MILLIPEDS FROM THE ATLANTIC LOWLANDS OF COSTA RICA

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ABSTRACT

From a collection of millipedes made in Limon Province new locality records for 13 established species are given; descriptions, figures, and as extensive keys as possible are given for 15 n. spp. in 7 families; 1 sp. represents a n. gen. of chytoesmid. Cyrtodesmus laticaudatus n. sp. from Panama is described and figured. Siphonophora costaricae Chamberlin is redescribed and figured, and his S. valeri is placed as a new synonym under it.

No major contribution to the millipede fauna of Costa Rica has been made since R. V. Chamberlin published The millipedes of Central America, in 1922, where he reported 51 species occurring in that country. Since then 26 species have been added in minor publications.

In 1937 the writer spent 2 months in Costa Rica, mostly near Cairo, a small community in Limon Province, on what is known as the “Linea Vieja” of the railroad from Puerto Limon. This is about 18 miles west of the nearest point on the Caribbean coast, most of the area being heavily wooded and less than 300 ft. above the sea. One result of this visit was making of the largest collection of millipedes known in that country. It contained 13 established species, 5 others represented by partially identifiable specimens, and 16 new species, 1 of which, Costaricia curvipes Loomis, Proc. Biol. Soc. Washington, 79. p. 226-7, 1966, has been published. The others are the basis of this paper, and all collections were made by me unless otherwise stated.

No bibliography is included in this paper as citations for established genera and species mentioned herein are abbreviated as in Loomis, A Checklist of the millipedes of Mexico and Central America, U. S. Nat. Mus. Bull. 266, 1968, where the complete citation may be determined from that bibliography. Synonyms of any of these published names also will be found there.

All holotype and some other specimens have been deposited in the U. S. National Museum of Natural History. Paratype specimens and representatives of other species collected by me have been deposited in the Florida State Collection of Arthropods in Gainesville.

GLomeridesidae

Females of what appear to be an undescribed species were collected 2 February, 6 March, 7 April, and 7 December 1937, at Cairo and Guapiles.

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CHELOIDESMIIDAE

*Chondrodesmus* Silvestri 1897b, p. 13

Key to the species of *Chondrodesmus* in Costa Rica

1. Repugnatorial pores opening upward from their tubercles .......... hoffmanni (Peters)

1'. Repugnatorial pores opening approximately outward from their tubercles ................................................. 2

2. Pore tubercles on anterior keels abruptly projecting and pedunculate .......... *singularis* Chamberlin 1922, p. 44, & *euliotus* Chamberlin 1933, p 21

2'. Pore tubercles more elongate and less abruptly projecting, not pedunculate .................................................. 3

3. Large branch of gonopod strongly curved throughout, gradually decreasing in thickness to a slender point .......... *falciphallus* Chamberlin

3'. Large branch of gonopod generally thick and quite straight below; apex straight to sharply bent ............................................. 4

4. Apex of large branch of gonopod bent strongly mesad, elongate and acute .............................................................................................................. *cairoensis* new species

4'. Apex of large branch of gonopod little or not bent mesad and not slenderly acute ........................................................................................................ 5

5. Apex of branch produced slightly mesad, its tip approaching a right angle ............................................................... *rodriguezi* Brolemann

5'. Apex of branch not bent mesad, its tip broadly and squarely truncated ............................................................................................................. 6

6. Size large, 48-55 mm long ........................................................................................................ *granosus* (Carl)

6'. Size smaller, about 35 mm long ...................................................................................... *acuticollis* Attems

*Chondrodesmus cairoensis* new species

Holotype male, another male and female, 5 March; female, 24 February, male, 7 December 1937, Cairo.

*Diagnosis*: Related to *C. singularis* Chamberlin 1922, p. 44, which unfortunately was founded on a female so that its description is far from adequate, but above specimens appear to differ by being larger, with broader keels more angular behind, and with posterior keels produced farther caudal.

*Description*: Largest male 36 mm long, 4 mm broad; largest female 40 mm long, 5.5 mm broad, hence males much more slender than females, and posterior end of body narrowing more gradually.

Prozonites light colored in front, posterior half increasingly darker brown to constriction; metazonites with keels light, dorsum usually reddish brown in front and light along posterior half or entirely light except reddish brown adjacent to keel; front of head, antennae, legs, and ventral surface of body light.

Head moderately densely hispid below antennae but with only a single seta each side of median furrow above them; vertex finely wrinkled and slightly shining.

2*Specimens of these 2 species have not been seen, but in the original illustrations the shape of the keels and pore tubercles appear much alike. There is a decided likelihood that *euliotus* is a synonym of *singularis*. 
Fig. 1, *Chondrodesmus cairoensis* new species. Left gonopod (posterior view).

Fig. 2-4, *Phylactophallus canceripes* new species. 2. Male segments 1-3 (right side); 3. Left gonopod (posterior view); 4. Joints 5-6 of first male leg.

Fig. 5-7, *Trichomorpha agilis* new species. 5. Male segments 8-9 (left side); 6. Left gonopod (posterior view); 7. Three basal joints of male leg 7.

Fig. 8-9, *Trichomorpha crinitipes* new species. 8. Left gonopod (outer view); 9. Same (posterior view).

Fig. 10-11, *Trichomorpha eros* new species. 10. Right gonopod (posterior view); 11. Same (mesal view).

Fig. 12-14, *Trichomorpha inflecta* new species. 12. Male segment 13 (left side); 13. Left gonopod (outer view); 14. Same (posterior view).
Segment 2 lacking a tooth on each anterior corner, a minute one at anterior corners of segments 3 and 4. Principal segments finely and evenly granular with occasionally a few slightly larger granules near posterior border; granules of penultimate segment reduced, absent from last segment. Keels much as shown and described by Chamberlin for singularis but posterior corners of nonporiferous segments more angular; pore calloses from segment 5 to near posterior end of body distinctly longer and less abruptly protruding; raised margins of keels not noticeably "bent up uniformly all around excepting a slight raised angle or tubercle at the caudal corner," whatever this phrase means; from midbody to segment 18 a small tooth usually present on posterior margin of all keels; on segments 17-19 posterior corners larger and produced farther caudal than in singularis.

Prenal scale shaped as in singularis but the 2 setae much closer to the acute tip and borne on larger tubercles.

Gonopod as shown in Fig. 1.

*Phylactophallus* pocock 1909, p. 166

Males of this genus have only 19 segments in contrast to 20 of females and of related genera. Joint 5 of some anterior male legs has a distal lobe below extending under the rather short sixth joint.

Key to the species of *Phylactophallus*

1. Size large, body about 23 mm long; metazonites lacking transverse series of setae ................................................................. *stenomurus* Pocock

1'. Size smaller, body less than half as long; segments with transverse series of setae ........................................................................ 2

2. Outer margin of keels more or less serrate, their posterior margin along midbody with 1 or 2 dentations; joint 5 of seventh male legs with a ventral appendage .............................................. *parvulus* Attems

2'. Outer margin of keels not serrate, their posterior margin lacking teeth; joint 5 of seventh male legs without a ventral appendage ....

.................................................. *canceripes* new species

*Phylactophallus* canceripes new species

Mature 19-segmented male holotype and immature 19-segmented female, slope of Irazu Volcano above San Isidro, 31 March 1937.

*Diagnosis*: Related to *P. parvulus* (Attems 1933, p. 265), but smaller; keels without lateral or posterior dentations; and with differences of the gonopods and seventh male legs.

*Description*: Male 8 mm long, considerably more slender than female which is 10 mm long; body weakly chitinized. Living color almost white, except anterior segments light brown.

Head with fine vertigial furrow extending forward opposite upper limit of antennal sockets. Front rather coarsely and sparsely setose; setae behind antennae smaller and denser.

Segment 1 twice as wide as long, equaling segment 2; front margin very broadly rounded; back margin triarcuate; sides nearly parallel and straight for a considerable distance in front of each posterior angle (Fig. 2); segments 2 and 3 also shown, latter usually with a tiny tooth on anterior corner and similar ones to segment 10. Although badly rubbed,
segment 1 appears to have had setae in 3 transverse rows; segments thereafter with 2 rows. Principal body segments with distinct transverse median furrow; keels projecting almost horizontally from the convex dorsum, their outer margining rim smooth and almost perpendicularly raised from inner surface, pores readily seen from above; posterior angles slenderly acute, greatly produced backward to antepenultimate segment where they reach nearly opposite the apex of the minute ones of the next segment; posterior margin of keels without teeth.

Preanal scale rounded behind and with 2 widely separated marginal setae. Anal valves moderately convex; inner margins thin and only slightly raised.

Gonopod shown in Fig. 3. Male legs 1-5 with joint 5 continued as a large lobe below outer joint, the 2 joints resembling a crab's claw (Fig. 4), lobe reduced on sixth legs and lacking thereafter; coxal lobes of seventh legs much longer than in parvulus. Sternum between legs 4 and 6 with 2 high, thin, transverse lobes; those of fourth sternum broadening to the widely separated and truncated tips; those of sixth sternum in contact mesally to rounded tips, their outer margins parallel.

*Trichomorpha* Silvestri 1897c, p. 11

*Ethopallus* Chamberlin 1933, p. 19, new synonymy.

I have found that members of this predominantly South American genus are highly variable in color, shape, and many structural characters, but it seems impossible to separate them into finite generic or even sub-generic groups. Common to most if not all species is the more or less prominent tubercle on the distal portion of the coxa of each gonopod, from which joint also the seminiferous tube rises. The main branch of the gonopod usually has a long, slender branch rising from the basal portion, its tip sometimes shielded or hidden within the upper part of the branch.

The only North American species known were 4 from Panama, keyed in Loomis (1964a); a fifth described later from there by Loomis (1964b, p. 182), apparently is unique in the genus in having a dense curl of long setae on the coxae of the third male legs; and a sixth species which was from Cocos Island, Costa Rica. Four new species and a transfer *Ethopallus servantes* Chamberlin (1933, p. 19-20)—now bring the number in Costa Rica to 6, these being separated in the following key. The genus *Ethopallus* is here added to the synonymy of the genus on the basis of its original description and illustrations.

Key to the species of *Trichomorpha* in Costa Rica

1. Large branch of gonopod with a brush of long setae arising near middle and much exceeding tip of branch ............. *crinitapes* new species
2. Very small species, less than 10 mm long; produced posterior angle of keels curving inward at tip ............. *inflexa* new species
3. Transverse sulcus of metazonites confined to segments 5-7; posterior margin of keels smooth ............. *erosa* new species
3'. Transverse sulcus present on most metazonites; posterior margin
of keels with 1 or more teeth ........................................ 4
4. Body slender; keels narrow, with long slender posterior angle ......

agilis new species

4'. Body and keels broader; posterior angle of keels not slender .......... 5
5. Transverse sulcus of metastomites weak; keels with tooth at anterior
corner only; anterior male legs without lobe under joint 5 ...........

.............................................................. cervantes (Chamberlin)

5'. Transverse sulcus distinct; outer and posterior margins of keels
toothed; joint 5 of male legs 1-7 with ventral lobe .. folium Brolemann

Trichomorpha agilis new species

Holotype male, another male, 2 females, 5 December; 2 males, 14 March;
2 males, 7 December 1937, Cairo; male, female, 10 December 1937, Guapiles.

Diagnosis: Gonopods most closely suggesting T. vacuica Chamberlin
(1925, p. 42), of Panama, but with obvious other differences, the slender
body, acutely angled and elevated keels being distinctive.

Description: An unusually rapid running species, 16 17 mm long, 1.7
mm wide, narrowing very gradually behind; male narrower than female;
living color blackish brown; only legs, produced posterior corners of keels,
first joint and extreme tip of antennae, light brown.

Head densely setose below antennae, sparsely setose above, with 2 or 3
much larger setae on either side of the deep vertigial sulcus. Antennae
moderately long; joints 2-5 subequal in length; joints 5 and 6 with sensory
area on outer side distally.

Segment 1 broadly rounded from front to back; a marginal seta-bearing
tooth a short distance in front of each acute posterior corner; posterior
margin bisinuate; surface with anterior row of 8 erect setae and a sub
median row of 4 like ones.

Segments 2 and 3 with a faint transverse median sulcus becoming
strongly impressed to segment 15, 16, or 17, absent thereafter. Dorsum
of segments 2-4 with a single erect seta on each side rather close to pos-
terior margin. Lateral keels narrow, thin, and elevated; anterior corners
broadly rounded, with an outer angulation; posterior angles greatly pro-
duced backward, slender, acute, with several sharp teeth along inner side
(Fig. 5); posterior angles of segment 19 small and caudally directed, al-
most surpassed by those of segment 18. Legs slender and very long, equal
to 1 1/2 times body diameter.

Gonopod shown in Fig. 6. Male legs 1-3, and occasionally 4, with
penultimate joint apically lobed below; basal joints of leg 7 shown in Fig.
7. Sternum between fourth legs with 2 transverse lobes rising between
coxae; similar smaller lobes between third and sixth legs.

Trichomorpha crinitape new species

Holotype male, 2 females, 5 December; mature and young male, 4 fe-
males, 6 and 16 March and 7 December 1937, Cairo.

Diagnosis: The broad body with scarcely oblique lateral keels having
posterior angles not rising above dorsum and less developed than in most
species, and the quite short, stout antennae, aare diagnostic. While the
structure of the gonopods is quite typical of the genus, close association
with a known species is not indicated, and the long brush of setae on each
gonopod is without parallel.

Description: Holotype 16 mm long, 2.3 mm wide; surface shining, dor-
sum only moderately convex; color in alcohol dark brown.

Head invested with scattered setae, sparser on vertex which has a pro-
nounced median sulcus. Antennae unusually short and stout; joints 2-4
subequal in length; 5 and 6 decreasing in length, 6 much the thickest; a
very small sensory area near apex of joint 5, larger one on joint 6.

Segment 1 with a distinct series of erect setae just behind the fine
raised rim of anterior margin, setae on remainder of surface scattered;
posterior margin bisinuate, its median portion convex and not exceeded by
the acute lateral angles.

Segments 2-5 with setae scattered on surface; segments 5-16 with
strongly impressed transverse sulcus ending at base of lateral keels: inter-
zonal constriction pronounced. Keels rather small, thin, projecting almost
horizontally, and scarcely oblique, the small but acute posterior corners
not raised above the highest part of the dorsum; keels of segment 19
about 2/3 as long as those of 18 but very slender, spine-like; keels with a
tooth at anterior corner behind which, on segments 2-4, are 2 small teeth:
nonporiferous keels thereafter with 3 small teeth; poriferous keels with 2
teeth in front of pore; posterior margin of keels with 2-3 tiny teeth.

Last segment with a median dorsal row of 6 setae and a posterior row
of 4, on conical tubercles, outer ones of latter row projecting beyond mar-
gin.

Gonopods shown in Fig. 8-9. Penultimate joint of all pregenital legs
with a conic lobe below apex; third joint of seventh legs slightly curved
and without a subbasal knob. Sterna between legs 3 and 4 with 2 high,
thin, erect, transverse lobes, the first pair adjacent, the second ones widely
separated and concave on posterior face.

Trichomorpha erosu new species

Broken holotype male, 21 February 1937, Cairo.

Diagnosis: Apparently most closely related to T. fallum (Brolemann
1903, p. 139) but smaller, lacking a transverse sulcus on midbody metazon-
itides, or teeth on posterior margin of their keels, and in differences of
the gonopods.

Description: Diameter 2 mm; living color very dark shining brown, al-
most black.

Head rather densely short-setose on frontal area, less so above anten-
nae; vertical sulcus strong to between antennae of which joint 5 has a
large, broad, sensory area distally on outer side, a smaller circular area on
joint 6, and a very tiny one on joint 7 below middle.

Segment 1 with posterior midmargin deeply concave; 8 setae rising
from minute punctures behind front margin, a single seta projecting from
the margin a little distance mesad of each slightly produced posterior
angle; 4 setae in punctures across middorsum.

Surface of segments rather coarsely coriaceous or eroded; 2 transverse
rows of 4-6 setae in punctures cross metazonites which lack a transverse
sulcus except a faint one on segments 5-7; anterior portion of metazonites
slightly more concave than posterior; interzonal furrow pronounced. Keels high on sides, narrow, posteriorly produced, and acute from segment 2-19; slightly oblique, posterior corner hardly elevated, a small tooth at anterior corner on segments 2-17; lateral margin with 2 setae, the posterior margin smooth.

Last segment with dorsal setae on small conic tubercles, outer one each side, in anterior row of 6, slightly projecting beyond lateral margin, similar one, in posterior row of 4, more strongly projecting. Inner margins of anal valves thick at base but rising moderately and very thin at apex. Preanal scale large and rounded-angular at apex.

*Trichomorpha folium* v (Brolemann 1903, p. 139)

*T. evidens* (Chamberlin 1940a, p. 11) is closely related to this Cocos Island species and may be a synonym of it.

*Trichomorpha inflecta* new species

Holotype male, 24 February; male, 7 December 1937, Cairo.


*Description*: Size small, length 9.0-9.5 mm.

Head more or less setose throughout; a deep median furrow on crest of vertex, ending considerably above antennae; surface in front of antennae conspicuously depressed, almost flat to labral margin.

Segment 1 large, a little convex longitudinally but strongly so transversely; crossed by a series of 8-10 erect setae near front margin, a series across middle, another near back margin indicated by minute swellings from which setae may have disappeared; anterior margin broadly rounded; lateral margins thin, extending nearly straight back to the small, thin, acute posterior angles; posterior margin triarcuate.

Segment 2 with row of 6 erect setae across median third, but none elsewhere on or other segments, although perhaps rubbed off. Intervertebral constriction of segments deep; prozonites rising higher and more abruptly from it than metazonites which are moderately convex between the quite horizontal keels; surface of metazonites smooth but with an indefinite transverse median depression present on a few midbody segments. Keels broad, anterior corners nearly square on segment 2 but increasingly rounded thereafter; anterior margin with a sharply raised rim, outwardly terminating in an acute tooth evident to segment 17; posterior corner of keels from segment 5 or 6-18 strongly produced caudally, apex hooked inward (Fig. 12), except near ends of body; posterior margin with 1-4 strong teeth from segment 5 caudal; lateral margin of keels with a small to tiny seta at base of tooth at anterior corner, a much larger one near midmargin.

Last segment with apex short, cylindrical, squarely truncated; dorsal surface with usual macrosetae, outer one on each side of posterior row on a distinct tubercle. Anal valves with inner margins unusually high and thin. Preanal scale large, about half as long as wide, rounded behind, the
2 macrosetae very widely separated, rising from surface well in front of posterior margin.

Gonopod shown in Fig. 13-14. Penultimate joint of male legs 1-7 distally lobed beneath; sternum between sixth legs with tiny tubercle or granule each side adjacent to median furrow; sterna behind gonopods somewhat elevated, with a deep, sharply impressed longitudinal furrow, the surface either side noticeably convex; transverse furrow evident only on sides adjacent to coxae.

_Trichomorpha sp._

Two females of an undescribed species, 1937, Cairo.

**CHYTODESMIDAE**

The previously known Central American genera of this family have been keyed in Loomis (1964a). The genus proposed hereafter differs from them in having the dorsum more convex and definitely tuberculate; pores opening from tubercles on upper surface of keels; and the last segment completely hidden beneath the penultimate one. It is most closely associated with _Docodesmiella_ Loomis (1961).

_Dicropus_ new genus

_Type species:_ _Dicropus tecticaudatus_ new species

_Description:_ Body small and short, about 3 times as long as wide, strongly arched, with 20 segments; keels broad, almost evenly continuing descent of dorsum to or below level of base of legs and sterna; dorsal surface strongly tuberculate, most conspicuous being a series of 3 broad tubercles each side of segments.

Anterior border of segment 1 greatly expanded beyond head and divided into 12 elongate areas ending as slight crenations in front. Keels of segment 5 with 2 outer lobes; 3 lobes on segments 24 and 616 and 4 lobes on segments 17-19. Keels of segment 19 produced strongly caudal, narrowly separated at middle, greatly exceeding the minute last segment, and completely hiding it from above. Anal valves without raised inner margins but each with a broadly swollen ridge along outer third.

Each gonopod consisting of a galeate coxal joint from which a large biramous arm projects mesally, its posterior blade broadest. Third male legs strongly crassate.

_Dicropus tecticaudatus_ new species

_Holotype male, head and 8 anterior segments of female, Hamburg Farm, Limon Province, 29 April 1926, F. Neverman Coll._

_Description:_ Body 5.5 mm long, 1.8 mm wide, broadly oval; dorsum strongly and evenly descending to outer margin of keels; dorsum of segments with a submedian row of 3 large tubercles over twice as wide as long and nearly touching opposite row; much less evident are 2 outer rows of 3 small tubercles each; surface of keels with 5 or 6 rounded tubercles; entire dorsal surface, including tubercles and margins, finely spiculate or serophulous and with more or less organic matter adhering.

Head of both sexes with vertex extensively swollen on either side of middle into a prominent elevation; side margins in clypeal region and
Fig. 15-16, *Dicropus tecticaudatus* new species. 15. Segments 18-19 (dorsal view); 16. Right gonopod (latero-caudal view).

Fig. 17-18, *Cyrtodesmus laticaudatus* new species. 17. Last segment (dorsal view); 18. Right gonopod (mesal view).

Fig. 19-20, *Cyrtodesmus palliatus* new species. 19. Left gonopod (posterior view); 20. Base of second legs, cyphopods, and raised rim behind them (anterior view).

Fig. 21-22, *Cyrtodesmus quadrident* new species. 21. Segment 19 (dorsal view); 22. Left gonopod (mesoposterior view).

Fig. 23-25, *Eusphaeriodesmus bilobatus* new species. 23. Segments 4-5 (lateral view); 24. Left gonopod (lateral view); 25. First male leg (posterior view).

Fig. 26-27, *Prostemmiulus grandis* new species. 26. Gonopods (anterior view); 27. Right posterior gonopod, more magnified, (posterior view).
above it broadly emarginate; antennae short-crassate, separated by little more than diameter of a socket; joints 1, 4, 6, and 7 subequal in length; joint 5 about equalling either 2 adjoining ones in length but considerably thicker.

Segment 1 more than half as long as wide; front margin broadly expanded, divided into 12 long-quadrate areas separated by deep furrows, each area faintly rounded in front; median surface with 5 quite definite transverse series of large prominent tubercles arranged 12, 12, 4, 8, and 6, counting caudad.

Segment 2 with keels strongly produced forward; outer margin of keels half again as long as on segment 5 but exceeded by keels of segments 17-19. Keels of segments 2-4 and 6-16 outwardly trilobed, fifth keels bilobed, those of 17-19 with 4 lobes; anterior margins apparently 4-lobed but their sinuses soil-filled, the 4 lobes of posterior margins more distinct. Pores in normal sequence, each borne on a rounded tubercle in advance of the middle sinus of posterior margin of keel. Segment 19 (Fig. 15) with keels caudally directed, their posterior (inner) margins only slightly separated and preceded by a long median tubercle depressed along crest.

Last segment very small, completely hidden from above; apex very short, slightly deflexed, with 4 terminal setae. Anal valves not raised along inner margins, their surface flattened to outer third which is elevated into a convex ridge. Preanal scale broadly lenticular and strongly swollen; a well-separated pair of small seta-bearing tubercles near middle of posterior margin.

Gonopod shown in Fig. 16. First male legs rather slender and only about half as long as second pair. Third male legs with joints 2-6 much more crassate than on adjacent legs, thickest at distal end of joint 3. Sterna of midbody segments no more than half as wide as long and deeply impressed in each direction between the 4 coxae which project laterally from the strongly elevated sternum. Female with anterior ventral margin of segment 3 elevated into a high ridge originating behind middle of third joint of the second legs on each side.

**CYRTODESMIDAE**

*Cyrtodesmus* Gervais 1847, p. 92

All previously known North American species of this genus are from Panama and were keyed in Loomis (1964a). None of these 12 species has been found in Costa Rica, and the 2 new ones in the present collection considerably extend the range of the genus northward. Another new species from eastern Panama is hereafter described and included in the following key which, with that cited above, make possible the separation of the 15 Central American species.

**Key to new species of* Cyrtodesmus***

1. Dorsum with small secondary tubercles, the usual rows of larger primary ones not evident; last segment very wide ..............................................
   ............................................................. *laticaudatus* new species
1'. Dorsum with large primary tubercles in 4 distinct rows; last segment narrow ................................................................. 2
Fig. 28-29, Prostemmiulus grandis new species. 28. Coxal joints of second male legs (anterior view); 29. Second male leg (lateral view).

Fig. 30-33, Stemmiulus unicus new species. 30. Right gonopod (anterior view); 31. Same (posterior view); 32. Second male leg (anterior view); 33. Third male leg (anterior view).

Fig. 34-37, Platydesmus bitumulus new species. 34. Anterior end of body (dorsal view); 35. Posterior end of body in outline (dorsal view); 36. Segment 20 (anterior view); 37. Dorsum of segment 30.

Fig. 38-39, Siphonopora alticola new species. 38. Head and segment 1 (dorsal view); 39. Left gonopods (posterior view).

Fig. 40, Siphonopora coottarii Chamberlin. Right gonopods (posterior view).

Fig. 41-42, Siphonopora vosacea new species. 41. Head and first 2 segments (dorsal view); 42. Apical joint of anterior left gonopod (ventral or posterior view).
2. Last segment hidden from above and with 2 translucent ventral hooks ............................................. *quadridonus* new species

2'. Last segment exposed from above, lacking translucent ventral hooks ......................................................... *palliatius* new species

*Cyrtodesmus laticaudatus* new species

Holotype male, female, taken from bromeliad, Cerro Azul, ca 2,000 ft. elev., Panama Province, Panama, 5 April 1966, by G. B. Fairchild.

*Diagnosis:* In dorsal sculpture and details of gonopods appearing more closely related to the Colombian genotype, *C. velutinus* Gervais, than any Central American species but distinct from all in the larger posterior sinus of the lateral keels.

*Description:* Female about 12 mm long, 2.5 mm wide, the rigidly curved male 2.3 mm wide and correspondingly shorter; body very convex; color dark above except clypeal area which is unpigmented.

Vertex of head very densely and finely granular to between antennae, including a distinct rounded swelling, largest in male, above and a little mesial of each socket; a fine vertical sulcus evident behind; 2 widely separated interantennal ridges which converge slightly behind are broadened and elevated in front, especially in male, but scarcely raised behind; clypeus strongly swollen, with 6 macrosetae; cheek swollen laterad of each antenna and with a supplementary low rounded tubercle near antenna; interantennal space about as broad as length of antennal joint 2.

Segment 1 with anterior margin straight across between the large, broadly rounded, forwardly projecting lobes; 6 large tubercles rising sharply above margin; middorsal surface deeply depressed near anterior third and extremely swollen either side; entire surface densely beset with coarse, abruptly raised granules surmounted by a small, erect, stiff seta, and several minute ones.

Segment 2 with sides vertical, shaped much as in *deplulis* Loomis (1964a, Fig. 43). Keels of segments 3 and 4 outwardly bilobed, those thereafter usually trilobed to segment 16 or 17 beyond which the margin is slightly undulate, at most; sinus in posterior margin of keels extensive, larger than in other species. Pores inconspicuous, opening from a larger tubercle than adjacent ones and closer to sinus than to outer margin. Intezoneal furrow broad and deep; prozonite rising gradually, metazonite rising sharply. Metazonites with abruptly raised secondary tubercles as on segment 2 and lacking distinct rows of primary ones except that at posterior margin of segment 4 or 5-18 there are 4 large tubercles while segment 19 has only 2.

Last segment large, very convex, and much exposed; apex broadly produced, subtruncate, and 5-lobed (Fig. 17). Anal valves nearly flat, depressed at base near the strongly raised inner margins; transparent hooks lacking. Preanal scale slightly produced at apex, a setiferous tubercle at either angle, margin between them straight.

Gonopod shown in Fig. 18. Sternae of male legs 6 and 7 as broad as a leg socket; others narrow, the coxae in contact. Females with second coxae, cyphopods, and segment rim behind them somewhat as shown for *palliatius*, but inner lobes of coxae wider, much more produced, with anterior face concave throughout, not merely distal half; rim behind cypho-
pods thin, as wide but more greatly elevated, and more constricted at base; entire anterior surface strongly and evenly concave; apex straight across.

**Cyrtodesmus palliatus** new species

Broken holotype male, 3 females, 6 March 1937; 3 females, March 1937, Cairo.

**Diagnosis**: The gonopods, as well as several other characters, associate this species with *C. hispidulosus* Loomis (1964a, p. 46), but the adjacent tubercles of the preanal scale and slender setae of the supplementary margin of segments also differentiate it.

**Description**: Largest female 12.5 mm long, 2.3 mm wide; surface of body usually dirt incrusted, the notches of the keel margins seldom open.

Head with interantennal ridges high, leaning outward strongly, only moderately separated, nearly parallel, and extending almost half way to back of head; space between them with a row of small tubercles reaching farther back, the row usually incrusted and appearing ridge-like; interantennal area and front meeting at same level; vertex broadly depressed along middle.

Segment 1 short, deeply and broadly depressed along middle, surface each side much swollen; similar conditions, in lessening degrees, on segments 2 and 3; anterior margin much as shown for *C. confluentus* Loomis (1964a, p. 40), being smooth for a moderate distance at middle, on either side of which are 3 projecting lobes, outermost usually broadest; posterior margin straight across. Surface, and that of next segment, scattered with small rounded tubercles but no large ones.

Segment 2 with greatly expanded keels resembling those of *confluentus*, but the subbasal posterior lobe broader and bounded by shallower openings usually dirt filled; surface of keels flattened, depressed only near junction with dorsum. On segment 3 the 4 rows of primary tubercles usually are evident but become fully developed thereafter; tubercles rounded at apex, the surface and that of the small secondary ones hispid, but not distinctly spiculate, and all more or less incrusted; tubercles of submedian rows largest on segment 18, those of segment 19 about half as large, erect, not projecting behind posterior margin. Lateral keels from segment 3 caudad abruptly bent outward from incline of dorsum just lateral of the inner posterior lobe which is bounded on each side by a deep, narrow notch, usually dirt-filled; outer portion of keels from segment 8-18 definitely longer than wide; lobation of outer margin of keels indistinct. Pore opening from apex of a large tubercle a little behind center of outer portion of keel. Supplementary margin of segments composed of equally long, slender, closely placed setae.

Last segment exposed and a little more than half as long as segment 19; posterior margin transverse with 3 lobes each side of the broad median portion below which the 4 apical setae project from a pronounced depression bounded on each side by a small indistinct tubercle; transparent hooks lacking; dorsal surface crossed by a row of 6 tubercles in front and closely followed by 2 others well removed from posterior margin. Preanal scale with 2 contiguous, strongly projecting, seta-bearing tubercles at apex.

Gonopod shown in Fig. 19. Females with broad apically lobed coxae on second lego (Fig. 20) behind which the cyphopods project; posterior rim of
Loomis: Millipedes from Costa Rica

cyphopod opening greatly elevated, thin, and deeply concave all across its distal half in front.

_Cyrtodesmus quadridens_ new species

_Holotype_ male, 4 others, 6 females, 21 February, 6-7 March, 5 December 1937, Cairo; male, female, 10 December 1937, Guapiles.

_Diagnosis:_ Associated by the gonopods with _C. hispidulosus_ Loomis (1964a) and _C. palliatus_ but outwardly distinguished by the hidden last segment, apically spiculate dorsal tubercles, and other characters.

_Description:_ Holotype 11 mm long; largest female 14.5 mm long. Dorsum and marginal notches of keels usually free of dirt.

Head with interantennal crests prominent, rather short, widely separated in front, rapidly converging behind; surface between them more or less flattened but finely tuberculate, its anterior margin a little elevated above front; vertex tuberculate, without median sulcus or depression.

Segment 1 not visible in lateral view; front margin with about 10 rounded tubercles; median surface depressed and with small tubercles; surface each side swollen, beset with large and small rounded tubercles intermixed; 2 large submedian tubercles near posterior margin.

Segment 2 with lateral keels large, deeply depressed medianly; surface scattered with small, seta-tipped tubercles; a large tubercle near anterior margin; the 4 typical rows of primary tubercles beginning on this segment and continuing through segment 19; tubercles high, rounded-conic, more or less caudally inclined, tipped by 1 or 2 short but stout spicules as are the secondary tubercles; space between submedian rows considerably greater than on segment 3; posterior margin of segment broadly curved forward across dorsum. On succeeding segments the keels curve outward and downward, the portion beyond the outer posterior sinus broader than long, its outer margin, from segment 5-16 or 17, faintly 3-lobed; segments 18 and 19 faintly 4-lobed. Pores in normal sequence, opening from a large tubercle behind the center of outer portion of keel. Segments 18 and 19 with secondary tubercles greatly reduced in number, the submedian primary ones increased in size, the last in each row projecting behind margin (Fig. 21). Supplementary margin of segments composed of close spaced, narrow lobes, 2-3 times as long as wide, and subtruncated at apex.

Last segment small, hidden from above; dorsum very short, finely granular; posterior margin very convex, with 3 lobes each side of the small rounded apex beneath which 2 transparent, widely separated hooks diverge caudally, with 4 papillae between and below them.

_Gonopod shown_ in Fig. 22. Females with sternum and coxae of second legs following pattern of _palliatus_, but coxae broadly rounded at mesal corners, instead of lobed, and the apical margin longer. Posterior rim of cyphopod opening higher and less convex on front face; each outer angle more broadly rounded.

_Cyrtodesmus sp._

_Female_ of undescribed species from slopes of Volcan Irazu, above San Isidro, 31 March 1937.
EURYURIDAE

Aphelidesmus Brolemann 1898b, p. 322
Aphelidesmus phylephus (Attems 1900, p. 279)
Two males, February; 2 males, 3 females, December 1937; 4 males, female, April 1938, Cairo.

Pseudamphillus Hoffman 1934a, p. 51
Pseudamphillus convexus (Carl 1902, p. 633)
Male, 2 females, 23-24 February; female, 5 March 1937, Cairo; male, female, 10 December 1937, Guaymas.
In life the front part of head, antennae, and legs uncolored; vertex light brown; prozonites light brown above, lighter below; metazonites and segment 1 uncolored.

PARADOXOSOMATIDAE

Oxidus Cook 1911c, p. 628
Oxidus gracilis (Koch 1847, p. 142)
Numerous specimens above San Isidro, near San Jose, 31 March 1937.

PLATYRHACIDAE

Nyssidemus Cook 1896, p. 53
Nyssidemus bivirgatus (Carl 1902, p. 652)
Male, 3 March; 2 males, female, 11 March 1937, Cairo.

Nyssidemus fraternus (Carl 1902, p. 655)

Nyssidemus montivagus (Carl 1902, p. 662)
Female, 24 February 1937, Cairo.

SPHAERIODESMIDAE

Eusphaeriodesmus Brolemann 1916, p. 561
Key to the species of Eusphaeriodesmus

1. Body over 25 mm long; terminal joint of gonopod bluntly rounded at apex ........................................... robustus (Pocock)
1'. Body less than 20 mm long; terminal joint of gonopod not bluntly rounded at apex ........................................... 2

2. Terminal joint of gonopod lacking a submedian protuberance ......
   ................................................................................. bilobatus new species
2'. Terminal joint of gonopod with a submedian protuberance ....... 3

3. Terminal joint of gonopod ending in a slenderly acute prolongation ........................................................................... angustus (Pocock)

3'. Terminal joint of gonopod biramous at tip ................................ 4

4. Apical branches of gonopod subequal in length and thickness, nearly straight ......................................................................... prehensor (Pocock)

4'. Apical branches differing in length and thickness, the longest slender and strongly curved ........................................... stilifer (Pocock)

Eusphaeriodesmus bilobatus new species
Holotype male, very young female, 21 February 1937; other very young, March 1938, Cairo.


Loomis: Millipeds from Costa Rica

Diagnosis: Related to E. stilifer (Pocock 1909, p. 124) as shown by the gonopods and the 2 marginal lobes on posterior rim of gonopod opening. This appears to be a larger species and lacks the small submedian projection of each gonopod.

Description: Male 18 mm long, 5.7 mm wide.

Head with vertical sulcus fine, poorly impressed. Segments 4 and 5 as in Fig. 23; fifth segment largest, not sigmoidally curved, outer limit subtruncate. Segment 16 with posterior margins of metazonite and keels continuous; succeeding keels increasingly produced caudad, junction with midmargin almost at right angle on segment 19. Preanal scale subtriangular, sides slightly convex to the narrowly rounded apex.

Gonopod as in Fig. 24, its inner apical prong finely bifurcate at tip. Gonopodial opening with posterior margin outwardly raised into a high thin lobe each side of the narrow, slightly raised median portion.

First male legs as in Fig. 25; second legs with seminal tubes long, acuminate, much like those shown for E. longitubus Loomis (1963, Fig. 4). Sternum between second legs very narrow; sterna thereafter increasingly wider to gonopods, immediately following which they are about as wide as the fifth sternum, but narrowing to segments 18 and 19 where coxae are almost in contact.

Styloidesmidae

Poratia Cook and Cook 1894, p. 238
Poratia digitata (Porat 1888b, p. 24)
Numerous specimens, 6 March, 7 April, 5 and 7 December 1937, Cairo.

Trichopolydesmidae

Irazunus Attems 1933, p. 260
Irazunus reimus Attems 1933, p. 260
Two males, 14 females, 21 February 1937, Cairo.
Living color pink to brownish pink. As typical of the family, the animals were very rapid runners.

Rhinocricidae

Eurhinocterus Brolemann 1903, p. 131
Eurhinocterus bialgyti Brolemann 1903, p. 132
Numerous specimens, 21 and 24 February, 6, 7, and 14 March 1927, Cairo; 10 December 1937, Guapiles.
I feel quite certain that E. pygmoides (Chamberlin 1933, p. 22), described from Parismina, between the above localities, is a synonym of this species.

Rhinocricus Karsch 1881, p. 68
Rhinocricus centralis Chamberlin 1922, p. 21
Two females, 8 March; male, 21 March; fragment of male, female, 2 April 1937, Cairo.

Trigoniulidae

Spirostrophus Saussure and Zehntner 1902, p. 150
Spirostrophus naresi (Pocock 1893, p. 252)
Very common at Cairo, Guapiles, and Siquirres, 1937. This introduced species is found most frequently under fallen leaves and stems of bananas but also walking in full daylight.

**Epinannolidae**

*Epinannolene* Brolemann 1903, p. 135  
*Epinannolene bicornis* Brolemann 1905, p. 356  
Common at all times in 1937, Cairo.

**Spirostreptidae**

*Orthoporus* Silvestri 1897, p. 7  
*Orthoporus festae* (Silvestri 1896a, p. 3)  
Six males and females, 21 March 1937, Cairo.  
*Orthoporus absconsus* Chamberlin 1922, p. 15  
A careless statement is found for the Costa Rican holotype locality of this species where Chamberlin says “one male in vial with specimens of *G. lactus* (W. R. Maxon).” Probably he meant to refer to his *G. pacificus*, on the preceding page, for his *G. lactua*, on the page before that, was collected in Guatemala, by O. F. Cook.  
*Orthoporus sp.*  
Three unidentifiable females, 6 March 1937, Cairo.

**Stemmiulidae**

*Prosterniulus* Silvestri 1916, p. 323  
The species of this genus appear to be very localized, extending from Mexico to Panama, with only 3 of the known 15 reported beyond their type localities. Geographically, the species are known from 2 areas separated by about 900 miles; the northern area extends from Mexico to Honduras, while the southern one includes Costa Rica and Panama. The 5 Panamanian species are keyed in Loomis (1964a). The 2 Costa Rican species were found in the highlands—*P. tristani* Silvestri (1916, p. 326), *P. picadoi* Silvestri (1916, p. 327). The present collection adds a third species, here described, from the lowlands and exceeding all other members of the genus in size.  
*Prosterniulus grandis* new species  
Holotype male, female, 6 March 1937; other males and females, 7, 21 March, 7 December 1937, Cairo; male, Guapiles, 10 December 1937.  
*Diagnosis:* This unusually large species has distinctive gonopods showing little similarity with those of other species, but perhaps it is closest to *P. cincinnatus* Loomis (1964a, p. 108).  
*Description:* Largest male 32 mm long, 2.5 mm wide; largest female 40 mm long, 3 mm wide; number of segments 53-56; body slender, terete, scarcely compressed laterally; males smaller, more slender and tapering more gradually behind than females; color pattern not unusual.  
Head with antennae long and slender; joint 2 much the longest; joints 3-5 successively shorter; upper ocellus large, at least twice the diameter of the other.  
Segment 1 with a strong stria extending from above eye to lateral angle, a shorter stria in front of it. Segment 3 widely open beneath; more so in male, the inner pleural margin on each side rounded and raised.
Fourth male segment with elevated marginal lobe, each side in front, immediately behind apex of the enlarged coxal joint of leg 2. Segments with dorsal setae present near posterior margin; rising from distinct punctations, other tiny punctations sparsely scattered over surface elsewhere; oblique striae prominent on sides of segments but not reaching middorsum until segment 15-20; notch at posterior end of median furrow of dorsum narrow, shallow, and minute.

Last segment with 14-16 setae projecting back from posterior margin. Anal valves with numerous setae scattered near opening. Preanal scale large, nearly semicircular.

Gonopods shown in Fig. 26-27. Second male legs shown in Fig. 28-29; third male legs somewhat heavier, especially the third joint, than those behind.

*Stemmiodus* Gervais 1844b, p. 28

This predominantly South American genus is known in Panama by 3 species keyed in Loomis (1964a). It is here extended northward by a new species distinguished from all others by the prominent finger-like tubercle on the anterior face of the strongly crassate third male legs.

*Stemmiodus unicus* new species

Holotype male, 5 females, March 1937; female, 7 December 1937, Cairo.

*Diagnosis:* In addition to the prominent tubercle on the supracoxal joint of the third male legs, the rather simple gonopods are distinctive and seem to place the species closest to *S. marginandus* Loomis (1964a, p. 110).

*Description:* Male 10 mm long, with 42 segments; females a little stouter, 11-12 mm long, with 41-46 segments; bodies of both sexes moderately compressed laterally.

Head with fine vertical sulcus; in largest females the ocellus each side is only a little smaller than antennal socket and separated from it by about 2/3 the diameter of the ocellus. Antennae of male with joint 2 much the longest, joint 5 next, then subequal joints 3, 4, and 6, followed by joints 1 and 7; females with joint 2 not as long as in male, joints 3-6 subequal.

Segment 1 with a long stria above anterior margin infuscating rim, extending to just behind ocellus. On succeeding segments the oblique lateral striae first reach middorsum on segment 8 or 9. Notch at posterior end of dorsal median furrow of metazonites very small, short, and inconspicuous.

Anal valves strongly convex, their inner margins finely raised. Preanal scale large, rounded behind.

Gonopods shown in Fig. 30-31. Second male legs as in Fig. 32. Third male legs strongly crassate; supracoxal joints unusual in having a long, erect, finger-like tubercle projecting from anterior face as seen in Fig. 33.

**Platydesmidae**

*Platydesmus* Lucas 1843, p. 51

Twenty-four apparently greatly localized species and a variety have been reported ranging from Mexico to Panama. Three old and 7 new species were described and keyed by Pocock (1903, p. 42-49), in the only comprehensive study of the genus, which was then recorded from Mexico and Guatemala. The presently described new species is readily distinguished from those of Pocock and subsequent authors by characters of its first segment.

No attempt has been made to prepare a complete key to all species
since recognition of many will require redescriptions, modern illustrations, or actual examination of original or topotype specimens to establish comparable diagnostic characters.

*Platydnesmus bitumulus* new species

Holotype female, USNM No. 2967, 3 females, 1 immature, labeled "#1919, Paraismina, 1920," collected between Cairo and Guapiles, by Manuel Velario, and sent me for identification by Dr. E. A. Chapin, National Museum of Natural History.

*Diagnosis:* Distinguished by the broad body with very broadly rounded ends; many segments; the essentially rectangular first segment with forwardly directed lobes between which, near front margin, are 2 large transverse tubercles.

*Description:* Body about 4 times as long as broad; the ends more bluntly rounded than in other species (Fig. 34-35); dorsum strongly arched, sides evenly descending to outer limits of keels which reach well below sterna (Fig. 36). Holotype 27 mm long, 7 mm broad, 66 segments; other 2 females 24 and 26 mm long, 6 mm broad, with 60 and 58 segments respectively. In alcohol the median line narrowly light buff, dorsum either side dusky to near base of keels beyond which color fades to light buff to outer margin.

Head very little exposed in front of segment 1; labral region broadly rounded; antennae short and stout; each side of head with a large, rounded, shining, convex area poorly defined, slightly lighter than adjacent surface, and possibly light sensitive.

Segment 1 transversely subrectangular, the broad anterior lobes directed straight forward, widely separated; 2 very large transverse tubercles between them above front margin; posterior half of surface crossed by a row of about 12 rounded tubercles. Segment 2 with lateral keels more forwardly directed than in other species. Succeeding segments also with keels more strongly bent forward, and more of them, than in other species; not until segment 11 are keels at a right angle to body axis.

Segments with a distinct median furrow and 2 transverse rows of round tubercles conspicuous to base of keels or farther; posterior row with the 2 inner tubercles largest (Fig. 37); surface of keels with tiny scattered granules; entire dorsum surface, except tubercles, densely covered with very fine prostrate pubescence difficult to see. Penultimate segment with keels produced backward and inward considerably beyond apex of last segment; inner angles nearly touching in some specimens. Last segment elongate; surface with tiny granules; apex with about 6 small acute teeth. Anal valves combining with preanal scalo to form a broad oval, valves strongly inflated, brilliantly shining. Sterna very broad, at least half as wide as length of a leg; tips of legs not extending to sides of body.

*Platydnesmus lankesteri* Brolemann 1905, p. 354

This is the only other Costa Rican species and comes from the highlands. It is smaller than the foregoing, has fewer segments, and with the anterior ones of different shape.

**Polyzoniidae**

*Siphonotus* Brandt 1837, p. 179

Specimens from Cairo and Guapiles are in such poor condition that
positive identification cannot be made although they appear to resemble S. panamanus Loomis (1964a, p. 122).

**Siphonophoridae**

*Siphonophora* Brandl 1887, p. 179

Nineteen species and a variety of this genus have been reported from Mexico and Central America. Five occur in Panama and are keyed in Loomis (1964a); 2 are in Costa Rica, with the others 250 miles to the north, in El Salvador, Honduras, Guatemala, and Mexico. Many of the species of the northern contingent are known only from the original collection, some even based on females, and are inadequately described by present-day standards, making identifications difficult, and formulation of an accurate key impossible without a thorough study of most species erected before 1954—subsequent species being better documented.

*Siphonophora alveata* new species

Holotype male, 3 others, female, 5 December; 3 males, March 1937, Cairo.

**Diagnosis:** Related to the Panamanian *S. montana* Loomis (1904a, p. 125), but apparently smaller, relatively more slender, with fewer segments, and the apical joint of the anterior gonopod materially different.

**Description:** Maximum length 11 mm, width 0.9 mm; number of segments 42-52. Body widening quite rapidly from segment 1-8; dorsum strongly and evenly convex.

Head (Fig. 38) short, conical, the sides evenly convex to the barely deflexed beak which is relatively longer than in *montana*. Antennae short and heavy, the sockets opening almost laterally from lower sides of head: only a little of joint 1 visible from above; joints 2, 3, and 4 short, 5 distinctly longer, with joint 6 about half again as long.

Segment 1 nearly twice as wide as base of head; front margin strongly concave.

Gonopods (Fig. 39) resembling those of *montana* but the distal joint of the anterior ones heavier, less acute, and with posterior face broadly channelled from base to apex. First and second male legs with joints, except outer one, heavier than on legs that follow; first legs without anterior intercoxal lobes.

*Siphonophora costaricae* Chamberlin 1914, p. 186

*Siphonophora valeri* Chamberlin 1933, p. 24. New synonymy

Two males, female, 5 young, 7 April 1937, Cairo.

This species was founded on a single female and has not again been reported, Chamberlin (1922) even failing to record it in his "The millipeds of Central America." Neither did he refer to it in his description of *valeri*, based on 3 females, giving no character other than the variable one of color, under preservation, that might separate the 2 species. His illustrations of segment 1 of both species are of questionable accuracy and, conceivably, depict the same one. Since the present specimens agree with the meager details of both species, they have been assigned, with a supplementary description, to *costaricae*, and *valeri* is reduced to synonymy.

**Diagnosis:** The size of *costaricae* associates it with *panamensis* Loomis (1961, p. 121), but it differs in the shape of the head and apical joints of
the anterior gonopod, which characters, as well as the living color, also differentiate it from rosacea.

**Description:** Largest male 40 mm long, with 125 segments; largest female 34 mm long, 113 segments; living color light clay yellow with dark intestinal track along midbody very conspicuous. Antennae with joints 1 and 2 short and of equal length; joints 3-5 subequal and next in length; joint 6 decidedly the longest.

Gonopods shown in Fig. 40. Male legs 1 and 2 with all inner joints heavier than on legs that follow; last joint quite short, as compared to those of rosacea and alveata, little longer than preceding joint but slender, claw over half as long as joint. First male legs without anterior intercoxal lobes.

*Siphonophora rosacea* new species

Holotype male, female, 7 March 1937; male, March 1938, Cairo.

**Diagnosis:** Related to *S. panamensis* Loomis (1961, p. 121), but with head shorter and broader, body decidedly broader; terminal joint of anterior gonopods much thicker, living color rosy, rather than grayish white.

**Description:** Largest male (holotype) 71 mm long alive but in alcohol only 55 mm long, 2 mm wide; 136 segments; preserved female 52 mm long; 142 segments. Living color old rose or light purplish pink on upper and lower body surfaces, legs, and basal joints of antennae; midbody slightly darker than ends; outer antennal joints and beak dark yellow.

Head short (Fig. 41), sides very oblique; antennae short, stout, and slightly exceeding beak; joints 2-5 with bases narrow, rapidly broadening beyond; joints 2 and 6 subequal, longer than those between.

Segment 1 with sides only a little oblique; front margin moderately concave; succeeding segments widening very slightly and gradually.

Preanal scale transversely narrowly elliptic.

Anterior gonopods short and thick; outer joint (Fig. 42) at a right angle to basal joints, its apical nub strongly chitinized. Posterior gonopods much like those of *S. progressor* Chamberlin (1922, p. 0), but the terminal joint entirely simple and more uniformly slender, almost hair-like. First male leg with claw heavy, almost as long as the slender last joint, the other joints thick; no anterior intercoxal lobes. Other pregenital legs with basal joints and claws decreasing slightly in size but stouter than on legs behind gonopods. Coxal joints of all postgenital legs swollen distomesadly behind into a slightly produced rounded shoulder perforated for a protruding pouch.