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Source: American Museum Novitates, 2013(3788) : 1-38

Published By: American Museum of Natural History

URL: https://doi.org/10.1206/3788.1

AMERICAN MUSEUM NOVITATES

Number 3788, 38 pp. November 8, 2013

The goblin spider genus *Oonopoides* in North and Central America (Araneae, Oonopidae)

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ABSTRACT

The goblin spider genus *Oonopoides* Bryant was established for a species from Cuba, *Oonopoides maxillaris* Bryant, and most of the species that have subsequently been assigned to the genus are from that island. The group is actually circum-Caribbean in distribution, but many of its members have been misplaced in the genus *Oonops* Templeton; here we treat those representatives of the genus that have been collected in North and Central America. Six specific names are transferred from *Oonops* to *Oonopoides*: *O. endicus* Chickering from Florida and the Bahama Islands, *O. secretus* Gertsch from Texas and Tamaulipas, *O mitchelli* Gertsch from Mexico, and *O. pallidulus* (Chickering), *O. tenebus* Chickering, and *O. anoxus* Chickering from Panama. Males of *O. zullinii* Brignoli from Mexico and females of *O. secretus* are described for the first time; *O. tenebus* is placed as the male, and hence a junior synonym, of *O. pallidulus*. The holotype of *Oonops zeteki* Chickering from Panama is a juvenile that probably belongs to *Costarina* Platnick and Dupérré and the name is placed as a nomen dubium. Eight new species are described: *O. iviei* from Florida and the Bahama Islands, *O. catemaco*, *O. chicanna*, and *O. kaplanae* from Mexico, *O. hondo* from Honduras, *O. cristo* and *O. upala* from Costa Rica, and *O. cartago* from Costa Rica and Panama.

INTRODUCTION

The New World soft-bodied members of the subfamily Oonopinae have posed a taxonomic conundrum for many years; over 50 New World species were described in the classical literature and assigned, without justification, to the type genus of the family, *Oonops* Templeton. As

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 ISSN 0003-0082

is often the fate of type genera, *Oonops* has thus served primarily as a wastebasket, in this case for a wide variety of New World taxa, none of which are actually congeneric with the European type species of the genus and its close relatives. Various participants in the goblin spider Planetary Biodiversity Inventory (PBI) project have made some progress in delimiting groups within this highly heterogeneous assemblage, transferring some of the misplaced species out of *Oonops*; five specific names were assigned to *Heteroonops* Dalmas by Platnick and Dupérré (2009), and several others have been placed in new genera by Grismado and Ramírez (in press) and Platnick and Berniker (2013).

Here we continue the process by considering the North and Central American species that we argue should be assigned to *Oonopoides* Bryant (1940). That genus was established for the species *Oonopoides maxillaris* Bryant, based on three males taken at Soledad, Cuba, but has not received much attention in the subsequent literature. Chickering (1951) added a second species, *Oonopoides bryantae*, based on a single male from Panama, but commented (1951: 226) that "It seems quite possible that *O. bryantae* sp. nov. is the male of *Oonops reticulatus* Petrunkevitch from Panama City." Chickering (1970) subsequently confirmed that suggestion, synonymized the two names, and retained *O. reticulatus* in *Oonops*, thereby removing *O. bryantae* from *Oonopoides*. Oddly, *Oonopoides* was otherwise never mentioned in any of the long series of papers Chickering devoted to Central American and West Indian oonopids. Even though Chickering had ready access to the type specimens of *Oonopoides*, its members that he did describe were merely assigned to *Oonops*, along with many more distantly related species.

Brignoli (1974) was the first to point out the confusion rampant in the New World "*Oonops*," making extensive comments in the context of dealing with four adult specimens from southern Mexico. One male and two females were described as *Oonops chickeringi* Brignoli, which he correctly placed as a close relative of *Oonops tolucanus* Gertsch and Davis (1942). Despite his recognition that the New World species were all likely to be misplaced, Brignoli assigned the species to *Oonops*. His male does resemble those of *Oonops* in having the cymbium and palpal bulb separate; had he studied males of any of the many Mexican species in which the cymbium and bulb are fused, he would likely have established a new genus for them instead. Brignoli's description of *O. chickeringi* included the first detailed studies of the internal female genitalia of any of the New World oonopines, noting their complexity and predicting that they would supply information crucial to solving the generic-level puzzles.

Brignoli also studied another female, from Chiapas, that had internal genitalic structures very different from those of *O. chickeringi*, and he described that female as *Oonopoides zullinii*. At that time, no females were assigned to *Oonopoides*, and it isn't clear why Brignoli considered his Mexican female to be congeneric with the males of the Cuban type species, *O. maxillaris*. He commented (1974: 207) that most of the characters mentioned by Bryant "are not entirely convincing" and admitted that he "assigned *O. zullinii* to this genus on account of a certain resemblance between the gnathocoxae and those of *O. maxillaris* and because this species cannot easily be included in any other Central American genus." Bryant's comments on the endites (i.e., gnathocoxae) of *O. maxillaris* were of course based on modifications that occur only in males and that are therefore not relevant to the placement of Brignoli's female. Although we have not been able to examine Brignoli's holotype, we have been able to study good samples

from Chiapas, including males, that we consider to be conspecific with it, and we conclude that Brignoli's placement of his female in *Oonopoides* was actually correct, despite having been based mostly on the luck of the draw!

More recently, Dumitresco and Georgesco (1983) described six additional species from Cuba, presenting a discussion of several characters that they suggested might serve to separate *Oonopoides* from *Oonops*, including the somewhat elongated spinnerets that had been mentioned by Bryant (1940) when she established the genus. Dumitresco and Georgesco presented detailed illustrations of the male and female genitalia, based on compound microscope preparations. Those illustrations are very useful, but are misleading in one important respect. Their figures of the male palps, like those of Bryant, indicate that the palpal cymbium and bulb are separated by a distinct seam, but they are actually fully fused (figs. 49, 50); the limits of the cymbium are indicated only by the distribution of setae, not by a seam. The same authors, publishing as Dumitrescu and Georgescu (1987), added a ninth species to the genus, from Venezuela; here again, their figures indicate that the palpal bulb and cymbium are separated by a seam.

All the males of *Oonopoides* that we have been able to study differ from those of *Oonops* in having the male palpal bulb fully fused with the cymbium. This includes the males of the type species, *O. maxillaris*; because this species has not yet been adequately documented in the literature, we present here images of the male palps and endites (figs. 1–11). These images are of specimens from the type series from Cienfuegos province, Cuba, and indicate that at least the male illustrated as *O. maxillaris* by Dumitresco and Georgesco (1983), which was taken in a cave in Matanzas province, Cuba, was misidentified by those authors, who did not examine the type series. In having the palpal bulb and cymbium fused, *Oonopoides* members resemble those of *Noonops* Platnick and Berniker (2013), rather than *Oonops*, and the two genera may well be sister groups. *Noonops* is primarily a North American group, whereas *Oonopoides* seems to be fully circum-Caribbean in distribution. Interestingly, though, they seem to be largely allopatric in Mexico, with *Noonops* found from Baja California east to Tamaulipas and south to Colima, Guerrero, and Puebla, and *Oonopoides* occurring mostly in areas further to the southeast (far southern Veracruz, Chiapas, and the Yucatán Peninsula). The only exception to this pattern detected to date is a single record of the Texas species *Oonopoides secretus* (Gertsch) from Tamaulipas.

As here limited, the monophyly of *Oonopoides* is well supported by male palpal morphology and male endite modifications; the hyaline conductor, bearing numerous tiny projections (figs. 51–53), is apparently unique to the genus, as are the ledgelike protrusions on the endites (e.g., figs. 19, 95, 106, 117, 128, 150, 172, 183). The male palpal bulbs also have a characteristic shape, being more constricted in the middle than they are at the proximal or distal ends (figs. 3, 5, 42, 44). The female genitalia show a wide range of structural forms, but often have ducts in the posterior receptaculum that are notably enlarged and three-dimensional. Such ducts are found also in the females from Texas that were identified as *Noonops furtivus* (Gertsch) by Platnick and Berniker (2013); those females, which have not been collected together with males, may thus be misidentified and may actually belong to an undescribed species of *Oonopoides*.

Our methods follow those of Platnick and Dupérré (2009); only differences from the males (beyond the obvious lack of male endite modifications) are mentioned in the descriptions of

females. Scans were taken from uncoated right male palps, and the images were flipped for consistency. All measurements are in mm. Species are discussed in geographic order, beginning in Florida and continuing west to Texas and then south to Panama. To speed identifications, separate keys are presented to the species of North and Central America. High-resolution versions of the images, a sortable version of the geocoded locality data, and a distribution map for each species (with dots linked to the specimen data) will be available on the PBI project's website (http://research.amnh.org/oonopidae). Users should note that the relatively small published images are merely avatars for the actual image files on the website, which can each be enlarged several times before pixelating.

COLLECTIONS EXAMINED

AMNH	American Museum of Natural History, New York, NY
CAS	California Academy of Sciences, San Francisco, CA
CDU	Darrell Ubick collection, San Francisco, CA
FMNH	Field Museum of Natural History, Chicago, IL
INBIO	Instituto Nacional de Biodiversidad, Santo Domingo, Costa Rica
MCZ	Museum of Comparative Zoology, Harvard University, Cambridge MA
TAMU	Texas A&M University, College Station, TX
USNM	National Museum of Natural History, Smithsonian Institution, Washington, DC

Oonopoides Bryant

Oonopoides Bryant, 1940: 265 (type species by original designation *Oonopoides maxillaris* Bryant).

Diagnosis: Males resemble those of *Wanops* Chamberlin and Ivie and *Noonops* Platnick and Berniker in having the palpal bulb fully fused to the cymbium, but differ from those of *Wanops* in having the embolus originating subterminally on the bulb and from those of *Noonops* in having a hyaline conductor, bearing numerous tiny projections, attached to the embolus (figs. 51–53). Females have highly three-dimensional internal genitalia, typically involving distinct posterior ducts (figs. 90, 125).

Description: Total length of males 1.3–2.0, of females 1.3–2.7. Carapace, sternum, mouthparts, abdominal scuta, legs yellow, without any pattern, abdomen soft portions white, without pattern. **Cephalothorax:** Carapace elongated hexagonal in dorsal view, anteriorly narrowed to between 0.5 and 0.75 times its maximum width, pars cephalica slightly elevated in lateral view, anterolateral corners with slightly sclerotized triangular projections, pars thoracica with angular 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 of pars cephalica smooth, at least sometimes with distinct platelets (figs. 12, 54), sides smooth; fovea absent, lateral margin straight, rebordered (figs. 13, 55), without denticles; plumose setae near posterior margin of pars thoracica absent; marginal, nonmarginal pars cephalica, pars thoracica setae light, needlelike, scattered. Clypeus margin slightly rebordered, curved downward in front view, vertical in lateral view, low, ALE separated

from edge of carapace by less than their radius (figs. 14, 56), median projection absent; setae light, needlelike. Chilum divided. Eyes six, well developed, ALE largest, oval, PME squared, PLE oval; posterior eye row recurved from above, straight or procurved from front; ALE separated by at least their radius; ALE-PLE separated by less than ALE radius, PME touching throughout most of their length, PLE-PME separated by less than PME radius. Sternum longer than wide (figs. 15, 57), not fused to carapace, surface smooth, without pits or microsculpture, median concavity, hair tufts absent, radial furrows between coxae I–II, II–III, III–IV wrinkled, 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 without infracoxal grooves, distance between coxae approximately equal, extensions of precoxal triangles absent, lateral margins unmodified; setae sparse, light, needlelike, densest laterally, originating from surface. Chelicerae straight, anterior face unmodified (figs. 16, 58); without teeth on promargin or retromargin (figs. 17, 59); fangs without toothlike projections, directed medially, shape normal, without prominent basal process, tip unmodified; setae light, needlelike, densest medially; paturon inner margin with scattered setae, distal region, posterior surface unmodified, promargin with row of flattened setae, inner margin unmodified, laminate groove absent. Labium triangular, fused to sternum at sides (figs. 18, 60), anterior margin indented at middle, same as sternum in sclerotization; with six or more setae on anterior margin, subdistal portion with unmodified setae. Endites same as sternum in sclerotization, serrula usually absent in males (fig. 20), present in females as single row of teeth (figs. 61, 62), anterior portion of males with at least one protuberant ledge (fig. 19), posteromedian part unmodified. Labrum with rounded basal lobe (figs. 21, 63). Female palp without claw or spines (figs. 64, 65); tibia with three trichobothria (fig. 66), patella without prolateral row of ridges, tarsus unmodified. **Abdomen:** Cylindrical, without long posterior extension, rounded posteriorly, interscutal membrane without rows of small sclerotized platelets. Booklung covers large, ovoid, without setae, anterolateral edge unmodified; posterior spiracles connected by groove (figs. 27, 67). Pedicel tube short, unmodified, scutopedicel region unmodified, abdomen not extending anterior of pedicel; plumose hairs, matted setae on anterior ventral abdomen in pedicel area, cuticular outgrowths near pedicel all absent. Dorsal scutum absent. Epigastric scutum weakly sclerotized, not surrounding pedicel, not protruding, small lateral sclerites absent, without lateral joints in females. Postepigastric scutum present in females, present or absent in males, when present, weakly sclerotized, yellow, short, only around epigastric furrow, not fused to epigastric scutum, anterior margin unmodified, without posteriorly directed lateral apodemes. Spinneret scutum, supraanal scutum both absent. Abdominal setae light, needlelike, epigastric area setae not basally thickened; dense patch of setae anterior to spinnerets absent. Colulus present, bearing two setae (figs. 22, 68). Spinnerets relatively long (figs. 87, 88); anterior lateral spinnerets (scanned only in *O. endicus*) bisegmented, basal segment with oblique membranous strip (figs. 23, 69), both sexes with one major ampullate gland spigot and three piriform gland spigots (figs. 24, 70), posterior median unisegmented, both sexes with single terminal spigot (figs. 25, 71), posterior lateral bisegmented, both sexes with single terminal spigot (figs. 26, 72). **Legs:** Femur IV not thickened, same size as femora I–III, patella plus tibia I shorter than carapace, tibia I unmodified; tibia IV specialized

hairs on ventral apex, ventral scopula, metatarsi I, II mesoapical comb, metatarsi III, IV weak ventral scopula all absent. Leg spines present on tibiae, metatarsi III, IV, sometimes also on femora III, IV, spines longer than segment width but sometimes little wider than other setae and thus difficult to differentiate under light microscopy. Tarsi without inferior claw. Superior claws scanned only in *O. endicus*, males with 5–7 teeth largely in single row, but most distal tooth displaced slightly toward inner side of claw (figs. 28–35), females similar but with additional inner row of distally situated, tiny, closely spaced teeth (figs. 73–80). Trichobothrial base with rectangular opening (figs. 36, 81). Tarsal organs with three receptors on legs I, II (figs. 37, 38, 82, 83), two receptors on legs III, IV, palps (figs. 39–41, 84–86), distalmost receptor often slightly to deeply bifid. **Genitalia**: Male epigastric region with sperm pore not visible; furrow without Ω-shaped insertions, without specialized setae. Male palp of normal size, not strongly sclerotized, right and left palps mirror images of each other, proximal segments, cymbium, bulb yellow; embolus light, prolateral excavation absent; trochanter normal size, unmodified; femur normal size, two or more times as long as trochanter, without posteriorly rounded lateral dilation, attaching to patella basally; patella shorter than femur, not enlarged, without prolateral row of ridges, setae unmodified; tibia with three trichobothria (fig. 48); cymbium ovoid in dorsal view, completely fused with bulb, no seam visible, not extending beyond distal tip of bulb, plumose setae, stout setae, distal patch of setae all absent; bulb longer than cymbium, stout, distinctly narrower at middle than at proximal or distal ends (figs. 49, 50); embolus accompanied by hyaline conductor (figs. 45, 46) bearing numerous tiny projections (figs. 51, 52), usually with basal projection (figs. 46, 52), sometimes preceded proximally by dorsal lobe (figs. 165, 167). Female genitalia with distinct anterior receptaculum situated on stalk; posterior receptaculum highly three-dimensional, often containing large ducts (figs. 89–92).

Distribution: Circum-Caribbean.

Unidentifiable Species: The holotype and paratypes of *Oonops zeteki* Chickering (1951), described from Isla Barro Colorado, Panama, were thought by Chickering to be adult females, as were three specimens later collected at Summit Gardens, Panama (see Chickering, 1970: 494). They are actually juveniles with leg spination indicating that they probably belong to *Costarina* Platnick and Dupérré (2011); apparently Chickering was unaware that juveniles of hard-bodied gamasomorphine groups lack the abdominal scuta found in adults. The name is here placed as a nomen dubium, as multiple species of *Costarina* occur at the type locality, and these juveniles cannot be identified at the species level.

KEY TO NORTH AMERICAN SPECIES OF *OONOPOIDES*

1. Males (those of *O. chicanna* unknown).....2
– Females (those of *O. catemaco* unknown).....8
2. Basal projection on embolus long, extending almost to tip of embolus (figs. 45, 46, 51, 52) .....*endicus*
– Basal projection on embolus much shorter.....3
3. Embolus gently arched (figs. 97, 108).....4

– Embolus more strongly bent (figs. 119, 130, 141, 152).....5
4. Tiny projections on hyaline conductor extending almost to base of embolus (fig. 100).*iviei*
– Tiny projections restricted to tip of conductor (fig. 111).....*secretus*
5. Basal, straight portion of embolus relatively short (figs. 121, 132).....6
– Basal, straight portion of embolus longer (figs. 143, 154).....7
6. Basal embolar projection triangular, widened proximally (figs. 121, 123).....*catemaco*
– Basal embolar projection narrow throughout its length (figs. 132, 134).....*zullinii*
7. Basal portion of embolus relatively long, narrow (figs. 141, 143).....*mitchelli*
– Basal portion of embolus relatively short, wide (figs. 152, 154).....*kaplanae*
8. Posterior receptaculum greatly elongated, oval (figs. 89, 90).....*endicus*
– Posterior receptaculum shorter.....9
9. Tip of anterior receptaculum rounded (figs. 113, 114).....*secretus*
– Tip of anterior receptaculum not rounded.....10
10. Posterior receptaculum about as long as wide (figs. 146, 147).....*mitchelli*
– Posterior receptaculum wider than long.....11
11. Anterior receptaculum narrow throughout its length (figs. 102, 103).....*iviei*
– Anterior receptaculum widened anteriorly.....12
12. Anterior receptaculum gradually widened anteriorly (figs. 124, 125).....*chicanna*
– Anterior receptaculum abruptly widened anteriorly (figs. 136, 158).....13
13. Tip of anterior receptaculum squared (figs. 135, 136).....*zullinii*
– Tip of anterior receptaculum wide, oval (figs. 157, 158).....*kaplanae*

Oonopoides endicus (Chickering), new combination
Figures 12–92

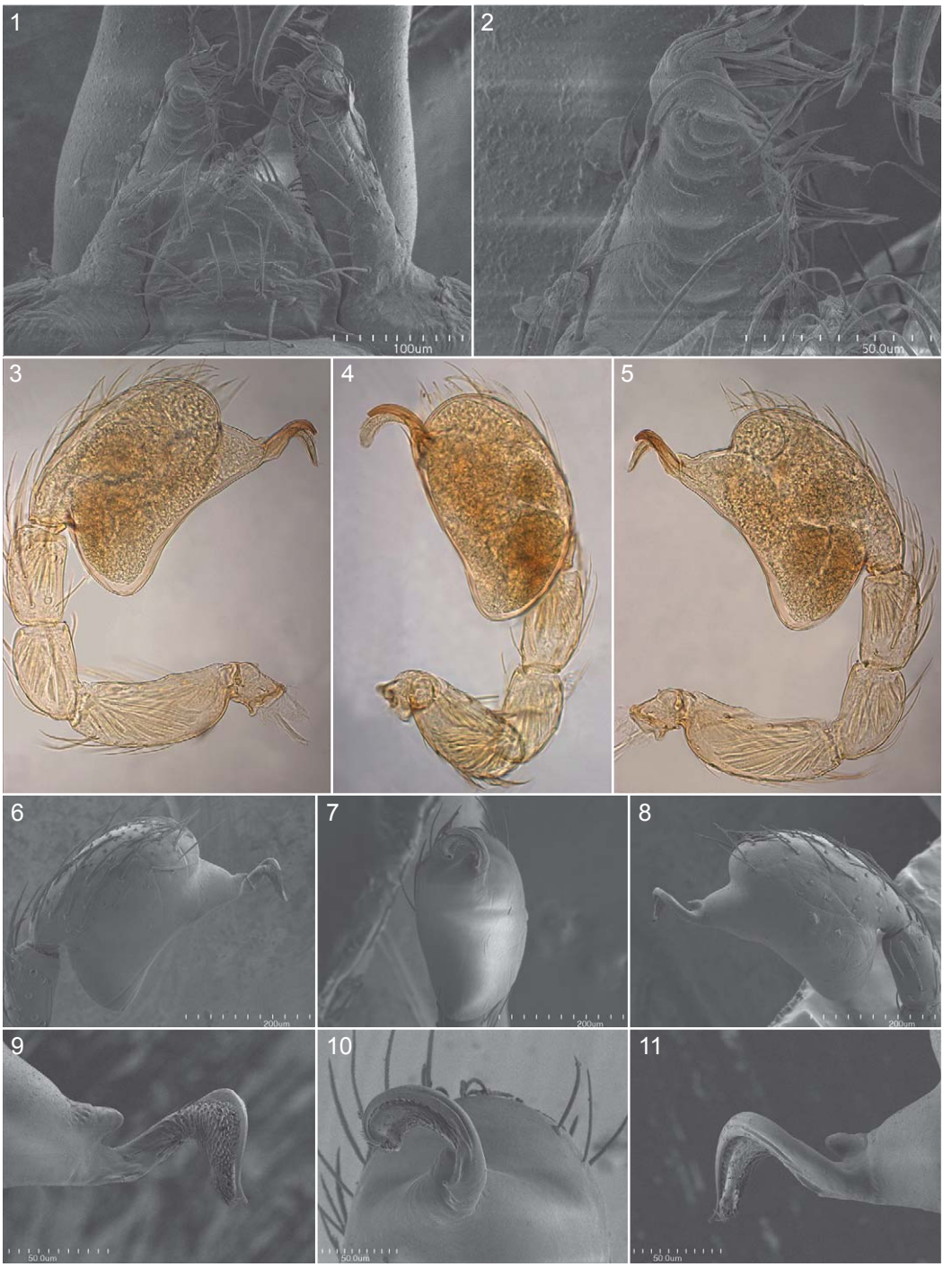
Oonops endicus Chickering, 1971: 209, figs. 21–23 (male holotype from South Bimini, Bahama Islands, in AMNH; examined); not figs. 24, 25, female (=*Oonopoides iviei*).

Diagnosis: Males can be recognized by the abruptly bent tip of the embolus (figs. 43, 46), females by the hypertrophied posterior receptaculum (figs. 89, 90).

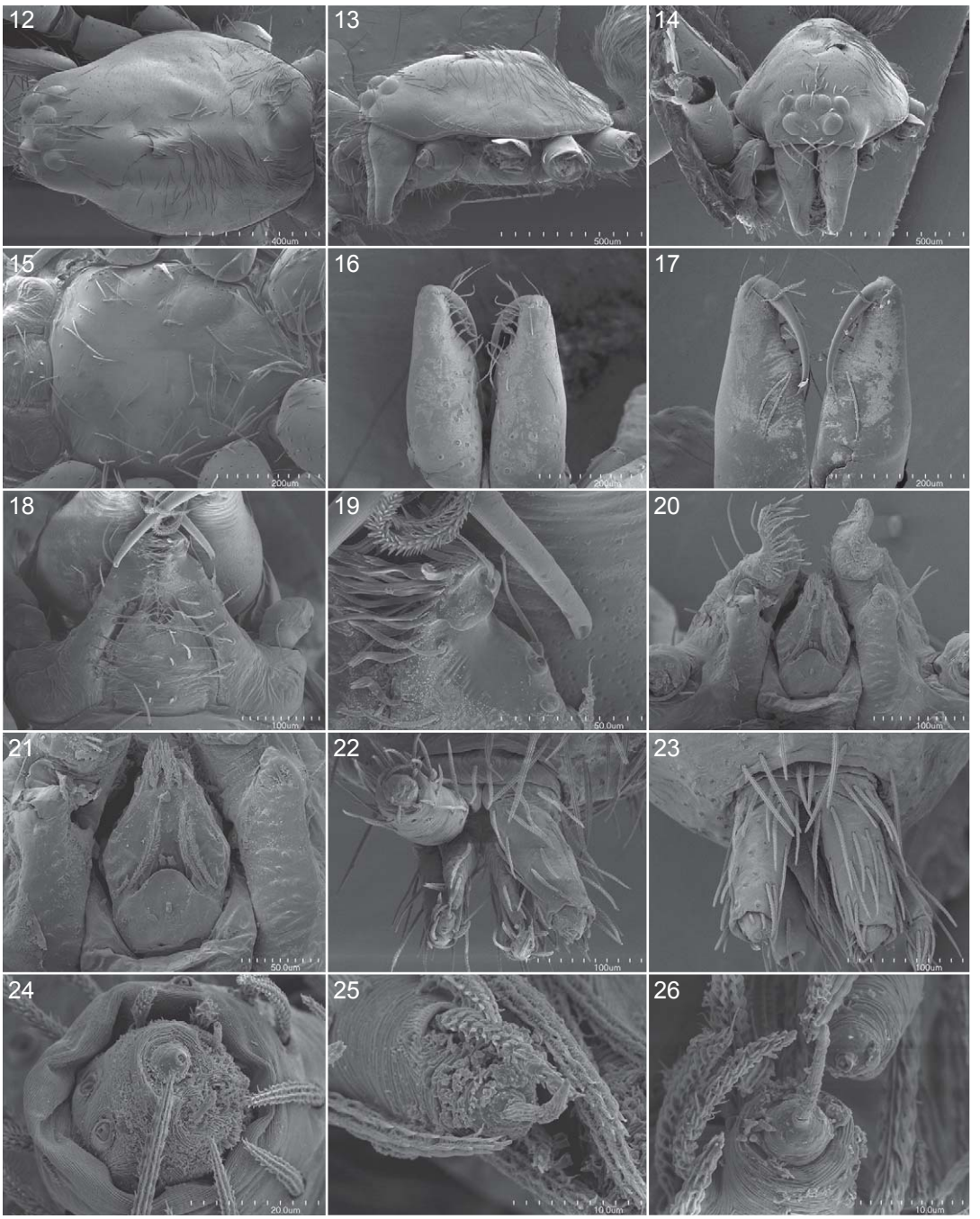
Male (PBI_OON 37975, figs. 12–53): Total length 1.72. Posterior eye row straight from front; ALE separated by more than their diameter. Endites distally excavated, anterior portion with single, strongly protuberant ledge. Postepigastric scutum absent. Leg spination: femora III, IV d1-0-1; tibiae: III p1-1-0, v0-0-2, r1-1-0; IV d1-1-0, p1-0-1, v0-2-2, r1-0-0; metatarsi: III v0-0-1p, r1-1-0; IV p1-1-0, v2-0-2, r1-1-0. Embolar base with long, narrow projection; embolus abruptly bent.

Female (PBI_OON 37975, figs. 54–92): Total length 2.63. Leg spination: femora: III d1-0-1; IV d1-0-0; tibiae: III p1-1-0, v0-1p-2, r1-1-0; IV d1-1-0, p1-0-1, v0-1p-2, r1-0-0; metatarsi: III v0-0-1p, r1-1-0; IV p1-1-1, v1p-0-2, r1-1-0. Anterior receptaculum small, anteriorly widened, globular; posterior receptaculum hypertrophied, ducts with anterior pair of large, longitudinal loops anteriorly, numerous smaller, transverse loops posteriorly.

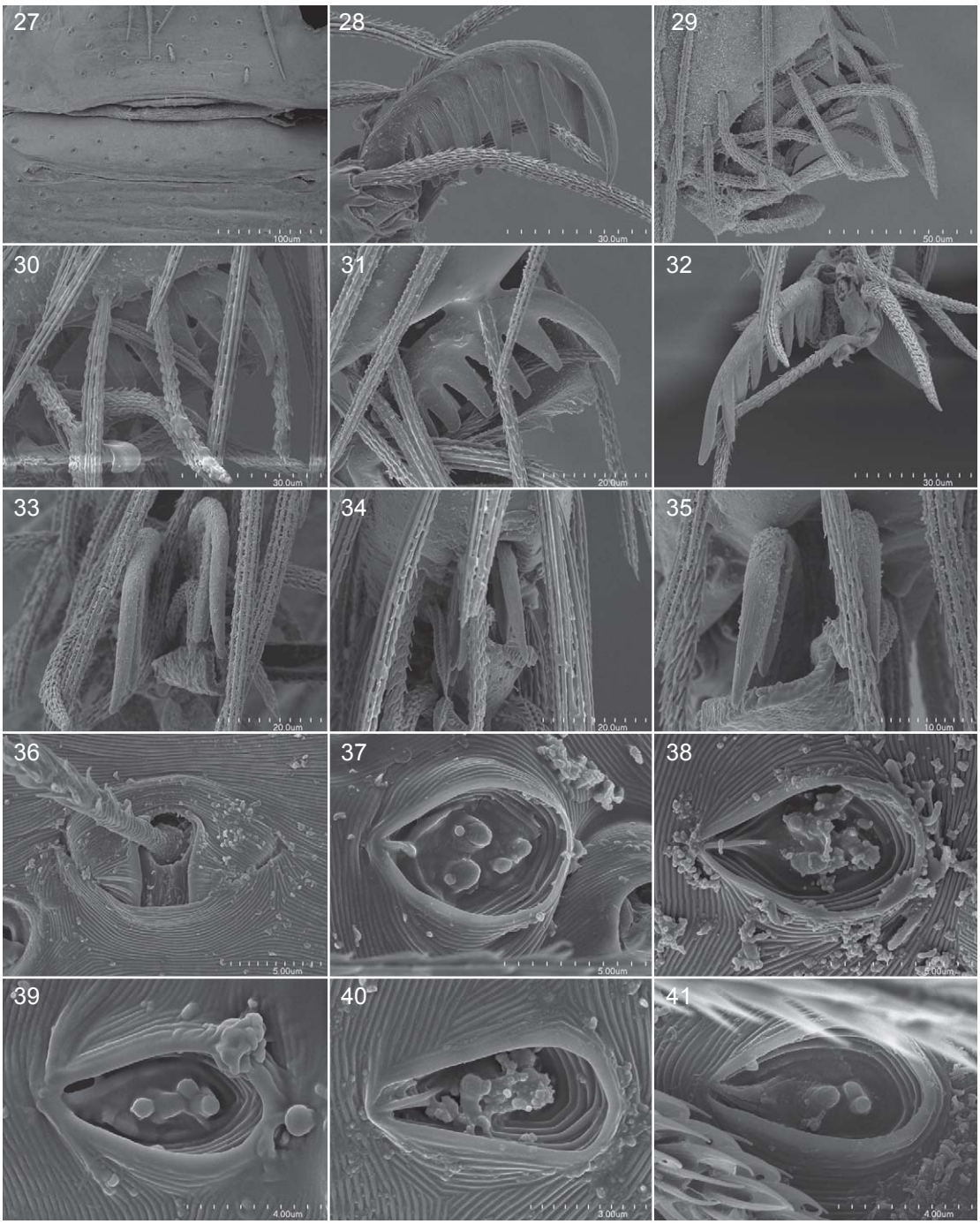
Material Examined: UNITED STATES: **Florida:** *Monroe Co.:* 2 mi SE Marathon, 24°37′N, 81°06′W, Dec. 15, 1962 (W. Ivie, AMNH PBI_OON 1101, 37975, 37977), 33♂, 17♀.



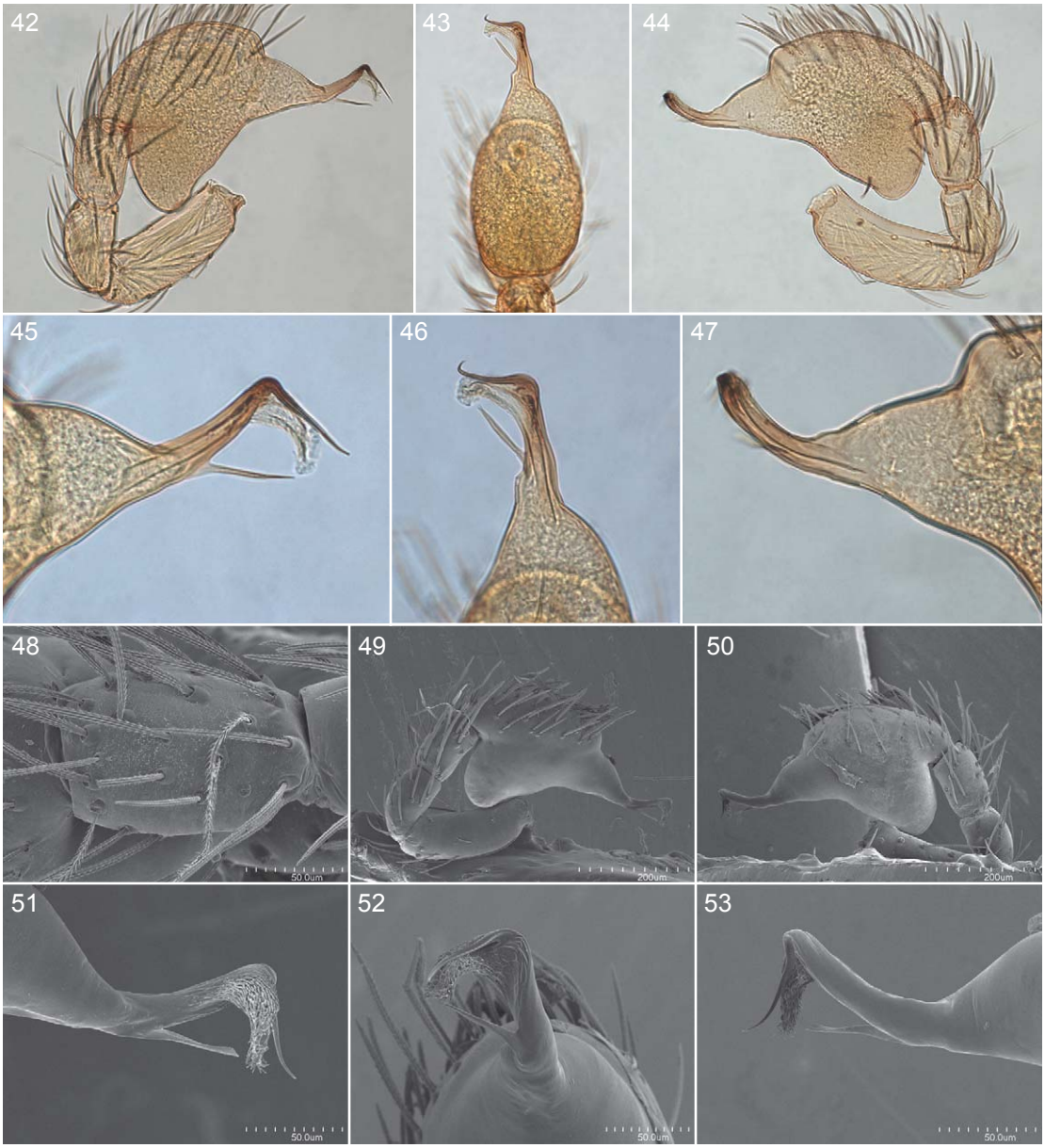
FIGURES 1–11. *Oonopoides maxillaris* Bryant, male paratype from Cuba (basal projection on embolar base broken). **1.** Labium and endites, ventral view. **2.** Tip of endite, ventral view. **3, 6.** Left palp, prolateral view. **4, 7.** Same, ventral view. **5, 8.** Same, retrolateral view. **9.** Left embolus, prolateral view. **10.** Same, ventral view. **11.** Same, retrolateral view.



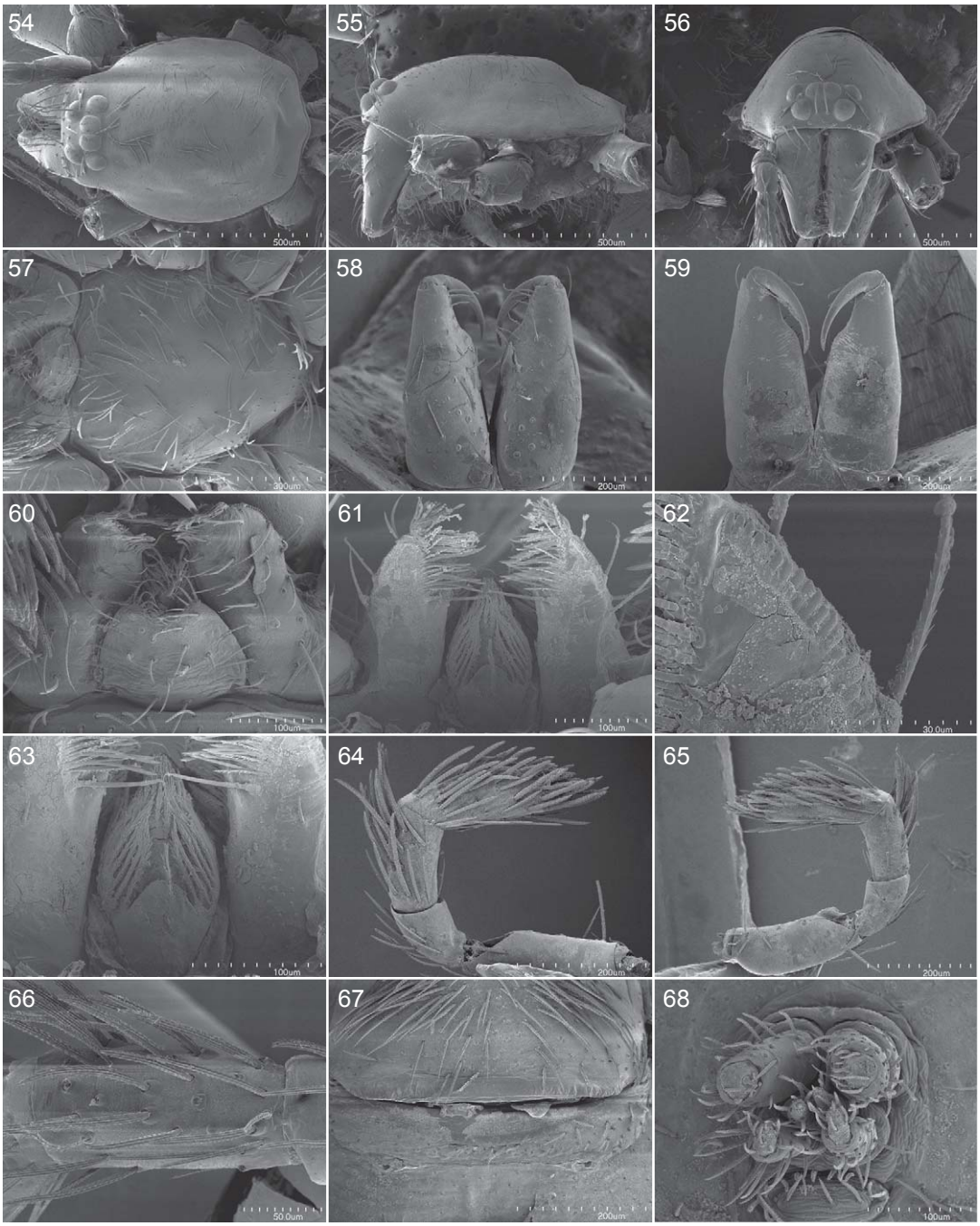
FIGURES 12–26. *Oonopoides endicus* (Chickering), male. **12.** Carapace, dorsal view. **13.** Same, lateral view. **14.** Same, anterior view. **15.** Sternum, ventral view. **16.** Chelicerae, anterior view. **17.** Same, posterior view. **18.** Labium and endites, ventral view. **19.** Tip of endite, ventral view. **20.** Labrum and endites, dorsal view. **21.** Labrum, dorsal view. **22.** Spinnerets, apical view. **23.** Anterior lateral spinnerets, ventral view. **24.** Anterior lateral spinneret, apical view. **25.** Posterior median spinneret, same. **26.** Posterior lateral spinneret, same.



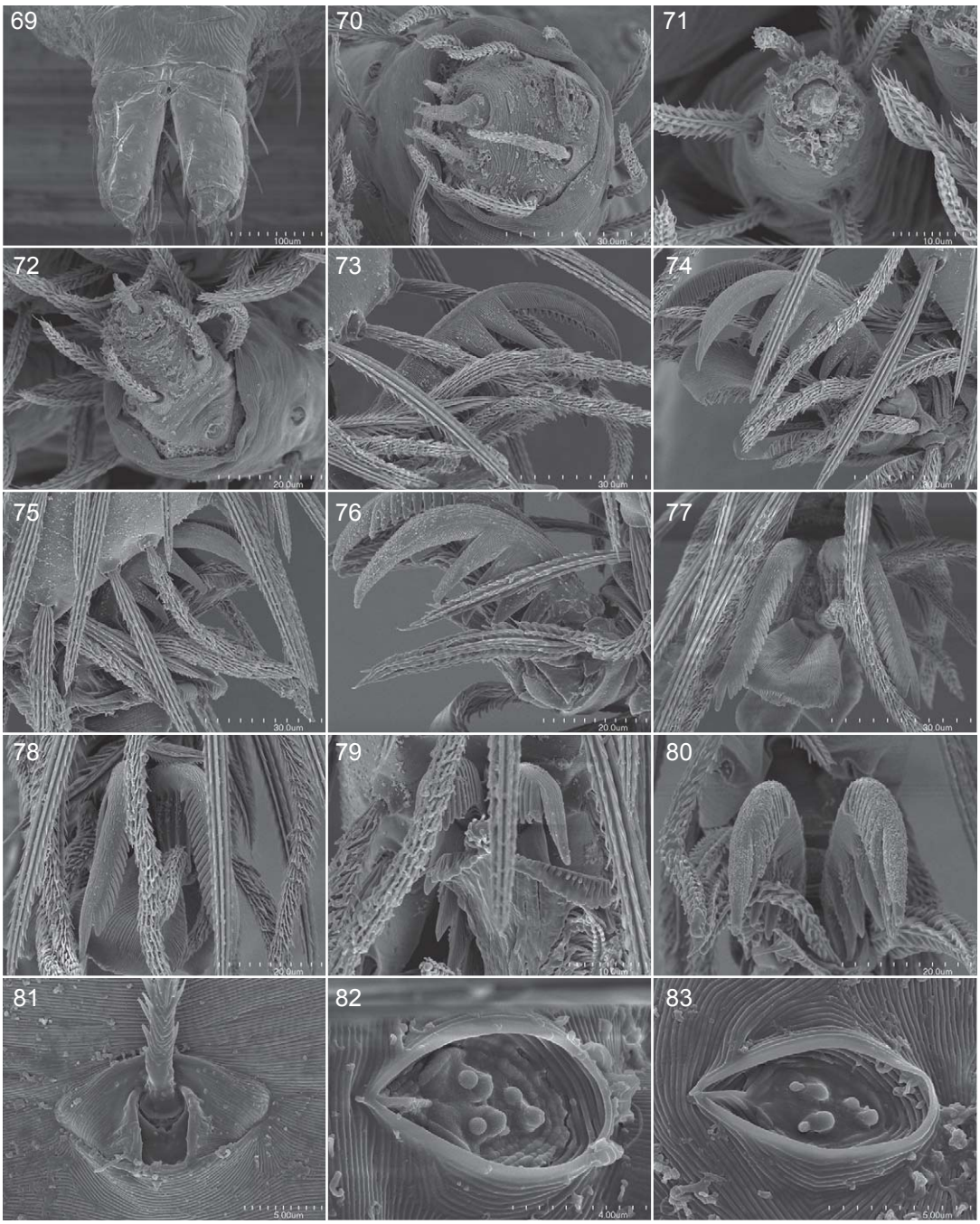
FIGURES 27–41. *Oonopoides endicus* (Chickering), male. **27.** Epigastric region, ventral view. **28.** Claws of leg I, lateral view. **29.** Same, leg II. **30.** Same, leg III. **31.** Same, leg IV. **32.** Claws of leg I, apical view. **33.** Same, leg II. **34.** Same, leg III. **35.** Same, leg IV. **36.** Trichobothrial base from metatarsus I, dorsal view. **37.** Tarsal organ from leg I, dorsal view. **38.** Same, leg II. **39.** Same, leg III. **40.** Same, leg IV. **41.** Same, palp.



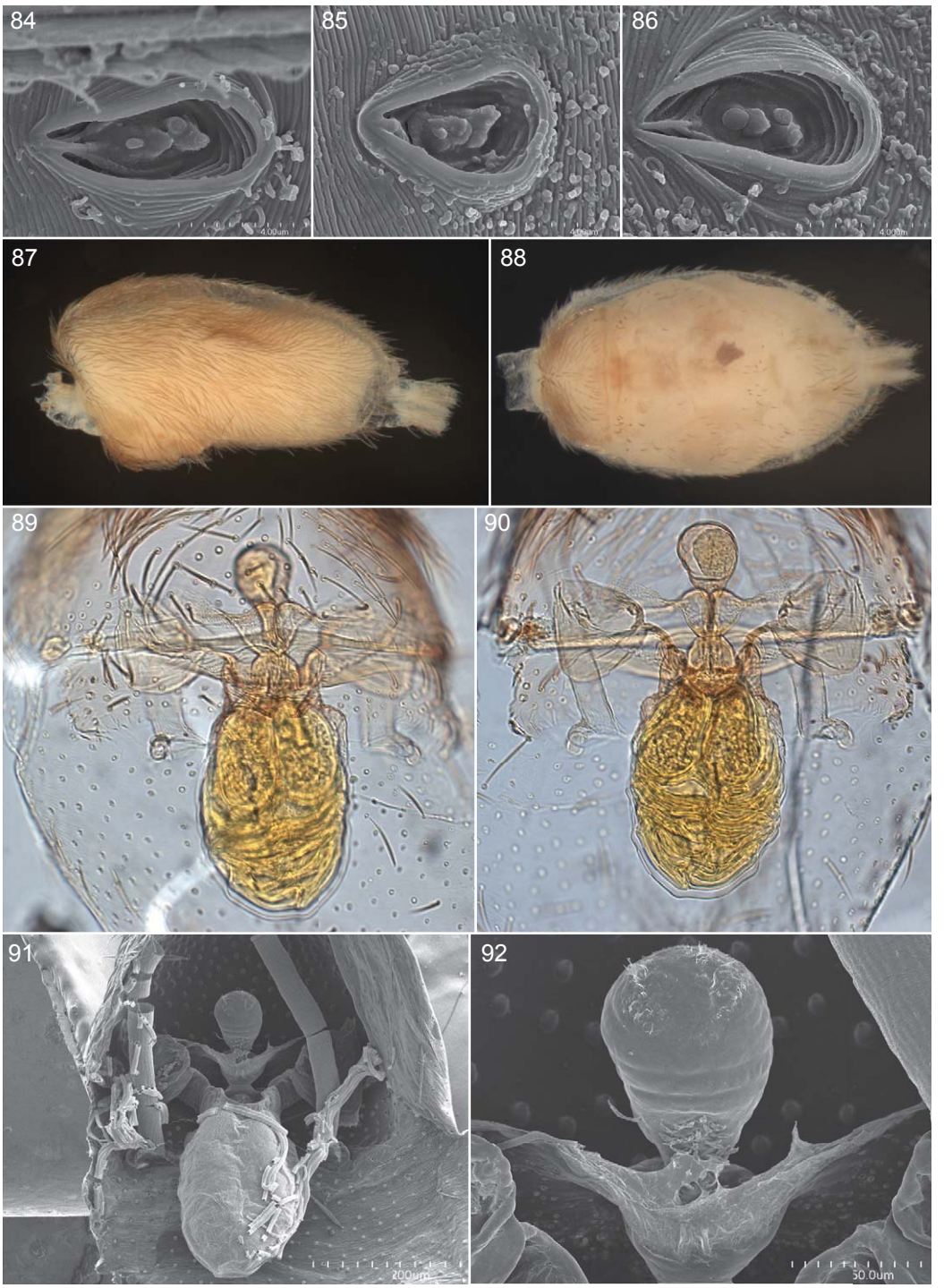
FIGURES 42–53. *Oonopoides endicus* (Chickering), male. **42, 49.** Left palp, prolateral view. **43.** Same, ventral view. **44, 50.** Same, retrolateral view. **45, 51.** Left embolus, prolateral view. **46, 52**. Same, ventral view. **47, 53.** Same, retrolateral view. **48.** Palpal tibia, dorsal view.



FIGURES 54–68. *Oonopoides endicus* (Chickering), female. **54.** Carapace, dorsal view. **55.** Same, lateral view. **56.** Same, anterior view. **57.** Sternum, ventral view. **58.** Chelicerae, anterior view. **59.** Same, posterior view. **60.** Labium and endites, ventral view. **61.** Labrum and endites, dorsal view. **62.** Serrula, dorsal view. **63.** Labrum, dorsal view. **64.** Palp, prolateral view. **65.** Same, retrolateral view. **66.** Palpal tibia, dorsal view. **67.** Epigastric region, ventral view. **68.** Spinnerets, apical view.



FIGURES 69–83. *Oonopoides endicus* (Chickering), female. **69.** Anterior lateral spinnerets, ventral view. **70.** Anterior lateral spinneret, apical view. **71.** Posterior median spinneret, same. **72.** Posterior lateral spinneret, same. **73.** Claws of leg I, lateral view. **74.** Same, leg II. **75.** Same, leg III. **76.** Same, leg IV. **77.** Claws of leg I, apical view. **78.** Same, leg II. **79.** Same, leg III. **80.** Same, leg IV. **81.** Trichobothrial base from metatarsus III, dorsal view. **82.** Tarsal organ from leg I, dorsal view. **83.** Same, leg II.



FIGURES 84–92. *Oonopoides endicus* (Chickering), female. **84.** Tarsal organ from leg III, dorsal view. **85.** Same, leg IV. **86.** Same, palp. **87.** Abdomen, lateral view. **88.** Same, ventral view. **89.** Genitalia, ventral view. **90, 91.** Same, dorsal view. **92.** Anterior receptaculum, anterior view.

WEST INDIES: **Bahama Islands:** South Bimini, May 1951 (W. Gertsch, M. Cazier, AMNH PBI_OON 37319), 1♂ (holotype), same (AMNH PBI_OON 1667, 37316), 14♂ (paratypes), June 1951 (M. Cazier, C., P. Vaurie, AMNH PBI_OON 1832), 2♂ (paratypes).

Distribution: Far southern Florida and the Bahama Islands.

Oonopoides iviei, new species

Figures 93–103

Oonops balanus (misidentification): Chickering, 1971: 204 (some males from South Bimini only).
Oonops endicus (misidentification): Chickering, 1971: 209, figs. 24, 25 (females only).

Type: Male holotype taken on South Bimini, Bahama Islands (May 1951; W. Gertsch, M. Cazier), deposited in AMNH (PBI_OON 51291)

Etymology: The specific name is a patronym in honor of Wilton Ivie, who was the first person to collect specimens of *Oonopoides* in Florida.

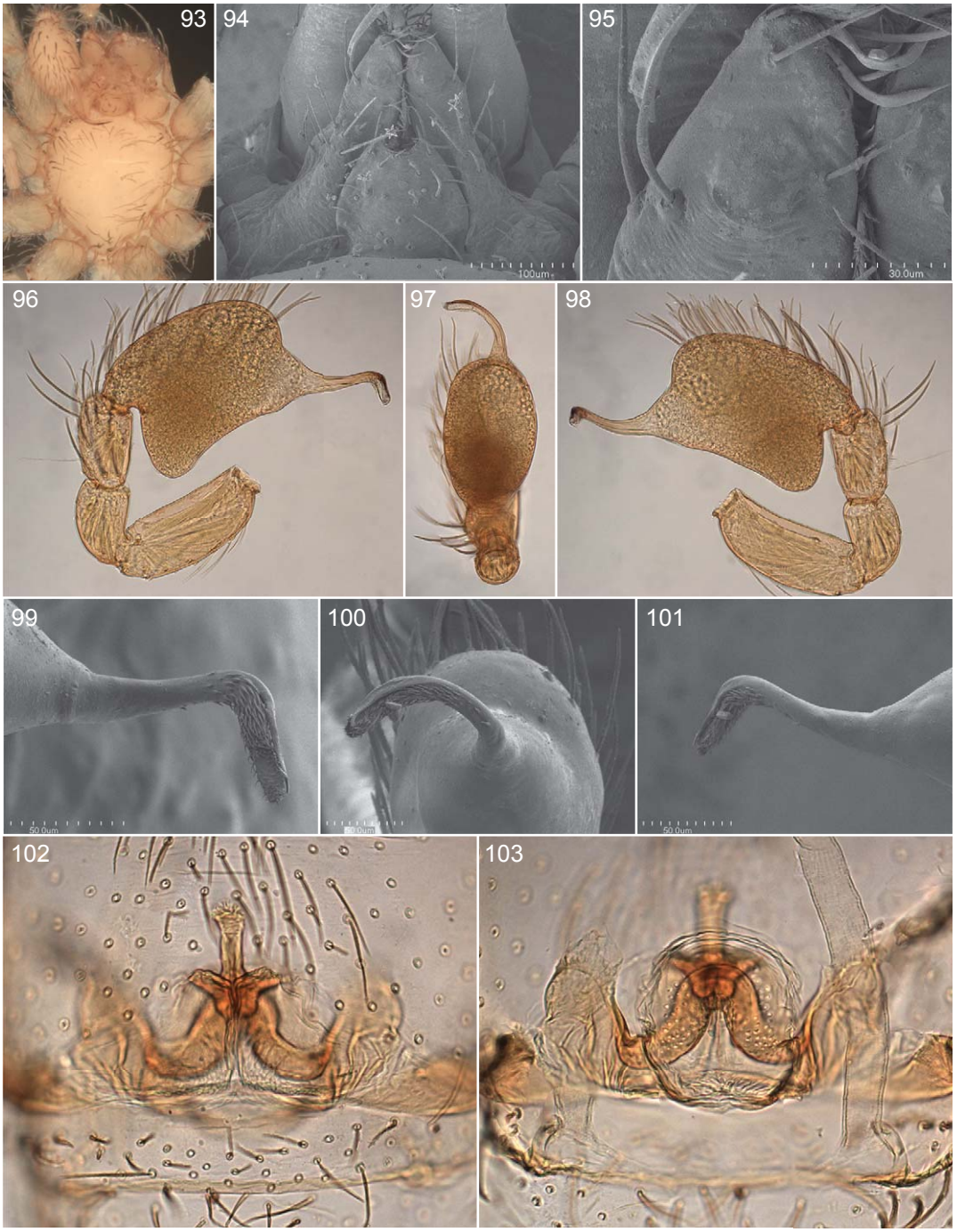
Diagnosis: Males resemble those from Bimini described (but probably misidentified) as "*Oonops balanus*" by Chickering (1971: figs. 1–11), but have a longer, more evenly curved embolus (figs. 97, 100); females have a distally narrow anterior receptaculum and a heavily sclerotized, W-shaped anterior margin of the posterior receptaculum (figs. 102,103).

Male (PBI_OON 37348, figs. 93–101): Total length 1.83. Posterior eye row straight from front; ALE separated by their radius to diameter. Endites distally not excavated, anterior portion with single, rounded, protuberant ledge. Postepigastric scutum absent. Leg spination: femur IV d1-0-0; tibiae: III p0-0-1, v0-1p-2; IV d0-1-0, p1-0-1, v0-1p-2, r0-0-1; metatarsi: III v0-0-2; IV p1-0-1, v0-0-1p, r1-0-1. Embolus gently arched, with basal projection reduced to tiny spur no longer than tiny projections on hyaline conductor.

Female (PBI_OON 1719, figs. 102, 103): Total length 1.97. ALE separated by more than their diameter. Leg spination: femur III d1-0-0; tibiae: III p1-0-0, v1p-0-2, r1-0-0; IV p0-1-1, v0-1r-2; metatarsi: III v0-1p-2; IV p1-0-0, v0-1p-2, r0-0-1. Anterior receptaculum narrow, tubular, posterior receptaculum with heavily sclerotized, W-shaped anterior margin.

Other Material Examined: UNITED STATES: **Florida:** *Monroe Co.:* Big Pine Key, E end, 24°40′N, 81°22′W, Dec. 13, 1962 (W. Ivie, AMNH PBI_OON 37348), 2♂; Big Pine Key, Jack Watson Nature Trail, off Key Deer Boulevard, Nov. 8, 2007, buttonwood leaf litter (P. Sierwald, FMNH 44208, PBI_OON 10687), 1♀; Long Key State Recreation Area, July 31, 1981, leaf litter, xeric scrub (D. Ubick, CDU PBI_OON 35673), 1♂. WEST INDIES: **Bahama Islands:** Andros Island: Pigeon Cay, May 1–6, 1994, Berlese, coastal coppice litter (R. Anderson, AMNH PBI_OON 1768), 1♂, 2♀, same, Berlese, buttonwood coppice litter (R. Anderson, AMNH PBI_OON 1767), 1♀; North Bimini, Dec. 31, 1952 (E. Hayden, AMNH PBI_OON 1465), 1♂; South Bimini, May 1951 (W. Gertsch, M. Cazier, AMNH PBI_OON 1608, 1625, 1718, 1719, 1823, 37323), 16♂, 31♀, June 1951 (M. Cazier, C., P. Vaurie, AMNH PBI_OON 1601), 2♀.

Distribution: Far southern Florida and the Bahama Islands.



FIGURES 93–103. *Oonopoides iviei,* new species, male (93–101) and female (102, 103). **93.** Sternum and mouthparts, ventral view. **94.** Labium and endites, same. **95.** Tip of endite, same. **96.** Left palp, prolateral view. **97.** Same, ventral view. **98.** Same, retrolateral view. **99.** Left embolus, prolateral view. **100.** Same, ventral view. **101.** Same, retrolateral view. **102.** Genitalia, ventral view. **103.** Same, dorsal view.

Oonopoides secretus (Gertsch), new combination
Figures 104–114

Oonops secretus Gertsch, 1936: 8, figs. 14–16 (male holotype from 15 mi SW Harlingen, Cameron Co., Texas, in AMNH; examined). – Gertsch and Davis, 1942: 3.

Diagnosis: Males resemble those of *O. iviei* in having a gently arched embolus, but have the tiny projections on the hyaline conductor restricted to the embolus tip (fig. 111); females have a large, rounded anterior receptaculum (figs. 113, 114).

Male (PBI_OON 1742, figs. 104–112): Total length 1.32. Posterior eye row straight from front; ALE separated by their radius to diameter. Endites distally not excavated, anterior portion with single, rounded, strongly produced ledge. Postepigastric scutum absent. Leg spination: femora: III d0-0-1; IV d1-0-1; tibiae: III d1-0-1, p0-1-1, v1p-0-2, r0-1-1; IV p0-1-1, v1p-1p-2, r0-0-1; metatarsi: III v1p-0-0, r0-1-0; IV p1-0-2, v1p-0-0, r1-0-2. Embolus without basal projection, hyaline conductor relatively short, situated near tip of embolus.

Female (PBI_OON 1592, figs. 113–114): Total length 1.39. ALE separated by more than their diameter. Leg spination: femur III d1-0-0; tibiae: III v1p-0-2; IV p0-1-0, v1p-1p-2, r0-1-0; metatarsi: III v1p-0-2; IV p1-0-2, v0-1p-0, r1-0-2. Anterior receptaculum large, rounded, almost as long as postepigastric scutum; median sclerotization narrowed anteriorly.

Material Examined: UNITED STATES: **Texas:** *Bexar Co.:* San Antonio, Dec. 28, 1935 (L. Davis, AMNH PBI_OON 31173), 1♀. *Burleson Co.:* Barr Site, Snook, 30°26′00.19″N, 96°30′36.28″W, July 13–19, 2006, pitfall (A. Calixto, TAMU PBI_OON 1584), 1♂. *Cameron Co.:* no specific locality, Jan. 1938 (L. Davis, AMNH PBI_OON 1592), 4♂, 7♀; 15 mi SW Harlingen, Nov. 18, 1934 (S. Mulaik, AMNH PBI_OON 49940), 1♂ (holotype). *Hidalgo Co.:* Edinburg, Apr. 29, 1936 (S. Mulaik, AMNH PBI_OON 1579), 1♂, Dec. 1939 (S. Mulaik, AMNH PBI_OON 37070), 1♂, (S., D. Mulaik, AMNH PBI_OON 1587), 2♂, 1♀. *Hudspeth Co.:* Guadalupe Pass, Oct. 4, 1961 (W. Gertsch, W. Ivie, AMNH PBI_OON 1589), 1♀. *Nueces Co.:* Driscoll, Apr. 14, 1963 (W. Gertsch, W. Ivie, AMNH PBI_OON 1583), 1♀. *San Patricio Co.:* 8 mi NE Sinton, Mar. 22–Apr. 28, 1960 (H. Laughlin, AMNH PBI_OON 1586, 1742), 2♂; Welder Wildlife Foundation, 7.5 mi N Sinton, Jan. 20, 1974, Berlese, litter under cactus (J. Bengtson, FMNH PBI_OON 21053), 1♀. MEXICO: **Tamaulipas:** 15 mi S Victoria, July 2, 1936 (A., L. Davis, AMNH PBI_OON 1743), 1♂.

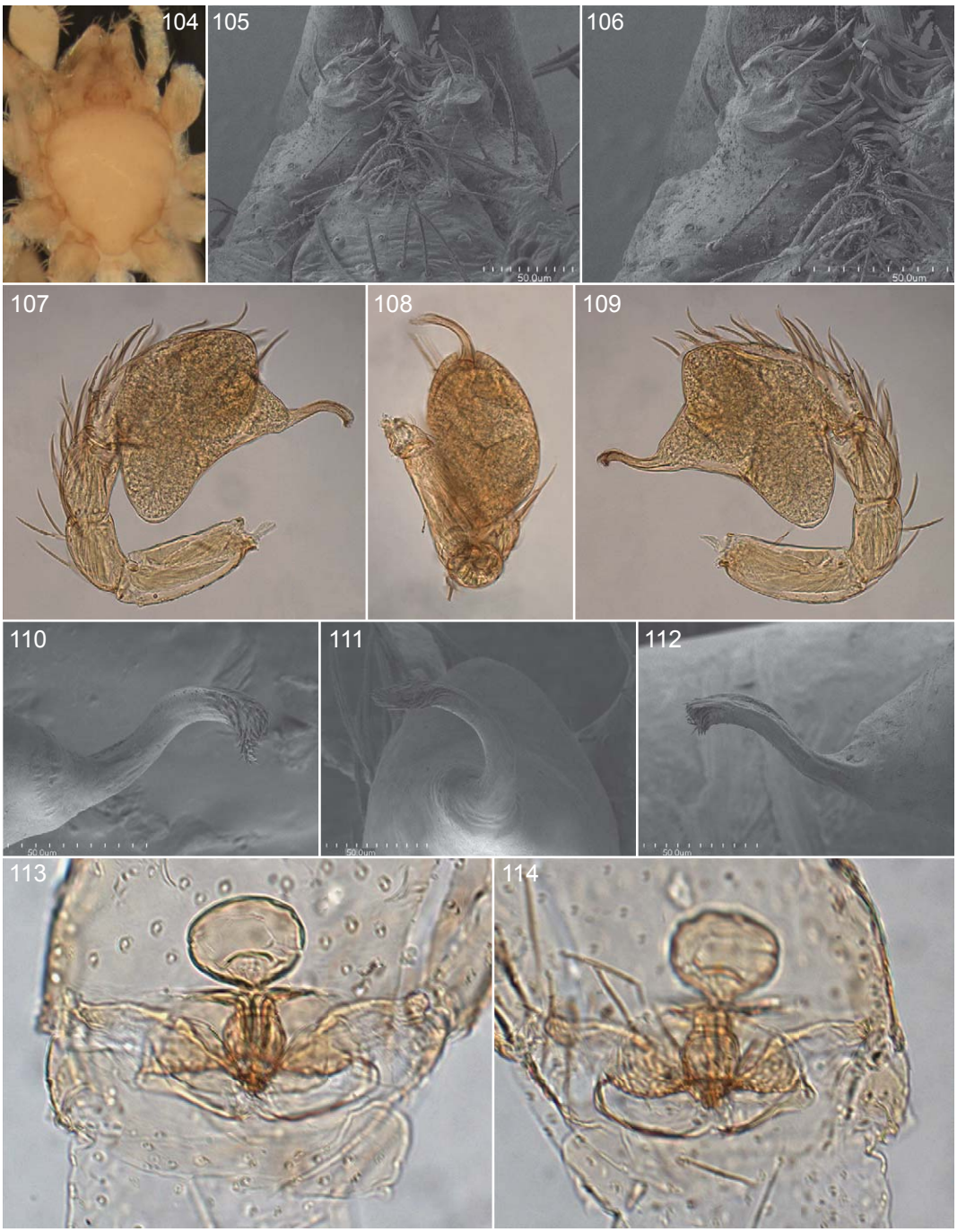
Distribution: Texas and Tamaulipas.

Oonopoides catemaco, new species
Figures 115–123

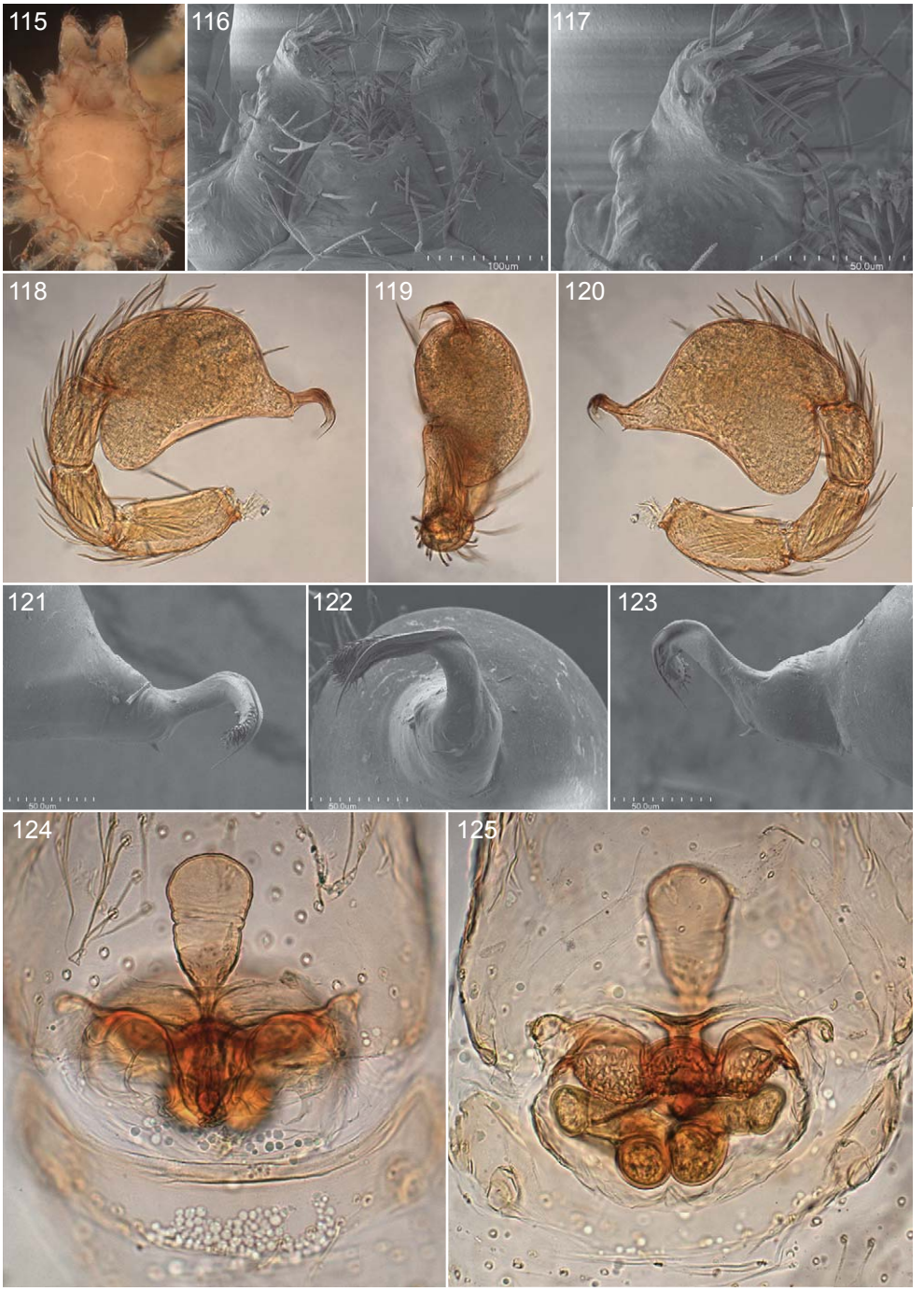
Types: Male holotype and male paratype from Berlese sample of litter from tree base taken at an elevation of 160 m in the Los Tuxtlas Biological Station, 33 km NE of Catemaco, Veracruz, Mexico (Aug. 1, 1983; S., J. Peck), deposited in AMNH (PBI_OON 31168).

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

Diagnosis: Males resemble those of *O. endicus* but have a more abruptly narrowed embolar base (figs. 118, 121).



FIGURES 104–114. *Oonopoides secretus* (Gertsch), male (104–112) and female (113, 114). **104.** Sternum and mouthparts, ventral view. **105.** Labium and endites, same. **106.** Tip of endite, same. **107.** Left palp, prolateral view. **108.** Same, ventral view. **109.** Same, retrolateral view. **110.** Left embolus, prolateral view. **111.** Same, ventral view. **112.** Same, retrolateral view. **113.** Genitalia, ventral view. **114.** Same, dorsal view.



FIGURES 115–125. *Oonopoides catemaco*, new species, male (115–123) and *O. chicanna*, new species, female (124, 125). **115.** Sternum and mouthparts, ventral view. **116.** Labium and endites, same. **117.** Tip of endite, same. **118.** Left palp, prolateral view. **119.** Same, ventral view. **120.** Same, retrolateral view. **121.** Left embolus, prolateral view. **122.** Same, ventral view. **123.** Same, retrolateral view. **124.** Genitalia, ventral view. **125.** Same, dorsal view.

Male (PBI_OON 31168, figs. 115–123): Total length 1.93. Posterior eye row procurved from front; ALE separated by their radius to diameter. Endites distally not excavated, anterior portion with single, rounded, strongly protuberant ledge, followed posteriorly by laterally situated knoblike projection. Postepigastric scutum present. Leg spination: tibiae: III p1-0-1, v0-1p-2; IV d1-1-0, v0-0-2, r0-0-1; metatarsi: III v0-1p-2; IV p1-0-1, v0-0-1p, r1-0-1. Embolus with basal projection very short, sharp; embolar tip bent twice.

Female: Unknown.

Other Material Examined: None.

Distribution: Southeastern Mexico (far southern Veracruz).

Oonopoides zullinii Brignoli
Figures 126–136

Oonopoides zullinii Brignoli, 1974: 205, figs. 3A–E (female holotype from Rancho del Cielito, Cerro Brujo, Ocozocoautla, Chiapas, Mexico, may be in the Museo di Storia Naturale, Verona, but no response to our inquiry was received from that institution; not examined).

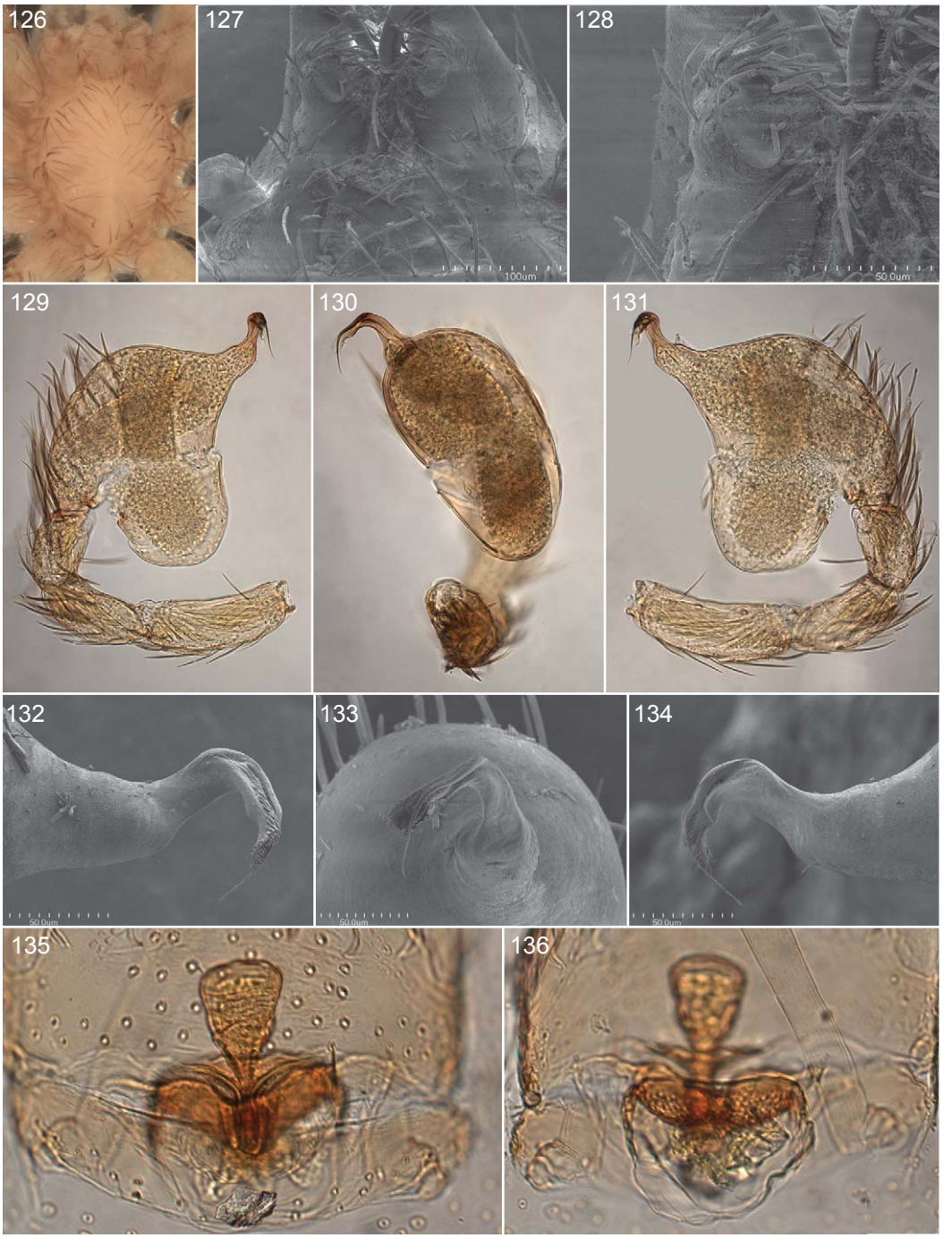
Diagnosis: Males resemble those of *O. endicus* but have a much wider, abruptly narrowed embolar base (fig. 132); females have a spatula-shaped anterior receptaculum (figs. 135, 136).

Male (PBI_OON 31149, figs. 126–134): Total length 1.83. Posterior eye row procurved from front; ALE separated by more than their diameter. Endites distally not excavated, anterior portion with single, large, rounded, strongly protuberant ledge. Postepigastric scutum present. Leg spination: femora: III d0-0-1; IV d1-0-0; tibiae: III p0-1-1, v0-1p-2, r0-1-1; IV d0-1-0, p1-1-0; v1p-0-2, r1-1-1; metatarsi: III v0-1p-2, r0-0-1; IV p0-1-1, v0-0-2, r0-1-0. Embolus with basal projection tiny, extremely narrow; embolar tip much longer than conductor.

Female (PBI_OON 1602, figs. 135, 136): Total length 1.89. Leg spination: tibiae: III p0-0-1, v0-0-1p, r0-0-1; IV d1-0-0, p1-0-0, v0-1p-2; metatarsi: III v1p-0-1p; IV p1-0-1, v0-1p-2, r1-0-1. Anterior receptaculum spatula-shaped; posterior receptaculum with heavily sclerotized anterior margin.

Material Examined: MEXICO: **Chiapas:** 5 mi NE Chiapa, 16°45′N, 92°58′W, Aug. 26, 1966, hillside (J., W. Ivie, AMNH PBI_OON 1637), 1♂, 2♀; near Ruinas de Palenque, 17°31′N, 92°01′W, Jan. 2, 1984, dense forest (V., B. Roth, CAS 25884, 25898, PBI_OON 2398, 2412), 1♂, 1♀; S Ruinas de Palenque, rainforest trail near Templo de León, Jan. 24, 1976, Berlese, litter (C. Alteri, AMNH PBI_OON 31160), 1♂; 4 mi SE San Cristóbal, 16°42′N, 92°36′W, Aug. 23, 1966 (J., W. Ivie, AMNH PBI_OON 1602), 1♂, 3♀, Aug. 25, 1966 (J., W. Ivie, AMNH PBI_OON 31153), 1♂, 1♀; Sumidero, canyon rim, 16°50′N, 93°05′W, July 30, 1966 (J., W. Ivie, AMNH PBI_OON 31151), 6♂, 1♀; Sumidero, NE Tuxtla Gutiérrez, Aug. 19, 1966 (J., W. Ivie, AMNH PBI_OON 1639), 1♂, 2♀; 2 mi S Sumidero, rim of gorge NE Tuxtla Gutiérrez, 16°48′N, 93°04′W, Aug. 17, 1966 (J., W. Ivie, AMNH PBI_OON 31149), 6♂, 4♀; 5 km S Sumidero, rim of canyon, 16°48′N, 93°05′W, Aug. 17, 1966 (J., W. Ivie, AMNH PBI_OON 31167), 4♂, 1♀; plateau 6 mi S Tuxtla Gutiérrez, 16°42′N, 93°07′W, Aug. 21, 1966 (J., W. Ivie, AMNH PBI_OON 37345), 3♂.

Distribution: Southern Mexico (Chiapas).



FIGURES 126–136. *Oonopoides zullinii* Brignoli, male (126–134) and female (135, 136). **126.** Sternum and mouthparts, ventral view. **127.** Labium and endites, same. **128.** Tip of endite, same. **129.** Left palp, prolateral view. **130.** Same, ventral view. **131.** Same, retrolateral view. **132.** Left embolus, prolateral view. **133.** Same, ventral view. **134.** Same, retrolateral view. **135.** Genitalia, ventral view. **136.** Same, dorsal view.

Oonopoides chicanna, new species
Figures 124, 125

Type: Female holotype from Berlese sample of mixed forest litter taken in a seasonal tropical forest at an elevation of 300 m at Chicanna, 10 km W of Xpujil, Campeche, Mexico (July 13, 1983; S., J. Peck), deposited in AMNH (PBI_OON 1671).

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

Diagnosis: Females have a long, gradually widened anterior receptaculum and a pair of thick, transverse ducts in the posterior receptaculum (figs. 124, 125).

Male: Unknown.

Female (PBI_OON 31156, figs. 124, 125): Total length 1.99. Posterior eye row straight from front; ALE separated by their radius to diameter. Leg spination: tibiae: III v0-0-1p; IV d1-0-0, p0-1-0, v0-1p-2; metatarsi: III v0-0-1p; IV p1-0-1, v0-1p-2. Anterior receptaculum long, anteriorly widened; posterior receptaculum with pair of thick, transverse ducts.

Other Material Examined: MEXICO: **Campeche:** ruins of Chicanna, trail to Aguada, Xpujil, July 9, 1974, litter sample (R. Waide, AMNH PBI_OON 31156), 1♀. **Quintana Roo:** Kohunlich, 68 km W Chetumal, July 15, 1982, seasonal tropical forest litter (S., J. Peck, AMNH PBI_OON 1610), 1♀.

Distribution: Southeastern Mexico (Campeche, Quintana Roo).

Oonopoides mitchelli (Gertsch), new combination
Figures 137–147

Oonops mitchelli Gertsch, 1977: 122, figs. 72, 75, 76 (female holotype from Grutas Xpukil, Yucatán, Mexico, in AMNH; examined).

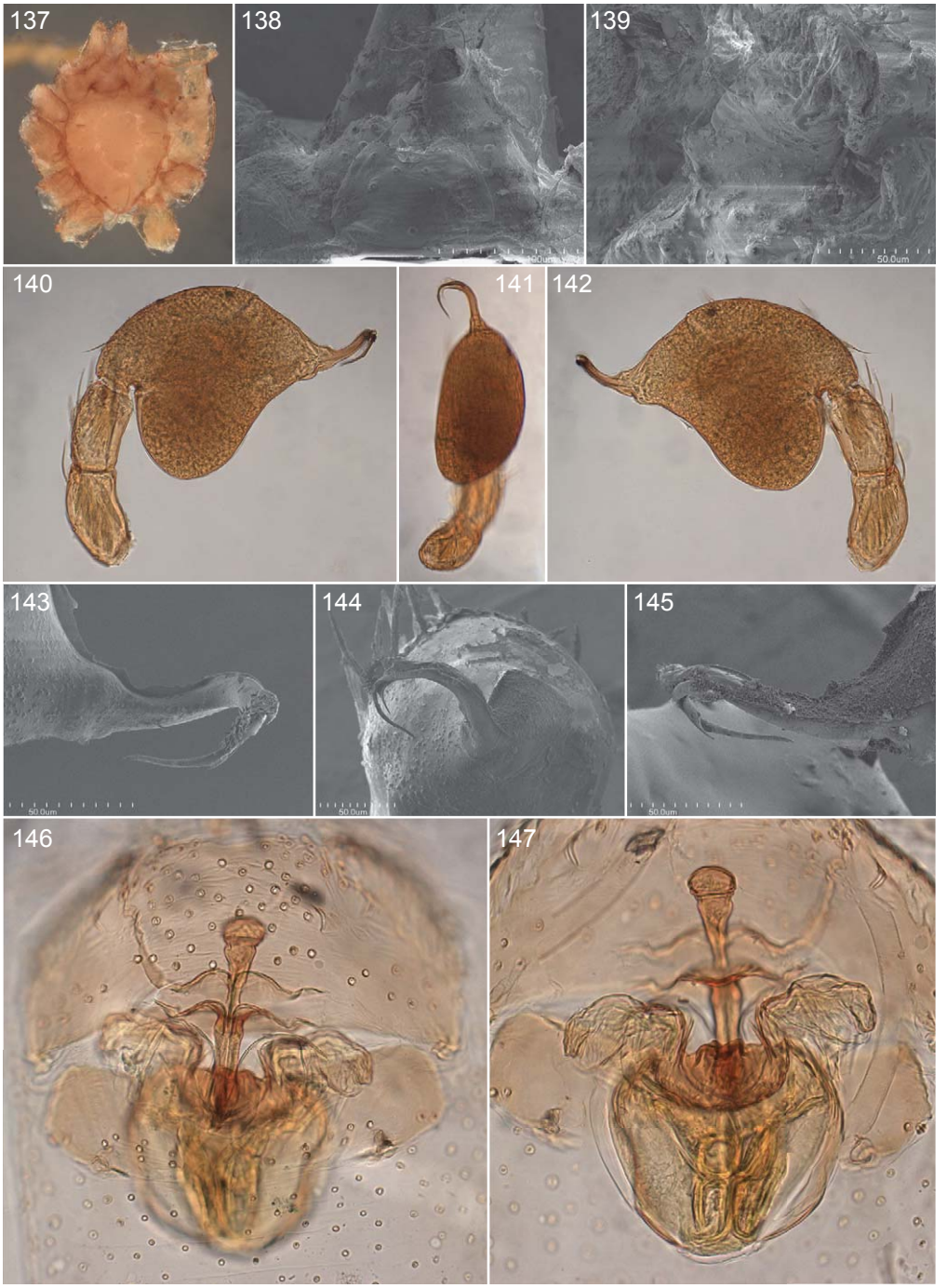
Diagnosis: Males have the tip of the hyaline conductor elongated and sharply pointed (figs. 144, 145), females have a somewhat squared posterior receptaculum (figs. 146, 147).

Male (PBI_OON 1735, figs. 137–145): Carapace length 0.59 (abdomen missing). Posterior eye row procurved from front; ALE separated by their radius to diameter. Endites distally not excavated, in poor condition but apparently with single, anteromedially situated protuberant ledge and posterolaterally protuberant knob. Leg spination unknown (legs III, IV missing). Distal portion of hyaline conductor elongated, sharply pointed.

Female (PBI_OON 1736, figs. 146, 147): Total length 1.66. Posterior eye row straight from front. Leg spination: femur IV d1-0-0; tibiae: III d0-1-0, p1-0-1, v0-1p-2, r1-0-1; IV d1-0-1, p1-0-1, v0-2-2, r1-0-1; metatarsi: III v0-1p-2, r0-1-0; IV p1-0-1, v1p-2-2, r1-0-1. Anterior receptaculum with rounded tip on long, narrow stalk; transverse sclerite at anterior margin of posterior receptaculum deeply invaginated.

Material Examined: MEXICO: **Yucatán:** Grutas Xpukil, Mar. 18–19, 1973, Berlese, dry guano (J. Reddell, AMNH PBI_OON 1615), 1♀ (holotype), same, entrance sink (J. Reddell et al., AMNH PBI_OON 1059), 1♀; Hoctún, Aug. 12, 1973 (J. Reddell, AMNH PBI_OON 1736), 1♀; pyramid at Izamal, Aug. 10, 1973 (J. Reddell, AMNH PBI_OON 1737), 1♀; 1 km S Muna, July 31–Aug. 4, 1973 (M. Canul, E. González, AMNH PBI_OON 1735), 1♂.

Distribution: Southeastern Mexico (Yucatán).



FIGURES 137–147. *Oonopoides mitchelli* (Gertsch), male (137–145) and female (146, 147). **137.** Sternum and mouthparts, ventral view. **138.** Labium and endites, same. **139.** Tip of endite, same. **140.** Left palp, prolateral view. **141.** Same, ventral view. **142.** Same, retrolateral view. **143.** Left embolus, prolateral view. **144.** Same, ventral view. **145.** Same, retrolateral view. **146.** Genitalia, ventral view. **147.** Same, dorsal view.

Oonopoides kaplanae, new species

Figures 148–158

Types: Male holotype and female allotype from seasonal forest litter taken at an elevation of 20 m at a site 2 km east of Chichén-Itzá, Yucatán, Mexico (July 20, 1983; S., J. Peck), deposited in AMNH (PBI_OON 31146).

Etymology: The specific name is a patronym in honor of Helene Kaplan, in recognition of her service to the American Museum of Natural History, on the occasion of her 80th birthday.

Diagnosis: The male embolus has a widened base, with the tip abruptly narrowed and recurved (figs. 154, 155); females have a tripartite anterior receptaculum, with a narrow base, somewhat widened medial portion, and widened tip (figs. 157, 158).

Male (PBI_OON 31146, figs. 148–156): Total length 1.58. Posterior eye row procurved from front; ALE separated by their radius to diameter. Endites distally not excavated, with single, strongly protuberant anteromedian ledge, posteromedian protuberant knob. Postepigastric scutum present. Leg spination: femora: III d0-0-1; IV d1-0-1; tibiae: III p1-0-1, v0-1p-2, r0-0-1; IV d0-1-0, p1-0-1, v1r-0-2, r1-0-1; metatarsi: III v0-2-2, r0-0-1; IV p1-0-1, v0-0-2, r1-0-1. Embolus with basal projection short, narrow, embolus much longer than conductor.

Female (PBI_OON 31146, figs. 157, 158): Total length 1.92. Posterior eye row straight from front; ALE separated by more than their diameter. Leg spination: femora III, IV d0-0-1; tibiae: III p0-0-1, v0-1p-1p, r0-0-1; IV d0-1-0, p1-0-1, r1-0-1; metatarsi: III v0-1p-2, r0-0-1; IV p1-0-1, v0-2-2, r0-1-1. Tip of anterior receptaculum ovoid, much wider than stalk, anterior portion of posterior receptaculum M-shaped, heavily sclerotized medially.

Other Material Examined: MEXICO: **Yucatán:** Chichén-Itzá, June 27, 1951 (L. Stannard, AMNH PBI_OON 1048), 1♀.

Distribution: Southeastern Mexico (Yucatán).

KEY TO CENTRAL AMERICAN SPECIES OF *OONOPOIDES*

1. Males.....2
– Females (those of *O. hondo* unknown).....7
2. Embolus preceded by dorsal lobe on bulb (figs. 165, 176).....3
– Embolus not preceded by such a lobe.....4
3. Tip of embolus relatively long, extending to near tip of basal embolar projection (fig. 165) .....*cristo*
– Tip of embolus shorter (fig. 176).....*upala*
4. Basal embolar projection relatively long, extending to near tip of embolus (fig. 210)....*anoxus*
– Basal embolar projection shorter (figs. 188, 199, 223).....5
5. Embolar base greatly widened (figs. 195, 198).....*pallidulus*
– Embolar base narrower (figs. 184, 187, 217, 222).....6
6. Embolus relatively short (figs. 184–189).....*cartago*
– Embolus relatively long (figs. 217–224).....*hondo*
7. Tip of anterior receptaculum round (figs. 212, 213).....*anoxus*

– Tip of anterior receptaculum not round.....8
8. Stalk of anterior receptaculum gradually widened anteriorly (figs. 168, 179).....9
– Stalk of anterior receptaculum more abruptly widened anteriorly (figs. 190, 201).....10
9. Anterior receptaculum flower shaped (fig. 179).....*upala*
– Anterior receptaculum thumb shaped (fig. 168).....*cristo*
10. Tip of anterior receptaculum relatively short, oval (fig. 190).....*cartago*
– Tip of anterior receptaculum longer, almost square (fig. 201).....*pallidulus*

Oonopoides hondo, new species

Figures 214–224

Type: Male holotype from Winkler sample of sifted leaf litter taken in a pine forest at an elevation of 1315 m on the road from San Marcos de Caiquín to Gracias, 14.42548°N, 88.61245°W, Lempira, Honduras (Sept. 29, 2008; C. Víquez, M. Branstetter), deposited in AMNH (PBI_OON 38428).

Etymology: The specific name is an arbitrary combination of letters.

Diagnosis: Males resemble those of *O. cartago* but have a longer embolus (figs. 217–224).

Male (PBI_OON 38428, figs. 214–224): Total length 1.75. Posterior eye row procurved from front; ALE separated by more than their diameter. Endites distally not excavated, anteromedially with single, broad protuberant ledge. Postepigastric scutum present. Leg spination (leg III missing): femur IV d1-1-0; tibia IV d1-0-0, p1-0-0, v0-1p-2; metatarsus IV p1-0-1, v1p-2-2, r0-0-1. Embolus with long, expanded base, basal projection short, tip elongated.

Female: Unknown.

Other Material Examined: None.

Distribution: Honduras.

Oonopoides cristo, new species

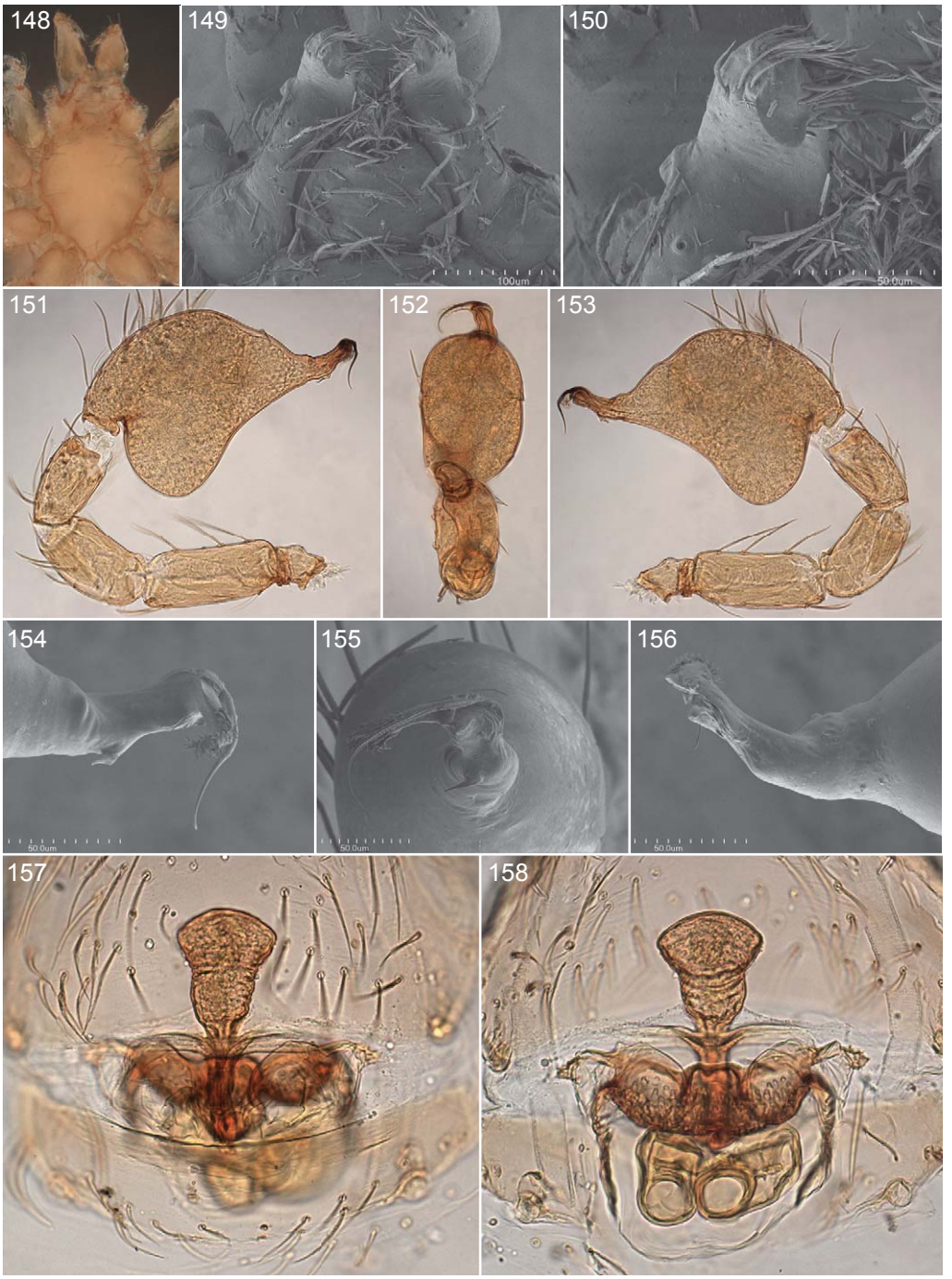
Figures 159–169

Type: Male holotype and male paratype from Upala, Montecristo, Alajuela, Costa Rica (Jan. 10, 2009; C. Víquez), deposited in INBIO (PBI_OON 1616).

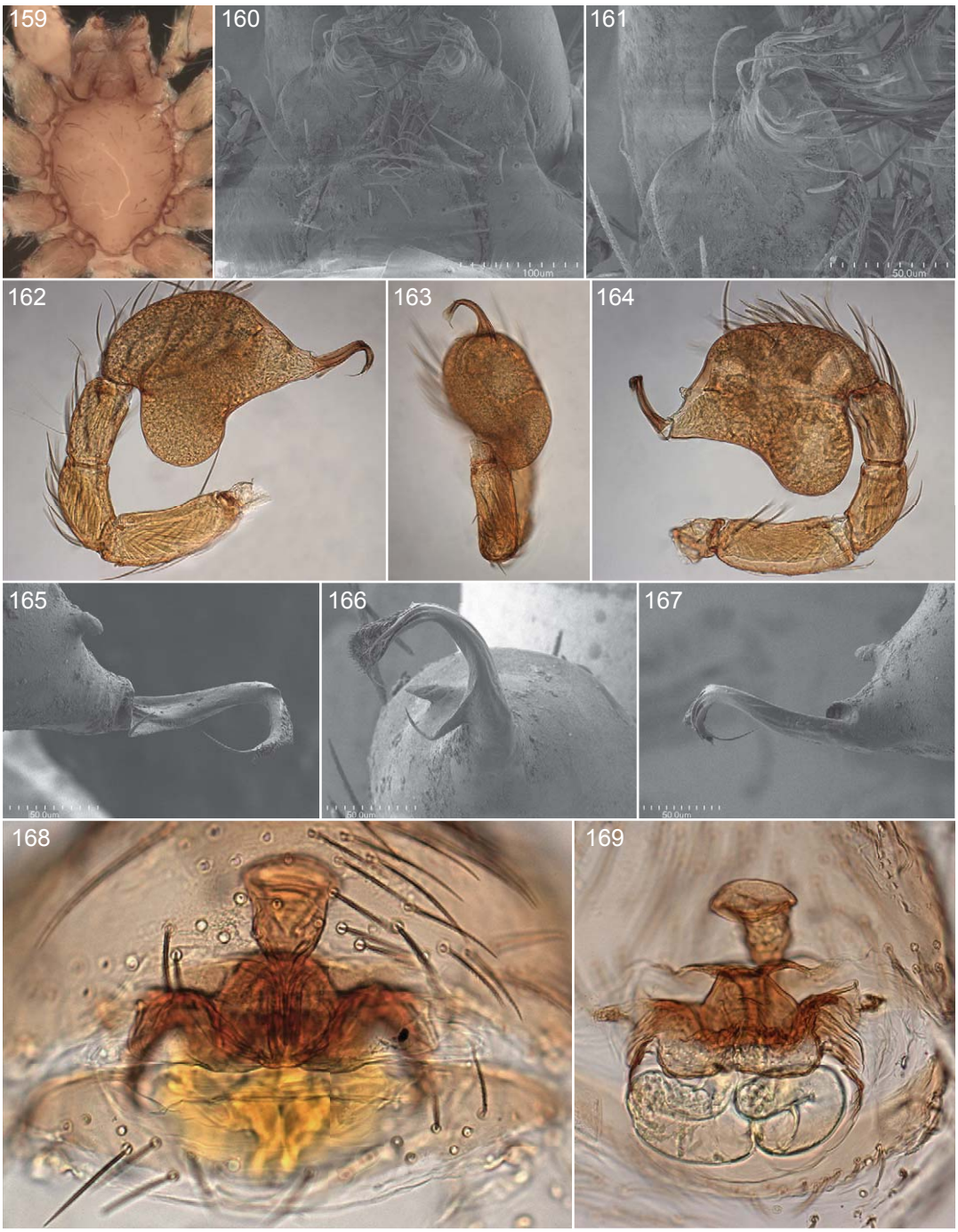
Etymology: The specific name is a noun in apposition shortened from the type locality.

Diagnosis: Males resemble those of *O. upala* in having a protuberant lobe proximal to the embolus, but have a longer embolar tip (figs. 162–167), females have a thumb-shaped anterior receptaculum (figs. 168, 169).

Male (PBI_OON 21117, figs. 159–167): Total length 1.93. Posterior eye row procurved from front; ALE separated by their radius to diameter. Endites distally not excavated, anteromedially with two protuberant ledges, anterolaterally with enlarged, projecting setal base. Postepigastric scutum present. Leg spination: femur IV d1-0-0; tibiae: III p1-0-1, v1p-1p-2, r1-0-0; IV p1-0-1, v1p-1p-2, r1-0-1; metatarsi: III d0-1-0, v0-1p-2, r0-1-0; IV d1-0-1, p1-0-1, v1p-0-2, r1-0-1. Embolus with basal projection sharply bent at about half its length, embolus preceded by rounded dorsal lobe.



FIGURES 148–158. *Oonopoides kaplanae*, new species, male (148–156) and female (157, 158). **148.** Sternum and mouthparts, ventral view. **149.** Labium and endites, same. **150.** Tip of endite, same. **151.** Left palp, prolateral view. **152.** Same, ventral view. **153.** Same, retrolateral view. **154.** Left embolus, prolateral view. **155.** Same, ventral view. **156.** Same, retrolateral view. **157.** Genitalia, ventral view. **158.** Same, dorsal view.



FIGURES 159–169. *Oonopoides cristo*, new species, male (159–167) and female (168, 169). **159.** Sternum and mouthparts, ventral view. **160.** Labium and endites, same. **161.** Tip of endite, same. **162.** Left palp, prolateral view. **163.** Same, ventral view. **164.** Same, retrolateral view. **165.** Left embolus, prolateral view. **166.** Same, ventral view. **167.** Same, retrolateral view. **168.** Genitalia, ventral view. **169.** Same, dorsal view.

Female (PBI_OON 31094, figs. 168, 169): Total length 1.86. Leg spination: femora: III d1-0-1; IV d1-0-0; tibiae: III d1-0-0, p1-0-1, v1p-1p-2, r1-0-1; IV d1-0-1, p1-0-0, v0-1p-2; metatarsi: III v0-0-2, r0-0-1; IV p1-0-1, v0-1p-2, r1-0-1. Ovoid tip of anterior receptaculum wider than stalk, median portion of anterior margin of posterior receptaculum produced anteriorly.

Other Material Examined: COSTA RICA: **Alajuela:** Montecristo, 1km W cacao plantation of Julio Hernandez, Jan. 10–12, 2009, canopy fogging, elev. 40 m (C. Víquez, A. Solis, R. Guries, INBIO PBI_OON 1677), 1♂; San Carlos, El Tanque, 10.49522°S, 84.58535°W, May 15, 2008, Berlese, riparian forest, elev. 130 m (C. Víquez, INBIO PBI_OON 31087), 1♀; Upala, Montecristo (INBIO PBI_OON 26725, 26727), 2♂, Apr. 14, 2007 (C. Víquez, INBIO PBI_OON 30969), 1♀. **Guanacaste:** Estación Biológica Pitilla, 9 km S Santa Cecilia, Aug. 1993, elev. 700 m (C. Moraga, INBIO PBI_OON 30971), 1♀. **Heredia:** Estación Biológica La Selva, 10°26′N, 84°01′W, Sept. 1992, elev. 50–150 m (INBIO PBI_OON 29703), 1♂; La Selva, Mar. 5, 1933, fogging *Carapa guianensis* (C. Víquez, INBIO PBI_OON 31090), 1♀, June 25, 1999 (C. Víquez, INBIO PBI_OON 30977), 1♀, May 11, 2000, fogging (C. Víquez, INBIO PBI_OON 31091), 1♂; 10 km SE La Virgen, 10°20′N, 84°05′W, Mar. 17, 2003, litter, elev. 450–550 m (R. Anderson, INBIO PBI_OON 30985), 1♂; 11 km ESE La Virgen, 10°21′N, 84°03′W, Feb. 16, 2004, elev. 250–350 m (INBIO PBI_OON 31092), 1♂, 1♀, Mar. 20, 2004, same (INBIO PBI_OON 31094), 1♀; Sarapiquí, Estación Biológica La Selva, experimental road south, Mar. 1, 2002, elev. 830 m (C. Víquez, INBIO PBI_OON 30986), 1♂; 9 km NE Vara Blanca, 10°14′N, 84°05′W, Apr. 15, 2005, elev. 1550 m (INBIO PBI_OON 31093), 1♀. **Limón:** Hone Creek, farm of Alberto Moore, Apr. 5–June 7, 2004, cacao-cordia-banana litter (C. Víquez, INBIO PBI_OON 29698, 29699, 29701), 3♂, 2♀; Río Toro Amarillo, near Guápiles, Mar. 1966, rainforest litter (W. Brown, MCZ 72235, PBI_OON 29399), 1♀; Valle de Silencio, Cerro Hoffman, Feb. 26–27, 2005, forest litter, elev. 2310 m (R. Anderson, INBIO PBI_OON 30972), 1♀. **Puntarenas:** Monteverde, Feb. 23–27, 1991, leaf litter, elev. 1500 m (H. Howden, AMNH PBI_OON 21117), 3♂.

Distribution: Northern Costa Rica (Guanacaste, Alajuela, Heredia, Limón, northern Puntarenas).

Oonopoides upala, new species

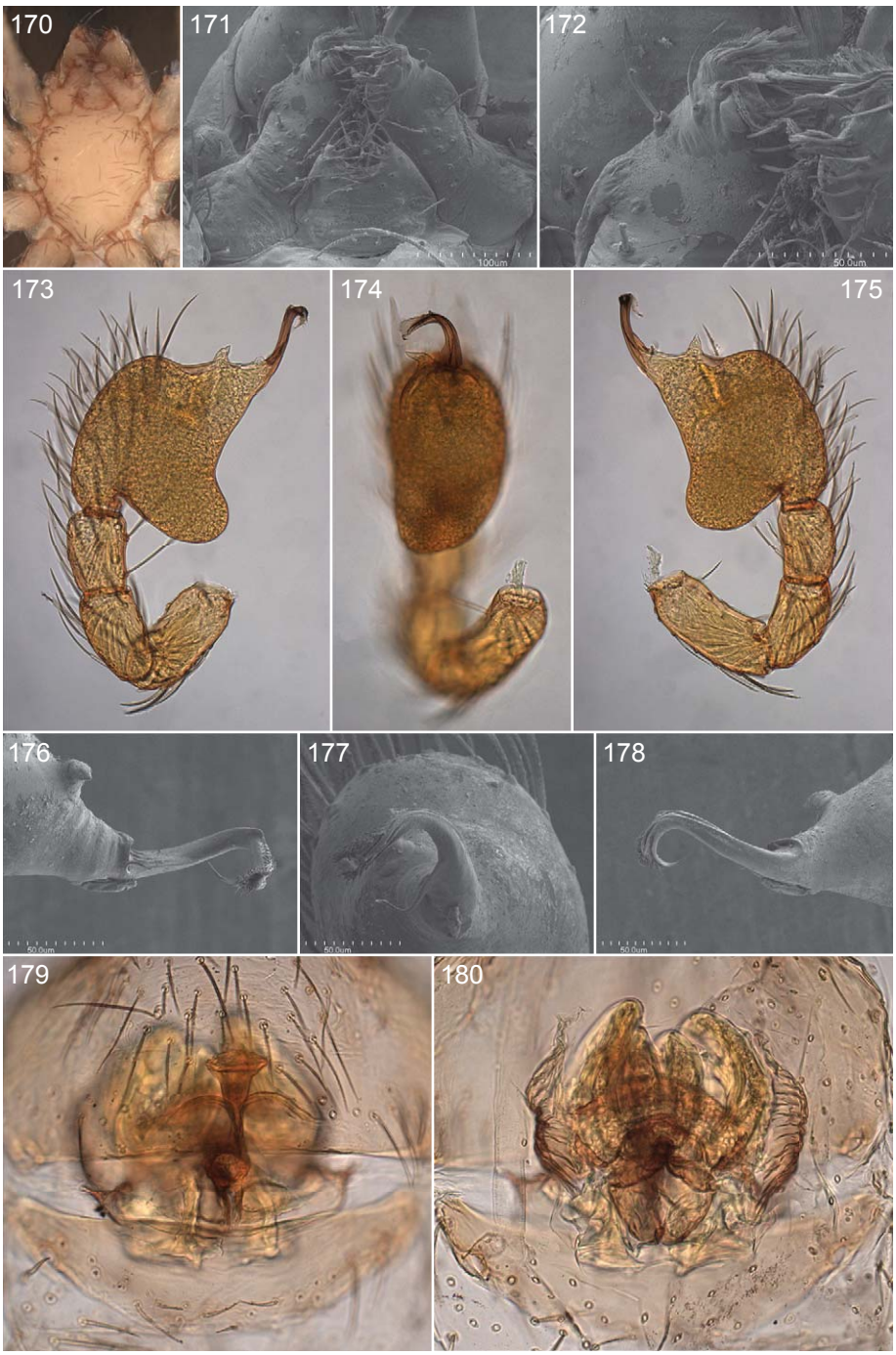
Figures 170–180

Type: Male holotype from cacao litter taken at an elevation of 60 m at Upala, Montecristo, 10°54′22″N, 84°58′09″W, Alajuela, Costa Rica (June 8, 2007; C. Víquez), deposited in INBIO (PBI_OON 30987).

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

Diagnosis: Males resemble those of *O. cristo* in having a protuberant lobe proximal to the embolus, but have a shorter embolar tip (figs. 173–178), females have a flower-shaped anterior receptaculum (fig. 179).

Male (PBI_OON 31163, figs. 170–178): Total length 1.68. Posterior eye row procurved from front; ALE separated by their radius to diameter. Endites distally not excavated, anteromedially with strong protuberant ledge followed posteriorly by much weaker ledges, anterolaterally with enlarged setal base. Postepigastric scutum present. Leg spination: femur IV d0-0-1;



FIGURES 170–180. *Oonopoides upala*, new species, male (170–178) and female (179, 180). **170.** Sternum and mouthparts, ventral view. **171.** Labium and endites, same. **172.** Tip of endite, same. **173.** Left palp, prolateral view. **174.** Same, ventral view. **175.** Same, retrolateral view. **176.** Left embolus, prolateral view. **177.** Same, ventral view. **178.** Same, retrolateral view. **179.** Genitalia, ventral view. **180.** Same, dorsal view.

tibiae: III d0-1-0, p0-1-1, v0-0-2, r0-1-1; IV d0-1-0, p1-0-1, v0-0-1p, r1-0-1; metatarsi: III v0-1p-2, r0-0-1; IV d0-1-0, p1-0-1, v0-0-2; r1-0-1. Embolus with basal projection short, curled, embolus tip curled, embolus preceded by pronounced dorsal knob.

Female (PBI_OON 31170, figs. 179, 180): Total length 1.89. Leg spination: femora: III d0-0-1; IV d1-0-1; tibiae: III p0-0-1, v0-0-2, r0-0-1; IV d0-1-0, p1-0-0, v0-1p-2, r0-0-1; metatarsi: III v0-1p-2, r1-0-0; IV d1-0-0, p1-0-1, v0-1p-2; r1-0-1. Anterior receptaculum flower shaped, posterior receptaculum with convoluted ducts.

Other Material Examined: COSTA RICA: **Alajuela:** Upala, Montecristo (INBIO PBI_OON 1596), 1♀. **Heredia:** Finca La Selva, 4 km SE Puerto Viejo de Sarapiquí, Oct. 1981, Berlese, litter (C. Griswold, CAS 25891, PBI_OON 2405), 1♂; La Selva, 10.422139°N, 84.001523°W, Aug. 9–15, 2010, Berlese, elev. 60 m (INBIO PBI_OON 1049, 31163, 31170), 2♂, 2♀; 11 km SE La Virgen, 10°20′N, 84°04′W, Feb. 22, 2003, elev. 450–550 m (INBIO PBI_OON 31095), 1♂. **Limón:** Reserva Biológica Hitoy-Cerere, May 12, 1998, litter, elev. 160 m (E. Rojas, INBIO PBI_OON 30984), 1♂, Aug. 29–Sept. 30, 2000 (INBIO PBI_OON 30976), 1♀. **Puntarenas:** path to Quebrada Bonita, Parque Nacional Carara, 9.774293°N, 84.527464°W, Mar. 14, 2008, Berlese (C. Víquez, INBIO PBI_OON 31084, 31085), 1♂, 1♀.

Distribution: Northern Costa Rica (Alajuela, Heredia, Limón, northern Puntarenas).

Oonopoides cartago, new species

Figures 181–191

Oonops anoxus (misidentification): Chickering, 1970: 502 (specimens from Boquete, Panama, only).

Type: Male holotype taken by sifting litter and moss in a bog at an elevation of 2500 m at La Chonta, km 54 on the Interamericana highway, 9°43′N, 83°56′W, Cartago, Costa Rica (Mar. 26–27, 1999; J. Miller), deposited in USNM (PBI_OON 27814).

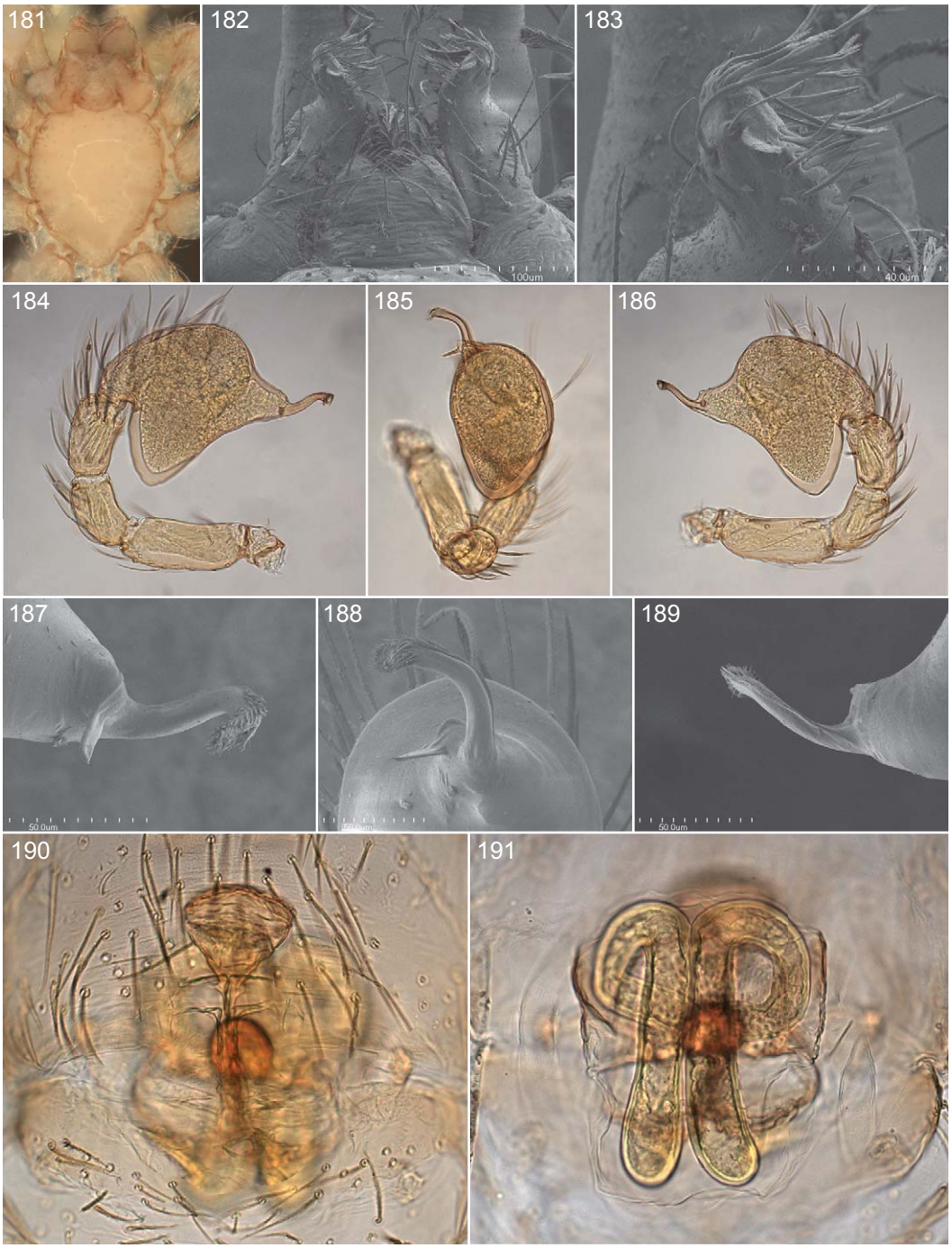
Etymology: The specific name is a noun in apposition taken from the type locality.

Diagnosis: Males have the basal projection on the embolus flat and straight (fig. 188), females have a circular median sclerotization at the anterior margin of the posterior receptaculum (figs. 190, 191)

Male (PBI_OON 3601, figs. 181–189): Total length 1.53. Posterior eye row procurved from front; ALE separated by their radius to diameter. Endites distally not excavated, with very short protuberant lobe. Postepigastric scutum present. Leg spination: femora III, IV d0-0-1; tibiae: III p1-0-1, v1p-0-2, r1-0-1, IV d0-1-0, p0-1-1, v1p-1p-2, r0-1-0; metatarsi: III v0-1p-2, r0-0-1; IV d1-0-1, p0-0-1, v0-0-2, r0-0-1. Embolus with basal projection flattened, straight, embolus tip relatively short

Female (PBI_OON 5698, figs. 190, 191): Total length 1.83. Leg spination: femur III d0-0-1; tibiae: III p0-0-1, v0-1p-2, r0-0-1; IV d0-1-0, p0-1-0, v1p-0-2, r0-1-0; metatarsi: III v0-1p-2, r1-0-1; IV p1-0-1, v1p-0-2, r1-0-1. Anterior receptaculum ovoid, on posteriorly narrowed stalk, posterior receptaculum with elongated ducts enveloping circular median sclerotization.

Other Material Examined: COSTA RICA: **Cartago:** near Estación Meteorológica del CATIE, road to Cuericí, Feb. 15, 1998, elev. 2750 m (R. Anderson, C. Víquez, INBIO PBI_OON 30990), 1♂; La Chonta, km 54 on the Interamericana highway, 9°43′N, 83°56′W, Mar. 26–27,



FIGURES 181–191. *Oonopoides cartago*, new species, male (181–189) and female (190, 191). **181.** Sternum and mouthparts, ventral view. **182.** Labium and endites, same. **183.** Tip of endite, same. **184.** Left palp, prolateral view. **185.** Same, ventral view. **186.** Same, retrolateral view. **187.** Left embolus, prolateral view. **188.** Same, ventral view. **189.** Same, retrolateral view. **190.** Genitalia, ventral view. **191.** Same, dorsal view.

1999, sifting forest litter, moss, elev. 2500 m (J. Miller, USNM PBI_OON 27816), 1♀; Reserva Forestal de Río Macho, km 70 on Interamericana highway, 9°39′N, 83°51′W, May 22–26, 1999, sifted moss and litter in bog, elev. 2850 m (J. Miller, USNM PBI_OON 27815), 2♂, 2♀; Turrialba, Aug. 7, 1965 (A. Chickering, MCZ 72234, PBI_OON 29400), 1♂. **Puntarenas:** Cerro Pelón, Isla del Coco, 5°31′55″N, 87°04′45″W, May 3–31, 2002 (A. Azofeifa, INBIO PBI_OON 30970), 1♀; Estación Biológica Las Cruces, 8°46′N, 82°58′W, Mar. 15–21, 1973, leaf litter, banana root litter, mixed floor litter, elev. 4000–4700 ft (J. Wagner, J. Kethley, FMNH 33522, PBI_OON 10029, 10604, 10627, 10645, 10651, 38415), 4♂, 3♀; Estación Sirena, Península de Osa, Feb. 12–15, 2001, litter (A. Azofeifa, INBIO PBI_OON 30973, 30988), 1♂, 1♀; 3 km NE Golfito, May 22–23, 1987, under log, sifting leaf litter, tropical wet forest, elev. 100 m (D. Ubick, CDU PBI_OON 3602, 3605), 1♂, 1♀; La Lucha, Cerro Amuo, 9.114388°N, 83.093426°W, Feb. 19–27, 2008, elev. 1500 m (C. Víquez, INBIO PBI_OON 49185), 1♀; 3 km S Palmar Norte, May 24, 1987, sifting litter, elev. 100 m (D. Ubick, CDU PBI_OON 3601), 5♂, 1♀; Parque Nacional Corcovado, 3 km W Madrigal, May 20–21, 1987, sifting leaf litter, tropical wet forest (D. Ubick, CDU PBI_OON 3613), 1♀; 8 km W Puerto Jiménez, May 19, 1987, sifting litter, tropical moist forest, elev. 100 m (D. Ubick, CDU PBI_OON 3604), 2♀; Rancho Quemado, Península de Osa,, Feb. 12, 1978 (F. Quesada, INBIO PBI_OON 30975), 1♀; 5 km W Rincón de Osa, Península de Osa, 8°42′N, 83°32′W, Mar. 25, 1973, Berlese, tropical wet forest litter, elev. 50 m (J. Wagner, J. Kethley, FMNH 34934, PBI_OON 10605), 1♀, June 2001 (R. Anderson, C. Víquez, INBIO PBI_OON 30974), 2♀. **San José:** Parque Nacional Braulio Carrillo, Apr. 28–30, 1983, cloud-rainforest transect, elev. 1100 m (D. Ubick, CDU PBI_OON 3603), 2♂. PANAMA: **Chiriquí:** Boquete, Aug. 4–11, 1954 (A. Chickering, MCZ 71513, PBI_OON 5698), 4♂, 4♀; Cerro Bollo cloud forest, 3.5 km E Escopeta, 8°34′N, 81°50′W, Berlese, June 13, 1980, litter and root mat, elev. 1855 m (J. Wagner, FMNH 33649, PBI_OON 10151), 1♀; Cerro Colorado, Jan. 5, 1981, litter under small clumps of bamboolike grass, elev. 1220 m (W. Suter, FMNH 33665, PBI_OON 10167), 1♂, 1♀, Jan. 7, 1981, under bamboo, elev. 1220 m (W. Suter, FMNH PBI_OON 10139), 1♂, 1♀, Jan. 8, 1981, grassy litter on slope under bush, elev. 1200 m (W. Suter, FMNH 33678, PBI_OON 10180), 1♂, Jan. 12, 1981, pseudofork between stumps, litter at strap fern clump, elev. 1220 m (W. Suter, FMNH 33668, 33681, PBI_OON 10183, 10170), 1♂, 2♀, Jan. 13, 1981, litter of stage III stump, semidry, elev. 1290 m (W. Suter, FMNH 33663, PBI_OON 10165), 2♂, 1♀, Jan. 15, 1981, subcortical litter of log, strap fern, elev. 1225 m (W. Suter, FMNH 33679, PBI_OON 10181), 2♂, 1♀, Jan. 17, 1981, ecotonal slash, bamboo litter, elev. 1290 m (W. Suter, FMNH 33662, PBI_OON 10164), 1♀, moss on strap fern rhizome, elev. 1290 m (W. Suter, FMNH 33685, PBI_OON 10187), 1♂, Jan. 26, 1981, under seedling banana, elev. 1235 m (W. Suter, FMNH 33667, PBI_OON 10169), 1♂; Cerro Pate Macho, near Bajo Boquete, Aug. 11, 1983, leaf litter (L. Sorkin, AMNH PBI_OON 21110), 1♀; 2 km S Cuenavaca Camp, Rincón Valley, Jan. 16, 1981, treeholelike litter, base of riddled tree, elev. 750 m (W. Suter, FMNH PBI_OON 38414), 1♀; N Escopeta along Río Escopeta, Jan. 9. 1981, riddled stage III long, coffee plantation, elev. 860 m (W. Suter, FMNH 33661, PBI_OON 10163), 1♂, subcortical pockets, stage II log, coffee plantation, elev. 860 m (W. Suter, FMNH 33692, PBI_OON 10194), 1♂; Parque Nacional Volcán Baru, 5.9 km E Cerro Punto, June 14,

1995, oak ridge bamboo forest litter, elev. 2400 m (R. Anderson, AMNH PBI_OON 1673), 1♀; Renacimiento Mountain, near Río Sereno, Aug. 10, 1983, sifting leaf litter (L. Sorkin, AMNH PBI_OON 21111), 1♀; 5 mi W Volcán, Aug. 10, 1983, rainforest edge, elev. 1000 m (J., F. Murphy, AMNH PBI_OON 36761), 1♀.

Distribution: Central and southern Costa Rica (Cartago, Puntarenas, San José), northern Panama (Chiriquí), and Cocos Island.

Oonopoides pallidulus (Chickering), new combination
Figures 192–202

Oonopinus pallidulus Chickering, 1951: 222, figs. 10, 11 (female holotype from Canal Zone Biological Area [= Isla Barro Colorado], Panamá, Panama, in MCZ; examined).

Oonops pallidulus: Chickering, 1970: 496, figs. 12, 13.

Oonops tenebus Chickering, 1970: 509, figs. 43–46 (male holotype from Forest Preserve, Panamá, Panama, in MCZ; examined). NEW SYNONYMY.

Oonops donaldi (misidentification): Chickering, 1970: 499 (one female from Isla Barro Colorado, Panamá, Panama only).

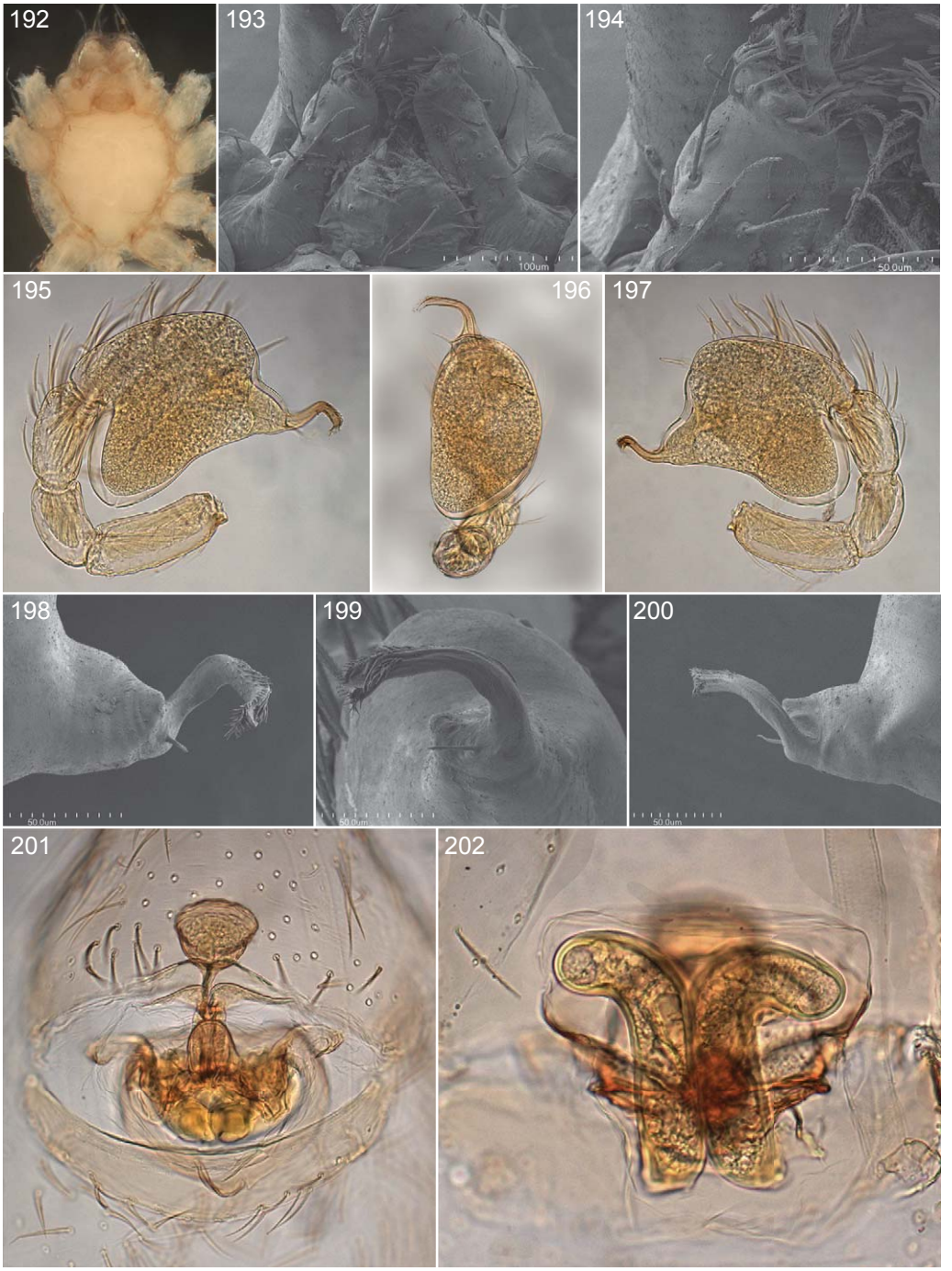
Oonops anoxus (misidentification): Chickering, 1970: 502 (specimens listed from sites other than Isla Barro Colorado and Boquete, Panama).

Diagnosis: Males have a greatly widened embolar base (figs.195, 198); females have an almost square tip on the anterior receptaculum (fig. 201).

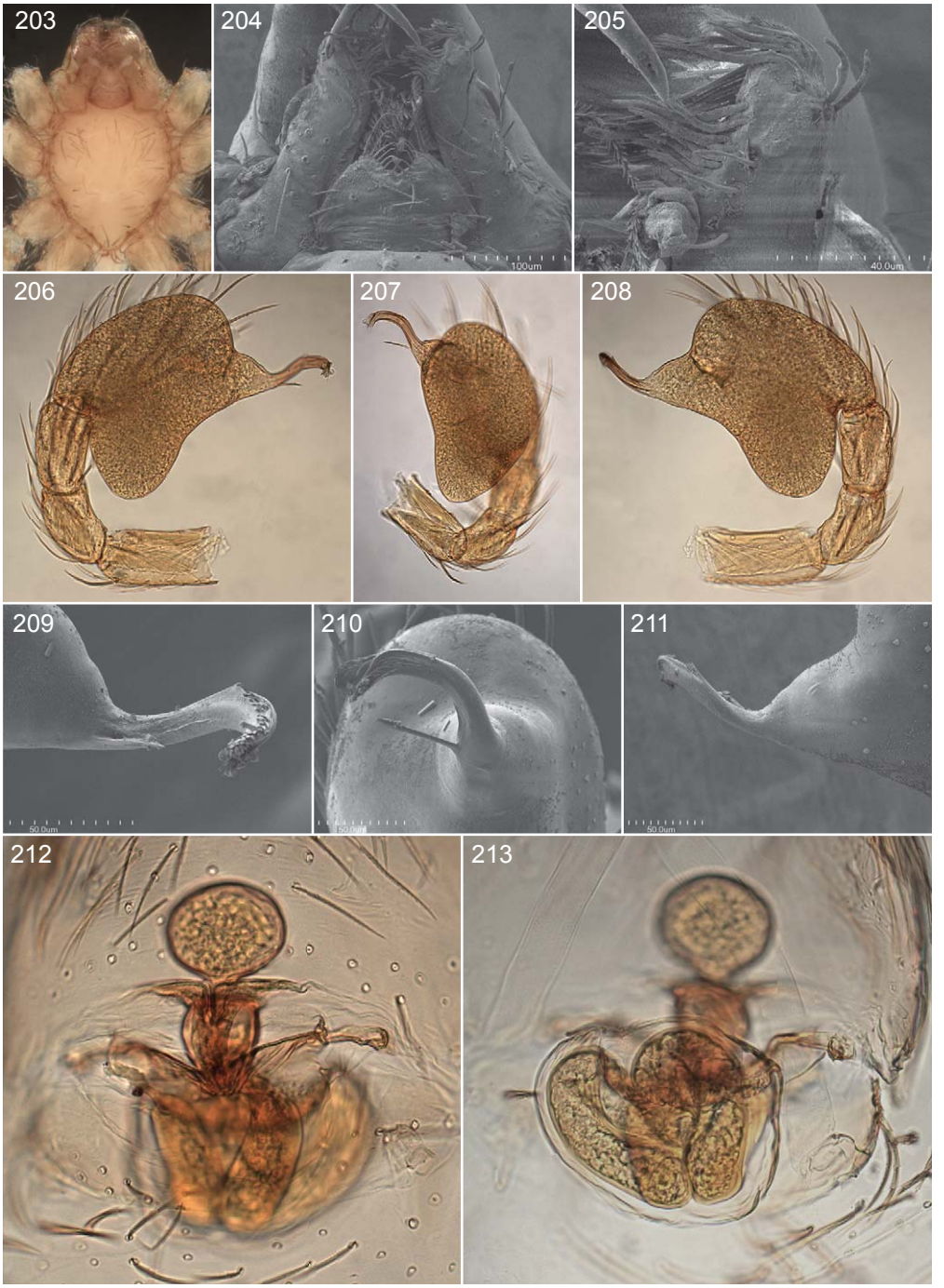
Male (PBI_OON 21107, figs. 192–200): Total length 1.55. Posterior eye row procurved from front; ALE separated by their radius to diameter. Endites distally not excavated, anterior portion with single, strongly protuberant ledge. Postepigastric scutum present. Leg spination: tibiae: III p0-0-1, v0-1p-1p, r1-0-1; IV p1-0-1, v0-0-2, r1-0-1; metatarsi: III v0-2-2, r1-0-1; IV p1-0-1, v0-1p-2, r1-0-1. Embolus with basal projection short, straight, embolar base greatly widened.

Female (PBI_OON 27479, figs. 201, 202): Total length 1.83. Leg spination: tibiae: III d0-1-0, p1-0-1, v0-0-2, r1-0-1; IV d0-1-0, p1-0-1, v0-1p-2, r1-0-1; metatarsi: III v0-1p-2, r0-0-1; IV p1-0-1, v0-2-2, r1-0-1. Anterior receptaculum almost square, on extremely narrow stalk, posterior receptaculum with pair of large ducts.

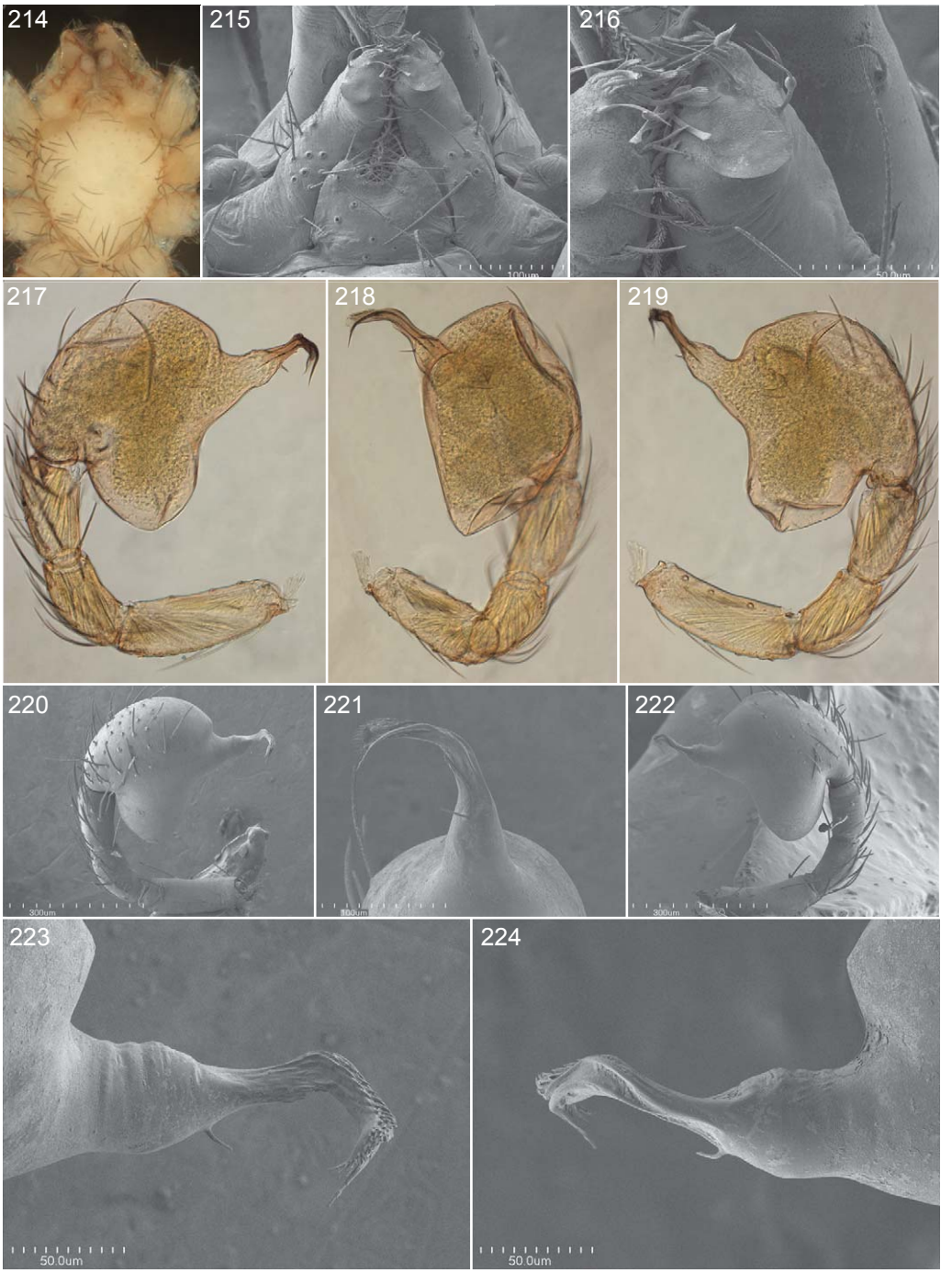
Material Examined: PANAMA: **Colón:** Parque Metropolitano, near canopy crane, 8.99483°N, 79.54366°W, Dec. 30, 2007, sweeping rainforest vegetation (M. Draney et al., FMNH 34877, 44219, PBI_OON 10590, 10696), 2♀; Pipeline Road, Parque Nacional Soberania, 0.5 km S Río Frijolito, 9.14793°N, 79.72935°W, Jan. 8, 2008, rainforest leaf litter (B. Butterfield, M. Draney, FMNH 34879, PBO_OON 10592), 1♂. **Panamá:** Balboa, Aug. 1936 (A. Chickering, MCZ 71508, PBI_OON 5694), 1♂; Isla Barro Colorado, June–July 1934 (MCZ PBI_OON 1629), 1♀ (holotype), July–Aug. 1954 (A. Chickering, MCZ 71568, PBI_OON 27476), 2♀, June 1950 (A. Chickering, MCZ PBI_OON 31080), 1♀, May 6–18, 1964 (A. Chickering, MCZ 71571, 71572, PBI_OON 27464, 27478), 2♀, Feb. 19–Mar. 9, 1975, rotten flowers of *Pseudobombax* (AMNH PBI_OON 21108), 1♀, Aug. 17, 1975, Berlese, leaf litter (S. Levings, USNM PBI_OON 27804), 1♀, Aug. 24–Sept. 13, 1975, Berlese, leaf litter (S. Levings, USNM PBI_OON 27808, 27813), 2♂, Feb. 17, 1976, Berlese, leaf litter (S. Levings, USNM PBI_OON



FIGURES 192–202. *Oonopoides pallidulus* (Chickering), male (192–200) and female (201, 202). **192.** Sternum and mouthparts, ventral view. **193.** Labium and endites, same. **194.** Tip of endite, same. **195.** Left palp, prolateral view. **196.** Same, ventral view. **197.** Same, retrolateral view. **198.** Left embolus, prolateral view. **199.** Same, ventral view. **200.** Same, retrolateral view. **201.** Genitalia, ventral view. **202.** Same, dorsal view.



FIGURES 203–213. *Oonopoides anoxus* (Chickering), male (203–211) and female (212, 213). **203.** Sternum and mouthparts, ventral view. **204.** Labium and endites, same. **205.** Tip of endite, same. **206.** Left palp, prolateral view. **207.** Same, ventral view. **208.** Same, retrolateral view. **209.** Left embolus, prolateral view. **210.** Same, ventral view. **211.** Same, retrolateral view. **212.** Genitalia, ventral view. **213.** Same, dorsal view.



FIGURES 214–224. *Oonopoides hondo*, new species, male. **214.** Sternum and mouthparts, ventral view. **215.** Labium and endites, same. **216.** Tip of endite, same. **217, 220.** Left palp, prolateral view. **218.** Same, ventral view. **219, 222.** Same, retrolateral view. **221.** Left embolus, ventral view. **223.** Same, prolateral view. **224.** Same, retrolateral view.

27801), 1♀, Feb. 22–June 20, 1976, Berlese, leaf litter (S. Levings, USNM PBI_OON 27803, 27811), 2♂, Dec. 12, 1976, Berlese, leaf litter (S. Levings, USNM PBI_OON 27806), 2♀, Jan. 30, 1977, Berlese, leaf litter (S. Levings, USNM PBI_OON 27807), 1♂, 1♀, June 27, 1977, Berlese, leaf litter (S. Levings, USNM PBI_OON 27809), 2♀, July 25, 1977, Berlese, leaf litter (S. Levings, USNM PBI_OON 27812), 1♂, 1♀; Madden Forest Preserve, Jan. 8, 1958 (A. Chickering, MCZ 71509, 71511, 72233, PBI_OON 5685, 5696, 5697), 2♂, 1♀, Jan. 21, 1958 (A. Chickering, MCZ 66781, PBI_OON 21107), 1♂, Jan. 29, 1958 (A. Chickering, MCZ 71588, PBI_OON 27466), 3♀, Feb. 14, 1958 (A. Chickering, MCZ 72227, 80955, PBI_OON 5487, 5686), 1♂, 1♀, same (A. Chickering, MCZ 23249, PBI_OON 1065), 1♂ (holotype), Feb. 28, 1958 (A. Chickering, MCZ 71573, PBI_OON 27468), 1♀; Playa Corona, Aug. 8, 1983, litter (J., F. Murphy, AMNH PBI_OON 36768), 2♀; Summit Gardens, July 29, 1954 (A. Chickering, MCZ 71570, PBI_OON 27467), 1♀, Aug. 12, 1954 (A. Chickering, MCZ 71569, PBI_OON 27479), 8♀, May 1964 (A. Chickering, MCZ 66780, 71506, PBI_OON 5699, 21101), 2♂.

Distribution: Southern Panama (Colón, Panamá).

Synonymy: Numerous simultaneous collections indicate that *O. tenebus* is merely the male of *O. pallidulus*.

Oonopoides anoxus (Chickering), new combination

Figures 203–213

Oonops anoxus Chickering, 1970: 502, figs. 30–35 (male holotype from Isla Barro Colorado, Panamá, Panama, in MCZ; examined).

Diagnosis: Males resemble those of *O. pallidulus* but have a narrower embolar base (figs. 206, 209); females have a round anterior receptaculum (fig. 212).

Male (PBI_OON 5410, figs. 203–211): Total length 1.84. Posterior eye row procurved from front; ALE separated by their radius to diameter. Endites distally not excavated, anterior portion with single, strongly protuberant ledge, ledge wider distally than proximally. Postepigastric scutum absent. Leg spination: femora III, IV d1-0-0; tibiae: III p1-0-1, v0-1p-1p, r0-0-1; IV d0-1-0, p1-0-1, v0-1p-1p, r0-0-1; metatarsi: III v0-1p-2, r0-0-1; IV p1-0-1, v0-1p-2, r1-0-1. Embolus with basal projection long, straight, embolus relatively short, distally sinuous.

Female (PBI_OON 5410, figs. 212, 213): Total length 2.07. Leg spination: femora III, IV d1-0-0; tibiae III, IV p0-0-1, v0-0-2, r0-0-1; metatarsi: III v0-1p-2, r0-0-1; IV p1-0-1, v0-0-2, r1-0-1. Anterior receptaculum round, posterior receptaculum with wide, sinuous ducts

Material Examined: PANAMA: **Panamá:** Isla Barro Colorado, May 17, 1964 (A. Chickering, MCZ 20294, PBI_OON 5409), 1♂ (holotype), May 20–21, 1964 (A. Chickering, MCZ 66737, PBI_OON 5410, 5695), 3♂, 2♀ (paratypes), Jan. 4–9, 1977, Berlese, leaf litter (S. Levings, USNM PBI_OON 27802, 27805, 27810), 3♂.

Distribution: Known only from Isla Barro Colorado, Panama.

ACKNOWLEDGMENTS

This study is part of the oonopid PBI project supported by the U.S. National Science Foundation (grant DEB-0613754) and organizations in several other countries. The assistance of the many participants in that project is immensely appreciated. As always, we thank the many curators of collections that have supplied specimens: Allen Dean (TAMU), Jonathan Coddington (USNM), Gonzalo Giribet and Laura Leibensperger (MCZ), Charles Griswold and Darrell Ubick (CAS, CDU), Petra Sierwald (FMNH), and Carlos Víquez (INBIO). We also thank Steve Thurston for composing the plates, and Darrell Ubick and an anonymous reviewer for helpful comments on a draft of the manuscript.

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