharum*) are known only from Costa Rica. The *tortuguero* group (containing *V. ramila, V. tortuguero, V. varablanca*, and *V. veragua*) and the *sansidro* group (containing *V. heredia* and *V. sansidro*) are also primarily Costa Rican, but each contain one species that extends into northern Panama. The *yacambu* group (containing *V. pittieri, V. trujillo*, and *V. yacambu*) is endemic to Venezuela. The members of these groups are united by the following details: the *cafista* group by the evenly curved embolus with a distinct plate-shaped tip in combination with a distinct opening on the conductor (figs. 12–15, 150), the *montesta* group by an embolus bent about 90° prolaterad with an opening skewed dorsally and a distinct conductor with a backward-pointed spur (figs. 163, 165, 178, 193), the *tortuguero* group by an embolus tip abruptly bent prolaterad and a simple, elongated conductor originating prolateroventrally at the embolus base (figs. 72, 73, 208, 242, 253), the *sansidro* group by a basally strongly bent and more distally moderately bent, smooth embolus in combination with a very short, flat, triangular conductor (figs. 270, 272, 287), and the *yacambu* group by the broadly fused base of the embolus and conductor (figs. 393, 409, 418).

The remaining species are more enigmatic. The male of *V. girven* resembles those of the *montesta* group in having the embolar opening directed dorsally, but the conductor more closely resembles those of the *sansidro* group. Due to their distinctively different bulb morphologies, *V. funator* and *V. cerrado* from Panama do not fit into any of the delimited groups. Females of *V. edvardi* (figs. 364–367) and *V. sinesama* (figs. 368–375), the only species known from Colombia, have similar internal genitalia, but in the absence of males of the latter species, we prefer not to group them. Members of the Venezuelan species *V. chordio* (figs. 428–442) most closely resemble those of the *cafista* group in general bulb and embolus shape, and even share with them what seems to be a distal opening on the conductor (similar to the one reported in species of the soft-bodied oonopine genus *Neotrops* by Grismado and Ramírez, 2013). The remaining three Venezuelan species are problematic: *V. grancho* (figs. 376–382) is known only from a single female from an uncertain locality, *V. potaguo* (figs. 474–488), the smallest species in the genus, resembles species of the *yacambu* group but also shows distinct differences, and *V. parlata* is so markedly different, with fewer sternal granulations (figs. 446, 462), that it might represent either the sister group of all the other species, or just a highly autapomorphic member of the genus.

Our methods generally follow those of Platnick and Dupérré (2009a); only differences from the males (other than the obvious lack of male endite and scutal 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 right male palps, and the images were flipped for consistency. All measurements are in mm; high-resolution versions of the 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 and then geographically, from Costa Rica south to Venezuela.

COLLECTIONS EXAMINED

AMNH	American Museum of Natural History, New York, NY
CAS	California Academy of Science, 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
MHNG	Muséum d'Histoire Naturelle, Geneva, Switzerland

Varioonops, new genus

Type Species: *Varioonops cafista*, new species.

Etymology: The generic name refers to the colored and patterned abdomen (Latin *varius* = "variegated, marked with contrasting colors"), which is unusual among oonopids, and is masculine in gender.

Diagnosis: Members of this genus are similar to species of the *Dysderina* and *Scaphiella* complexes in their sexual dimorphism, with a dorsal abdominal scutum present in males (where the dorsal and epigastric scuta are not fused), but absent in females. They differ from all those species in having the surface of the sternum granulated (figs. 4, 34) and from all those except the members of *Pescennina* in having a highly patterned abdomen. In addition, males differ in having the cymbium and bulb not fused and by the uniquely broad, subapical, triangular projection on the endites (figs. 7, 67). Females differ in having a very short postepigastric scutum without lateral platelets or extensions, almost as wide as (but not fused to) the epigastric scutum (figs. 137, 139), the epigastric scutum completely surrounding the pedicel (figs. 138, 155), an indistinct epigynal area (figs. 139, 154), and a cluster of filiform glands at the base of anterior genitalic process (figs. 44, 103, 157).

Description: Total length of males 1.0–2.1, of females 1.3–2.2. Carapace, sternum, mouthparts, abdominal scuta typically pale orange to orange-brown, legs typically pale orange, without any pattern (indistinct structurally based pattern of radial stripes present on carapace, figs. 1, 121), abdomen soft portions typically with pale red-brown to dark purple ground color with wide brown to dark purple netlike pattern, cardiac mark pale, posteriorly with two or four 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 granulate, sometimes cephalic portion less distinctly granulated, appearing smoother; 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 strongly rebordered, straight or moderately curved downward in front view, vertical in lateral view, ALE separated from edge of carapace by their radius or more (except in *V. parlata*, which has a low clypeus, fig. 445), median projec-

tion absent; setae needlelike. Chilum absent. Eyes six, well developed, all eyes subequal (except in *V. parlata* PLE smaller than others, fig. 445), ALE oval, PME almost squared, PLE almost oval; posterior eye row recurved from above, moderately procurved from front; ALE separated by their radius to diameter (except females of *V. potaguo*, fig. 475, and *V. sinesama*, fig. 370, separated by slightly more than ALE 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, PLE-PME separated by less or slightly more than PME radius. Sternum slightly longer than wide, not fused to carapace (may be fused in *V. girven, V. potaguo,* and *V. ramila*), surface without transverse ridges or pits, median concavity and hair tufts 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 and pores (scanned only in *V. cafista* and *V. tortuguero*), distance between coxae approximately equal, extension of precoxal triangles absent, 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 a field of small teeth (scanned only in *V. cafista, V. tortuguero*, and female of *V. parlata*); 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 both sexes of *V. cafista* and *V. tortuguero* and females of *V. parlata* and *V. velsala*), inner margin unmodified, laminate groove absent. Labium rectangular or trapezoidal, 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, anteromedian tip unmodified, in males posteromedian part with broad triangular projection with special, distally moderately flattened setae (unmodified in females, male of *V. parlata* with additional modifications, fig. 447), serrula present in single row (scanned only in *V. cafista* and *V. tortuguero*). Female palp without claw or spines; tibia with three trichobothria (scanned only in *V. cafista* and *V. tortuguero*), 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; both posterior and anterior spiracles connected by groove (in females, 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, covering ¾ to nearly full length of abdomen, more than ½ to most of abdomen width, not fused to epigastric scutum (except possibly in *V. parlata*, fig. 452), middle surface, sides finely reticulate. Epigastric scutum weakly sclerotized, moderately granulated,

completely surrounding pedicel, not protruding, small lateral sclerites absent, without lateral joints in females. Postepigastric scutum weakly sclerotized, anterior margin unmodified, without posteriorly directed lateral apodemes, in males covering ¾ to nearly full length of abdomen, long semicircular (more rectangular in *V. parlata*), fused to epigastric scutum, in females short, almost rectangular, only around epigastric furrow, not fused to epigastric scutum. Spinneret scutum present, represented by 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 males of two species (figs. 16, 76) and females of five species (figs. 46–49, 106–110, 300, 335, 464–467), anterior laterals of males with one major ampullate gland spigot and three piriform gland spigots, of females with one major ampullate gland spigot and three or four (two in *V. parlata*), posterior medians of males with three spigots, of females with eight or nine spigots (*V. parlata* with six), posterior laterals of males with five spigots, of females with 12–13 spigots (*V. parlata* with nine). **Legs:** Femur IV not thickened, same size as femora I–III, patella plus tibia I nearly as long as carapace or moderately shorter, 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, and metatarsi; femoral spines strong, tibial, metatarsal spines long, strong, long spines absent on posterior legs. Tarsi without inferior claw. Superior claws (scanned only in two species), tarsi I, II with four or five teeth on outer row, one to six teeth on inner row, tarsi III with zero to three teeth on outer row, one to four teeth on inner row, tarsi IV with one to four teeth on outer row, zero or one tooth on inner row; pairs of special setae with distinct flattened clawlike apexes 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 (scanned only in *V. cafista* and *V. tortuguero*). **Genitalia:** Male epigastric region with sperm pore small, 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; bulb 1 to 1.5 times as long as cymbium, slender to stout, moderately tapering apically. Embolus diverse, tube shaped, prolaterally curved, conductor originating prolaterally of embolus. Female genitalia externally 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, cluster of usually filiform glands present at base of anterior genitalic process, posterior genitalic process (receptaculum) diversely shaped.

Distribution: Specimens are known from southern Central America and northwestern South America, including Costa Rica, Panama, Colombia, and Venezuela.

KEY TO SPECIES

1. Sternum moderately granulated (figs. 446, 462), males with wrench-shaped conductor (figs. 454, 457), females with anterior genitalic process goblet shaped (fig. 470).....*parlata*
– Sternum distinctly granulated (fig. 4), genital structures different 2
2. Males with distinctly squared bulb (fig. 329) and dorsoventrally flattened embolus (fig. 328), females with elongated pocketlike posterior genitalic process (fig. 337).....*funator*
– Genital structures different 3
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– Female (those of *V. trujillo* unknown).....22
4. Basally fused embolus and conductor with distinctly pronounced base (figs. 393, 408, 418) .....*yacambu* group, 5
– Embolus and conductor not basally fused or if so with indistinct base.....7
5. Embolus short, stout, conductor short, lamelliform, with long spikelike appendages (figs. 418–422).....*pittieri*
– Embolus slender, conductor sickle or fork shaped.....6
6. Embolus base narrow (fig. 390), conductor fork shaped (fig. 393).....*yacambu*
– Embolus base broad, stepped, conductor sickle shaped (figs. 404, 409).....*trujillo*
7. Conductor simple, narrow (figs. 13, 73, 150, 210, 257, 287).....8
– Conductor complex, broad (figs. 165, 347, 479).....18
8. Bulb long, subrectangular (fig. 359), embolus and conductor base narrowly fused, conductor narrow, lamelliform, with three short distal spikes (fig. 358).....*edvardi*
– Bulb, embolus, and conductor different 9
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– Embolus more strongly bent basally, medially or distally, tip and conductor otherwise.....11
10. Conductor short (figs. 13, 129, 131).....*cafista*
– Conductor long, almost reaching embolus tip (fig. 150).....*velsala*
11. Embolus medially bent about 90° prolaterad, conductor with distinct retrolateral lamella (figs. 432, 437).....*chordio*
– Embolus basally or distally bent, conductor otherwise 12
12 Embolus distally abruptly bent prolaterad, conductor long (at least reaching ¾ of embolus length, figs. 210, 225, 242, 255) .....*tortuguero* group, 13
– Embolus basally bent, conductor short (figs. 270, 287, 313).....16

13. Conductor reaching at least embolus tip (figs. 210, 257).....14
– Conductor shorter (figs. 73, 225, 240, 242).....15
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– Conductor lamelliform, as long as embolus (fig. 257).....*ramila*
15. Conductor basally flattened (figs. 240, 242).....*veragua*
– Conductor distinctly spindle shaped (figs. 73, 225).....*tortuguero*
16. Embolus relatively short, longitudinally ribbed, opening skewed dorsad (fig. 313) .....*girven*
– Embolus relatively long, smooth, opening otherwise.....*sansidro* group, 17
17. Embolus opening skewed anteriad, conductor relatively long (figs. 286, 287).....*sansidro*
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– Conductor with backward-pointed spur.....19
19. Conductor with short backward-pointed spur (fig. 343, 347).....*cerrado*
– Conductor with long backward-pointed spur (figs. 163, 178, 193).....*montesta* group, 20
20. Conductor tip simple, pointed (fig. 163).....*montesta*
– Conductor tip hook shaped.....21
21. Conductor tip narrow, elongated (fig. 178).....*spatharum*
– Conductor tip broad (fig. 193).....*poas*
22. Anterior genitalic process dendriform, apex two times wider than long (figs. 397, 427).....23
– Apex of anterior genitalic process as wide as long or narrower.....24
23. Posterior genitalic sclerite short, pocketlike (fig. 427).....*pittieri*
– Posterior genitalic sclerite long, with subspherical apex (fig. 397).....*yacambu*
24. Posterior genitalic process distally spherical or subspherical (figs. 172, 247, 262).....25
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– Posterior genitalic process longer than anterior process, connecting duct longer than enlarged tip (figs. 172, 247).....28
26. Posterior genitalic process spherical, connecting duct extraordinarily short (fig. 442).....*chordio*
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27. Apex of anterior genitalic process bulbous enlarged (fig. 262).....*ramila*
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28. Posterior genitalic process bent or convoluted (figs. 172, 187, 302–304) 29
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– Anterior genitalic process long stalked, with enlarged apex, as long as or longer than half of posterior process length (figs. 172, 302).....30
30. Only subspherical apex of posterior genitalic process bent (figs. 302–304).....*sansidro*
– Posterior genitalic process convoluted (fig. 172).....*montesta*

31. Apex of anterior genitalic process moderately enlarged, spherical apex of posterior genitalic process twice as wide as the duct (fig. 352).....*cerrado*
– Apex of anterior genitalic process distinctly and irregularly enlarged, spherical apex of posterior genitalic process more than twice as wide as the duct (fig. 247).....*veragua*
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– Posterior genitalic process otherwise.....35
33. Posterior genitalic process bent dorsad (fig. 217).....*varablanca*
– Posterior genitalic process straight (figs. 43, 102, 141, 142, 232).....34
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– Anterior genitalic process relatively narrow and long stalked (figs. 102, 232).....*tortuguero*
35. Posterior genitalic process convoluted (figs. 156, 157).....*velsala*
– Posterior genitalic process otherwise.....36
36. Posterior genitalic process tube shaped, elongated, distally conspicuously trapezoidal enlarged (fig. 202).....*poas*
– Posterior genitalic process otherwise.....37
37. Posterior genitalic process conical, flask shaped (fig. 322).....*girven*
– Posterior genitalic process otherwise.....38
38. Posterior genitalic process broad pocket shaped, large genitalic plate distinctly V-shaped, medially distinctly less sclerotized (fig. 487).....*potaguo*
– Posterior genitalic process and plate otherwise.....39
39. Posterior genitalic process simple, finger shaped (fig. 375).....*sinesama*
– Posterior genitalic process pocket shaped, elongated (figs. 367, 382).....40
40. Posterior genitalic process weakly sclerotized, anterior process relatively broadly stalked (fig. 382).....*grancho*
– Posterior genitalic process well sclerotized, subrectangular, anterior process relatively narrowly stalked (fig. 367).....*edvardi*

Species from Costa Rica and Panama

The *cafista* group

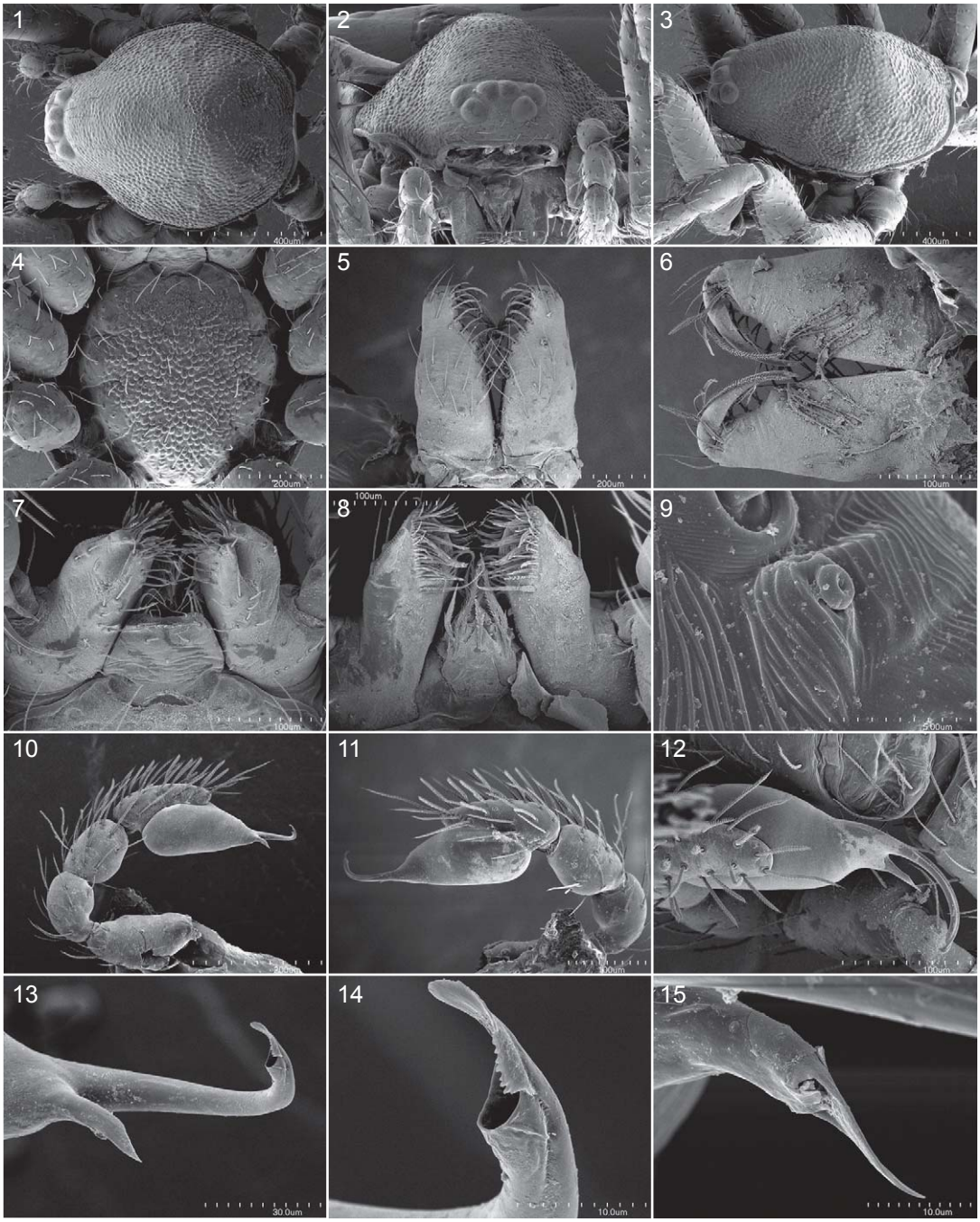
Varioonops cafista, new species

Figures 1–60, 121–142

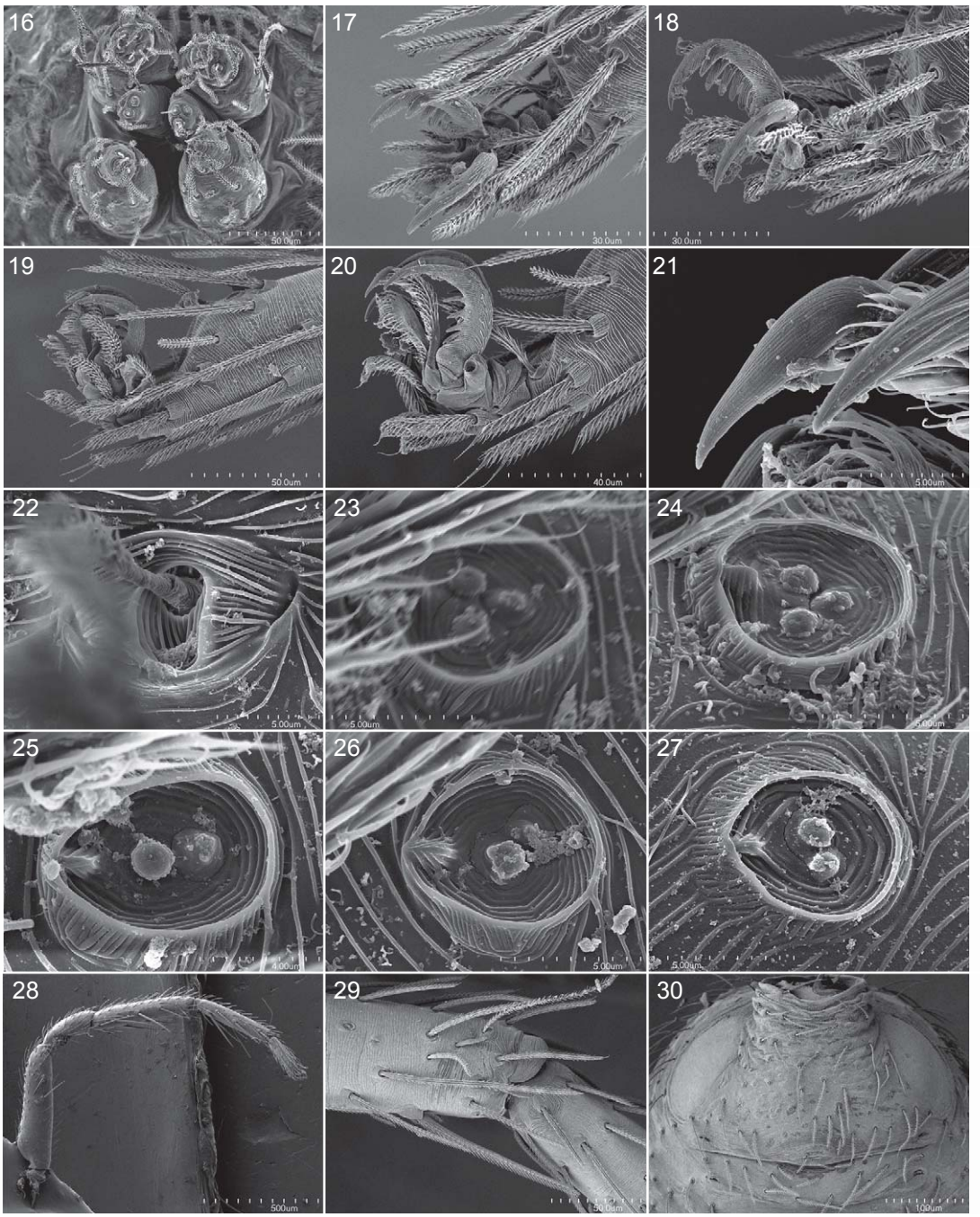
Types: Male holotype, one male paratype, and two female paratypes from montane forest litter taken at an elevation of 1300 m at Cacao Field Station, Guanacaste, Costa Rica (Feb. 12, 1996; R. Anderson), deposited in AMNH (PBI_OON 49156).

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

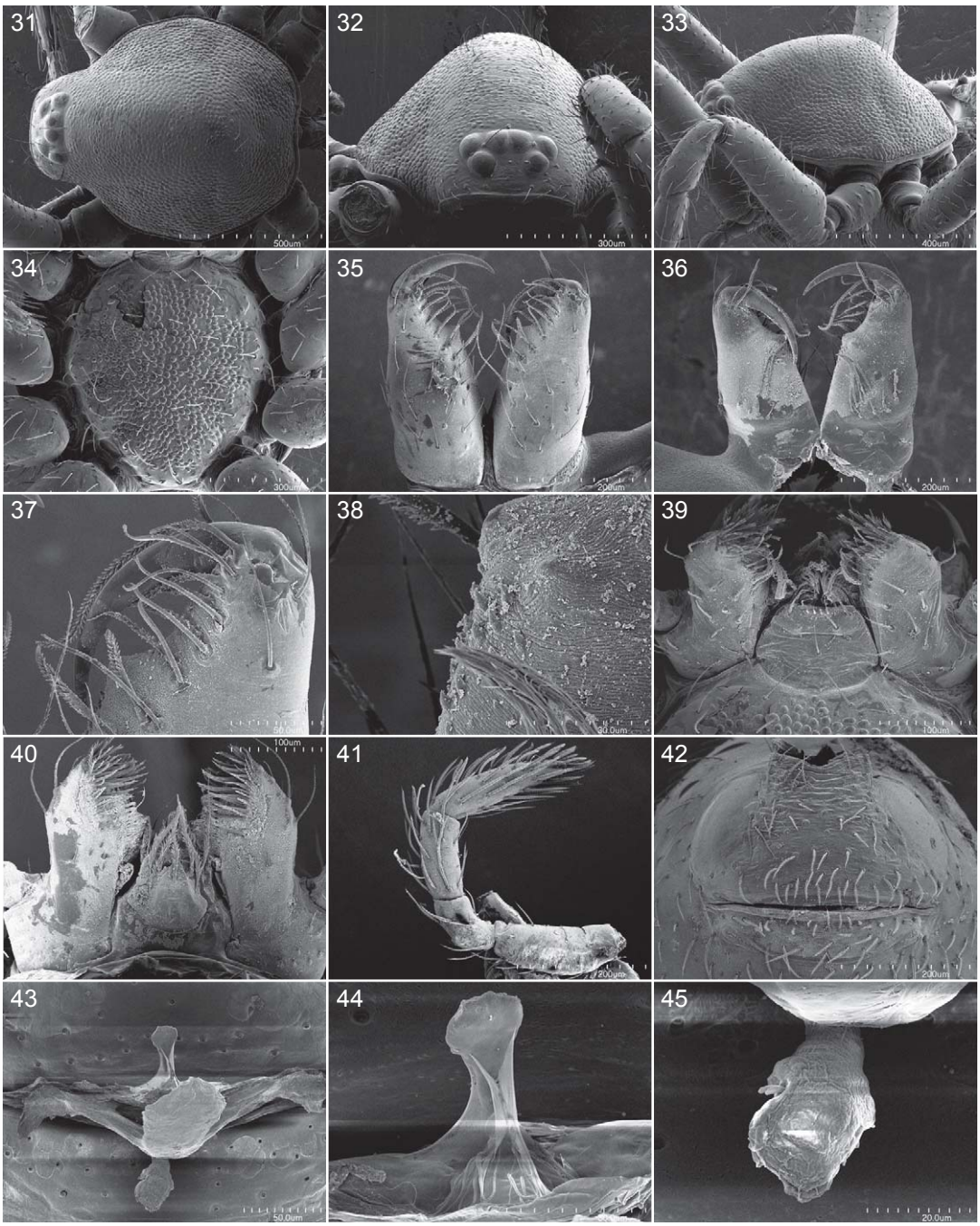
Diagnosis: Males differ from those of the other species in having a moderately but evenly curved, tube-shaped embolus with a distinct tip (fig. 14, 131) in combination with a narrow, flat, short, tube-shaped conductor that has a distinct opening (figs. 13, 15). Females differ from those of all other species in having an anterior genitalic process with an only moderately enlarged apex and an unconvoluted, club-shaped posterior genitalic process distally bearing suboval glands (figs. 43–45, 141, 142).



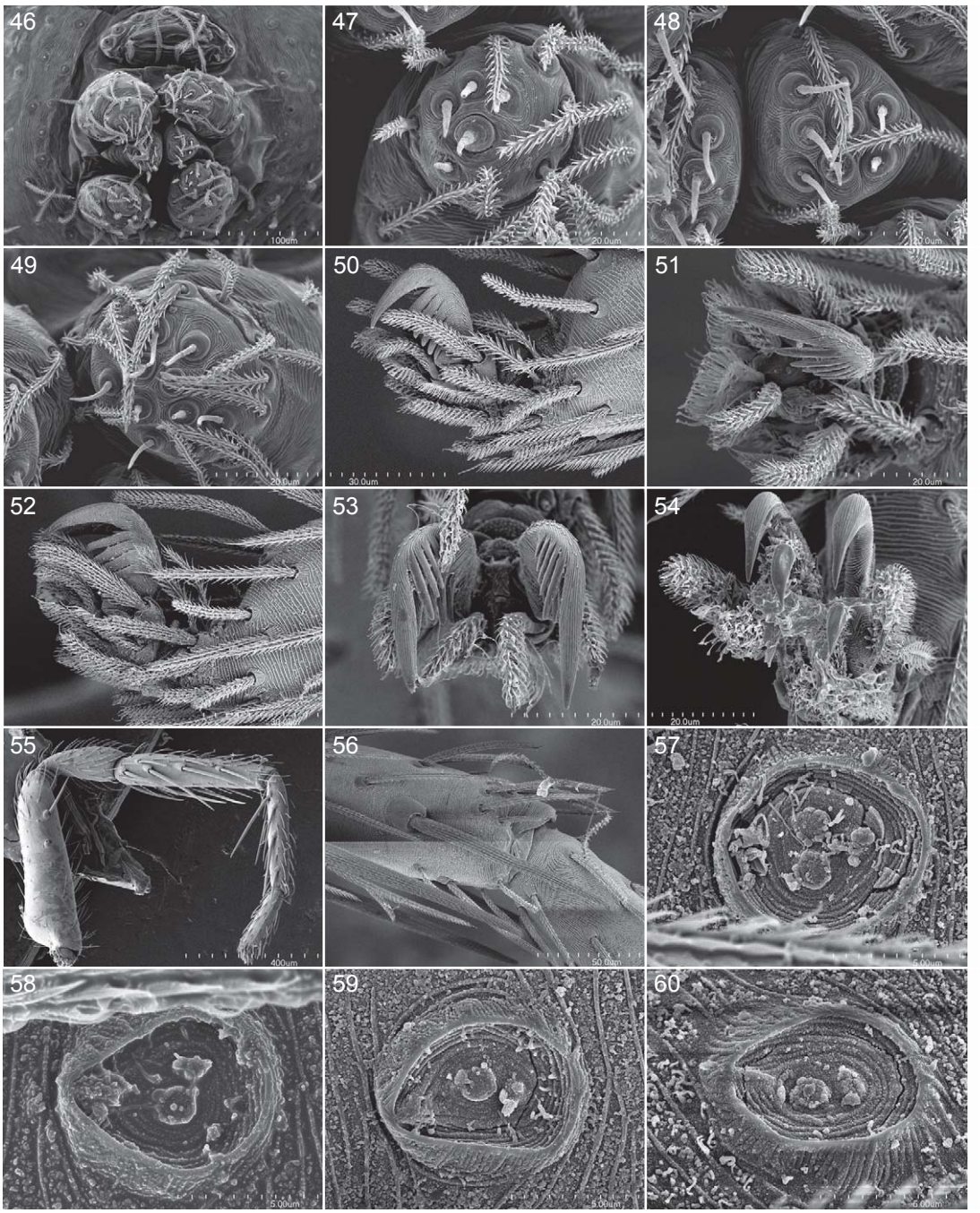
FIGURES 1–15. *Varioonops cafista*, new species, male. **1.** Carapace, dorsal view. **2.** Same, anterior view (with detached chelicerae). **3.** Same, dorsolateral view. **4.** Sternum, ventral view. **5.** Chelicerae, anterior view. **6.** Same, posterior view. **7.** Mouthparts, ventral view. **8.** Same, dorsal view. **9.** Cymbial cone, dorsoretrolateral view. **10.** Palp, prolateral view. **11.** Same, retrolateral view. **12.** Same dorsal view. **13.** Embolus and conductor, prolateral view. **14.** Embolus opening, prolateral view. **15.** Conductor, ventroprolateral view.



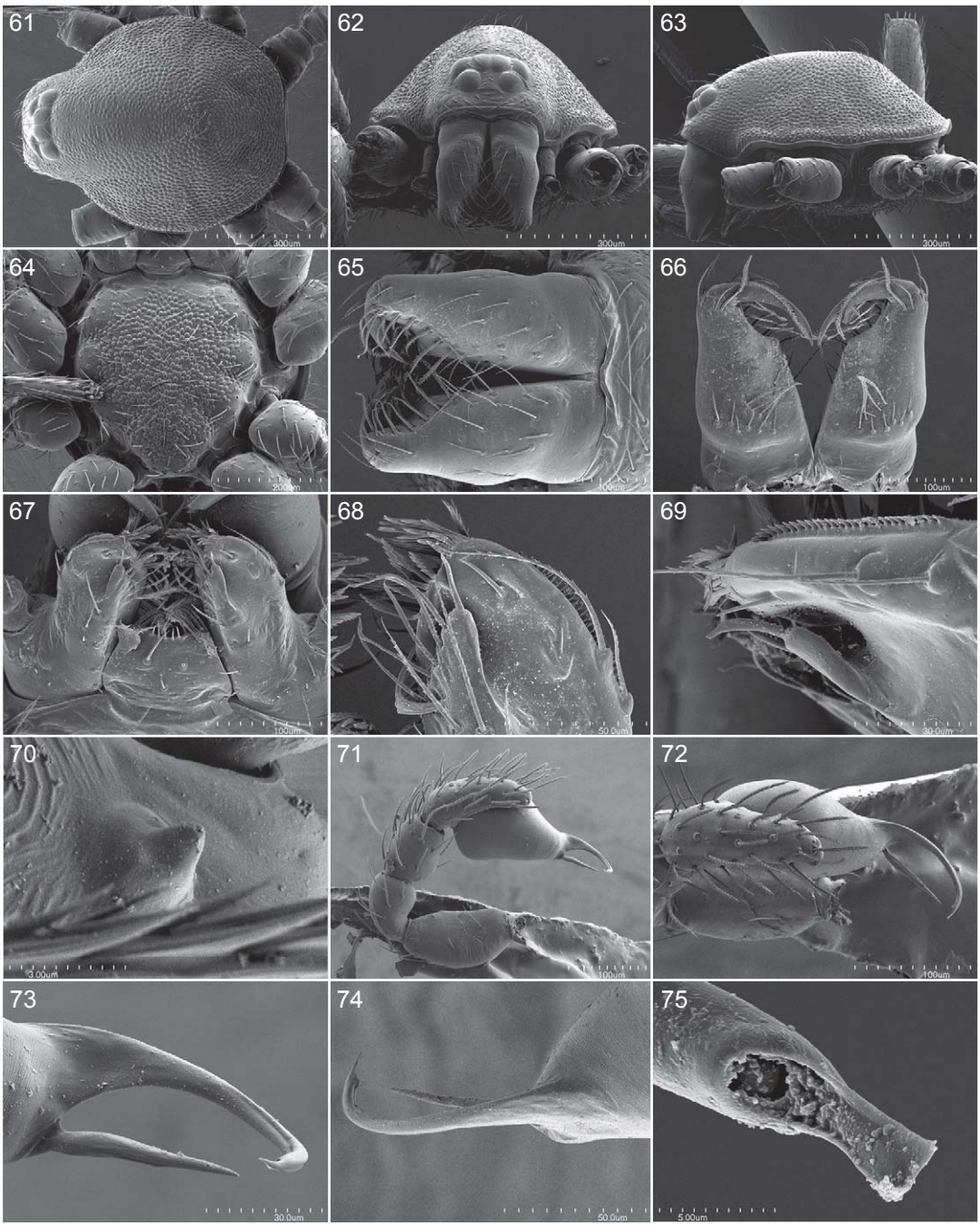
FIGURES 16–30. *Varioonops cafista*, new species, male. **16.** Spinnerets, posterior view. **17.** Claws, leg I, dorsolateral view. **18.** Same, leg II. **19.** Same, leg III, lateral view. **20.** Same, leg IV. **21.** Tip of paired setae at claw of leg IV ("false claw"), lateral view. **22.** Trichobothrial base, metatarsus I, dorsal view. **23.** Tarsal organ, leg I, dorsal view. **24.** Same, leg II. **25.** Same, leg III. **26.** Same, leg IV. **27.** Same, palp. **28.** Leg I, prolateral view. **29.** Metatarsus tip, leg II, lateral view. **30.** Epigastric area, ventral view.



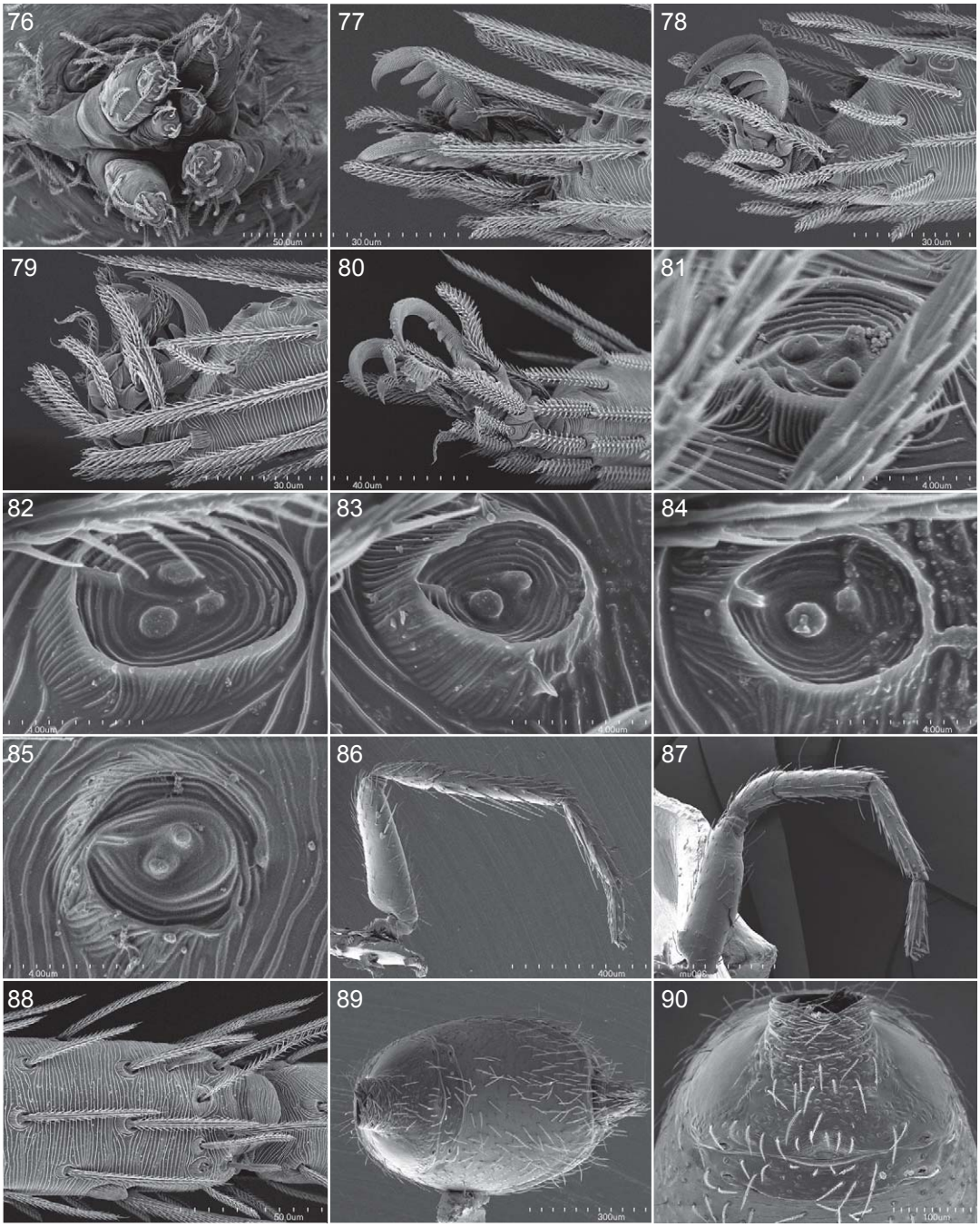
FIGURES 31–45. *Varioonops cafista*, new species, female. **31.** Carapace, dorsal view. **32.** Same, anterior view (with detached chelicerae). **33.** Same, lateral view. **34.** Sternum, ventral view. **35.** Chelicerae, anterior view. **36.** Same, posterior view. **37.** Fang and distal setae of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



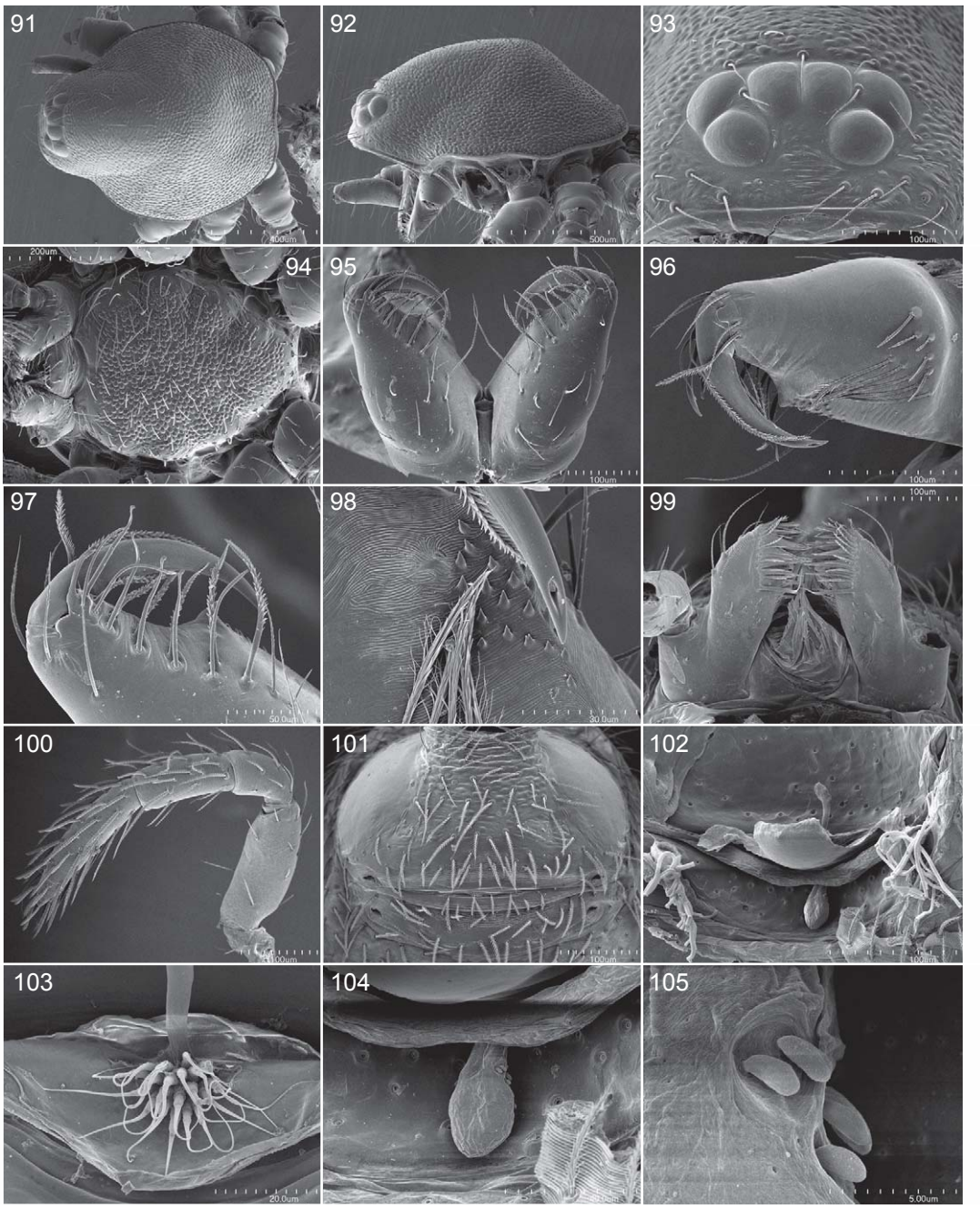
FIGURES 46–60. *Varioonops cafista*, new species, female. **46.** Spinnerets, posterior view. **47.** Anterior lateral spinneret, same. **48.** Posterior median spinnerets, same. **49.** Posterior lateral spinneret, same. **50.** Claws, leg I, lateral view. **51.** Same, dorsal view. **52.** Claws, leg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



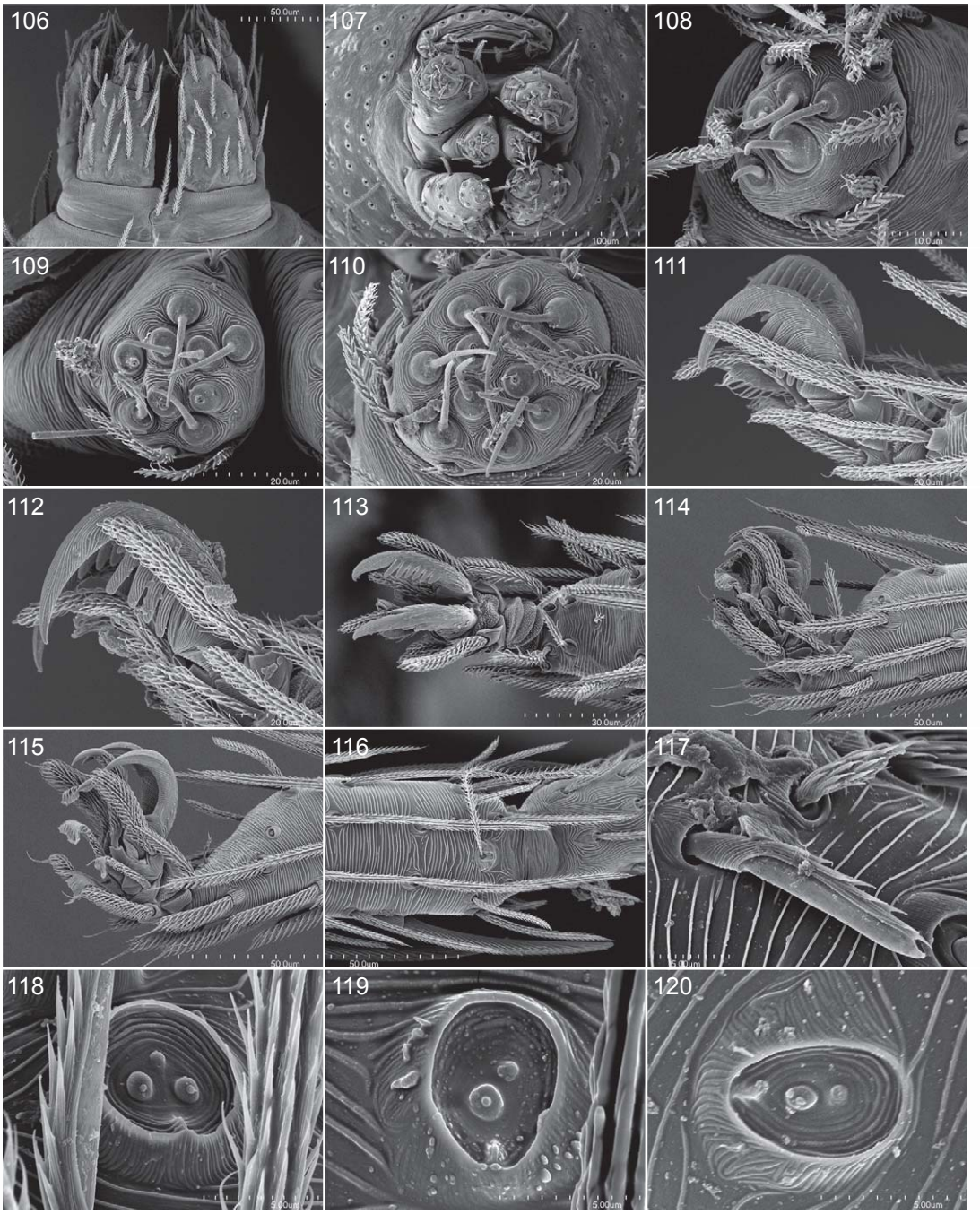
FIGURES 61–75. *Varioonops tortuguero*, new species, male. **61.** Carapace, dorsal view. **62.** Same, anterior view. **63.** Same, lateral view. **64.** Sternum, ventral view. **65.** Chelicerae, anterior view. **66.** Same, posterior view. **67.** Mouthparts, ventral view. **68.** Triangular projection on endite, posteroventral view. **69.** Same, lateral view. **70.** Cymbial cone, dorsoretrolateral view. **71.** Palp, prolateral view. **72.** Same, dorsal. **73.** Embolus and conductor, prolateral view. **74.** Same, retrolateral view. **75.** Embolus opening, posterior view.



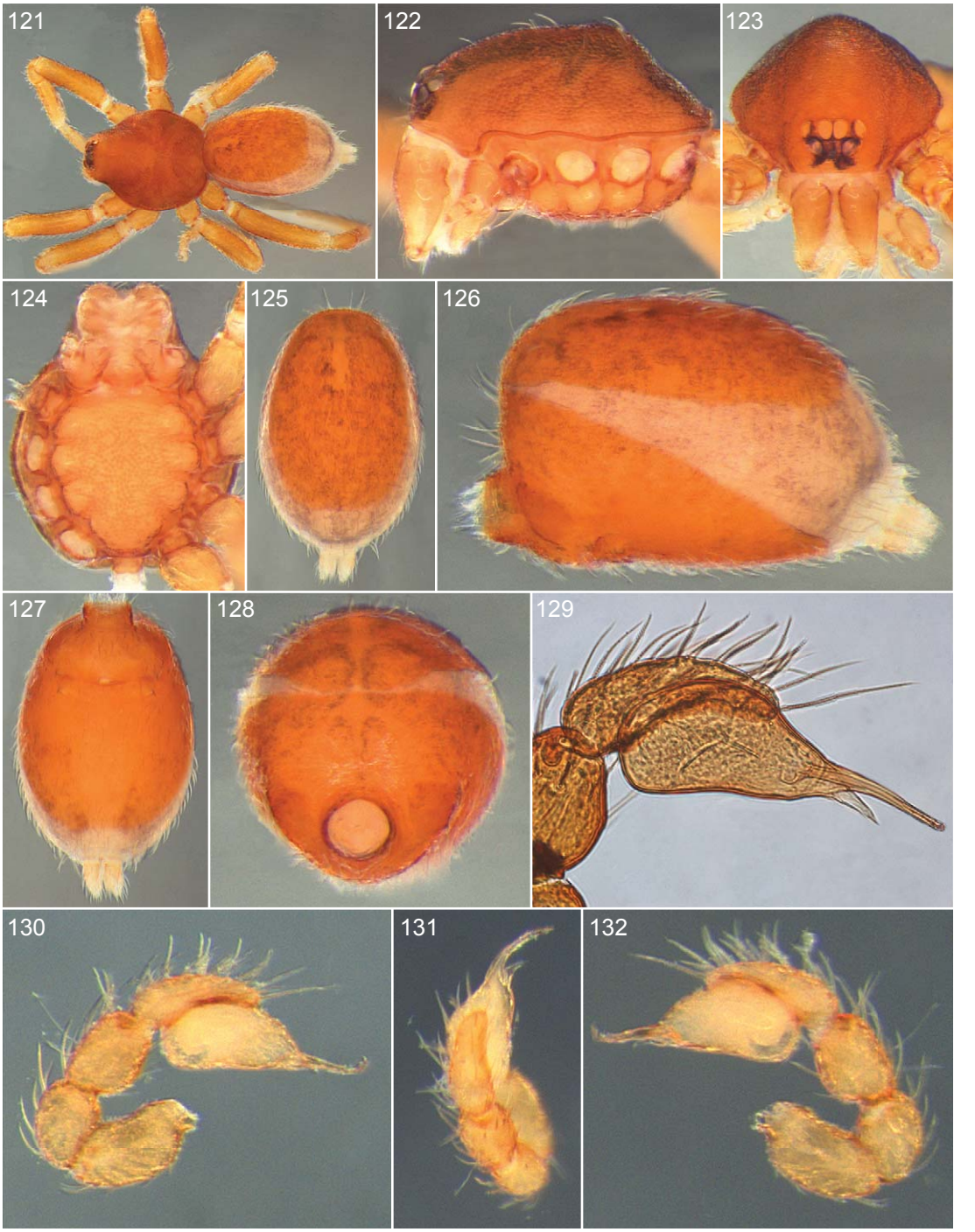
FIGURES 76–90. *Varioonops tortuguero*, new species, male. **76.** Spinnerets, posterior view. **77.** Claws, leg I, dorsolateral view. **78.** Same, leg II, lateral view. **79.** Same, leg III. **80.** Same, leg IV, ventrolateral view. **81.** Tarsal organ, leg I, dorsolateral view. **82.** Same, leg II. **83.** Same, leg III. **84.** Same, leg IV, dorsal view. **85.** Same, palp. **86.** Leg I, prolateral view. **87.** Leg III, lateral view. **88.** Metatarsus tip, leg I, dorsal view. **89.** Abdomen, ventral view. **90.** Epigastric area, ventral view.



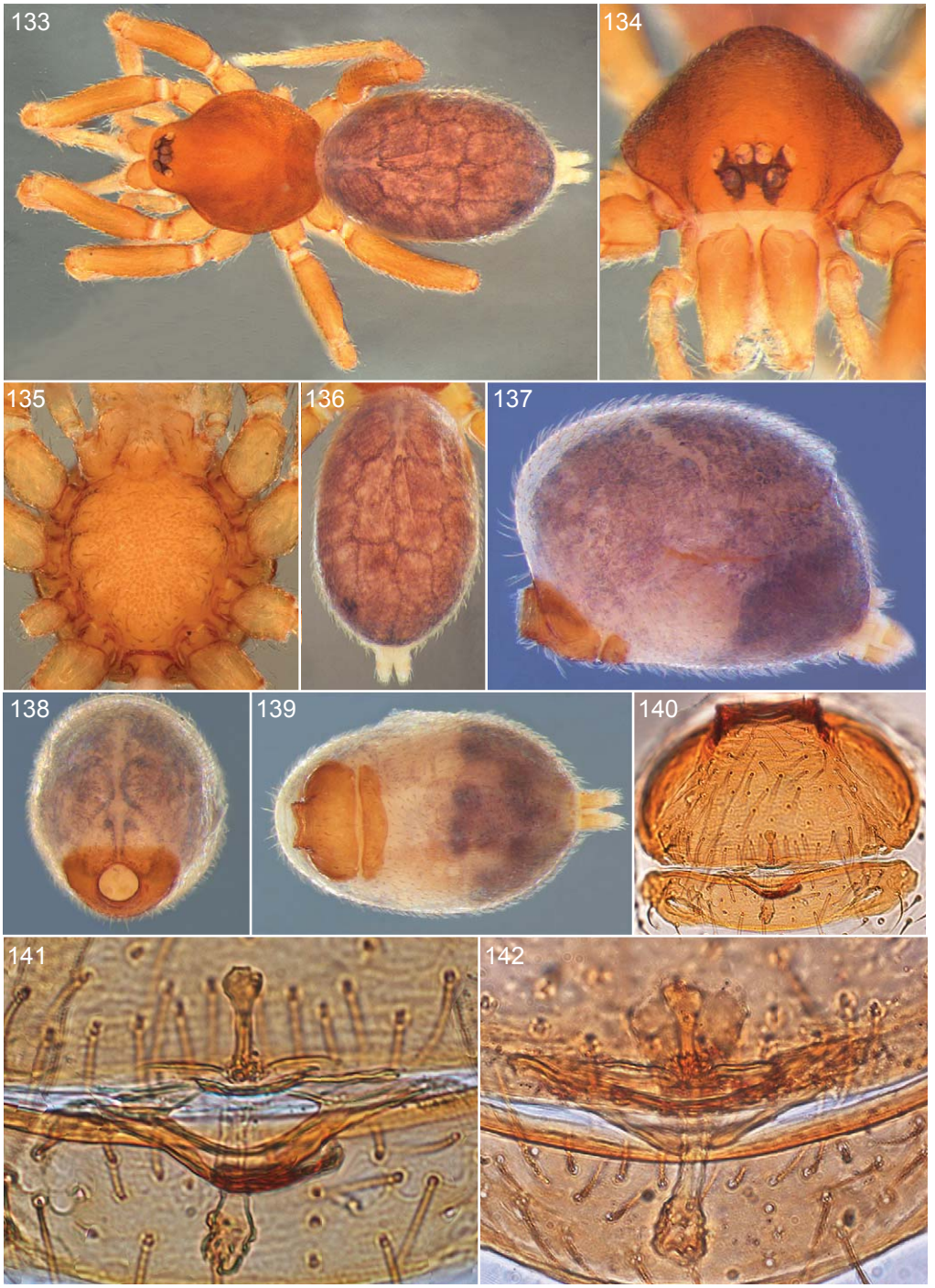
FIGURES 91–105. *Varioonops tortuguero*, new species, female. **91.** Carapace, dorsal view. **92.** Same, lateral view. **93.** Eyes, anterior view. **94.** Sternum and mouthparts, ventral view. **95.** Chelicerae, anterior view. **96.** Same, posterior view. **97.** Fang and distal setae on chelicerae, anterior view. **98.** Field of small teeth on cheliceral retromargin, ventrolateral view. **99.** Mouthparts, dorsal view. **100.** Palp, lateral view. **101.** Epigastric area, ventral view. **102.** Genitalia, dorsal view. **103.** Base of anterior genitalic process, same. **104.** Posterior genitalic process, same. **105.** Glands on posterior genitalic process, same.



FIGURES 106–120. *Varioonops tortuguero*, new species, female. **106.** Spinnerets, ventral view. **107.** Same, posterior view. **108.** Anterior lateral spinneret, same. **109.** Posterior median spinneret, same. **110.** Posterior lateral spinneret, same. **111.** Claws, leg I, lateral view. **112.** Same, leg II. **113.** Same, leg II, dorsal view. **114.** Same, leg III, lateral view. **115.** Same, leg IV. **116.** Metatarsus tip, leg I, dorsal view. **117.** Special metatarsal setae, leg II, dorsolateral view. **118.** Tarsal organ, leg II, dorsal view. **119.** Same, leg III. **120.** Same, palp.



FIGURES 121–132. *Varioonops cafista*, new species, male. **121.** Habitus, dorsal view. **122.** Carapace, lateral view. **123.** Carapace, anterior view. **124.** Sternum, ventral view. **125.** Abdomen, dorsal view. **126.** Same, lateral view. **127.** Same, ventral view. **128.** Same, anterior view. **129.** Bulb, prolateral view. **130.** Palp, same. **131.** Same, dorsal view. **132.** Same, retrolateral view.



FIGURES 133–142. *Varioonops cafista*, new species, female. **133.** Habitus, dorsal view. **134.** Carapace, anterior view. **135.** Sternum, ventral view. **136.** Abdomen, dorsal view. **137.** Same, lateral view. **138.** Same, anterior view. **139.** Same, ventral view. **140.** Epigastric area, dorsal view. **141, 142.** Genitalia, dorsal view.

Male (PBI_OON 49156, figs. 1–30, 121–133): Total length 1.71. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum straight (in anterior view, fig. 128). Postepigastric scutum with posterior margin straight. Leg spination: femur I p0-1-1; tibiae: I p1-0-0 or p1-1-0, v4-2-2; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore oval. Cymbial cone distinctly doughnut shaped. Embolus tube shaped, elongated, slightly curved prolaterad, tip with simple oval opening and elongated, distally denticulate plate; conductor narrow, flat, tube shaped, ¼ to ⅓ of embolus length, distally with round opening and triangular, distally pointed protrusion.

Female (PBI_OON 49156, figs. 31–60, 134–142): Total length 1.80. Leg spination: femur I p0-1-1; tibiae: I p1-1-0, v4-2-2; II p1-0-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genital plate longer than wide; anterior genitalic process long, bulbous, shorter than posterior process; posterior genitalic process club shaped, distally bearing suboval glands.

Other Material Examined: COSTA RICA: **Alajuela:** Garroba, Upala, no additional information on label (INBIO PBI_OON 49181), 1♂. **Cartago:** near Estación CATIE, road to Cuericí, Feb. 15, 1998, elev. 2750 m (R. Anderson, C. Víquez, INBIO PBI_OON 31021), 2♂. **Guanacaste:** Cacao Field Station, May 4, 1995, Berlese, mountain hardwood cloud-forest litter, elev. 1100–1200 m (R. Anderson, AMNH PBI_OON 49159, 49161), 2♂, 2♀, Feb. 15, 1996, wet montane forest litter, elev. 1150 m (R. Anderson, AMNH PBI_OON 49165), 1♀, wet cloud-forest litter, elev. 1400 m (R. Anderson, AMNH PBI_OON 49224) 1♀, Feb. 20, 1996 (R. Anderson, AMNH PBI_OON 49157), 1♂, elev. 1700 m (R. Anderson, AMNH PBI_OON 49166), 1♂, transitional bamboo/cloud-forest litter, elev. 1300 m (R. Anderson, AMNH PBI_OON 49167), 1♂; Maritza Field Station, Feb. 17, 1996, wet montane forest litter, elev. 875 m (R. Anderson, AMNH PBI_OON 49196), 1♀; Rincón de la Vieja Las Palas, Jan. 18, 1996, *Clusea rosea* forest litter, elev. 1400 m (R. Anderson, AMNH PBI_OON 49180), 1♀, Feb. 18, 1996 (R. Anderson, AMNH PBI_OON 49162, 49169. 49170), 1♂, 2♀; Santa Rosa National Park, May 19, 2007, Berlese, humid forest, leaf and log litter (J. Louderman, C. Grinter, FMNH 34168, PBI_OON 10471), 2♂, same park, San Girardo Zoological Station, May 20, 2007, Berlese, leaf and log litter (J. Louderman, C. Grinter, FMNH 34864, PBI_OON 10581), 1♂. **Puntarenas:** Estación Biológica Monteverde, 10.32777°N, 84.81888°W, June 9, 2001, montane forest litter, elev. 1540 m (R. Anderson, AMNH PBI_OON 31079), 1♂, June 11, 2001, cloud-forest litter, elev. 1540 (R. Anderson, AMNH PBI_OON 31077), 2♂, June 12, 2001, montane cloud-forest litter (R. Anderson, AMNH PBI_OON 31074), 2♂, 2♀, 10.31472°N, 84.79694°W, June 13, 2001, cloud-forest litter, 1800 m (R. Anderson, AMNH PBI_OON 31073), 1♂,June 16, 2001, elev. 1480 m (R. Anderson, AMNH PBI_OON 31075), 1♂, 8♀, June 20, 2001 (R. Anderson, AMNH PBI_OON 31076), 4♂; Monteverde, Aug. 24, 1983, roadside scrub, elev. 1500 m (J., F. Murphy, AMNH PBI_OON 36654, 36694, 36777), 2♂, 2♀, Aug. 26, 1983, scrub, elev. 1500 m (J., F. Murphy, AMNH PBI_OON 36775), 2♀, Aug. 28, 1983, litter, elev. 1500 m (J.. F. Murphy, AMNH PBI_OON 36663, 36776), 3♂, 1♀, May 10, 1984, elev. 1200 m (J. Ashe, R. Leschen, FMNH PBI_OON 10621), 1♂, May 10, 1989, elev. 1240 m (J. Ashe, R. Leschen, R. Brooks, FMNH 34130, PBI_OON 10432), 1♂, 1♀, Feb. 23–27, 1991, sifting leaf litter, elev. 1500 m (H., A. Howden, AMNH PBI_OON 21115), 1♂.

Distribution: Costa Rica (Alajuela, Cartago, Guanacaste, and northern Puntarenas).

Varioonops velsala, new species

Figures 143–157

Types: Male holotype, male paratype, and two female paratypes (only one female prosoma present) taken at an elevation of 400 m on the southwest trail at La Selva, Heredia, Costa Rica

(Mar. 2, 2002; D. Chandler), deposited in INBIO (males: PBI_OON 31011; females: PBI_OON 31040); also two female paratypes collected at La Selva, Heredia, Costa Rica (June 25, 1999, C. Víquez), deposited in INBIO (PBI_OON 31039).

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

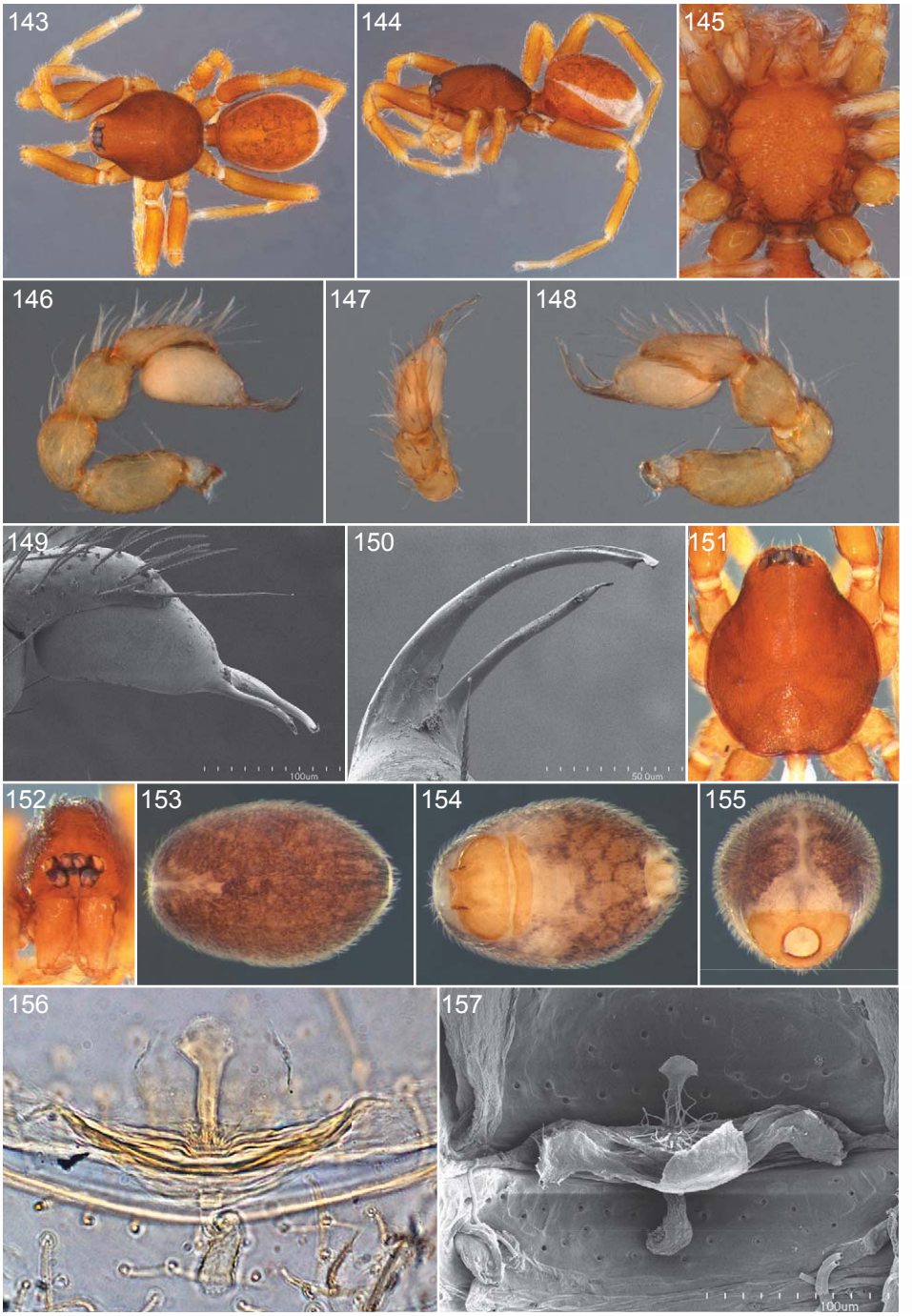
Diagnosis: Males resemble those of *V. cafista* in having a moderately but evenly curved, tube-shaped embolus with a plate-shaped tip (fig. 150) but have a long, straight, tube-shaped conductor with a rounded opening (rather than a narrow, flat, short, tube-shaped conductor with a pointed distal end). Females differ in having a moderately ventrodorsally convoluted posterior genitalic process with a blunt distal end, rather than an unconvoluted, club-shaped posterior genitalic process (figs. 156, 157).

Male (PBI_OON 31011, figs. 143–150): Total length 1.42. Sternum microsculpture everywhere but front, at level of coxae moderately less microstructure, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum straight (in anterior view). Postepigastric scutum with posterior margin concave. Leg spination: femur I p0-1-1; tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore circular. Embolus tube-shaped, elongated, evenly prolaterad curved, retrolaterally with longitudinal keel, tip with irregular oval opening and broad, elongated, distally moderately denticulate plate; conductor straight, tubular, almost as long as embolus, distally with round opening (collapsed in SEM, fig. 149).

Female (PBI_OON 28114, figs. 151–157): Total length 1.64. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genital plate longer than wide; anterior genitalic process stalked, bulbous, with moderately enlarged apex, moderately shorter than posterior genitalic process; field of filiform glands on small basal plate of anterior genitalic process conspicuous; posterior genitalic process moderately convoluted, tube-shaped duct, distally blunt, laterally with distinct glands (fig. 157).

Other Material Examined: COSTA RICA: **Alajuela:** Reserva Biológica San Ramón, 27 km N, 8 km W San Ramón, 10.22500°N, 84.59166°W, wet premontane forest litter, June 14, 1997, elev. 950 m (R. Anderson, INBIO PBI_OON 31014), 1♂, June 15, 1997, elev. 1050 m (R. Anderson, INBIO PBI_OON 31013), 1♂. **Heredia:** Estación Biológica La Selva, Puerto Viejo de Sarapiqui, Río Puerto Viejo, 10.43333°N, 83.98333°W, Mar. 1973, Berlese, epiphytic humus (FMNH 34768, PBI_OON 10485), 1♂, Mar. 6, 1973, Berlese, teaching area forest, floor litter (FMNH 33531, PBI_OON 10038), 1♂, Mar. 10, 1973, rotten palm leaf mold (J. Wagner, J. Kethley, FMNH PBI_OON 49179), 1♂, (no other data on label, INBIO PBI_OON 49177), 1♂, Mar. 13, 1987 (D. Olson, MCZ 72955, PBI_OON 28114), 1♂, 1♀, same (D. Olson, MCZ 72958, PBI_OON 37096), 1♀, 10.43333°N, 84.01666°W, June 13, 1999, elev. 50–150 m (C. Víquez, INBIO PBI_OON 31000. 31012), 3♂, 1♀, June 14, 1999 (C. Víquez, INBIO PBI_OON 31041), 1♀, Winkler (C. Víquez, INBIO PBI_OON 31009), 1♂, June 18, 1999 (C. Víquez, INBIO PBI_OON 31010, 31038), 2♂, 1♀, June 25, 1999 (C. Víquez, INBIO PBI_OON 31007), 1♂, June 23, 1999 (C. Víquez, INBIO PBI_OON 31008), 1♂, Mar. 1–20, 2002, experimental lot, forest litter, elev. 830 m (D. Chandler, INBIO PBI_OON 31001), 1♀; 11 km ESE La Virgen, 10.35000°N, 84.05000°W, Feb. 18, 2004, INBio-OET transect, elev. 250–350 m (C. Víquez, INBIO PBI_OON 31135), 1♀; 11 km SE La Virgen, Mar. 18, 2003, INBio-OET transect, elev. 450–550 m (C. Víquez, INBIO PBI_OON 31099), 1♂; 16 km SSE La Virgen, 10.26666°N, 84.08333°W, Mar. 19–22, 2001, INBio-OET transect, 1050–1150 m (C. Víquez, INBIO PBI_OON 31098), 1♀, Mar. 22, 2001 (C. Víquez, INBIO PBI_OON 31110), 1♂.

Distribution: Costa Rica (Alajula, Heredia).



FIGURES 143–157. *Varioonops velsala*, new species, male (143–150) and female (151–157). **143.** Habitus, dorsal view. **144.** Same, lateral view. **145.** Sternum, ventral view. **146.** Palp, prolateral view. **147.** Same, dorsal view. **148.** Same, retrolateral view. **149.** Bulb, prolateral view. **150.** Embolus and conductor, dorsal view. **151.** Carapace, same. **152.** Same, anterior view. **153.** Abdomen, dorsal view. **154.** Same, ventral view. **155.** Same, anterior view. **156, 157.** Genitalia, dorsal view.

The *montesta* group

***Varioonops montesta*,** new species

Figures 158–172

Types: Male holotype, male paratype, and female paratype from cloud-forest litter taken at an elevation of 1750 m at the Estación Biológica Mongteverde, 10.31472°N, 84.79694°W, Puntarenas, Costa Rica (June 15, 2001; R. Anderson), deposited in AMNH (males: PBI_OON 31072, female: PBI_OON 31078).

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

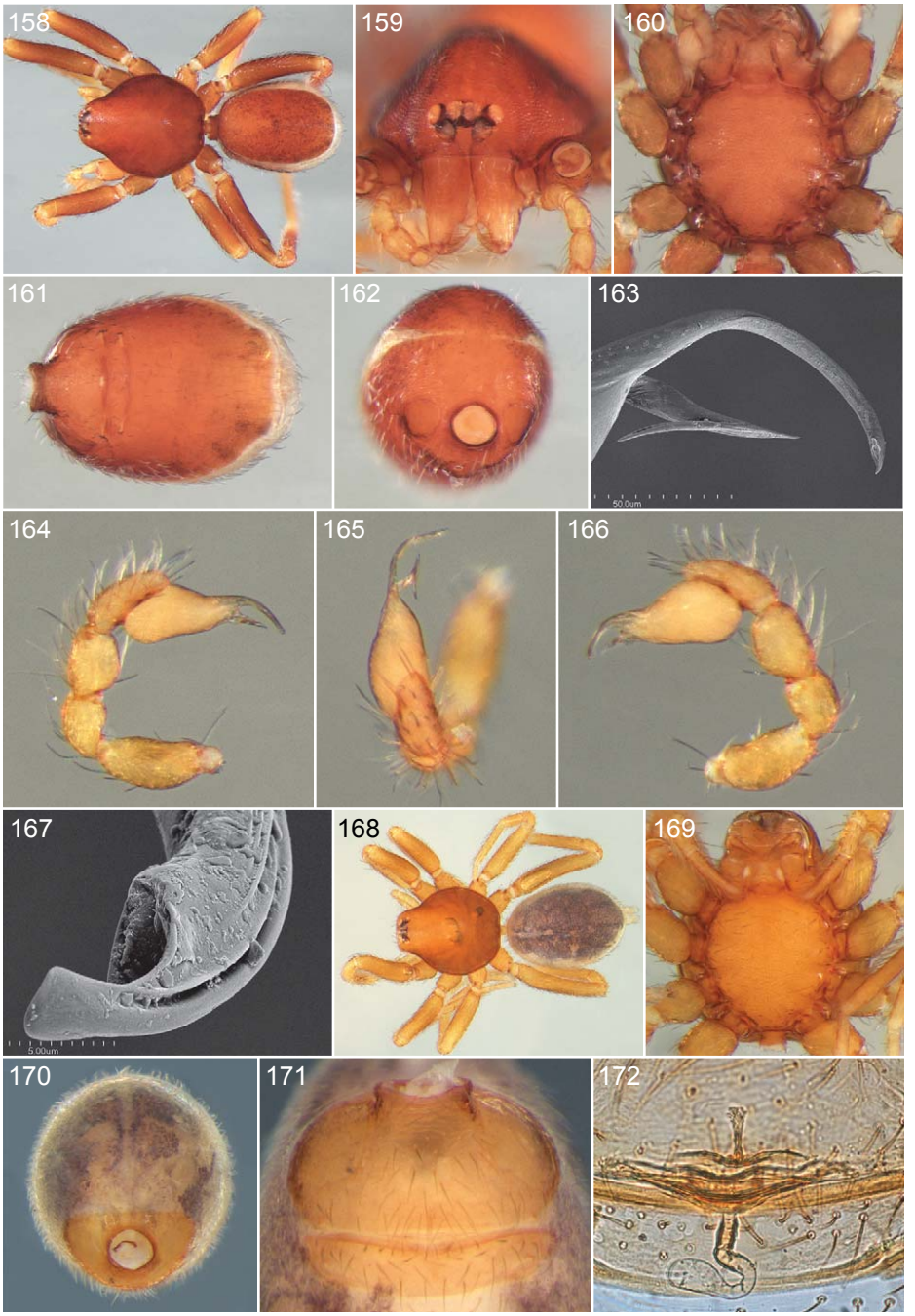
Diagnosis: Males resemble only those of *V. spatharum* (fig. 178) and *V. poas* (fig. 193) in having a tube-shaped embolus, bent approximately 90° prolaterad with an opening skewed dorsally and a distinct conductor with a broadened, flat base and distally with a long, backward-pointing spur (also present but short in *V. cerrado*, fig. 343). They differ in having a simple pointed distal tip of the conductor (rather than broad and hook shaped in *V. poas* or elongated and hook shaped in *V. spatharum*). Females can be separated from those of all other species by the short anterior genitalic process and the distinctly convoluted, distally spherically enlarged posterior process (fig. 172).

Male (PBI_OON 31072, figs. 158–167): Total length 1.75. Sternum microsculpture medially and in furrows, surface evenly, finely granulated. Anterodorsal margin of epigastric scutum straight (in anterior view). Postepigastric scutum with posterior margin straight (fig. 161). Leg spination: femur I p0-1-1; tibiae I, II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore oval. Cymbial cone basally broad, distally narrow, tube shaped, protruding. Embolus tube shaped, elongated, curved ventroprolaterad, retrolaterally with longitudinal keel and furrow, tip with simple oval opening and distally elongated, subrectangular plate; conductor proximally broad, lamelliform, long, triangular, distally pointed with distally originating, long, backward-directed, grooved, pointed spur, spur as long as lamelliform part of conductor.

Female (PBI_OON 31078, figs. 168–172): Total length 1.94. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Posterior genitalic process moderately visible through postepigastric plate. Median protruding part of large genital plate longer than wide; anterior genitalic process club shaped, with moderately enlarged apex, much shorter than posterior genitalic process; filiform glands on small basal plate of anterior genitalic process inconspicuous; posterior genitalic process long, convoluted duct with subspherical, enlarged distal end.

Other Material Examined: COSTA RICA: **Heredia:** 9 km NE Vara Blanca, 10.23333°N, 84.10000°W, Mar. 6, 2005, INBio-OET-ALAS transect, elev. 1550 m (C. Víquez, INBIO PBI_OON 31096), 1♂, Apr. 11, 2005, elev. 1450–1550 (C. Víquez, INBIO PBI_OON 31111), 1♀. **Puntarenas:** Reserva Biológica Bosque Nuboso Monteverde, Apr. 1–4, 1983, cloud forest, elev. 1700 m (D. Ubick, CDU PBI_OON 3612), 1♂.

Distribution: Costa Rica (Heredia, Puntarenas).



FIGURES 158–172. *Varioonops montesta*, new species, male (158–167) and female (168–172). **158.** Habitus, dorsal view. **159.** Carapace, anterior view. **160.** Sternum, ventral view. **161.** Abdomen, same. **162.** Same, anterior view. **163.** Embolus and conductor, dorsal view. **164.** Palp, prolateral view. **165.** Same, dorsal view. **166.** Same, retrolateral view. **167.** Embolus opening, anterodorsal view. **168.** Habitus, dorsal view. **169.** Sternum, ventral view. **170.** Abdomen, anterior view. **171.** Epigastric area, ventral view. **172.** Genitalia, dorsal view.

Varioonops spatharum, new species
Figures 173–187

NOTE: Males and females have not been collected together, but are a good match in somatic morphology (e.g., microsculpture on the sternum, eyes, size); a female and a male were collected at La Selva in February 2001 and 2002, respectively.

TYPE: Male holotype taken at an elevation of 2000 m at a site 6 km ENE of Vara Blanca, 10.18333°N, 84.11666°W, Heredia, Costa Rica (C. Víquez; Apr. 15, 2002), deposited in INBIO (PBI_OON 31104).

ETYMOLOGY: The specific name refers to the embolus tip shape, in prolateral view, which resembles the shape of the spathe of an *Arum* plant.

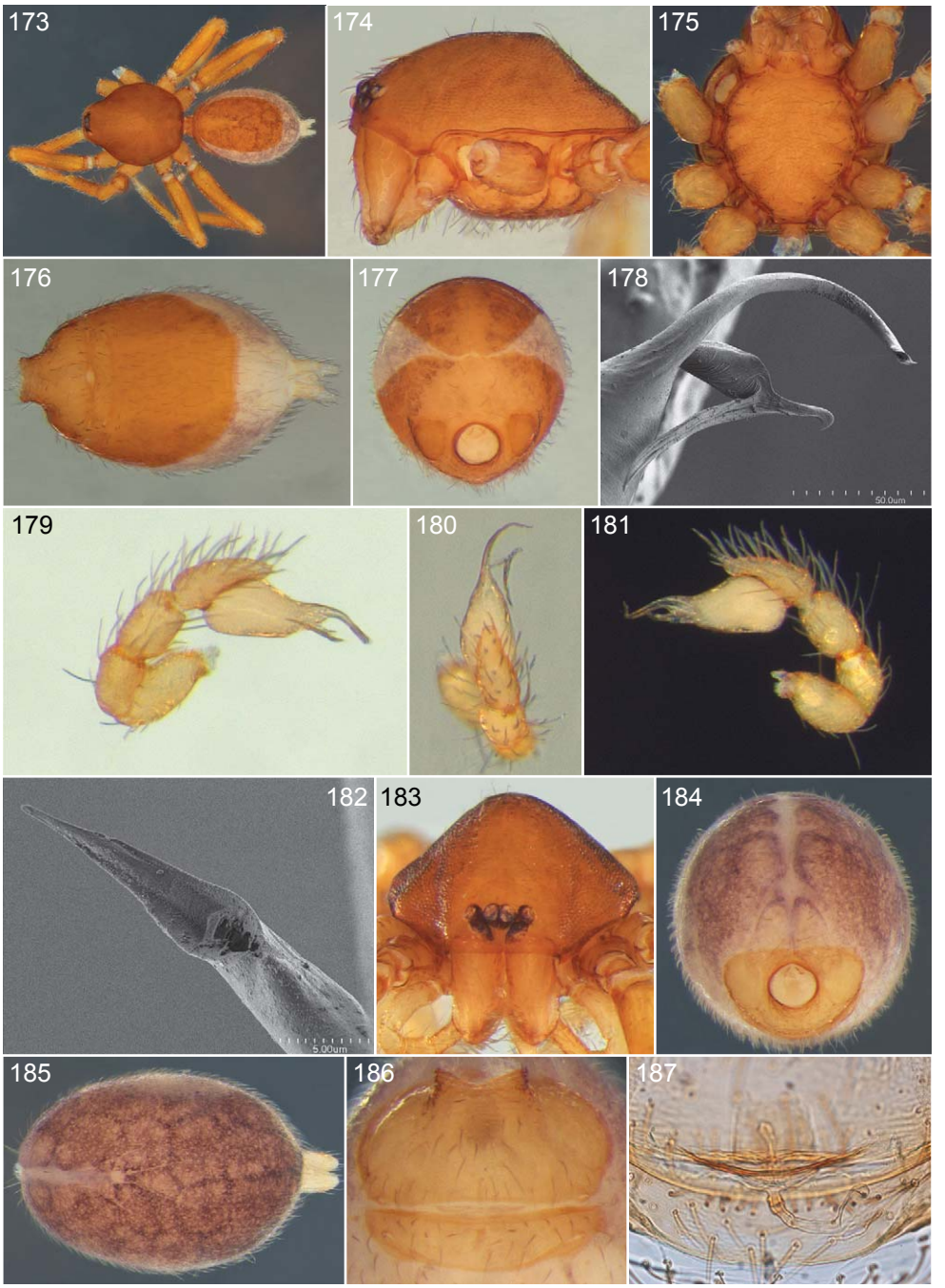
DIAGNOSIS: Males resemble only those of *V. montesta* (fig. 163) and *V. poas* (fig. 193) in having a tube-shaped embolus, bent approximately 90° prolaterad with an opening skewed dorsally and a distinct conductor with a broadened flat, base and distally with a long, backward-pointed spur (also present but short in *V. cerrado*, fig. 343). They differ in having an elongated hook-shaped distal tip of the conductor (rather than broad, hook shaped in *V. poas* or simple, pointed in *V. montesta*). Females can be separated from those of all other species by the short stalked, leaf-shaped anterior genitalic process and the moderately convoluted, distally subspherically enlarged posterior process (fig. 187).

MALE (PBI_OON 31104, figs. 173–182): Total length 1.84. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum moderately concave (in anterior view). Postepigastric scutum with posterior margin moderately concave. Leg spination: femur I p0-1-1; tibiae: I p1-1-0, v4-2-2, r1-0-0; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore oval. Cymbial cone narrow, cone shaped. Embolus tube shaped, elongated, evenly curved prolaterad, tip with rebordered, oval opening and distally strongly elongated, triangularly pointed protrusion, proximal of opening with slightly elevated protuberance; conductor basally broad, lamelliform, enlarged distally, T-shaped, with simple, pointed, furrowed, proximal branch twice as long as elongated hook-shaped distal branch.

FEMALE (PBI_OON 31002, figs. 183–187): Total length 2.00. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Anterior process, plate, and posterior sclerite moderately visible through epigastric and postepigastric scuta. Median protruding part of large genitalic plate as long as wide; anterior genitalic process short stalked, leaf shaped, approximately half length of posterior genitalic process; field of filiform glands on small basal plate of anterior genitalic process not observed; posterior genitalic process originating from small W-shaped plate, long, tube shaped, basally stronger sclerotized (with ring of glands), distally moderately bent, subspherically enlarged.

OTHER MATERIAL EXAMINED: COSTA RICA: **Cartago:** Reserva Forestal de Río Macho, km 70 on Interamerican Highway, 9.65000°N, 83.85000°W, Mar. 22–26, 1999, sifted moss, litter in log, elev. 2850 m (J. Miller, USNM PBI_OON 27794), 1♀. **Heredia:** 6 km ENE Vara Blanca, 10.18333°, 84.11666°, Mar. 16, 2002, elev. 2000 m (C. Víquez, INBIO PBI_OON 31102, 31108), 2♂, Apr. 16, 2002 (C. Víquez, INBIO PBI_OON 31101), 1♂; La Selva, Feb. 20, 2001 (C. Víquez, INBIO PBI_OON 31002), 1♀, Feb. 17, 2002 (INBIO PBI_OON 49178), 1♂.

DISTRIBUTION: Costa Rica (Cartago, Heredia).



FIGURES 173–187. *Varioonops spatharum*, new species, male (173–182) and female (183–187). **173.** Habitus, dorsal view. **174.** Carapace, lateral view. **175.** Sternum, ventral view. **176.** Abdomen, ventral view. **177.** Same, anterior view. **178.** Embolus and conductor, dorsal view. **179.** Palp, prolateral view. **180.** Same, dorsal view. **181.** Same, retrolateral view. **182.** Embolus opening, posterodorsal view. **183.** Carapace, anterior view. **184.** Abdomen, anterior view. **185.** Same, dorsal view. **186.** Epigastric area, ventral view. **187.** Genitalia, dorsal view.

Varioonops poas, new species
Figures 188–202

NOTE: Males and females have not been collected together, show some somatic differences (e.g., microsculpture on the sternum, size), and may be mismatched.

TYPES: Male holotype and male paratype collected at the camping area at Volcán Poás, Heredia, Costa Rica (C. Víquez, E. Ulate, May 10, 2005), deposited in INBIO (PBI_OON 31082).

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

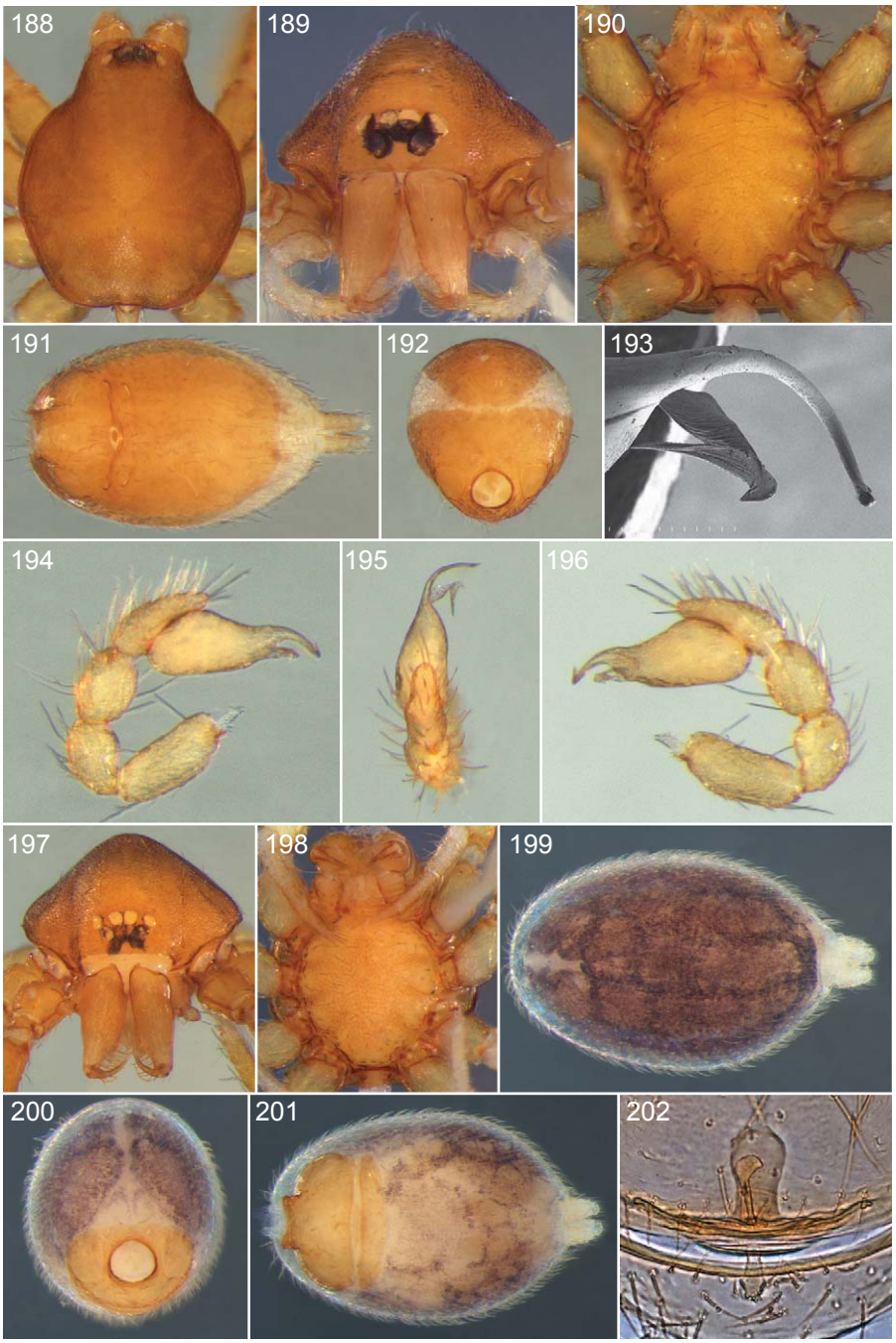
DIAGNOSIS: Males resemble only those of *V. montesta* (fig. 173) and *V. spatharum* (fig. 178) in having a tube-shaped embolus, bent approximately 90° prolaterad with an opening skewed dorsally and a distinct conductor with a broadened flat base and distally with a long, backward-pointed spur (also present but short in *V. cerrado*, fig. 343). They differ in having a broad, flat hook-shaped distal tip of the conductor (rather than elongated, hook shaped in *V. spatharum* or simple, pointed in *V. montesta*). Females can be separated from those of all other species by the skewed, spoon-shaped, narrowly stalked anterior genitalic process and the distally conspicuously trapezoidal, enlarged posterior process (fig. 202).

MALE (PBI_OON 31082, figs. 188–196): Total length 2.05. Sternum microsculpture medially and in furrows, surface evenly granulated. Anterodorsal margin of epigastric scutum moderately concave (in anterior view). Postepigastric scutum with posterior margin moderately concave. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore oval. Cymbial cone narrow, elongated, originating from pit. Embolus tube shaped, elongated, smooth (distally with some short longitudinally scattered ribs), curved ventroprolaterad; tip with oval opening, margin moderately rebordered, distally elongated, subrectangular plate; conductor basally broad, lamelliform, enlarged, distally divided into broad, flat hook, pointing posteriad, and backward-pointed spur-shaped, furrowed projection.

FEMALE (PBI_OON 31043, figs. 197–202): Total length 1.80. Sternum surface loosely, coarsely granulated. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genitalic plate almost twice as long as wide; anterior genitalic process skewed, spoon shaped, narrowly stalked, as long as posterior genitalic process; field of filiform glands on small basal plate of anterior genitalic process present but inconspicuous; posterior genitalic process basally broad, tube shaped, elongated, distally conspicuously trapezoidal, enlarged.

OTHER MATERIAL EXAMINED: COSTA RICA: **Alajuela:** Parque Nacional Volcán Poás, trail to Tierra Fina, Apr. 6, 2002, dry leaves, elev. 2600 m (P. Thomas, INBIO PBI_OON 29826), 1♂. **Heredia:** Cerro Chompipe, 8 km N San Rafael, Aug. 10, 2007, sifted forest leaf litter, elev. 2040 m (D. Chandler, INBIO PBI_OON 31043), 1♀.

DISTRIBUTION: Costa Rica (Alajuela, Heredia).



FIGURES 188–202. *Varioonops poas*, new species, male (188–196) and female (197–202). **188.** Carapace, dorsal view. **189.** Same, anterior view. **190.** Sternum, ventral view. **191.** Abdomen, same. **192.** Same, anterior view. **193.** Embolus and conductor, dorsal view. **194.** Palp, prolateral view. **195.** Same, dorsal view. **196.** Same, retrolateral view. **197.** Carapace, anterior view. **198.** Sternum, ventral view. **199.** Abdomen, dorsal view. **200.** Same, anterior view. **201.** Same, ventral view. **202.** Genitalia, dorsal view.

The *tortuguero* group

Varioonops varablanca, new species

Figures 203–217

Type: Male holotype taken at an elevation of 1450–1550 m at a site 9 km northeast of Vara Blanca, 10.23333°N, 84.10000°W, Heredia, Costa Rica (C. Víquez, Feb. 19, 2005), deposited in INBIO (PBI_OON 31106).

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

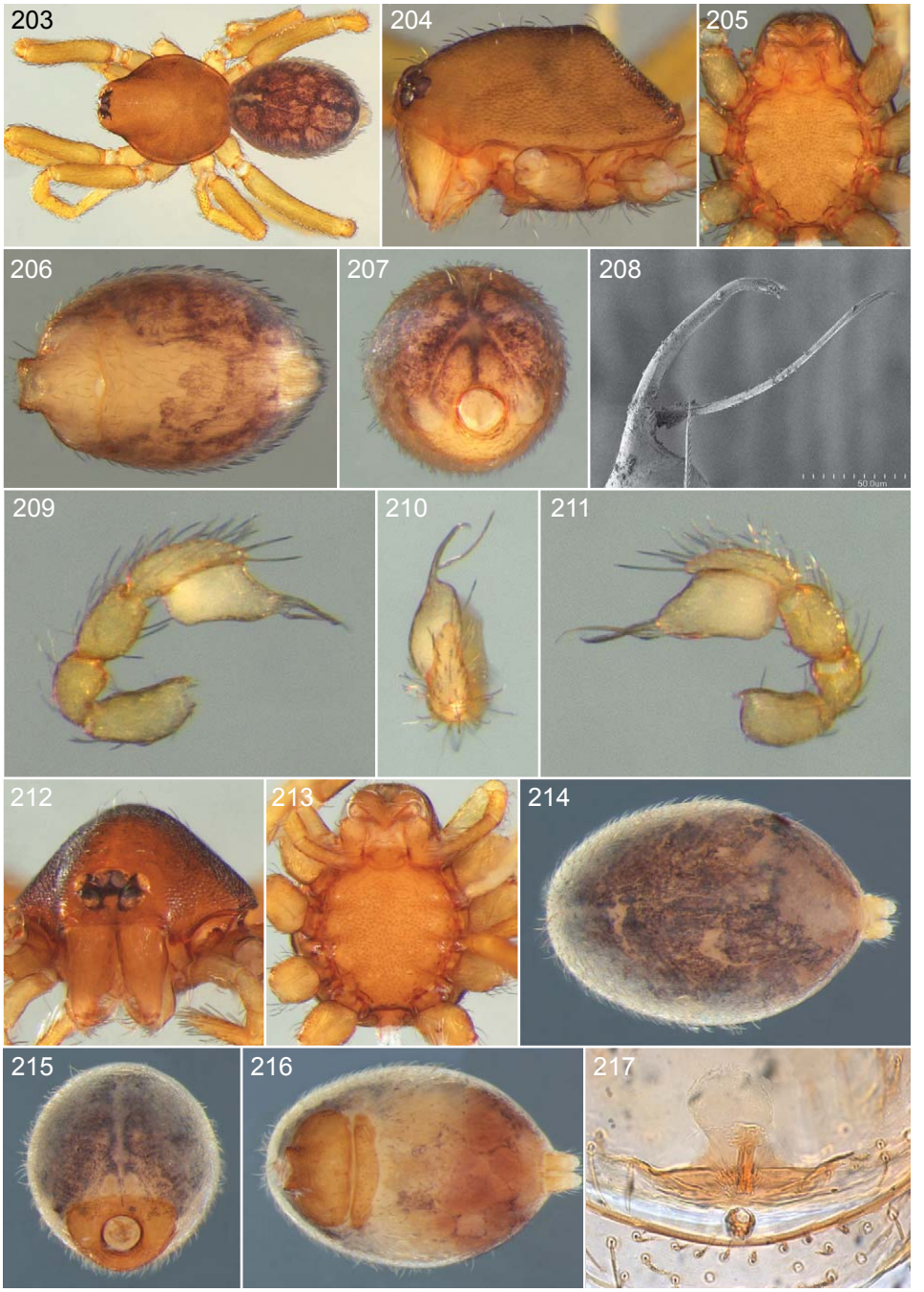
Diagnosis: Males resemble only those of *V. tortuguero*, *V. veragua,* and *V. ramila* in having the embolus tip abruptly bent prolaterad and in having a simple long conductor originating ventroprolateral at the embolus base. They differ in the very distinct, narrow, tube-shaped conductor which is longer than the embolus (fig. 208, rather than spindle shaped in *V. tortuguero*, figs. 72, 73, basally flat in *V. veragua*, fig. 242, or completely flattened in *V. ramila*, fig. 253, and all shorter than embolus). Females differ from those of all other species by the broad-stalked, mushroom-shaped anterior genitalic process and the dorsally bent, moderately club-shaped posterior process (fig. 217).

Male (PBI_OON 31106, figs. 203–211): Total length 1.53. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum moderately concave (in anterior view). Postepigastric scutum with posterior margin straight. Leg spination: femur I p0-1-1; tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore oval. Cymbial cone not detected. Embolus tube shaped, elongated, smooth, basally moderately curved, distally abruptly bent; tip with simple oval opening and distally elongated, spur-shaped, pointed tip; conductor smooth, narrow, branch shaped, distally moderately flattened, pointed, distinctly longer than embolus.

Female (PBI_OON 31036, figs. 212–217): Total length 1.78. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genitalic plate as long as wide; anterior genitalic process broad stalked, with irregularly enlarged apex, mushroom shaped, longer than posterior genitalic process; field of filiform glands on small basal plate of anterior genitalic process conspicuous; posterior genitalic process moderately club shaped, bent dorsally, distally folded, appearing heart shaped, glands visible.

Other Material Examined: COSTA RICA: **Alajuela:** Garroba, Upala, Feb. 2 (year unknown) (INBIO PBI_OON 49172), 1♀; Reserva Biológica San Ramón, 27 km N, 8 km W San Ramón, 10.22500°N, 84.59166°W, June 14, 1997, wet premontane forest litter, elev. 950 m (R. Anderson, INBIO PBI_OON 31016, 31036), 1♂, 1♀. **Heredia:** 9 km NE Vara Blanca, 10.23333°N, 84.10000°W, Mar. 6, 2005, elev. 1450–1550 m (C. Víquez, INBIO PBI_OON 31109), 1♂, Apr. 15, 2005 (C. Víquez, INBIO PBI_OON 31103), 1♂.

Distribution: Costa Rica (Alajuela, Heredia).



FIGURES 203–217. *Varioonops varablanca*, new species, male (203–211) and female (212–217). **203.** Habitus, dorsal view. **204.** Carapace, lateral view. **205.** Sternum, ventral view. **206.** Abdomen, same. **207.** Same, anterior view. **208.** Embolus and conductor, dorsal view. **209.** Palp, prolateral view. **210.** Same, dorsal view. **211.** Same, retrolateral view. **212.** Carapace, anterior view. **213.** Sternum, ventral view. **214.** Abdomen, dorsal view. **215.** Same, anterior view. **216.** Same, ventral view. **217.** Genitalia, dorsal view.

Varioonops tortuguero, new species
Figures 61–120, 218–232

Types: Male holotype, seven male paratypes, and nine female paratypes taken in wet forest (second growth) leaf litter at Parque Nacional Tortuguero, Limón, Costa Rica (D. Ubick, Apr. 17–23, 1983), deposited in CAS (PBI_OON 3611).

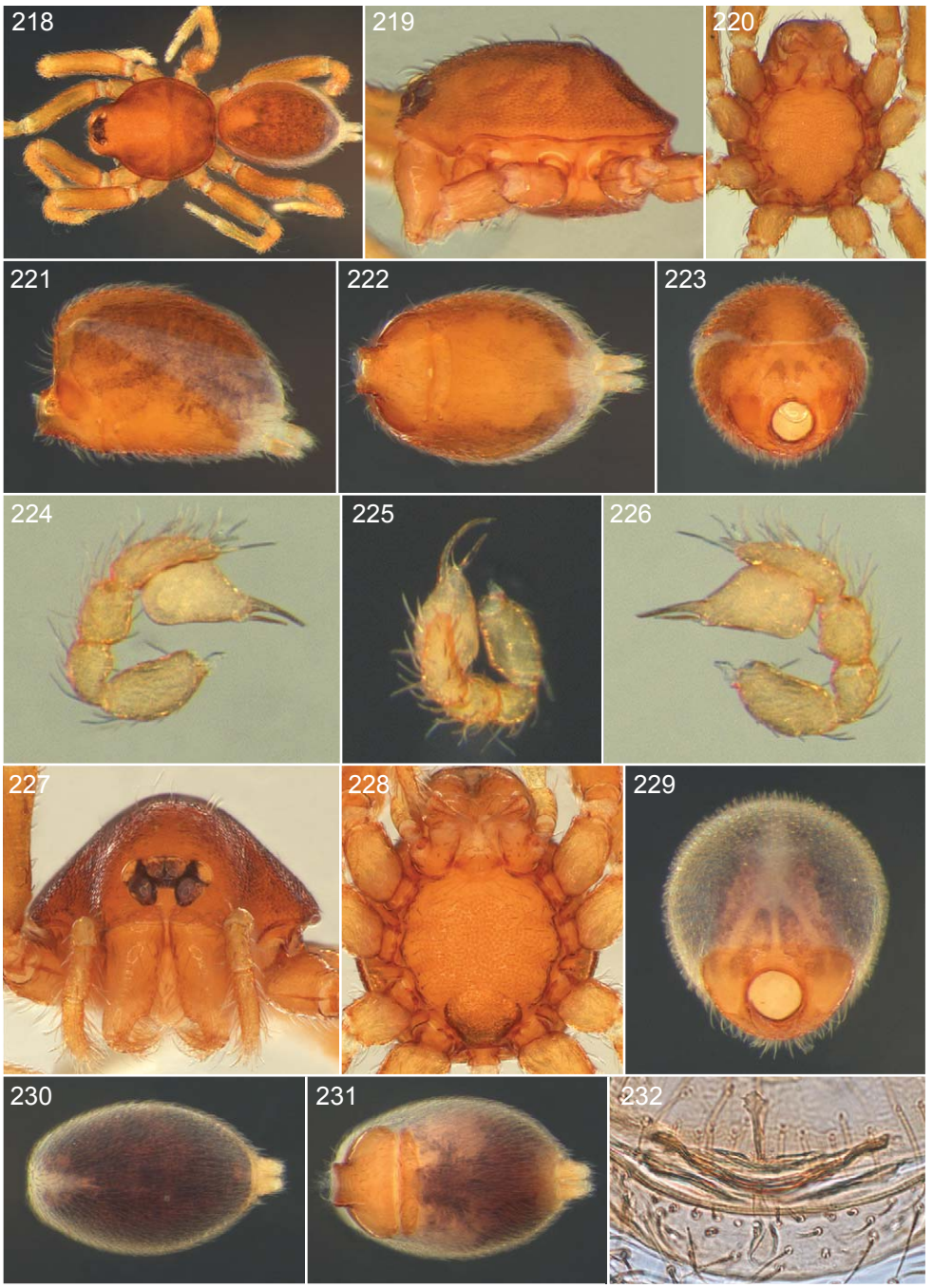
Etymology: The specific name is a noun in apposition taken from the type locality.

Diagnosis: Males resemble only those of *V. varablanca* (fig. 208), *V. veragua* (fig. 242), and *V. ramila* (fig. 253) in having the embolus tip abruptly bent prolaterad and in having a simple, long conductor originating ventroprolaterally at the embolar base. They differ in having a very distinct, spindle-shaped conductor (fig. 73), rather than a narrow, branch-shaped one, that is longer than the embolus in *V. varablanca*, basally flat in *V. veragua,* and completely flattened in *V. ramila*. Females are most similar to those of *V. veragua* (fig. 247) but differ from those and all other species by the long, narrow-stalked, distally bulky, enlarged anterior genitalic process and the broad, club-shaped, unconvoluted posterior process (figs. 102, 232).

Male (PBI_OON 3611, figs. 61–90, 218–226): Total length 1.45. Sternum microsculpture medially and in furrows, sternum surface evenly, coarsely granulated. Anterodorsal margin of epigastric scutum concave (in anterior view). Postepigastric scutum with posterior margin concave. Leg spination: femur I p0-1-1; tibiae: I v4-2-2; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore oval. Cymbial cone basally broad, distally cone shaped. Embolus tube shaped, elongated, smooth, curved prolaterad, tip with simple oval opening with indistinctly rebordered rim, distally with elongated, skewed subrectangular plate; conductor long, spindle shaped, tip almost reaching embolus opening.

Female (PBI_OON 3611, figs. 91–120, 227–232): Total length 1.64. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genitalic plate wider than long; anterior genitalic process long, narrow-stalked, distally bulkily enlarged, moderately shorter than posterior genitalic process; field of filiform glands on small basal plate of anterior genitalic process conspicuous; posterior genitalic process broad, club shaped, medially bearing suboval gland.

Other Material Examined: COSTA RICA: **Cartago:** Parque Nacional Barbilla, Jan. 19, 2001, mulch, elev. 600 m (W. Arana, INBIO PBI_OON 31006), 1♀; 10 km S Tapantí, Río Grande de Orosi, 9.70000°N, 83.78333°W, Apr. 14, 1973, Berlese, mixed floor litter, elev. 1500 m (J. Wagner, J. Kethley, FMNH 73396, PBI_OON 10033), 1♂, same, moss on logs and loam (J. Wagner, J. Kethley, FMNH 73394, PBI_OON 10636), 1♂. **Limón:** 5.5 km E Guápiles, May 14–16, 1987, sifting tropical wet forest leaf litter, elev. 200 m (D. Ubick, CDU PBI_OON 3609), 2♂, 1♀; Parque Nacional Cahuita National Park, Punta Cahuita, Apr. 25, 1983, maritime wet forest (D. Ubick, CDU PBI_OON 3634), 1♀; Reserva Biológica Hitoy Cerere , May 12, 1998, mulch, elev. 160 m (E. Rojas, INBIO 50908, PBI_OON 31023), 1♂; Oct. 14, 1998, mulch, elev. 450 m (E. Rojas, INBIO PBI_OON 31037), 1♂, Aug. 29–Sept. 30, 2000 (W. Arana, INBIO PBI_OON 31033), 1♂, Apr. 1, 2002 (W. Arana, INBIO PBI_OON 31005, 31035), 1♂, 1♀, same, Esparel trail, Mar. 28, 2002, litter, elev. 200 m (P. Thomas, INBIO PBI_OON 31034), 1♂; Hone Creek, Finca de Alberto Moore, Jan. 5, 2004, cacao and banana, mulch extraction (C. Víquez, INBIO PBI_OON 31026), 1♂, 1♀, Jan. 8–9, 2004, transect in en mangos (C. Víquez, INBIO 332, PBI_OON 29686), 1♀, Feb. 14–15, 2004, abandoned cacao, mulch extraction (C. Víquez, INBIO 341, PBI_OON 29684), 3♀, cacao and *Cordia* (C. Víquez, INBIO PBI_OON 31024), 1♂, Mar. 12–15, 2004 (C. Víquez, INBIO 2086,



FIGURES 218–232. *Varioonops tortuguero*, new species, male (218–226) and female (227–232). **218.** Habitus, dorsal view. **219.** Carapace, lateral view. **220.** Sternum, ventral view. **221.** Abdomen, lateral view. **222.** Same, ventral view. **223.** Same, anterior view. **224.** Palp, prolateral view. **225.** Same, dorsal view. **226.** Same, retrolateral view. **227.** Carapace, anterior view. **228.** Sternum, ventral view. **229.** Abdomen, anterior view. **230.** Same, dorsal view. **231.** Same, ventral view. **232.** Genitalia, dorsal view.

PBI_OON 29690, 31031), 1♂, 1♀, hand collecting, abandoned cacao (C. Víquez, INBIO 540, PBI_OON 29691), 1♀, Apr. 5–8, 2004, abandoned cacao, mulch extraction (C. Víquez, INBIO 330 PBI_OON 29724), 1♂, cacao and banana (C. Víquez, INBIO PBI_OON 31028), 1♂, June 4–7, 2004, transect in mangos (C. Víquez, INBIO PBI_OON 31025), 1♂, cacao, *Cordia*, banana (C. Víquez, INBIO PBI_OON 31030), 1♂, cacao and *Cordia* (C. Víquez, INBIO 2731, PBI_OON 29689), 1♀, July 8–11, 2005 (C. Víquez, INBIO 1923, PBI_OON 29688), 1♀, Aug. 3, 2004 (C. Víquez, INBIO 340, PBI_OON 29685, 31027), 1♂, 1♀, Oct. 8–11, 2004, cacao, *Cordia,* banana (C. Víquez, INBIO 524, PBI_OON 27972, 31032,), 1♂, 1♀, cacao and *Cordia* (C. Víquez, INBIO 348, 2728, PBI_OON 29692, 31081), 2♂, 1♀, Oct. 21–23, 2005, cacao, *Cordia*, banano (C. Víquez, INBIO 1921, PBI_OON 29687), 1♀, same, hand collected, cacao and *Cordia*, under trunk (C. Víquez, INBIO PBI_OON 31029), 1♂; Penshurst, 10 km N Cahuita, Apr. 13–15, 1983, humid forest with cacao, leaf litter (D. Ubick, CDU PBI_OON 3610), 1♂, 1♀. **San José:** San Ramón, Río María Aguilar, 9.93475°N, 83.98826°W, Sept. 30, 2010, mulch, elev. 1424 m (B. Hernandez, M. Maraga, INBIO 99824, PBI_OON 49183), 1♂.

Distribution: Costa Rica (Cartago, Limón, San José).

Varioonops veragua, new species

Figures 233–247

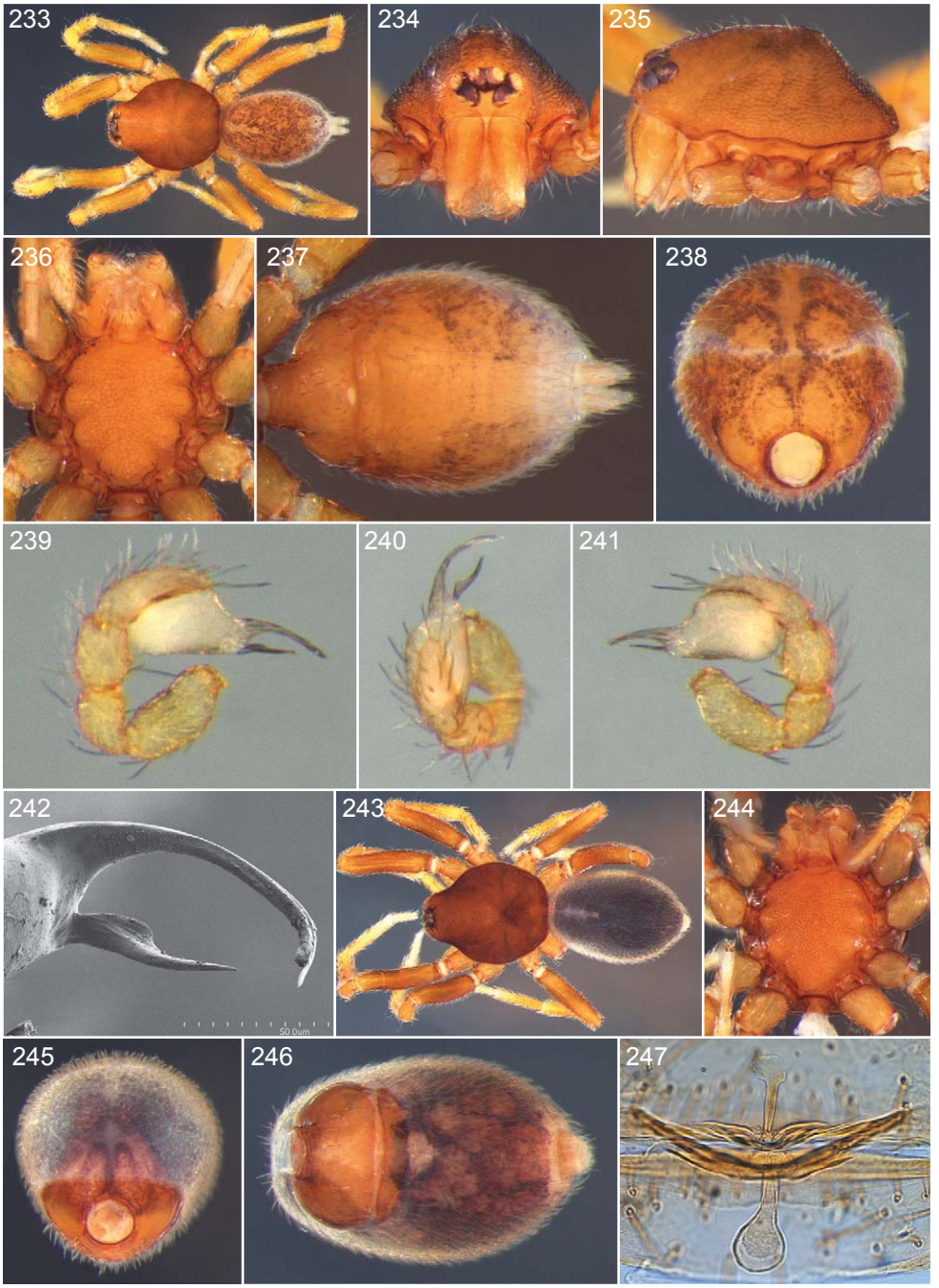
Types: Male holotype, male paratype, and three female paratypes taken in a mini-Winkler trap in a rainforest on the El Pity trail in the Veragua Rainforest, Limón, Costa Rica (M. Solis; Mar. 19, 2009), deposited in INBIO (PBI_OON 49175).

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

Diagnosis: Males resemble only those of *V. tortuguero* (figs. 71–75), *V. varablanca* (fig. 208), and *V. ramila* (fig. 253) in having the embolus tip abruptly bent prolaterad and in having a simple, long conductor originating ventroprolaterally at the embolar base. They differ in having the conductor basally flat (fig. 242), rather than spindle shaped in *V. tortuguero*, narrow, branch shaped, and longer than the embolus in *V. varablanca,* and completely flattened in *V. ramila*. Females resemble those of *V. tortuguero* but differ those of all other species by the long, narrow-stalked, distally enlarged, and subcircular anterior genitalic process and the long, tube-shaped, distally spherically enlarged, unconvoluted posterior process (fig. 247).

Male (PBI_OON 49175, figs. 233–242): Total length 1.42. Sternum microsculpture everywhere but front, weaker laterally at coxae, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum moderately concave (in anterior view). Postepigastric scutum with posterior margin moderately concave. Leg spination: femur I p0-1-1; tibiae I, II v4-2-2; metatarsi I, II p1-0-0, v2-2-2. Sperm pore oval. Cymbial cone not detected. Embolus tube shaped, elongated, dorsally with moderate longitudinal furrow, curved prolaterad; tip with simple oval opening and distally elongated scoop-shaped blunt terminus; conductor basally broad, flattened, semicircular, protruding toward embolus, distally tapering, pointed, reaching ⅔ of embolus length.

Female (PBI_OON 49175, figs. 243–247): Total length 1.67. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Anterior sclerite, plate, and posterior sclerite moderately visible through epigastric, postepigastric scuta. Median protruding part of large genitalic plate longer than wide; anterior genitalic process long, narrow stalked, with irregularly subcircular, enlarged apex, shorter than posterior genitalic pro-



FIGURES 233–247. *Varioonops veragua*, new species, male (233–242) and female (243–247). **233.** Habitus, dorsal view. **234.** Carapace, anterior view. **235.** Same, lateral view. **236.** Sternum, ventral view. **237.** Abdomen, ventral view, **238.** Same, anterior view. **239.** Palp, prolateral view. **240.** Same, dorsal view. **241.** Same, retrolateral view. **242.** Embolus and conductor, dorsoprolateral view. **243.** Habitus, dorsal view. **244.** Sternum, ventral view. **245.** Abdomen, anterior view. **246.** Same, ventral view. **247.** Genitalia, dorsal view.

cess; field of filiform glands on small basal plate of anterior genitalic process conspicuous; posterior genitalic process long, tube shaped, with spherical distal end, distinct glands absent.

Other Material Examined: COSTA RICA: **Limón:** Veragua Rainforest, Los Gigantea, Mar. 17, 2009, mini-Winkler, elev. 400 m (M. Solis, B. Hernandez, INBIO 96612, PBI_OON 49227), 1♀.

Distribution: Costa Rica (Limón).

Varioonops ramila, new species

Figures 248–262

Types: Male holotype, male paratype, and female paratype from Berlese sample of concentrated forest floor litter taken at Almirante, Bocas del Toro, Panama (H. Dybas; Apr. 1, 1959), deposited in FMNH (33655, PBI_OON 10157).

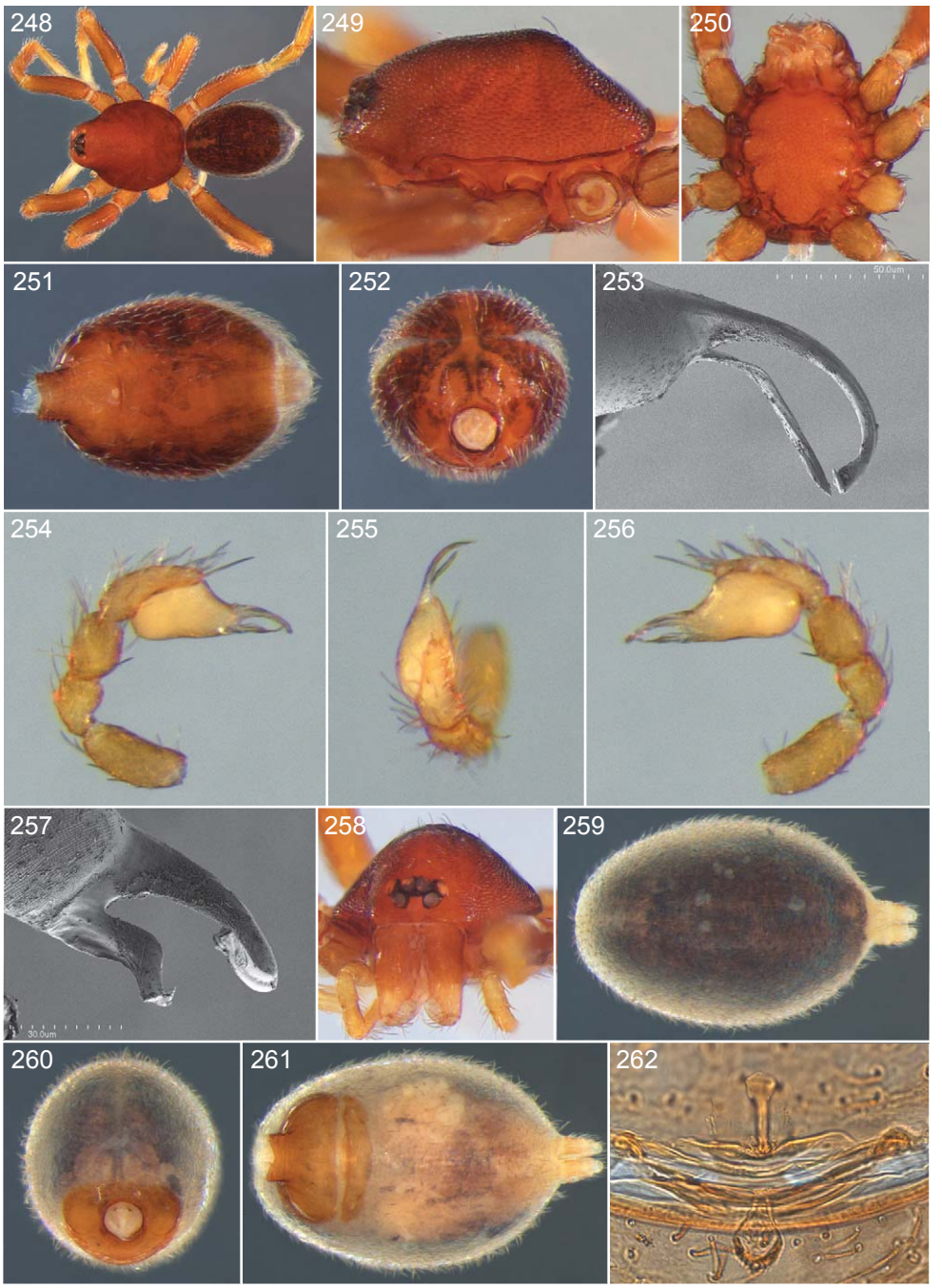
Etymology: The specific name is a noun in apposition, a shortened anagram taken from the type locality.

Diagnosis: Males resemble only those of *V. tortuguero* (figs. 71–75), *V. varablanca* (fig. 208), and *V. veragua* (fig. 242) in having the embolus tip abruptly bent prolaterad and in having a simple, long conductor originating ventroprolaterally at the embolar base. They differ in having the conductor completely flat (figs. 253, 257), rather than distinctly spindle shaped in *V. tortuguero*, narrow, branch shaped, and longer than the embolus in *V. varablanca,* and basally flattened in *V. veragua*. Females resemble those of *V. heredia* but differ from those of all other species by the long-stalked, distally bulbous, enlarged anterior genitalic process and the very short, distally subspherical, enlarged, and gland-bearing posterior process (fig. 262).

Male (PBI_OON 37759, figs. 248–257): Total length 1.38. Sternum fused to carapace, microsculpture everywhere but front, laterally less dense, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum straight (in anterior view). Postepigastric scutum with posterior margin moderately concave. Leg spination: femur I p0-1-1; tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore relatively large, oval. Embolus tube shaped, elongated, evenly curved prolaterad, dorsally moderately carinated; tip with simple oval opening and distally elongated plate (broken off on SEM picture); conductor lamelliform, originating ventroprolaterally on same base as embolus, bent prolaterad, distally narrowing, with pointed tip, moderately shorter than embolus.

Female (PBI_OON 10405, figs. 258–262): Total length 1.70. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-0-0, v4-2-2, r1-0-0; II v4-2-2; metatarsi I, II p1-0-0, v2-2-2. Anterior, posterior sclerite, plate moderately visible through epigastric and postepigastric scuta. Median protruding part of large genitalic plate longer than wide; anterior genitalic process long stalked, with bulbous, enlarged apex, as long as posterior genitalic process; field of filiform glands at base of anterior genitalic process conspicuous; posterior genitalic process with short connecting duct, distally subspherical, bearing glands.

Other Material Examined: COSTA RICA: **Limón:** Veragua Rainforest, Los Gigantea, Mar. 17, 2009, mini-Winkler, rainforest, elev. 400 m (M. Solis, B. Hernandez, INBIO 96612, PBI_OON 49176), 1♀. PANAMA: **Bocas del Toro:** Almirante, Mar. 26, 1959, decaying palm fruit stalk and sublitter on ground (H. Dybas, FMNH 59-270, PBI_OON 10396), 1♂, Berlese, forest floor litter (H. Dybas, FMNH 33724, PBI_OON 10577), 1♂, Mar. 27, 1959, floor litter (H. Dybas, FMNH PBI_OON 10397), 1♂, trail to dam



FIGURES 248–262. *Varioonops ramila*, new species, male (248–257) and female (258–262). **248.** Habitus, dorsal view. **249.** Carapace, lateral view. **250.** Sternum, ventral view. **251.** Abdomen, same. **252.** Same, anterior view. **253.** Embolus and conductor, dorsal view. **254.** Palp, prolateral view. **255.** Same, dorsal view. **256.** Same, retrolateral view. **257.** Embolus and conductor, dorsoprolateral view. **258.** Carapace, anterior view. **259.** Abdomen, dorsal view. **260.** Same, anterior view. **261.** Same, ventral view. **262.** Genitalia, dorsal view.

on Nigua Creek, Mar. 23, 1959, fibrous center of decayed palm log (H. Dybas, FMNH PBI_OON 10405), 1♀, Mar. 30, 1959, floor litter on hill (H. Dybas, FMNH 33899, PBI_OON 37759), 2♂, Mar. 31, 1959, fibrous palm debris from old palm log on ground (H. Dybas, FMNH 33899, PBI_OON 10401), 1♂.

Distribution: Caribbean coast of Costa Rica (Limón) and Panama (Bocas del Toro).

The *sansidro* group

Varioonops heredia, new species

Figures 263–277

Note: The male and female specimens described here were collected at the same locality, but not at the same time. There are some obvious somatic differences between them in sternum microstructure and size, and their association may be erroneous.

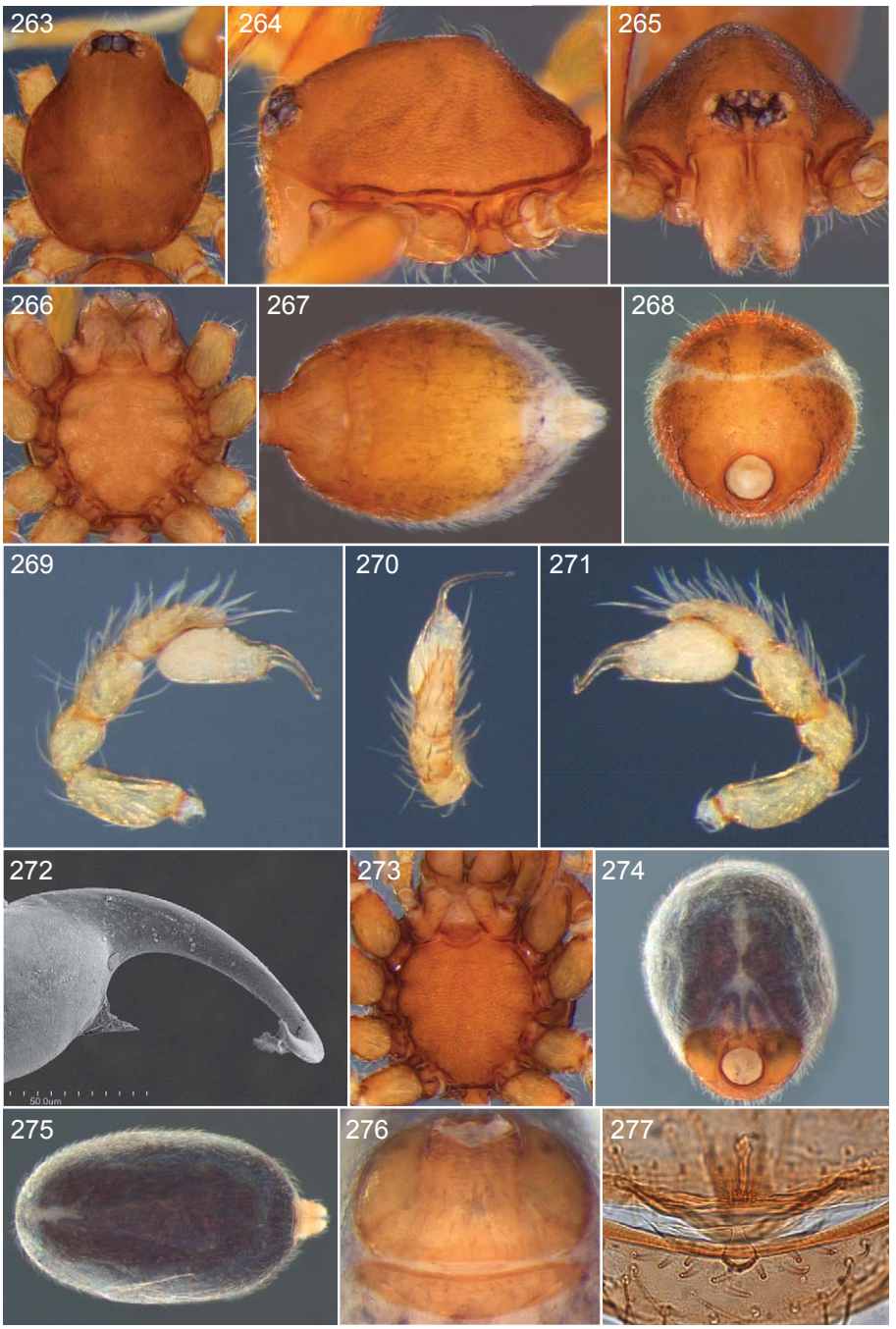
Type: Male holotype taken at an elevation of 1450–1550 m at a site 9 km northeast of Vara Blanca, 10.23333°N, 84.10000°W, Heredia, Costa Rica (C. Víquez; Apr. 15, 2005), deposited in INBIO (PBI_OON 31105).

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

Diagnosis: Males resemble only those of *V. sansidro* (figs. 286–288) in having a basally strongly bent and more distally only moderately bent, smooth, tube-shaped embolus in combination with a very short, flat, triangular conductor (figs. 270, 272). A similar conductor is also present in males of *V. girven*, which differ in having a more evenly bent embolus with longitudinal furrows (fig. 313). The distinctly shorter conductor and the moderately pointed embolus tip with its opening directed posteriorly (rather than an irregularly formed opening directed anteriorly) are characters that separate males from those of *V. sansidro*. Females resemble those of *V. ramila* (fig. 262) but differ from those and of all other species by the long-stalked, distally only moderately enlarged anterior genitalic process and the very short (even shorter than in *V. ramila*), subspherical, flask-shaped, gland-bearing posterior process (fig. 277).

Male (PBI_OON 31105, figs. 263–272): Total length 1.66. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum straight (in anterior view). Postepigastric scutum with posterior margin concave. Leg spination: femur I p0-1-1; tibiae I, II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Cymbial cone longitudinally ribbed. Sperm pore relatively large, oval. Embolus tube shaped, elongated, curved ventroprolaterad, narrowing toward tip; tip posteroventrally furrowed, opening simple, oval, distally elongated, truncated; conductor very short, flat, triangular.

Female (PBI_OON 31042, figs. 273–277): Total length 2.03. Sternum microsculpture everywhere but front (even though less dense laterally). Leg spination: femur I p0-1-1; tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-2; metatarsi I, II p1-0-0, v2-2-2. Anterior, posterior sclerite, plate moderately visible through epigastric and postepigastric scuta. Median protruding part of large genitalic plate longer than wide; anterior genitalic process long stalked, with moderately enlarged apex, distinctly longer than posterior process; field of filiform glands at base of anterior genitalic process conspicuous; posterior genitalic process flask shaped, with short connecting tube, distally bearing glands.



FIGURES 263–277. *Varioonops heredia*, new species, male (263–272) and female (273–277). **263.** Carapace, dorsal view. **264.** Same, lateral view. **265.** Same, anterior view. **266.** Sternum, ventral view. **267.** Abdomen, same. **268.** Same, anterior view. **269.** Palp, prolateral view. **270.** Same, dorsal view. **271.** Same, retrolateral view. **272.** Embolus and conductor, prolateral view. **273.** Sternum, ventral view. **274.** Abdomen, anterior view. **275.** Same, dorsal view. **276.** Epigastric area, ventral view. **277.** Genitalia, dorsal view.

Other Material Examined: COSTA RICA: **Heredia:** 9 km NE Vara Blanca, 10.23333°N, 84.10000°W, Apr. 7–9, 2005 (C. Víquez, INBIO PBI_OON 31042), 1♀.

Distribution: Known only from the type locality in Heredia, Costa Rica.

Varioonops sansidro, new species

Figures 278–307

Note: In the dissected female genitalia, some morphological differences are obvious (figs. 302–304); they are regarded as intraspecific variation.

Types: Male holotype, male paratype, and three female paratypes from in cloud-forest litter taken at an elevation of 1800 m at a site at km 117 of the Interamerican Highway, 19 km north of San Isidro, 9.46666°N, 83.70555°W, San José, Costa Rica (R. Anderson; Feb. 15, 1998), deposited in AMNH (PBI_OON 49184).

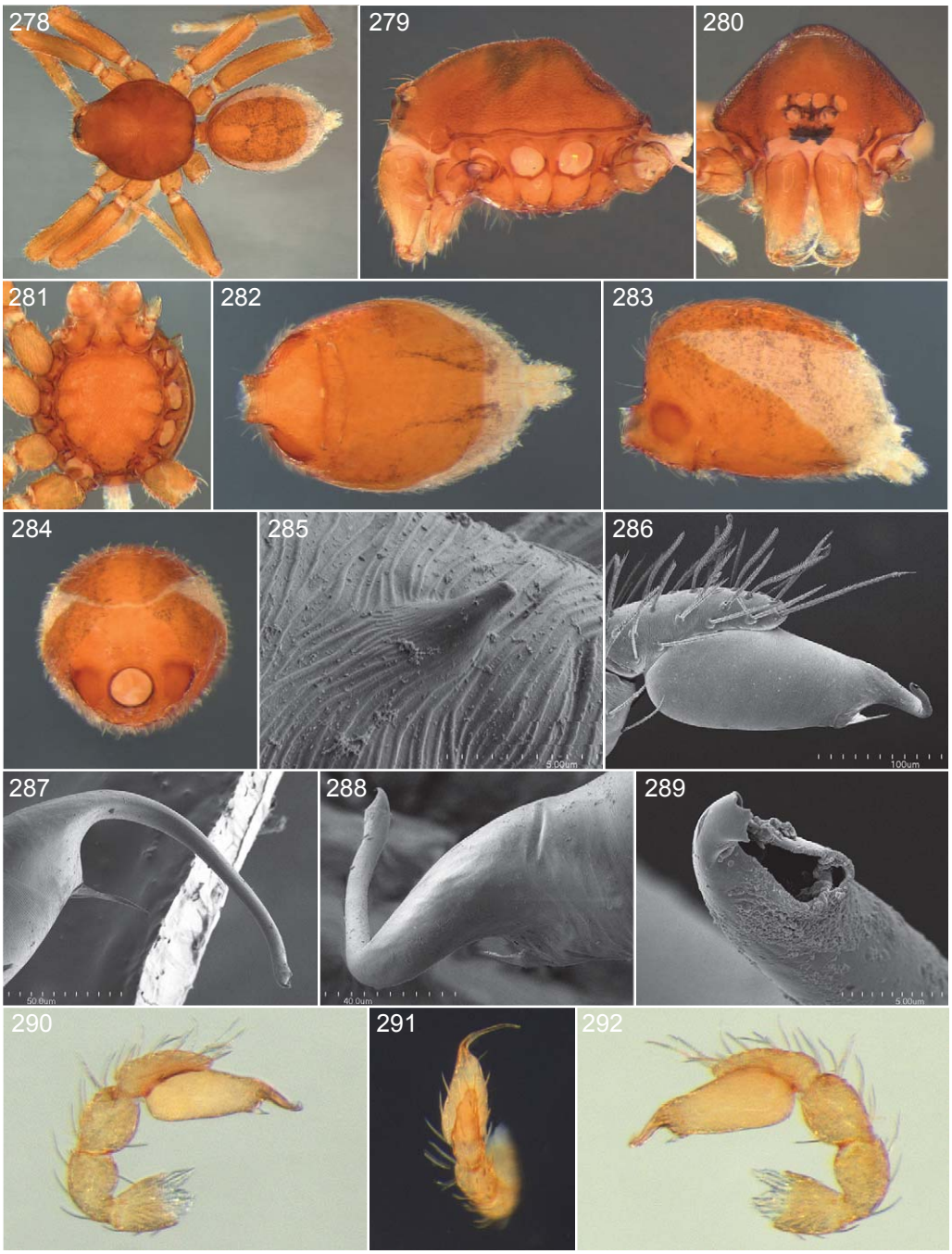
Etymology: The specific name is a noun in apposition, contracted from the type locality.

Diagnosis: Males resemble only those of *V. heredia* (fig. 272) in having a basally strongly bent and more distally only moderately bent, smooth, tube-shaped embolus in combination with a very short, flat, triangular conductor (figs. 287, 291). A similar conductor is also present in *V. girven*, which differs in having a more evenly bent and longitudinally ribbed embolus (fig. 313). The distinctly longer conductor and the stepped, truncated, plate-shaped projection at the embolus tip, with an irregularly formed opening pointing anteriorly (rather than a moderately pointed embolus tip with its opening pointing posteriorly) are characters that separate males from those of *V. heredia*. Females differ from those of all other species by having a narrow, long-stalked, distally variably enlarged anterior genitalic process and a long, duct-shaped, distally subspherically enlarged, moderately but variably bent posterior process with many suboval glands attached at the duct, producing a ribbed appearance (figs. 301–304, 306, 307).

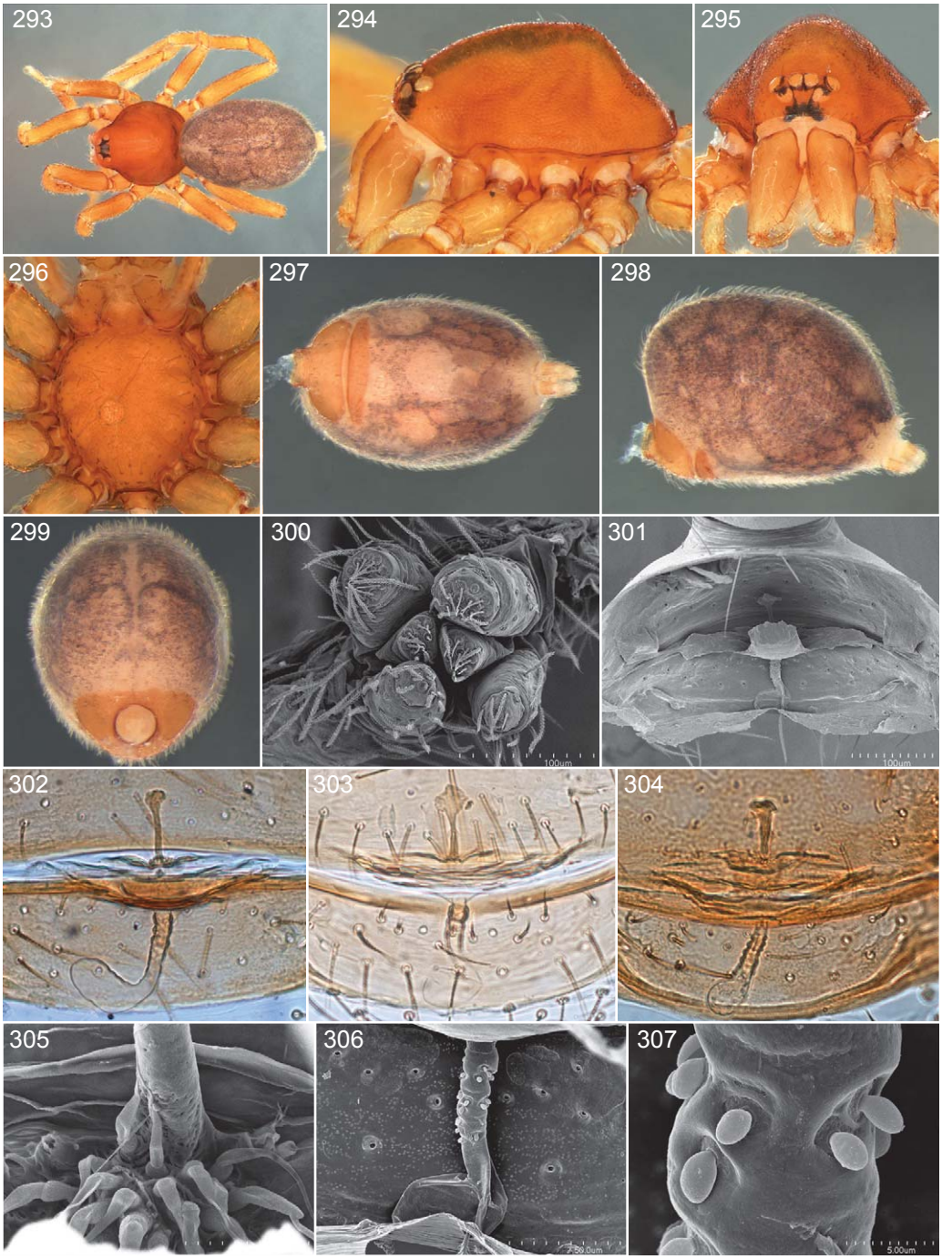
Male (PBI_OON_49184, figs. 278–292): Total length 1.73. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum concave (in anterior view). Postepigastric scutum with posterior margin straight. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore oval. Cymbial cone distally moderately elongated. Embolus tube shaped, elongated, smooth, almost orthogonally bent prolaterad, opening subtriangular, distally with stepped, truncated, plate-shaped projection; conductor simple, flat, triangular, less than ⅓ of embolus length.

Female (PBI_OON_49184, figs. 293–307): Total length 1.87. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-2; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genitalic plate as long as wide; anterior genitalic process long, narrow stalked, distally enlarged, bulbous (variable, figs. 301–304), shorter than posterior process; field of filiform glands on small basal plate of anterior genitalic process conspicuous; posterior genitalic process long duct with subspherically enlarged distal end, moderately bent (variable), many suboval glands attached at duct producing a ribbed appearance.

Other Material Examined: COSTA RICA: **Puntarenas:** Alturas, Quepos, July 29–31, 2010 (A. Solis, C. Víquez, INBIO PBI_OON 49163, 49168), 1♂, 1♀; 1 km SW Biolley, Altamira, Jan. 1–28, 1996, mulch, elev. 1350 m (R. Villalobos, INBIO PBI_OON 31004), 1♀; Estación Biológico Las Alturas, 2 km



FIGURES 278–292. *Varioonops sansidro*, new species, male. **278.** Habitus, dorsal view. **279.** Carapace, lateral view. **280.** Same, anterior view. **281.** Sternum, ventral view. **282.** Abdomen, same. **283.** Same, lateral view. **284.** Same, anterior view. **285.** Cymbial cone, dorsoretrolateral view. **286.** Bulb, prolateral view. **287.** Embolus and conductor, dorsal view. **288.** Same, retrolateral view. **289.** Embolus opening, anterolateral view. **290.** Palp, prolateral view. **291.** Same, dorsal view. **292.** Same, retrolateral view.



FIGURES 293–307. *Varioonops sansidro*, new species, female. **293.** Habitus, dorsal view. **294.** Carapace, lateral view. **295.** Same, anterior view. **296.** Sternum, ventral view. **297.** Abdomen, same. **298.** Same, lateral view. **299.** Same, anterior view. **300.** Spinnerets, posterior view. **301–304.** Genitalia, dorsal view. **305.** Base of anterior genitalic process. **306.** Posterior genitalic process. **307.** Glands on posterior genitalic process.

NE Alturas, 8.94888°N, 82.83361°W, June 20, 1998, montane forest litter, elev. 1520 m (R. Anderson, AMNH PBI_OON 49155), 2♀; 5 km SW Estación Biológica Las Cruces, 8.78694°N, 82.98694°W, June 22, 1998, wet cloud-forest litter, elev. 1400 m (R. Anderson, AMNH PBI_OON 49158, 49174), 1♂, 1♀; OTS Station, 5 km SW Finca Las Cruces, La Fila, Mar. 15, 1973, lower 3″ leaf litter with root mat, elev. 1433 m (J. Wagner, J. Kethley, FMNH 73307, PBI_OON 49226), 1♀, Mar. 21, 1973, Berlese, mixed floor litter (leaf litter, palm fibers, log mold) (J. Wagner, J. Kethley, FMNH 73329, PBI_OON 10615), 1♀, 8.76666°N, 82.96666°W, Mar. 18, 1973, floor litter from virgin forest, moderate slope, elev. 1220 m (J. Wagner, J. Kethley, FMNH 73320, PBI_OON 10650), 1♂; La Lucha, Cerro Amuo, base camp for INBio Darwin Project, 9.11439°N, 83.09342°W, Feb. 19–27, 2008, rock outcrop, elev. 1500 m (C. Víquez, INBIO PBI_OON 31112, 31113), 2♂, 4♀; 35 km NE San Vito, near Los Alturas, Rio Bella Vista, road to gravel pit, Mar. 22, 1991, elev. 1311 m (L. Herman, AMNH PBI_OON 1774), 1♀. PANAMA: **Chiriquí:** 5.6 km N Boquete, La Culebra trail, June 15, 1996, wet cloud-forest litter, elev. 1800 m (R. Anderson, AMNH PBI_OON 49190), 1♀; near Nueva Calfornia, W Finca Palo Santo, Mar. 5, 1959, Berlese, chips, leaf mold at cut stump, elev. 1448 m (H. Dybas, FMNH 59229, PBI_OON 49225), 1♀; 2 km N Santa Clara, Hartmann Finca, May 25, 1977, litter, frass under log bark, elev. 1550 m (S., J. Peck, FMNH 33644, PBI_OON 10146), 1♀; 30.7 km W Volcano, Hartman's Finca, June 16, 1995, mixed oak forest litter, elev. 1800 m (R. Anderson, AMNH PBI_OON 49192), 1♂.

Distribution: Southern Costa Rica (Puntarenas, San José) and northern Panama (Chiriquí).

Ungrouped Species from Costa Rica and Panama

Varioonops girven, new species

Figures 308–322

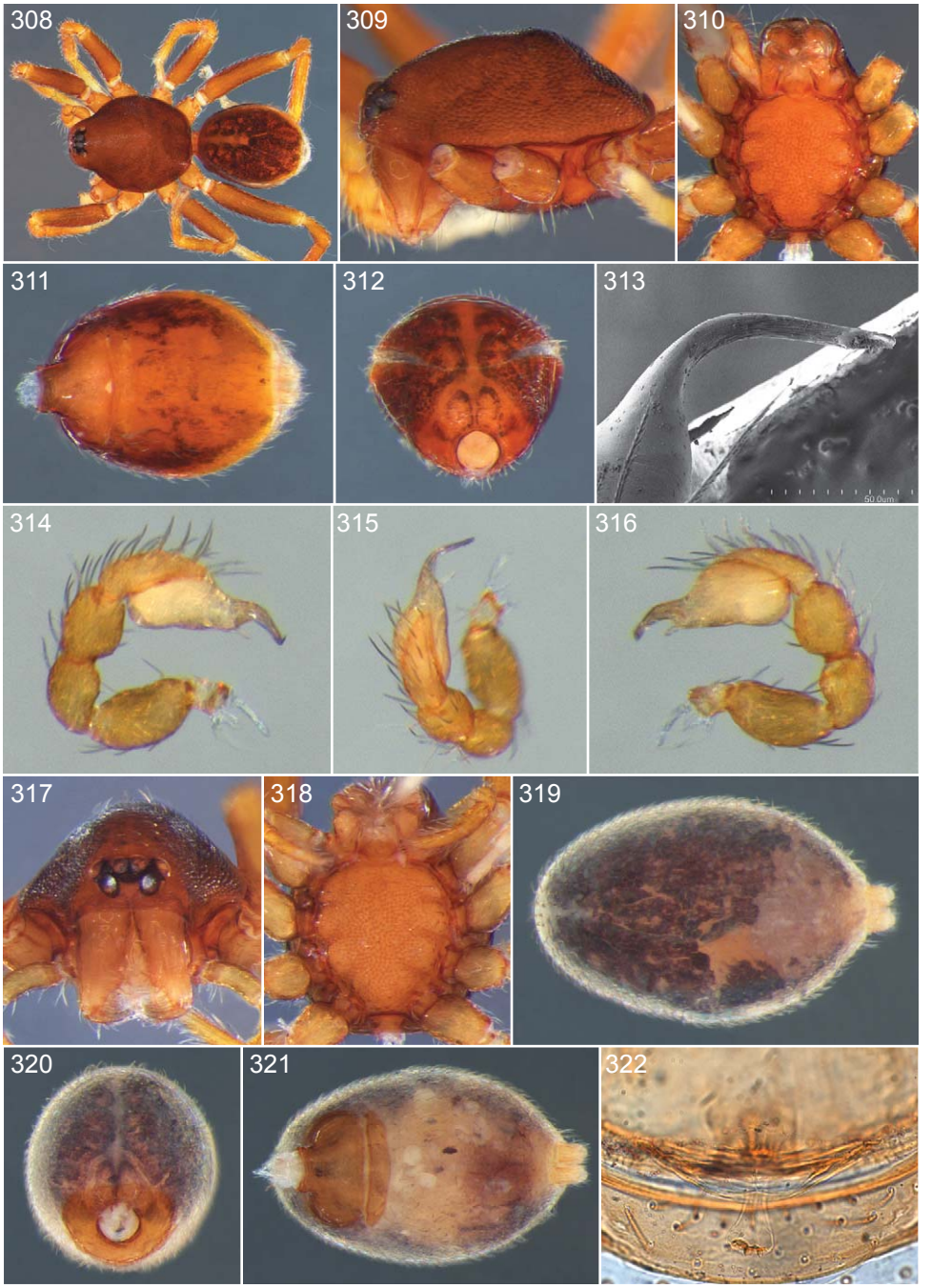
Note: Males and females have not been collected together; even though there is a good match in somatic morphology, the affiliation of the two sexes is tentative and remains uncertain.

Types: Male holotype and male paratype taken at an elevation of 250–350 m at a site 11 km ESE of La Virgen, Heredia, Costa Rica (C. Víquez; Feb. 18, 2004), deposited in INBIO (PBI_OON 31100).

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

Diagnosis: Males differ from those of all other species in having a small, flat, triangular conductor (similar to that found in *V. heredia,* fig. 272, and *V. sansidro*, figs. 286–288) in combination with a broad, longitudinally ribbed, tube-shaped embolus with an oval opening that is skewed dorsad (fig. 313). Females can be separated from those of all other species by the distinct, conical, flask-shaped posterior genitalic process, distally bearing suboval glands (fig. 322).

Male (PBI_OON 31100, figs. 308–316): Total length 1.41. Sternum fused to carapace, microsculpture everywhere but front, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum concave (in anterior view). Postepigastric scutum with posterior margin straight. Leg spination: femur I p0-1-1; tibiae I, II v4-2-1p; metatarsi: I p1-0-0, v2-2-2; II v2-2-2. Sperm pore relatively large, triangular, with rounded angles. Embolus tube shaped, elongated, longitudinally ribbed on ventroprolateral side, curved ventroprolaterad, basally broad, moderately tapering toward tip, tip with slanted oval opening; conductor short, triangular, lamelliform, distally pointed, much shorter than embolus.



FIGURES 308–322. *Varioonops girven*, new species, male (308–316) and female (317–322). **308.** Habitus, dorsal view. **309.** Carapace, lateral view. **310.** Sternum, ventral view. **311.** Abdomen, same. **312.** Same, anterior view. **313.** Embolus and conductor, dorsal view. **314.** Palp, prolateral view. **315.** Same, dorsal view. **316.** Same, retrolateral view. **317.** Carapace, anterior view. **318.** Sternum, ventral view. **319.** Abdomen, dorsal view. **320.** Same, anterior view. **321.** Same, ventral view. **322.** Genitalia, dorsal view.

Female (PBI_OON 49173, figs. 317–322): Total length 1.73. Leg spination: femora: I p0-1-1; II v0-0-1; tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Anterior sclerite, plate not visible through epigastric scutum; median protruding part of large genitalic plate longer than wide; anterior genitalic process moderately long, bulbous, as long as posterior genitalic process; field of long filiform glands at base of anterior genitalic process conspicuous; posterior genitalic process conical, flask-shaped, distally bearing suboval glands.

Other Material Examined: COSTA RICA: **Heredia:** Estación Biológica La Selva, 10.43333°N, 84.01666°W, June 13, 1999, elev. 50–150 m (C. Víquez, INBIO PBI_OON 31019), 1♂, June 25, 1999 (C. Víquez, INBIO PBI_OON 31017, 31020), 2♂, southwest trail, Mar. 2, 2002, elev. 400 m (D. Chandler, INBIO PBI_OON 31018), 1♂, 10.42216°N, 84.00153°W, Aug. 9–18, 2010, Berlese, successional plots, elev. 52 m (Heteroptera course, INBIO 99380, PBI_OON 49173), 1♀;10 km SE La Virgen, 10.33333°N, 84.08333°W, Mar. 17, 2003, mulch, elev. 550 m (R. Anderson, INBIO PBI_OON 31022), 1♂.

Distribution: Costa Rica (Heredia).

Varioonops funator, new species

Figures 323–337

Types: Male holotype, four male paratypes, and seven female paratypes from wet montane cloud-forest litter taken at an elevation of 1200 m on the Continental Divide trail at La Fortuna Area, Bocas del Toro, Chiriquí, Panama (R. Anderson, June 9, 1995), deposited in AMNH (PBI_OON 49193).

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

Diagnosis: Males differ from those of all other species by the distinctly squared bulb (prolateral view, fig. 329) and the very distinctive embolus, which is dorsoventrally flattened and bears a scoop-shaped, elongated projection prolateral of the opening (figs. 328–333). Females differ from those of all other species by the elongated, pocket-shaped, distally moderately tapering and rounded posterior genitalic process (fig. 337).

Male (PBI_OON 49193, figs. 323–333): Total length 1.54. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum moderately concave (in anterior view). Postepigastric scutum with posterior margin straight. Leg spination: femur I p0-1-1; tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore subcircular. Cymbial cone short. Embolus dorsoventrally flattened, moderately curved prolaterad, prolateral longitudinally ribbed; short tip tube shaped, with simple oval opening and distal scoop-shaped, elongated projection; conductor originating prolaterally on same base as embolus, narrow, moderately flattened, simply pointed, half as long as embolus.

Female (PBI_OON_0049193, figs. 334–337): Total length 1.77. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genitalic plate moderately wider than long; anterior genitalic process dendriform, narrow stalked, slightly shorter than posterior process; field of filiform glands on small basal plate of anterior genitalic process conspicuous; posterior genitalic process broad, elongated, pocket shaped, distally moderately tapering, rounded.

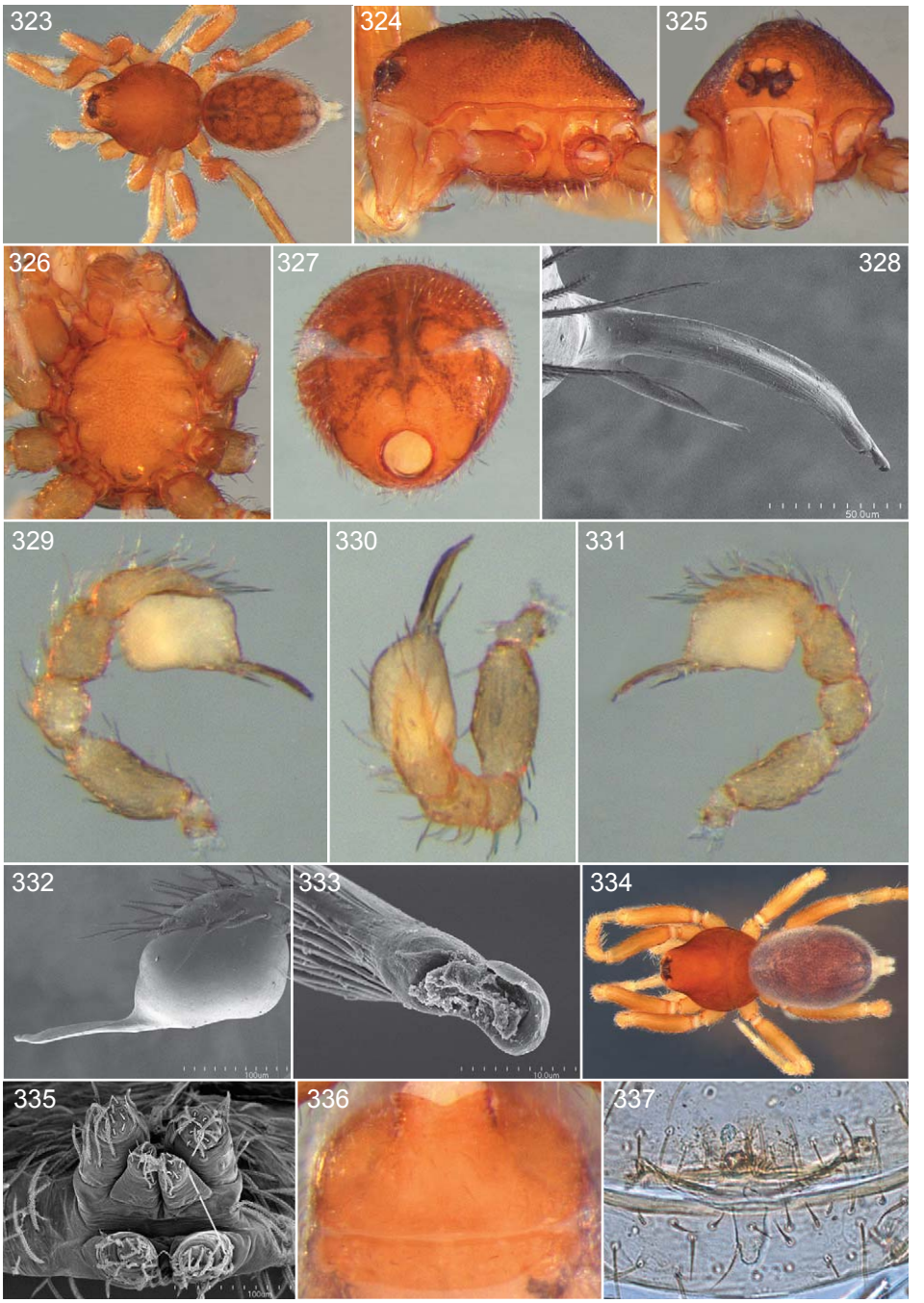


FIGURE 323–337. *Varioonops funator*, new species, male (323–333) and female (334–337). **323.** Habitus, dorsal view. **324.** Carapace, lateral view. **325.** Same, anterior view. **326.** Sternum, ventral view. **327.** Abdomen, anterior view. **328.** Embolus and conductor, dorsal view. **329.** Palp, prolateral view. **330.** Same, dorsal view. **331.** Same, retrolateral view. **332.** Bulb, same. **333.** Embolus opening, posteroprolateral view. **334.** Habitus, dorsal view. **335.** Spinnerets, posterior view. **336.** Epigastric area, ventral view. **337.** Genitalia, dorsal view.

Other Material Examined: PANAMA: **Bocas del Toro:** Fortuna-Chiriquí Grande Road, 8.78333°N, 82.18333°W, July 16–18, 1987, pitfall trap, elev. 800 m (D. Olson, MCZ 72897, PBI_OON 37097), 1♀; Quebrada Alicia cloud forest, 25 km NNE San Félix, 8.56666°N, 81.83333°W, June 4, 1980, Berlese, forest floor litter, root mat, elev. 1500 m (J. Wagner, FMNH 33653, PBI_OON 10155), 1♂, June 5, 1980, floor litter on slopes (J. Wagner, FMNH 33624, PBI_OON 10132), 1♂, June 6, 1980, upper floor litter near ridge top (J. Wagner, FMNH PBI_OON 37760), 1♂, 8.78333°N, 82.18333°W, July 14–16, 1987, premontane rainforest, elev. 800 m (D. Olson, MCZ 88152, PBI_OON 37092), 1♂. **Chiriquí:** Cerro Bollo cloud forest, 3.5 km E Escopeta Camp, 8.56666°N, 81.83333°W, June 13, 1980, Berlese, litter, root mat, elev. 1856 m (J. Wagner, FMNH 33653, PBI_OON 10415), 1♂; Reserva Forestal Fortuna, cloud forest at Quebrada Samudio, 8.73502°N, 82.24719°W, Sept. 21, 2008, sifting, field litter, lush undergrowth, spiny ferns (M. Draney, A. McKenna-Foster, FMNH PBI_OON 10665), 5♂; 30.7 km W Volcan, Hartman's Finca, June 16, 1995, mixed oak forest litter, elev. 1800 m (R. Anderson, AMNH PBI_OON 49194), 1♂. **Veraguas:** 6.1 km N Santa Fe, Cerro Tute, 8.50833°N, 81.11833°W, June 13, 1996, wet cloud-forest litter, elev. 1220 m (R. Anderson, AMNH PBI_OON 49191), 1♂).

Distribution: Panama (Bocas del Toro, Chiriquí, Veraguas).

Varioonops cerrado, new species

Figures 338–352

Note: Males and females have not been collected at the same locality, but given their similar somatic morphology and the proximity of their sites, it is likely that the two specimens described here are conspecific.

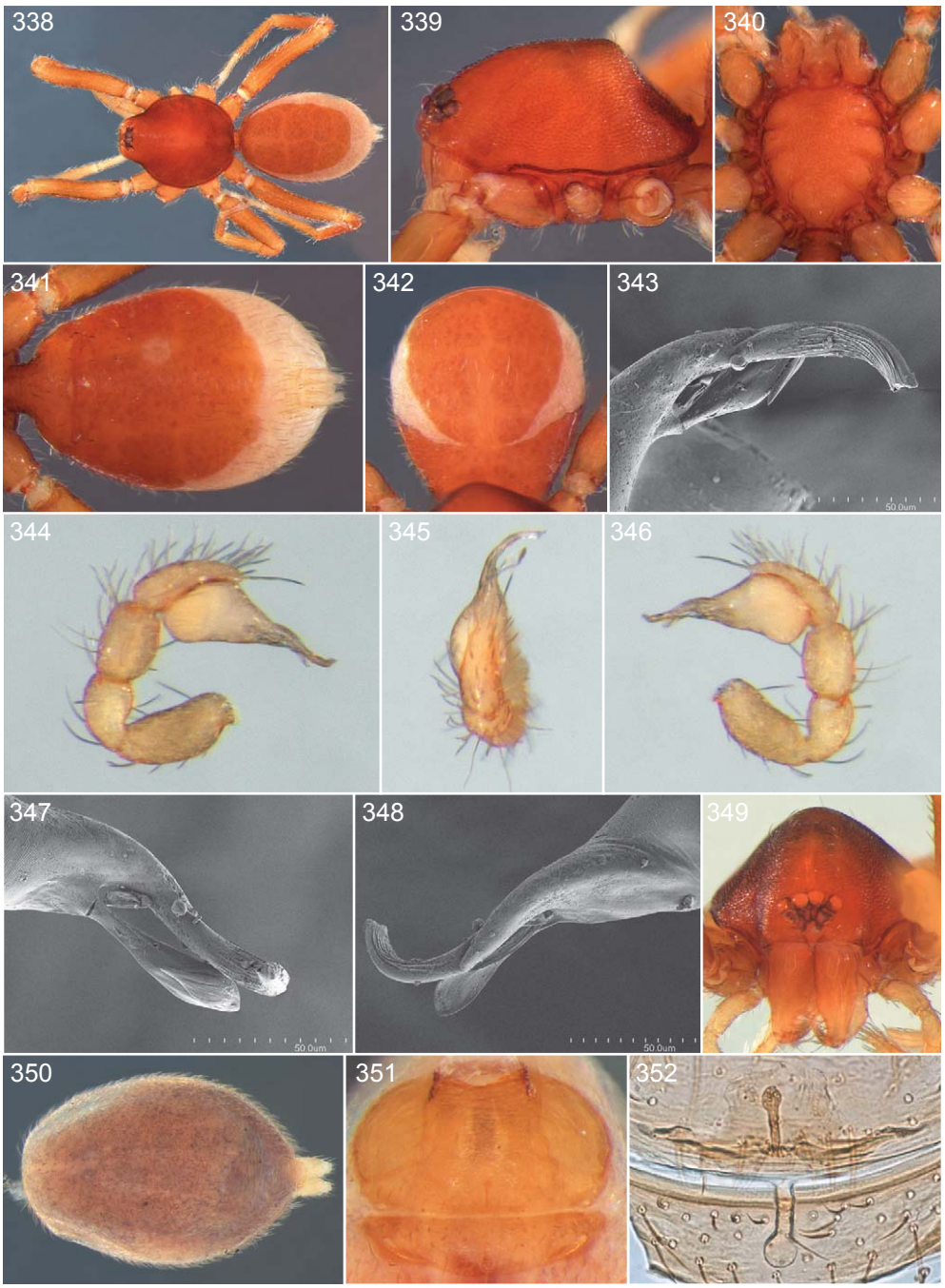
Type: Male holotype from moss on rocks with sphagnum taken in a ravine in a cloud forest at an elevation of 1460 m at Cerro Colorado, Chiriquí, Panama (W. Suter; Jan. 18, 1981), deposited in FMNH (33670, PBI_OON 10172).

Etymology: The specific name is a noun in apposition, contracted from the type locality.

Diagnosis: Both sexes can be separated from those of the other known species by their distinct genitalia. The most salient characters are the overall shape of the male bulb (figs. 344–346), the spoon-shaped conductor with a short, backward-pointing appendage (a long, backward-pointing spur is present in males of the *montesta* group, figs. 163, 182, 193), and the posterior genitalic process of females having a relatively long connection duct with a spherical apex, in combination with a strongly sclerotized anterior process (fig. 352).

Male (PBI_OON 10172, figs. 338–348): Total length 1.87. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum straight (in anterior view). Postepigastric scutum with posterior margin straight. Leg spination: femur I p0-1-1; tibia I v4-2-2; metatarsi: I p1-0-0, v2-2-2; II missing. Sperm pore relatively large, oval. Embolus tube shaped, elongated, distally not tapering, discontinuously curved prolaterad; distal half longitudinally ribbed (tip may be broken off in SEM sample); conductor basally narrow, medially wide, lamelliform, distally spoon shaped, prolaterally with backward-folded, pointed appendage, shorter than embolus.

Female (PBI_OON 10175, figs. 349–352): Total length 2.13. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Anterior, posterior sclerites moderately visible through epigastric and postepigastric scuta. Median pro-



FIGURES 338–352. *Varioonops cerrado*, new species, male (338–348) and female (349–352). **338.** Habitus, dorsal view. **339.** Carapace, lateral view. **340.** Sternum, ventral view. **341.** Abdomen, same. **342.** Same, anterior view. **343.** Embolus and conductor, dorsal view. **344.** Palp, prolateral view. **345.** Same, dorsal view. **346.** Same, retrolateral view. **347.** Embolus and conductor, prolateral view. **348.** Same, retrolateral view. **349.** Carapace, anterior view. **350.** Abdomen, dorsal view. **351.** Epigastric area, ventral view. **352.** Genitalia, dorsal view.

truding part of large genitalic plate wider than long, anterior genitalic process stalked, with moderately enlarged apex, strongly sclerotized, as long as posterior process; filiform glands at base of anterior genitalic process conspicuous; posterior process with long connecting duct, indistinctly ribbed, distally spherical.

Other Material Examined: PANAMA: **Chiriquí:** Cerro Colorado, ravine de los Caidos, Jan. 6, 1981, moss near falls, elev. 1200 m (W. Suter, FMNH 33673, PBI_OON 10175), 1♀.

Distribution: Panama (Chiriquí).

Species from Colombia

Varioonops edvardi, new species

Figures 353–367

Types: Holotype male, 14 male paratypes, and 12 female paratypes taken at an elevation of 1563 m at a site between San Pedro and San Javier, Sierra Nevada de Santa Marta, Magdalena, Colombia (J. Kochalka; Mar. 29, 1975), deposited in AMNH (PBI_OON 37055).

Etymology: The specific name is a patronym in honor of the Norwegian painter Edvard Munch. The anterior view of the male abdomen resembles the screaming face in Munch's most famous painting, "The Scream."

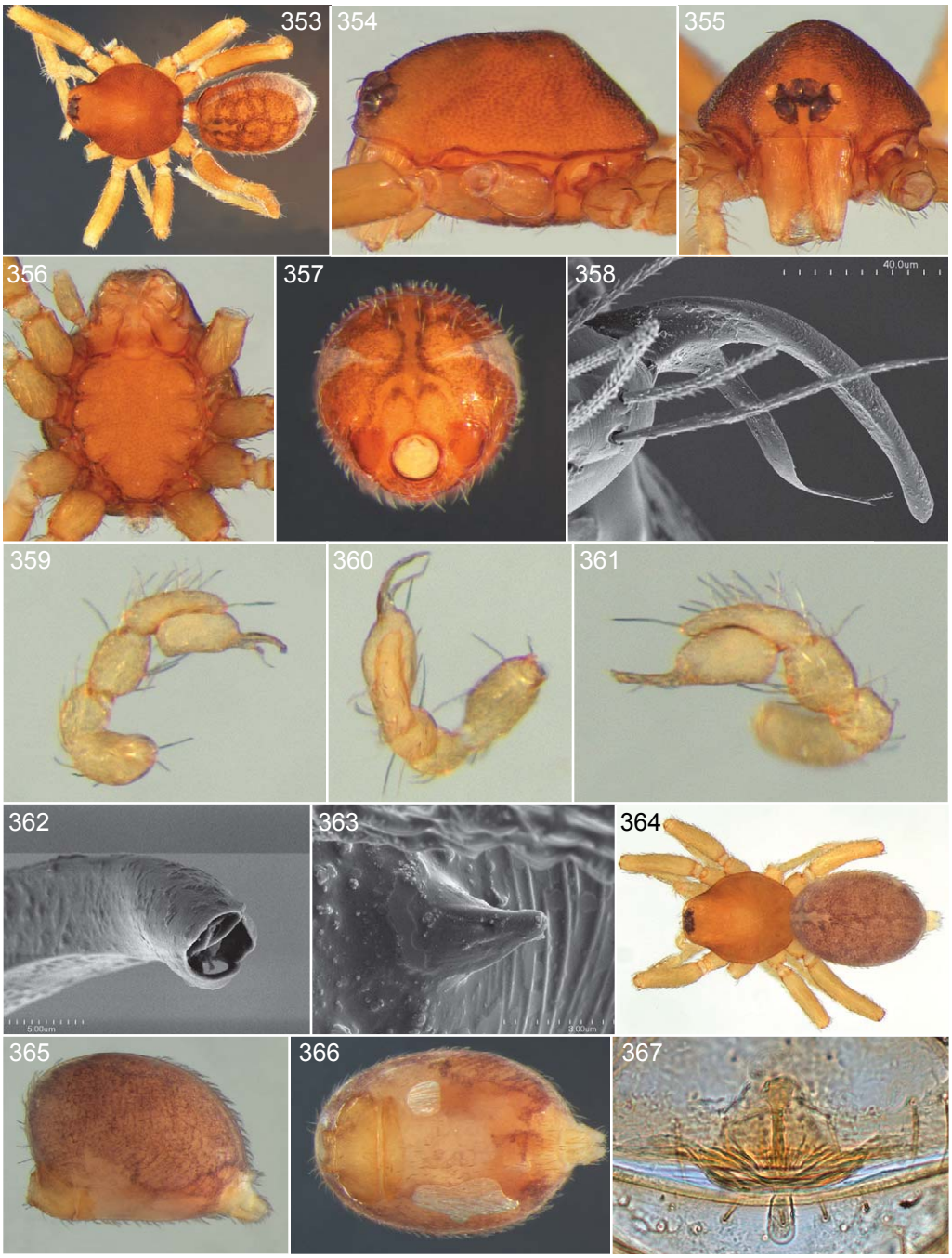
Diagnosis: Males differ from the other known species by the narrow, lamelliform conductor equipped distally with three short, pointed spikes (similar to *V. ramila,* fig. 253, but those males lack distal spikes and have a very differently shaped bulb). Females are similar to those of *V. sinesama* (fig. 375) but differ from those and the other species in having a long-stalked anterior genitalic process (rather than a shorter, broader one as in *V. sinesama*) in combination with a pocket-shaped, subrectangular, and distally rounded posterior genitalic process (rather than long and finger shaped in *V. sinesama*).

Male (PBI_OON 37055, figs. 353–363): Total length 1.57. Sternum microsculpture everywhere but front, laterally less dense, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum concave (in anterior view). Postepigastric scutum with posterior margin straight. Leg spination: femur I p0-1-1; tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II v2-2-2. Sperm pore triangular, with rounded angles. Embolus tube shaped, elongated, curved prolaterad; tip with simple subcircular opening, ventrally with additional opening; conductor narrow, lamelliform, originating prolaterally on same base as embolus, distally with three short, pointed spikes, almost as long as embolus.

Female (PBI_OON 37055, figs. 364–367): Total length 1.76. Leg spination: femur I p0-1-1; tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genitalic plate blunt, triangular; anterior genitalic process long stalked, with broadened apex, longer than posterior process; field of filiform glands on small basal plate of anterior genitalic process conspicuous; posterior process elongated, pocket shaped, subrectangular, distally rounded.

Other Material Examined: COLOMBIA: **Magdalena:** Cerro Lagila, Sierra Nevada de Santa Marta, Apr. 15–30, 1975, elev. 1539 m (J. Kochalka, AMNH PBI_OON 37054), 2♂.

Distribution: Colombia (Magdalena).



FIGURES 353–367. *Varioonops edvardi*, new species, male (353–363) and female (364–367). **353.** Habitus, dorsal view. **354.** Carapace, lateral view. **355.** Same, anterior view. **356.** Sternum, ventral view. **357.** Abdomen, anterior view. **358.** Embolus and conductor, dorsal view. **359.** Palp, prolateral view. **360.** Same, dorsal view. **361.** Same, retrolateral view. **362.** Embolus opening, prolateral view. **363.** Cymbial cone, dorsoretrolateral view. **364.** Habitus, dorsal view. **365.** Abdomen, lateral view. **366.** Same, ventral view. **367.** Genitalia, dorsal view.

Varioonops sinesama, new species

Figures 368–375

Type: Female holotype from leaf litter and moss taken at an elevation of 2200 m at San Lorenzo, northern Sierra Nevada de Santa Marta, Magdalena, Colombia (H.-G. Mueller, June 20, 1985), deposited in MHNG (PBI_OON 49205).

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

Diagnosis: Females resemble those of *V. edvardi* but differ from those and the other known species in having a short, broad-stalked anterior genitalic process (rather than a longer one as in *V. edvardi*) in combination with a long, finger-shaped posterior genitalic process (fig. 375); rather than a pocket-shaped, subrectangular, distally rounded one as in *V. edvardi*.

Male: Unknown.

Female (PBI_OON 49205, figs. 368–375): Total length 2.05. ALE separated by moderately more than their diameter. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Leg spination: femur I p0-1-1; tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genitalic plate wider than long; anterior genitalic process short, broad stalked, bulbous, apex irregularly enlarged, moderately longer than posterior process; field of filiform glands at base of anterior genitalic process conspicuous; posterior process simple, finger shaped, blunt, distal half bearing glands.

Other Material Examined: None.

Distribution: Known only from the type locality in Magdalena, Colombia.

Species from Venezuela

The *yacambu* group

Varioonops yacambu, new species

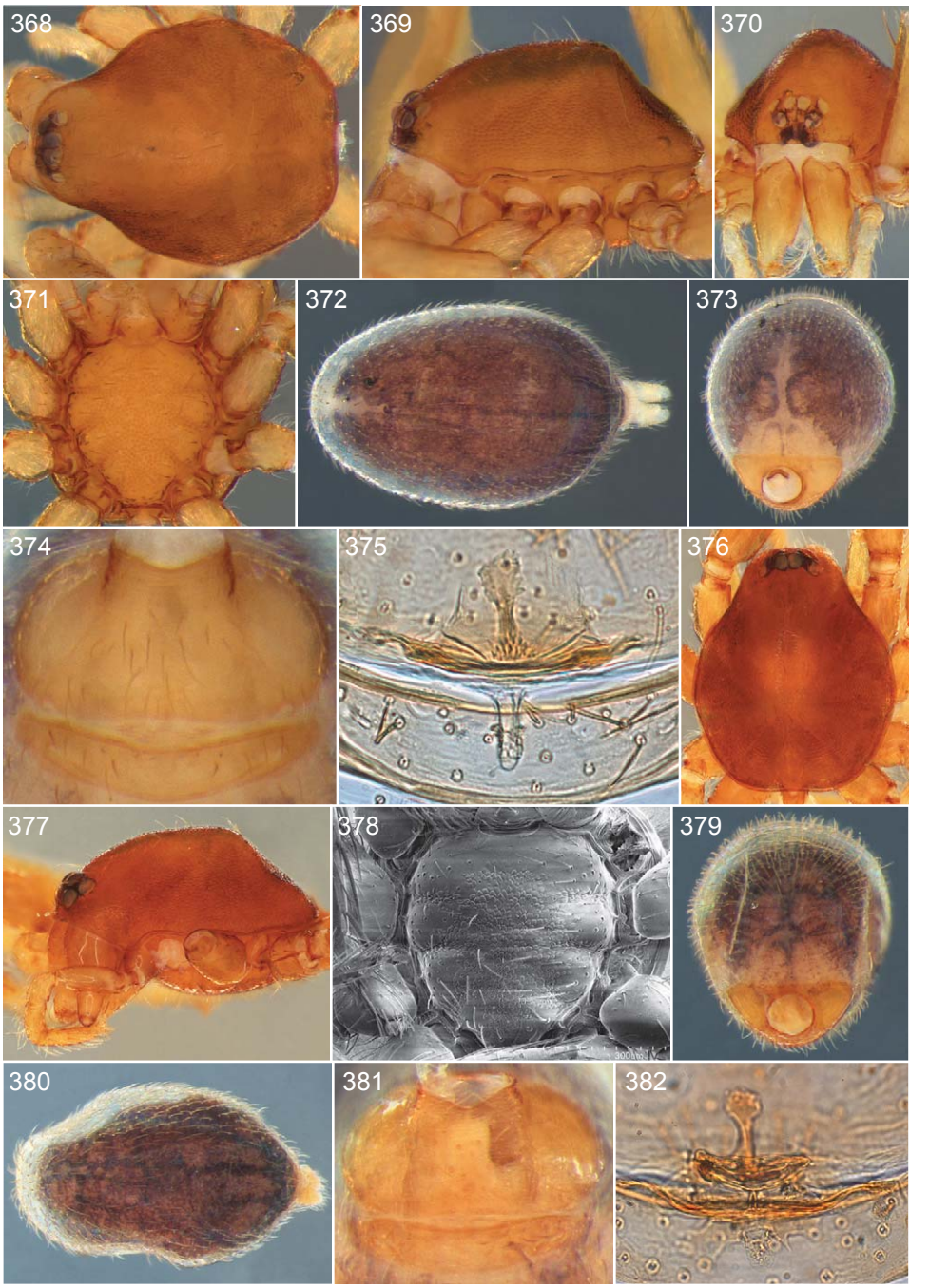
Figures 383–397

Types: Male holotype and two female paratypes from cloud-forest litter taken at an elevation of 1850 m at a site 6.4 km southeast of Sanare, Yacambú National Park, 9.69750°N, 69.64916°W, Lara, Venezuela (R. Anderson; May 17, 1998), deposited in AMNH (PBI_OON 49204).

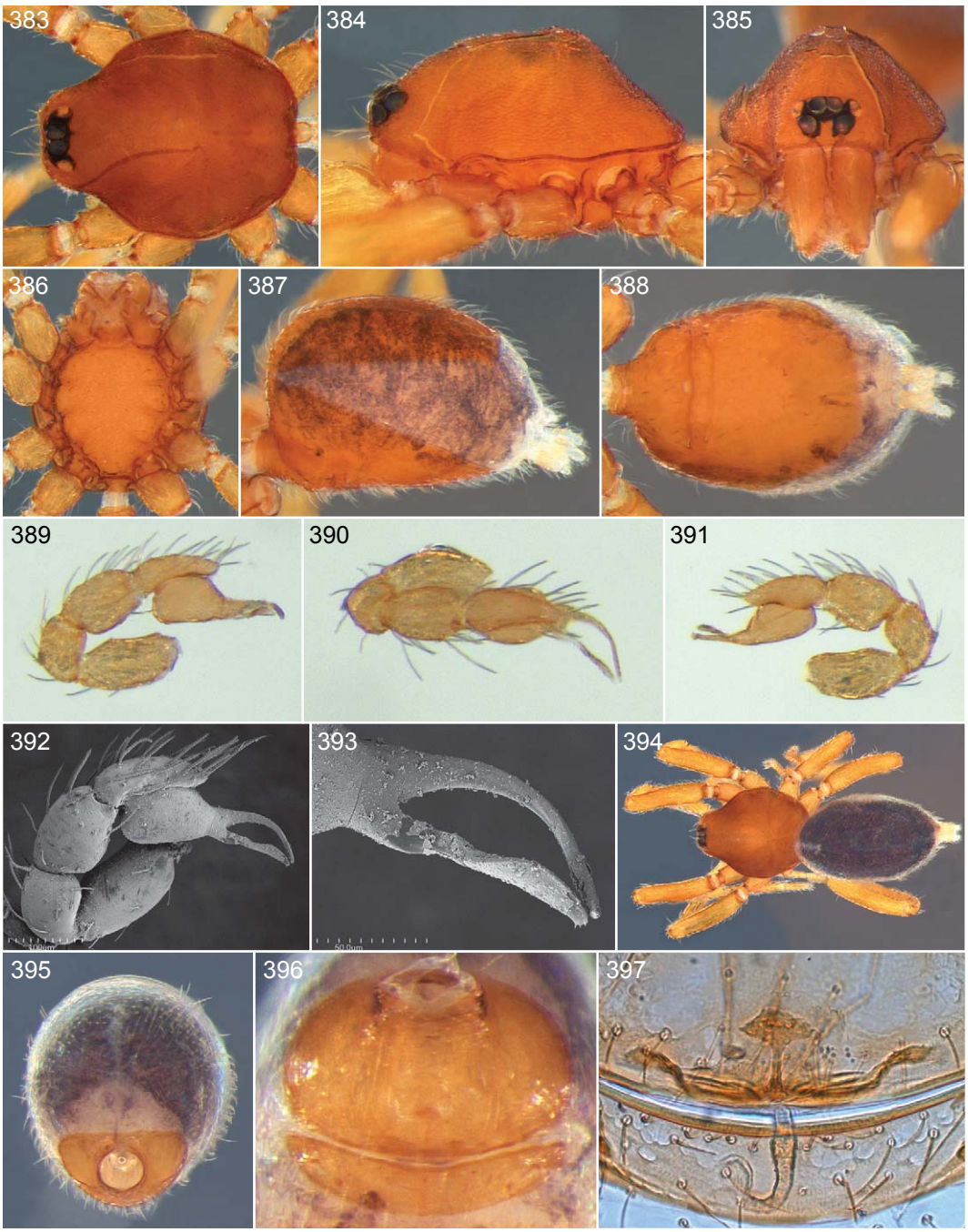
Etymology: The specific name is a noun in apposition taken from the type locality.

Diagnosis: Males resemble those of *V. trujillo* (fig. 408) and *V. pittieri* (fig. 418) in having a basally fused embolus and conductor with a pronounced base, but differ from those and all other species in having a slender embolus (figs. 392, 393) rather than the basally broadly stepped and distally more robust one found in *V. trujillo* or the markedly different one found *in V. pittieri*, and a distinctly fork-shaped conductor with three short, pointed spikes (fig. 393). Females can easily be recognized by the narrow-stalked, dendriform anterior genitalic process with its very broadly enlarged apex (rather than broad and long stalked in *V. pittieri*, fig. 427) and the long, tube-shaped, distally bent and subspherically enlarged posterior process (fig. 397).

Male (PBI_OON 49204, figs. 383–393): Total length 1.77. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum straight (in anterior view). Postepigastric scutum with posterior margin straight. Leg



FIGURES 368–382. *Varioonops sinesama*, new species, female (368–375) and *V. grancho*, new species, female (376–382). **368.** Carapace, dorsal view. **369.** Same, lateral view. **370.** Same, anterior view. **371.** Sternum, ventral view. **372.** Abdomen, dorsal view. **373.** Same, anterior view. **374.** Epigastric area, ventral view. **375.** Genitalia, dorsal view. **376.** Carapace, same. **377.** Same, lateral view. **378.** Sternum, ventral view. **379.** Abdomen, anterior view. **380.** Same, dorsal view. **381.** Epigastric area, ventral view. **382.** Genitalia, dorsal view.



FIGURES 383–397. *Varioonops yacambu*, new species, male (383–393) and female (394–397). **383.** Carapace, dorsal view. **384.** Same, lateral view. **385.** Same, anterior view. **386.** Sternum, ventral view. **387.** Abdomen, lateral view. **388.** Same, ventral view. **389, 392.** Palp, prolateral view. **390.** Same, dorsal view. **391.** Same, retrolateral view. **393.** Embolus and conductor, dorsoprolateral view. **394.** Habitus, dorsal view. **395.** Abdomen, anterior view. **396.** Epigastric area, ventral view. **397.** Genitalia, dorsal view.

spination: femur I p0-1-1; tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore relatively large, oval. Cymbial cone not observed. Spherical bulb tapering apically to shared base of embolus and conductor; embolus tube shaped, elongated, smoothly arcuated ventroprolaterad, distal portion longitudinally ribbed, tip with simple oval opening; conductor fork shaped, distally with three short, pointed spikes, as long as embolus.

Female (PBI_OON 2741, figs. 394–397): Total length 1.71. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-0-0, v4-2-2; II p0-1-0, v4-2-2; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genitalic plate as long as wide; anterior genitalic process narrow stalked, dendriform, apex two times wider than long, process shorter than posterior process; some bulbous glands at base of anterior genitalic process; posterior process long, tube shaped, indistinctly ribbed, distally bent, subspherically enlarged.

Other Material Examined: VENEZUELA: **Lara:** 10.5 km SE Sanare, Yacambú National Park, 9.69777°N, 69.61750°W, June 1, 1998, cloud-forest litter, elev. 1760 m (R. Anderson, AMNH PBI_OON 49206), 1♀. **Trujillo:** 15.3 km SSE Boconó, San Antonio, 9.13333°N, 70.21666°W, Apr. 17, 1992, sifted leaf litter, elev. 1500 m (J. Lattke, CAS 46598, PBI_OON 2741), 1♂, 2♀.

Distribution: Venezuela (Lara, Trujillo).

Varioonops trujillo, new species

Figures 398–412

Type: Male holotype from cloud-forest litter taken at an elevation of 2240 m at km 6.0 on the old road to Trujillo, 9.35083°N, 70.29333°W, Trujillo, Venezuela (R. Anderson; May 20, 1998), deposited in AMNH (PBI_OON 49199).

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

Diagnosis: This male specimen differs from those of all other species by the basally broadly stepped and distally robust embolus (figs. 404, 407–409) in combination with the sickle-shaped conductor (fig. 409).

Male (PBI_OON 49199, figs. 398–412): Total length 1.88. Sternum microsculpture medially and in furrows, surface evenly, coarsely granulated. Anterodorsal margin of epigastric scutum moderately concave (in anterior view). Postepigastric scutum with posterior margin straight. Leg spination: femur I p0-1-1; tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore relatively large, oval. Spherical bulb tapering apically to shared base of embolus and conductor; embolus basally broadly stepped, robust, tube shaped, elongated, moderately curved ventroprolaterad; tip longitudinally ribbed, with simple suboval opening; conductor broad, lamelliform, sickle shaped, distally truncate, as long as embolus.

Female: Unknown.

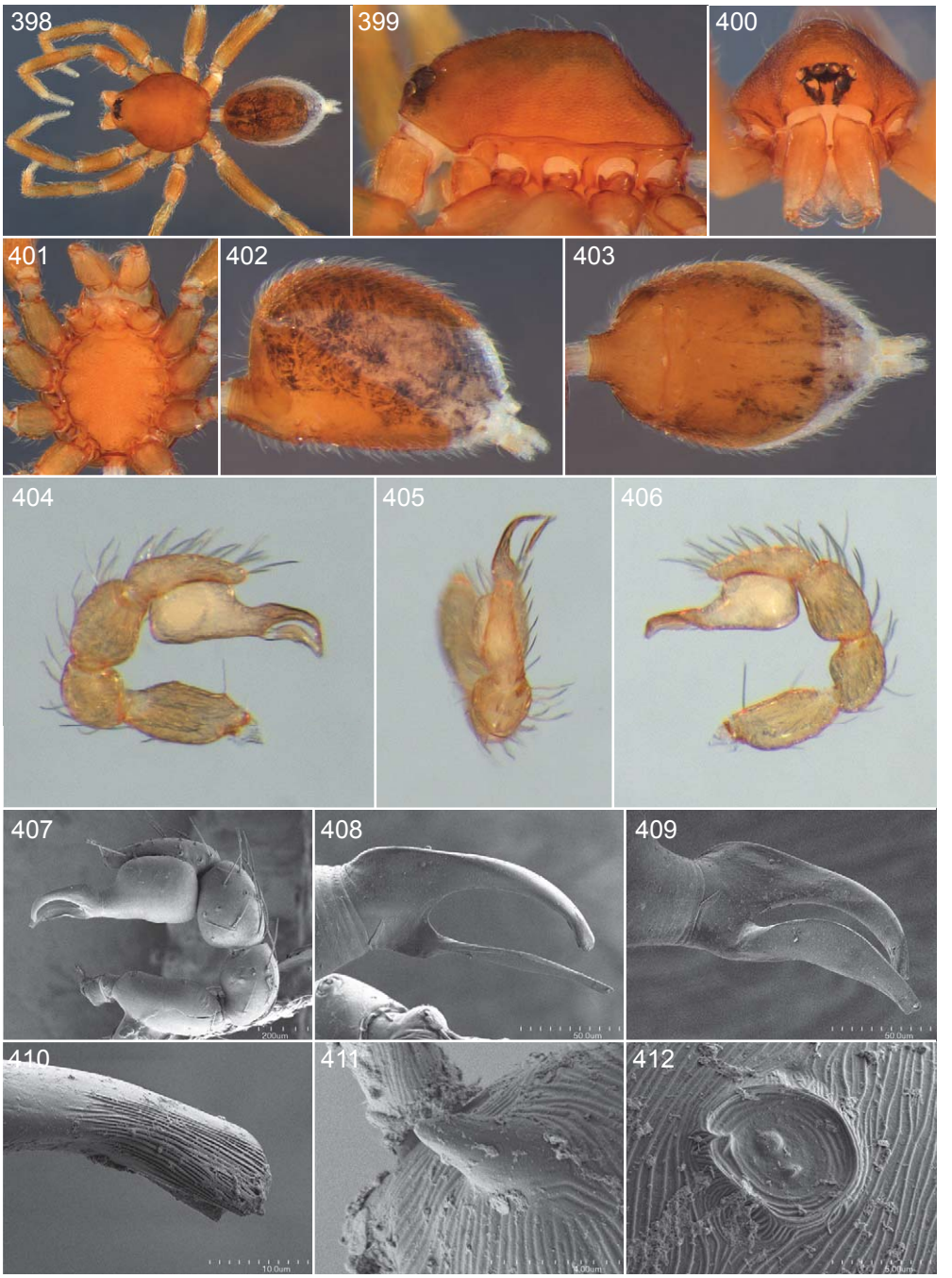
Other Material Examined: None.

Distribution: Known only from the type locality in Trujillo, Venezuela.

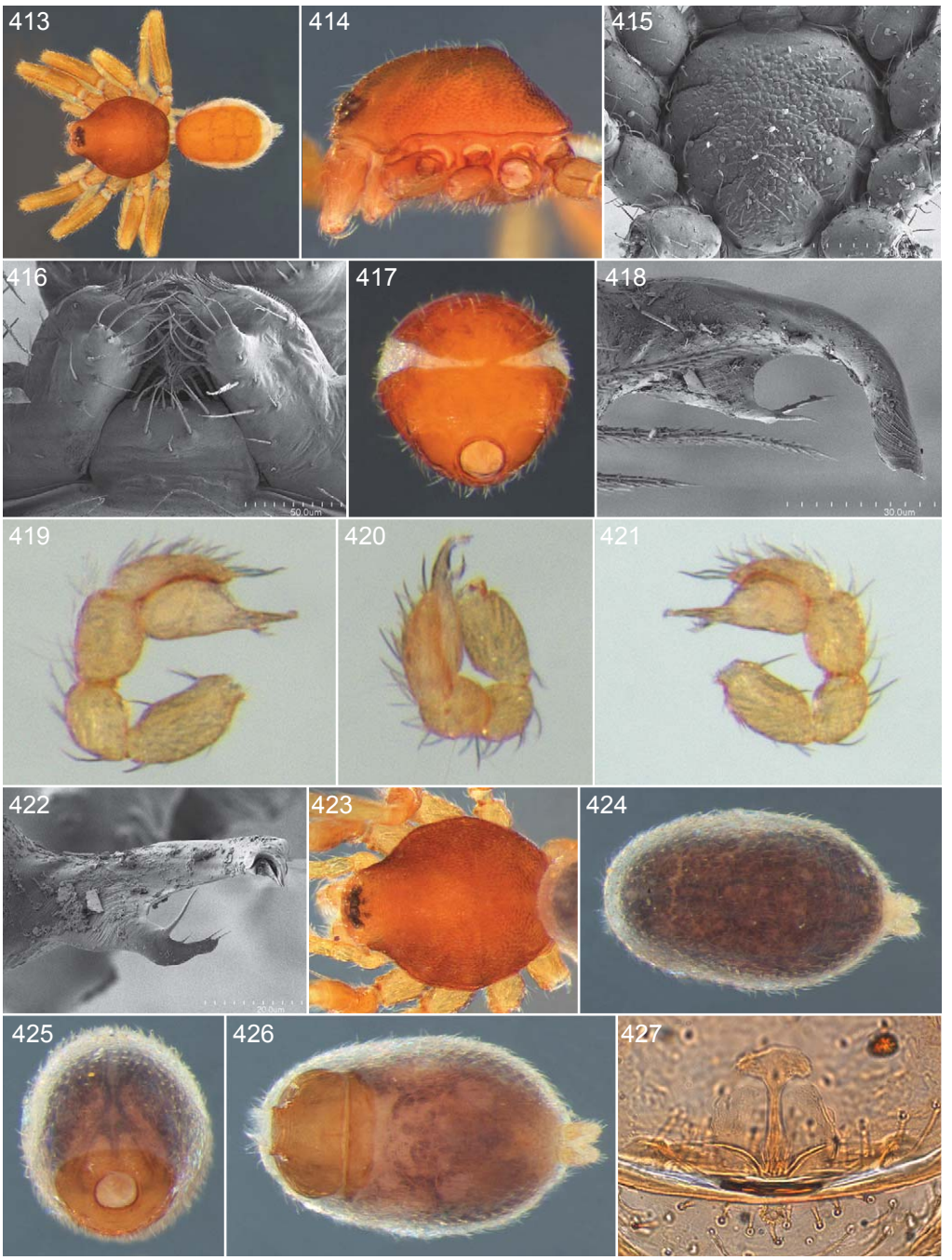
Varioonops pittieri, new species

Figures 413–427

Types: Male holotype, male paratype, and one female paratype from Berlese sample of forest litter taken at an elevation of 1000–1400 m at a site 15 mi north of Maracay, Rancho



FIGURES 398–412. *Varioonops trujillo*, new species, male. **398.** Habitus, dorsal view. **399.** Carapace, lateral view. **400.** Same, anterior view. **401.** Sternum, ventral view. **402.** Abdomen, lateral view. **403.** Same, ventral view. **404.** Palp, prolateral view. **405.** Same, dorsal view. **406, 407.** Same, retrolateral view. **408.** Embolus and conductor, dorsal view. **409.** Same, prolateral view. **410.** Embolus tip, dorsal view. **411.** Cymbial cone, dorsoretrolateral view. **412.** Tarsal organ, cymbium, dorsal view.



FIGURES 413–427. *Varioonops pittieri*, new species, male (413–422) and female (423–427). **413.** Habitus, dorsal view. **414.** Carapace, lateral view. **415.** Sternum, ventral view. **416.** Mouthparts, same. **417.** Abdomen, anterior view. **418.** Embolus and conductor, dorsal view. **419.** Palp, prolateral view. **420.** Same, dorsal view. **421.** Same, retrolateral view. **422.** Embolus and conductor, prolateral view. **423.** Carapace, dorsal view. **424.** Abdomen, same. **425.** Same, anterior view. **426.** Same, ventral view. **427.** Genitalia, dorsal view.

Grande, Aragua, Venezuela (S., J. Peck; Feb. 19–27, 1971), deposited in FMNH (males: PBI_OON 10119, female: PBI_OON 37841).

Etymology: The specific name is a patronym in honor of the Swiss naturalist and botanist Henri Pittier (1857–1950), who is also the eponym of the Parque Nacional Henri Pittier, in which the type locality is situated.

Diagnosis: Male and female specimens can easily be separated from those of all other species by the uniquely shaped embolus and conductor (figs. 418, 422) and the broad, long-stalked dendriform anterior genitalic process (rather than the narrow-stalked dendriform process found in *V. yacambu*, fig. 397) in combination with the short, pocket-shaped posterior process (fig. 427).

Male (PBI_OON 10119, figs. 413–422): Total length 1.16. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum straight (in anterior view). Postepigastric scutum with posterior margin straight. Leg spination: femur I p0-1-1; tibiae: I p1-0-0, v4-2-2; II v4-2-1p; metatarsi: I v2-2-2; II p1-0-0, v2-2-2. Sperm pore relatively large, subtriangular. Embolus broad, tube shaped, elongated, almost orthogonally bent prolaterad, surface transversely ribbed; tip truncated, moderately enlarged, with inverse U-shaped opening; conductor originating prolateral of embolar base, basally broad, flat, triangular, distally narrowed, irregularly flattened with four anteriorly directed spikes, most proximal spike distinctly larger, longer than others, conductor half as long as embolus.

Female (PBI_OON 37841, figs. 423–427): Total length 1.39. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genitalic plate subrectangular, as long as wide; anterior genitalic process long stalked, dendriform, three times longer than posterior process, originating from small V-shaped plate; field of filiform glands at base of anterior genitalic process conspicuous; posterior genitalic process short, pocket shaped, distal half bearing glands.

Other Material Examined: VENEZUELA: **Aragua:** Rancho Grande, 15 km N Maracay, Feb. 9–27, 1971, Berlese, forest litter (S. Peck, AMNH PBI_OON 1237, 1688), 2♂, 1♀.

Distribution: Venezuela (Aragua: Maracay).

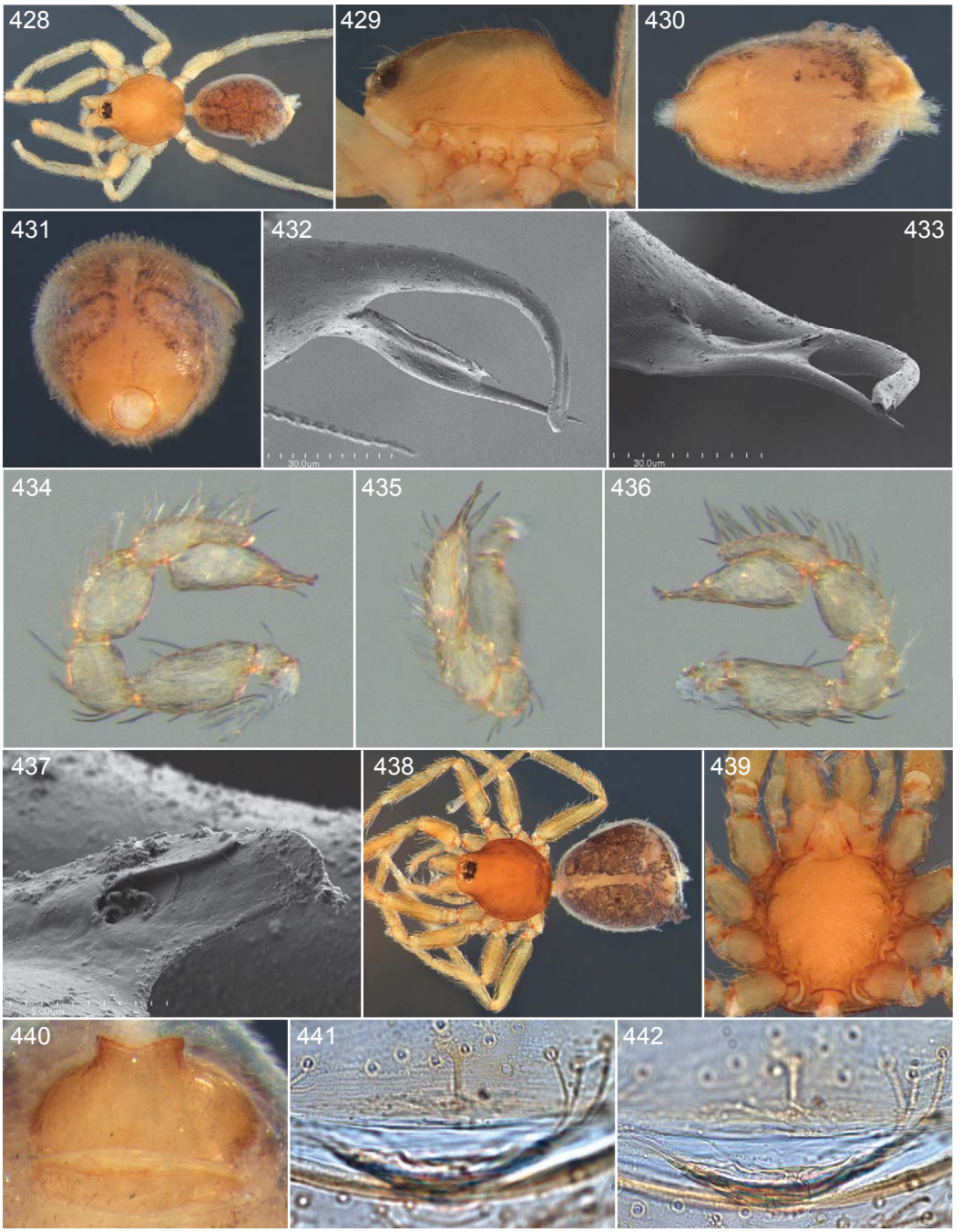
Ungrouped Species from Venezuela

Varioonops chordio, new species

Figures 428–442

Types: Male holotype and female paratype from upper montane forest litter taken at an elevation of 1300 m at a site reportedly 10 km northeast of San Cristóbal (based on coordinates on label, actually southeast of San Cristóbal), Parque Nacional Chorro El Indio, 7.72944°N, 72.20472°W, Táchira, Venezuela (R. Anderson; May 29, 1998), deposited in AMNH (PBI_OON 49201).

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



FIGURES 428–442. *Varioonops chordio*, new species, male (428–437) and female (438–442). **428.** Habitus, dorsal view. **429.** Carapace, lateral view. **430.** Abdomen, ventral view. **431.** Same, anterior view. **432.** Embolus and conductor, dorsal view. **433.** Same, prolateral view. **434.** Palp, same. **435.** Same, dorsal view. **436.** Same, retrolateral view. **437.** Conductor "opening," prolateral view. **438.** Habitus, dorsal view. **439.** Sternum, ventral view. **440.** Epigastric area, same. **441, 442.** Genitalia, dorsal view.

Diagnosis: Males can be separated from those of all other species by the distally bifid conductor with a thorn-shaped process and a rounded plate with a recessed opening (figs. 233, 237). Females can be recognized by the spherical gland-bearing posterior genitalic process with an extraordinary short connecting duct (fig. 442, anterior genitalic process detached from plate in this image).

Male (PBI_OON 49201, figs. 428–437): Total length 1.63. Sternum microsculpture medially and in furrows, surface loosely, coarsely granulated. Anterodorsal margin of epigastric scutum straight or moderately convex (in anterior view). Postepigastric scutum with posterior margin straight. Leg spination: femur I p0-1-1; tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II p1-0-0, v2-2-2. Sperm pore relatively large, circular. Embolus tube shaped, elongated, evenly curved ventroprolaterad; tip with simple, stepped, oval opening; conductor basally broad, lamelliform, distally divided into short, rounded plate with recessed opening and long, thorn-shaped process, longer than embolus.

Female (PBI_OON 49201, figs. 438–442): Total length 1.9. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-0-0, v4-2-2, r1-0-0; II p0-1-0, v4-2-1p or v4-2-2; metatarsi I, II p1-0-0, v2-2-2. Anterior genitalic process long-stalked, with irregularly enlarged apex, longer than posterior process, originating from wide U-shaped small plate (detached in figs. 441, 442), filiform glands at base of anterior process conspicuous; posterior process spherical, with very short connecting duct, distally bearing glands.

Other Material Examined: None.

Distribution: Venezuela (Táchira).

Varioonops parlata, new species

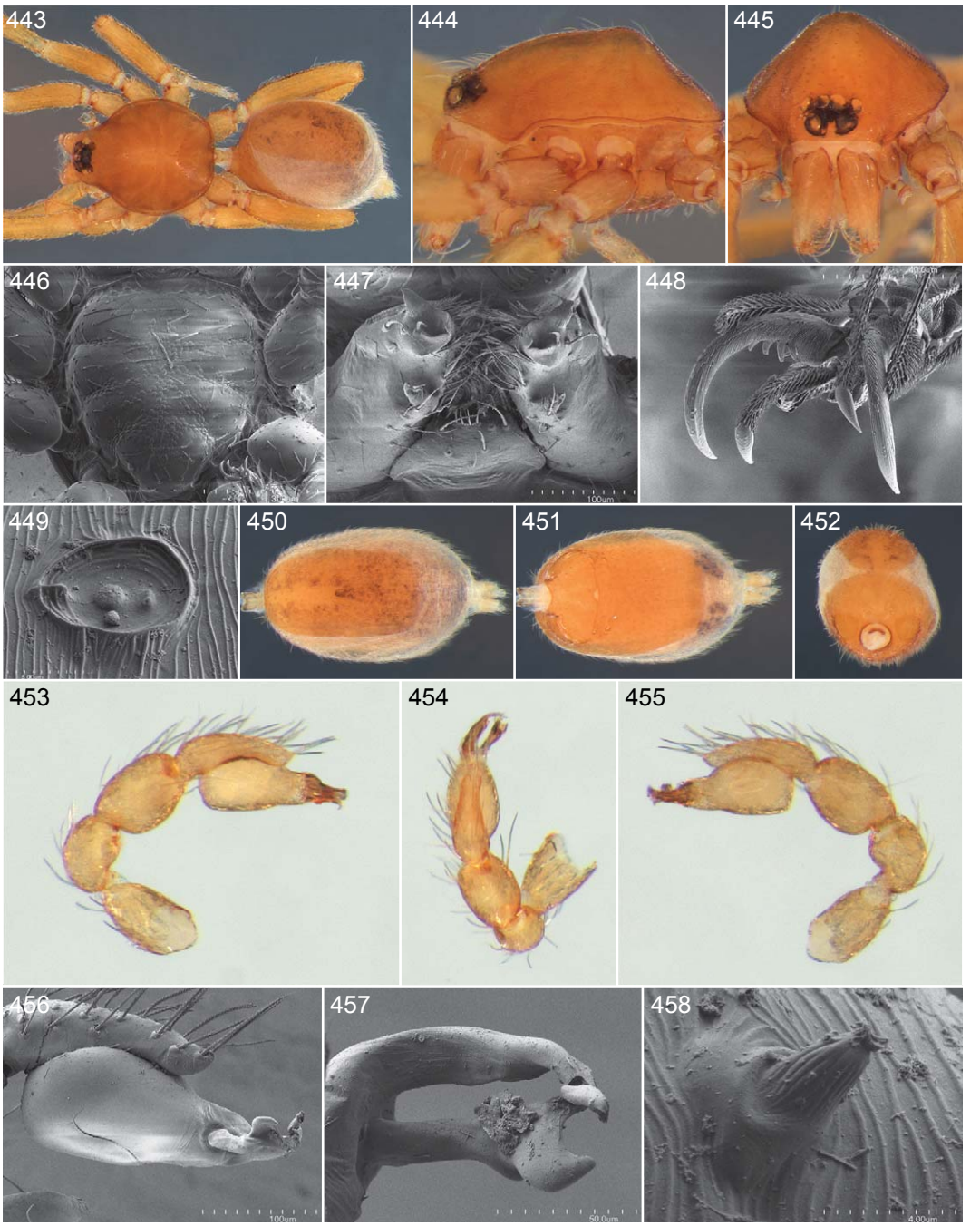
Figures 443–473

Types: Male holotype and two female paratypes from streamside shrub litter taken at an elevation of 2950 m on the Páramo La Culata, 18.5 km NE Mérida, 8.74277°N, 71.06222°W, Mérida, Venezuela (R. Anderson; May 25, 1998), deposited in AMNH (male and one female: PBI_OON 49200, female: PBI_OON 49203).

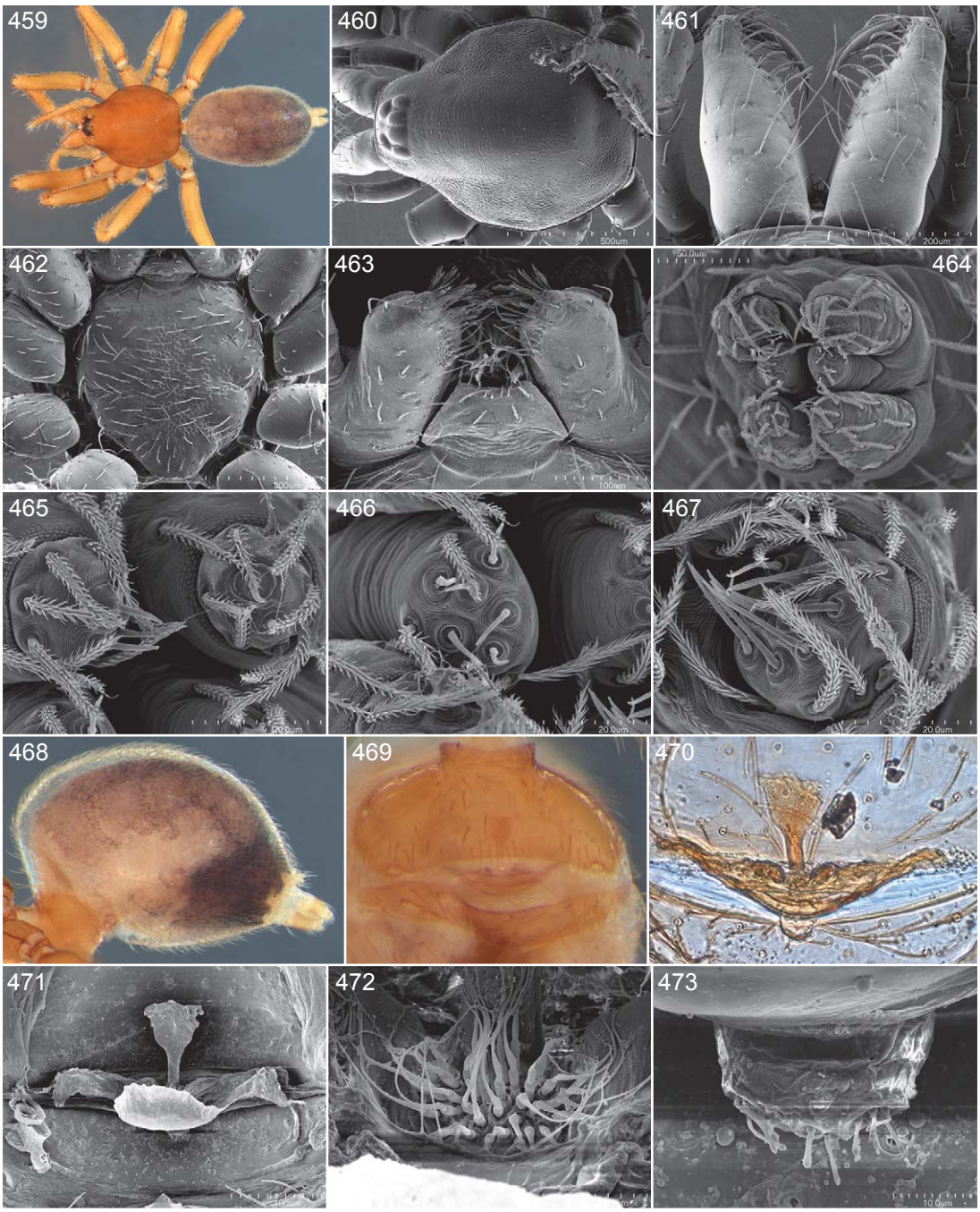
Etymology: The specific name is a noun in apposition, a shortened anagram taken from the type locality.

Diagnosis: Male and female specimens can be separated from those of all other species by the only moderately granulated carapace (fig. 443–445, 459, 460) and the only indistinctly granulated sternum (fig. 446, 462). Males have a unique, wrench-shaped conductor (figs. 456, 457) and anteromedially modified endites (fig. 447). Females can be recognized by the goblet-shaped anterior genitalic process (figs. 470, 471).

Male (PBI_OON 49200, figs. 443–458): Total length 1.92. Carapace with moderate granulation. Clypeus low, ALE separated from edge of carapace by less than their radius. ALE, PME subequal, larger than PLE. Sternum microsculpture medially and in furrows, surface indistinctly granulated (moderately reduced). Endites anteromedially with distinct modifications: distal cone-shaped process, median lamella, sickle-shaped seta. Dorsal scutum moderately fused to epigastric scutum. Anterodorsal margin of epigastric scutum convex (in anterior



FIGURES 443–458. *Varioonops parlata*, new species, male. **443.** Habitus, dorsal view. **444.** Carapace, lateral view. **445.** Same, anterior view. **446.** Sternum, ventral view. **447.** Mouthparts, same. **448.** Claws, leg IV, anterior view. **449.** Tarsal organ, palp, dorsal view. **450.** Abdomen, dorsal view. **451.** Same, ventral view. **452.** Same, anterior view. **453.** Palp, prolateral view. **454.** Same, dorsal view. **455.** Same, retrolateral view. **456.** Bulb, prolateral view. **457.** Embolus and conductor, dorsal view. **458.** Cymbial cone, dorsoretrolateral view.



FIGURES 459–473. *Varioonops parlata*, new species, female. **459.** Habitus, dorsal view. **460.** Carapace, same. **461.** Chelicerae, anterior view. **462.** Sternum, ventral view. **463.** Mouthparts, ventral view. **464.** Spinnerets, posterior view. **465.** Anterior lateral spinnerets, same. **466.** Posterior median spinnerets, same. **467.** Posterior lateral spinneret, same. **468.** Abdomen, lateral view. **469.** Epigastric area, ventral view. **470, 471.** Genitalia, dorsal view. **472.** Field of filiform glands at base of anterior genitalic process, anterodorsal view. **473.** Posterior genitalic process, dorsal view.

view). Postepigastric scutum almost rectangular, with posterior margin straight. Leg spination: femur I p0-1-1; tibiae: I v4-2-2; II v4-2-1p; IV v0-0-2; metatarsi I, II p1-0-0, v2-2-2; leg III with indistinct spines on metatarsus (p0-0-1), leg IV also with indistinct lateral spines on tibia (p0-0-1, r0-0-1) and metatarsus (p0-0-1). Sperm pore relatively large, triangular, with rounded angles. Cymbial cone longitudinally furrowed. Embolus basally broad, tube shaped, finely longitudinally ribbed, distally abrupt narrowed. elongated, curved ventroprolaterad; tip with simple oval opening (not readily visible as specimen is crushed); conductor massive, discontinuously attached to bulb prolaterally of embolus base, wrench shaped, as long as embolus.

Female (PBI_OON 49200, figs. 459–473): Total length 2.11. Leg spination: femora: I p0-1-1; II v0-0-1; tibiae: I p1-1-0, v4-2-2; II p1-0-0, v4-2-1p; IV v0-0-2; metatarsi I, II p1-0-0; v2-2-2; leg III with indistinct spines on tibia and metatarsus (p0-0-1), leg IV with indistinct lateral spines on tibia (p0-0-1, r0-0-1) and metatarsus (p0-0-1, r0-0-1). Median protruding part of large genitalic plate as long as wide; anterior genitalic process goblet shaped, 2.5 times longer than posterior process, laterally at base of anterior genitalic process with two small, strongly sclerotized oval structures (lateral extensions of smaller plate); field of filiform glands at base of anterior genitalic process present; posterior process subspherical, distally with narrow elongated glands.

Other Material Examined: VENEZUELA: **Mérida:** La Mucuy, 7 km E Tabay, Parque Nacional de Sierra Nevada, 8.62888°N, 71.04055°W, May 24, 1998, upper montane forest litter, elev. 2340 m (R. Anderson, AMNH PBI_OON 49207), 1♀, 8.62805°N, 71.02944°W, cloud-forest litter, elev. 2520 m (R. Anderson, AMNH PBI_OON 49211), 2♀; N Mérida, trail to Monte Cerpa, Mar. 29, 1992, litter near stream, elev. 2256 m (L. Herman, AMNH PBI_OON 21017), 1♀.

Distribution: Venezuela (Mérida).

Varioonops potaguo, new species

Figures 474–488

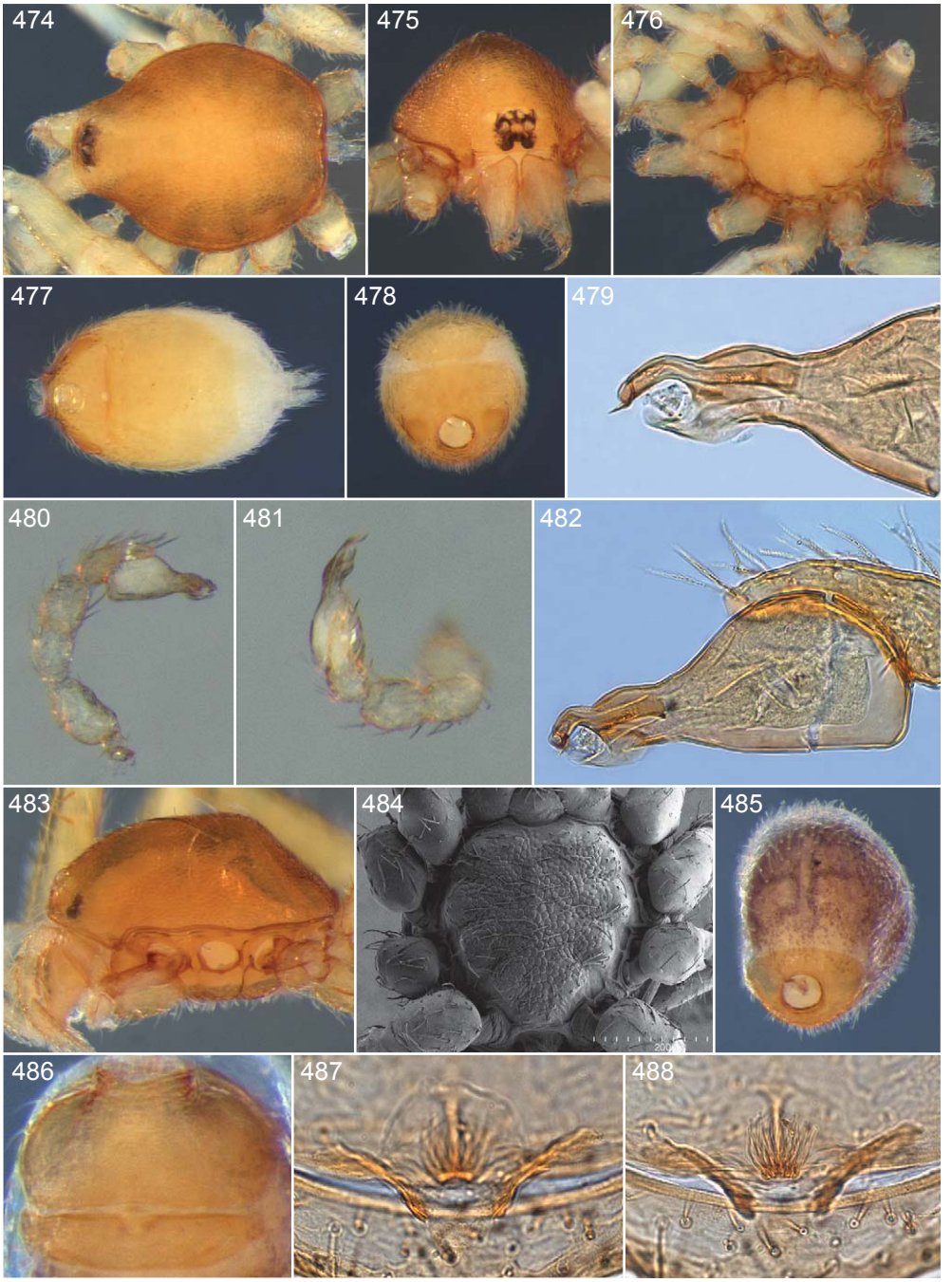
Note: Males and females have been collected at the same locality, but not at the same time. Based on somatic morphology, it is likely that the described male and females are conspecific.

Type: Male holotype from sifted insect bait taken at an elevation of 400 m at a site 35 km north of Altagracia, Parque Nacional Guatopo, Agua Blanca, Miranda, Venezuela (S., J. Peck; June 3, 1987), deposited in AMNH (PBI_OON 1312).

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

Diagnosis: Males and females of this smallest species can be separated from those of all other species by the very broad, lamelliform conductor (figs. 479) and the somewhat medially interrupted, large genitalic plate, which is even visible ventrally at the epigynal area (figs. 486–488). In addition, the field of distally filiform glands at the base of the anterior genitalic process is conspicuously expressed (fig. 488).

Male (PBI_OON 1312, figs. 474–482): Total length 1.08. Sternum fused to carapace, microsculpture everywhere but front, surface loosely, coarsely granulated. Anterodorsal margin



FIGURES 474–488. *Varioonops potaguo*, new species, male (474–482) and female (483–488). **474.** Carapace, dorsal view. **475.** Same, anterior view. **476.** Sternum, ventral view. **477.** Abdomen, same. **478.** Same, anterior view. **479.** Embolus and conductor, retrolateral view. **480.** Palp, prolateral view. **481.** Same, dorsal view. **482.** Bulb, retrolateral view. **483.** Carapace, lateral view. **484.** Sternum, ventral view. **485.** Abdomen, anterior view. **486.** Epigastric area, ventral view. **487, 488.** Genitalia, dorsal view.

of epigastric scutum straight (in anterior view). Postepigastric scutum with posterior margin straight. Leg spination: femur I p01-1; tibiae: I v4-2-2; II v4-2-1p; metatarsi I, II v2-2-2. Sperm pore relatively large, circular. Cymbial cone not examined. Embolus tube shaped, elongated, curved ventroprolaterad, moderately bent at half its length, distally with strongly sclerotized spike; conductor broad, lamelliform.

Female (PBI_OON 1690, figs. 483–488): Total length 1.36. ALE separated by slightly more than their diameter. Leg spination: femur I p0-1-1; patella II p1-0-0; tibiae: I v4-2-2; II v4-2-1p; metatarsi: I p1-0-0, v2-2-2; II v2-2-2. Large distinct V-shaped genitalic plate with lateral extensions, medially distinctly less sclerotized, protruding, covering anterior genitalic process, protruding part as long as wide; anterior genitalic process long stalked, with wide, rhomboidal head, longer than posterior process; field of basally bulbous and distally filiform glands at base of anterior genitalic process present; posterior process broad, pocket shaped, weakly sclerotized.

Other Material Examined: VENEZUELA: **Miranda:** 28 km N Altagracia, Parque Nacional Guatopo, El Lucero, June 8, 1987, rotted log litter, elev. 700 m (S., J. Peck, AMNH PBI_OON 1700), 2♀; 35 km N Altagracia, Parque Nacional Guatopo, Agua Blanca, May 31, 1987, ravine litter, elev. 400 m (S., J. Peck, AMNH PBI_OON 1690), 2♀.

Distribution: Venezuela (Miranda).

Varioonops grancho, new species

Figures 376–382

Type: Female holotype collected at Rancho Grande (presumably the well-known Estación Biológica Rancho Grande, northwest of El Limon, south of the Parque National Herni Pittier, Aragua), Venezuela (M. Paoletti; Sept. 29, 1980), deposited in AMNH (PBI_OON 1692).

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

Diagnosis: The female resembles that of *V. sinesama* (fig. 375) in having a short, broad-stalked anterior genitalic process but differs from those and other species in having a short, weakly sclerotized, pocked-shaped. elongated posterior process (fig. 382).

Male: Unknown.

Female (PBI_OON 1692, figs. 376–382): Total length 1.91. Sternum microsculpture medially and in furrows, surface evenly, coarsely granulated. Leg spination: femora: I p0-1-1; II p0-0-1; tibiae: I p1-1-0, v4-2-2; II p0-1-0, v4-2-2; metatarsi I, II p1-0-0, v2-2-2. Median protruding part of large genitalic plate wider than long; anterior genitalic process short, broad stalked, bulbous, moderately longer than posterior process; glands at base of anterior genitalic process inconspicuous; posterior genitalic process elongated, pocked shaped, weakly sclerotized.

Other Material Examined: None.

Distribution: Known only from the holotype from Venezuela.

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