

Hawaiian Helminths, Part III New Opecoelid Trematodes¹

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THE OPECOELID TREMATODES described in this paper were collected from Hawaiian fishes by the author during a sabbatical leave spent mainly at the Hawaii Marine Laboratory of the University of Hawaii. A recent review of the family Opecoelidae by Skrjabin (1958) includes, among others, keys to the genera *Opecoelus* and *Coitocaecum* which contain four of the five species described in the present paper. The fifth species is assigned to the genus *Pseudopecoeloides*. A sixth species in this family, *Dactylostomum caballeroi*, collected in Hawaii is described elsewhere (Martin, in press).

The specimens described here were fixed in Heidenhain's solution, stained with either Mayer's paracarmine or Celestin Blue B, and mounted in H-S-R mounting medium.

All measurements are expressed in millimeters.

EXPLANATION OF FIGURES

All drawings were made with the aid of a camera lucida. Abbreviations used: *A*, acetabulum; *C*, cecum; *Ci*, cirrus; *CS*, cirrus sac; *E*, excretory vesicle; *G*, genital pore; *M*, metraterm; *O*, ovary; *P*, prostate; *S*, seminal vesicle; *T*, testis; *V*, vitellaria.

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Coitocaecum Nicoll, 1915

Coitocaecum banneri n. sp.

Figs. 1, 2

SPECIFIC DIAGNOSIS: Based on seven specimens. Body smooth, oval, length 1.414–1.855, av. 1.683, greatest width 0.399–1.071, av. 0.858; oral sucker subterminal, length 0.21–.256, av. 0.241, width 0.196–.238, av. 0.217; acetabulum, length 0.308–.392, av. 0.348, width 0.252–.357, av. 0.329; prepharynx very short; pharynx oval, muscular, 0.096–.112, av. 0.106 long, and 0.088–.112, av. 0.096 wide; esophagus nearly as long as pharynx, glandular; ceca united near posterior end of body; gonads in posterior third of body, ovary pretesticular, smooth to weakly three-lobed, immediately to right of midventral line, 0.148–.224, av. 0.2 transversely, and 0.084–.126, av. 0.105 anteroposteriorly; seminal receptacle lacking; Laurer's canal present; Mehlis gland diffuse, lightly staining, immediately anterior to ovary; proximal uterine coils contain many sperm, uterine coils mainly intercecal and between ovary and acetabulum; metraterm short; eggs operculate, yellow, 0.048–.058, av. 0.056 long, and 0.027–.032, av. 0.03 wide; vitellaria richly developed, extending from about mid-esophageal level to posterior end of body, usually separated anteriorly but joining posteriorly, invading intercecal zone; testes postovarian, tandem to oblique, smooth to indented, posterior testis usually larger than anterior, anterior testis 0.231–.504, av. 0.334 long, and 0.108–.252, av. 0.167 wide, posterior testis 0.175–.49, av. 0.335 long, and 0.112–.291, av. 0.216 wide; seminal vesicle saccular, terminating shortly anterior to or slightly overlapping the acetabulum; cirrus sac short, cirrus weakly developed; genital pore ventral, on left side of body at postpharyngeal level; excretory bladder tubular, reaching to ovary, opening at posterior end of body.

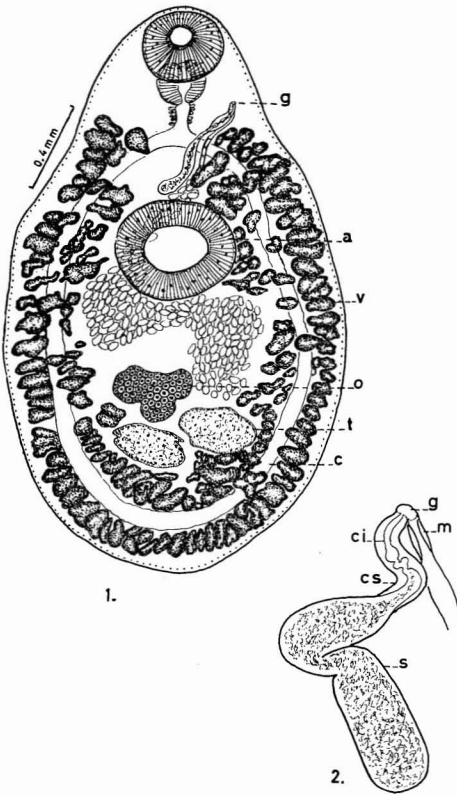


FIG. 1. *Coitocaecum banneri*, ventral view.

FIG. 2. *C. banneri*, terminal genital organs.

HOST: *Thalassoma duperrey* (Quoy and Gaimard), a wrasse. Hawaiian name: hinalea lauili.

Three of seven fish infected; maximum number of worms, 4.

LOCATION: Gall bladder.

LOCALITY: Kaneohe Bay, Oahu, Hawaii.

TYPE SPECIMEN: *Coitocaecum banneri*, deposited as no. 569, Hancock Parasitology Collection.

Coitocaecum hawaiiensis n. sp.

Figs. 3, 4

SPECIFIC DIAGNOSIS: Based on four specimens. Body smooth, spindle-shaped, length 0.801–1.435, av. 1.136, maximum width 0.385–.469, av. 0.418; oral sucker subterminal, 0.107–.13, av. 0.119 long, and 0.096–.12, av. 0.11 wide;

acetabulum near mid-body, 0.192–.256, av. 0.223 transversely, and 0.166–.192, av. 0.82 antero-posteriorly; prepharynx short; pharynx oval, muscular, 0.08–.104, av. 0.089 long, and 0.064–.072, av. 0.071 wide; esophagus usually shorter than pharynx; ceca extend laterally and posteriorly to unite a short distance posterior to testes; gonads in posterior third of body, ovary pretesticular, on right side of body, oval to triangular, smooth, 0.084–.088, av. 0.086 long, and 0.056–.08, av. 0.071 wide; Mehlis gland immediately anterior to ovary; Laurer's canal present; seminal receptacle lacking; coils of uterus confined to intercecal area between gonads and acetabulum; metraterm about half the length of the cirrus sac; eggs yellow, operculate 0.048–.051, av. 0.05 long, and 0.024–.027, av. 0.026 wide; vitellaria richly developed, extending from pharynx level to near posterior end of body, invading intercecal zone, uniting anteriorly and posteriorly; testes immediately post-ovarian, tandem, smooth to slightly irregular, anterior testis 0.16 long, and 0.056–.064, av. 0.06 wide; posterior testis 0.128–.137, av. 0.132 long, and 0.08–.112, av. 0.093 wide; seminal vesicle saccular, terminating shortly anterior to or slightly overlapping acetabulum, surrounded by large cells with large nuclei; cirrus sac nearly as long as seminal vesicle and twice as long as metraterm; genital pore ventral, on left side of body at pharyngeal level, excretory bladder tubular, reaching to ovarian level, opening at posterior end of body.

HOST: *Thalassoma duperrey* (Quoy and Gaimard), a wrasse. In one of seven fish.

LOCATION: Gall bladder.

LOCALITY: Kaneohe Bay, Oahu, Hawaii.

TYPE SPECIMEN: *Coitocaecum hawaiiensis*, deposited as no. 5610, Hancock Parasitology Collection.

Coitocaecum norae n. sp.

Figs. 5, 6

SPECIFIC DIAGNOSIS: Based on one specimen. Body smooth, oval, 1.05 long and 0.476 wide; oral sucker 0.144 by 0.128; acetabulum diameter 0.187; prepharynx short; pharynx oval, 0.048 long and 0.04 wide; esophagus approximately as long as pharynx, glandular, ceca extend lat-

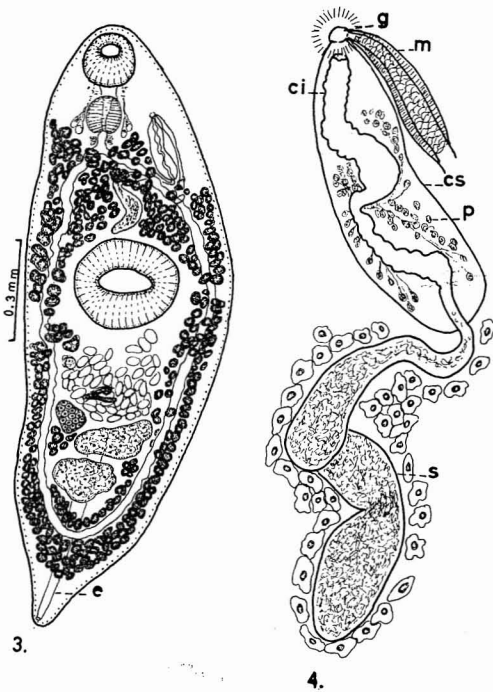


FIG. 3. *Coitocaecum hawaiiensis*, ventral view.
 FIG. 4. *C. hawaiiensis*, terminal genital organs.

erally and posteriorly to unite near posterior end of body; gonads in posterior half of body, ovary pretesticular, three-lobed; Laurer's canal present; seminal receptacle lacking; Mehlis gland indistinct; uterine coils few, between ovarian and acetabular levels; metraterm short, relatively thick-walled; vitellaria extend from pharyngeal level to near posterior end of body, invading intercecal zone; eggs yellow, operculate, approximately 0.049 long and 0.029 wide; testes tandem, transversely elongate, lobed; seminal vesicle extends posteriorly to anterior margin of acetabulum; cirrus sac about twice as long as metraterm; cirrus weak, about same length as metraterm; common genital pore ventral, on left side of body, at mid-esophageal level; excretory bladder tubular, reaching to ovary, with thicker-walled posterior portion, opening terminally.

HOST: *Ctenochaetus strigosus* (Bennett). One of fourteen fish infected.

LOCATION: Gall bladder.

LOCALITY: Kaneohe Bay, Oahu, Hawaii.

TYPE SPECIMEN: *Coitocaecum norae*, deposited as no. 5611, Hancock Parasitology Collection.

The new species of *Coitocaecum* described in this paper are unique in living in the gall bladder, all other species of the genus having been recovered from the digestive tract. *C. banneri* seems to be closest to *C. orthorcbis* Ozaki 1929, found in the stomach and intestine of *Tridentiger obscurus* Temminck and Schlegel at Hiroshima, and *Acanthogobius flavimanus* T. and S. from the fish market of Takamatsu City, Japan. Besides the differences of host and location within the host, *C. banneri* has larger suckers, a longer cirrus sac, and smaller eggs than *C. orthorcbis*.

Coitocaecum hawaiiensis also is close to *C. orthorcbis* and *C. banneri*. It differs from both in having a well-developed cirrus sac and cirrus, in having the seminal vesicle surrounded by large cells, and in the union of vitellaria anteriorly.

Coitocaecum norae has lobed, transversely elongate and narrow (anteroposteriorly) testes that distinguish it from all other species of the genus.

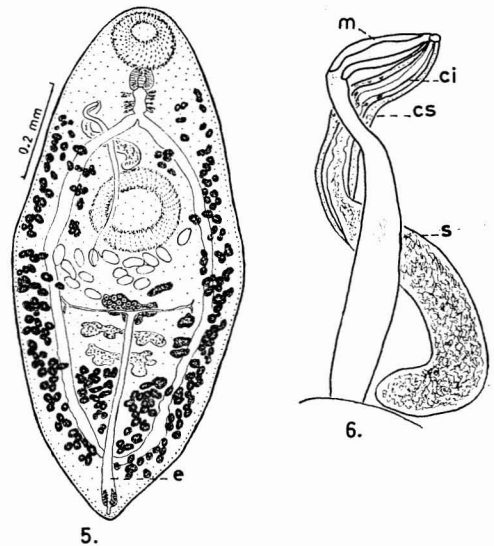


FIG. 5. *Coitocaecum norae*, dorsal view.
 FIG. 6. *C. norae*, terminal genital organs.

Opecoelus lanceolatus n. sp.

Figs. 7, 8, 9

SPECIFIC DIAGNOSIS: Based on four specimens. Body elongate, narrow, smooth, 1.86–3.08, av. 2.4 long, and 0.364–.476, av. 0.394 maximum width; oral sucker subterminal 0.096–.112, av. 0.106 long, and 0.096–.112, av. 0.103 wide; acetabulum with five pairs of dactyls or papillae, the three median pairs longer than others, acetabulum 0.16–.172, av. 0.164 long, and 0.16 wide; prepharynx short; pharynx oval, 0.064–.08, av. 0.078 long, and 0.04–.058, av. 0.049 wide; esophagus approximately as long as pharynx; ceca extend laterally and posteriorly to join near the posterior end of body, rectum short, anus ventral, near posterior end of body; gonads in middle third of body, ovary pretesticular, oval to slightly indented; Mehlis gland diffuse,

immediately anterior to ovary; Laurer's canal present; seminal receptacle lacking; uterine coils intercecal, mainly between ovary and acetabulum; metraterm short but slightly longer than cirrus sac; vitellaria extend from a short distance posterior to the acetabulum to the posterior end of body where they unite, mainly extracecal but slightly invading intercecal zone anterior to ovary and conspicuously between the testes and posterior to them; eggs yellow, operculate, 0.042–.048, av. 0.047 long, and 0.029–.032, av. 0.031 wide; testes tandem, one or both with indentation in posterior margin, anterior testis 0.179–.288, av. 0.24 long, and 0.09–.238, av. 0.188 wide; posterior testis 0.192–.32, av. 0.232 long, and 0.112–.224, av. 0.184 wide; seminal vesicle elongate, tubular, usually extending posterior to the acetabulum at least the diameter of the latter organ; cirrus sac short, enclosing prostatic cells and a weakly developed cirrus; common genital pore on left side of body, at or near posterior pharyngeal level; excretory vesicle tubular, reaching to or near ovary, opening terminally.

HOST: *Mulloidichthys samoensis* (Gunther), a goatfish. Four of ten fish infected.

LOCATION: Intestine.

LOCALITY: Kaneohe Bay, Oahu, Hawaii.

TYPE SPECIMEN: *Opecoelus lanceolatus*, deposited as no. 5612, Hancock Parasitology Collection.

Opecoelus lanceolatus seems to be closest to *O. xenistii* Manter, 1940, found in the intestine of *Xenistius californiensis* (Steindachner) collected at Tagus Cove, Albemarle Island, Galapagos. It differs from *O. xenistii* in the following ways: the vitellaria do not extend anteriorly as far as the acetabulum, the metraterm is much shorter, and the ovary is not trilobed.

Pseudopecoeloides tenuoides n. sp.

Figs. 10, 11

SPECIFIC DIAGNOSIS: Based on eight specimens. Body elongate, slender, smooth, somewhat constricted at gonad levels, 2.555–5.04, av. 3.47 long, and 0.16–.5, av. 0.3 wide; oral sucker subterminal 0.22–.28, av. 0.243 long, and 0.18–.23, av. 0.193 wide; acetabulum pedunculate

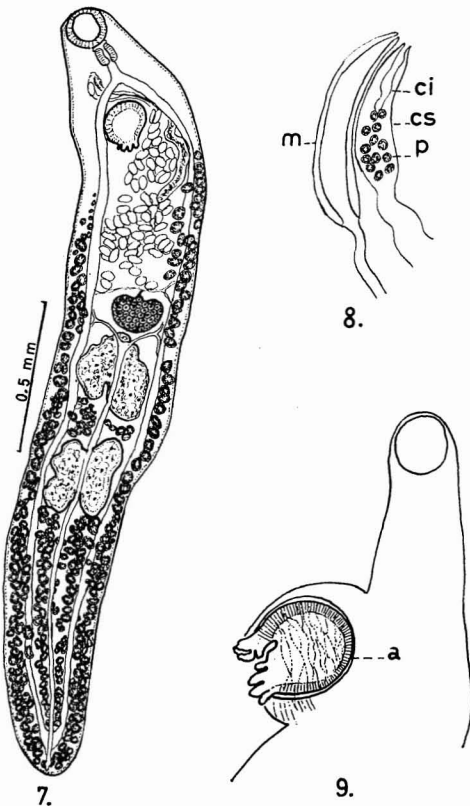
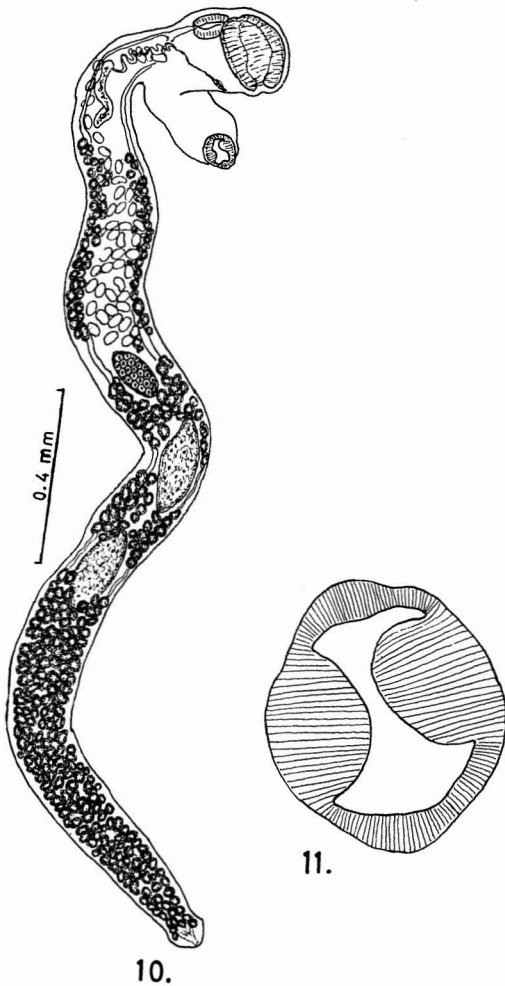


FIG. 7. *Opecoelus lanceolatus*, dorsal view.

FIG. 8. *O. lanceolatus*, terminal genital organs.

FIG. 9. *O. lanceolatus*, side view to show dactyls on acetabulum.

FIG. 10. *Pseudopecoeloides tenuoides*.FIG. 11. *P. tenuoides*, acetabulum showing pads.

with thick pads, 0.068–.118, av. 0.098 long, and 0.087–.109, av. 0.096 wide; prepharynx short; pharynx 0.087–.124, av. 0.1 long, and 0.65–.081, av. 0.068 wide; esophagus up to two-thirds length of pharynx; ceca proceed laterally and posteriorly to unite with excretory bladder near posterior end of body; gonads in middle third of body; ovary pretesticular, oval to spindle-shaped, smooth, 0.131–.211, av. 0.18 long, and 0.062–.143, av. 0.096 wide; Mehlis gland immediately anterior to ovary; Laurer's canal present; seminal receptacle lacking; uterine coils mainly between ovary and seminal vesicle; metraterm indistinct; eggs oval, operculate, 0.040–

.050, av. 0.044 long, and 0.025–.037, av. 0.030 wide; vitellaria well developed beginning a little posterior to the seminal vesicle and extending to near the posterior end of body, interrupted at gonad levels; testes spindle-shaped, smooth, tandem, anterior testis 0.187–.336, av. 0.267 long and 0.093–.146, av. 0.115 wide, posterior testis 0.218–.348, av. 0.292 long, and 0.093–.124, av. 0.111 wide; seminal vesicle tubular with a coiled narrow duct; prostate cells fairly numerous; cirrus rudimentary, a cirrus sac was not observed; genital opening ventral, sinistral, approximately midway between suckers; excretory vesicle tubular extending to or near ovary, opening terminally as a cloaca.

HOST: *Priacanthus cruentatus* (Lacépède).

Four of seven fish infected; maximum number of worms, four.

LOCATION: Intestine.

LOCALITY: Kaneohe Bay, Oahu, Hawaii.

TYPE SPECIMEN: *Pseudopecoeloides tenuoides*, deposited as no. 5613, Hancock Parasitology Collection.

Pseudopecoeloides tenuoides is closest to *P. tenuis*, described by Yamaguti (1940) from the small intestine of *Pseudopriacanthus nipponicus* (Cuv. et Valenc.), collected at Hamazima, Mie Prefecture, Japan. *P. tenuoides* differs from *P. tenuis* in having smaller eggs, a smaller oral sucker, smaller acetabulum, and in having acetabular pads.

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