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A Review of the Spider Genera *Anapisona* and *Pseudanapis* (Araneae, Anapidae)

NORMAN I. PLATNICK¹ AND MOHAMMAD U. SHADAB²

ABSTRACT

Anapisona is redefined to include those anapids with a single distal apophysis on the male palpal femur, a dorsally elongated male palpal tibia, and distal bristles on the cymbium; and *Pseudanapis* those with a coarsely punctate carapace and sternum, a pattern of two apophyses on the male palpal femur, one or two on the patella, and none on the tibia, and subequally long legs I and IV. Keys, diagnoses, and supplementary illustrations are provided for the 10 known species of *Anapisona*, found from southern Mexico and the Lesser Antilles south to Ecuador and Brazil, and the six known species of *Pseudanapis*, found in Indonesia, New Guinea, Melanesia, Hawaii, Middle and South America, and central Africa. The suggested synonymy of

Pseudanapis with *Chasmocephalon* is disclaimed, but of the 18 species previously assigned to *Pseudanapis* only *P. aloha* and *P. wilsoni* are congeneric with the type species, *P. paroculus* (the remainder being more closely related to *Chasmocephalon*); true *Pseudanapis* are newly recorded from America and Africa. Eight new species are described: *A. kethleyi* from Mexico and Costa Rica, *A. ashmolei* and *A. pecki* from Ecuador, *A. bordeaux* from the Virgin Islands, *A. aragua* from Venezuela and Colombia, *A. schuhi* from Brazil, *P. benoiti* from Zaire, and *P. domingo* from Ecuador. *Anapisona gertschi* Forster is transferred to *Pseudanapis* and newly recorded from Costa Rica and Panama.

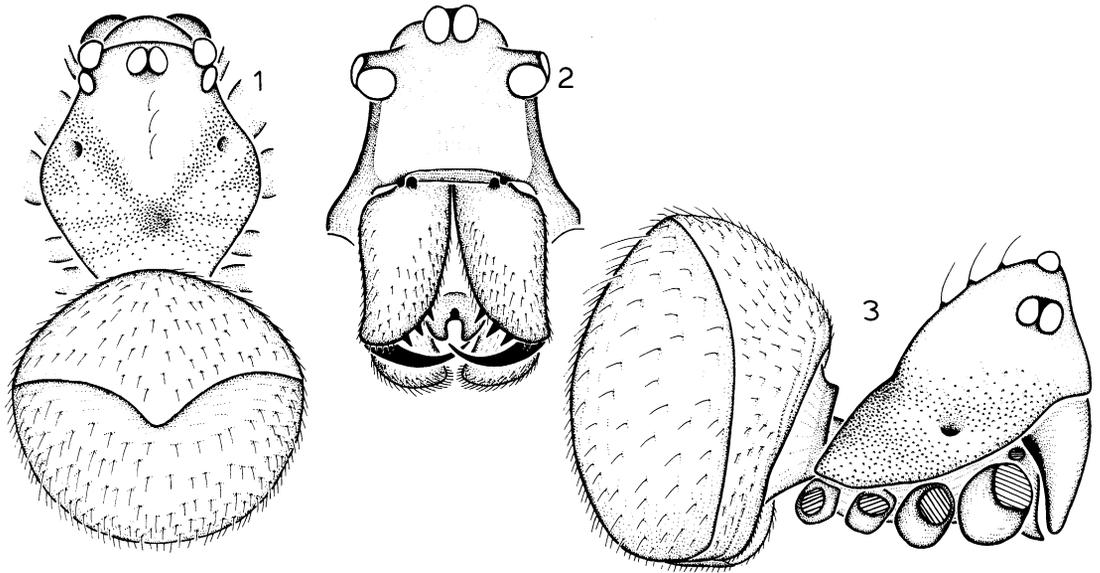
INTRODUCTION

This paper is the fourth in a series on the spiders placed in the family Symphytognathidae prior to its relimitation by Forster and Platnick (1977), and reviews the genera *Anapisona* Gertsch and *Pseudanapis* Simon. Most of the previously described species treated below have been well discussed and illustrated in the modern literature, so our major purposes here are to redefine the limits of these two genera, to describe several additional species, and to provide keys to all the known forms.

Anapisona was established by Gertsch (1941) for two species from Panama differing from *Anapis* in having a straight or slightly recurved (rather than strongly procurved) posterior eye row (figs. 1-3), and was intended by him to include also the Venezuelan specimens illustrated by Simon (1895, figs. 991, 992, 996, 997) as an undescribed species of *Anapis*. Simon (1897), who had subsequently found the Venezuelan species on St. Vincent as well, described it as *Anapis hamigera*. Forster (1958)

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FIGS. 1-3. *Anapisona simoni* Gertsch, male. 1. Dorsal view. 2. Anterior view. 3. Lateral view.

transferred *A. hamigera* to *Anapisona* and described two additional species, *Anapisona kartabo* from Guyana and *Anapisona gertschi* from Mexico.

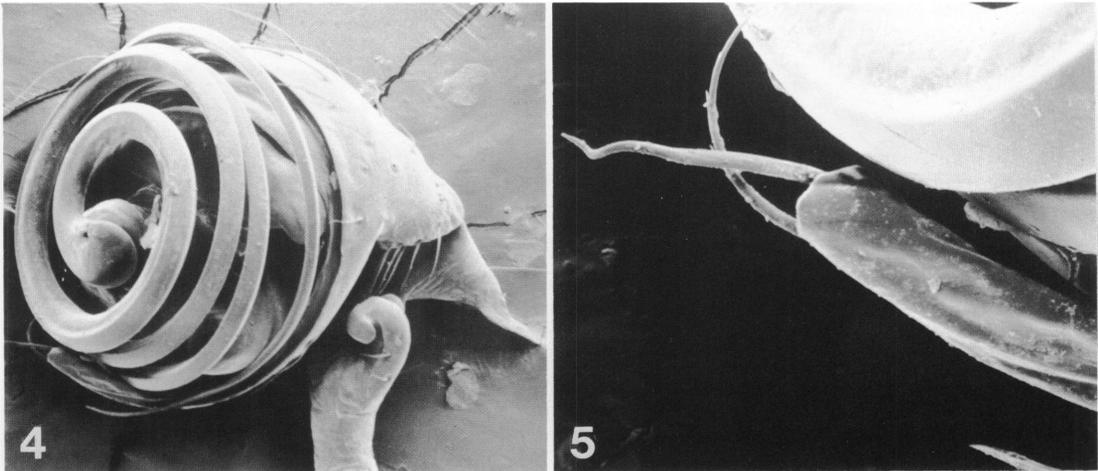
Our initial investigation of these species raised doubts about the monophyly of *Anapisona*, as *A. gertschi* seemed not to belong to the group. These doubts have been substantiated through study of the six additional species of *Anapisona* described below. Several characters unique to all these species except *A. gertschi* have been found: the presence of a dorsally elongated tibia on the male palp, stiff distal bristles on the cymbium, and a single recurved distal apophysis on the male palpal femur (figs. 20, 21). In addition, other characters discussed below ally *A. gertschi* with *Pseudanapis* rather than *Anapisona*.

Little is known about the biology of *Anapisona*; at least some species, such as *A. hamigera* and *A. simoni*, build orb webs resembling those of *Anapis* (fig. 12), but most specimens in collections have been taken in Berlese samples of wet forest litter or moss. One new species described below is known only from caves (at Los Tayos, Ecuador); as in most cave spiders, the legs, setae, and tarsal claws are elongated, but no reduction of the eyes has

occurred and the species is presumably not an obligate troglobite.

Anapisona seems to be most closely related to *Anapis*; both genera have unusual respiratory systems in that the cephalothorax is supplied with tracheae arising from the posterior spiracle. The tracheae of *Anapis* have been figured by Forster (1958, fig. 25, of *A. mexicana*; also 1959, fig. 157), and those of *Anapisona* by Fage (1937, fig. 1, of *A. hamigera*) and Forster (1958, fig. 24, of *A. simoni*; also 1958, fig. 26, and 1959, fig. 155, purportedly of "*Anapisona*" *gertschi* but actually based on a penultimate male belonging not to that species but probably to the sympatric *Anapisona kethleyi*). The two genera differ in that the posterior spiracle in *Anapis* is advanced anteriorly to about half the distance between the epigastric furrow and the spinnerets.

Relationships within the genus remain rather poorly resolved. One new species from Brazil differs from the others in retaining the anterior median eyes (a plesiomorphic condition), so one might suspect it to be the sister group of the remaining species. However, it seems likely that the anterior median eyes have been lost more than once within the genus, because the Brazilian species shares with all the others ex-



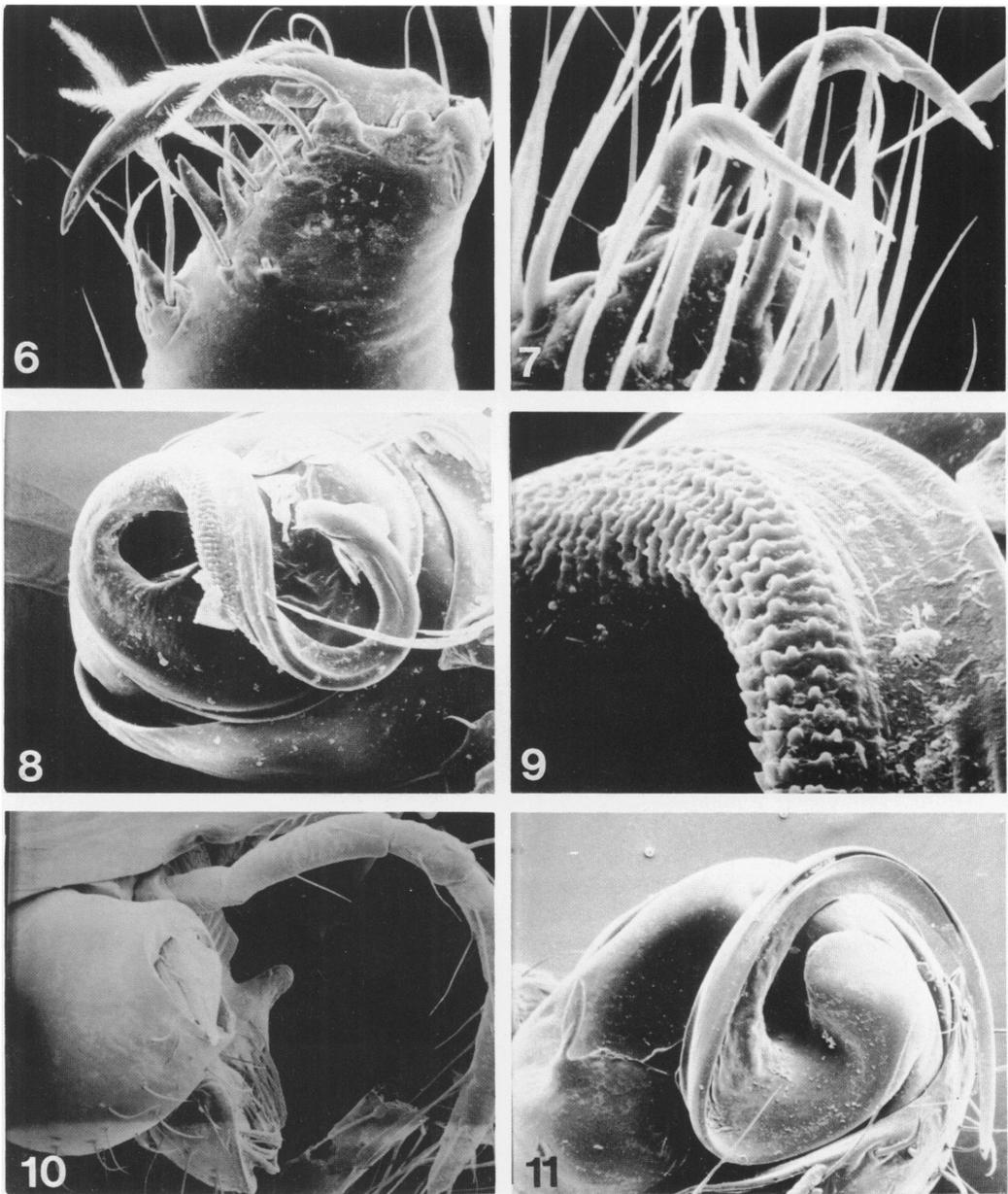
FIGS. 4, 5. *Anapisona kethleyi*, new species, male palp, scanning electron micrographs. 4. Retrolateral view, 240x. 5. Tip of cymbial extension, showing distal bristles, retrolateral view, 1100x.

cept *A. aragua* and *A. kartabo* the presence of paired cusps on the clypeus that interlock with similar paired cusps on the anterior proximal surface of the chelicerae (fig. 2), a presumably synapomorphic character. The eight species sharing this character fall clearly into two groups, although interrelationships of the species within each group remain obscure. *Anapisona simoni*, *A. kethleyi*, *A. furtiva*, *A. ashmolei*, and *A. pecki* form a group in which the cymbium has a long ventral extension (termed a paracymbium by Gertsch, 1941) that probably functions as a conductor (figs. 4, 5), the embolus is tightly curled in three or more coils (fig. 4; Gertsch, 1941, figs. 27, 28), and the spermathecae are advanced anteriorly (fig. 26), so much so that in the extreme case (*A. pecki*, fig. 34) they are situated above the pedicel, as in some Ochyroceratidae. The remaining three species (*A. hamigera*, *A. bordeaux*, and *A. schuhi*) are united by the presence of epigynal wings in the known females (figs. 36, 42) and an anteriorly invaginated dorsal scutum and basal retrolateral apophysis on the palpal tibia (figs. 21, 23) in the known males.

The distribution of *Anapisona* is summarized in figures 13 and 14; the limits of its range correspond closely to those of *Anapis* (Platnick and Shadab, 1978b, figs. 12, 13) and *Mysmenopsis* (Platnick and Shadab, 1978a, figs. 2,

3). Additional species may be expected to occur in the Greater Antilles and in southern Brazil. The species of *Anapisona* generally have larger ranges than do those of *Anapis* (most of which are known only from a single locality).

The genus *Pseudanapis* Simon (1905) was established for the Sumatran species *Anapis paroculus* Simon (1899), differing from all other spiders then known by lacking the pedipalp in females (although the coxae or endites remain, of course, and examination of a female from Java assigned to the species by Simon [1905] indicates that, as in *Micropholcomma* [Hickman, 1944, figs. 8, 19, 29], the palpal trochanter is also present). Since 1905, 17 additional species have been placed in the genus from Algeria and New Caledonia (Berland, 1924), Europe (Kratochvil, 1935; Caporiacco, 1949), New Zealand (Forster, 1951), Australia, New Guinea, and Hawaii (Forster, 1959), and central Africa (Forster, 1974). Many of these species are very similar to those of *Chasmocephalon* O. P.-Cambridge, and the differences between these two genera have remained obscure. Forster (1951) described several species in *Chasmocephalon* and later (1959) transferred them to *Pseudanapis*, saying only that they are "more correctly placed in *Pseudanapis*." Wunderlich (1976) has indicated that he "kann zwischen den Vertretern beider



FIGS. 6-11. Scanning electron micrographs. 6-9. *Anapisona aragua*, new species, male. 6. Chelicera, posterior view, 500x. 7. Tarsal claws, oblique lateral view, 2000x. 8. Palp, retrolateral view, 500x. 9. Embolus, retrolateral view, 2000x. 10, 11. *A. hamigera* (Simon), male. 10. Mouthparts, lateral view, showing anterior labral spur, 200x. 11. Palp, retrolateral view, 250x.

Gattungen auch nach den Genital-Organen keine signifikanten Unterschiede erkennen und ist der Ansicht, dass *Pseudanapis* (wahr-

scheinlich auch *Risdonius* Hickman 1939) synonym ist mit *Chasmocephalon*."

Examination of the male and female from

Java assigned by Simon (1905) to *P. paroculus* as well as the type specimen of *Chasmocephalon neglectum* O. P.-Cambridge has allowed us to contribute to the eventual solution of this problem. The two genera are not synonymous, but most of the species placed in *Pseudanapis* do not belong there. *Pseudanapis paroculus* differs from most anapids in having a coarsely punctate carapace, sternum, and ventral abdominal scutum (figs. 44-49), two apophyses on the male palpal femur but none on the tibia (fig. 50), and subequally long legs I and IV (rather than considerably longer first legs). Among the species currently assigned to *Pseudanapis*, only *P. aloha* Forster and *P. wilsoni* Forster share these characters, which are also found in "*Anapisona*" *gertschi* and in two new species described below. Hence,

Pseudanapis is delimited here to include only those six species.

The remaining 15 species previously assigned to *Pseudanapis* do seem to be most closely related to *Chasmocephalon*, but they are not formally transferred to that genus here because many of them have not been examined by us and because it seems likely that a complex of several genera may be involved. Undescribed species belonging to this complex occur in Chile, and the problem will be examined in subsequent papers. At least one character may prove to be synapomorphic for *Chasmocephalon*: the anterior tracheae open through spiracles situated on, rather than behind, the epigastric scutum (Fage, 1937, fig. 3; Hickman, 1944, figs. 6, 7, 32).

The almost pantropical distribution of

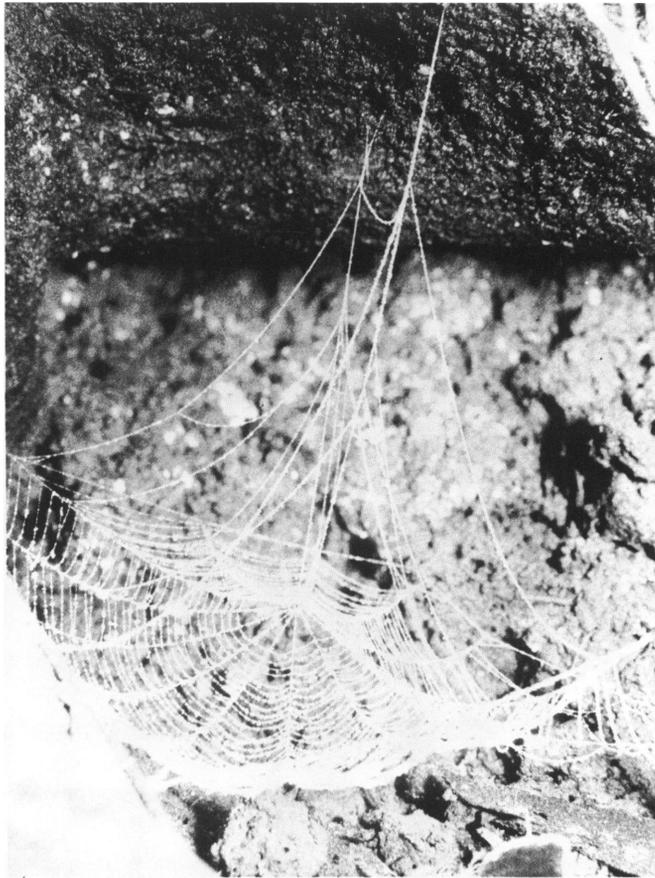


FIG. 12. Web of *Anapisona simoni* Gertsch in Panama. Photograph by W. G. Eberhard.



FIG. 13. Map of Middle America, showing known records of *Anapisona kethleyi* (closed circles), *A. simoni* (star), *A. furtiva* (open circle), and *A. bordeaux* (triangle).

Pseudanapis (fig. 15) makes it seem likely that many additional species remain to be discovered; relationships among the few known forms are difficult to assess because of their somatic uniformity and abundance of genitalic autapomorphies. The African species *P. benoitii* shares with *P. aloha* (known from Hawaii and Yap and thus probably widely distributed in the Pacific) the advancement of the second palpal femoral apophysis to the distal end of the femur and the prolongation of the first femoral apophysis into a long, sickle-shaped prong (fig.



FIG. 14. Map of South America, showing known records of *Anapisona hamigera* (closed circles), *A. aragua* (stars), *A. kariabo* (upright triangle), *A. pecki* (arrow), *A. ashmolei* (inverted triangle), and *A. schuhi* (open circle).

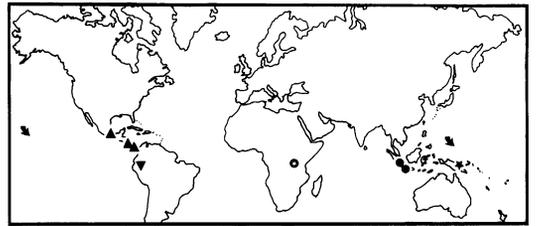


FIG. 15. Map showing known records of *Pseudanapis gertschi* (upright triangles), *P. domingo* (inverted triangle), *P. benoitii* (open circle), *P. paroculus* (closed circles), *P. wilsoni* (star), and *p. aloha* (arrows).

51; Forster, 1959, figs. 108, 109; Suman, 1967, fig. 6). The two American species, *P. gertschi* and *P. domingo*, are the only ones with a medially situated, long, narrow embolus (figs. 52, 53). In *P. paroculus* and *P. wilsoni* the segments beyond the trochanter have been lost from the female pedipalp.

We are deeply indebted to the following curators and collectors for lending material: Drs. N. P. Ashmole (NPA), J. A. Beatty (JAB), P. L. G. Benoit, Musée Royal de l'Afrique Central (MRAC), H. S. Dybas and J. B. Kethley, Field Museum of Natural History (FMNH), W. J. Gertsch, American Museum of Natural History (AMNH), M. Hubert, Muséum National d'Histoire Naturelle (MNHN), J. A. Kochalka (JAK), H. W. Levi, Museum of Comparative Zoology, Harvard University (MCZ), W. A. Shear (WAS), and F. R. Wanless, British Museum (Natural History), BMNH. Mr. Robert J. Koestler provided assistance with the scanning electron microscope.

All measurements presented below are in millimeters.

ANAPISONA GERTSCH

Anapisona Gertsch, 1941, p. 4 (type species by original designation *Anapisona simoni* Gertsch).

DIAGNOSIS: Specimens of *Anapisona* can be distinguished from other anapids by the single recurved distal apophysis on the male palpal femur (fig. 20), the dorsally elongated male palpal tibia (fig. 21), the presence of one or more stiff distal bristles on the cymbium (fig. 23), and posterior tracheae supplying the

cephalothorax from a spiracle immediately in front of the spinnerets (Forster, 1958, figs. 24, 26).

DESCRIPTION: See Gertsch (1941) and Forster (1958). Illustrations are presented here of the habitus (figs. 1-3), chelicerae (fig. 6), tarsal claws (fig. 7), and anterior labral spur (fig. 10).

SPECIES: Gertsch (1941) has supplied a detailed description of *A. simoni* which can be supplemented as follows: soft portions of abdomen with few sclerotizations; from above, posterior eye row slightly recurved; chelicerae with a retromarginal tooth and anterior knobs (fig. 2); femur I with ventral setae arising from tubercles; posterior spiracle precedes six spinnerets with tiny colulus. Only differences from *A. simoni* are noted in the descriptions below.

KEY TO SPECIES OF *ANAPISONA*

1. Males2
Females9
2. Embolus with three or more coils, cymbium with a long ventral extension (figs. 4, 5; Gertsch, 1941, figs. 27, 28)3
Embolus with fewer than three coils; cymbium without a long ventral extension6
3. Embolus with four coils (fig. 4; Gertsch, 1941, fig. 27); cymbial extension with two bristles at tip (figs. 16, 17)4
Embolus with three coils (Gertsch, 1941, fig. 28); cymbial extension with one or three bristles at tip (figs. 18, 19)5
4. Bristles on cymbial extension subterminal (fig. 16); Panama*simoni*
Bristles on cymbial extension terminal (fig. 17); Mexico south to Costa Rica*kethleyi*
5. Cymbial extension with one bristle (fig. 18); Panama*furtiva*
Cymbial extension with three bristles (fig. 19); Ecuador*ashmolei*
6. Palpal patella with a dorsal apophysis (figs. 20, 22, 24)7
Palpal patella without a dorsal apophysis (fig. 38); Guyana*kartabo*
7. Embolus relatively wide (figs. 8, 9, 25); Colombia and Venezuela*aragua*
Embolus relatively narrow (figs. 21, 23).....8
8. Tegulum with an apophysis (figs. 11, 20, 21); Panama east to St. Vincent*hamigera*
Tegulum without an apophysis (figs. 22, 23); Virgin Islands*bordeaux*
9. Epigynal ducts with two or more coils (figs.

- 26-35)10
Epigynal ducts with at most one coil14
10. Spermathecae situated above pedicel (figs. 34, 35); Ecuador*pecki*
Spermathecae situated at or below pedicel ..11
11. Spermathecae situated at pedicel (figs. 26-29) .
.....12
Spermathecae situated below pedicel (figs. 30-33)13
12. Epigynal openings relatively narrow (fig. 26); Panama.....*simoni*
Epigynal openings relatively wide (fig. 28); Mexico south to Costa Rica*kethleyi*
13. Epigynal openings relatively short (fig. 30); Panama.....*furtiva*
Epigynal openings relatively long (fig. 32); Ecuador*ashmolei*
14. Epigynum with wings (figs. 36, 42)15
Epigynum without wings (fig. 40); Colombia and Venezuela*aragua*
15. Six eyes; Panama east to St. Vincent
.....*hamigera*
Eight eyes; Brazil*schuhi*

Anapisona simoni Gertsch
Figures 1-3, 16, 26, 27

Anapisona simoni Gertsch, 1941, p. 6, figs. 1-4, 27 (male holotype from Barro Colorado Island, Canal Zone, Panama, in AMNH, examined). Forster, 1958, fig. 24.

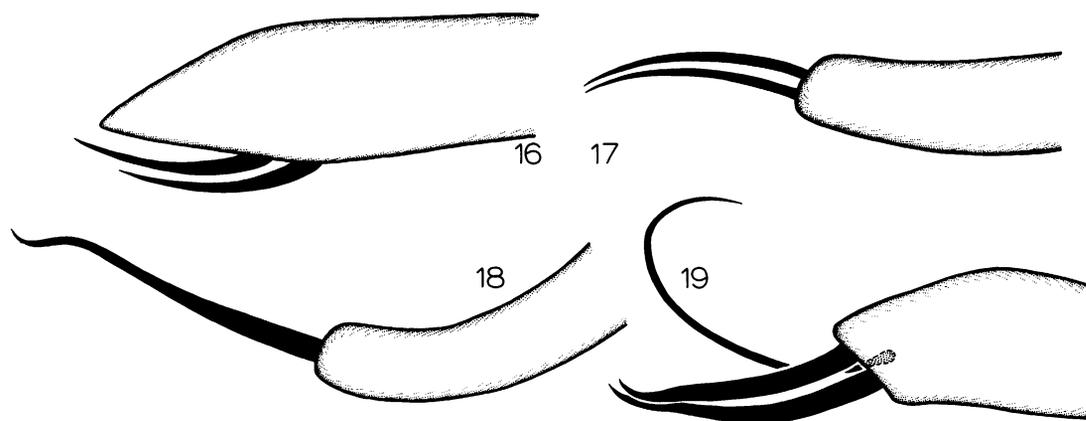
DIAGNOSIS: Males of *A. simoni* may be recognized by the subterminal bristles on the cymbial extension (fig. 16), females by the narrow, triangular epigynal openings and highly coiled ducts (figs. 26, 27).

MALE: Described by Gertsch (1941).

FEMALE: Described by Gertsch (1941).

VARIATION: Because this is the only species of *Anapisona* for which an adequate sample from one locality is known, variability in the cusps on leg I was studied. In males, the first tibia usually bears a single cusp at about half its length, but it may be lacking on the right or left leg and is occasionally doubled; the first metatarsus usually has one median and two distal cusps but the median and one of the distal cusps may be lacking. In females, only a few specimens have a tibial cusp, and most have one median and one distal metatarsal cusp (although the median cusp may be missing and the distal cusp is rarely doubled).

MATERIAL EXAMINED: **Panama:** *Canal*



FIGS. 16-19. Tip of cymbial extension, showing distal bristles. 16. *Anapisona simoni* Gertsch. 17. *A. kethleyi*, new species. 18. *A. furtiva* Gertsch. 19. *A. ashmolei*, new species.

Zone: Barro Colorado Island, no date (J. Zetek, AMNH), 1♂, 2♀; Feb. 12, 1936 (W. J. Gertsch, AMNH), 1♀; Mar. 10, 1936 (W. J. Gertsch, AMNH), 1♂, 1♀ (holotype, allotype); Berlese sample, July, 1943-Mar., 1944 (J. Zetek, MCZ), 1♂; Berlese sample, June-Nov., 1946 (J. Zetek, MCZ), 3♂, 5♀; Berlese sample, Nov., 1952-Mar., 1953 (J. Zetek, AMNH), 1♂; Feb. 7, 1958 (A. M. Chickering, MCZ), 3♂; May, 1964 (A. M. Chickering, MCZ), 1♀; elevation 50 m., Sept., 1975 (W. G. Eberhard, MCZ), 2♂, 3♀.
Panamá: Chilibrillo Cave, Buenos Aires, Apr. 3, 1945 (H. Trapido, AMNH), 1♀.

***Anapisona kethleyi*, new species**

Figures 4, 5, 17, 28, 29

Anapisona gertschi (misidentification): Forster, 1958, p. 9 (in part; fig. 26 only); 1959, p. 326 (fig. 155).

TYPES: Male holotype and female paratype taken in a Berlese sample of leaf litter in a stream bed at an elevation of 4000 feet at the Organization for Tropical Studies station at Finca Las Cruces, Puntarenas, Costa Rica (March 18, 1973; J. Wagner and J. Kethley), deposited in FMNH.

ETYMOLOGY: Named for one of the collectors of the type specimens.

DIAGNOSIS: Males of *A. kethleyi* may be recognized by the two terminal bristles on the

cymbial extension (fig. 17), females by the wide epigynal openings and highly coiled ducts (figs. 28, 29).

MALE: Total length 0.94. Carapace 0.54 long, 0.46 wide, 0.42 high. Abdomen 0.47 long, 0.50 wide. Sternum with central dark patch, borders lighter. Leg cusps as in *A. simoni* or lacking.

	I	II	III	IV
Femur	0.54	0.40	0.27	0.33
Patella	0.22	0.18	0.11	0.12
Tibia	0.47	0.29	0.20	0.23
Metatarsus	0.25	0.22	0.14	0.16
Tarsus	0.32	0.29	0.25	0.25
Total	1.80	1.38	0.97	1.09

Embolus with four coils; cymbium with two terminal bristles (fig. 17).

FEMALE: Total length 1.19. Carapace 0.61 long, 0.48 wide, 0.40 high. Abdomen 0.65 long, 0.81 wide. Sternum as in male. Metatarsus I with median and distal prolateroventral cusp, or without median cusp, or without cusps.

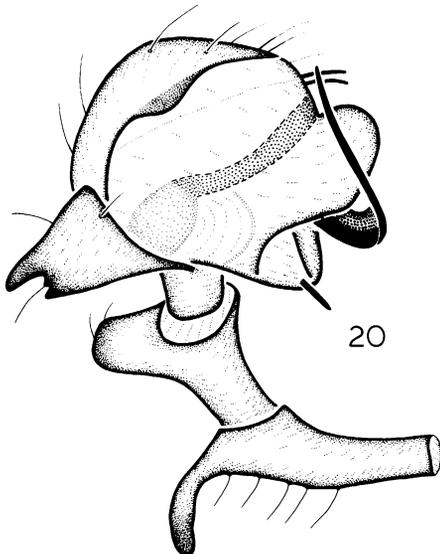
	I	II	III	IV
Femur	0.52	0.43	0.29	0.43
Patella	0.18	0.16	0.14	0.14
Tibia	0.43	0.29	0.22	0.27
Metatarsus	0.22	0.22	0.18	0.18
Tarsus	0.33	0.29	0.24	0.27
Total	1.68	1.39	1.07	1.29

Epigynal openings wide (fig. 28); spermathecal ducts narrow, highly coiled (fig. 29).

MATERIAL EXAMINED: **Costa Rica:** *Cartago*: 10 km. S Tapanti, Río Grande de Orosi, elevation 1500 m., Berlese of mixed forest floor litter, Apr. 14, 1973 (J. Wagner, J. Kethley, FMNH), 1♂. *Heredia*: Río Toro Amarillo, near Guápiles, rain forest litter, Mar., 1966 (W. L. Brown, MCZ), 1♀. *Puntarenas*: La Fila, 5 km. SW Finca Las Cruces, elevation 4700 feet, Berlese of leaf litter from forest slope, Mar. 15, 1973 (J. Wagner, J. Kethley, FMNH), 1♀; San Vito, elevation 4000 feet, Berlese of floor litter from slope above stream, Mar. 15, 1973 (J. Wagner, J. Kethley, FMNH), 2♀. **Mexico:** *Chiapas*: Ruinas de Palenque, Berlese of stump litter, Apr. 6, 1974 (C. Alteri, AMNH), 1♀; Mar. 2-24, 1975 (C. Alteri, AMNH), 2♀. *Oaxaca*: 6 mi. S Valle Nacional, elevation 2000 feet, Berlese of leaf litter, May 19, 1971 (S. B. Peck, MCZ, FMNH, WAS), 6♂, 2♀. *Tabasco*: Pico de Oro, Aug. 12, 1966 (J. and W. Ivie, AMNH), 1♀.

Anapisona furtiva Gertsch
Figures 18, 30, 31

Anapisona furtiva Gertsch, 1941, p. 8, fig. 28 (male holotype from Barro Colorado Island, Canal Zone, Panama, in AMNH, examined).



DIAGNOSIS: Males of *A. furtiva* may be recognized by the single bristle on the cymbial extension (fig. 18), females by the short epigynal openings and moderately coiled ducts (figs. 30, 31).

MALE: Described by Gertsch (1941).

FEMALE: Described by Gertsch (1941).

MATERIAL EXAMINED: **Panama:** *Canal Zone*: Barro Colorado Island, July 21, 1938 (E. G. Williams, Jr., AMNH), 2♀ (including allotype); Aug. 4, 1938 (E. G. Williams, Jr., AMNH), 1♂ (holotype).

Anapisona ashmolei, new species

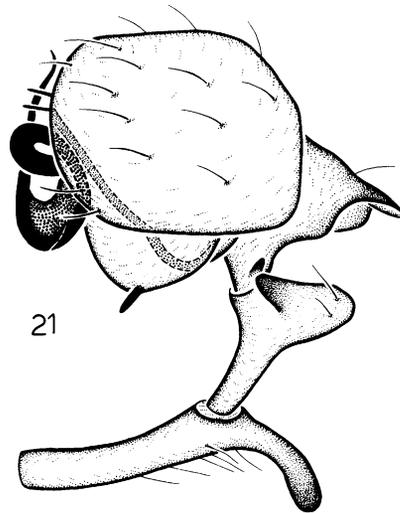
Figures 19, 32, 33

TYPES: Male holotype and female paratype taken on a rock in the terminal sump of the main cave at Los Tayos, latitude 3° 10' S, longitude 78° 12' W, Morona-Santiago, Ecuador (July 12, 1976; N. P. Ashmole), deposited in AMNH courtesy of Dr. Ashmole.

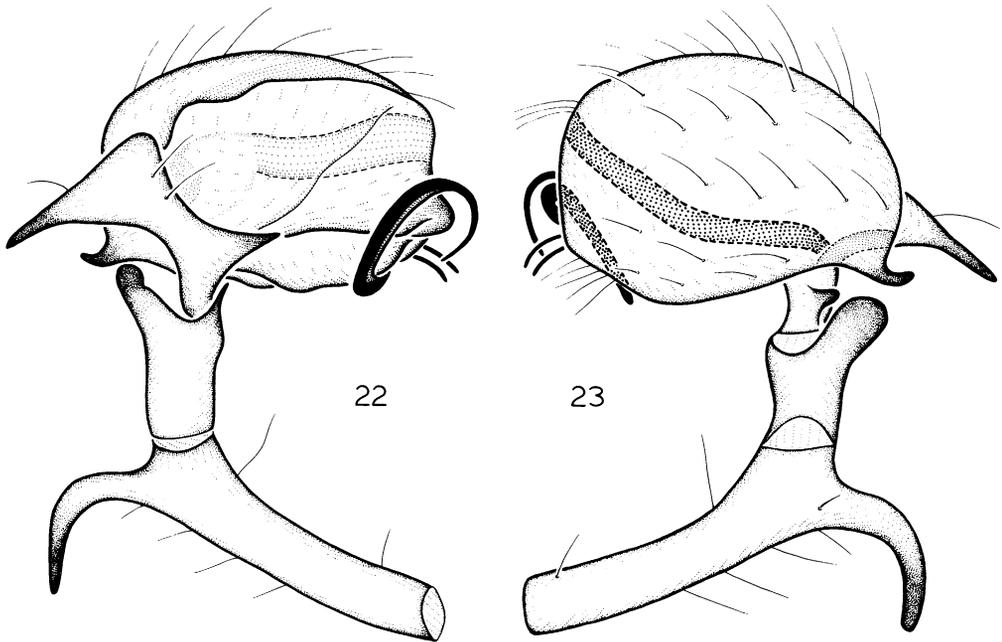
ETYMOLOGY: Named for the collector of the type specimens.

DIAGNOSIS: Males of *A. ashmolei* may be recognized by the three bristles on the cymbial extension (fig. 19), females by the long epigynal openings and moderately coiled ducts (figs. 32, 33).

MALE: Total length 1.98. Carapace 0.90



FIGS. 20, 21. *Anapisona hamigera* (Simon), male palp. 20. Prolateral view. 21. Retrolateral view.



FIGS. 22, 23. *Anapisona bordeaux*, new species, male palp. 22. Proterolateral view. 23. Retrolateral view.

long, 0.79 wide, 0.43 high. Abdomen 1.15 long, 1.12 wide. Pars cephalica and margins of pars thoracica brownish orange, remainder of pars thoracica dark brown. Sternum uniformly orange. Clypeal height more than three times the anterior lateral eye diameter. Posterior median eyes separated by twice their diameter from posterior laterals. Legs, setae, and tarsal claws elongated. Tibia I with one or two proterolateral cusp at middle.

	I	II	III	IV
Femur	1.30	1.15	0.65	0.83
Patella	0.45	0.43	0.22	0.22
Tibia	1.15	0.94	0.58	0.65
Metatarsus	0.58	0.54	0.36	0.43
Tarsus	0.65	0.61	0.47	0.47
Total	4.13	3.67	2.28	2.60

Embolus with three coils; cymbial extension with one thin subterminal and two thick terminal bristles (fig. 19).

FEMALE: Total Length 1.94. Carapace 0.86 long, 0.61 wide, 0.46 high. Abdomen 1.22 long, 1.26 wide. Sternum with pale margins.

Clypeal height more than twice the anterior lateral eye diameter. Posterior median eyes separated by 1.5 times their diameter from posterior laterals. Tibia I with or without proterolateral cusp at middle; metatarsus I with median and two distal, median and one distal, or only distal cusps.

	I	II	III	IV
Femur	1.19	0.97	0.58	0.76
Patella	0.36	0.32	0.22	0.22
Tibia	1.01	0.79	0.50	0.61
Metatarsus	0.54	0.47	0.29	0.34
Tarsus	0.61	0.57	0.47	0.47
Total	3.71	3.12	2.06	2.40

Epigynal openings long (fig. 32); posterior portion of ducts transverse (fig. 33).

MATERIAL EXAMINED: **Ecuador:** *Morona-Santiago*: Los Tayos, on wet wall of main cave, July 12, 1976 (N. P. Ashmole, NPA), 1♂; bottom of second (80') pitch of Commando Cave, July 10, 1976 (N. P. Ashmole, NPA), 1♂, 1♀; 200 feet deep in Commando Cave,

July 23, 1976 (N. P. Ashmole, NPA), 1♀; July 10, 1976 (G. T. Jefferson, NPA), 2♀.

***Anapisona pecki*, new species**

Figures 34, 35

TYPE: Female holotype from Berlese sample of moss and wet forest litter taken at an elevation of 4600 feet 20-30 km. east-northeast of Alluriquín on the Chiriboga road, Pichincha, Ecuador (June 19, 1975; S. Peck), deposited in FMNH.

ETYMOLOGY: Named for the collector of the holotype.

DIAGNOSIS: Females of *A. pecki* may be recognized by the spermathecae being situated above the pedicel (figs. 34, 35).

MALE: Unknown.

FEMALE: Total length 1.30. Carapace 0.54 long, 0.45 wide, 0.34 high. Abdomen 0.79 long, 0.76 wide. Carapace orange. Posterior median eyes separated by 1.5 times their diameter from posterior laterals. Metatarsus I with a

distal prolateroventral cusp. Femur I without ventral tubercles.

	I	II	III	IV
Femur	0.54	0.47	0.29	0.40
Patella	0.22	0.18	0.14	0.14
Tibia	0.43	0.33	0.18	0.25
Metatarsus	0.25	0.22	0.18	0.18
Tarsus	0.29	0.27	0.21	0.25
Total	1.73	1.47	1.00	1.22

Spermathecae advanced dorsally beyond tip of sclerotic ring (figs. 34, 35).

MATERIAL EXAMINED: Only the holotype.

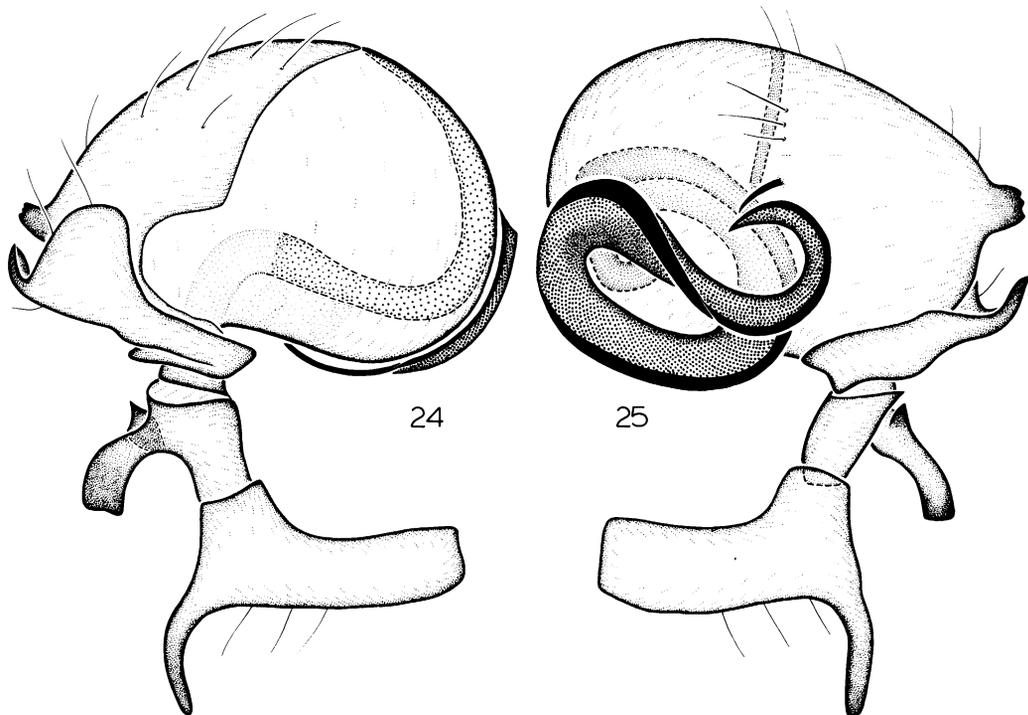
***Anapisona hamigera* (Simon)**

Figures 10, 11, 20, 21, 36, 37

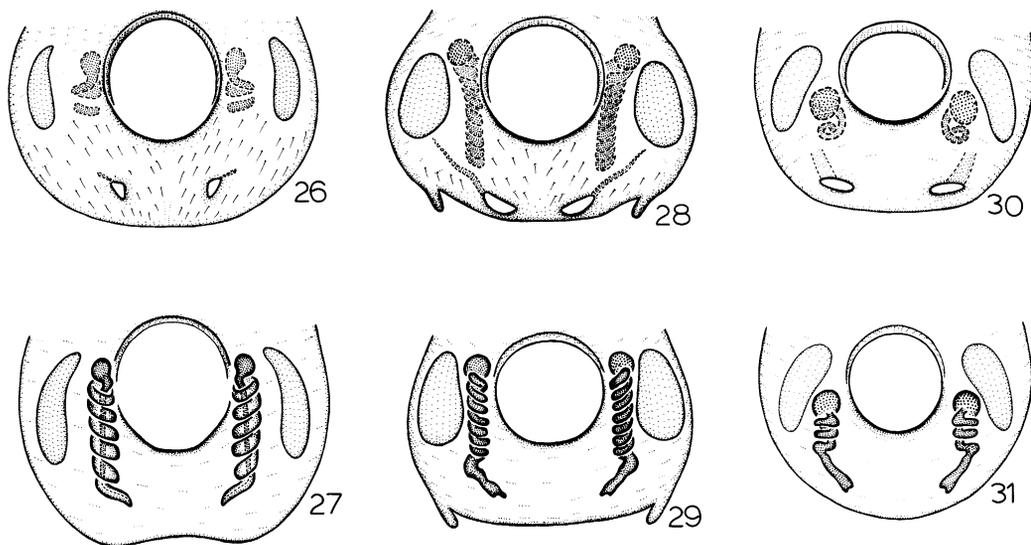
Anapis sp.: Simon, 1895, p. 927, figs. 991, 992, 996, 997.

Anapis hamigera Simon, 1897, p. 875 (one male and seven female syntypes from St. Vincent, British West Indies, in BMNH, examined). Fage, 1937, fig. 1.

Anapisona hamigera: Forster, 1958, p. 1.



Figs. 24, 25. *Anapisona aragua*, new species, male palp. 24. Prolateral view. 25. Retrolateral view.



FIGS. 26-31. Epigyna, ventral views (top) and dorsal views (bottom). 26, 27. *Anapisona simoni* Gertsch. 28, 29. *A. kethleyi*, new species. 30, 31. *A. furtiva* Gertsch.

DIAGNOSIS: Males of *A. hamigera* may be recognized by the tegular apophysis (figs. 11, 20, 21), females by the large spermathecae (fig. 37).

MALE: Total length 1.22. Carapace 0.64 long, 0.48 wide, 0.52 high. Abdomen 0.65 long, 0.63 wide. Sternum darkest medially. Dorsal abdominal scutum invaginated at top. Posterior median eyes separated by 1.5 times their diameter from posterior laterals.

	I	II	III	IV
Femur	0.72	0.48	0.40	0.47
Patella	0.22	0.15	0.14	0.14
Tibia	0.60	0.42	0.27	0.40
Metatarsus	0.27	0.22	0.13	0.16
Tarsus	0.45	0.39	0.28	0.32
Total	2.26	1.66	1.22	1.49

Embolus recurved, with expanded translucent rim; tegulum with stiff ventral apophysis (figs. 11, 20, 21).

FEMALE: Total length 1.58. Carapace 0.75 long, 0.50 wide, 0.54 high. Abdomen 0.79 long, 0.81 wide. Sternum as in male. Posterior metatarsi darkened distally. Clypeal height twice the anterior lateral eye diameter. Metatar-

sus I with one or two median and one or two distal cusps.

	I	II	III	IV
Femur	0.83	0.61	0.45	0.61
Patella	0.25	0.22	0.18	0.14
Tibia	0.70	0.47	0.32	0.47
Metatarsus	0.34	0.24	0.22	0.23
Tarsus	0.49	0.40	0.36	0.34
Total	2.61	1.94	1.53	1.79

Epigynum with triangular wings (fig. 36); spermathecae large (fig. 37).

MATERIAL EXAMINED: **British West Indies:** *Grenada*: Chantilly, under decaying weeds on damp rock in second growth forest near stream, Mar. 14 (no collector, BMNH), 1♂, 1♀. *St. Vincent* (no collector, BMNH), 1♂, 7♀ (syntypes). **Colombia:** *César*: Socorpa Mission, Sierra de Perijá, elevation 1300-1400 m., beaten from dry vegetation, Aug. 1-22, 1968 (B. Malkin, AMNH), 1♀. *Magdalena*: San Pedro, Sierra Nevada de Santa Marta, elevation 960 m., low-medium height miscellaneous vegetation, May 19, 1975 (J. A. Kochalka, JAK), 2♀. *Valle del Cauca*: Anchicayá, elevation 400 m., Oct. 26, 1969 (W.G. Eberhard, MCZ), 1♂,

3 ♀; 28 km. E Buenaventura, elevation 50 m., second growth forest, Jan. 20, 1970 (W. G. Eberhard, MCZ), 1 ♂; Cisneros, Río Quebrada Descansion, Sept. 15, 1969 (W. G. Eberhard, MCZ), 1 ♂. **Panama:** Canal Zone: Barro Colorado Island, July, 1934 (A. M. Chickering, MCZ), 1 ♀. **Venezuela:** no specific locality (no collector, MNHN), 1 ♂, 7 ♀.

Anapisona bordeaux, new species

Figures 22, 23

TYPE: Male holotype from Bordeaux Mountain, St. John, United States Virgin Islands (December 17, 1965), deposited in AMNH.

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

DIAGNOSIS: Males of *A. bordeaux* may be recognized by the narrow, terminal embolus (fig. 22).

MALE: Total length 2.27. Carapace 1.10 long, 0.81 wide, 0.68 high. Abdomen 1.09 long, 1.18 wide. Dorsal abdominal scutum invaginated at top. Clypeal height almost three times the anterior lateral eye diameter. Posterior median eyes separated by almost twice their diameter from posterior laterals. Tibia I

with one prolateral and one retrolateral cusp at middle.

	I	II	III	IV
Femur	1.37	0.95	0.60	0.72
Patella	0.49	0.36	0.25	0.24
Tibia	1.15	0.72	0.50	0.58
Metatarsus	0.50	0.41	0.29	0.33
Tarsus	0.59	0.58	0.45	0.47
Total	4.10	3.02	2.09	2.34

Cymbium with dorsal projection at base and two strong bristles at apex (figs. 22, 23).

FEMALE: Unknown.

MATERIAL EXAMINED: Only the holotype.

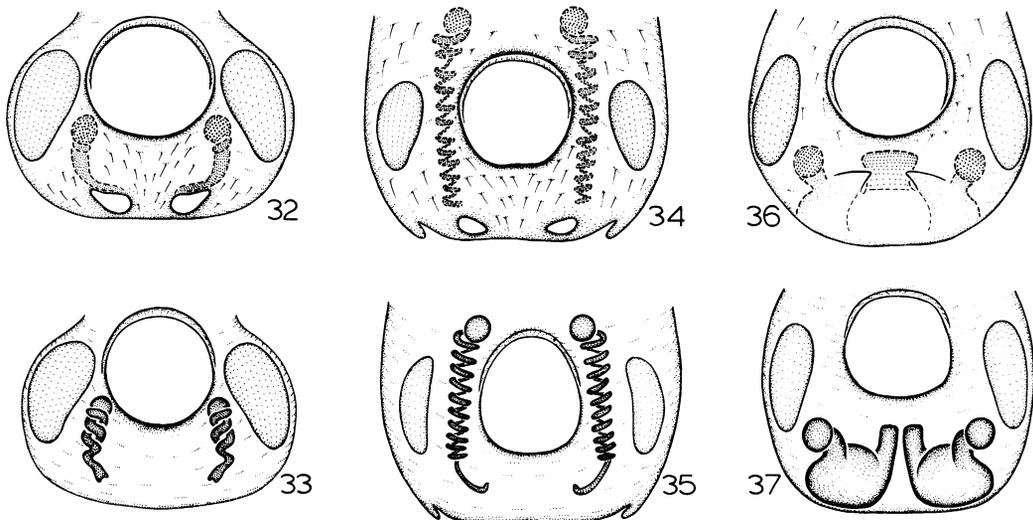
Anapisona schuhi, new species

Figures 42, 43

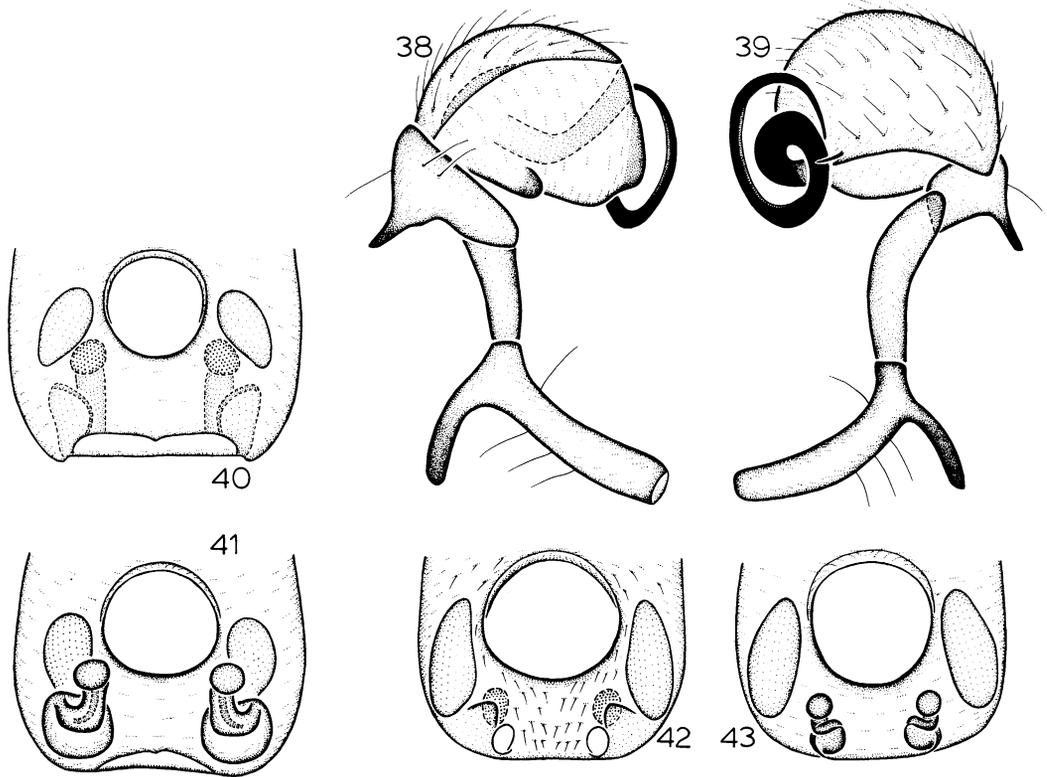
TYPE: Female holotype from an elevation of 120 m. at the Reserva Ducke, 25 km. north-northeast of Manaus, Amazonas, Brazil (July 21, 1973; R. T. Schuh), deposited in the Museu de Zoologia, Universidade de São Paulo.

ETYMOLOGY: Named with great pleasure for my good friend and colleague, Dr. R. T. Schuh, collector of the holotype.

DIAGNOSIS: Females of *A. schuhi* may be



FIGS. 32-37. Epigyna, ventral views (top) and dorsal views (bottom). 32, 33. *Anapisona ashmolei*, new species. 34, 35. *A. pecki*, new species. 36, 37. *A. hamigera* (Simon).



FIGS. 38-43. 38, 39. *Anapisona kartabo* Forster, male palp. 38. Prolateral view. 39. Retrolateral view. 40, 41. *A. aragua*, new species, epigynum. 40. Ventral view. 41. Dorsal view. 42, 43. *A. schuhi*, new species, epigynum. 42. Ventral view. 43. Dorsal view.

recognized by the presence of anterior median eyes.

MALE: Unknown.

FEMALE: Total length 1.48. Carapace 0.79 long, 0.58 wide, 0.47 high. Abdomen 0.76 long, 0.68 wide. Carapace and sternum orange, legs yellow. Anterior median eyes present, contiguous, about one-fourth the diameter of other eyes; from above, both eye rows slightly procurved. Metatarsus I with or without median cusp, with distal prolateroventral cusp.

	I	II	III	IV
Femur	1.04	0.79	0.45	0.72
Patella	0.29	0.22	0.18	0.18
Tibia	0.83	0.58	0.36	0.47
Metatarsus	0.36	0.29	0.22	0.29
Tarsus	0.50	0.47	0.32	0.36
Total	3.02	2.35	1.53	2.02

Epigynum with triangular wings (fig. 42); ducts basally expanded (fig. 43).

MATERIAL EXAMINED: Only the holotype.

Anapisona aragua, new species

Figures 6-9, 24, 25, 40, 41

TYPES: Male holotype and female paratype from Berlese sample of litter taken in a wet montane forest at an elevation of 1000-1400 m. at Rancho Grande, 15 km. north of Maracay, Aragua, Venezuela (February 9-27, 1971; S. B. Peck), deposited in MCZ.

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

DIAGNOSIS: Males of *A. aragua* may be recognized by the broad embolus (figs. 8, 9, 25), females by the basal epigynal ridge (figs. 40, 41).

MALE: Total length 0.72. Carapace 0.36 long, 0.36 wide, 0.37 high. Abdomen 0.47 long, 0.42 wide. Sternum with median dark patch. Chelicerae and clypeus without knobs. Tibia I without cusps. Metatarsus I with pair of distal cusps.

	I	II	III	IV
Femur	0.40	0.28	0.22	0.27
Patella	0.14	0.13	0.09	0.11
Tibia	0.27	0.24	0.13	0.22
Metatarsus	0.14	0.13	0.12	0.12
Tarsus	0.25	0.22	0.20	0.22
Total	1.20	1.00	0.76	0.94

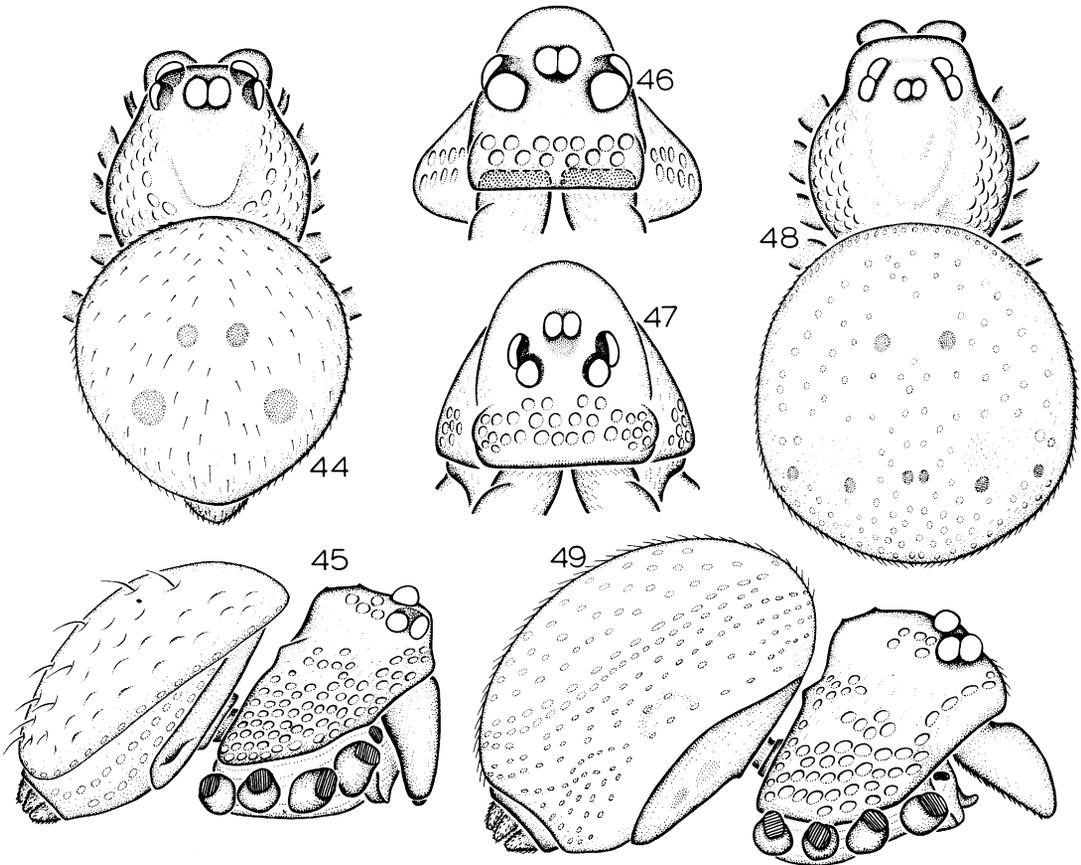
Embolus forming a figure-8, greatly expanded, with translucent rim (figs. 8, 9, 40, 41).

FEMALE: Total length 1.00. Carapace 0.40 long, 0.40 wide, 0.28 high. Abdomen 0.79 long, 0.65 wide. Sternum and chelicerae as in male. Legs without cusps.

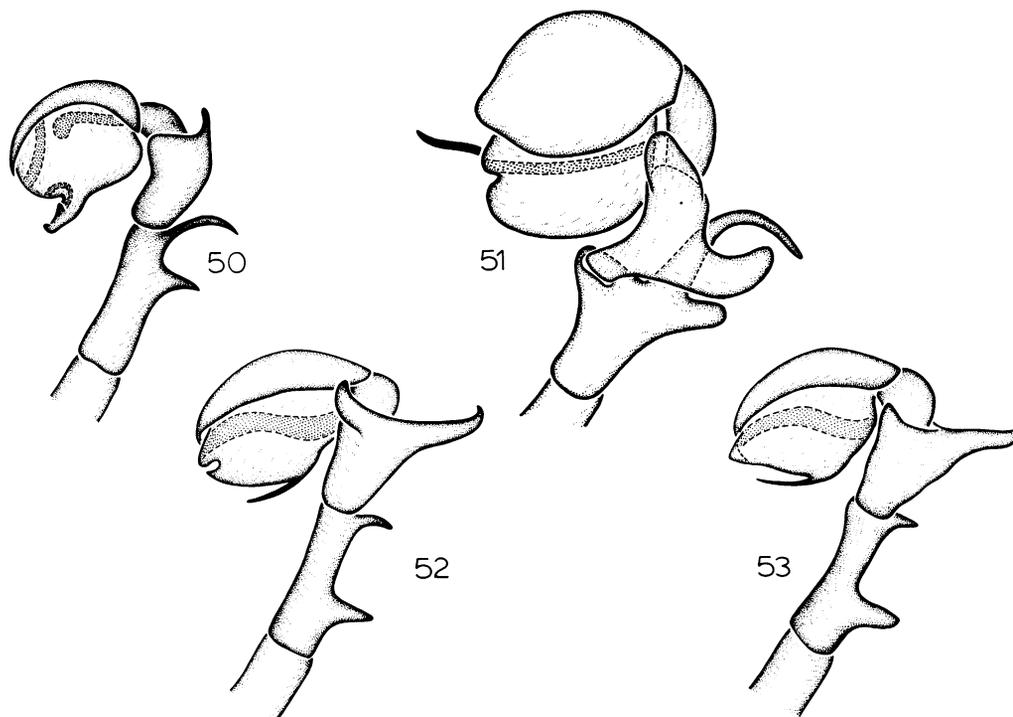
	I	II	III	IV
Femur	0.41	0.32	0.25	0.34
Patella	0.18	0.14	0.11	0.13
Tibia	0.30	0.23	0.17	0.26
Metatarsus	0.16	0.12	0.13	0.14
Tarsus	0.25	0.23	0.22	0.24
Total	1.30	1.04	0.88	1.11

Epigynum with basal ridge (fig. 41); ducts long, curved, bifid distally (fig. 41).

MATERIAL EXAMINED; Five males and two females taken with the types, and one male and



FIGS. 44-49. *Pseudanapis paroculus* (Simon). 44. Male, dorsal view. 45. Male, lateral view. 46. Male, anterior view. 47. Female, anterior view. 48. Female, dorsal view. 49. Female, lateral view (chelicerae displaced to show anterior labral spur).



FIGS. 50-53. Male palpi, retrolateral views. 50. *Pseudanapis paroculus* (Simon). 51. *P. benoitii*, new species. 52. *P. gertschi* (Forster). 53. *P. domingo*, new species.

three females taken in a Berlese sample of forest litter at an elevation of 1000 m. at Quebrada Susumuco, 23 km. northwest of Villavicencio, Meta, Colombia on March 5, 1972, by S. and J. Peck (FMNH).

Anapisona kartabo Forster

Figures 38, 39

Anapisona kartabo Forster, 1958, p. 11, figs. 9, 12, 14, 17, 22 (male holotype from Kartabo, Mazaruni-Putaro, Guyana, in AMNH, examined).

DIAGNOSIS: Males of *A. kartabo* may be recognized by the absence of an apophysis on the palpal patella (figs. 38, 39).

MALE: Described by Forster (1958).

FEMALE: Unknown.

MATERIAL EXAMINED: Only the holotype, taken by sifting in 1924.

PSEUDANAPIS SIMON

Pseudanapis Simon, 1905, p. 64 (type species by monotypy *Anapis paroculus* Simon).

Gossiblemma Roewer, 1963, p. 129 (type species by monotypy *Gossiblemma yapensis* Roewer); first synonymized by Shear, 1978, p. 8.

DIAGNOSIS: Specimens of *Pseudanapis* can be distinguished from other anapids by the coarsely punctate carapace, sternum, and ventral abdominal scutum (figs. 44-49), by a pattern of two femoral, one or two patellar, and no tibial apophyses on the male palp (figs. 50-53), and by the subequally long legs I and IV.

DESCRIPTION: Forster (1959) has provided a detailed description of *P. aloha* that (except, of course, for genitalic details) can also serve as a generic description. Only differences from *P. aloha* are noted in the species descriptions below (the trichobothriotaxy has not been checked in each species).

KEY TO SPECIES OF *PSEUDANAPIS*

1. Males2
- Females7

- 2. Tibia I with spines (Forster, 1959, fig. 114);
New Guinea *wilsoni*3
- 3. Both apophyses on palpal femur situated distally
(fig. 51; Forster, 1959, figs. 108, 109; Suman,
1967, fig. 16)4
- One apophysis on palpal femur at about half its
length (figs. 50, 52, 53; Forster, 1958, fig.
11)5
- 4. Proximal apophysis on palpal patella relatively
small (Forster, 1959, figs. 108, 109; Suman,
1967, fig. 16); Hawaii and Yap *aloha*
- Proximal apophysis on palpal patella relatively
large (fig. 51); Zaire *benoitii*
- 5. Distal apophysis on palpal femur relatively long,
embolus relatively wide (fig. 50); Java and
Sumatra *paroculus*
- Distal apophysis on palpal femur relatively
short, embolus relatively narrow (figs. 52,
53); America6
- 6. Palpal bulb invaginated distally (fig. 52); Mex-
ico and Central America *gertschi*
- Palpal bulb not invaginated distally (fig. 53);
Ecuador *domingo*
- 7. Pedipalp segments beyond trochanter absent . . .8
- 8. Pedipalp trochanter present; thorax with pair of
tubercles at shoulders (fig. 49); Java and
Sumatra *paroculus*
- Pedipalp trochanter absent; thorax without pair
of tubercles at shoulders (Forster, 1959, fig.
111); New Guinea *wilsoni*
- 9. Spermathecae relatively large (figs. 56, 57);
Zaire *benoitii*

- Spermathecae relatively small (figs. 58, 59;
Suman, 1967, fig. 15)10
- 10. Spermathecae on long stalks (figs. 58, 59);
Mexico and Central America *gertschi*
- Spermathecae on short stalks (Suman, 1967, fig.
15); Hawaii and Yap *aloha*

Pseudanapis paroculus (Simon)

Figures 44-50, 54, 55

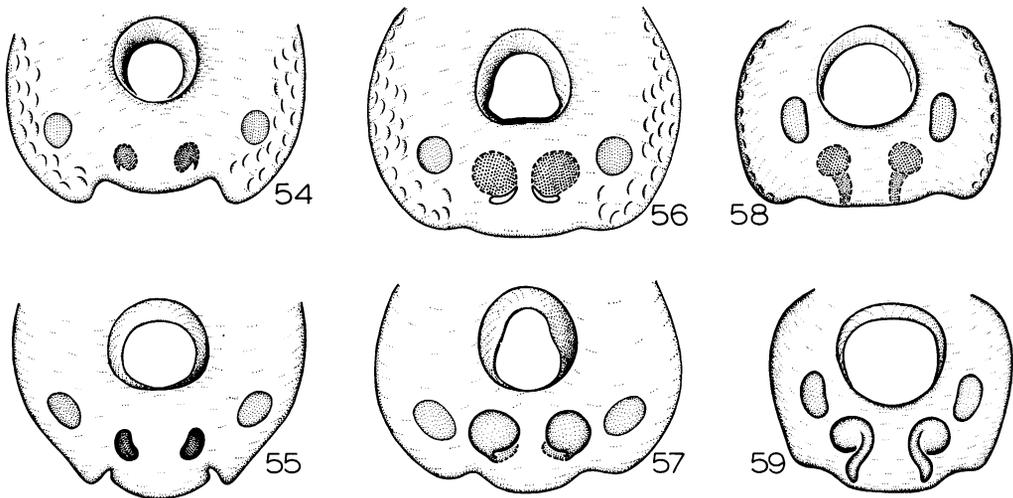
Anapis paroculus Simon, 1899, p. 97 (female holo-
type from Sumatra, should be in MNHN,
unavailable).

Pseudanapis paroculus: Simon, 1905, p. 64, figs. 3,
4.

DIAGNOSIS: Males of *P. paroculus* may be
recognized by the wide embolus (fig. 50), fe-
males by the small, ovoid spermathecae (figs.
54, 55) and absence of palpal segments beyond
the trochanter.

MALE: Total length 0.72. Carapace 0.34
long, 0.36 wide, 0.23 high. Abdomen 0.47
long, 0.45 wide. Thorax with pair of tubercles
at shoulders. From above, posterior eye row
slightly recurved.

	I	II	III	IV
Femur	0.29	0.25	0.24	0.28
Patella	0.11	0.11	0.10	0.09
Tibia	0.25	0.18	0.16	0.20
Metatarsus	0.14	0.14	0.11	0.11
Tarsus	0.21	0.20	0.20	0.21
Total	1.00	0.88	0.81	0.89



FIGS. 54-59. Epigyna, ventral views (top) and dorsal views (bottom). 54, 55. *Pseudanapis paroculus* (Simon). 56, 57. *P. benoitii*, new species. 58, 59. *P. gertschi* (Forster).

Palpal patella with distal dorsal apophysis; embolus wide (fig. 50).

FEMALE: Total length 0.83. Carapace 0.31 long, 0.32 wide, 0.22 high. Abdomen 0.58 long, 0.54 wide. Thorax and posterior eye row as in male. Pedipalp reduced to coxa and trochanter. Abdomen without dorsal scutum, with numerous small round sclerotizations and four large muscle impressions (figs. 48, 49).

	I	II	III	IV
Femur	0.29	0.25	0.22	0.25
Patella	0.11	0.11	0.11	0.11
Tibia	0.21	0.18	0.20	0.20
Metatarsus	0.14	0.12	0.12	0.14
Tarsus	0.23	0.21	0.17	0.22
Total	0.98	0.87	0.82	0.92

Spermathecae small, ovoid (figs. 54, 55).

MATERIAL EXAMINED: **Java:** Buitenzorg, 1904 (K. Kraepelin, MNHN), 1♂, 1♀.

Pseudanapis wilsoni Forster

Pseudanapis wilsoni Forster, 1959, p. 316, figs. 111-117, 154 (male holotype from New Guinea, in MCZ, not seen).

DIAGNOSIS: Males of *P. wilsoni* may be recognized by the presence of spines on the first tibia (Forster, 1959, fig. 114), females by the reduction of the pedipalp to the coxa only.

MALE: Described by Forster (1959).

FEMALE: Described by Forster (1959).

MATERIAL EXAMINED: None; known only from the type series taken in leafmould in a lowland rain forest at the Lower Basu River, Huon Peninsula, New Guinea, by E. O. Wilson in 1955.

Pseudanapis aloha Forster

Pseudanapis aloha Forster, 1959, p. 315, figs. 106-110 (male holotype from Hawaii, in AMNH, examined). Suman, 1967, p. 25, figs. 11-16.

Gossiblemma yapensis Roewer, 1963, p. 129, figs. 9e-9i (male and female syntypes from Yap, in Bishop Museum, not seen); first synonymized by Shear, 1978, p. 8.

DIAGNOSIS: Males of *P. aloha* may be recognized by the small proximal apophysis on the palpal patella (Forster, 1959, figs. 108, 109;

Suman, 1967, fig. 16), females by the small spermathecae on short stalks (Suman, 1967, fig. 15).

MALE: Described by Forster (1959).

FEMALE: Described by Suman (1967).

MATERIAL EXAMINED: **Hawaii:** Oahu (Van Zwaluwenburg, AMNH), 1♂ (holotype). **Yap:** Colonia, under rocks in grassy field, May 31, 1973 (J. A. Beatty, J. W. Berry, JAB), 1♂, 1♀.

Pseudanapis benoiti, new species

Figures 51, 56, 57

TYPES: Male holotype and female paratype from Vallée de Kiharo, Kambaila, Kivu, Zaire (June, 1973; M. Lejeune), deposited in MRAC.

ETYMOLOGY: Named for Dr. P. L. G. Benoit, who made these and other African anapids available for study.

DIAGNOSIS: Males of *P. benoiti* may be recognized by the large proximal apophysis on the palpal patella (fig. 51), females by the large, round spermathecae (figs. 56, 57).

MALE: Total length 0.81. Carapace 0.47 long, 0.41 wide, 0.26 high. Abdomen 0.48 long, 0.46 wide. Patellae lighter than other leg segments. Ratio of eyes, anterior lateral: posterior median: posterior lateral, 3:2:3. From above, posterior eye row slightly recurved. Posterior median eyes separated by twice their diameter from posterior laterals.

	I	II	III	IV
Femur	0.41	0.29	0.25	0.29
Patella	0.13	0.11	0.11	0.11
Tibia	0.25	0.23	0.20	0.24
Metatarsus	0.16	0.14	0.13	0.14
Tarsus	0.22	0.22	0.21	0.20
Total	1.17	0.99	0.90	0.98

Palpal patella with large proximal and small distal apophyses; embolus long, arising on pro-lateral side of bulb at about one-third its length, extending across and beyond tip of tegulum (fig. 51).

FEMALE: Total length 0.86. Carapace 0.47 long, 0.43 wide, 0.27 high. Abdomen 0.58 long, 0.58 high. Legs and eyes as in male, except posterior eye row slightly procurved. All

palpal segments present but tibia and tarsus fused. Abdomen as in *P. paroculus* females.

	I	II	III	IV
Femur	0.32	0.29	0.24	0.36
Patella	0.11	0.11	0.10	0.11
Tibia	0.28	0.22	0.18	0.27
Metatarsus	0.11	0.11	0.12	0.14
Tarsus	0.23	0.21	0.22	0.20
Total	1.05	0.94	0.86	1.08

Spermathecae relatively large, rounded (figs. 56, 57).

MATERIAL EXAMINED: Thirteen males and 19 females taken with the types (MRAC, AMNH, Otago Museum), plus the following: **Zaire:** *Kivu:* Forêt de Kasuo, Lubero, elevation 1600 m., Dec. 27-31, 1966 (R. P. M. Y. Celis, MRAC), 1♂, 3♀; *Ruiss.* Musumusubu, Lubero, elevation 1420 m., Dec. 30, 1966 (R. P. M. Y. Celis, MRAC), 1♀; Forêt de Visiki, Dec. 22, 1971 (M. Lejeune, MRAC), 1♀; Vallée de Kalingolingo, Kambaila, June, 1973 (M. Lejeune, MRAC), 1♂, 2♀; Vallée de Vukaika, Kambaila, June, 1973 (M. Lejeune, MRAC), 1♂.

Pseudanapis gertschi (Forster),
new combination
Figures 52, 58, 59

Anapisona gertschi Forster, 1958, p. 9, figs. 8, 10, 11, 13, 20, 23 (male holotype from Tenejapa, Chiapas, Mexico, in AMNH, examined); not fig. 26 (= *Anapisona kethleyi*).

DIAGNOSIS: Males of *P. gertschi* may be recognized by the medially situated embolus and invaginated tegulum (fig. 52), females by the small spermathecae on long stalks (figs. 58, 59).

MALE: Described by Forster (1958).

FEMALE: Described by Forster (1958); the abdomen (missing in specimens available to Forster) is as in *P. paroculus* females.

MATERIAL EXAMINED: **Costa Rica:** *Cartago:* Río Grande de Orosi, 10 km. S Tapantí, elevation 1500 m., Berlese of mixed forest floor litter, Apr. 14, 1973 (J. Wagner, J. Kethley, FMNH), 3♀. **Mexico:** *Chiapas:* Palenque, July 6, 1949 (C. and M. Goodnight, AMNH), 1♂, 2♀; Berlese of rotten wood from cacao grove,

Jan. 29, 1976 (C. Alteri, AMNH), 1♂; Berlese of leaves and humus from cacao grove, Jan. 29, 1976 (C. Alteri, AMNH), 2♂, 1♀. *Tenejapa,* July 22, 1950 (C. Goodnight, AMNH), 1♂ (holotype). *Veracruz:* Cueva Macinga, Tlilapan, Jan. 9, 1977 (J. Reddell, A. Grubbs, S. McKenzie, C. Soileau, AMNH), 1♂, 1♀. **Panama:** *Canal Zone:* Barro Colorado Island, June, 1950 (A. M. Chickering, MCZ), 1♀. *Chiriquí:* Boquete, Aug. 1-8, 1950 (A. M. Chickering, MCZ), 1♂, 2♀; Aug. 4-11, 1954 (A. M. Chickering, MCZ), 1♂, 1♀.

Pseudanapis domingo, new species
Figure 53

TYPE: Male holotype from Berlese sample of forest litter taken 16 km. southeast of Santo Domingo Tinalandia, Pichincha, Ecuador (June 15, 1975; S. B. Peck), deposited in FMNH.

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

DIAGNOSIS: Males of *P. domingo* may be recognized by the medially situated embolus and uninvaginated tegulum (fig. 53).

MALE: Total length 0.67. Carapace 0.43 long, 0.29 wide, 0.22 high. Abdomen 0.47 long, 0.40 wide. Patellae lighter than other leg segments.

	I	II	III	IV
Femur	0.31	0.27	0.22	0.29
Patella	0.12	0.11	0.11	0.11
Tibia	0.24	0.21	0.18	0.25
Metatarsus	0.14	0.13	0.14	0.15
Tarsus	0.24	0.20	0.19	0.20
Total	1.05	0.92	0.84	1.00

Palpal patella with small ventral apophysis; tegulum not invaginated distally (fig. 53).

FEMALE: Unknown.

MATERIAL EXAMINED: Only the holotype.

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