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Perulernaea pirapitingae n.sp. (Copepoda: Lernaeidae) a parasite of the serrasalmid fish, *Piaractus brachypomus* from the Meta River, Colombia

by

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Abstract

Perulernaea pirapitingae n.sp. a parasitic copepod (Lernaeidae) from the fish *Piaractus brachypomus* of the Meta River, Colombia, is described. In addition to the postmetamorphic female, observations on the copepodid V, the premetamorphic female and transitional stages are presented. The new species differs from the only other species known in the genus, *Perulernaea gamitanae* THATCHER & PAREDES, 1985, by being only about half as large, having less estensive "neck" glands and a leg 2 that is in a more anterior position. The new species also has a different host and is from another country.

Keywords: **Fish parasite, lernaeid, Colombia, copepod.**

Resumo

Perulernaea pirapitingae n.sp. (Lernaeidae), um copépodo parasito do peixe *Piaractus brachypomus* do Rio Meta, Colombia, é descrito. Além da fêmea pós-metamórfica, são apresentadas observações sobre o copepodito V, a fêmea pre-metamórfica e alguns estágios de transição. A nova espécie distingue-se da única outra do gênero, *Perulernaea gamitanae* THATCHER & PAREDES, 1985, por ser só a metade dessa em tamanho. Também, as glândulas do "pescoço" ocupam uma área menor, a perna 2 é mais anterior e as duas espécies são de diferentes hospedeiros e paises.

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THATCHER & PAREDES (1985) described a new genus and species of Lernaeidae that they called *Perulernaea gamitanae*. This parasite had been found dangling from the nasal fossae of the Amazonian food fish, *Colossoma macropomum*, at Iquitos, Peru. This is a fish called *tambaqui* in Brazil and *gamitana* in Peru. The same parasite was later found in the mouth and on the gills of the same host species at Manaus, Brazil. It was redescribed by THATCHER & WILLIAMS (1998). Both the description and the redescription were based on only a few specimens and developmental stages were not seen. Recently, gill material containing numerous postmetamorphic females and some developmental stages of a new species of *Perulernaea* came to hand. This species is herein described and the developmental stages are compared to those of *Lernaea devastatrix* as reported by BOXSHALL et al. (1997).

Material and Methods

Several gill arches of the serrasalmid fish, *Piaractus brachypomus*, from the Meta River of Eastern Colombia were sent to me for examination and parasite identification. They were found to be heavily infested with more than 100 specimens of *Perulernaea* n.sp. including several developmental stages. Parasites were removed with the aid of dissecting needles and preserved in 70% alcohol. The specimens were studied in phenol as temporary mounts and permanent preparations were made of some by the phenol-balsam method described in THATCHER (1991). Drawings were made with the aid of a camera lucida and measurements with a measuring ocular. Measuremente are in micrometers (μm) unless indicated as millimeters (mm).

Systematic Section

Perulernaea pirapitingae n.sp. (Figs. 1-17)

Host: *Piaractus brachypomus;* Serrasalmidae; Brazilian common name: *pirapitinga*.
Site: Gill filaments and gill arches.
Locality: Upper Meta River, Eastern Colombia.
Holotype postmetamorphic female and 3 paratype postmetamorphic females deposited in the Invertebrate Collection of the Instituto Nacional de Pesquisas da Amazônia, Manaus, Amazonas, Brazil.
Etymology: The common name of the fish host is used as the specific name of the parasite.

Postmetamorphic adult female (Figs. 4 & 8-17).

Description: Measurements made on six specimens. Length = 8.9-11.4 (10.0) mm; lateral spread of anchors = 2.7-4.6 (3.9) mm; diameter of anchors = 0.81-1.10 (0.93) mm; length of hindbody = 4.0-5.0 (4.5) mm; greatest width of hindbody = 0.91-1.10 (1.0) mm; hindbody representing 39-53 (46)% of the total length; 45-47 (46)% of hindbody lies posterior to genital pore; egg sacs 2.9-3.5 (3.1) x 0.61-0.78 (0.72) mm. Thoracopods 1 and 2 shown in Figures 13 and 14. Spine and setal formulae for first four thoracopods as in Table 1. Thoracopod 5 (Fig. 15) closely similar to that of *Lernaea devastatrix* (BOXCHALL et al., 1997). Protopod with a single seta; exopodal element flattened and spatulate bearing six setae. Antennules and antennae as in Figures 16 and 17. No aesthetasc was observed.

Other stages

Males were not found but females in the copepodid V stage, as premetamorphic adults and in various transitional stages were seen. These are herein described.

Female copepodid V (Fig. 1)

At this stage, the body consists of a cephalothorax, which incorporates the first pedigerous somite, pedigerous somites two to five, the genital somite and three abdominal somites. The body measures 1.10-1.25 mm in length by 29-35 µm in greatest width. This stage is similar to that in such species of *Lernaea* as have been described but the cephalothorax is bullet-shaped rather than truncate.

Adult premetamorphic female (Fig. 2)

This stage consists of a cephalothorax, including the first pedigerous somite, pedigerous somites two to five, a genital somite and four abdominal somites. The cephalothorax is nearly the same size as in copepodid V but the rest of the body is more elongate. Without the caudal filaments, it measures 1.50-1.70 mm in length and 30-35 µm in greatest width. The genital somite is larger and more rectangular than in the copepodid stage. This stage is more elongate than that of *Lernaea devastatrix* as shown in Figure 2a by BOXSHALL et al. (1997) and the cephalothorax is rounded anteriorly instead of truncate.

Growth of transitional stages (Figs. 3, 5-7)

Transitional stages measuring from 2.25-9.20 mm in length were found. The smallest of these (Fig. 3) shows fusion of all somites and areas of stretch between the cephalothorax and the second pedigerous somite, as well as between the third and fourth, the fourth and fifth, and the fifth and the genital somite. The next largest stage found (Fig. 5) measured 3.5 mm in length. It can be seen that the regions of greatest stretch were between the second and third and between the third and fourth pedigerous somites. The genital somite has lost its rectangular appearance and become rounded. Transitional stages measuring from 9 to 10 mm in length were also seen (Fig. 6). Here, the lengthening between the third and fourth pedigerous somites is particularly pronounced and the cephalothorax has begun to change shape. In Fig. 7, the cephalothorax can be seen to have enlarged but head anchors have not yet grown out. A slight swelling in the body just anterior to the fourth pair of swimming legs indicates where the hind body will start in the postmetamorphic adult female.

Discussion

HO (1998) pointed out the relative paucity of South American lernaeids as compared to the abundance of these forms in Asia and Africa and suggested a geological explanation. While it is true that there are fewer lernaeids known from South America, it should be remembered that there are literally thousands of native freshwater fishes on this continent that have never been examined for parasites. The principal papers dealing with South American lernaeids are: BOXSHALL et al. (1997); BRIAN (1924); PAGGI (1972, 1976); THATCHER (1998); THATCHER & PAREDES (1985) and THATCHER & WILLIAMS (1998).

THATCHER (1998) affirmed that there are no native species of the genus *Lernaea* known from South America. HO (1998) considered *Perulernaea* to be a synonym of *Lernaea*. According to him, the supposed distinguishing characters, namely: blunt head anchors, a well defined slender "neck" and a fusiform hindbody, are not unique to the Peruvian genus but "are also found in the species of *Lernaea*". He did not indicate what species of *Lernaea* have such characters, but if he was thinking of *Lernaea argentinensis* PAGGI, 1972, and *Lernaea lagenula* (HELLER, 1868) then he will have been misled and possibly have compromised the results of his cladistic analysis. As THATCHER & WILLIAMS (1998) pointed out, neither of these species can belong to *Lernaea*. Judging by the position of the thoracopods, as shown in the published drawings, both probably represent new genera. Table 2 shows the native genera and species

of Lernaeidae herein recognized for South America along with their known hosts and localities. In addition to the native species, there are three imported ones, namely: *Lernaea cyprinacea* L., *L. devastatrix* BOXSHALL, MONTU & SCHWARZBOLD 1997, and *Lamproglena monodi* CAPART, 1944. The two species of *Lernaea* have been reported from various imported and native fishes in the South of Brazil and the lamproglenid occurs in cultures of African tilapias.

Perulernaea pirapitingae n.sp. is much smaller than *P. gamitanae* THATCHER & PAREDES, 1985, (8.9-11.4 compared to 18.0-21.7). The glandular area of the "neck" in the new species is limited to the anterior expansion whereas in *P. gamitanae* glands occupy the first one-third of the "neck". Since the second thoracopods are immediately posterior to the glandular area in both species, these appendages are in a much more anterior position in the new species. The new species is also from a different host fish (*Piaractus brachypomus*) and a different country (Colombia).

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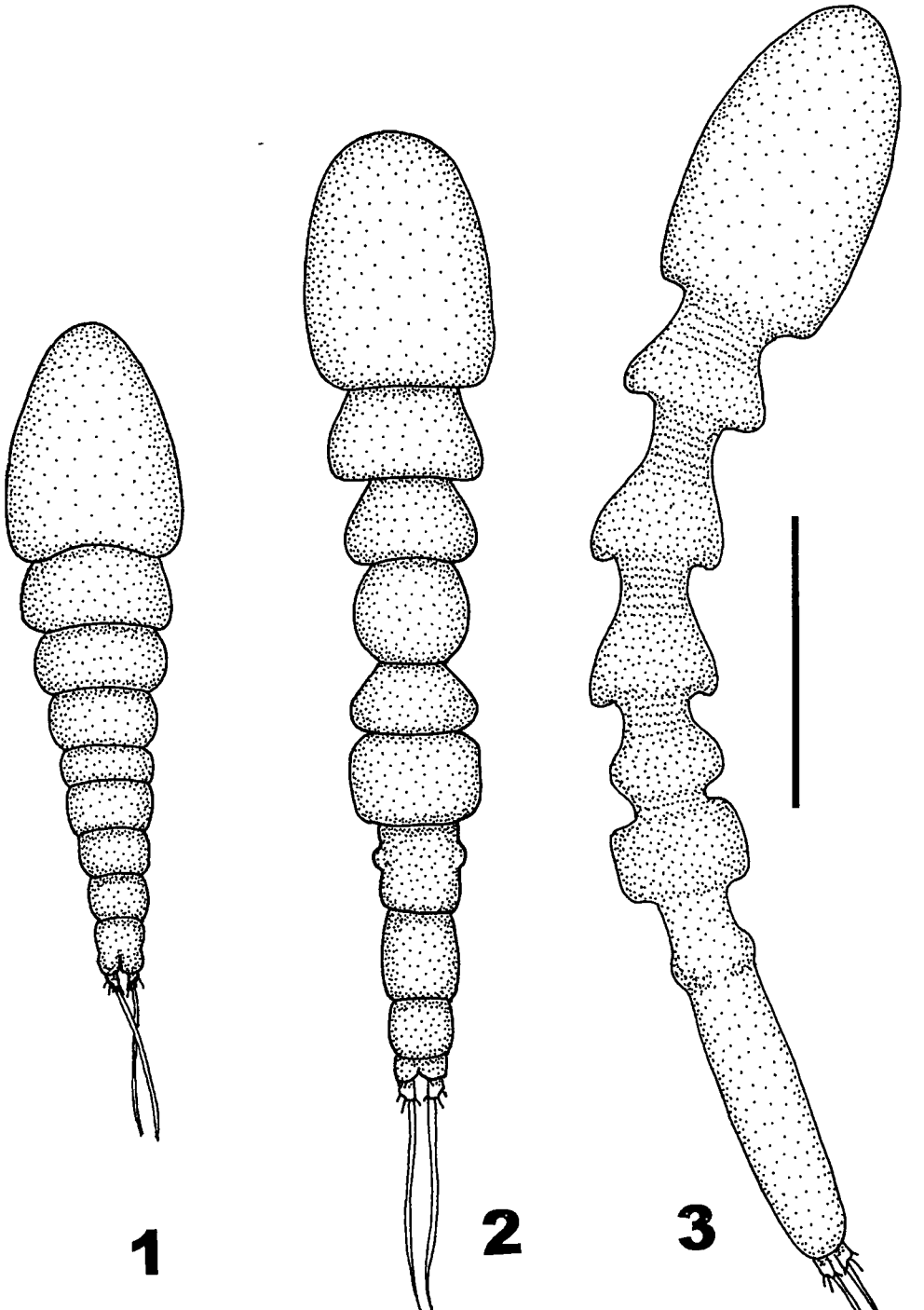
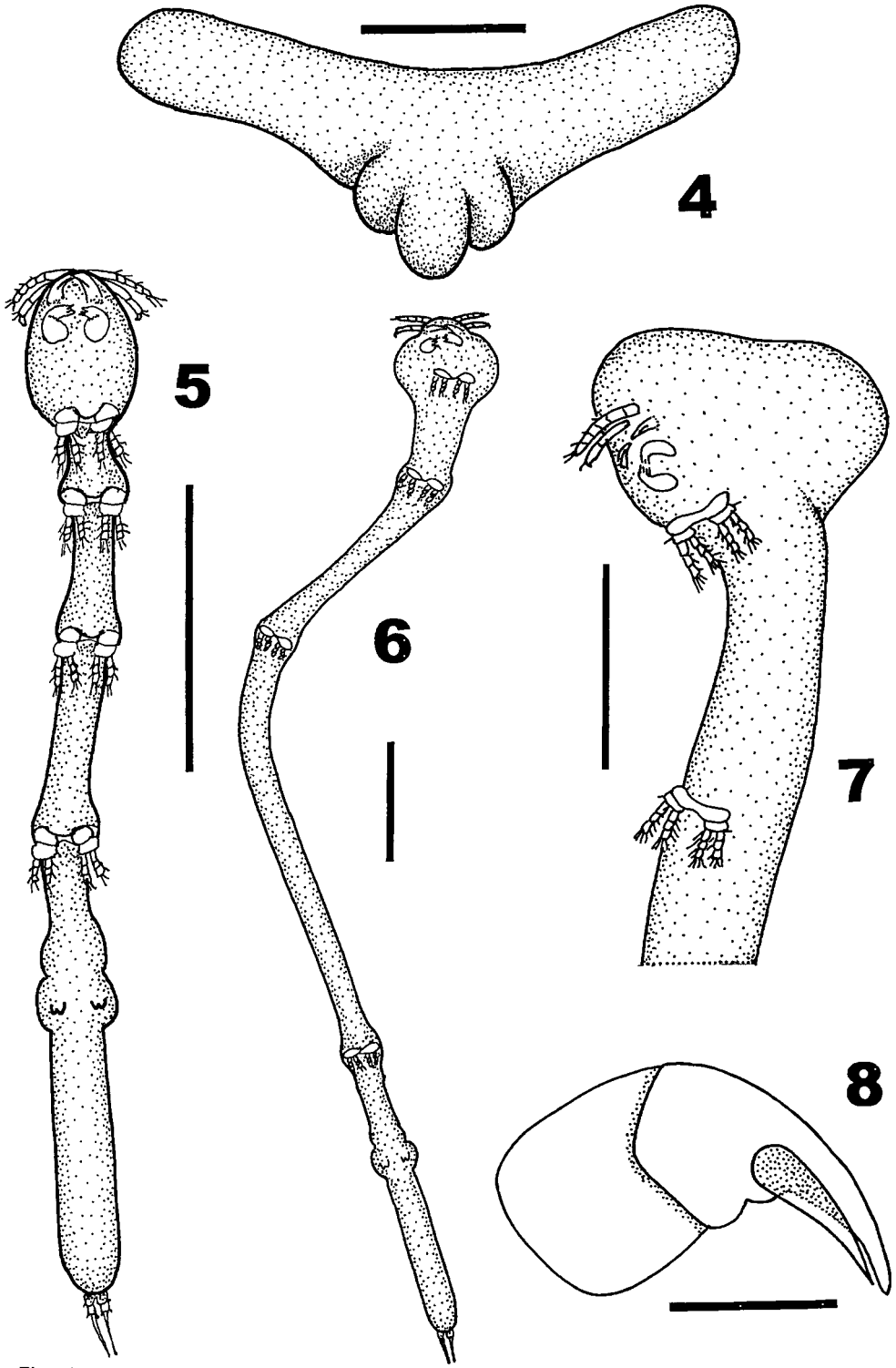


Figs. 1-3:
Perulernaea pirapitingae n.sp.
1: Copepodid V. **2**: Premetamorphic female. **3**: Metamorphosing female.
All to same scale = 500 μm.

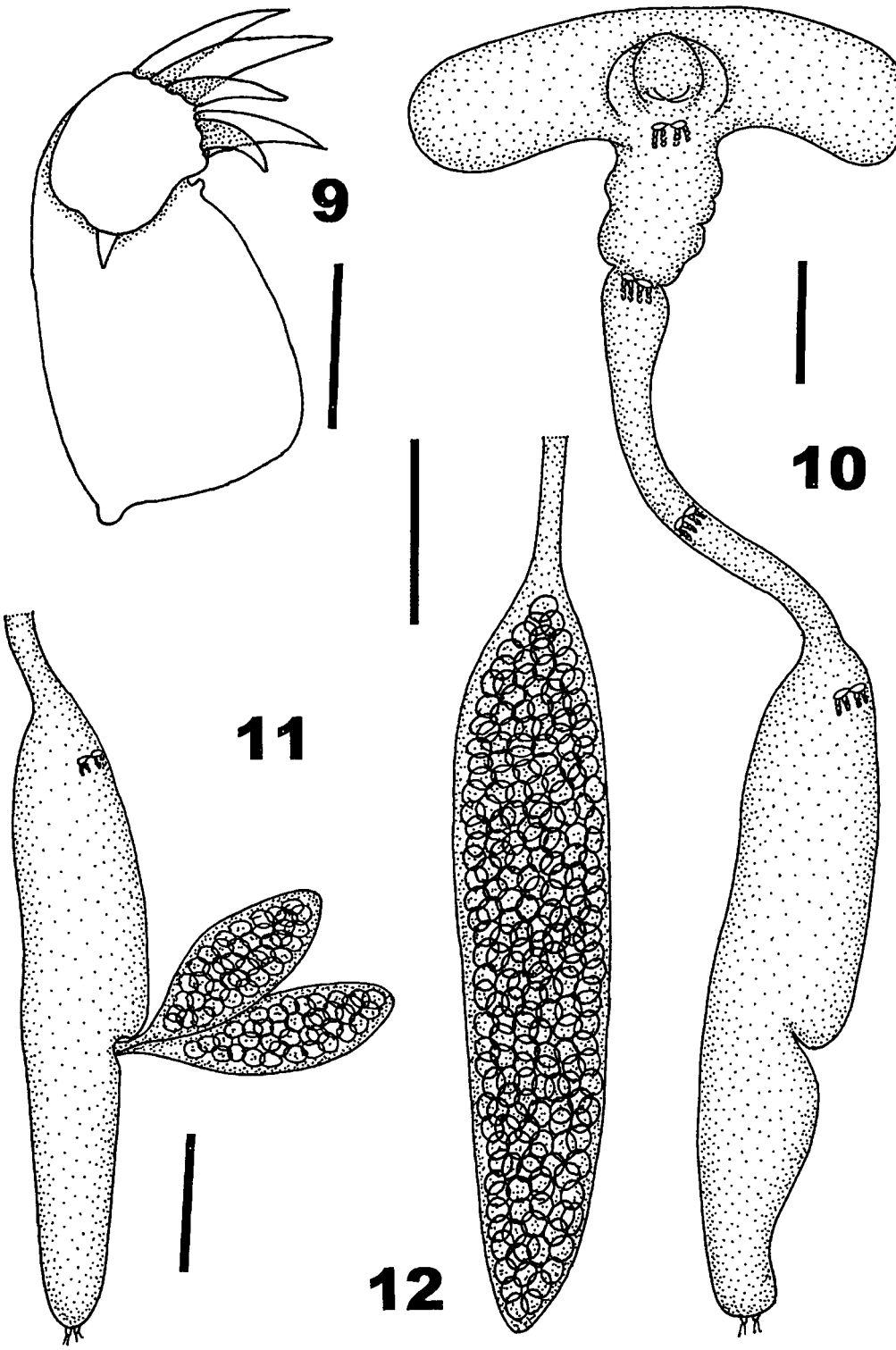


Figs. 4-8:

Perulernaea pirapitingae n.sp.

4: Holdfast of postmetamorphic adult female ("en face"). Scale = 1000 μm.

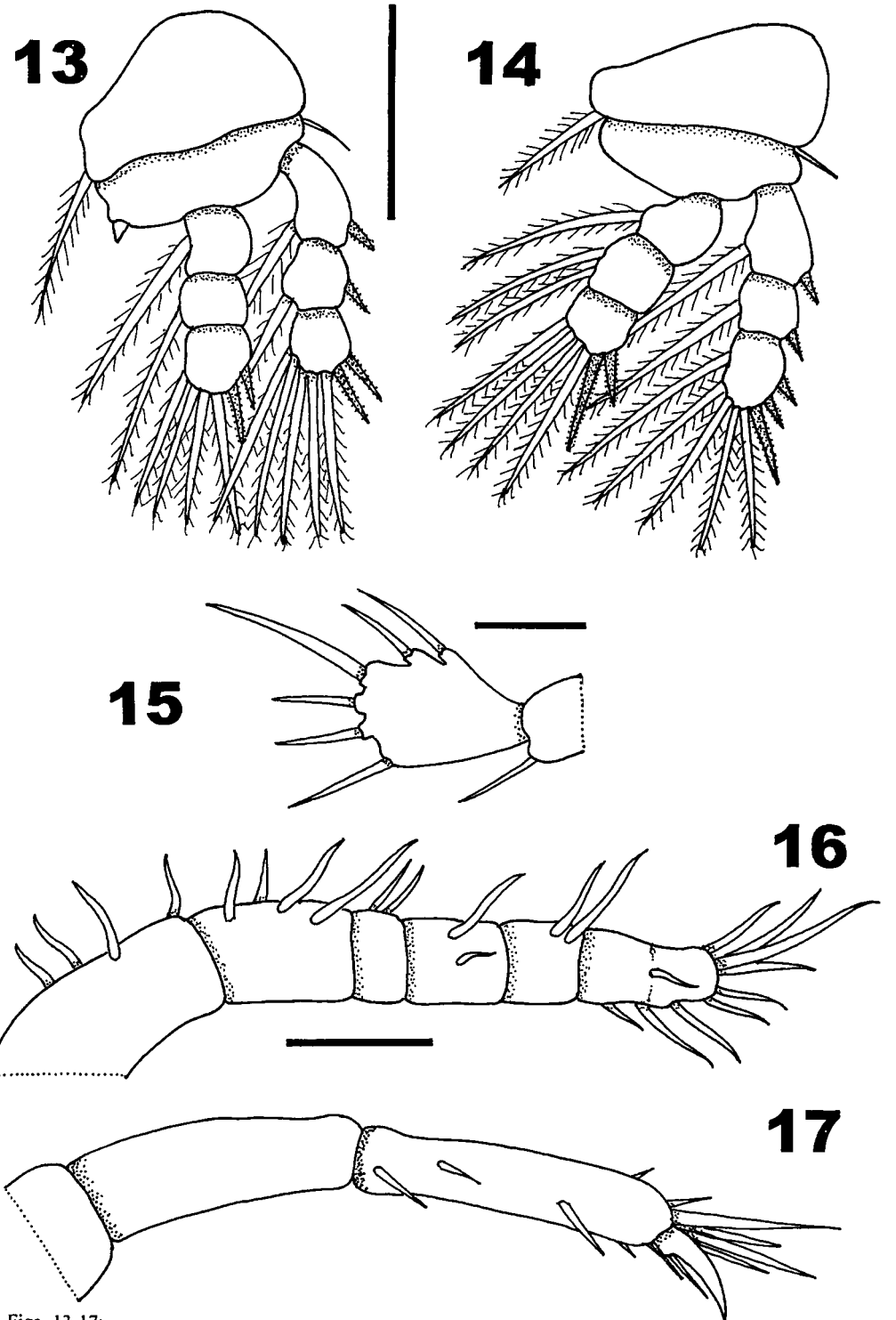
5-7: Metamorphosing females. Scales = 500 μm. **8**: Second maxilla of premetamorphic adult female. Scale = 50 μm.



Figs. 9-12:

Perulernaea pirapitingae n.sp.

9: Maxilliped of premetamorphic adult female. Scale = 50 µm. **10**: Adult postmetamorphic female (ventral). **11**: Posterior of small adult postmetamorphic female. **12**: Egg sac from large adult postmetamorphic female. Scales 10-12 = 1000 µm.



Figs. 13-17:
Perulernaea pirapitingae n.sp.
13: Leg one. **14**: Leg 2. **15**: Leg 5. **16**: Antennule. **17**: Antenna.
Scales 13-14 = 100 μm; 15 = 25 μm; 16-17 = 50 μm.

Table 1: Spine and setal formulae for the swimming legs of *Perulernaea pirapitingae* n.sp.

Leg	Ecopod	Endopod
1	I-1; I-1; II-5	0-1; 0-1; II-4
2	I-1; I-1; III-5	0-1; 0-2; II-4
3	I-1; I-1; III-5	0-1; 0-2; II-4
4	I-1; I-1; III-5	0-1; 0-2; II-3

Table 2: South American freshwater lernaeidae.

Lernaeid	Host	Distribution
Amazolernaea sannerae THATCHER & WILLIAMS, 1998	*Cichla monoculus*	Amazonia of Colombia & Brazil
Areotrachelus truchae (BRIAN, 1902)	*Percichthys trucha*	Patagonia, Argentina
Bedsylernaea collaris THATCHER & WILLIAMS, 1998	*Hoplias malabaricus*	Amazonia, Brazil
**Lernaea argentinensis* PAGGI, 1972	*Pseudoplatystoma* coruscans P. fasciatum	Argentina
**Lernaea lagenula* (HELLER, 1868)	host unknown	Brazil
Perulernaea gamitanae THATCHER & PAREDES, 1985	*Colossoma macropomum*	Amazonia of Peru & Brazil
Perulernaea pirapitingae n.sp. (this paper)	*Piaractus brachypomum*	Meta River, Colombia
Taurocherus salminisii BRIAN, 1924	*Salminis brevidens* *S. maxillosus*	Argentina
Taurocherus tarangophilus PAGGI, 1976	*Hoplias malabaricus*	Paraná River, Argentina

*not *Lernaea*, possibly new genera.