Digenetic trematodes of fishes from Palawan Island, Philippines. Part III. Families Hemiuriidae and Lepocreadiidae*

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The digenetic trematodes of this report were part of a collection of parasites of marine fishes made by the junior author while a member of the U. S. Naval Medical Research Unit No. 2, Taipei, Taiwan, and serving as a guest investigator on the Silliman University-Bishop Museum Expedition to Palawan Island, Republic of the Philippines. Parasites were washed in saline, killed in hot water and transferred immediately to FAA fixative. After 4-8 hours they were stored in 70 percent alcohol plus 2 percent glycerine. Staining was in carmalum and fast green, Gower's carmine, or Harris hematoxylin. All were mounted in balsam. Measurements are in microns.

FAMILY HEMIURIIDAE

_Hemiurus sigani_ n. sp. (Fig. 1)

**HOST:** _Siganus striolatus_ (Siganidae).

**HABITAT:** Small intestine.

**LOCALITY:** Puerto Princesa, Palawan Island, Philippines.

**DATE:** 21 May 1962.

**TYPE:** USNM Helm. Coll. No. 60401.

**DESCRIPTION** (based on single specimen): Body elongate, widest at vitellaria, with ecosoma; total length 1,809; body proper 1,254 by 595, ecosoma 555 by 425. Preoral lobe 11, forebody 184, acetabulum to posterior extremity of body proper 892. Cuticular pliaciones visible laterally to level of anterior portion of posterior testis on right and anterior portion of ovary on left; dorsal and ventral surfaces with pliaciones over entire worm, less distinct on body proper posterior to disappearance of lateral pliaciones and on ecosoma. Oral sucker 73 by 77, subterminal, ventral. Acetabulum 178 by 206, at about level of anterior fifth of body proper. Sucker length ratio 1:2.45. No visible prepharynx; pharynx 53 by 56, partially overlapping oral sucker dorsally; esophagus 41 long; bifurcation at anterior margin of acetabulum; ceeca extending into ecosoma slightly more than half way, postcecal space 255 (right) and 290 (left). Excretory bladder tubular, sinuous, extending to ovarian region; arms uniting dorsal to oral sucker-pharynx junction; pore terminal.

Testes two, smooth, transversely elongate, slightly oblique, postacetabular, anterior testis slightly overlapping posterior one dorsally; anterior testis 150 by 230, posterior 152 to 213; acetabulum to anterior testis 172, to

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posterior testis 295; latter to ovary 22. Seminal vesicle postacetabular, bipartite, both chambers thick-walled and muscular, transversely oriented left (proximal) to right (distal); left chamber 73 by 96, slightly overlapping anterior testis dorsally, right chamber 77 by 61; acetabulum to seminal vesicle 116. Pars prostatica dextral, slightly sinuous, long, extending from ventral surface of right chamber of seminal vesicle to short distance preacetabular, thick-walled, muscular; surrounded by prostate gland cells throughout length but more prominently postacetabular. Sinus sac 196 by 31, extending anteriorly from just preacetabular to genital pore on oral sucker, relatively thin-walled. Union of pars prostatica with metraterm at proximal end of sinus sac, entering latter as hermaphroditic duct; duct 196 by 15, relatively thick-walled, muscular. Genital pore a transverse slit, ventral, submedian to left, between posterior lip and posterior margin of oral sucker, 10 anterior to posterior margin of latter.

Ovary 133 by 172, transversely elongate, smooth, in tandem with testes, close to posterior testis, 467 postacetabular. Ootype complex posterodorsal to ovary. Seminal receptacle 92 by 66, posterosinistral to ovary, overlapping latter and left vitellarium ventrally. Vitelline lobes two, symmetrical, compact, smooth, in contact; right vitellarium 165 by 167, in contact with ovary, left vitellarium 145 by 165; acetabulum to vitellaria 587, latter to escoma 138 (right), 153 (left). Uterus much coiled, dorsal to gonads and vitellinaria but may overlap some of margins ventrally, separating posterior testis from ovary; uterus extending into escoma 111, one fifth length of latter; metraterm long, extending over most of acetabulum. Eggs numerous, 10 measuring 20 to 23 by 10 to 12.

DISCUSSION: Heminiris signani differs from all known species of the genus in having both chambers of the seminal vesicle thick-walled and muscular. It appears closest to H. appendiculatus (Rudolphi, 1802) Looss, 1899.

Aphanurus stossichi (Monticelli, 1891) Looss, 1907

SYNONYMS: Distomum ocreatum Monticelli, 1887, Stossich, 1888, 1898, nec Rudolphi, 1819, nec Osloss, 1867; Aplonema stossichi Monticelli, 1891; Heminirus stossichi (Monticelli, 1891) Lâhe, 1901; Aphanurus virgula Looss, 1907; Aphanurus harenulae Yamaguti, 1938.

HOST: Harengula dispilnotus (Clupeidae).

HABITAT: Small intestine.

LOCALITY: Puerto Princesa, Palawan Island, Philippines.

DATE: 19 May 1962.

SPECIMEN DEPOSITED: USNM Helm, Coll. No. 60402.

DESCRIPTION (based on single specimen): Body 589 by 111, entirely annulated, no escoma; preoral lobe 5, forebody 109, hindbody 311, postovarian space 191, postuterine space 65, postcecal space 35. Oral sucker diameter 40; acetabulum 69 by 83, at level of anterior body fourth; sucker length ratio 1:1.73; pharynx 26 by 24; esophagus 17 long; anterior (right) testis 46 by 44, posterior testis 38 by 45; acetabulum to anterior testis 54, to posterior 73; sinus sac median, 72 by 14; hermaphroditic duct 72 by 6; sae and duct overlapping anterior fifth of acetabulum and opening anteriorly into median genital pore just 5 posterior to oral sucker and ventral to midlevel of pharynx; pars prostatica long, surrounded by large prostate gland cells overlapping ceen, posterior portion of acetabulum and both testes; seminal vesicle 43 by 33, acetabulum to latter 31; ovarian 35 by 66, overlapping both testes ventrally, acetabulum to ovary 85; vitellarium 65 by 85, overlapping
ovary and posterior testis ventrally, acetabulum to vitellarium 103; 10 eggs measuring 19 to 25 by 9 to 13.

**Discussion:** Slusarski (1957) reviewed the various forms designated as *Aphanurus stossichi* sensu latu, noting that some were supposed to have a rudimentary esoma, some not. He concluded that the entire group needed restudy since the various authors ascribing an esoma to their forms did not document their conclusions. Our specimen resembles Yamaguti's (1938) de-

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**Figure 1.** *Hemiuris sigani*, ventral view of type specimen.

**Figure 2.** *Brachaitena cheilolous*, ventral view of type specimen.

**Figure 3.** Same. Terminal genitalia, ventral view.

**Figure 4.** *Aephnidiogenea barbarus*, ventral view.

**Figure 5.** Same. Terminal genitalia, dorsal view. C, cirrus; CS, cirrus sac; E, egg; GA, genital atrium; GC, gland cells; GP, genital pore; HDM, muscular portion of hermaphroditic duct; HDT, thin-walled portion of hermaphroditic duct; HV, hermaphroditic vesicle; M, metraterm; PG, prostate gland cells; PP, pars prostatica; SS, Sinus sac; SVE, external seminal vesicle; SVI, internal seminal vesicle; U, uterus.
criptions of A. stossichi from Dorosoma thrissa and A. harengulae (syn. of A. stossichi) from Harengula zunasi from Japan; it also fits Yamaguti's (1953) description of A. harengulae from Clupea clypeoides from Celebes.

**Lecithocephalus augustiovum** Yamaguti, 1953

**Host:** Caranx affinis (Carangidae).

**Habitat:** Small intestine.

**Locality:** Puerto Princesa, Palawan Island, Philippines.

**Date:** 19 May 1962.

**Specimens deposited:** USNM Helm. Coll. No. 60403 (three slides with one specimen each).

**Description:** (based on six specimens, five measured): Total length 2,713 to 3,177; body proper 1,716 to 1,906 by 269 to 350, escoma 997 to 1,292 by 213 to 299; forebody 491 to 508, acetabulum to posterior extremity of body proper 951 to 1,097; preoral lobe 7 to 16; plications on entire worm, much less distinct on escoma; oral sucker (in 6) 243 to 258 by 187 to 232; acetabulum (in 6) 220 to 244 by 223 to 225; sucker length ratio 1:0.90 to 0.95; pharynx 121 to 158 by 88 to 101; anterior testis (in 4) 140 to 198 by 96 to 195, posterior testis (in 4) 133 to 202 by 114 to 191; acetabulum to anterior testis 399 to 568, to posterior 560 to 759; seminal vesicle 309 to 449 by 107 to 166, maximum thickness of muscular wall 30 to 59; acetabulum to seminal vesicle 23 to 177; hermaphroditic duct 368 to 589 long; genital pore at anteroventral portion of oral sucker; ovary 77 to 147 by 96 to 203; acetabulum to ovary 851 to 1,074; ootype complex 52 to 118 by 74 to 128, distinct, compact, posterodorsal to ovary; 7 vitelline lobes, 4 right and 3 left (in 3) or 3 right and 4 left (in 2); uterus extending into escoma 607 to 905; 25 older intruterine eggs measuring 16 to 24 by 6 to 12. One specimen with only single testis 269 by 225, much larger than in those with 2, distance postacetabular 476.

**Discussion:** This species was described by Yamaguti (1953) from Rastrelliger (=Scambria) kanagurta from Celebes, and redescribed by Velasquez (1962) from R. chrysozonus from Visayan Islands and Luzon Island, Philippines. The latter stated that her specimens were smaller than Yamaguti's, but actually they were at the upper limit or larger; Yamaguti's figures for body length were for the entire worm and not for the body proper alone.

**Lecithochirium magnaporum** Manter, 1940

**Host:** Enthyxuna yaito (Seombridae).

**Habitat:** Small intestine.

**Locality:** Puerto Princesa, Palawan Island, Philippines.

**Date:** 20 May 1962.

**Specimens deposited:** USNM Helm. Coll. No. 60404 (four slides with one specimen each).

**Description:** (based on 19 specimens; four measured in ventral or dorsal view and four in lateral view): Escoma retracted in all specimens. Total length 1,246 to 1,715; width at genital pore 152 to 185, at ovary 280 to 445; depth at genital pore 145 to 195, at ovary 250 to 425; preoral lobe 12 to 31, forebody 275 to 450, hindbody 705 to 1,085, preacetabular pit opening to acetabulum 26 to 122; oral sucker, length 77 to 99, width 87 to 90, depth 76 to 97; acetabulum, length 208 to 320, width 232 to 280, depth 182 to 235;
sucker length ratio 1:2.45 to 3.48; pharynx, length 46 to 58, width 50 to 53, depth 41 to 56; oesophagus 25 to 60 long; right testis, length 97 to 182, width 85 to 102, depth 126 to 167, lying anterior to left testis in 3 of 8 specimens; left testis, length 104 to 155, width 95 to 174, depth 115 to 157, lying anterior to right testis in 5 of 8 specimens; seminal vesicle tripartite, posterior margin from 16 preacetabular (in 1) to maximum of 101 posterior to anterior margin of acetabulum (in 7); posterior chamber of seminal vesicle, length 97 to 140, width 59 to 68, depth 65 to 90; middle chamber of seminal vesicle, length 48 to 75, width 47 to 51, depth 46 to 68; anterior chamber of seminal vesicle looping posteriorly, then anteriorly, width 25 to 33, depth 27 to 39; pars prostatica short, relatively straight, length 26 to 85, width 13 to 19, depth 19 to 22, surrounded by prostate gland cells; sinu sac longer than wide, passing from posterodorsal to anteroventral, actual length (lateral view in 4) 88 to 138, longitudinal extent (ventral or dorsal view in 4) 69 to 98, width 49 to 93, depth 57 to 94, containing large vesicular cells surrounding hermaphroditic duct; prostatic vesicle cell lined, length 15 to 31, width 24 to 28, depth 26 to 37; hermaphroditic duct short, actual length (lateral view in 4) 62 to 90, longitudinal extent (ventral or dorsal view in 4) 10 to 41, width 29 to 38, depth 36 to 43, with circular muscles internally giving ringed appearance and prominent plaited longitudinal muscles externally giving longitudinally striated appearance, striations continuing to genital pore and giving its border a conspicuous radially striated appearance; genital pore large, transverse slit, ventral to oesophagus-cesal bifurcation, 111 to 264 preacetabular; ovary, length 90 to 138, width 116 to 186, depth 119 to 172, 185 to 440 postacetabular; vitelline lobes 6 to 8, variations in 8 specimens (right-left) 3-3, 3-4, 3-4, 3-4, 3-5, 4-3, 4-3, 4-3; metraterm uniting with male duct just anterior to prostatic vesicle; 34 eggs measuring 20 to 24 by 11 to 15.

Discussion: This species was described by Munter (1940) from Paralabrax humeralis, Euthynnus allletterata, Seriola dorsalis, and (?) Epinephelus sp. from the Galapagos Islands. Montgomery (1957) reported it from Pneumatophorus japonicus diego and Trachurus symmetricus from California. Munter gave the sucker length ratio as 1:2 or slightly less (oral sucker 135 to 150 in diameter, acetabulum 262 to 292). Montgomery noted a ratio of 1:2.3 to 2.4. Study of the type specimen of L. magnaporum (USNM Helu. Coll. No. 9366) from Paralabrax humeralis indicated an oral sucker 121 by 148 and an acetabulum 281 by 286; sucker length ratio 1:2.32. In a paratype specimen on the same slide the oral sucker was 109 by 131 and the acetabulum 281 by 283; sucker length ratio 1:2.58. Munter noted the sinus sac as wider than long (60 to 102 by 94 to 133). The sinus sac in the type specimen was 121 by 155, and in the paratype 62 by 59. Munter recorded the egg size as 15 to 19 by 8 to 9. Eight eggs in the type were 15 to 21 by 8 to 10, and 5 in the paratype 20 to 26 by 11 to 12.

Paraplerurus sauridae Fischthal and Kuntz, 1963

Host: Trichiurus humela (Trichiuridae).

Habitat: Small intestine.

Locality: Puerto Princesa, Palawan Island, Philippines.

Date: 19 May 1962.

Specimens deposited: USNM Helu. Coll. No. 60405 (three slides with one specimen each).

Description (based on six specimens, four measured): Body proper 3,083 to 5,155 by 1,442 to 2,040 (at ovary); cesoma 3,181 to 3,950 by 1,044 to
1,649 (at uterus end); body proper plus esoma 7,033 to 9,693; esoma retraced into body proper 483 to 1,488; actual overall length 5,545 to 8,389; preoral lobe 55 to 84; forebody 941 to 1,496; acetabulum to posterior extremity of body proper 1,137 to 4,165; oral sucker 360 to 460 by 406 to 417; acetabulum 851 to 1,065 by 920 to 1,074; sucker length ratio 1:2.02 to 2.53; pharynx 154 to 199 by 146 to 180; ceca into esoma 2,616 to 3,912; tests symmetrical or slightly oblique; right testis 372 to 468 by 506 to 782, left testis 368 to 606 by 537 to 675; acetabulum to right testis, overlapping to 15; acetabulum to left testis, overlapping to 253; seminal vesicle tripartite, posterior chamber 239 to 404 by 184 to 283, middle chamber 166 to 250 by 110 to 299, anterior chamber 162 to 221 by 92 to 176; posterior end of seminal vesicle to posterior margin of acetabulum 439 to 939; prostatic vesicle 81 to 162 by 140 to 188; sinus sac (in 2) 239 to 302 wide; genital pore to acetabulum (in 2) 243 to 445; ovary 514 to 548 by 629 to 828; acetabulum to ovary 591 to 1,012; ootype complex 208 to 414 by 453 to 682; ovary-ovotype complex 614 to 706 by 629 to 828; vitelline lobes 3 right, 4 left; uterus into esoma 905 to 2,768; 15 eggs measuring 16 to 23 by 8 to 13.

DISCUSSION: Fischthal and Kuntz (1963) described this genus and species from *Saurida undosquamis* from Egypt. The testes, sinus sac, prostatic vesicle, ovary, and ootype complex in the Palawan specimens are wider than in those from Egypt, but we do not believe these differences are sufficient for creating a new species.

*Brachadena cheilionis* n. sp. (Figs. 2 and 3)

HOST: *Cheilio inermis* (Labridae).

HABITAT: Small intestine.

LOCALITY: Puerto Princesa, Palawan Island, Philippines.

DATE: 20 May 1962.


DESCRIPTION (based on single specimen): Body 1,130 by 400, somewhat flattened, widest at acetabulum, tapering toward both extremities, no esoma, cuticle smooth; preoral lobe 10, forebody 290, hindbody 630, postovarian space 450. Oral sucker 99 by 128; acetabulum 210 by 235; sucker length ratio 1:2.12. No visible prepharynx; pharynx 68 by 87; esophagus short; cecal bifurcation midway between suckers; ceca extending into postovarian space one fourth to two fifths length of latter, ceca to posterior extremity 345 (right), 259 (left). Excretory bladder tubular, pore terminal.

Testes 2, symmetrical, separated, partly overlapping acetabulum and ceca; right testis 102 by 110, left testis 114 by 125. Seminal vesicle large, 148 by 123, thick-walled, over right side of anterior two thirds of acetabulum as well as partly lateral to latter, overlapping right cecum dorsally, extending slightly preacetabular; posterior end of seminal vesicle to posterior margin of acetabulum 75. Pars prostatica long, mostly dextral, winding in narrow space between seminal vesicle and sinus sac, overlapping right cecum dorsally, entering posterior end of sinus sac. Prostate gland cells surrounding pars prostatica and base of sinus sac. Sinus sac 87 by 68, elongate oval, thick-walled, muscular, ventral to cecal bifurcation, sinistral to midline; distance to acetabulum 47. Union of pars prostatica and metraterm at posterior border of sinus sac, entering latter as hermaphroditic duct; latter differentiated into three portions: relatively thin-walled, straight tube 10 by 10 (posterior portion); round vesicle 37 by 36 (middle portion); thick-walled, muscular tube (anterior portion) 33 by 12 (proximal) to 21 (distal). Herm-
phroditic duct opening into very small, spool-shaped genital atrium 5 by 6 (middle) to 9 (proximal and distal ends). Genital pore transverse slit, sinistral to midline at level of posterior portion of pharynx; distance to acetabulum 137.

Ovary round, diameter 97, median, slightly overlapping both ceca ventrally; acetabulum to ovary 90. Ootype complex postovarian. Vitellaria ventral, of 7 elongate lobes united centrally, posteroventral to ovary; 4 lobes directed posteriorly beyond cecal ends, 3 anterosinistrally with one slightly overlapping left testis ventrally; acetabulum to vitellaria 35, vitellaria to posterior extremity 230. Uterus much coiled; dorsal to vitellaria, dorsal and ventral to parts of gonds, circumcecal, overlapping posterior and lateral portions of acetabulum, one coil on left extending slightly preacetabular; descending posteriorly beyond cecal ends and vitellaria, ascending on right between seminal vesicle and acetabulum dorsum; uterus to posterior extremity 85. Metraterm short, preacetabular, ventral to portion of pars prostatica. Eggs numerous, very small, 10 measuring 15 to 16 by 9 to 11.

Discussion: The only species in the genus is B. pyriformis Linton, 1910. As noted by Manté (1947) it has been observed in a variety of fish hosts from the Atlantic coast of the United States and the Gulf of Mexico; Manté and Van Cleave (1951) and Bravo (1956) reported it from the Pacific coast of California and Mexico respectively. Yamaguti (1954) considered Brachadrua a synonym of Lecithophyllum Odhner, 1905. Bravo (1956) and Margolis (1958) reviewed Brachadrua and considered it valid, the latter author doing so on the basis of the centrally united vitelline lobes. According to Margolis the presence or absence of a genital atrium had not been determined for this genus. We can now report one as noted in B. cheilionis. Study of one of Linton's (1910) specimens of B. pyriformis from Haemulon macrostomum (USNM Helm. Coll. No. 8490) also indicated the presence of a very small genital atrium. We recognize the validity of Brachadrua on the same basis as cited by Margolis. B. cheilionis can be differentiated from B. pyriformis in having much smaller eggs, much longer vitelline lobes, and a large seminal vesicle mainly dorsal to and overlapping two thirds of the acetabulum rather than one mainly preacetabular and barely overlapping the acetabulum.

Family Lepocreadiidae

Aephnidiogenes barbarus Nicoll, 1915 (Figs. 4 and 5)

Host: Pomadasys hasteae (Pomadasyidae).

Habitat: Small intestine.

Locality: Puerto Princesa, Palawan Island, Philippines.

Date: 21 May 1962.

Specimens deposited: USNM Helm. Coll. No. 60407 (four slides with one specimen each).

Description (based on 11 specimens, 10 measured): Body elongate, 3.404 to 5.395 long in 5 with normal posttesticular space, 2.981 to 3.280 long in 5 with part of posttesticular space missing but healed over; 591 to 767 wide, more or less of uniform width from anterior extremity to just posttesticular, then tapering to posterior extremity; extremities rounded. Forebody 836 to 1,208; hindbody 2,894 to 3,981 in 5 normal specimens, 1,657 to 2,034 in 5 with abbreviated posttesticular body; posttesticular space 1,235 to 2,063 in 5 normal specimens, 84 to 383 in 5 abbreviated ones. Cuticle thick where
spined, thin otherwise; spines larger and distribution denser more anteriorly, terminating at varying levels in different specimens, from level of anterior margin of acetabulum to past middle of posttesticular space in complete individuals. No eyespot pigment. Preoral lobe 18 to 79. Oral sucker 147 to 236 by 136 to 239, subterminal, ventral. Acetabulum 121 to 220 by 121 to 217, round to slightly transversely elongate. Sucker length ratio 1:0.71 to 0.95. Prepharynx short, length where visible in four 14 to 47; pharynx 96 to 132 by 85 to 132, round to slightly longitudinally elongate and less frequently transversely elongate, overlapping oral sucker dorsally; esophagus 74 to 228 long, thick-walled, muscular; cecal bifurcation closer to oral sucker than acetabulum; ceca lined with prominent cells internally, tend to follow lateral contours of gonads but latter may slightly overlap them dorsally, terminating near posterior extremity. Excretory bladder elongate, tubular, passing left of posterior testis and right of anterior testis to ovarian region; pore terminal.

Testes 2, oblique, entire to slightly lobed, usually longer than wide, usually separated from each other, postovarian and separated from latter; anterior testis 298 to 399 by 224 to 360, sinistral; posterior testis 287 to 422 by 217 to 360, dextral; acetabulum to anterior testis 491 to 860, to posterior 813 to 1,512; ovary to anterior testis 101 to 368; testes in one specimen overlap 18, in contact in another, up to 314 apart in remainder. Vasa efferentia long, entering next to one another proximal end of external seminal vesicle. Latter long, much convoluted, tubular, commencing at level of anterior margin of ovary or preovarian, entering posterodorsal portion of cirrus sac; distal portion surrounded by prostate gland cells. Cirrus sac 173 to 294 by 110 to 202, elongate, oval to pyriform, muscular, relatively thin-walled; over right portion of acetabulum, extending 12 and 48 beyond posterior margin of latter in two, to posterior margin in one, and 7 to 88 anterior to posterior margin in remainder; containing internal seminal vesicle, pars prostatica, prostate gland cells, and cirrus. Internal seminal vesicle 74 to 158 by 85 to 173, usually slightly wider than long but may be round, extremely thick-walled, muscular, with relatively small lumen. Pars prostatica short, cell lined, thin-walled. Cirrus 63 to 132 by 48 to 70, variable in size depending on state of contraction, thick-walled, muscular, protrusible, distal end in some attenuated into papilla-like portion, opening independently into genital atrium. Prostate gland cells surrounding distal portion of internal seminal vesicle, pars prostatica, and proximal portion of cirrus. Genital atrium 66 to 107 by 62 to 121, large, usually slightly wider than long but may be round, walls prominent but relatively thin, preacetabular; atrium may project from body surface as large papilla. Genital pore median to slightly submedian to left, 33 to 128 preacetabular.

Ovary 176 to 246 by 162 to 237, round to longitudinally or transversely elongate, dextral, entire, 103 to 399 postacetabular, pretesticular. Oviduct leading from median side of ovary, proximal portion an ovicap. Ootype complex median to ovary. Laurer's canal from seminal receptacle. Latter large, posterior and medial to ovary, dorsal to uterus. Uterus pretesticular, intercecal, left of ovary, ventral to ootype complex. Metraterm sinistral to cirrus sac, commencing at level of anterior portion of acetabulum, extending slightly anterior to cirrus sac, genital atrium, and genital pore, turning ventrally, then posteroventrally, to open independently into genital atrium, distal portion forming very muscular, thick-walled vesicle or dilation. Vitelline follicles small, numerous, circumcecal, commencing beside ovary on
right but somewhat variable on left, confluent to some degree posttesticular, may overlap gonads slightly; vitelline reservoir dorsal to uterus. Eggs operculate, yellow, 16 measuring 58 to 71 by 38 to 49.

**Discussion:** We are designating our specimens as *A. barbarus* solely on the basis of its presence in the same host species and general geographical area as recorded by Nicoll (1915). The latter inadequately described this species from Australia, the account of the genitalia being especially poor. Yamaguti (1934, 1939) reported this parasite from *Parapristipoma trilineatum* (Pomadasyidae) from Japan. Yamaguti (1934), without naming it, briefly described what he (1939) further described and called *A. isagi* from the same host and country as the latter. Dollfus and Capron (1958) stated that it seemed very probable that *A. barbarus*, *A. isagi*, and *A. major*, the latter described by Yamaguti (1934) from *Plectorhynchus pictus* (Pomadasyidae) from Japan, represent a single species. Thomas (1960) declared *A. isagi* a synonym of *A. barbarus*. We concur in both conclusions. Nicoll (1915) for *A. barbarus* and Yamaguti (1939) for *A. isagi* specifically noted that the cirrus sac was entirely preacetabular and globular to oval in shape. We believe these observations to be in error, and that what was called the cirrus sac actually was the genital atrium (see discussion below of *A. senegalensis* Dollfus and Capron, 1958).

Dollfus and Capron (1958) described *A. senegalensis* from *Labrax punctatus* (Serranidae) from Senegal, separating it from the above species in possessing an uterine seminal receptacle rather than a true one. The cirrus sac was described as entirely preacetabular, short, thick-walled and dorsoventrally oriented, appearing as a regular circle in ventral view; it contained a very small, very short cirrus, but lacked an internal seminal vesicle.

Through the courtesy of Dr. R. P. Dollfus we were able to study 6 whole mount syntypes of this species. Our study indicated that their description and illustration of the male and female reproductive systems were incorrect. Instead they should be, with minor variations, as described by Thomas (1960) for the form he called *A. barbarus* from *Pomadasys (=Pristipoma) jubelini* (Pomadasyidae) from Ghana, a whole mount specimen of which we were able to study through the courtesy of Dr. J. D. Thomas. A true seminal receptacle and Laurer's canal were present; in Dollfus and Capron's figure 2 the structure labeled "R" is the ovicap containing sperm released from the true seminal receptacle rather than being an uterine seminal receptacle; vasa efferentia entered the proximal end of the external seminal vesicle which commenced at the level of the anterior margin of the ovary or pre-ovarian; the cirrus sac (in 4) measured 148 to 208 (longitudinal extent) by 73 to 87, overlapping one to two thirds of the left side and margin of the acetabulum; preacetabularly the cirrus sac turned ventrally at almost a right angle, then proceeded to the genital atrium; an internal seminal vesicle was present. Dollfus and Capron's cirrus sac actually is the genital atrium. In their specimens and in Thomas' the cell lined pars prostatica appeared well developed, being about 1.5 times as long as the cirrus. In one specimen the testes were only 22 x apart. Three of the 6 specimens of *A. senegalensis* showed abnormalities: one with the anterior end from the level of the distal portion of the esophagus missing; a second with only one testis and most of the posttesticular body missing; a third also with most of the posttesticular body missing, the posttesticular space measuring only 150 x. We declare the form described by Thomas (1960) as *A. barbarus* a synonym of *A. senegalensis*; Thomas did not mention the latter species in his paper. We
consider *A. senegalensis* a valid species, differing from *A. barbarus* as described by us in the morphology of the terminal genitalia.

Razarihelisoa (1960) described *A. dollfusi* from a single specimen from *Abudeleuf sexfasciatus* (Pomacentridae) from Madagascar, and stated it closely resembled *A. senegalensis* in possessing an uterine seminal receptacle.

We believe this observation in error and that a true seminal receptacle is present. The characters used for separating *A. dollfusi* from *A. senegalensis* were variable ones; the terminal genitalia were inadequately described. Therefore, it is difficult to ascertain whether *A. dollfusi* is a valid species, synonym of *A. senegalensis*, or should be declared a species inquirienda. We favor synonymy with *A. senegalensis*.


The genus *Holorchis* Stossich, 1901, has been variously related to *Aeplnidiogenes* by Dollfus (1946), Manter (1954), Dollfus and Capron (1958), Yamaguti (1958), Thomas (1960), and Skrjabin and Koval (1960). All but Yamaguti placed these two genera in Lepocreadididae Nicoll, 1935.

*Holorchis legendrei* was described by Dollfus (1946) from *Mullus surmaletus* (Mullidae) from the Atlantic; from a specimen from *Mullus barbatus* from the Mediterranean, he (1948) added to and corrected in part his earlier description. He (1946) indicated that the cirrus sac contained a large, sinuous, thick-walled, muscular ejaculatory duct (but no cirrus) surrounded by large prostate gland cells; the metraterm was short and surrounded by longitudinal muscles; and the testes were smooth. Through the courtesy of Dr. R. P. Dollfus we were able to study 12 syntypes in whole mount and three in serial frontal and sagittal sections. Our study indicated that the cirrus sac contained a short, tubular, relatively thin-walled, slightly muscular internal seminal vesicle continuous with the external seminal vesicle; this was followed by a longer, thicker-walled, very muscular, tubular internal seminal vesicle; a short, muscular, tubular, cell lined pars prostatica was next; a very short, muscular cirrus opened into the short, tubular genital atrium. The distal thicker-walled portion of the internal seminal vesicle in sections showed a relatively thin inner circular muscle layer and a much thicker outer longitudinal muscle layer. The pars prostatica in sections showed an inner layer of cells, a thin middle layer of circular muscles, and a very much thicker outer layer of longitudinal muscles; it was much thicker-walled and muscular proximally than distally; the cells were not readily detectable in whole mounts. The cirrus was composed of a thick inner circular and equally thick outer longitudinal muscle layers. The metraterm also consisted of an inner cell layer, and inner circular and outer longitudinal muscle layers. The testes in all whole mounts and sectioned specimens showed deep crypts, the walls of each crypt in contact so that a lumen was not visible. It is our opinion that *H. legendrei* is a valid species.

*Holorchis rhabdosargi* was described from 3 specimens as *Aeplnidiogenes rhabdosargi* by Prudhoe (1956) from *Rhabdosargus sarba* (Sparidae) from South Africa. Thomas (1960) placed it in *Holorchis*. Prudhoe noted the male and female complexes opening to the exterior by separate pores, and a cirrus sac containing an ejaculatory duct which was exceedingly muscular distally, a large mass of well developed prostate gland cells, and a small
portion of the seminal vesicle. Through the courtesy of Dr. S. Prudhoe we were able to study one eotype in whole mount and one in serial sagittal section. Our study revealed that the terminal genitalia were almost exactly like that described by us for *H. legendrei*. In the whole mount specimen of *H. rhabdosargi* a very small, shallow, thin-walled genital atrium was present, the male and female pores opening into it; the sections did not show this portion of the worm. Dollfus (1946) originally noted separate male and female pores for *H. legendrei*, but (1948) corrected this observation in reporting a superficial genital atrium. It is our opinion that *H. rhabdosargi* is a valid species and that it belongs in the genus *Holorchis* as reassigned by Thomas (1960).

*Holorchis pulcher* was described by Manter (1954) from *Latridopsis ciliaris* from New Zealand. Yamaguti (1958) transferred this species to his newly created genus *Pseudoholorchis*. Manter noted that the internal seminal vesicle was small, ovoid, followed by a prostatic vesicle of about the same size; the cirrus was long, coiled when retracted, often protruded as a muscular tube. Examination of whole mounts of the type specimen and a paratype (USNM Helm. Coll. No. 49123) indicated that the internal seminal vesicle started at the proximal end of the cirrus sac as a thin-walled tube continuous with the external seminal vesicle and then enlarged into a relatively thicker-walled, muscular, ovoid chamber; an ovoid, cell lined prostatic vesicle followed the latter, slightly overlapping it ventrally; the cells lining the prostatic vesicle continued into the so-called cirrus a short distance (actually a continuation of the pars prostatica) before becoming the cell free cirrus. On the basis of the morphology of the terminal genitalia we agree with Yamaguti (1958) in his erecting the genus *Pseudoholorchis* for this species and consider it valid.

**LITERATURE CITED**


