

COPEPODS OF THE JURÉIA ECOLOGICAL RESERVE, STATE OF SÃO
PAULO, BRAZIL. I. **DOVIELLA PRIMA**, NEW GENUS, NEW SPECIES
(POECILOSTOMATOIDEA: CLAUDIDIIDAE)

CARLOS EDUARDO FALAVIGNA DA ROCHA

Departamento de Zoologia, Instituto de
Biociências, Universidade de São Paulo,
Caixa Postal 20520 - 01498 - São Paulo,
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RESUMO - **Doviella prima** gen. n., sp. n. é descrita de amos -
tras bentônicas coletadas no estuário do Rio Una do Prelado,
que drena parte da região da Juréia, Estado de São Paulo.
Suas características diagnósticas mais importantes são os en-
dopoditos do primeiro par de pernas acentuadamente modifica-
dos nos machos, as antenas triarticuladas e preênseis, a es-
trutura de cada um dos apêndices bucais e a ornamentação das
pernas locomotoras. É um copépodo ectoparasita, mas seu hos-
pedeiro permanece desconhecido, pois foi encontrado livre de
le. Diferentes grupos de invertebrados meiobentônicos que po-
deriam ser os hospedeiros deste novo copépodo são discutidos,
sendo que o mais provável de todos eles seja algum poliqueto
tubícola.

ABSTRACT - **Doviella prima** n. gen., n. sp is described from
benthic samples of the blackwater river Rio Una do Prelado ,
which drains part of the Juréia Region, State of São Paulo ,
Brazil. It is easily distinguished from the other clausi-
diid copepods by the much modified endopodites of the first
pair of legs in males, the 3-segmented and prehensil an-
tennae, the structure of the oral appendages and the setal
and spinal formulae of the swimming legs. Its host is unk -
nown, since it was found free in the samples. Tube-dweller
polychaetes are suggested as probable hosts of this new clau-
sidiid copepod.

Very abundant copepods which later revealed, to be
most interesting were caught in the meiobenthos of the black
water river Rio Una do Prelado in 1982, some of which were
put at my disposal for examination. Although their structure
indicates that they are parasitic or associate copepods ,
they were always found free. Among the several families of
poecilostomatoid copepods, they could be accommodated only
in the family Clausidiidae. However, they showed enough

features which made impossible their inclusion in any known clausidiid genus, and made necessary the erection of a new genus and species for them.

The present material was collected in the framework of a limnological project headed by Dr F. D. Por. The preliminary hydrobiological data of the Rio Una as well as the collecting area are provided by Por et al. (1984)

Doviella gen. n.

Type-species: *Doviella prima* sp. n.; by monotypy

Diagnosis: Clausidiidae. Body elongated. Genital somite not coalesced with first postgenital somite in both sexes. Anal somite with a ventral transverse row of spinules near its anterior border. Antennule 6-segmented with aesthetascs on last three segments. Antenna 3-segmented. Labrum with a median linguiform flap. Mandible with a single claw. Maxillule with basal lobe bearing 4 setae and terminal lobe smooth. Maxilla bi-segmented; terminal segment finger-like with 2 setae and crenulated tip. Maxilliped 3-segmented in female ending in a short and broad claw, and 4-segmented in male bearing an articulated process covered by scale-like ridges on second segment and ending in a long claw. All legs heavily spinulose. Terminal spines of last segment of exopodite from first to fourth pairs of legs with a seta-like extension on their inner edges reaching beyond tip of spine. Endopodite of first leg bi-segmented and modified in male. Fifth leg similar in both sexes, its basal segment with a seta and terminal one with four setae. Sixth leg represented by a single seta in both sexes.

Host: unknown

Gender: feminine

Etymology: This genus is named in honor of Dr Francis Dov Por, a friend and eminent copepodologist, who put at my disposal the specimens of the new clausidiid for examination.

Doviella prima sp. n. (Figs. 1-26)

Type Material. Fifteen females and 6 males from benthos samples dredged at 5 m depth in Rio Una do Prelado estuary, State of São Paulo, Brazil, July-September, 1982, G. Y. Shimizu col. Female holotype (nº 7276), 5 female paratypes (nº 7277) and 2 male paratypes (nº 7279) in Museu de Zoologia University of São Paulo, São Paulo, Brazil.

Female. Total length 740-900 µm; holotype 860 µm. General shape of body (Fig. 1) slender. Prosome (470 µm, holotype)

not greatly expanded. Cephalothorax as long as wide. Urosome (390 μm , holotype) with 6 somites plus caudal rami.

Genital somite (Fig. 2) not coalesced with first post-genital somite and twice wider than long. Area of egg sac attachment (Figs. 2, 3) proximally protruded into lateral flattened lobe, hairy and wide posteriorly, narrower and turned inwards and upwards anteriorly (Fig. 3); margin of narrower part of this lobe also hairy but with spinule. Single serrate seta (leg 6) inserted posteriorly to lobe. Egg sac (Fig. 1) slender, reaching half of caudal ramus, containing 25 eggs arranged in 4 longitudinal rows (one dorsal, one ventral and two lateral).

Anal somite (Fig. 4) with ventral transverse row of spinules near its anterior border and another ventral row of spinules along its posterior border. All other urosomal somites smooth and shorter than anal somite.

Caudal rami (Fig. 4) almost as long as anal somite. Each ramus 60 μm long and 22 μm wide at insertion of lateral seta (30 μm), which inserts halfway along external margin. Dorsal seta (35 μm) naked. Outermost terminal seta about twice as long as innermost (38:18 μm). Inner median terminal seta 2.5 times length of outer one, both ornamented by short hairs (Fig. 5). A row of spinules along the end of ramus ventral to insertion of setae.

Rostrum (Fig. 6) conspicuous in dorsal view, almost square.

Antennule (Figs. 7, 8) 6-segmented, segments measuring 5, 12, 10, 8, 10 and 20 μm in length respectively from basis to antennule tip along their posterior margins. Second segment with dorsal row of denticles along median portion of its distal border (Fig. 8). Third segment bears the longest and thickest seta (Fig. 7). Each of the last three segments with single aesthetasc (Fig. 7, arrows). Rest of armature as indicated in figures.

Antenna (Fig. 9) 3-segmented. First and second segment with a seta each. Third segment (Fig. 10) with short spine and seta at end of double row of spinules on inner side, and bearing terminally four unequal, thickened, recurved, prehensile, spine-like setae and two barbed setae, the outermost the longest.

Oral area as in Fig. 11. Labrum protruded medially backwards and downwards into pointed flap with smooth edges. Mandible (Fig. 12) very small, bearing recurved claw expanded internally into spine-like process. Paragnaths not seen. Maxillule (Fig. 13) slightly bilobed, with expanded basal lobe having 4 setae and terminal lobe narrower and smooth.

Maxilla (Fig. 14) bi-segmented. Basal segment broad and spinulose externally. Terminal segment elongated, with tip crenulated and bearing 2 short, naked setae. Maxilliped (Figs. 15) 3-segmented. Second segment the largest, spinulose basally and hairy distally on inner side and expanded externally in terminal flap armed with row of long spinules (Fig. 16). Last segment forming a recurved and prehensile claw.

Legs 1-4 (Figs. 17-20) heavily ornamented by rows of thickened spinules and setules. All legs with terminal spines of last segment of exopodite serrate on outer edges and with seta-like extension on inner edges reaching beyond tip of spine; only inner edges of inner spines and their extension plumose. Their spine (roman numerals) and setal (arabic numerals) formulae as follows:

	Leg 1		Leg 2		Leg 3		Leg 4	
	Exp	End	Exp	End	Exp	End	Exp	End
1st segment	I-0	0-1	I-0	0-1	I-0	0-1	I-0	0-1
2nd segment	I-1	0-1	I-1	0-2	I-1	0-2	I-1	0-2
3rd segment	IV-3	I-4	IV-4	III-3	III-5	II-3	III-5	II-2

Leg 5 (Fig. 21) bi-segmented. Basal segment broad and with outer seta. Terminal segment about 1.5 times longer than wide (45:28 μm), with 3 long barbed spines and a short naked seta. Outer spine 100 μm long and inserted just beyond mid-length of segment. Terminal spine the longest (135 μm). Inner spine 75 μm long and inserted at midpoint of edge. Inner seta (30 μm) between inner and terminal spines.

Male. Body shape (Fig. 22) similar to female. Total length 680 μm (prosoma = 340; urosoma = 340 μm) Genital somite 2.6 times wider than long and containing 2 small spermatophores. Leg 6 (Fig. 23) consisting of single, naked, short, spine-like seta. Caudal rami like those of female.

Antennule, antenna, and mouthparts (except maxillipeds) as in female. Maxilliped (Fig. 24) 4-segmented. Basal segment broad and with inner seta. Second segment large, with seta near articulation of heavily chitinized, finger-like process covered with minute scale-like spinules on its whole surface and long spine near its tip. Third segment short Fourth segment forming a claw bearing proximal seta and aesthetascan on midpoint; inner margin with strong denticles excepting near the tip where it is finely crenulated.

Leg 1 (Fig. 25) differing from that in female by having outer spine of first segment of exopodite stronger than other ones and endopodite bi-segmented modified as follows: basal segment with inner plumose seta; terminal segment bearing inner strong, recurved spine proximally and 4 terminal setae, two innermost much shorter than two outermost.

Leg 2-4 as in female. Leg 5 (Fig. 26) similar to that of female in all important respects, both a little more slender. Terminal segment twice as long as wide; lengths of its spines from inner to outer 70, 140, 100 μm , and of seta 30 μm .

Habitat. *Doviella prima* was collected in the benthos of the Rio Una do Prelado estuary during low tide at a depth of 5.0 m. The salinities and temperatures of the water near the bottom varied from 4.0 to 19.0‰ and from 20.0 to 21.3°C,

respectively. while the pH ranged from 6.7 to 7.2.

Distribution. *Doviella prima* is known only from its type-locality, the Rio Una do Prelado, Brazil.

Remarks. At first sight, *Doviella* resembles *Hersiliodes* Canu, *Leptinogaster* Pelseneer, *Conchylurus* Bocquet & Stock, and *Pseudopsyllus* T. Scott by its slender long body shape, with the urosome scarcely distinct from the prosome. However, a more detailed examination of the appendages of these genera shows that this similarity must be attributed to convergence and it makes clear that the new form here described is a very typical genus.

The most important character distinguishing *Doviella* from all clausidiids known is the peculiar sexual dimorphism in the first pair of legs, both endopodites of the males being much modified in a structure which might participate in the reproductive process. Although not so pronounced as in *Doviella*, sexual dimorphism in this pair of legs has been registered in other clausidiids. In *Clausidium* it involves the seta of the first basipodite, which is replaced by a blade-like seta in females, and the setal formula of the exopodite (Humes, 1949; 1957; Pillai, 1959; Kensley, 1974) and in males of *Leptinogaster* the second segment of the endopodite of the first leg is prolonged on the anterior aspect of the ramus into a small process variable in shape and ornamentation with the species (Humes & Cressey, 1958)

Doviella also differs in the Clausidiidae by the spinal and setal formulae of its swimming legs, being the only clausidiid bearing four spines and four setae on the terminal segment of the exopodite of the second leg, and two spines and three setae on the terminal segment of the endopodite of the third leg.

The antenna of *Doviella* has the same number of segments found in *Tychidion guyanense* Humes, 1973. However, the terminal segment of this appendage is long and bears four weak setae distally in the latter while it is short, heavily spinulose and armed with four prehensile, terminal claws in the former.

As the other genera of Clausidiidae, *Doviella* has very characteristic oral appendages. Its mandibles, with only one terminal claw is the simplest type found in clausidiids, being similar to that of *Goidelia japonica* Embleton, 1901. Nevertheless, the structure of the mandibular claw is greatly different in both genera.

The maxillule of *Doviella* resembles mainly that of *Leptinogaster* but the spine present on the tip of the maxillule distal lobe in *Leptinogaster* (Bocquet & Stock, 1958) is wanting in *Doviella*. The structure of the maxilla and maxilliped in both sexes does not have a parallel in any clausidiid known to date.

The invertebrate group which might be the host of *Doviella* is problematic to be proposed, and all said here con-

cerning a possible host for it, must be considered pure speculation.

Among the several groups registered by Por & Shimizu (in press) in the meiobenthos of Rio Una do Prelado, the most probable ones which could be hosts of *Doviella* are bivalves or polychaetes. Coincidentally or not, the same groups have been registered as hosts of the clausidiid genera allied to *Doviella*.

Judging that the bivalves from Rio Una were as big or little larger than the specimens of *Doviella* (G. Y. Shimizu, personal communication) it diminishes the chances of a probable association between them. Even though the bivalves were large enough to be the hosts, the fact of the specimens of *Doviella* having always been found free and numerous in the meiobenthos (Por et al., 1984, as *Pontoclausia* sp.) is another obstacle in considering these animals as hosts. The clausidiids associated with bivalves have been found almost exclusively in the mantle cavities of these animals, being very rarely caught free.

The exclusion of the bivalves makes the tube-dweller polychaetes the most probable hosts of *Doviella*. The fact that this copepod has been found free is not inconsistent with this proposition since the tube could easily be broken during the collecting process, releasing the associate copepods, as Gotto (1964) has proposed to *Anomoclausia indrehusae*. Further work is needed to determine not only the host, but also the dependence relations between these copepods and their host.

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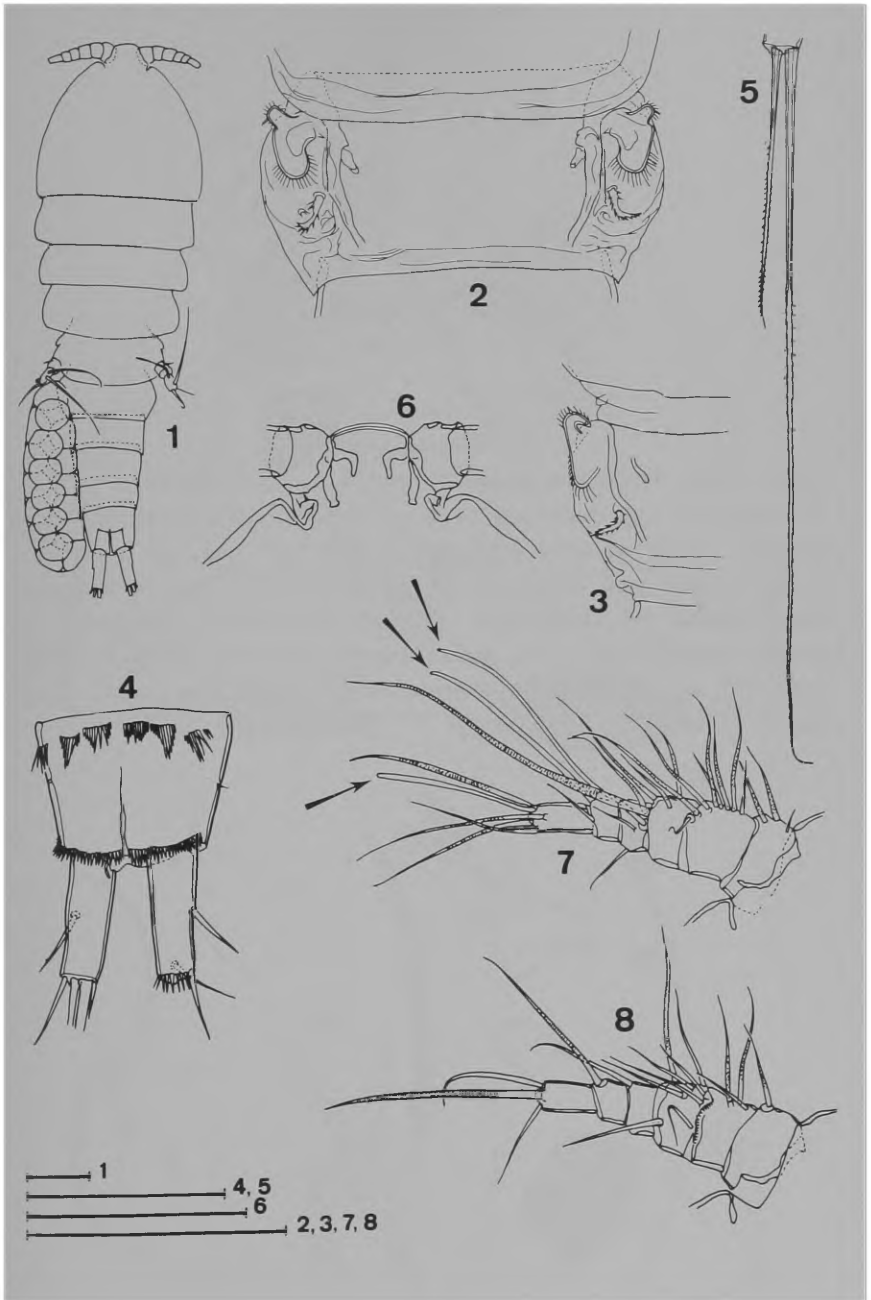
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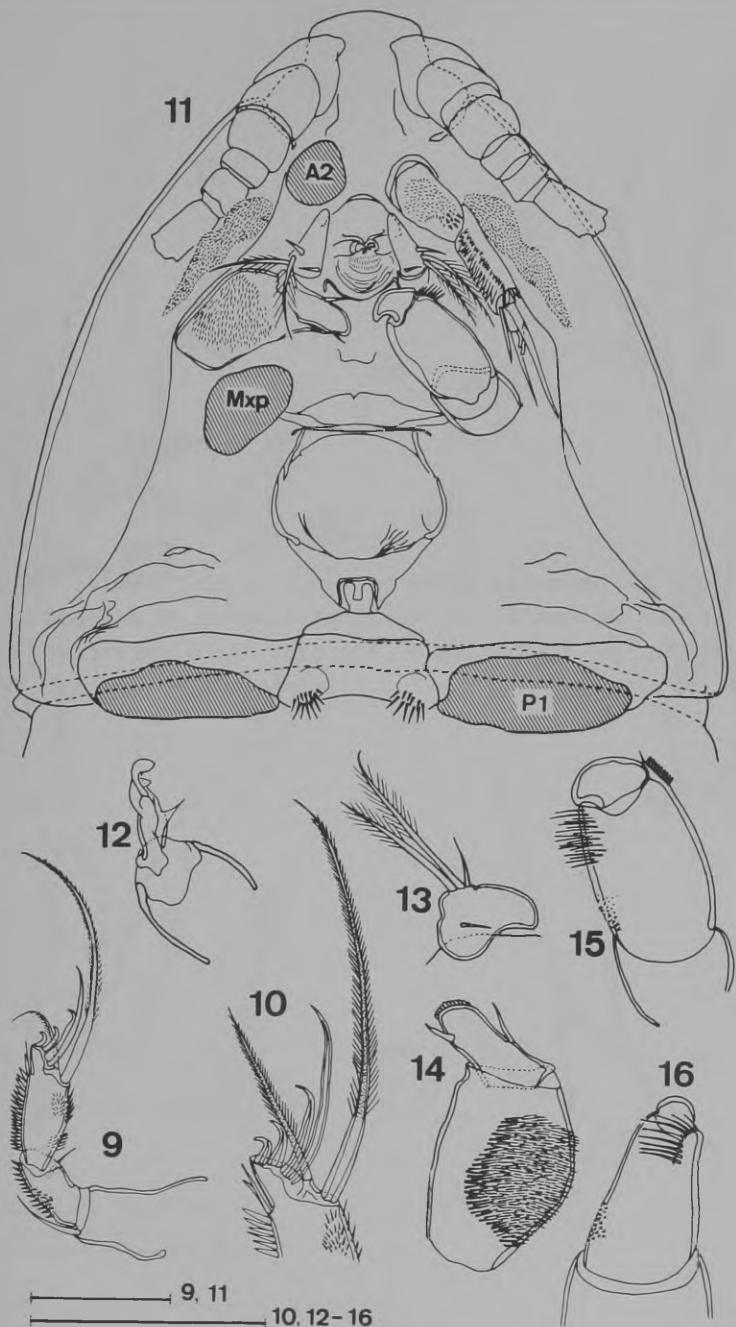
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Figs. 1-8. *Doviella prima* n. gen., n. sp. Female.

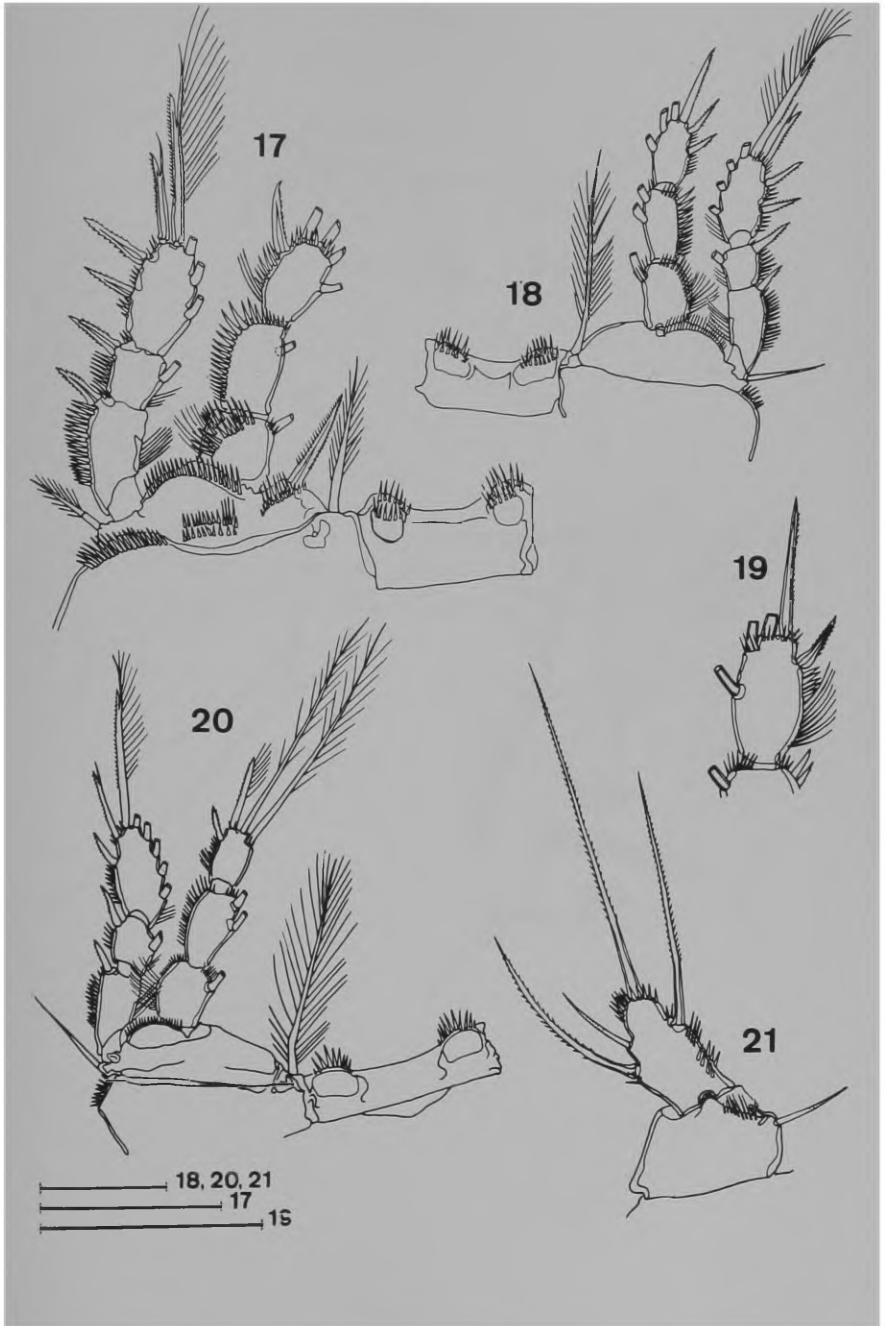
1, habitus, dorsal; 2, genital somite, dorsal; 3, left side of the genital somite, lateral; 4, anal somite and caudal rami, ventral (row of spinules along end of right caudal ramus omitted); 5, median terminal setae of caudal rami; 6, rostrum, ventral; 7 right antennule, ventral; 8, right antennule, dorsal. Figs. 1, 2 and 6 from holotype; others from paratypes. Scale bars: 100 μ m.



Figs. 9-16. *Doviella prima* n. gen., n. sp. Female.
9, antenna; 10, terminal part of antenna; 11, cephalothorax, ventral, showing oral area (part of first pair of legs (P1) right maxilliped (Mxp) right antennule(A2) and left maxilla suppressed); 12, mandible; 13, maxillule; 14, maxilla; 15, maxilliped, ventral; 16, maxilliped, external lateral view. Figs. 11 and 12 from holotype; others from paratypes. Scale bars: 50 μ m.



Figs. 17-21. **Doviella prima** n. gen. n. sp. Female.
17, leg 1; 18, leg 2; 19, terminal segment of endopodite of
leg 3; 20, leg 4; 21, leg 5. All figs. from paratypes. Scale
bars: 50 μm .



Figs. 22-26. *Doviella prima* n. gen. n. sp. Male.
22, habitus, dorsal; 23, leg 6; 24, maxilliped; 25, leg 1,
basal plate omitted; 26, leg 5 Scale bars: 50 μ m.

