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# *PERODERMA CYLINDRICUM* HELLER, A COPEPOD PARASITE OF *SARDINELLA ALBELLA**

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THE genus *Peroderma* Heller (1868) includes four species, *P. cylindricum* Heller, *P. branchiata* Basset-Smith, *P. petersi* Richiardi and *P. bellottii* Richiardi. According to Wilson (1917) the last two species are poorly described and certainly do not belong to *Peroderma*. As Basset-Smith (1898) had only a single specimen he did not make any attempt to study the appendages. This precludes a detailed comparison of his species with the genotype. Brian (1906) and Wilson (1917) have considered *P. cylindricum* and *P. branchiata* as synonymous. The object of the present paper is not to discuss the synonymy but to give a detailed description of *P. cylindricum*.

The original description of the species was supplemented by Monterosso (1922, '26 and '30) who gave a description of the structure and histology of the mature adult and the juvenile. A perusal of the available literature on the genus shows that information of the appendages is still incomplete. I was fortunate to get a rich collection of specimens which facilitated a detailed study.

## **Peroderma cylindricum** Heller

*Peroderma cylindrica* Heller, 1868, P. 250, Pl. XXV, fig. 6.

*Peroderma branchiata* Basset Smith, 1898, P. 13, Pl. VII, fig. 2.

*Peroderma, cylindricum* Brian, 1906, P. 93.

*Material :* Twenty two adult females, twelve with egg strings, were collected from *Sardinella albella* (Val.) caught at Mandapam, South India, during 1958-59.

*Adult female* (Fig. 1)

The general shape of the body is as described by Heller and Basset Smith. Body is clearly demarcated into a swollen head, a narrow cylindrical neck and a stout cylindrical trunk with a slight dorsoventral flattening. The head and neck remain at right angles to the long axis of the trunk and the latter is produced slightly beyond the point of insertion of the neck. The trunk is enveloped in a loose chitinous jacket very much detached from the body flesh more or less as in some Lernaeopodidae. The head is somewhat globular, irregularly lobed and carries a bunch of long rhizoid like outgrowths originating from a common base or peduncle

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emerging from the middle of the ventral surface of the head. The dorsal side of the head shows a dark spot, the rudimentary eye.

First antennae are somewhat club-shaped, three jointed structures carrying several stiff setae ; the third joint is comparatively very long and carries a long seta. Second antennae are three jointed, subchelate prehensile organs. The first joint is short, second stout with its inner distal part produced into a triangular process against which the long falcate third joint closes. The oral appendages are sunk into a deep cleft just anterior to the origin of the head processes. The mouth tube is bulbous and slightly protruding, its free border with a fringe of fine hairs. The mandibles are simple pointed stylets enclosed within the mouth tube. Maxillae are close to the mouth tube, each is two jointed, the distal joint bearing two long spine setae. Maxillipede are three jointed, the third joint is slightly curved and the second joint bears a small blunt accessory claw. There are three pairs of legs, the first two are placed fairly close together while the third is separated from the second by a longer interval. The first two pairs of legs are typically biramous, the rami two jointed and carrying fairly long setae. The third leg is uniramous, indistinctly two jointed and carries a few short spines and a long terminal seta. A pair of incipient caudal processes, the anal laminae, are also present.

*Newly hatched larva* (Fig. 2)

The newly hatched larva is an advanced metanauplius or a copepodid. It is 0.75 mm. long and has an elongate ovate body. The carapace is ovate, slightly more than half the total length of the body. The large eye is situated anteromedially. Behind the carapace there are four distinct somites. The first free somite carries the second pair of legs. The segment carrying the first legs is fused with the carapace. The second free segment carries the third pair of legs, a pair of small tubercles surmounted by a spine. The fourth free somite carries a pair of broad and flattened anal laminae, each carrying two pairs of plumose setae, the inner pair is considerably longer than the outer.

The cephalic appendages are very much like those of the adult. The first two pairs of legs are biramose but the rami are one jointed.

*Remarks*

As far as I am aware the appendages of *Peroderma* have not been adequately described and none of the previous authors seem to have observed the anal laminae. It may be observed that in the structure of the appendages *Peroderma* falls in line with that of the other members of the family particularly *Lernaenicus* and *Phrixocephalus*, two other genera having the same mode of life.

In the case of all the other genera so far studied the genital segment is partially or completely free, projecting through the skin of the host. In *P. cylindricum* the entire trunk is enclosed within the body of the host and the egg-tubes alone project. When the egg-tubes are missing a small hole, extremely difficult to locate, alone reveals the presence of the parasite. It seems to show a decided preference for *S. albella*. As a rule each host is infested with a single parasite. The parasite penetrates the lateral muscles and reaches the posterior aorta near the kidneys where it is assured of a plentyful supply of blood to feed on. The presence of an oral tube with stylet like mandibles shows that the entire nourishment is absorbed through the mouth and that the cephalic processes serve only to anchor the parasite firmly.

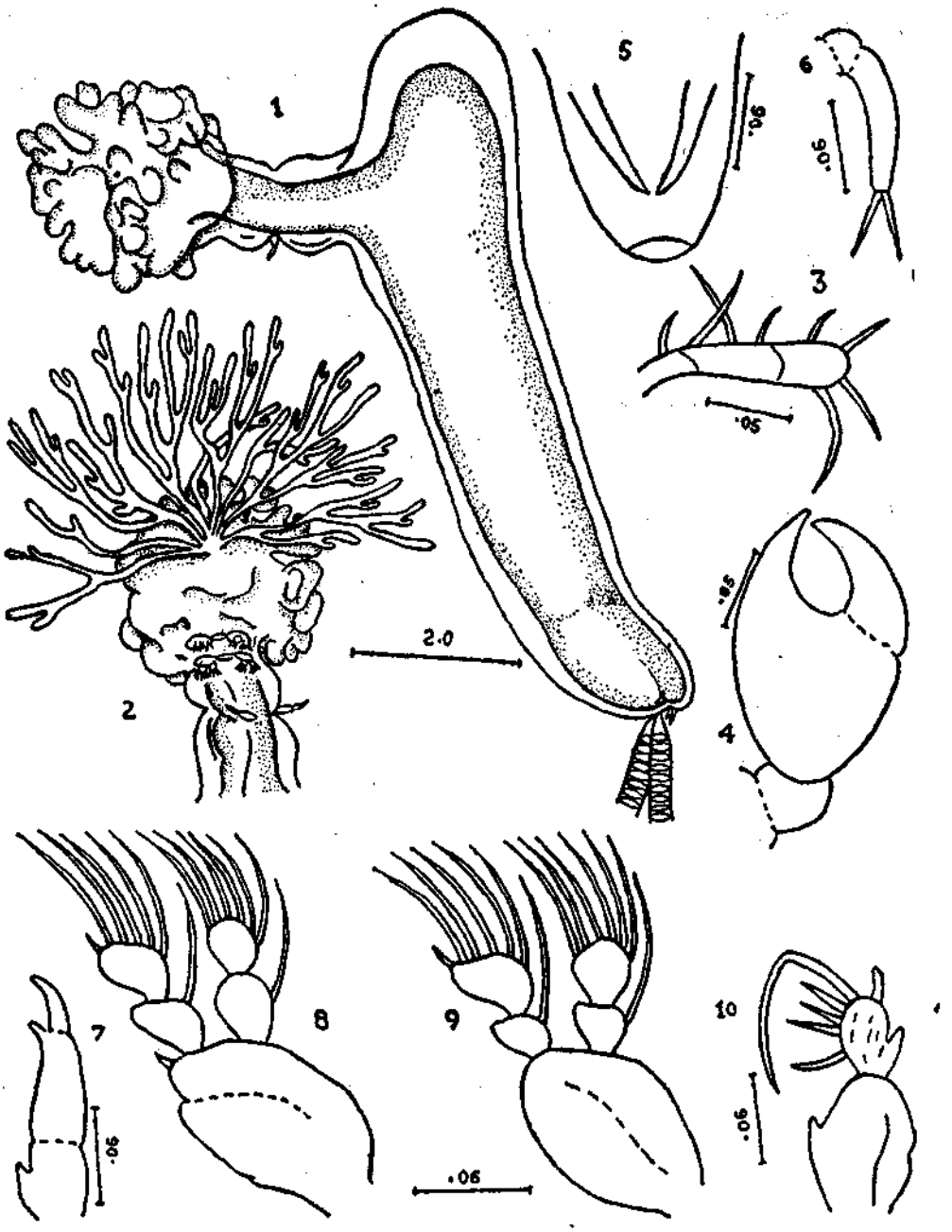


FIG. 1. *Peroderma cylindricum*]1, female, rhizoidal outgrowths removed. 2, head and neck ventral view. 3, first antenna. 4, second antenna. 5, mouth tube with mandibles. 6, maxilla. 7, maxillipede. 8, first leg. 9, second leg. 10, third leg. Magnifications in millimeters.

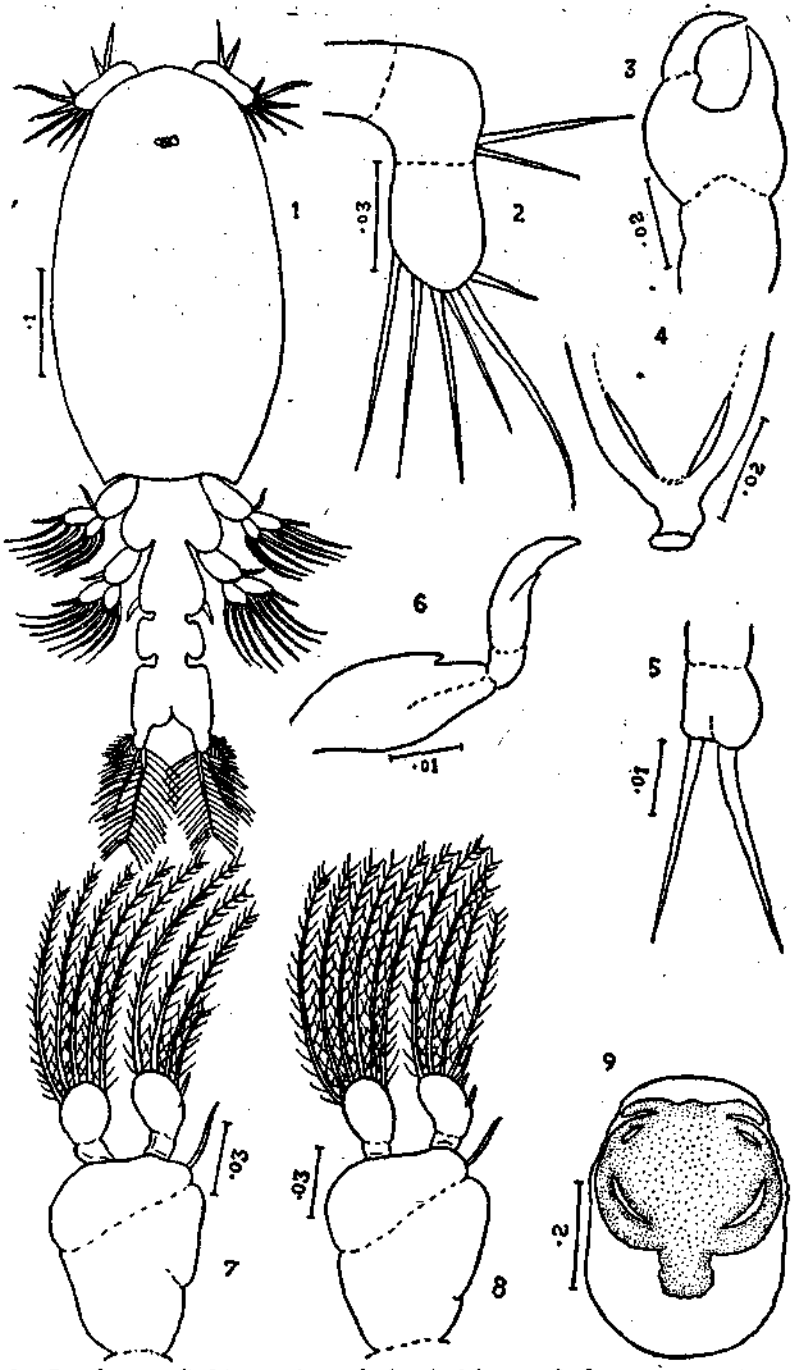


FIG. 2. *Peroderma cylindricum*. 1, newly hatched larva. 2, first antenna. 3, second antenna. 4, mouth tube with mandibles. 5, maxilla. 6, maxillipede. 7, first leg. 8, second leg. 9, egg with embryo. Magnifications in millimeters.

According to Wilson the larva of *Peroderma* is unknown. According to him the egg of lernaeids hatch out in the third metanauplius stage and that of lernaeopodids in the first copepodid stage. This observation is correct with regard to *Peroderma* as is evident from the structure of the larva described above. Though every effort was made to keep the larvae alive all of them died without moulting on the fourth day. The fact that they continued to live without further metamorphosis for four days perhaps shows that the larvae must at this stage contact a host for further development.

The adult is an extremely degenerate parasite but surprisingly its appendages show an exact resemblance to those of the larva. The only difference that could be seen is in the legs ; those of the adult have two jointed rami while those of the larvae are one jointed. Thus with regard to the appendages *Peroderma* exhibits progressive metamorphosis.

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## References

Basset-Smith, P. W. 1898. Some new parasitic copepods found in fish at Bombay. *Ann. Mag. Nat. Hist.* (7), 1, 13.

Brian, Alessandro, 1906. *Copepodi Parassiti dei Pesci d' Italia,* XXI Tav. Genova, 93-94.

Heller, Camil., 1868. *Reise der Novara,* Wien. 250.

Monterosso, B, 1922. Contributo allo studio di *Peroderma cylindricum* Heller copepoda parasita di *clupea pilchardus* Art. *Atti Accad Gioenia Catania,* 13, 1-19.

———, 1926. *Peroderma cylindricum* anatomy of adult and young. *Arch. Zool. Napoli,* 11, 105-141.

———, 1930. *Peroderma cylindricum* structure and function of intestine. *Arch. Zool. Ital. Torino,* 14, 169-225.

*Richiardi, 1875. Intorno al *Peroderma cylindricum* dell' Heller. *Soc. Tosc. Sci. Nat. Pisa, Atti,* 2, 189-196.

*———, 1881. *Peroderma petersi,* sp. n., *Zool. Anz.,* IV, 387.

*———, 1882. *Peroderma bellottii,* sp. n., *Ibid.,* 475.

Wilson, C. B. 1917. Copepods belonging to the Lernaeidae with a revision of the entire family. *Proc. U.S. nat. Mus.,* 53.

* Original not consulted.