

# AMERICAN MUSEUM *Novitates*

PUBLISHED BY  
THE AMERICAN MUSEUM  
OF NATURAL HISTORY

CENTRAL PARK WEST AT 79TH STREET  
NEW YORK, N.Y. 10024 U.S.A.

NUMBER 2598

JUNE 15, 1976

NORMAN I. PLATNICK AND MOHAMMAD U. SHADAB

A Revision of the Spider Genera  
*Lygromma* and *Neozimiris*  
(Araneae, Gnaphosidae)





# AMERICAN MUSEUM *Novitates*

PUBLISHED BY THE AMERICAN MUSEUM OF NATURAL HISTORY  
CENTRAL PARK WEST AT 79TH STREET, NEW YORK, N.Y. 10024

Number 2598, pp. 1-23, figs. 1-62

June 15, 1976

## A Revision of the Spider Genera *Lygromma* and *Neozimiris* (Araneae, Gnaphosidae)

NORMAN I. PLATNICK<sup>1</sup> AND MOHAMMAD U. SHADAB<sup>2</sup>

### ABSTRACT

The 11 known species of *Lygromma* and eight of *Neozimiris* are diagnosed and described. Relationships between the classical families Gnaphosidae and Prodidomidae are examined, and on the basis of shared, derived characters it is concluded that the prodidomids are the sister group of the Anagraphinae (Gnaphosidae) and must therefore be relegated to subfamilial status in the Gnaphosidae. The genus *Pseudolygromma* Berland is placed as a junior synonym of *Lygromma*. *Tivodrassus* Chamberlin and Ivie is assigned to the Anagraphinae; *Zimiromus* Banks is transferred from the Anagraphinae to the Echeminae. The first known troglobitic gna-

phosid, *Lygromma gertschi*, is described from Jamaica; its adaptations to cave life include the loss of functional eyes, elongation of the legs, tarsal trichobothria, and spinnerets, and the loss of teeth on the tarsal claws. Thirteen other new species are described: *L. huberti* from Venezuela; *L. peckorum*, *L. quindio*, and *L. kochalkai* from Colombia; *L. dybasi* from Panama and Costa Rica; *L. peruviana* from Peru; *N. crinis* from Mexico; *N. chickeringi* from Panama; *N. exuma* from the Bahama Islands; *N. nudus* from Puerto Rico; *N. levii* from the Netherlands Antilles; and *N. pinta* and *N. pinzon* from the Galapagos Islands.

### INTRODUCTION

The present paper, the seventh in a series on the spider family Gnaphosidae, is concerned with the Neotropical genera *Lygromma* and *Neozimiris* and, since these genera have been placed in the Gnaphosidae and Prodidomidae, respectively, with the relationships between those two families. Both are of considerable interest; *Lygromma* contains the only six-eyed American gnaphosids and the first known cavernicolous species in the family, and *Neozimiris*, formerly

considered monotypic and restricted to southwestern North America, is shown below to be speciose and widespread in Central America, the West Indies, and the Galapagos Islands.

*Lygromma* was established by Simon (1893a) for two species he collected in "les parties les plus sombres et les plus humides des forêts, dans les détritits au pied des arbres" (p. 452) during his expedition to northern Venezuela. At the time, these two species were the only known six-

<sup>1</sup>Assistant Curator, Department of Entomology, the American Museum of Natural History.

<sup>2</sup>Scientific Assistant, Department of Entomology, the American Museum of Natural History.

eyed gnaphosoid spiders, and although Simon noted that the spinnerets of *Lygromma* have "exactement la disposition de celles des *Zimiris* de la famille précédente [Prodidomidae]" (p. 451), he placed *Lygromma* in the Gnaphosidae and subsequently (1893b) erected a separate subfamily for the genus. Since that time only one additional species, *Lygromma chamberlini* Gertsch from Panama, has been described, but Petrunkevitch (1928) placed *Lygromma* with *Theuma*, *Anagraphis*, and their relatives in a single subfamily, a decision followed by all subsequent workers.

In addition to *Lygromma*, three other American genera were placed by Roewer (1954) in the Anagraphinae: *Paratheuma* Bryant, *Pseudolygromma* Berland, and *Zimiromus* Banks. Elsewhere (Platnick, in press) it has been shown that neither of the species placed by Bryant in *Paratheuma* belongs to the Gnaphosidae. The type specimen of *Zimiromus fragilis* Banks, the only species described in its genus, has been examined; many of the Neotropical species that have been erroneously placed in the European genus *Echemus* actually belong to this genus, which should thus be placed in the Echeminae (Simon's group Echemeae; since most of the groups actually called subfamilies by Simon are now considered to be families his "tribal" groupings of genera ending in -eae are best considered subfamilies) rather than the Anagraphinae. *Zimiromus* will be revised in a later paper.

Berland (1913) described as *Pseudolygromma simoni* a female from Ecuador that resembled *Lygromma* closely except that minute anterior median eyes (with a diameter roughly equal to one-eighth that of an anterior lateral eye) were present. An additional species from Peru described below has similarly minute anterior median eyes that are visible only as slight tubercles and only in oblique view. As the genitalia of *P. simoni* are closer to those of other *Lygromma* than to the Peruvian species, and as a new species described below from Jamaican caves has lost all functional eyes, we have not considered the number of eyes to be a valid generic character and below synonymize *Pseudolygromma* with *Lygromma*.

The discovery of a troglobitic (used in the sense of Reddell, 1965, for an obligatory caverni-

cole) *Lygromma* by Dr. Stewart B. Peck of Carleton University during his survey of the invertebrate fauna of Jamaican caves is of considerable importance. Although a blind prodidomid, *Plutonodomus kungwensis* Cooke, has been described from a termite nest in Tanzania, the new *Lygromma* is, as far as we are aware, the first blind gnaphosoid spider found in a cave. Both sexes have longer legs, spinnerets, and tarsal trichobothria than do the surface-dwelling species of *Lygromma*; these modifications are clearly associated with the need for more effective long-distance mechanoreception in a cave environment where photoreception is of no value. However, the cavernicolous *Lygromma*, unlike all other species in the genus, lacks teeth on the tarsal claws. We have been unable to suggest any selective value for this loss of teeth. Although Gertsch (1973) noted a similar loss of claw teeth in the troglobitic diplurid *Euagrus anops*, this does not appear to be a common phenomenon in cavernicolous arthropods; in the Campodeidae (Apterygota) cave-dwelling forms tend to have more rather than less complex claws (Wygodzinsky, personal commun.). The presence or absence of teeth on the claws has been used as a generic character within the Anagraphinae (between *Anagraphis* and *Theuma*, for example); obviously, the use of this character should be carefully reevaluated.

The Institut Royal des Sciences Naturelles de Belgique, Brussels, houses three specimens of a blind *Lygromma* species from Isla Santa Cruz, Galapagos Islands; as all three are unfortunately immature, the species is noted here but not described. Roth and Craig (1970, p. 118) listed these specimens as a new genus of Prodidomidae, but the presence of teeth on both the tarsal claws and chelicerae demonstrates that that identification is erroneous. The specimens were taken in humid detritus scattered among stones and debris at the bottom of a 10 m. deep crevasse 800 m. from the dock of St. Darwin.

In an earlier paper (Platnick and Shadab, 1976a) we suggested that the Mexican genus *Tivodrassus* Chamberlin and Ivie, originally described without being placed in a subfamily, might be closely related to *Lygromma*. Now that the latter genus has been revised, it is apparent that there are genitalic synapomorphies (the

presence of multiple retrolateral tibial apophyses in males and paired inner and outer epigynal ducts in females) indicating that the two genera are sister groups. The eyes of these spiders can be arranged in a transformation series starting with *Tivodrassus*, where the anterior median eyes are half the size of the anterior laterals, proceeding through species like *Lygromma simoni*, where the anterior median eyes are still present but minute, and typical *Lygromma* lacking anterior median eyes, and ending with *Lygromma gertschi*, lacking all functional eyes and possessing only slight cuticular tubercles in their place. Although it is possible to divide this continuum and segregate *Tivodrassus* on the basis of the presence of a paracymbium on the male palp, that genus should clearly be placed in the Anagraphinae.

The classical family Prodidomidae, although very rare in collections, is, thanks to an excellent revision by Dalmás (1918) and a modern supplement by Cooke (1964), relatively well known. Although always considered a close relative of the Gnaphosidae and placed in the superfamily Gnaphosoidea, no serious consideration was given to the placement of the group in a phylogenetic classification until Lehtinen (1967) suggested that the Molycriinae (placed by Simon in the Clubionidae) should be placed in the Prodidomidae, and that the Anagraphinae "probably belongs to the vicinity of Prodidomidae" (p. 384). Earlier (Platnick and Shadab, 1976b) we pointed out that the Echeminae (including *Scopodes* and its relatives) also belong to this group, as indicated by their enlarged anterior spinnerets and strongly procurved posterior eye row. We present here a more detailed consideration of the phylogenetic relationships of these groups.

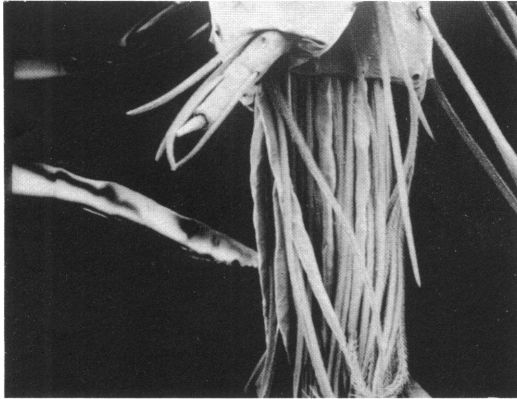
At present we believe that the Echeminae, Molycriinae, Anagraphinae, and the "Prodidomidae" (including both the Prodidominae and Zimirinae of Roewer, 1954) form a monophyletic group within the Gnaphosidae characterized by the synapomorphic possession of enlarged (elongated, widened, or both) anterior spinnerets bearing long spigots (fusuli) and a ventrally situated elongate tubule that is morphologically very different from the other spigots (fig. 1). This distinctive ventral tubule has

been routinely illustrated for the prodidomids (see Dalmás, 1918, figs. 18, 19 and Cooke, 1964, figs. 56, 58-64) and occasionally noted in the Gnaphosidae (*Theuma*, Simon, 1893b, fig. 312); it is present in both sexes of all the species of each of these groups we have been able to examine. The phylogenetic significance of such an unusual structure occurring in the Prodidomidae and in some Gnaphosidae seems to have been overlooked by earlier workers. If the ventral tubule is a uniquely derived character, the prodidomids are only a relatively apomorphic offshoot of some gnaphosids and cannot be placed as a separate family in a phylogenetic classification.

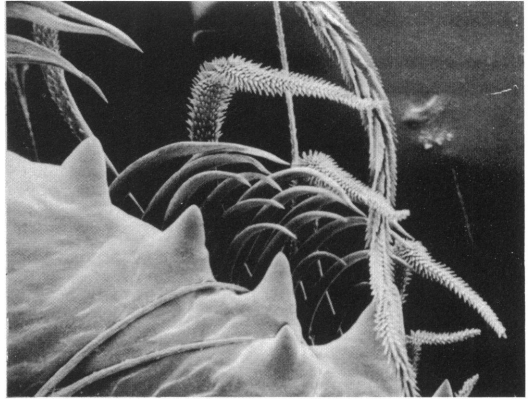
Within this presumably monophyletic group, the Molycriinae, Anagraphinae, and Prodidominae seem to form a monophyletic subgroup characterized by having a distinct lobe of the sternum projecting between the fourth coxae; this is highly unusual if not unique among gnaphosoids. Similarly, the Anagraphinae and Prodidominae share peculiar clumps of widened setae situated between each of the coxae (fig. 5); although scanning electron micrographs reveal some differences in the ultrastructure of these setae in *Lygromma* (fig. 4) and *Neozimiris* (fig. 6), they are instantly recognizable at ordinary magnifications and are presumably homologous. We have never seen this type of seta outside these two groups, and thus consider the Anagraphinae and Prodidominae sister groups. Lehtinen's (1967) conclusion that the "male palpus of Anagraphinae is fundamentally dissimilar [from those of other gnaphosids], and there is no median apophysis" (p. 385) appears to be incorrect, however; the palpi are very similar to those of some echemines and, as the illustrations below show, all male *Lygromma* (as well as *Tivodrassus*) have a median apophysis, as do male *Neozimiris*, although in that genus the apophysis is not heavily sclerotized and is therefore easily overlooked (as, for example, by Cooke, 1964, fig. 40).

At present, then, we regard the Anagraphinae and Prodidominae as sister groups (thus placing in one clade all blind gnaphosoids [*Lygromma*, *Plutonodomus*] as well as all of those with paracymbia [*Tivodrassus*, *Theuma*, *Zimirina*]) and as constituting the sister group of the Molycriinae,

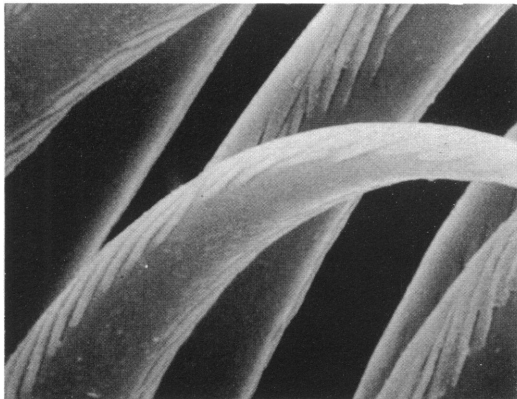




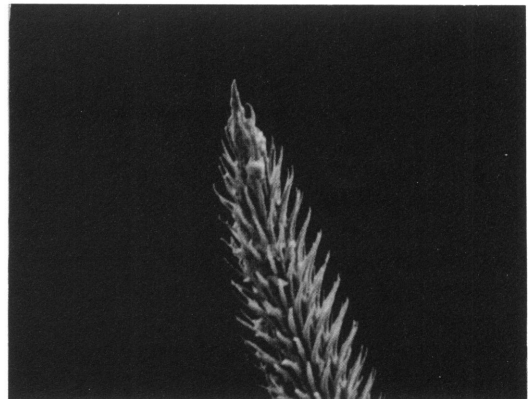
1



2



3



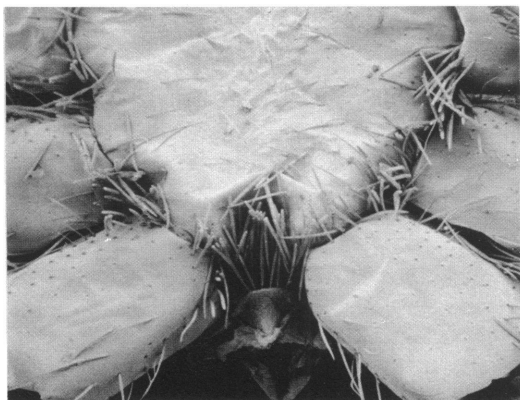
4

FIGS. 1-4. *Lygromma gertschi*, new species, scanning electron micrographs. 1. Tip of anterior spinneret, ventral view, showing long spigots and shorter ventral tubule, 200X. 2. Chelicera, posterior view, showing denticles and curved promarginal setae, 500X. 3. Promarginal cheliceral setae, posterior view, 4900X. 4. Tip of intercoxal seta, ventral view, 2100X.

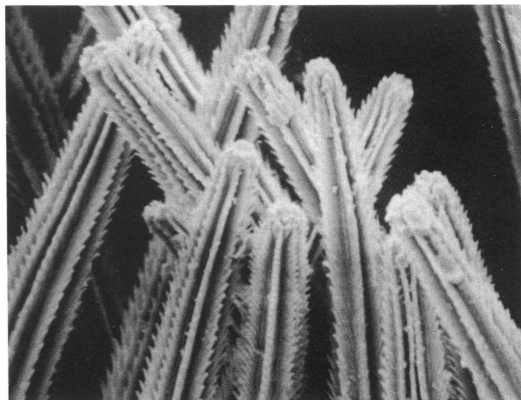
and consider that all three groups constitute the sister group of the Echeminae. Of course, all these groups can retain subfamilial rank in a phylogenetic classification only if that classification is based on the principle of phyletic sequencing (see Cracraft, 1974). This arrangement is not proposed with any finality but only as a working hypothesis to be further tested as revisionary work in the group continues.

The format of the descriptions and the standard abbreviations of morphological terms follow those used by Platnick and Shadab (1975); eye diameters of the oval eyes of *Neo-*

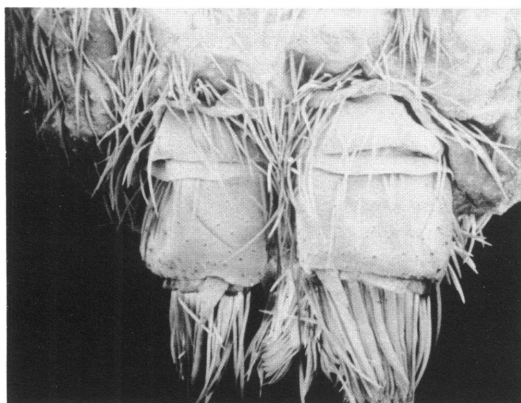
*zimiris* are transverse rather than longitudinal or oblique measurements. We are grateful to Dr. Willis J. Gertsch for making the Jamaican *Lygromma* material available for study, to Dr. William B. Peck for donating the female of *L. simoni* described below, and to Dr. Stewart B. Peck for collecting much of the new *Lygromma* material. In addition to the collection of the American Museum of Natural History (AMNH), we have used specimens from the private collection of Mr. J. A. Kochalka (JAK) and material supplied by Drs. J. Cooreman and J. Kekenbosch of the Institut Royal des Sciences Naturelles de



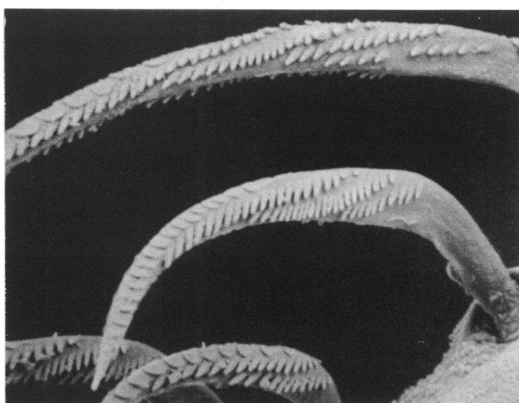
5



6



7



8

FIGS. 5-8. *Neozimiris pubescens* (Banks), scanning electron micrographs. 5. Posterior half of sternum, ventral view, showing clumps of intercoxal setae, 110 $\times$ . 6. Intercoxal setae, ventral view, 2150 $\times$ . 7. Anterior spinnerets, ventral view, showing long spigots and shorter ventral tubule, 105 $\times$ . 8. Promarginal cheliceral setae, posterior view, 1000 $\times$ .

Belgique, H. S. Dybas of the Field Museum of Natural History (FMNH), M. Hubert of the Muséum National d'Histoire Naturelle (MNHN), H. W. Levi of the Museum of Comparative Zoology (MCZ), and D. C. Rentz of the California Academy of Sciences (CAS).

#### *LYGROMMA* SIMON

*Lygromma* Simon, 1893a, p. 451 (type species, designated by Simon, 1893b, p. 353, *Lygromma senoculatum* Simon). Roewer, 1954, p. 352. Bonnet, 1957, p. 2674.

*Pseudolygromma* Berland, 1913, p. 85 (type species by monotypy *Pseudolygromma simoni* Berland). Roewer, 1954, p. 353. Bonnet, 1958, p. 3816. NEW SYNONYMY.

**Diagnosis.** *Lygromma* is closest to the Mexican genus *Tivodrassus* but may be distinguished by having the anterior median eyes much smaller (far less than half the anterior lateral eye diameter), or altogether absent, and by the absence of a paracymbium on the male palp.

**Description.** Total length 1.9-4.6 mm. Carapace oval in dorsal view, truncate posteriorly,

widest between coxae II and III, gradually narrowed anteriorly, pale orange with darkened ocular area, with long black setae along posterior margin and steep posterior declivity. Cephalic area not elevated; thoracic groove longitudinal, dark. Eyes zero, six, or eight, oval and in two rows when present; posterior eye row procurved; anterior lateral eyes largest; anterior median eyes, if present, minute. Eye pattern variable, six-eyed species typically with ALE separated by one-sixth of their diameter, by one-sixth of their diameter from PLE, and with PME separated by slightly more than their diameter, by one-fifth of their diameter from PLE. Clypeal height roughly equal to ALE diameter except in *L. peckorum*, female *L. quindio*, and *L. peruviana*, where equal to only half the ALE diameter. Chelicerae with seven to nine promarginal denticles increasing in length medially, with or without a retromarginal denticle (sometimes approximate to promarginal row, fig. 2), with row of stiff, acutely bent promarginal setae (figs. 2, 3). Endites short, obliquely depressed, rounded anteriorly. Labium short, square. Sternum rebordered, produced between coxae IV, bearing clumps of wide setae (fig. 4) between all coxae (as in fig. 5). Leg formula 4123. Typical leg spination pattern (only surfaces bearing spines listed): femora: I, II d1-1-0; III, IV d1-1-1, p0-0-1, r0-0-1; tibiae: III p1-0-1, vlp-2-2, r1-0-1; IV p1-0-1, vlp-1p-2, r1-1-1; metatarsi: II v0-2-0; III p1-0-1, v0-2-0, r0-1-0; IV p0-1-2, vlp-2-0, r0-1-1. Legs pale yellow, femora darkest. Tarsi with light scopulae, two dentate claws (except in *L. gertschi*, where smooth), and claw tufts. Metatarsal preening comb lacking. Trochanters unnotched. Abdomen pale yellow, sometimes with scattered dark markings, males sometimes with tiny anterodorsal scutum. Six spinnerets, anteriors widely separated, elongated, bearing long spigots and distinct ventral tubule (fig. 1). Palp with short to long embolus, bent median apophysis, and sometimes conductor. Two to four retrolateral tibial apophyses. External epigynum reduced to smooth plate; internal female genitalia with inner and outer ducts on each side, loosely coiled or symmetrically arranged, rarely (*L. peruviana*) with round bulb.

*Synonymy.* Reasons for discounting the number of eyes as a generic character are given in the Introduction.

*Phylogeny.* A detailed analysis of the interrelationships of the various *Lygromma* species is impossible until a larger proportion of the species are known from both sexes, but some observations can be made. The presence of anterior median eyes in *L. simoni* and *L. peruviana* indicates that they are plesiomorphic (relative to the other species), but their genitalia show no autapomorphies and the two are probably independently derived rather than sister species. Judging by their retrolateral tibial apophyses, the three Venezuelan species seem more closely related to each other than to any of the other forms. *Lygromma peckorum*, *L. chamberlini*, *L. quindio*, *L. kochalkai*, *L. dybasi*, and *L. gertschi* seem to form a monophyletic subgroup characterized by the presence of a palpal conductor in males and symmetrically arranged epigynal ducts in females.

#### KEY TO SPECIES OF *LYGROMMA*

1. Males . . . . . 2  
Females . . . . . 9
2. Palp with translucent conductor (figs. 21, 25, 29, 33, 57) . . . . . 3  
Palp without translucent conductor (figs. 9, 13, 17) . . . . . 7
3. Embolus relatively long (figs. 21, 29, 57) . . . . . 4  
Embolus relatively short (figs. 25, 33) . . . . . 6
4. Palpal duct extending to base of tegulum (fig. 21); four retrolateral tibial apophyses (fig. 22) . . . . . *peckorum*  
Palpal duct not extending to base of tegulum (figs. 29, 57); two retrolateral tibial apophyses (figs. 30, 58) . . . . . 5
5. Embolus originating on prolateral side of tegulum (fig. 29) . . . . . *quindio*  
Embolus originating on retrolateral side of tegulum (fig. 57) . . . . . *kochalkai*
6. Embolus longer than median apophysis (fig. 25); functional eyes present . . . . .  
 . . . . . *chamberlini*  
Embolus shorter than median apophysis (fig. 33); functional eyes absent . . . . . *gertschi*
7. Embolus at prolateral side of tegulum (fig. 17) . . . . . *huberti*  
Embolus near middle of tegulum (figs. 9, 13) . . . . . 8
8. Palpal duct with conspicuous basal loop (fig. 13) . . . . . *valencianum*  
Palpal duct without conspicuous basal loop (fig. 9) . . . . . *senoculatum*
9. Epigynal ducts loosely coiled (figs. 20, 36,



- 40)..... 10  
 Epigynal ducts symmetrically folded (figs. 12, 16, 24, 28, 32, 60)..... 12  
 10. Round spermathecal bulb present (fig. 20)..... *peruviana*  
 Round spermathecal bulb absent (figs. 36, 40)..... 11  
 11. Epigynum with anteriorly situated dark circles (fig. 35)..... *gertschi*  
 Epigynum with posteriorly situated dark circles (fig. 39)..... *simoni*  
 12. Inner epigynal ducts narrow anteriorly (figs. 12, 28)..... 13  
 Inner epigynal ducts wide anteriorly (figs. 16, 24, 32, 60)..... 14  
 13. Inner epigynal ducts widened posteriorly (fig. 12)..... *senoculatum*  
 Inner epigynal ducts not widened posteriorly (fig. 28)..... *chamberlini*  
 14. Inner epigynal ducts folded longitudinally (figs. 16, 32, 60)..... 15  
 Inner epigynal ducts not folded longitudinally (fig. 24)..... *peckorum*  
 15. Pair of anterior median blind ducts present (fig. 60)..... *kochalkai*  
 Pair of anterior median blind ducts absent (figs. 16, 32)..... 16  
 16. Outer epigynal ducts relatively wide medi-

ally (fig. 32)..... *quindio*  
 Outer epigynal ducts relatively narrow medially (fig. 16)..... *dybasi*

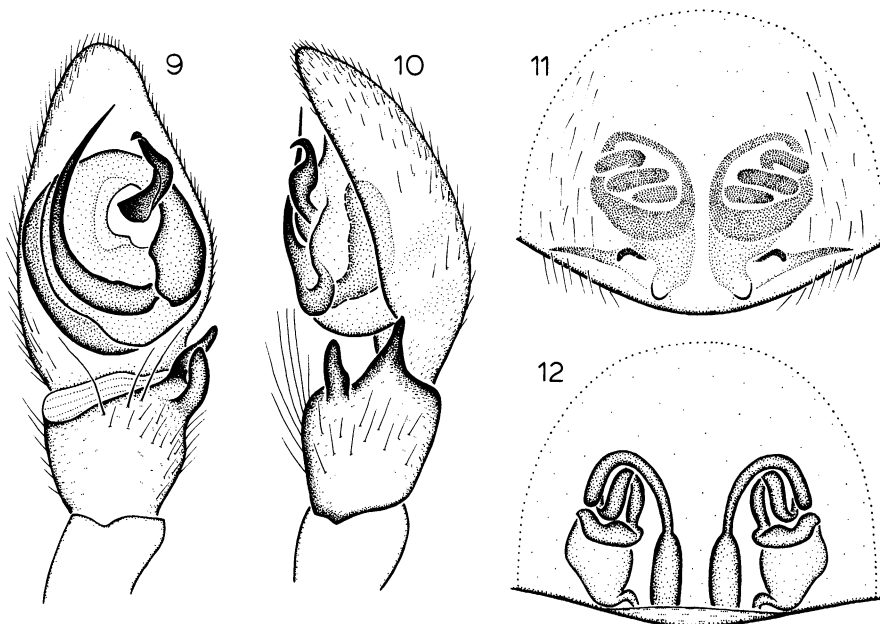
*Lygromma senoculatum* Simon

Figures 9-12

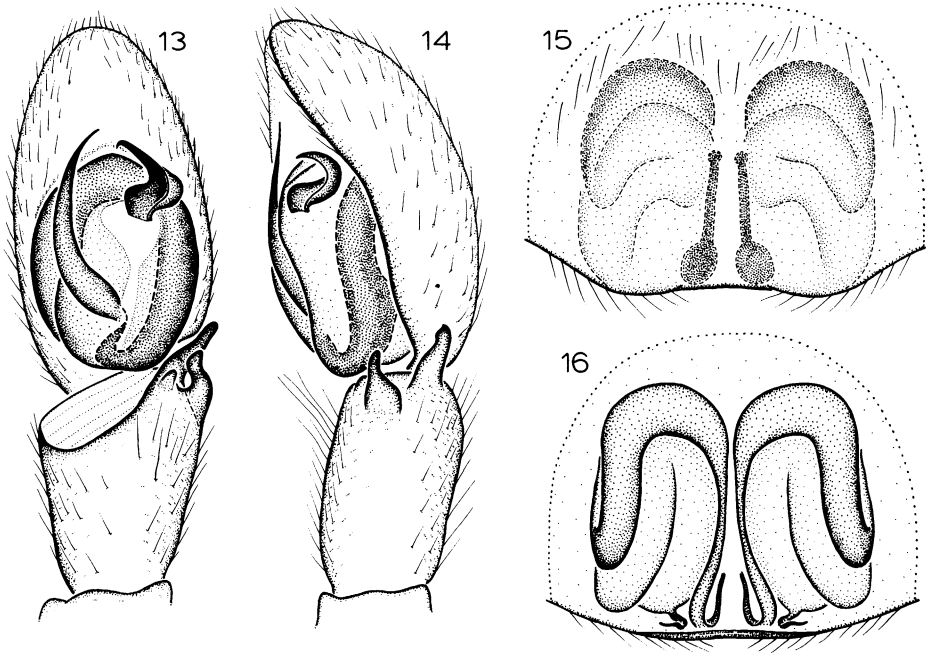
*Lygromma senoculatum* Simon, 1893a, p. 451, figs. 16, 17 (two male and one female syntypes from Catuche Forest, near Caracas, Distrito Federal, Venezuela, and Colonia Tovar, Aragua, Venezuela, in MNHN, examined). Roewer, 1954, p. 352. Bonnet, 1957, p. 2674.

**Diagnosis.** *Lygromma senoculatum* is closest to *L. valencianum* and *L. huberti* but may be distinguished by the medially situated embolus and unlooped palpal duct of males (fig. 9) and the posteriorly widened inner epigynal ducts of females (fig. 12).

**Male.** Total length 2.41, 2.45 mm. Carapace 1.02, 1.13 mm. long, 0.83, 0.88 mm. wide. Femur II 0.79, 0.86 mm. long (syntypes). Eye pattern typical for six-eyed species of the genus. Embolus long, gently curved, medially situated, arising from unlooped palpal duct (fig. 9).



FIGS. 9-12. *Lygromma senoculatum* Simon. 9. Palp, ventral view. 10. Palp, retrolateral view. 11. Epigynum, ventral view. 12. Vulva, dorsal view.



FIGS. 13-16. 13, 14. *Lygromma valencianum* Simon. 13. Palp, ventral view. 14. Palp, retrolateral view. 15, 16. *L. dybasi*, new species. 15. Epigynum, ventral view. 16. Vulva, dorsal view.

Ventrally situated tibial apophysis narrowed apically (fig. 10). Leg spination: femur III d1-1-0, p0-0-0, r0-0-0; tibiae: II v0-1r-0; III v0-2-2; metatarsus IV p1-1-1.

*Female*. Total length 2.63 mm. Carapace 1.09 mm. long, 0.82 mm. wide. Femur II 0.77 mm. long (syntype). Eye pattern typical for six-eyed species of the genus. Epigynum with posteriorly directed basal openings (fig. 11). Inner and outer epigynal ducts widened posteriorly (fig. 12). Leg spination: tibia III v0-2-0, r0-1-0; metatarsus IV r0-1-0.

*Material Examined*. Only the syntypes.

*Distribution*. The only locality label presently with the syntypes reads Valencia (in Carabobo, Venezuela) rather than either of the localities cited above, which are the ones given by Simon in his original description and more likely to be correct. This confusion of specimens from different localities in one vial makes it possible that the female belongs to *L. valencianum* or *L. huberti* rather than with the male described above; all three localities (and species) are from northern Venezuela.

*Lygromma valencianum* Simon

Figures 13, 14

*Lygromma valencianum* Simon, 1893a, p. 452, fig. 18 (male lectotype here designated from either San Esteban or Valencia, Carabobo, Venezuela, in MNHN, examined). Roewer, 1954, p. 352. Bonnet, 1957, p. 2674.

*Diagnosis*. *Lygromma valencianum* is closest to *L. senoculatum* and *L. huberti* but may be distinguished by the medially situated embolus arising from a conspicuously looped palpal duct (fig. 13).

*Male*. Total length 3.67 mm. Carapace 1.58 mm. long, 1.19 mm. wide. Femur II 1.12 mm. long (lectotype). ALE separated by one-third of their diameter from PLE; AME absent. Embolus long, gently curved, medially situated, arising from basally looped palpal duct (fig. 13). Both tibial apophyses narrowed apically (fig. 14). Leg spination: femora: III d1-1-0, p0-0-0; IV p0-0-0; tibiae: III v0-2-2; IV vlp-2-2; metatarsi: III p0-1-2; IV r0-1-0.

*Female*. Unknown.

*Material Examined.* Only the lectotype.

*Distribution.* Simon's two syntypes are from two different localities and represent two different species; unfortunately, it is impossible to determine which specimen is from which locality (both of which are, however, in Carabobo, Venezuela). The paralectotype belongs to *L. huberti*, new species.

***Lygromma huberti*, new species**

Figures 17, 18

*Lygromma valencianum* (misidentification):  
Simon, 1893a, p. 452 (in part, not fig. 18).

*Type.* Male holotype from Berlese sample of forest litter at Tiara, 50 km. south of Caracas, elevation 1500 m., Aragua, Venezuela (February 22, 1971; S. B. Peck), deposited in MCZ.

*Etymology.* The specific name is a patronym in honor of Dr. M. Hubert of the Muséum National d'Histoire Naturelle, Paris, who by arranging for the loan of the Simon types made this project possible.

*Diagnosis.* *Lygromma huberti* is closest to *L. senoculatum* and *L. valencianum* but may be

distinguished by the prolaterally situated embolus (fig. 17).

*Male.* Total length 1.98-2.59 mm. Carapace 0.84-1.19 mm. long, 0.58-0.86 mm. wide. Femur II 0.50-0.79 mm. long (three specimens). Eye pattern typical for six-eyed species of the genus. Embolus very long, almost straight, prolaterally situated, arising from unlooped palpal duct (fig. 17). Ventrally situated tibial apophysis acutely bent (fig. 18). Leg spination: tibiae: II v0-1p-0; IV vlp-2-2; metatarsi: III p0-1-2, vlp-2-0; IV r0-1-0.

*Female.* Unknown.

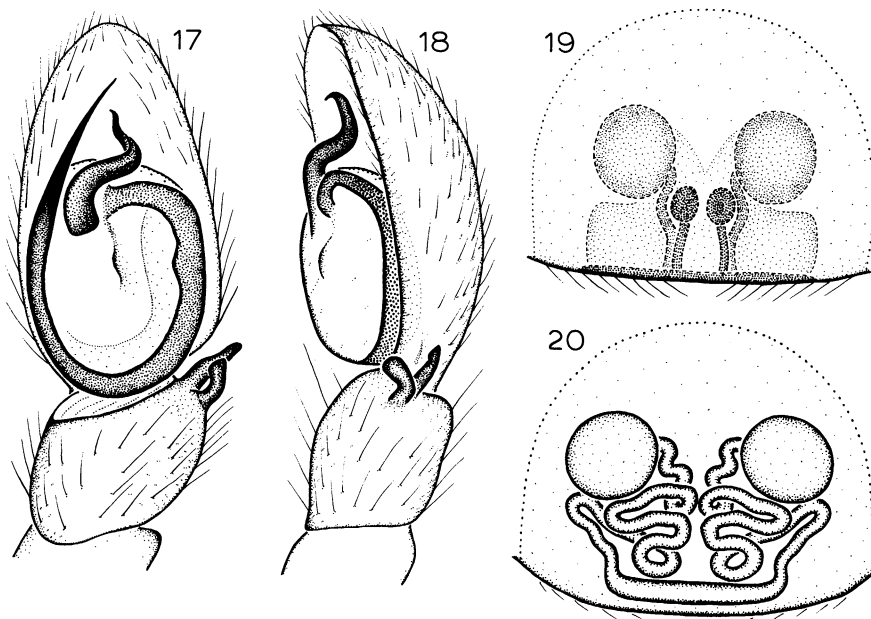
*Material Examined.* One male taken with the holotype (MCZ) and a male paralectotype of *L. valencianum* from San Esteban or Valencia, Carabobo, Venezuela (MNH).

*Distribution.* Aragua and Carabobo, Venezuela.

***Lygromma peckorum*, new species**

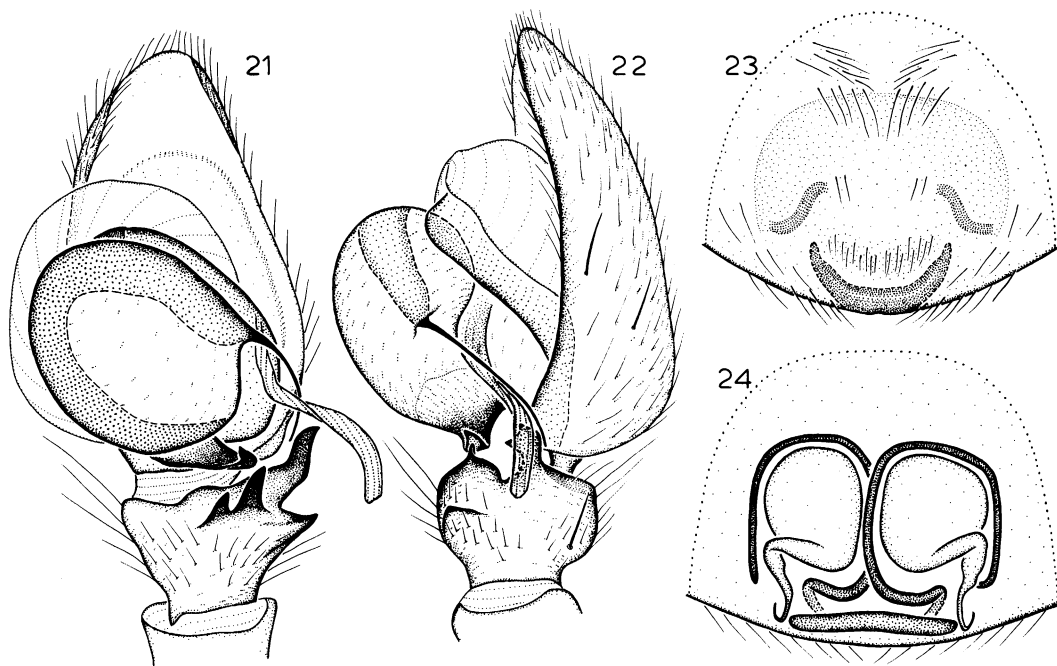
Figures 21-24

*Types.* Male holotype and female paratype from 11 km. east of Calarcá, elevation 7000 feet,



FIGS. 17-20. 17, 18. *Lygromma huberti*, new species. 17. Palp, ventral view. 18. Palp, retrolateral view. 19, 20. *L. peruviana*, new species. 19. Epigynum, ventral view. 20. Vulva, dorsal view.





FIGS. 21-24. *Lygromma peckorum*, new species. 21. Expanded palp, ventral view. 22. Expanded palp, retrolateral view. 23. Epigynum, ventral view. 24. Vulva, dorsal view.

Quindío, Colombia (March 7-11, 1974; S. and J. Peck), deposited in MCZ.

**Etymology.** The specific name is a patronym in honor of Drs. S. and J. Peck, the collectors of the type specimens and many other *Lygromma*.

**Diagnosis.** *Lygromma peckorum* is a distinctive species easily recognized by the presence of four retrolateral tibial apophyses in males (figs. 21, 22) and extremely wide inner epigynal ducts in females (fig. 24).

**Male.** Total length 3.31 mm. Carapace 1.48 mm. long, 1.14 mm. wide. Femur II 0.99 mm. long (holotype). ALE separated by half their diameter, by one-third their diameter from PLE; PME separated by half their diameter from PLE; AME absent. Embolus extremely long, gently curved, prolaterally situated, arising from un-looped palpal duct that reaches base of tegulum; translucent conductor present (fig. 21). Four retrolateral tibial apophyses, three visible in retrolateral view (fig. 22). Leg spination: tibiae: III v0-1p-2; IV r0-1-1; metatarsus IV p0-1-1, v0-2-0.

**Female.** Total length 4.05 mm. Carapace 1.41 mm. long, 1.12 mm. wide. Femur II 1.02 mm. long (paratype). ALE separated by almost their diameter, by half their diameter from PLE; PME separated by half their diameter from PLE; AME absent. Epigynum with procurved basal sclerotized strip (fig. 23). Inner epigynal ducts greatly widened (fig. 24). Leg spination: femur III p0-1-1, r0-1-1; tibiae: II v0-1p-0; III v0-1p-2; IV r0-1-1; metatarsi: II v0-0-0; III p0-0-1; IV v0-2-0.

**Material Examined.** Only the types.

**Distribution.** Quindío, Colombia.

*Lygromma chamberlini* Gertsch  
Figures 25-28

*Lygromma chamberlini* Gertsch, 1941, p. 12, figs. 23-25 (male holotype and female allotype from Barro Colorado Island, Panama Canal Zone, should be in AMNH, lost).

**Diagnosis.** *Lygromma chamberlini* may be easily recognized by the moderate length of the

embolus (only slightly longer than the median apophysis, fig. 25) and extremely thin epigynal ducts (fig. 28).

**Male.** Total length 2.39-3.49 mm. Carapace 1.08-1.56 mm. long, 0.86-1.26 mm. wide. Femur II 0.88-1.07 mm. long (nine specimens). ALE separated by one-third of their diameter, by one-third of their diameter from PLE; PME separated by one-third of their diameter from PLE; AME absent. Embolus only slightly longer than median apophysis, arising apically from palpal duct that does not reach base of tegulum; short translucent conductor present (fig. 25). Both retrolateral tibial apophyses short (fig. 26). Leg spination: tibiae: II v0-2-0; IV d0-1-0, v1p-2-2; metatarsi: III p0-1-2, v0-2-1p, r0-0-2; IV v1p-2-1p, r0-1-2.

**Female.** Total length 3.10±0.24 mm. Carapace 1.20±0.05 mm. long, 0.94±0.04 mm. wide. Femur II 0.84±0.08 mm. long (10 specimens). Eye pattern as in male. Epigynum with paired basal dark circles and distinctly recurved, ventrally visible anterior ducts (fig. 27). Inner and outer epigynal ducts long, sinuous (fig. 28).

Leg spination: tibia IV v1p-2-2, r1-0-1; metatarsi: II v0-1p-0; III p0-1-2, v0-2-1p, r0-0-2; IV v1p-2-1p, r0-1-2.

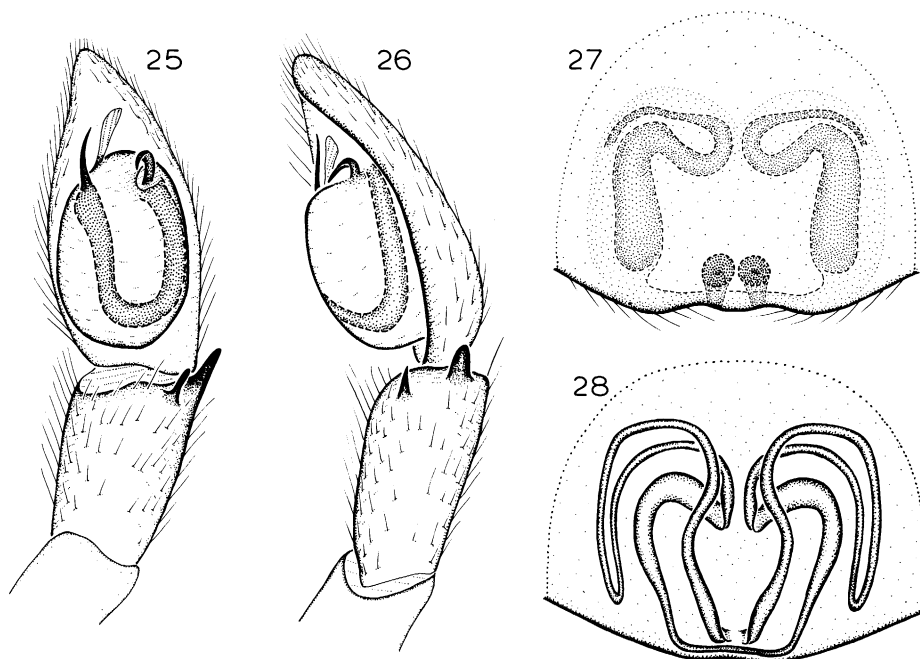
**Material Examined.** **Panama:** Canal Zone: Barro Colorado Island, July, 1936 (A. M. Chickering, MCZ), 1♀; July, 1943-Mar., 1944 (A. M. Chickering, MCZ), 4♂, 4♀; 1946 (J. Zetek, MCZ), 1♂, 2♀; June-Aug., 1949 (J. Zetek, MCZ), 1♂, 1♀; July 15, 1950 (A. M. Chickering, MCZ), 1♀; Nov., 1952-Mar., 1953, Berlese sample (J. Zetek, AMNH), 1♂; Aug. 16, 1954 (A. M. Chickering, MCZ), 1♂. Forest Reserve, Aug., 1939 (A. M. Chickering, MCZ), 1♀. **Colón:** Portobelo, Aug., 1936 (A. M. Chickering, MCZ), 1♂.

**Distribution.** Southern Panama.

***Lygromma kochalkai*, new species**

Figures 57-60

**Types.** Male holotype from Villa Leonor, elevation 1311 m., Serranía Nueva Granada, Sierra Nevada de Santa Marta, Magdalena, Colombia (April 12, 1975; J. A. Kochalka) and



FIGS. 25-28. *Lygromma chamberlini* Gertsch. 25. Palp, ventral view. 26. Palp, retrolateral view. 27. Epigynum, ventral view. 28. Vulva, dorsal view.

female paratype sifted from leaf litter at San Pedro, elevation 960 m., Sierra Nevada de Santa Marta, Magdalena, Colombia (May 19, 1975; J. A. Kochalka), deposited in AMNH courtesy of Mr. Kochalka.

*Etymology.* The specific name is a patronym in honor of the collector of the type specimens.

*Diagnosis.* *Lygromma kochalkai* is a distinctive species easily recognized by the extremely long, retrolaterally originating embolus (fig. 57) and unique anterior epigynal ducts (fig. 60).

*Male.* Total length 2.44-3.35 mm. Carapace 1.08-1.58 mm. long, 0.86-1.26 mm. wide. Femur II 0.83-1.19 mm. long (three specimens). ALE separated by one-third of their diameter, by one-fourth of their diameter from PLE; PME separated by slightly less than their diameter; AME absent. Embolus extremely long, originating on retrolateral side of tegulum; translucent conductor present (fig. 57). Two retrolateral tibial apophyses widely separated (fig. 58). Leg spination: femora I, II p0-1-1; tibiae: I v0-1p-0; IV v1p-2-2; metatarsi: III p0-1-2, v2-2-1p, r0-1-1; IV v2-2-1p.

*Female.* Total length 2.29-4.00 mm. Carapace 0.97-1.73 mm. long, 0.83-1.30 mm. wide. Femur II 0.72-1.19 mm. long (five specimens). ALE separated by two-sevenths of their diameter, equally far from PLE; AME absent; eyes sometimes depigmented. Epigynum with recurved ducts (fig. 59). Inner epigynal ducts longitudinally folded; outer ducts uniformly wide, of slightly variable length at posterolateral corners; blind anterior ducts present (fig. 60). Leg spination: femur IV p0-0-0; tibia IV v1p-2-2; metatarsi: III p0-1-2, v1p-2-1p, r0-1-1; IV v1p-2-1p.

*Material Examined.* Colombia: Magdalena: Sierra Nevada de Santa Marta: Cerro Lagila, pitfall trap, elevation 5050 feet, Mar. 15-30, 1975 (J. A. Kochalka, JAK), 1♀; Cuchilla Cebolleta, under rocks, elevation 11,460 feet, Mar. 2, 1975 (J. A. Kochalka, JAK), 1♀; between San Pedro and San Javier, under rocks and logs, elevation 5130 feet, Mar. 29, 1975 (J. A. Kochalka, JAK), 2♀; Serranía Nueva Granada, pitfall trap, elevation 5280 feet, Apr. 9-27, 1975 (J. A. Kochalka, JAK), 2♂.

*Distribution.* Magdalena, Colombia.

### **Lygromma quindio**, new species

Figures 29-32

*Types.* Male holotype from 23 km. east of Calarcá, elevation 10,000 feet, Quindío, Colombia (February 6-11, 1974; S. and J. Peck), and female paratype from 1 km. south of Calarcá, elevation 5000 feet, Quindío, Colombia (March 8-10, 1974; S. and J. Peck), deposited in MCZ.

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

*Diagnosis.* *Lygromma quindio* may be easily recognized by the long embolus arising from a palpal duct that does not reach the base of the tegulum (fig. 29) and the folded inner and wide outer epigynal ducts (fig. 32).

*Male.* Total length 3.76 mm. Carapace 1.61 mm. long, 1.27 mm. wide. Femur II 1.33 mm. long (holotype). ALE separated by one-fourth of their diameter, by one-third of their diameter from PLE; PME separated by their diameter; AME absent. Embolus very long, almost straight, arising from short palpal duct that does not reach base of tegulum; translucent conductor present (fig. 29). Two retrolateral tibial apophyses widely separated (fig. 30). Leg spination: femur III p0-0-0, r0-0-0; tibia IV r1-0-1; metatarsi: II v0-0-0; III p0-1-2, v0-2-1p, r0-1-1; IV 1p-2-1p.

*Female.* Total length 3.11 mm. Carapace 1.40 mm. long, 1.15 mm. wide. Femur II 1.14 mm. long (paratype). PME separated by one and one-half times their diameter; AME absent. Epigynum with dark basal and median longitudinal strips (fig. 31). Inner epigynal ducts longitudinally folded; outer ducts uniformly wide (fig. 32). Leg spination typical for the genus (both right and left leg III missing and therefore unchecked).

*Material Examined.* Only the types.

*Distribution.* Quindío, Colombia.

### **Lygromma dybasi**, new species

Figures 15, 16

*Type.* Female holotype from Finca Lérída, Chiriquí, Panama (March 16-18, 1959; H. S. Dybas), deposited in FMNH.

*Etymology.* The specific name is a patronym in honor of the collector of the holotype.

*Diagnosis.* *Lygromma dybasi* is closest to *L. quindio* but may be easily distinguished by the



medially narrowed outer epigynal ducts (fig. 16).

*Male.* Unknown.

*Female.* Total length 2.14-2.38 mm. Carapace 0.94-1.15 mm. long, 0.79-0.86 mm. wide. Femur II 0.65-0.79 mm. long (three specimens). ALE separated by two-thirds of their diameter; PME separated by one and one-half times their diameter; AME absent. Epigynum with paired longitudinal median dark strips (fig. 15). Inner epigynal ducts longitudinally folded, outer ducts much wider laterally than medially (fig. 16). Leg spination: femora III, IV p0-0-0, r0-0-0; tibiae: II v0-1p-0; III v1p-1p-1p, r1-0-0; IV v1p-2-2, r1-0-1; metatarsi: II v0-1p-0; III r0-0-0; IV r0-1-0.

*Material Examined.* Costa Rica: Puntarenas: Organization for Tropical Studies station, Las Cruces, latitude 8° 46' N, longitude 82° 58' W, elevation 4000 feet, Mar. 9, 1973, Berlese sample of epiphytic humus (J. Wagner, J. Kethley, FMNH, AMNH), 2♀.

*Distribution.* Costa Rica and northern Panama.

### *Lygromma gertschi*, new species

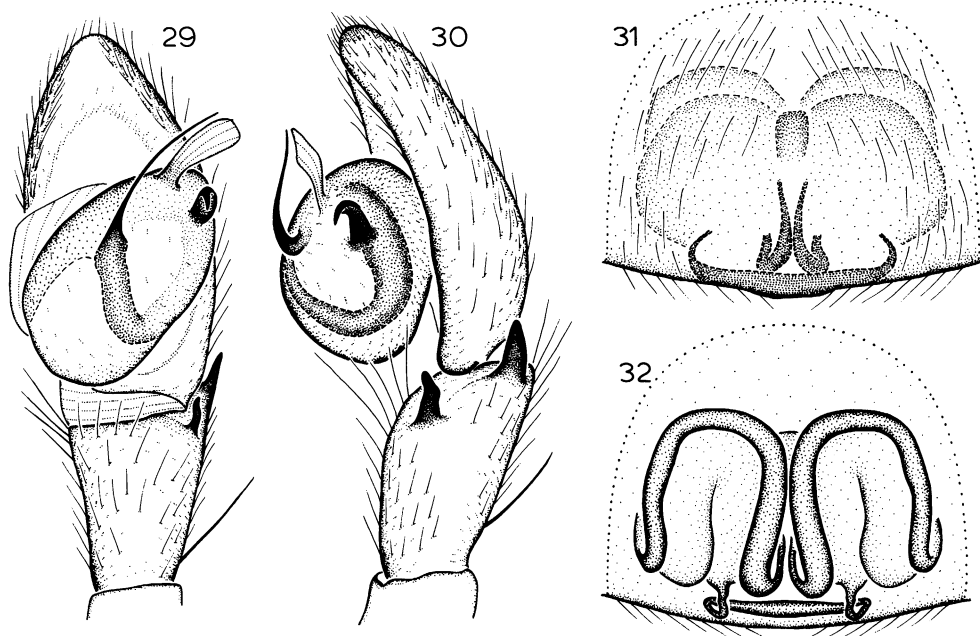
Figures 1-4, 33-36

*Types.* Male holotype and female paratype from Falling Cave, Douglas Castle, St. Ann Parish, Jamaica (male, August 18, 1974, S. Peck; female, December 20, 1972, S. and J. Peck), deposited in AMNH.

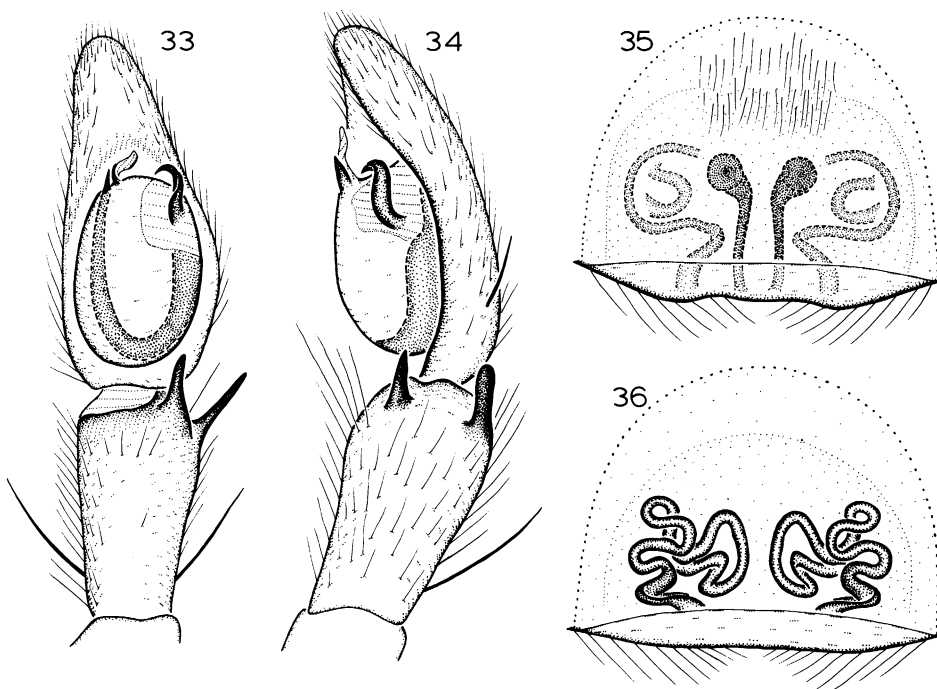
*Etymology.* The specific name is a patronym in honor of Dr. Willis J. Gertsch, in recognition of his contributions to our knowledge of cave-dwelling Arachnida.

*Diagnosis.* *Lygromma gertschi* may be easily distinguished from the other known species in the genus by the absence of functional eyes, the lack of teeth on the tarsal claws, the very short embolus (fig. 33), and the arrangement of the epigynal ducts (fig. 36).

*Male.* Total length 4.07 mm. Carapace 1.67 mm. long, 1.28 mm. wide. Femur II 1.84 mm. long (holotype). Blind; eyes represented only by six slight cuticular elevations. Embolus extremely short, straight, arising from long palpal duct that almost reaches base of tegulum; short translucent



FIGS. 29-32. *Lygromma quindio*, new species. 29. Partially expanded palp, ventral view. 30. Partially expanded palp, retrolateral view. 31. Epigynum, ventral view. 32. Vulva, dorsal view.



FIGS. 33-36. *Lygromma gertschi*, new species. 33. Palp, ventral view. 34. Palp, retrolateral view. 35. Epigynum, ventral view. 36. Vulva, dorsal view.

conductor present (fig. 33). Two long, widely separated retrolateral tibial apophyses (fig. 34). Leg spination: femora: I p0-0-1, II p0-1-1; III p0-1-1; IV p0-1-1, r0-1-1; tibiae: I, II v2-2-0; III, IV d1-1-0, v2-2-2; metatarsi: I v0-2-0; III d1-0-0, r1-0-1; IV p1-1-2, r1-1-1.

*Female*. Total length 3.35-4.69 mm. Carapace 1.73-2.12 mm. long, 1.37-1.53 mm. wide. Femur II 1.69-2.23 mm. long (seven specimens). Blind; only four slight cuticular elevations (representing ALE and PLE) discernible. Epigynum with anteriorly situated paired dark circles (fig. 35). Epigynal ducts loosely coiled (fig. 36). Leg spination: femora: I, II p0-0-1; III r0-1-1; tibiae: I, II v2-2-0; III, IV d1-1-0, v2-2-0; metatarsi: I v0-2-0; III r2-0-1; IV p1-1-2, r1-1-1.

*Material Examined*. Jamaica: *St. Catherine Par.*: Worthy Park Cave #2, Worthy Park, Apr. 6, 1968 (S. Peck, A. Fiske, MCZ), 5♀; Dec. 26, 1972 (S. and J. Peck, AMNH), 1♀.

*Distribution*. Known only from caves on Jamaica.

*Lygromma simoni* (Berland), new combination  
Figures 39, 40

*Pseudolygromma simoni* Berland, 1913, p. 85, figs. 12-15 (female holotype from Mirador, Pichincha, Ecuador, may be in MNHN, not examined). Roewer, 1954, p. 353. Bonnet, 1958, p. 3816.

*Diagnosis*. *Lygromma simoni* resembles *L. gertschi* and *L. peruviana* in having loosely coiled epigynal ducts, but may be distinguished from the former species by having functional eyes and basally situated dark epigynal circles (fig. 39) and from the latter species by lacking a distinct spermathecal bulb.

*Male*. Unknown.

*Female*. Total length 4.59 mm. Carapace 1.69 mm. long, 1.33 mm. wide. Femur II 1.26 mm. long (one specimen). ALE separated by their diameter, by their radius from PLE; PME separated by two-fifths of their diameter from PLE; AME present, represented by two small

elevations less than one-sixth the ALE diameter. Epigynum with posteriorly situated paired dark circles (fig. 39). Epigynal ducts loosely coiled (fig. 40). Leg spination: tibiae: II v0-1p-0; IV d0-1-0; metatarsi: III p1-1-2, r1-0-1; IV p0-1-1.

**Material Examined.** Ecuador: *Pichincha*: Quito, Apr. 28, 1942 (H. Exline, AMNH), 1♀.

**Distribution.** *Pichincha*, Ecuador.

***Lygromma peruviana*, new species**

Figures 19, 20

**Type.** Female holotype from Huacapistana, Junín, Peru (no date or collector), deposited in AMNH.

**Etymology.** The specific name refers to the type locality.

**Diagnosis.** *Lygromma peruviana* may be easily distinguished from the other known species in the genus by the presence of distinct spermathecal bulbs (fig. 20).

**Male.** Unknown.

**Female.** Total length 2.48 mm. Carapace 1.11

mm. long, 0.86 mm. wide. Femur II missing (holotype). ALE separated by their diameter, by their radius from PLE; PME separated by twice their diameter, by three-fourths of their diameter from PLE; AME present, represented by two minute cuticular elevations visible only in oblique view. Epigynum with medially situated paired dark circles (fig. 19). Round spermathecal bulb present on each side (fig. 20). Leg spination (only leg III present): femur III p0-0-0, r0-0-0; tibia III r0-1-0; metatarsus III p1-1-1, r0-0-0.

**Material Examined.** Only the holotype.

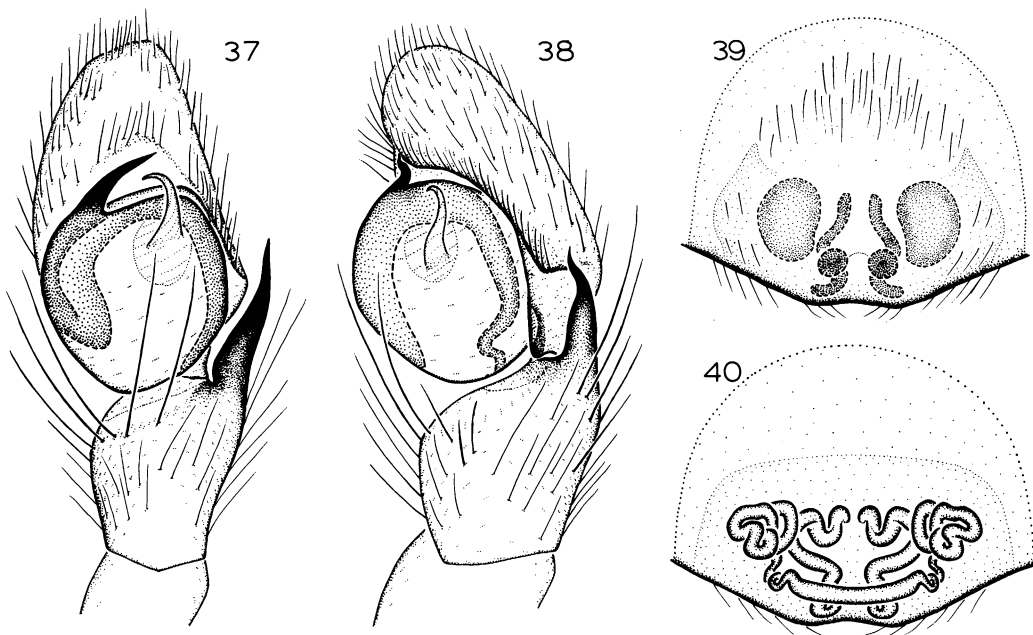
**Distribution.** Junín, Peru.

***NEOZIMIRIS* SIMON**

*Neozimiris* Simon, 1903, p. 984 (type species by original designation *Zimiris pubescens* Banks). Bonnet, 1958, p. 3063.

*Zimiris* (in part): Dalmás, 1918, p. 330. Roewer, 1954, p. 347.

*Pericuris* Chamberlin, 1924, p. 608 (type species by original designation *Pericuris insularis* Chamberlin, =*Neozimiris pubescens*). Roewer,



FIGS. 37-40. 37, 38. *Neozimiris chickeringi*, new species. 37. Palp, ventral view. 38. Palp, retrolateral view. 39, 40. *Lygromma simoni* (Berland). 39. Epigynum, ventral view. 40. Vulva, dorsal view.



1954, p. 346. Bonnet, 1958, p. 3483. First synonymized by Cooke, 1964, p. 262.

**Diagnosis.** Three genera of prodidomines other than *Neozimiris* are known from the New World. The Argentine species *Hyltonia scottae* Birabén differs from *Neozimiris* by having the first rather than fourth pair of legs longest. *Zimiris guianensis* Dalmas from French Guiana and *Zimiris grisea* Banks from Mexico appear to be correctly placed in this otherwise Asian genus (although the type of the latter species is destroyed and no other specimens are known) and may be distinguished from *Neozimiris* by having the anterior spinnerets situated far in advance of the others. *Prodidomus rufus* Hentz, the type species of the genus, may be easily distinguished by its greatly enlarged and divergent chelicerae; the two Venezuelan females described by Simon as *Prodidomus nigricauda* and *Prodidomus opacithorax* have unmodified chelicerae, however, and differ further from the other species of this widespread genus by having the anterior spinnerets larger than the posteriors (as in *Neozimiris*). Thus, the generic placement of those two species must be considered uncertain, and it is possible that they actually belong to *Neozimiris* or to an undescribed genus. *Neozimiris* males can be easily recognized by their long single retrolateral tibial apophysis (as in fig. 42), females by their curved spermathecae and median, lateral and posterior ducts (as in fig. 44).

**Description.** Total length 1.7-5.6 mm. Carapace almost rectangular in dorsal view, flattened, widest between coxae II and III, very gradually narrowed anteriorly, pale orange, darkest anteriorly, with long dark setae at borders. Cephalic area not elevated; thoracic groove almost obliterated; clypeus almost horizontal. Eight eyes in two rows; from above, anterior row slightly recurved, posterior row very strongly procurved; AME circular, dark, other eyes oval, light. AME separated by their diameter or less, almost contiguous with ALE; PME usually separated by roughly their radius, contiguous with PLE; lateral eyes of each side almost contiguous; MOQ longer than wide, wider in back than in front. Clypeal height usually less than AME diameter. Chelicerae without teeth, with promarginal row

of stiff, acutely bent setae (fig. 8). Endites V-shaped, obliquely depressed, rounded anteriorly. Labium short, rounded anteriorly. Sternum rebordered, produced between coxae IV, bearing clumps of wide setae (fig. 6) between all coxae (fig. 5). Leg formula 4123. Typical leg spination pattern (only surfaces bearing spines listed): femora: I, II d1-0-0; III, IV d1-1-0; tibiae: III p0-1-0, v0-0-1p; IV p1-0-1, v1p-2-2; metatarsi: III p0-0-1, v0-0-1p; IV p0-0-1, v1p-1p-1p, r0-0-1. Legs pale orange, femora darkest. Tarsi with dorsal trichobothria, two smooth claws, and claw tufts. Metatarsal preening comb lacking. Trochanters unnotched, trochanter IV elongated. Patella I (*N. levii*) or patellae I and IV (*N. chickeringi*) sometimes elongated. Abdomen pale white with scattered dark markings or uniformly gray dorsally. Six spinnerets, anteriors greatly enlarged, widened, bearing long spigots and distinct ventral tubule (fig. 7). Palp with short to long embolus, lightly sclerotized median apophysis, and sinuous duct. Single elongate retrolateral tibial apophysis present. External epigynum reduced, translucent. Epigynal ducts situated anteriorly.

**Phylogeny.** Little can be said of the interrelationships of the known species until the missing sexes are discovered; additional species of the genus will almost certainly be found in the West Indies. *Neozimiris pubescens* and *N. crinis* may well be sister species; they have very similar epigyna. *Neozimiris chickeringi* and *N. exuma*, with their short emboli, are closer to each other than either is to *N. levii*.

#### KEY TO SPECIES OF *NEOZIMIRIS*

1. Males . . . . . 2  
Females . . . . . 5
2. Embolus originating at base of tegulum (fig. 49). . . . . *levii*  
Embolus originating at tip of tegulum (figs. 37, 41, 45). . . . . 3
3. Retrolateral tibial apophysis sinuous (fig. 38) . . . . . *chickeringi*  
Retrolateral tibial apophysis straight (figs. 42, 46). . . . . 4
4. Palpal duct recurved anteriorly (fig. 45). . . . . *exuma*  
Palpal duct not recurved anteriorly (fig. 41) . . . . . *pubescens*

5. Epigynum with anterior hood (figs. 51, 52) ..... *nudus*  
Epigynum without anterior hood (figs. 43, 47, 53, 55) ..... 6
6. Epigynum with anterior bulbous lobes (figs. 43, 44) ..... *pubescens*  
Epigynum without anterior bulbous lobes (figs. 47, 53, 55) ..... 7
7. Epigynum with tubelike posterior ducts (figs. 48, 54) ..... 8  
Epigynum without tubelike posterior ducts (fig. 56) ..... *pinzon*
8. Median epigynal ducts expanded anteriorly (fig. 54) ..... *pinta*  
Median epigynal ducts not expanded anteriorly (fig. 48) ..... *crinis*

*Neozimiris pubescens* (Banks)

Figures 5-8, 41-44

*Zimiris pubescens* Banks, 1898, p. 214, pl. 13, fig. 3 (female holotype from Mexico, no specific locality, in California Academy of Sciences, destroyed). Roewer, 1954, p. 347.

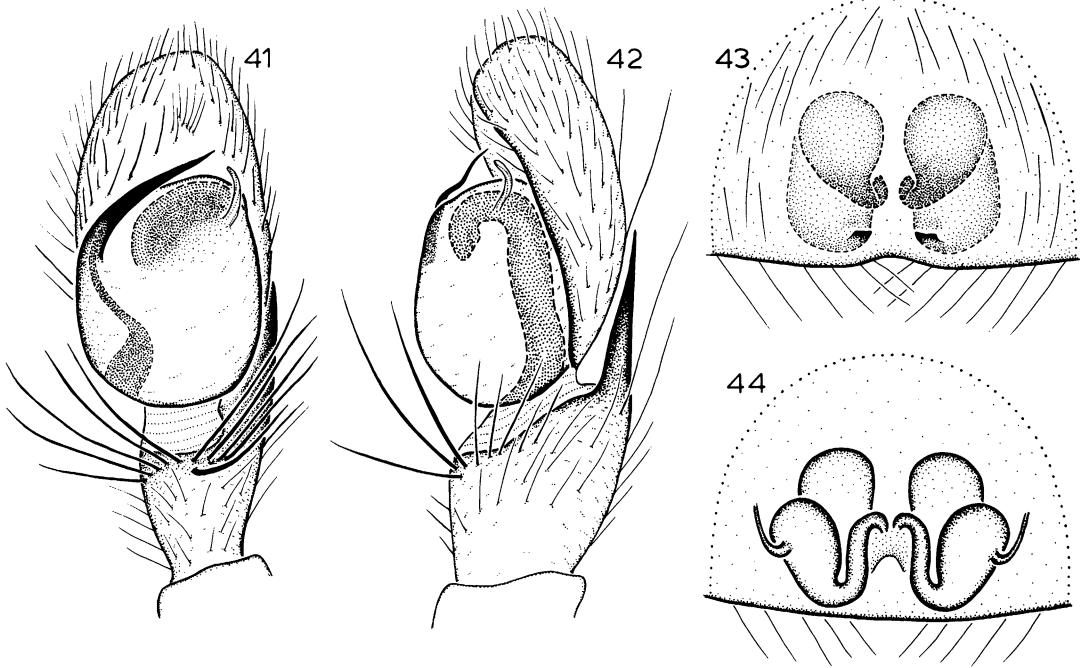
*Neozimiris pubescens*: Simon, 1903, p. 984. Bonnet, 1958, p. 3063.

*Pericuris insularis* Chamberlin, 1924, p. 609, figs. 42-45 (female holotype from Isla Ballena, Baja California Sur, Mexico, may be in California Academy of Sciences, not examined). Roewer, 1954, p. 346. Bonnet, 1958, p. 3483. First synonymized by Cooke, 1964, p. 262.

*Pericuris pallida* Chamberlin and Ivie, 1935, p. 11, fig. 35 (juvenile holotype from junction of Mesa and Salt rivers, Maricopa County, Arizona, should be in University of Utah collection, lost). Roewer, 1954, p. 346. Bonnet, 1958, p. 3483. First synonymized by Cooke, 1964, p. 262.

**Diagnosis.** *Neozimiris pubescens* may be easily recognized by the moderately long embolus arising from a palpal duct that is not recurved (fig. 41) and by the bulbous anterior lobes of the epigynum (fig. 43).

**Male.** Total length 1.78-2.81 mm. Carapace 0.83-1.18 mm. long, 0.63-0.88 mm. wide. Femur II 0.58-0.90 mm. long (four specimens). Eye



FIGS. 41-44. *Neozimiris pubescens* (Banks). 41. Palp, ventral view. 42. Palp, retrolateral view. 43. Epigynum, ventral view. 44. Vulva, dorsal view.

sizes and interdistances (mm.): AME 0.05, ALE 0.07, PME 0.08, PLE 0.07; AME-AME 0.05, AME-ALE 0.01, PME-PME 0.05, PME-PLE 0.00, ALE-PLE 0.01. MOQ length 0.25 mm., front width 0.16 mm., back width 0.21 mm. Embolus moderately long, arising prolaterally from sinuous but not recurved duct (fig. 41). Retrolateral tibial apophysis gradually tapered toward tip (fig. 42). Leg spination: tibia IV v1p-1p-2.

*Female.* Total length 3.01-5.51 mm. Carapace 1.15-1.35 mm. long, 0.90-1.08 mm. wide. Femur II 0.94-1.06 mm. long (seven specimens). Eye sizes and interdistances (mm.): AME 0.07, ALE 0.07, PME 0.09, PLE 0.06; AME-AME 0.06, AME-ALE 0.01, PME-PME 0.05, PME-PLE 0.00, ALE-PLE 0.01. MOQ length 0.28 mm., front width 0.20 mm., back width 0.22 mm. Epigynum with basal openings (fig. 43). Spermathecae with anterolateral bulbous lobes (fig. 44). Leg spination: tibiae: III v1p-1p-1p; IV v1p-1p-2; metatarsus III p0-1-1.

*Material Examined.* **Mexico:** *Baja California Norte:* Isla Cedros, Mar. 14, 1945 (B. F. Osorio Tafall, AMNH), 1♀. *Baja California Sur:* Boca de la Sierra, near Miraflores, Feb. 10, 1966 (V. Roth, AMNH), 1♀; 20 mi. S El Arco, Apr. 17, 1969, elevation 800 feet (S. C. Williams, CAS), 1♀; La Paz, Feb. 1-3, 1965 (V. Roth, AMNH), 2♀, Feb. 2-3, 1966 (V. Roth, AMNH), 1♀; Punta El Mostrado, Isla Cerralvo, Mar. 22, 1953, under bark of tree (B. Firstman, AMNH), 1♂; 32 mi. S Villa Constitucion, Jan. 30, 1965 (V. Roth, AMNH), 1♀. **United States:** *Arizona:* Yuma Co.: Palm Canyon, Kofa Mountains, Apr. 25, 1960 (W. J. Gertsch, AMNH), 1♂. *California:* Riverside Co.: Andreas Canyon, Palm Springs, Mar. 26, 1960 (W. J. Gertsch, W. Ivie, R. Schrammel, AMNH), 1♂. San Diego Co.: Borrego Springs, Mar. 27, 1960 (W. J. Gertsch, W. Ivie, R. Schrammel, AMNH), 1♂.

*Distribution.* Arizona, California, and Baja California.

#### ***Neozimiris crinis*, new species**

Figures 47, 48

*Type.* Female holotype from 12 mi. west of Tehuantepec, latitude 16° 20' N, longitude 95° 20' W, Oaxaca, Mexico (April 29, 1963; W. J. Gertsch and W. Ivie), deposited in AMNH.

*Etymology.* The specific name is a noun in

apposition from the Latin *crinis* (hair), referring to the conspicuous tufts of intercoxal setae.

*Diagnosis.* *Neozimiris crinis* may be distinguished from *N. pubescens* by the absence of bulbous anterior spermathecal lobes and from *N. nudus* by the absence of an epigynal hood (figs. 47, 48).

*Male.* Unknown.

*Female.* Total length 3.38 mm. Carapace 0.97 mm. long, 0.79 mm. wide. Femur II 0.72 mm. long (holotype). Eye sizes and interdistances (mm.): AME 0.06, ALE 0.07, PME 0.08, PLE 0.08; AME-AME 0.04, AME-ALE 0.02, PME-PME 0.03, PME-PLE 0.00, ALE-PLE 0.01. MOQ length 0.25 mm., front width 0.16 mm., back width 0.20 mm. Epigynum with conspicuous dark anterolateral ducts (fig. 47). Spermathecal ducts long, coiled (fig. 48). Leg spination: femora: I d1-1-0, II d0-0-0; III d1-0-0; tibia III p0-0-0, v1p-1p-1p; metatarsus III p0-1-1.

*Material Examined.* Only the holotype.

*Distribution.* Oaxaca, Mexico.

#### ***Neozimiris chickeringi*, new species**

Figures 37, 38

*Type.* Male holotype from Forest Preserve, Panama Canal Zone (January 8, 1958; A. M. Chickering), deposited in MCZ.

*Etymology.* The specific name is a patronym in honor of the collector of the holotype.

*Diagnosis.* *Neozimiris chickeringi* may be easily recognized by the sinuous retrolateral tibial apophysis (fig. 38).

*Male.* Total length 2.29, 2.92 mm. Carapace 1.15, 1.18 mm. long, 0.86, 0.88 mm. wide. Femur II 0.80, 0.86 mm. long (two specimens). Eye sizes and interdistances (mm.): AME 0.07, ALE 0.07, PME 0.08, PLE 0.06; AME-AME 0.03, AME-ALE 0.01, PME-PME 0.05, PME-PLE 0.01, ALE-PLE 0.01. MOQ length 0.23 mm., front width 0.16 mm., back width 0.22 mm. Embolus short, arising from recurved palpal duct (fig. 37). Retrolateral tibial apophysis relatively short, sinuous (fig. 38). Leg spination: femur III d1-0-0; tibiae: III v0-2-2; IV v0-2-2, r0-0-1; metatarsi: III p0-1-1, r0-0-1; IV r0-1-1.

*Female.* Unknown.

*Material Examined.* One male collected with the holotype (MCZ).

*Distribution.* Panama Canal Zone.



***Neozimiris exuma*, new species**

Figures 45, 46

*Type.* Male holotype from cays west of Green Turtle Cut, Great Exuma, Bahama Islands (1973; R. Wetzler), deposited in MCZ.

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

*Diagnosis.* *Neozimiris exuma* may be recognized by the recessed embolus and anteriorly recurved palpal duct (fig. 45).

*Male.* Total length 2.38 mm. Carapace 1.32 mm. long, 0.83 mm. wide. Femur II missing, femur IV 0.70 mm. long (holotype). Eye sizes and interdistances (mm.): AME 0.06, ALE 0.06, PME 0.07, PLE 0.08; AME-AME 0.05, AME-ALE 0.01, PME-PME 0.03, PME-PLE 0.00, ALE-PLE 0.00. MOQ length 0.22 mm., front width 0.17 mm., back width 0.17 mm. Embolus recessed behind tip of palpal bulb, arising from anteriorly recurved duct (fig. 45). Retrolateral tibial apophysis extremely narrow (fig. 46). Leg spination (legs I and II missing): tibia IV p0-0-1; metatarsus IV v0-0-1p, r0-0-0.

*Female.* Unknown.

*Material Examined.* Only the holotype.

*Distribution.* Great Exuma, Bahama Islands.

***Neozimiris nudus*, new species**

Figures 51, 52

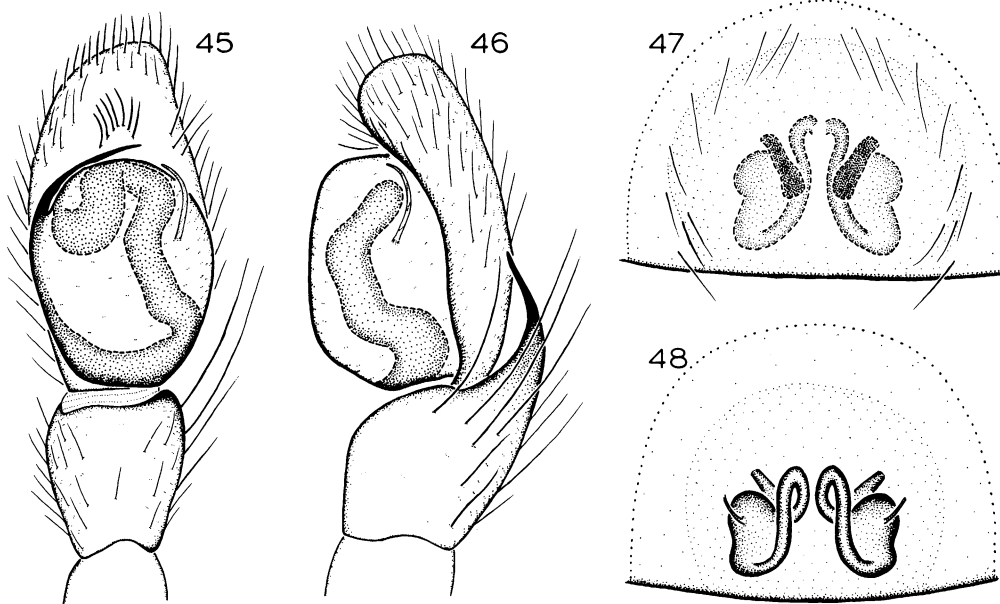
*Type.* Female holotype from Isla Maguey, Puerto Rico (March 7, 1968; A. Bliss), deposited in MCZ.

*Etymology.* The specific name is from the Latin *nudus* (bare), referring to the smooth claws.

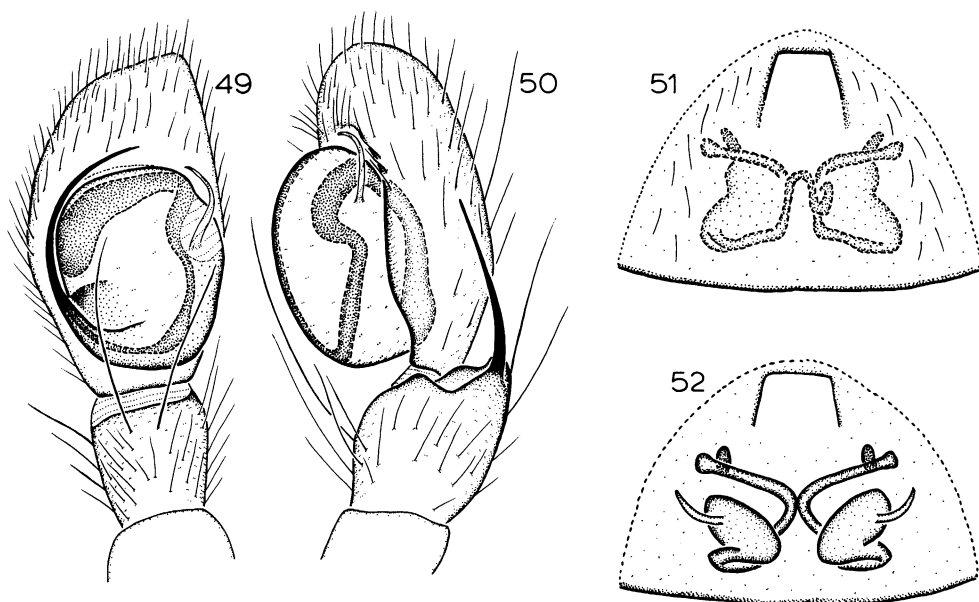
*Diagnosis.* *Neozimiris nudus* may be recognized by the presence of an epigynal hood (fig. 51). It is possible but unlikely that this species is the female of *N. exuma* or *N. levii*.

*Male.* Unknown.

*Female.* Total length 4.41 mm. Carapace 1.30 mm. long, 1.04 mm. wide. Femur II 0.94 mm. long (holotype). Eye sizes and interdistances (mm.): AME 0.08, ALE 0.07, PME 0.07, PLE 0.08; AME-AME 0.05, AME-ALE 0.01, PME-PME 0.09, PME-PLE 0.01, ALE-PLE 0.02. MOQ length 0.29 mm., front width 0.21 mm., back width 0.24 mm. Epigynum with anteromedian



FIGS. 45-48. 45, 46. *Neozimiris exuma*, new species. 45. Palp, ventral view. 46. Palp, retrolateral view. 47, 48. *N. crinis*, new species. 47. Epigynum, ventral view. 48. Vulva, dorsal view.



FIGS. 49-52. 49, 50. *Neozimiris levii*, new species. 49. Palp, ventral view. 50. Palp, retrolateral view. 51, 52. *N. nudus*, new species. 51. Epigynum, ventral view. 52. Vulva, dorsal view.

hood (fig. 51). Spermathecal ducts long, curved, with anterior lobes (fig. 52). Leg spination: tibiae: III p0-0-1, v1p-1p-1p; IV p1-1-1; metatarsi: III p0-1-1; IV v1p-1p-2.

*Material Examined.* Only the holotype.

*Distribution.* Puerto Rico.

***Neozimiris levii*, new species**

Figures 49, 50

*Type.* Male holotype from dump at Piscadera Baai, Curaçao, Netherlands Antilles (December 20, 1962; H. W. Levi), deposited in MCZ.

*Etymology.* The specific name is a patronym in honor of the collector of the holotype.

*Diagnosis.* *Neozimiris levii* may be easily distinguished from the other known species in the genus by the basally originating embolus (fig. 49).

*Male.* Total length 1.91 mm. Carapace 0.82 mm. long, 0.71 mm. wide. Femur II 0.68 mm. long (holotype). Eye sizes and interdistances (mm.): AME 0.05, ALE 0.05, PME 0.06, PLE 0.06; AME-AME 0.04, AME-ALE 0.01, PME-PME 0.05, PME-PLE 0.01, ALE-PLE 0.01. MOQ length 0.20 mm., front width 0.14 mm., back

width 0.18 mm. Embolus extremely long, arising at base of tegulum (fig. 49). Retrolateral tibial apophysis expanded at base (fig. 50). Leg spination: femora: I, II, III d0-0-0; IV d0-1-0; tibiae: III p1-1-0, v0-2-1p; IV r0-0-1; metatarsus III v0-1p-1p.

*Female.* Unknown.

*Material Examined.* Only the holotype.

*Distribution.* Curaçao, Netherlands Antilles.

***Neozimiris pinta*, new species**

Figures 53, 54

*Type.* Female holotype from the south coast of Isla Pinta, Galapagos Islands (May 25, 1964; D. Q. Cavagnaro), deposited in CAS.

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

*Diagnosis.* Females of *Neozimiris pinta* may be recognized by the anteromedially coiled epigynal ducts (fig. 53).

*Male.* Unknown.

*Female.* Total length 3.35 mm. Carapace 1.19 mm. long, 0.94 mm. wide. Femur II 0.97 mm. long (holotype). Eye sizes and interdistances (mm.): AME 0.06, ALE 0.05, PME 0.08, PLE

0.06; AME-AME 0.06, AME-ALE 0.02, PME-PME 0.08, PME-PLE 0.01, ALE-PLE 0.01. MOQ length 0.27 mm., front width 0.18 mm., back width 0.24 mm. Epigynum with long, recurved posterior ducts (fig. 53). Spermathecal ducts enlarged anteriorly (fig. 54). Leg spination: femur II d1-1-0; tibiae: III p2-0-1, v1p-2-1p; IV p1-1-1, v2-2-2, r1-0-0; metatarsi: III p0-1-1; IV p1-1-1, v2-2-2.

*Material Examined.* Only the holotype.

*Distribution.* Isla Pinta, Galapagos Islands; the Institut Royal des Sciences Naturelles de Belgique has a juvenile specimen from Isla Santa Cruz, Galapagos Islands, that belongs to this or a closely related species.

***Neozimiris pinzon*, new species**

Figures 55, 56

*Type.* Female holotype from Isla Pinzón, Galapagos Islands (August 2, 1964; M. Castro), deposited in CAS.

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

*Diagnosis.* Females of *Neozimiris pinzon* may be recognized by their short, rounded median epigynal ducts (fig. 56).

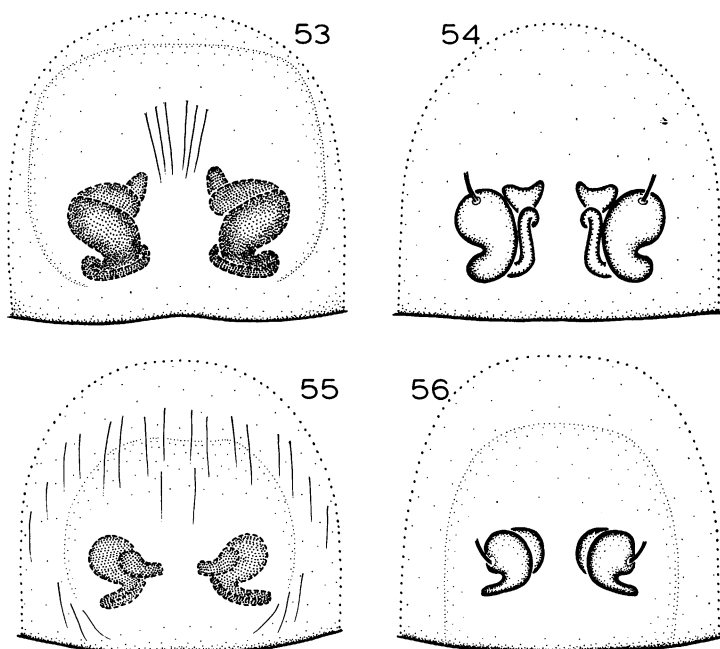
*Male.* Unknown.

*Female.* Total length 3.35 mm. Carapace 1.22 mm. long, 0.88 mm. wide. Femur II 0.83 mm. long (holotype). Eye sizes and interdistances (mm.): AME 0.05, ALE 0.05, PME 0.06, PLE 0.06; AME-AME 0.06, AME-ALE 0.01, PME-PME 0.09, PME-PLE 0.01, ALE-PLE 0.01. MOQ length 0.24 mm., front width 0.16 mm., back width 0.23 mm. Epigynum with medially narrowed anterior ducts (fig. 55). Spermathecae extremely short (fig. 56). Leg spination: tibiae: III p1-0-1, v0-2-1p; IV p2-1-1, v2-2-2; metatarsus IV p0-1-1, v0-2-2.

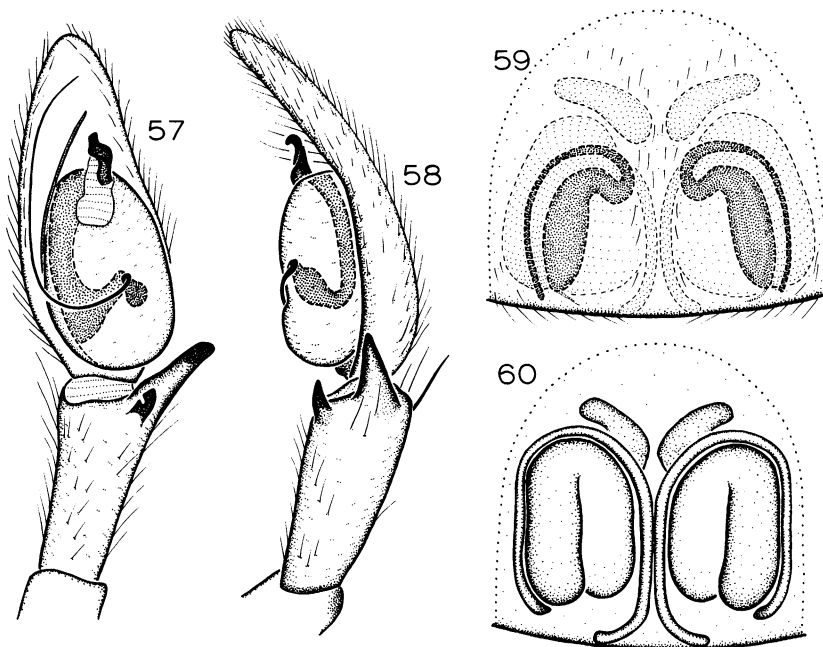
*Material Examined.* Only the holotype.

*Distribution.* Isla Pinzón, Galapagos Islands.

Note: This species is remarkable for the extreme length and thickness of the trichobothria on the tibiae, metatarsi, and tarsi; they are often as much as four times as long as the segment is wide, and give the legs a characteristic fringed appearance.



FIGS. 53-56. 53, 54. *Neozimiris pinta*, new species. 53. Epigynum, ventral view. 54. Vulva, dorsal view. 55, 56. *N. pinzon*, new species. 55. Epigynum, ventral view. 56. Vulva, dorsal view.

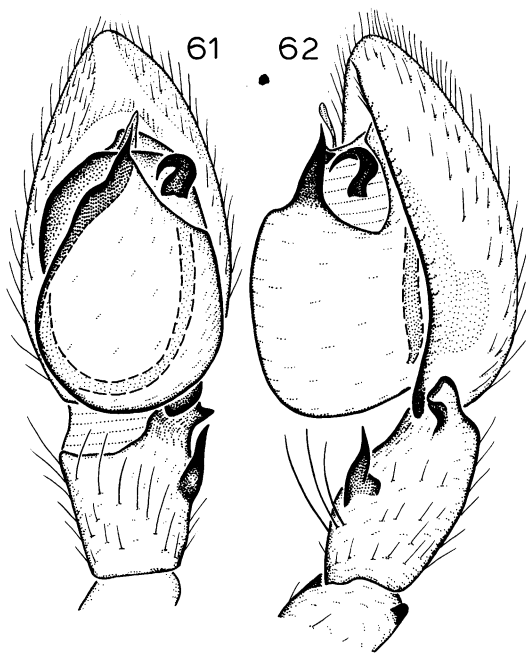


FIGS. 57-60. *Lygromma kochalkai*, new species. 57. Palp, ventral view. 58. Palp, retrolateral view. 59. Epigynum, ventral view. 60. Vulva, dorsal view.

#### SUPPLEMENT

After the manuscript of the present paper had been set in type, we received additional Berlese samples from the Costa Rican locality of *Lygromma dybasi* cited above; included was the first known male of the species. The specimen, described below, was obtained from a sample of concentrated floor litter taken from a moderate slope in a virgin forest by J. Wagner and J. Kethley on March 18, 1973, and is deposited in the Field Museum of Natural History. The male will key out to *Lygromma chamberlini* in the key given above, but may be easily distinguished by the larger tibial apophyses (figs. 61, 62).

*Male*. Total length 2.30 mm. Carapace 1.12 mm. long, 0.90 mm. wide. Femur II 0.79 mm. long. ALE separated by their diameter; PME separated by one and one-half times their diameter; AME absent. Embolus short, protruding distally; median apophysis wide; narrow translucent conductor present (fig. 61). Palpal tibia with long, narrow proximal and wide distal apophyses (fig. 62). Leg spination: femora: III d1-1-1, p0-0-0, r0-0-0; IV d1-1-0, p0-0-0, r0-0-0; tibiae:



FIGS. 61, 62. *Lygromma dybasi*, new species. 61. Palp, ventral view. 62. Palp, retrolateral view.

III vlp-1p-2, r1-0-0; IV r1-0-1; metatarsi: II v0-1p-0; III r0-0-0; IV v1p-1p-0, r0-1-0.

### LITERATURE CITED

- Banks, Nathan  
1898. Arachnida from Baja California and other parts of Mexico. Proc. California Acad. Sci., ser. 3, vol. 1, pp. 205-296, pls. 13-17.
- Berland, Lucien  
1913. Araignées. In Mission du Service géographique de l'Armée pour la Mesure d'un Arc de Méridien Équatorial en Amérique du Sud. Paris, vol. 10, pp. 79-119, figs. 1-120.
- Bonnet, Pierre  
1957. Bibliographia araneorum. Toulouse, vol. 2, pt. 3, pp. 1927-3026.  
1958. Bibliographia araneorum. Toulouse, vol. 2, pt. 4, pp. 3027-4230.
- Chamberlin, Ralph V.  
1924. The spider fauna of the shores and islands of the Gulf of California. Proc. California Acad. Sci., ser. 4, vol. 12, pp. 561-694, figs. 1-140.
- Chamberlin, Ralph V., and Wilton Ivie  
1935. Miscellaneous new American spiders. Bull. Univ. Utah, vol. 26, no. 4, pp. 1-79, figs. 1-142.
- Cooke, John A. L.  
1964. A revisionary study of some spiders of the rare family Prodidomidae. Proc. Zool. Soc. London, vol. 142, pp. 257-305, figs. 1-68.
- Cracraft, Joel  
1974. Phylogenetic models and classification. Syst. Zool., vol. 23, pp. 71-90, figs. 1-5.
- Dalmas, Raymond de  
1918. Synopsis des Araignées de la famille des Prodidomidae. Ann. Soc. Ent. France, vol. 87, pp. 289-340, figs. 1-34.
- Gertsch, Willis J.  
1941. Report on some arachnids from Barro Colorado Island, Canal Zone. Amer. Mus. Novitates, no. 1146, pp. 1-14, figs. 1-33.  
1973. A report on cave spiders from Mexico and Central America. Assoc. Mexican Cave Studies Bull., vol. 5, pp. 141-163, figs. 1-41.
- Lehtinen, Pekka T.  
1967. Classification of the cribellate spiders and some allied families. Ann. Zool. Fennici, vol. 4, pp. 199-468, figs. 1-524, tables 1-53.
- Petrunkévitch, Alexander  
1928. Systema araneorum. Trans. Connecticut Acad. Arts Sci., vol. 29, pp. 1-270.
- Platnick, Norman I.  
[In press.] Notes on the spider genus *Paratheuma* Bryant (Arachnida, Araneae). Jour. Arachnology
- Platnick, Norman I., and Mohammad U. Shadab  
1975. A revision of the spider genus *Gnaphosa* (Araneae, Gnaphosidae) in America. Bull. Amer. Mus. Nat. Hist., vol. 155, pp. 1-66, figs. 1-150, maps 1-15.  
1976a. A revision of the spider genera *Drassodes* and *Tivodrassus* (Araneae, Gnaphosidae) in North America. Amer. Mus. Novitates, no. 2593, pp. 1-29, figs. 1-80, maps 1-4.  
1976b. A revision of the spider genera *Rachodrassus*, *Sosticus*, and *Scopodes* (Araneae, Gnaphosidae) in North America. *Ibid.*, no. 2594, pp. 1-33, figs. 1-91, 1 table, maps 1-5.
- Reddell, James R.  
1965. A checklist of the cave fauna of Texas. I. Texas Jour. Sci., vol. 17, pp. 143-187.
- Roewer, Carl F.  
1954. Katalog der Araneae. Brussels, vol. 2, pt. 1, 923 pp.
- Roth, Vincent D., and Patrick R. Craig  
1970. Arachnida of the Galapagos Islands. In Mission zoologique belge aux îles Galapagos et en Ecuador (N. et J. Leleup, 1964-1965), vol. 2, pp. 107-124.
- Simon, Eugène  
1893a. Voyage de M. E. Simon au Venezuela (Décembre 1887-Avril 1888). 21<sup>e</sup> Mémoire (1). Arachnida. Ann. Soc. Ent. France, vol. 61, pp. 423-462, figs. 1-31.  
1893b. Histoire naturelle des Araignées. Paris, vol. 1, pt. 2, pp. 257-488, figs. 216-490.  
1903. Histoire naturelle des Araignées. Paris, vol. 2, pt. 4, pp. 669-1080, figs. 793-1117.









