

Daubaylia olsoni sp. n. (Daubayliidae: Rhabditida) from the Leech, *Dina anoculata*, in California

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ABSTRACT: The new species, *Daubaylia olsoni*, is described from the predaceous leech, *Dina anoculata*, in Southern California. This is the first report of a *Daubaylia*, a typical genus of snail parasites, from a member of the order Annelida.

Size, shape of the male and female tail, spicules and gubernaculum, and the elongate spermatheca are characters that separate this species from previously described *Daubaylia*. This report extends the range of *Daubaylia* into Western North America.

Species of *Daubaylia* are known as parasites of snails throughout the world. The present report records for the first time a member of this genus from a predaceous leech belonging to the Annelida. Discovery of a genus of traditional snail parasites in another host phylum raises some interesting questions concerning the host specificity of *Daubaylia* species.

Materials and Methods

Specimens of *Daubaylia* removed from a preserved leech, *Dina anoculata* Moore, were collected and submitted to the present author by Andrew C. Olson, Jr., and Richard M. Gadler, both of the Department of Zoology at San Diego State University. They were encountered during a study of the gut contents of *D. anoculata*.

The infected leech was collected on October 2, 1982 from Laguna Meadow pool, Mount Laguna in San Diego County, California.

The nematodes were originally recovered from the intestine where they were associated with partially digested gut contents; however, a reexamination of the infected leech revealed the possibility of a coelomic infection, because nematodes were also found in the body cavity.

Results

The nematodes removed from *D. anoculata* were found to represent a new species of *Daubaylia* and are described below. In the quantitative portion of the description, all measurements are given in micrometers unless otherwise specified. The number following the character is the average value and the figures in parentheses represent the ranges of the characters. The species is named in honor of Dr. Andrew Olson, Jr., who noted the significance of this association.

Daubaylia olsoni sp. n.

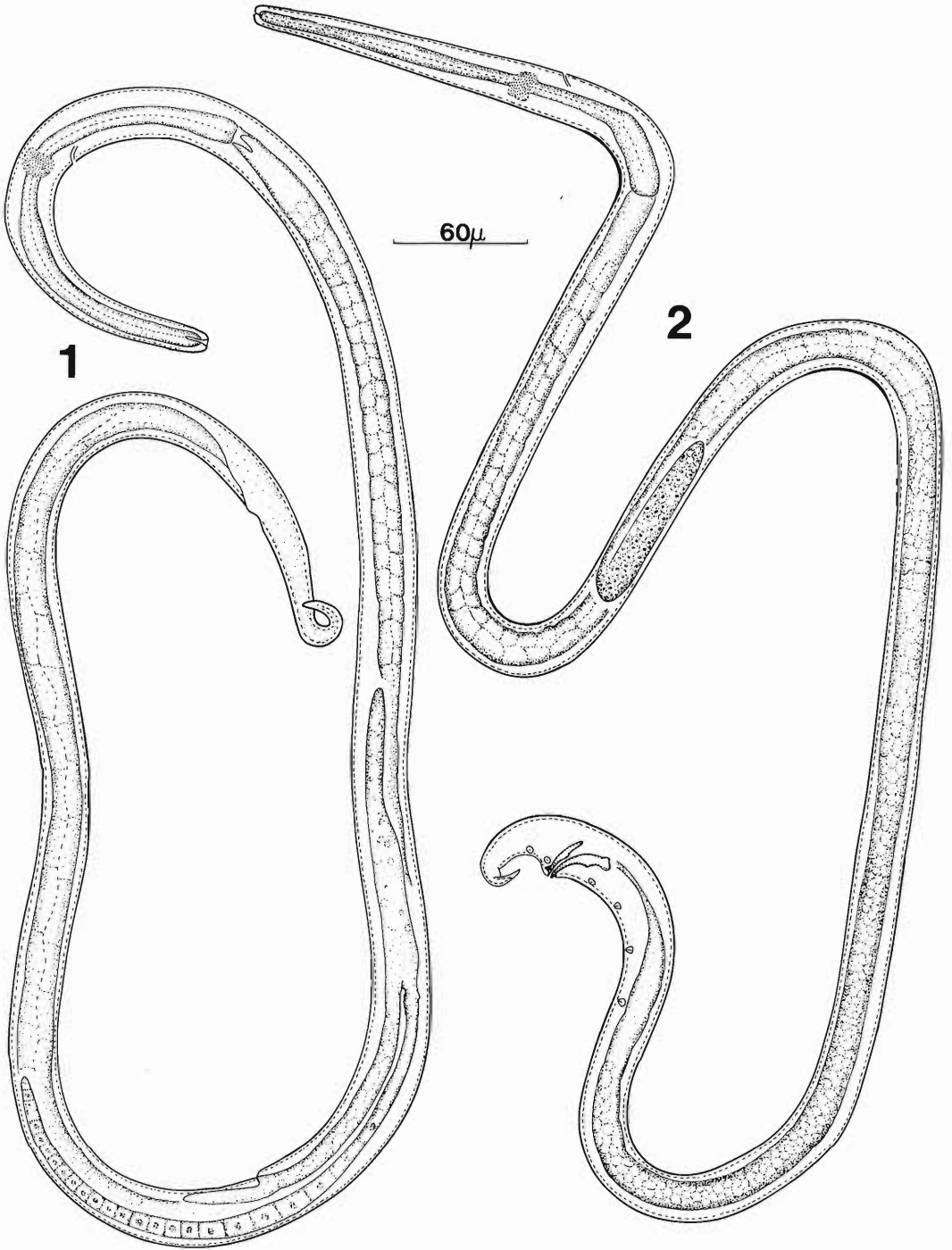
Daubaylia Chitwood and Chitwood (1934);
Daubayliidae (Chitwood and Chitwood) Poinar,

1977; Rhabditoidea (Oerley) Travassos; Rhabditida (Oerley) Chitwood. Relatively slender nematodes; cuticle smooth, six lips either partially or completely fused; amphids dorsolateral, small; stoma partially collapsed at base, leaving a small anterior vestibule; glottoid apparatus lacking; pharynx elongate, composed of a slender cylindrical corpus and isthmus and a glandular basal bulb lacking a valve; ovary single, tip reflexed, usually past vulva; testis single, reflexed; spicules paired, similar, separate; gubernaculum present; bursa absent; genital papillae present. The family contains the single genus *Daubaylia*.

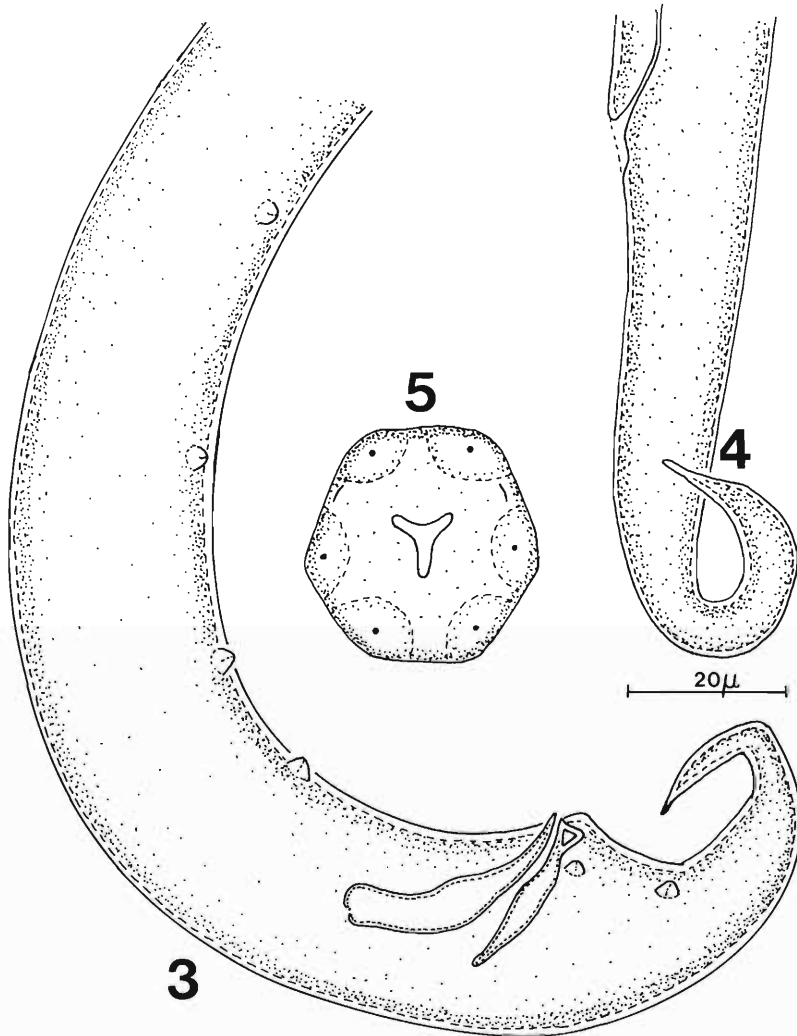
DAUBAYLIA OLSONI: With characters as presented in the above generic description. Lips fused, amphids indistinct, stoma collapsed at base leaving a small anterior vestibule; excretory pore opens slightly below nerve ring; pharynx cylindrical and elongate, with a nonvalvated basal glandular bulb; postuterine sac present, generally longer than body width at vulva; elongate saclike spermatheca at junction of oviduct and uterus; female tail bent dorsally 180° or more; spicules paired, similar, separate; gubernaculum with a posterior (dorsal) v-shaped structure at the tip; male tail with six pairs of genital papillae arranged in two ventrolateral rows; four pairs preanal, one pair adanal, and one pair postanal.

FEMALE ($N = 10$): Length, 1.29 (1.02-1.63) mm; greatest width, 24 (20-29); distance from head to nerve ring, 115 (104-133); distance from head to excretory pore, 130 (120-149); length of pharynx, 206 (179-237); length of tail, 97 (78-107); length of postvulvar uterine sac, 39 (26-64); % vulva, 55 (45-60); eggs were 50 × 22 "in utero."

MALE ($N = 4$): Length, 1.30 (1.20-1.42) mm; greatest width, 21 (20-22); distance from head to nerve ring, 126 (118-131); distance from head



Figures 1, 2. Adults of *Daubaylia olsoni*. 1. Female. 2. Male.



Figures 3-5. *Daubaylia olsoni*. 3. Lateral view of male tail. 4. Lateral view of female tail. 5. "En face" view of female.

to excretory pore, 141 (131-147); length of pharynx, 217 (203-224); length of tail, 49 (48-50); length of spicules, 29 (26-32); length of gubernaculum, 18 (17-20).

TYPE LOCALITY: Laguna Meadow pool, Mount Laguna, San Diego County, California.

TYPE HOST: *Dina anocolata* Moore (Hirudinica; Erpobdellidae).

TYPE SPECIMENS: Holotype (female) and allotype (male) deposited in the nematology collection at the University of California, Davis.

DIAGNOSIS: *D. olsoni* is a medium-sized *Daubaylia*. The females are smaller in length than those of *D. dewiti* Schuurmans-Stekhoven (1956),

D. potomaca Chitwood and Chitwood (1934), and *D. elegans* Honer and Jansen (1961). The tail of females of *D. olsoni* is longer than that of *D. dewiti* and shorter than that of *D. elegans*. In addition, the 180° or greater dorsal bend of the tail separates females of *D. olsoni* from those of *D. helicophilus* Poinar and Richards (1979), *D. elegans*, *D. malayanum* Sullivan and Palmieri (1978), and *D. seistanensis* Baylis and Daubney (1922). The presence of a long, saclike spermatheca may be diagnostic for *D. olsoni* because none of the previously described species were noted to possess this structure.

Males of *D. olsoni* are larger in length than

those of *D. helicophilus*, *D. seistanensis*, and *D. malayanum*, and smaller than those of *D. potomaca* and *D. dewiti*. In addition, the gubernaculum of *D. olsoni* possesses a wedge-shaped structure on the dorsal ridge of the apical portion, a structure absent in all previously described species except *D. malayanum*. However, the latter species has spicules shaped differently from those of *D. olsoni*. The strongly curved tail tip and presence of six genital papillae also separate *D. olsoni* from most other males of *Daubaylia*.

The rarity of eggs in the uteri of female *D. olsoni* may indicate infrequent egg development coupled with rapid oviposition. This phenomenon was also noted for *D. elegans* (Honer and Jansen, 1961).

Discussion

All previous species of *Daubaylia* have been recovered from planorbid snails where they occurred in the mantle cavity and internal tissues. Only rarely have they been found in the mollusc's intestinal tract.

Morphologically, members of *Daubaylia* represent moderately specialized obligate parasites. The only detailed biological studies on this genus were conducted on *D. potomaca* (Chernin et al., 1960; Chernin, 1962) and revealed the interesting fact that a specialized infective stage is lacking. According to the above authors, infection is initiated by gravid females that leave the parasitized host and make contact with a healthy one. Laboratory studies showed that parasite-host contact was passive and made when a snail crawled over a gravid female nematode. At this time the nematode entered the slime and somehow arrived in the snail tissues, presumably by passing through the mantle cavity, although this action was never observed.

Such a nonspecific type of infection process is surprising with the specialized morphology of the parasite. However, if a similar biology occurred with *D. olsoni*, then it is possible to see how leeches and possibly other freshwater invertebrates could become infected with *Daubaylia* nematodes.

Adult and juvenile nematodes were recovered from the infected leech, but because the leeches had first been killed and preserved, it was difficult to establish the exact location of the parasites (e.g., body cavity, intestine, or both).

Since *D. anoculata* is predaceous and stomach contents revealed the presence of whole *Daphnia*, ostracods, and amphipods, it is conceivable that snails are also a source of nourishment. If

an infected snail were ingested, could the nematodes survive and develop inside the leech's intestine and possibly enter the tissues? An examination of the pond indicated the presence of the planorbid snail, *Planorbella tenuis*.

Moreover, a *D. olsoni* infection was noted in specimens of this snail that were dissected. Because there was no indication that the parasitized leech had recently ingested snail tissue and all stages (juveniles and adults) of *D. olsoni* appeared normal in the leech, it is concluded that both snails and leeches were infected in this habitat.

Previous reports of nematode parasites of leeches were made by Schuberg and Schroder (1904) and Pereira (1931), who reported the presence of *Myenchus* in the tissues of leeches in Germany and Brazil, respectively. The genus *Myenchus* is a member of the order Tylenchida and is quite distinct from *Daubaylia*.

Literature Cited

- Baylis, H. A., and R. Daubney. 1922. Report on the parasitic nematodes in the collection of the zoological survey of India. Mem. Ind. Mus. 7:263-347.
- Chernin, E. 1962. The unusual life-history of *Daubaylia potomaca* (Nematoda; Cephalobidae) in *Australorbis glabratus* and in certain other freshwater snails. Parasitology 52:459-481.
- , H. Michelson, and D. L. Augustine. 1960. *Daubaylia potomaca*, a nematode parasite of *Helisoma trivolvis*, transmissible to *Australorbis glabratus*. J. Parasitol. 52:599-604.
- Chitwood, B. C., and M. B. Chitwood. 1934. *Daubaylia potomaca*, n. sp., a nematode parasite of snails, with a note on other nemas associated with molluscs. Proc. Helminthol. Soc. Wash. 1:8-9.
- Honer, M. R., and J. Jansen, Jr. 1961. On *Daubaylia elegans* n. sp., in *Planorbis carinatus* Muller. J. Helminthol. 35:115-118.
- Pereira, C. 1931. *Myenchus botelhoi* n. sp., curiosa nematode parasites de *Limnodynastes brasiliensis* Pinto (Hirudinea). These, Fac. Med., São Paulo, Brazil. 29 pp.
- Poinar, Jr., G. O., and C. S. Richards. 1979. *Daubaylia helicophilus* n. sp. (Daubayliidae: Nematoda) a parasite of the snail *Gyraulus spirillus* from Taiwan. Ann. Parasit. (Paris) 54:615-619.
- Schuberg, A., and O. Schroder. 1904. *Myenchus bothryophorus*, ein in den Muschelzellen von *Nephelis schmarotzender* neuer Nematode. Zeitsch. Wiss. Zool. 76:509-521.
- Schuermans-Stekhoven, J. H., Jr. 1956. *Daubaylia dewiti* n. sp. nematodo parasito de *Planorbis contortus* (L.). Rev. Iberica Parasitol. 6:277-282.
- Sullivan, J. T., and J. R. Palmieri. 1978. *Daubaylia malayanum* sp. n. (Nematoda: Cephalobidae), a parasite of Malaysian pulmonate snails, with observations on its life history. J. Parasitol. 64:799-802.