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A New Marine Triclad from the Coast of California

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The marine triclads are a small group of turbellarians limited to the littoral zone and more or less restricted to cold waters. The species known to the date of publication were monographed by Wilhelmi in 1909. At that time marine triclads were known on American coasts only from Long Island Sound northward and from the South American Antarctic and Subantarctic. In 1944 I added a new species from Long Island Sound and made some corrections of Wilhelmi's terminology. The new species, *Probursa veneris*, was later surprisingly found on algae off the coast of North Carolina (Hyman, 1952). New marine triclads were described from the coast of Brazil by Marcus (1947, 1948), and new Antarctic species were added by Hallez (1911, 1913), Böhmig (1914), and Westblad (1952). Westblad has given a useful review of the Turbellaria of the South American Antarctic. Thus up to the present writing no marine triclads have been found on the Pacific coasts of the American continents north of Subantarctic waters. It is therefore of interest to record the finding of a marine triclad on the coast of California.

ORDER TRICLADIDA

SUBORDER MARICOLA

FAMILY PROCERODIDAE

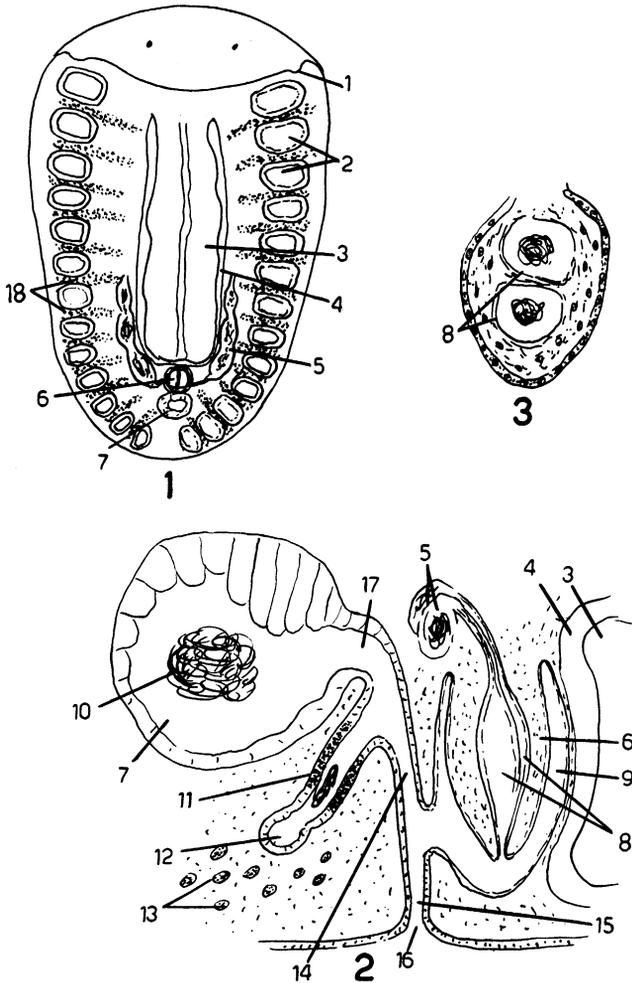
Procerodes pacifica, new species

A large number of specimens of this new marine triclad were sent by Dr. T. E. Bowman who had collected them on kelp (*Macrocystis*) washed up on shore at the base of Sunset Cliffs, near San Diego, California, June 21, 1953.

Judged from the preserved specimens, this species must be very small, not more than 2 to 3 mm. in length when alive, extended. The general appearance of a preserved specimen, after clearing, is given in figure 1. No information was received as to the shape in life, but auricles are evident on the preserved worms, and therefore the normal appearance is presumably similar to that of other species of *Procerodes*, which are abundantly illustrated in Wilhelmi's monograph. The color is stated to be milky white. Some other species of the genus are known to be white, but most are gray or brown.

The histology of members of this group has been so exhaustively treated by Wilhelmi that any detailed description in the present instance appears superfluous. The fixation in sea water saturated with mercuric chloride is excellent. The dorsal epidermis is very low and so packed with rhabdites as to appear like a solid black band in which cells are indistinguishable. The ventral epidermis is much taller, with few rhabdites. Cilia are well preserved in places, and from comparison of the available sections it appears that the entire surface of the worm is ciliated, except of course for the sites of exit of the marginal adhesive glands. The epidermis is underlain by a definite basement membrane followed by the subepidermal musculature, of outer circular and inner longitudinal fibers. This musculature is, as usual, much thicker ventrally than dorsally. Diagonal fibers appear to be wanting. The marginal zone of adhesive glands is very well developed in this species and appears in all sections as an eosinophilous mass at both ends of the body opening on the ventral side of the margin. Good sections were obtained of the eyes, which are definitely typical pigment cup ocelli without any lens.

The sexual anatomy is typical of the genus. The large testes are dorsally located between the intestinal diverticula and extend in a single row on each side from the level of the ovaries to near the posterior end (fig. 1). There appear to be a maximum number of 17 or 18 testes on each side. The spermiducal vesicles packed with sperm are evident on each side of the posterior part of the pharynx (fig. 1). On approaching the penis, which is located directly behind the pharynx, each spermiducal vesicle narrows to a slender duct that enters the penis from above (fig. 2). The penis is a conical eminence depending vertically from above into the male antrum and is singularly lacking in muscular provision. There are some circular fibers around the sperm ducts at their entry into the penis and also around the seminal vesicles, and a few fibers seem to course through the mesenchyme of the penis. Each sperm duct on entering the penis expands into a seminal vesicle so that the greater part of the penis is occupied by the two seminal vesicles (fig. 3). These unite distally to a



FIGS. 1-3. *Procerodes pacifica*. 1. View of cleared whole mount. 2. Sagittal view of copulatory apparatus, anterior end to right. 3. Diagonal section through the penis, showing the two seminal vesicles. Subsidiary numbering: 1, auricle; 2, testes; 3, pharynx; 4, pharyngeal cavity; 5, spermiducal vesicles; 6, penis, 7, seminal bursa; 8, seminal vesicles; 9, male antrum; 10, ball of sperm; 11, common ovovitelline duct; 12, entrance of ovovitelline ducts into common duct; 13, cement glands; 14, vagina; 15, common antrum; 16, common gonopore; 17, bursal canal; 18, yolk glands.

short common ejaculatory duct that exits at the tip of the penis. The male antrum opens posteriorly into the common antrum that exits below by the common gonopore (fig. 2).

There is the usual pair of ovaries located anteriorly shortly behind the brain. The ovovitelline ducts could not be traced. Numerous masses of yolk glands occupy the spaces between the intestinal diverticula to the medial side of the testes and also extend dorsally between the testes where space is available. The female copulatory apparatus occurs immediately behind the male apparatus (fig. 2). Its most conspicuous feature is the large sacciform seminal bursa, also called seminal receptacle. This is lined by a tall epithelium, mostly taller dorsally than ventrally, and contains a mass of sperm. It exists by the bursal canal that almost immediately receives from behind the common ovovitelline duct. This descends ventrally, receiving into its wall the usual eosinophilous cement glands, and after a short course is seen to be formed by the union of the two ovovitelline ducts coming from in front; these, however, could not be traced forward in the available sections. After receiving the common ovovitelline duct, the bursal canal, now termed vagina, descends ventrally and, after union with the male antrum, becomes continuous with the common antrum.

The entire copulatory apparatus is surrounded by a glandular tissue, composed of large cells in close contact with one another and staining uniformly with eosin. These seem to correspond with what are called penis glands in the literature, but they appear to have no particular relation to the penis, nor is there any evidence of their entry into the penis. They are distinctly different from the cement glands, which have granular contents, whereas these cells present a homogeneous cytoplasm.

Procerodes pacifica differs from all other described species of the genus in the presence of two seminal vesicles in the penis. In other species the sperm ducts unite to form a single seminal vesicle.

The holotype (A.M.N.H. No. 443) as serial sections (three slides) and a number of specimens mounted whole (A.M.N.H. No. 444) on another slide have been deposited in the American Museum of Natural History.

LITERATURE CITED

BÖHMIG, L.

1914. Die rhabdocoelen Turbellarien und Tricladen. In Drygalski, E. von, Deutsche Südpolar-Expedition 1901-1903. Berlin, vol. 15, Zoologie, vol. 7, no. 1, pp. 1-34, 4 text figs., 3 pls.

HALLEZ, P.

1911. Un bdellouride non parasite des mers antarctiques. Compt. Rendus Acad. Sci., Paris, vol. 152, pp. 461-463.
1913. Vers polyclades et triclades maricoles. In Charcot, Jean, Deuxième expédition antarctique française (1908-1910). Paris, vol. 4, pp. 1-69, 8 pls.

HYMAN, L. H.

1944. Marine Turbellaria from the Atlantic coast of North America. *Amer. Mus. Novitates*, no. 1266, pp. 1-15, 16 figs.
1952. Further notes on the turbellarian fauna of the Atlantic coast of the United States. *Biol. Bull.*, vol. 103, pp. 195-200, 3 figs.

MARCUS, E.

1947. Turbelarios marinhos do Brasil. *Bol. Fac. Fil. Cien. Letr., Univ. São Paulo, Zoologia*, no. 12, pp. 99-215, 21 pls.
1948. Turbellaria do Brasil. *Ibid.*, no. 13, pp. 111-243, 20 pls.

WESTBLAD, E.

1952. Turbellaria (excl. Kalyptorhynchia) of the Swedish South Polar Expedition 1901-1903. In Odhner, N. H. (ed.), Further zoological results of the Swedish Antarctic Expedition 1901-1903, under . . . Norden-skjöld. Stockholm, vol. 4, no. 8, pp. 1-55, 24 figs.

WILHELMI, J.

1909. Tricladen. Fauna u. Flora des Golfes von Neapel, *Monogr.*, no. 32, xii + 405 pp., 16 pls.

