

NEOLABRIFER BRAVOAE GEN. NOV. SP. NOV. AND *LABRIFER SECUNDUS* MANTER, 1940 (TREMATODA: LEPOCREADIIDAE)
FROM THE CALIFORNIA SHEEPHEAD IN
THE AMERICAN PACIFIC *

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ABSTRACT

Neolabrifer bravoae gen. nov. sp. nov., is described from the intestine of the California sheephead, *Pimelometopon pulchrum* (Ayres), a marine fish, taken at La Jolla and Point Loma, California, and from 52.5 naut. mi. E. of Isla Guadalupe, México. *Neolabrifer* differs from other lepopocreadiid trematodes in that the cecal bifurcation is dorsal to the posterior part of the acetabulum rather than preacetabular, and from the closely related genera *Labrifer* Yamaguti, 1936, and *Myzoxenus* Manter, 1934, in that the lamellar tissue forms concentric rings around the aperture of the acetabulum rather than lips.

New collections from the type host show the variability of *Labrifer secundus* Manter, 1940, and *L. tertius* Pritchard, 1960, is declared a synonym.

RESUMEN

Se describe a *Neolabrifer bravoae* gen. nov. sp. nov., del intestino de la "Vieja", *Pimelometopon pulchrum* (Ayres), pez marino capturado en La Jolla y en Point Loma, California, así como a 52.5 millas náuticas al E. de la Isla de Guadalupe, Baja California, México. *Neolabrifer* difiere de otros tremátodos lepopocreadiidos en que la bifurcación cecal es dorsal a la parte posterior del acetábulo más que preacetabular, y de los cercanamente emparentados géneros *Labrifer* Yamaguti, 1936 y *Myzoxenus* Manter, 1934, en que el tejido lamelar forma anillos concéntricos, más que labios, alrededor de la abertura del acetábulo.

Nuevas recolecciones en el huésped tipo exhiben la variabilidad de *Labrifer secundus* Manter, 1940, y se declara sinónimo a *L. tertius* Pritchard, 1960.

It is with great pleasure that I contribute this study in commemoration of a lifetime of scholarly pursuit by my friend, Margarita Bravo-Hollis, the well-known Mexican helminthologist.

The trematodes were collected from freshly-caught fishes, fixed in AFA, and stained in Van Cleave's hematoxylin. Figures were drawn with the aid of a

camera lucida, and measurements are in micra unless stated otherwise.

Neolabrifer gen. nov.

Lepocreadiidae; Lepocreadiinae: Body small, ovoid, spined. Granules of larval eyespot pigment in forebody, often scat-

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tered. Oral sucker subterminal; prepharynx short; pharynx well developed; esophagus long, bifurcating dorsal to posterior part of acetabulum; ceca terminating near posterior end of body. Acetabulum large, protuberant, in anterior half of body, with lamellar structure surrounding aperture. Testes tandem, in posterior half of body. External seminal vesicle mostly postacetabular, joined by isthmus to cirrus sac. Cirrus sac elongate, relatively thick-walled, overlapping acetabulum posteriorly, enclosing seminal vesicle, pars prostatica, and short eversible cirrus. Large gland cells massed dorsal to external seminal vesicle. Genital pore left of esophagus or posterior part of pharynx. Ovary dextral and immediately pretesticular. Seminal receptacle and Laurer's canal present. Uterus coiled between ovary and acetabulum. Eggs relatively large and few. Vitellaria circumcecal in hindbody. Excretory vesicle I-shaped, reaching middle of posterior testis. Parasitic in intestine of marine fishes.

Type and only species: *Neolabriifer bravoae*.

Neolabriifer bravoae gen. nov. sp. nov.
(Figs. 1 and 2)

Host: *Pimelometopon pulchrum* (Ayres), California sheephead (Labridae).

Incidence and Localities: 18 specimens in 3 of 8 hosts, La Jolla, California. Type locality.

1 specimen in 1 of 2 hosts, Point Loma, California.

4 specimens in 2 of 5 hosts, 52.5 naut. mi. E. of Isla Guadalupe, Mexico.

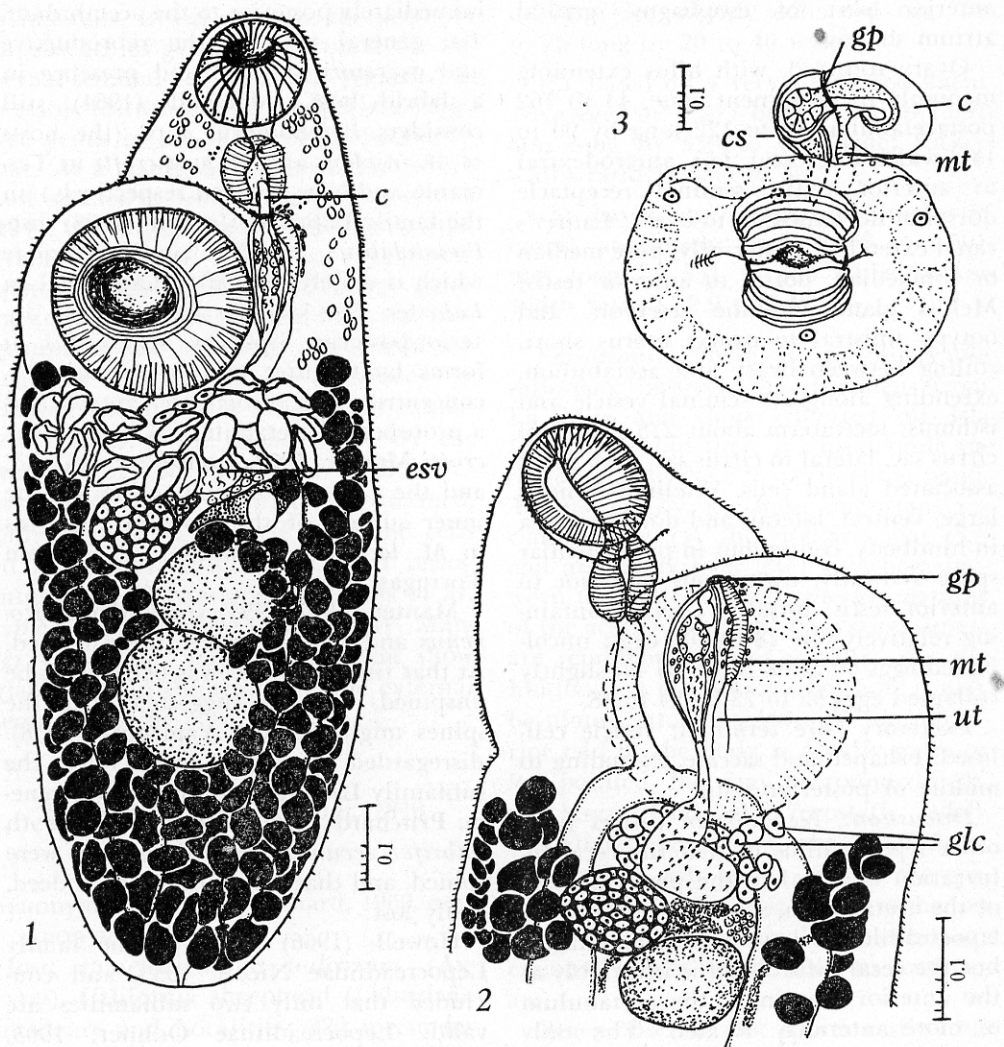
Site: Intestine.

Holotype: U. S. National Museum Helminthol. Coll. No. 71864.

Description (based on 23 specimens): Body ovate, 0.734 to 1.273 mm long by

0.288 to 0.571 mm wide, widest at acetabular-uterine level; cuticular spines close-set anteriorly, fewer and farther apart on hindbody; forebody 177 to 277 long, tapered, with cervical glands and eyespot pigment granules either scattered or compact; hindbody 490 to 816 long, very slightly tapered and rounded posteriorly. Oral sucker subterminal, rounded, 106 to 139 long by 108 to 155 wide; prepharynx 25 to 41 long (61 in one extended specimen); pharynx 61 to 106 long by 65 to 98 wide, with four lobes (two lateral, one dorsal, and one ventral) at anterior margin; esophagus 90 to 167 long; cecal bifurcation dorsal to posterior half of acetabulum, usually near posterior border of acetabulum; ceca moderately wide, extending to near posterior end of body, ending blindly. Acetabulum protuberant, rounded, about $1/3$ body length from anterior end, 163 to 290 long by 168 to 294 wide; aperture guarded by concentric rings of lamellar tissue; tegument extending around lamellar tissue, bearing small spines in inner margin; lumen sometimes appearing to have lobes; sucker width ratio 1: 1.5 to 2.0 (1: 2.85 in one very young specimen).

Testes smooth, tandem or obliquely tandem, intercecal, contiguous, at middle of hindbody; anterior testis 98 to 171 long by 114 to 212 wide; posterior testis 98 to 220 long by 126 to 245 wide; external seminal vesicle saccate, posterior to acetabulum, extending to ovarian level; large gland cells dorsal to external seminal vesicle; narrow isthmus connecting seminal vesicle with cirrus sac; cirrus sac 100 to 148 long by 32 to 52 wide, thick-walled, overlapping anterior half of acetabulum, containing: internal seminal vesicle in posterior third, pars prostatica in middle third, eversible, unarmed cirrus in anterior third, and a few small prostate cells; cirrus more or less coiled when not everted. Genital pore submedian, sinistral to pharynx or



Abbreviations used: c=cirrus; cs=cirrus sac; esv=external seminal vesicle; glc=gland cells; gp=genital pore; mt=metraterm; ut=uterus.

Fig. 1. *Neolabrifer bravoae*. Ventral view of holotype. Fig. 2. Same. Ventral view of anterior part of body of paratype; acetabulum dotted in and uterus omitted to show esophagus and large gland cells associated with external seminal vesicle. Fig. 3. *Labrifer secundus* from La Jolla, California. Ventral view of acetabulum and terminal genital ducts.

anterior part of esophagus; genital atrium shallow.

Ovary rounded, with hilus extending medianly in prominent cone, 44 to 162 postacetabular, 82 to 122 long by 90 to 131 wide, intercecal but anterodextral to anterior testis; seminal receptacle dorsal or dorsomedian to ovary; Laurer's canal extending posteriorly, pore median or submedian, dorsal to anterior testis; Mehlis' gland, vitelline reservoir, and ootype sinistral to ovary; uterus short, coiling between ovary and acetabulum, extending alongside seminal vesicle and isthmus; metraterm about $2/3$ length of cirrus sac, lateral to cirrus sac, with small associated gland cells. Vitelline follicles large, ventral, lateral, and dorsal to ceca in hindbody, contiguous in posttesticular space ventrally, contiguous posterior to anterior testis dorsally. Uterus containing relatively few (8 to 40) eggs; uncollapsed eggs 60 to 68 by 38 to 44, slightly collapsed eggs 52 to 72 by 24 to 38.

Excretory pore terminal; vesicle cell-lined, I-shaped and saccate, extending to middle of posterior testis.

Discussion: *Neolabrifer* differs from other lepecreadiids in that the cecal bifurcation is dorsal to the posterior part of the acetabulum. It is not unusual for lepecreadiids to have a long esophagus, but the cecal bifurcation is invariably at the anterior margin of the acetabulum or more anteriorly located. The only exception might be *Astacotrema cirrigerum* (Von Baer, 1827) Warren, 1903, which is lepecreadiid-like although the cirrus sac reaches the ovary, there is no external seminal vesicle, and the eggs are very small.

Neolabrifer, *Labrifer* Yamaguti, 1936, and *Myzoxenus* Manter, 1934, are closely related genera as evidenced by the distinctive lamellar tissue associated with the aperture of the acetabulum, similarities in the structure of the cirrus sac, the presence of glandular (prostatic?) cells at the level of the seminal vesicle

immediately posterior to the acetabulum, the general plan of the reproductive and excretory systems, and presence in a labrid host. [Marshall (1964) still considers *Pseudolabrus* spp. (the hosts of *M. insolens* and *M. crowcrofti* in Tasmania and New Zealand respectively) in the family Labridae. Jordan (1963) lists *Pseudolabrus* in the family Coridae which is closely related to Labridae.] In *Labrifer*, the lamellar tissue forms anterior-posterior lips; in *Myzoxenus*, it forms lateral lips; and in *Neolabrifer*, concentric rings. *Neolabrifer bravoae* has a protuberant acetabulum as in *M. crowcrofti* Manter, 1954, from New Zealand, and the presence of small spines on the inner surface of the lamellar tissue as in *M. lachnolaimi* Manter, 1947, from Tortugas, Florida.

Manter (1947, 1954) stated that *Myzoxenus* and *Labrifer* were surely related. At that time, *Labrifer* was believed to be unspined, but he suggested that the spines might be lost. Yamaguti (1958) disregarded spination and named the subfamily Labriferinae for the two genera. Pritchard (1960) reported that both *Labrifer secundus* and *L. tertius* were spined, and that the spines were, indeed, easily lost.

Howell (1966) reviewed the family Lepocreadiidae Nicoll, 1935, and concluded that only two subfamilies are valid: Lepocreadiinae Odhner, 1905, with a cirrus sac, and Homalometrinae Cable and Hunninen, 1942, lacking a cirrus sac. Certainly the two lines are present within the family, but whether there are only two subfamilies is a subjective conclusion. Howell recognizes groups within the subfamilies, but these are not homogeneous. He pointed out that two *Myzoxenus* species [*M. insolens* (Crowcroft, 1945) Manter, 1947, and *M. crowcrofti*] apparently lack gland cells around the external seminal vesicle while the other two species (*M. vitellus* Manter, 1934, and *M. lachnolaimi*) have such

gland cells. In his opinion, the presence or absence of gland cells around the external seminal vesicle can be regarded as a stable feature among the species of a given genus in the subfamily Lepocreadiinae. As a result, he assigned the former two species to *Gnathomyzon* Crowcroft, 1945, while the other two species remained in *Myzoxenus*. Thus, four very closely related species are in two different genera and the genera are in different subgroups of the subfamily. The solution may lie in restudy of specimens or further collection of the species apparently lacking the gland cells. Of the more than 200 specimens of *Labrifer secundus* (below) which I examined, only about 25% showed the gland cells in totomount. With this clue, I reexamined the 10 paratype specimens of *M. crowcrofti* which are in the H. W. Manter Collection, and half of them show gland cells in the region of the external seminal vesicle.

Labrifer secundus Manter, 1940

(Fig. 3)

Synonym: *L. tertius* Pritchard, 1960, new synonymy.

Host: *Pimelometopon pulchrum* (Ayes), California sheephead (Labridae).

Incidence and Localities: 220 specimens from 6 of 10 hosts, La Jolla, California.

7 specimens from 2 of 5 hosts, 52.5 naut. mi. E. of Isla Guadalupe, Mexico.

Site: Intestine.

Specimen deposited: U. S. National Museum Helminthol. Coll. No. 71865.

Measurements: (1) based on 95 adult specimens: body 1.469 to 2.579 mm long by 0.514 to 1.069 mm wide; oral sucker 131 to 237 wide; acetabulum 408 to 767 wide; sucker width ratio 1: 2.58 to 3.77; uncollapsed eggs 56 to 70 long by 36

to 48 wide; slightly collapsed eggs 58 to 76 long by 20 to 40 wide.

(2) based on 4 very young specimens (five eggs or less): body 1.387 to 1.591 mm long by 539 to 637 wide; sucker width ratio 1: 3.05 to 3.4.

(3) based on 7 immature (nonovigerous) specimens: body 0.808 to 1.501 mm long by 351 to 550 wide; sucker width ratio 1: 2.9 to 3.47.

Variations: There is no observable difference between the specimens from La Jolla and those collected off Isla Guadalupe, but there is considerable variation among the 227 specimens at hand. Taxonomically, the most important variations are: (1) the vitellaria may extend anteriorly to a level anywhere between the posterior and anterior margins of the acetabulum, and the various levels are represented about equally; (2) the hindbody is usually tapered, but it may be almost straight-sided; (3) the posterior end of the body is usually more or less pointed, but may be rounded; (4) the large gland cells (prostatic cells?) immediately posterior to the acetabulum, observed in only about 25% of the specimens, appear in most cases to be on either side of the seminal vesicle, but occasionally they can be seen to form an arc.

Other observations: spines easily lost, but well preserved specimens spined to posterior end of body; oral sucker normally subterminal, terminal in more macerated specimens; prepharynx emerging from oral sucker somewhat dorsally; esophagus varying from as long as pharynx to only $\frac{1}{4}$ as long; ceca usually moderately wide but may be slender; acetabular lips vary in size, anterior lip usually wider and more curved; four conspicuously large cells present in acetabulum, one anterior and one posterior to the lips, and one on each side near anterolateral margins; testes tandem or

slightly oblique, usually smooth but may be slightly irregular and degenerate; vasa efferentia enter base of seminal vesicle together without forming vas deferens; seminal vesicle extending to, or almost to, ovarian level, varying in size with amount of contents, straight or sinuous; cirrus sac club-shaped, attenuated posteriorly to some point dorsal to anterior half of acetabulum, thick-walled, bent dorsoventrally near middle; cirrus often everted, transparent except for sperm duct; ovary usually submedian (dextral) but may be median; anterior coil of uterus may be ventral to posterior part of acetabulum; metraterm about as long as cirrus sac, accompanied by small gland cells; seminal receptacle transversely ovoid, dextral, at level of ovary; Laurer's canal curving across median line to reach pore dorsal to left cecum; vitelline follicles small or large; vitelline reservoir median at ovarian level; occasionally converging yolk ducts form conspicuous enlargements median to ceca at ovarian level; eggs moderately thick-shelled, occasionally with slight knob at anopercular end; excretory vesicle extending anteriorly to some point dorsal to the posterior testis.

Discussion: Manter (1940) described *Labrifer secundus* from a single specimen collected from *Pimelometopon pulchrum* at Cedros Island,² Baja California, Mexico. Montgomery (1957) emen-

ded the description after study of 24 specimens from the same host at La Jolla, California. The present data are based on specimens from the same host from a collecting station about midway between Guadalupe and Cedros islands, and from La Jolla. *Labrifer tertius* Pritchard, 1960, was based on six specimens from *Thalassoma duperreyi* (Quoy et Gaimard) and *Bodianus bilunulatus* (Lacépède) at Hawaii. The present knowledge of the range of variation in *L. secundus* leads clearly to the conclusion that the specimens of *L. tertius* lie within the limits of variability, and *L. tertius* is considered a synonym of *L. secundus*, a new synonymy.

Labrifer secundus is now very similar to the type and only other species of *Labrifer*, *L. semicosyphi* Yamaguti, 1936, which was based on numerous specimens from *Semicossyphus reticulatus* (Cuv. et Val.) in Japan. About the only character separating the two species is the anterior extent of the vitellaria. In *L. semicosyphi*, the vitellaria extend anteriorly from midway between the ovary and the acetabulum to the posterior border of the acetabulum. In *L. secundus*, the anterior vitellaria lie at a level between the posterior and anterior borders of the acetabulum. All the hosts involved belong to the family Labridae.

ZOOGEOGRAPHY

At the present time, two species of *Myzoxenus* are from Tortugas, Florida; two species of *Myzoxenus* are from the South Pacific (one each from Tasmania

and New Zealand); one species of *Labrifer* is from Japan, the other is from Hawaii and the American Pacific; the single species of *Neolabrifer* is from the American Pacific. The Pacific origin of these genera is strongly indicated, and, as Manter (1947, 1954) has pointed out, the species at Tortugas apparently got there before the rise of the Central American land bridge.

² Certain reports of the cruises of the Veleiro III contain a typographical error listing Cedros Island as Cerros Island. All references in Manter (1940) to Cerros Island should be corrected. Cedros Island lies off the western shore of Baja California about midway between San Diego, California, and La Paz, Baja California, Mexico.

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