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## **Comments**

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## COLLASTOMA KOZLOFFI SP. N., A NEORHABDOCOEL TURBELLARIAN FROM THE INTESTINE OF THE SIPUNCULAN *THEMISTE DYSCRITA*

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**ABSTRACT:** *Collastoma kozloffi* sp. n. is described from the intestine of the sipunculan, *Themiste dyscrita*, collected at three localities on the Oregon coast. This species is particularly distinctive because of its large egg capsule (length about 400–500  $\mu\text{m}$ ). The relationships of the five known species of *Collastoma* are discussed.

The gut-inhabiting rhabdocoels of the genus *Collastoma* are restricted to worms of the phylum Sipuncula. The genus was established by Dörler (1900) for *C. monorchis*, found in *Golfingia vulgaris* (= *Phascolosoma vulgare*) at Roscoff, France. Wahl (1906) mentioned a species taken from *Phascolosoma granulatum* (= *Phymosoma granulatum*), and the legend for his illustrations refer to this worm as *C. minuta*. Later (1910b), he provided a proper description, emending the name to *C. minutum*. A third species of *Collastoma* was described from *Golfingia eremita* (= *Phascolosoma eremita*) by Beklemishev (1916). Considerably later, Kozloff (1953) described *C. pacifica*, found in *Themiste pyroides* (= *Dendrostoma pyroides*), at Pacific Grove and Carmel Point, Monterey Co., California. I have found this species in *T. pyroides* at Sunset Bay, Coos Co., Oregon. The current names for the sipunculan hosts of the various species of *Collastoma* referred to above are those given by Stephen and Edmonds (1972).

*Collastoma* belongs to the family Umagillidae, and is the only genus in the subfamily Collastominae, as established by Wahl (1910a). Its placement in this subfamily is based primarily on the presence of a single, median testis, instead of two lateral testes. The question of subfamilial division of the Umagillidae has been dealt with by Stunkard and Corliss (1951).

In the course of examination of various sipunculans along the Pacific coast in 1958, I found a new species of *Collastoma* in *The-*

*miste dyscrita* collected at Ecola State Park, Tillamook Co., Oregon. An additional 50 individuals of the host species were obtained at Cape Arago and Sunset Bay, Coos Co., Oregon in 1959. Of these, 24 had this new *Collastoma*. The number of worms in a single host ranged from one to 103.

### MATERIALS AND METHODS

The description is based on specimens fixed in Bouin's fluid or Brasil's fluid. The worms were not flattened during fixation. Whole mounts were stained with borax carmine. Specimens used for sections were embedded in paraffin, cut serially at 5 or 8  $\mu\text{m}$ , and stained with iron hematoxylin.

### *Collastoma kozloffi* sp. n.

(Figs. 1–6)

### Description

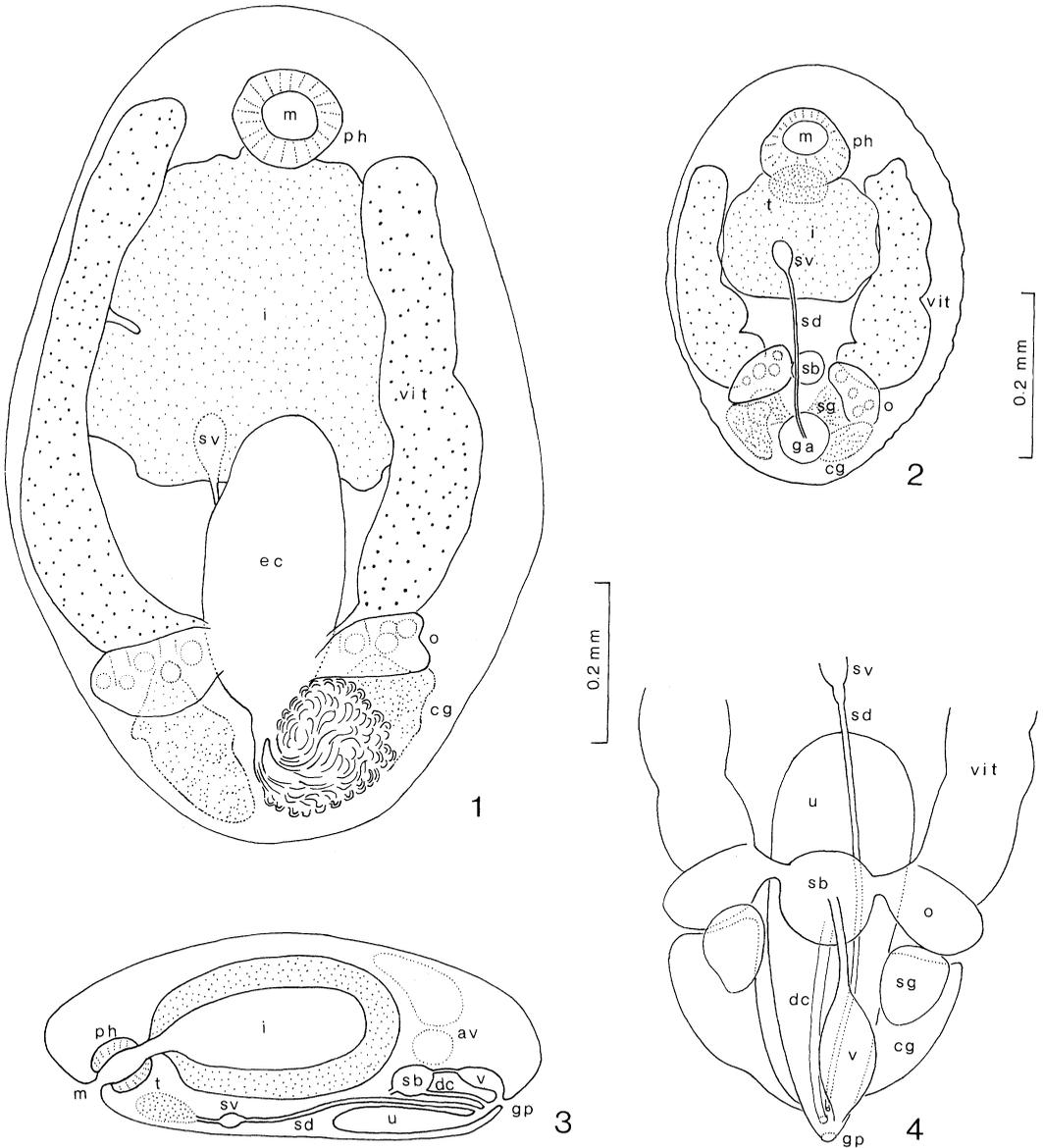
Living specimens of *C. kozloffi* are colorless or faintly pinkish. The shape varies considerably, but in general, the worms are ovoid and widest just anterior to the middle. Of 52 living specimens that were measured, the largest was 1,270  $\mu\text{m}$  long and 760  $\mu\text{m}$  wide when extended; the smallest was 653  $\mu\text{m}$  long and 254  $\mu\text{m}$  wide.

The epidermis consists of ciliated cuboidal cells, and the worms glide actively in the intestine of the host. In contracted specimens, the body surface often appears tuberculate. Beneath the epidermis is a thin layer of circular muscle fibers, and under this is a layer of longitudinal fibers. There are also oblique fibers between these layers. Dorsoventral muscle fibers are scattered through the parenchyma.

The mouth is a small opening on the ventral surface near the anterior end (Fig. 3). The pharynx is muscular and is similar to that of other umagillids. The brain, consisting of two principal ganglionic masses, is located anterior to the pharynx. The intestine extends posteriorly for about two-thirds the body length (Figs. 1–3). The epithelial cells of the intestine are large and irregular and contain many inclusions.

The shape of the single median testis (Figs. 2, 3)

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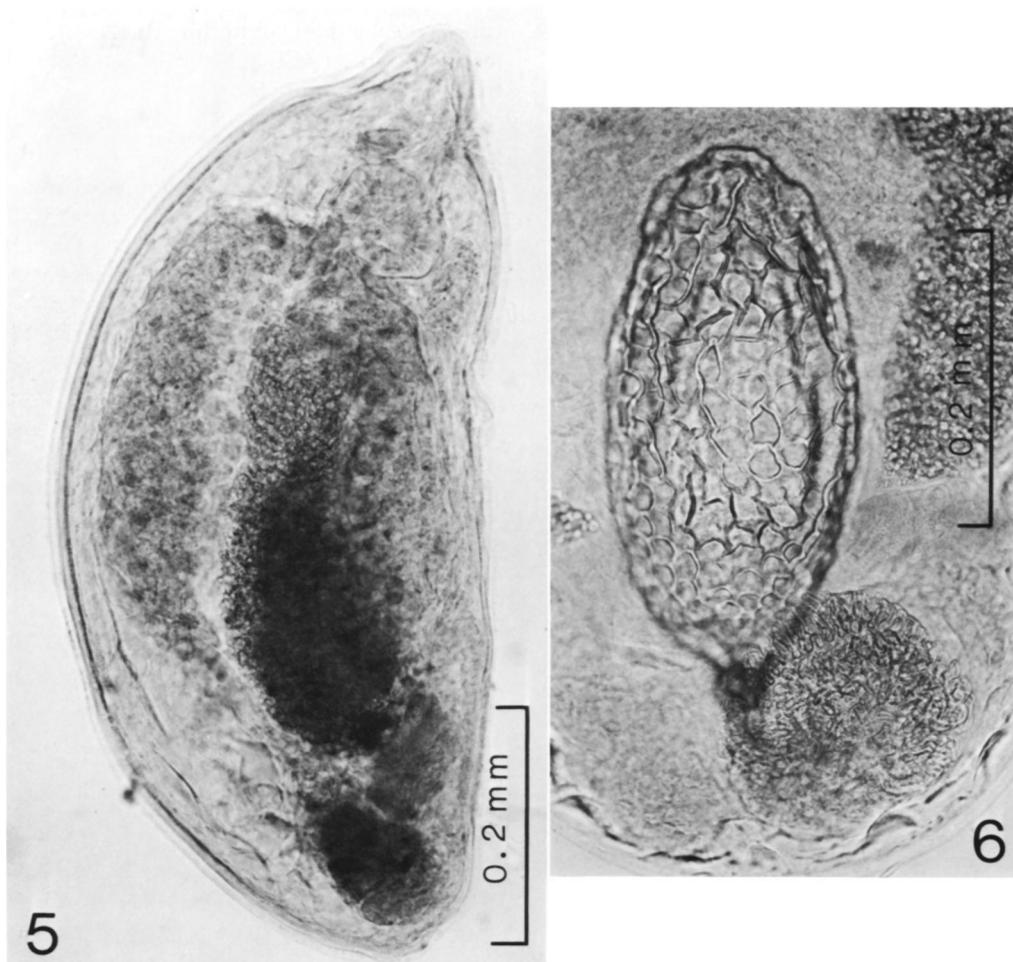


FIGURES 1-4. *Collastoma kozloffi* sp. n. 1. Dorsal view of entire worm (holotype specimen) with egg capsule; testis omitted. 2. Ventral view of entire worm; uterus omitted. 3. Median sagittal section (semi-diagrammatic). 4. Dorsal view of reproductive system (semi-diagrammatic); ducts of shell glands omitted. Figures 1 and 2 prepared with the aid of a camera lucida. Abbreviations: av, accessory vesicles; cg, cement gland; dc, ductus communis; ec, egg capsule; ga, genital antrum; gp, genital pore; i, intestine; m, mouth; o, ovary; ph, pharynx; sb, seminal bursa; sd, sperm duct; sg, shell gland; sv, seminal vesicle; t, testis; u, uterus; v, vagina; vit, vitellarium.

seems to change with the state of contraction, varying from nearly spherical to ovoid. The anterior end of the testis lies beneath the pharynx. The seminal vesicle is ovoid and enveloped by a sheath of muscle fibers. The portion of the sperm duct that leads from the seminal vesicle to the genital antrum is

slender and cuticularized; this portion is usually referred to as the penis. The proximal portion of the penis is surrounded by a swelling that perhaps has glandular components.

The paired vitellaria lie on both sides of the testis (Fig. 2). In relaxed specimens, they extend ante-



FIGURES 5, 6. *Collastoma kozloffii* sp. n., photomicrographs. 5. Side view of entire worm; Bouin's fixative, borax carmine. 6. Egg capsule.

riorly as far as the posterior edge of the pharynx. The vitellaria in contracted individuals are wavy and have alternating dilations and constrictions. The ovaries are posterior to the vitellaria. Anteromedially, each ovary becomes narrowed and joins the posterior end of the vitellarium on the same side to form a short oovitelline duct that enters the seminal bursa midventrally (Fig. 4). Extending posteriorly from the seminal bursa is the ductus communis; this enters the genital antrum. The seminal bursa is a spherical, thin-walled vesicle that usually contains sperm. The vagina leads from the genital antrum to the seminal bursa, entering the latter on its dorsal side. Above the seminal bursa is a complex that probably corresponds to the accessory vesicle described by Kozloff (1953) in *C. pacifica*, and perhaps also with the "blind sac" observed by Dörler (1900) in *C. monorchis* (Fig. 3). In *C. kozloffii* it consists of two major portions. The lower portion, closely associated with the terminal part of the vagina, is a vesicle that contains (in fixed specimens)

filaments that resemble sperm, but which may be threadlike elements of a coagulum. The filaments do not stain in quite the same way as do typical sperm within the seminal bursa. It is possible that they are degenerate or otherwise modified sperm. No passage, however, has been detected between this vesicle and the vagina, or between the vesicle and the seminal bursa. The other part of the complex is larger, and extends forward to beyond the posterior end of the gut (Fig. 3). It consists of an apparently unwallied pool of some nearly homogeneous fluid, probably a colloid of some sort. It is traversed by a few delicate strands or what may be membranous partitions, but it has no obvious cellular components.

The uterus is a blind sac extending anteriorly from the genital antrum and lies beneath the various ducts that open into the antrum (Figs. 3-5). The egg capsules are yellow. In individuals that are carrying an egg capsule, the body may have a ventral bulge, and the uterus may extend forward as far

as the middle of the body. The egg capsule contains several eggs, as well as many yolk cells (Figs. 1, 6). The capsule is prolonged into a stalk that branches into two long filaments. The stalk passes through the genital antrum and the filaments are coiled up in the dilated posterior portion of the vagina. On both sides of the posterior portion of the ductus communis are glands comparable to those Dörler (1900) called shell glands. Behind them are glands that discharge their secretion into the genital antrum (Fig. 4). These glands are usually regarded as cement glands, on the assumption that their secretion assists in attachment of the egg capsule to some object. The common genital pore opens on the ventral surface close to the posterior end.

#### Taxonomic summary

*Holotype*: Whole mount, USNM Helminthological Collection No. 76306.

*Paratypes*: In the author's collection.

*Host*: *Themiste dyscrita*.

*Site of infection*: Intestine.

*Locality*: OREGON: Coos Co.: Cape Arago; 19 July 1959.

*Etymology*: This species is named in honor of Dr. Eugene N. Kozloff, Professor of Zoology at the University of Washington, in recognition of his distinction as a teacher and for his many contributions to our knowledge of Pacific coast invertebrates.

#### DISCUSSION

Of the five known species of *Collastoma*, *C. eremitae* and *C. kozloffii* are the most distinctive. The vitellaria of mature individuals of *C. eremitae* have four to six branches; in all other species the vitellaria are unbranched. The egg capsule of *C. kozloffii* is usually about 400 to 500  $\mu\text{m}$  long; thus, it is three or four times as long as the egg capsule of any other species. In *C. monorchis*, according to Dörler (1900) the portion of the sperm duct that extends posteriorly from the seminal vesicle is muscular; in all other species, it is a slender cuticularized tube. In *C. pacifica* and *C. monorchis*, the ovovitelline ducts enter the ductus communis, whereas in the other

three species the ovovitelline ducts enter the seminal bursa itself, anterior to the origin of the ductus communis.

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