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Studies on the Helminth Fauna of Japan. : Part 44. Trematodes of Fishes, IX. With 5 Plates.

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Studies on the Helminth Fauna of Japan. Part 44. Trematodes of Fishes, IX.

With 5 Plates.

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Contents.

ALLOCREADIIDAE Stossich, 1904.

1. *Plagioporus lobatus* (Yamaguti, 1934) Yamaguti, 1938.
Pl. I, Fig. 1.

The following diagnosis of the species, which I have reserved in my previous paper, is based on numerous additional specimens from the small intestine of *Chelidonichthys kumu* (Lesson et Garnot) from Hamazima, Mie Prefecture, and four more from *Conger nystromi* (Jord. et Snyd.) from Taizi, Wakayama Prefecture.

Specific diagnosis. *Plagioporus* Stafford, 1904. Body flattened elliptical, unarmed, 1.14–3.0 × 0.4–1.0 mm. Oral sucker subterminal, 0.1–0.18 × 0.12–0.19 mm. Prepharynx distinct. Pharynx 63–120 × 60–105 μ, with well developed cervical glands on each side. Esophagus 0.05–0.25 mm long, bifurcating at or just in front of middle of anterior third of body. Ceca terminating near posterior extremity. Acetabulum broader than long, 0.18–0.38 × 0.22–0.44 mm, situated at junction of anterior with middle third of body; its center may be in front of this junction or just behind it. Ratio of oral sucker to acetabulum 1 : 1.8–2.36. Testes irregularly lobed, placed one exactly or a little obliquely behind the other at about middle of hindbody or a little more posteriorly, 0.125–0.44 × 0.17–0.53 mm; the posterior testis does not usually intrude into the caudal sixth of body. Cirrus pouch elongated club-shaped, 0.18–0.61 × 0.054–0.1 mm, extending in a more or less conspicuous S-shaped curve from anterior end of acetabulum to genital pore across commencement of left cecum; contained vesicula seminalis tubular, looped, tapering anteriorly with maximum diameter of 30–90 μ. Pars prostatica tubular, 45 × 17 μ in the specimen figured; prostate cells filling up space around vesicula seminalis. Ductus ejaculatorius lined with folded cuticle, probably eversible. Genital pore on the left of esophagus.

Ovary irregularly lobed, broader than long, 0.13–0.28 × 0.16–0.3 mm, situated immediately in front of right portion of anterior testis; it may or may not overreach the right cecum ventrally. Receptaculum seminis club-shaped, up to 90 μ in diameter, dorsal to ovary. Laurer's canal arising from junction of germiduct with receptaculum seminis, opening dorsally at level of anterior end of anterior testis or in front of it. Uterus winding in intercecal field between anterior testis and acetabulum; metraterm alongside cirrus pouch. Eggs elliptical, 54–70 × 32–45 μ. Vitellaria mostly lateral to ceca but surrounding them on all sides in post-testicular area, commencing at level of pharynx or anterior end of esophagus; in the pre-acetabular area they extend inwards across the ceca

dorsally and ventrally. Excretory vesicle reaching to level of ovary, with terminal pore.

Habitat. Pyloric appendages and small intestine of *Chelidonichthys kumu* (Lesson et Garnot) (type host) and *Conger nystromi* (Jord. et Snyd.).

Locality. Pacific coast of Mie and Wakayama Prefectures.

2. *Plagioporus acanthogobii* n. sp.

Pl. I, Fig. 2.

Habitat. Small intestine of *Acanthogobius hasta* (Temm. et Schleg.) (type host), also encysted in gill chamber of *Ostracion tuberculatum* Linné.

Locality and date. Miya, Mikawa Province; April 20, 1941.

Material. Numerous gravid specimens fixed in acetic sublimate under slight cover glass pressure, stained and mounted as usual.

Body shaped like a dorsoventrally flattened elongate pear, 1.5 – 3.4 mm long, 0.65 – 1.0 mm broad in middle region, whence it tapers markedly toward blunt-pointed anterior extremity. Cuticle thick (up to 5 μ) and smooth. Oral sucker subterminal, 0.16 – 0.225 × 0.17 – 0.25 mm. Prepharynx distinct. Pharynx usually barrel-shaped, 84 – 110 × 75 – 120 μ. Esophagus 50 – 80 μ long, bifurcating at about middle of anterior third of body. Ceca narrow, terminating convergently near posterior extremity. Acetabulum 0.25 – 0.33 × 0.27 – 0.38 mm, at anterior end of middle third of body, sucker ratio 1 : 1.4 – 1.6.

Testes very large, irregularly lobed[1], usually exactly tandem, 0.15 – 0.31 × 0.37 – 0.58 mm; the anterior situated in median field, sometimes a little to the left, at junction of middle with posterior third of body; the posterior always median, intruding into caudal third of body, with its posterior end 0.06 – 0.4 mm from posterior extremity. Cirrus pouch claviform, more or less curved, 0.33 – 0.6 × 0.07 – 0.095 mm, provided with well developed longitudinal muscle, reaching to anterior border of acetabulum. Vesicula seminalis tubular, 50 – 80 μ wide, looped as in *Plagioporus lobatus* (Yamaguti). There is no distinct pars prostatica, though the prostate cells are well developed. Genital pore in left submedian line at level of esophagus.

Ovary lobed irregularly but less conspicuously than testes, sometimes with entire margin, 0.21 – 0.35 × 0.1 – 0.24 mm, post-

1) In the specimens showing senile atrophy the testes are less lobed or rather indented

equatorial, usually in front of right portion of anterior testis, occasionally opposite it when the latter lies out of the median line ; it may or may not overreach the right cecum on its ventral side. In the type the germiduct, arising from the dorsal side of the ovary near its anteromedial corner, forms a cylindrical dilatation about 20 μ in diameter as it crosses ventrally the right transverse vitelline duct, on the dorsal side of which it joins the receptaculum seminis and the Laurer's canal. At this point it turns abruptly forward and then joins the vitelline reservoir in the median line 0.24 mm behind the acetabulum. Shell gland dorsomedian, just postequatorial. Receptaculum seminis club-shaped, dorsal to ovary, 84 μ broad at base in the type. Laurer's canal opening in left submedian line at level of ovary. Uterus coiled from side to side between anterior testis and acetabulum, overreaching ceca ventrally and separated from lateral edge of body by a narrow strand of vitelline follicles. Matraterm alongside cirrus pouch. Eggs elliptical, light brown, 63 – 78×39 – 45 μ ; contained ovum not segmented. Vitelline follicles extending along ceca, mostly on their outer side, from level of pharynx to posterior extremity, surrounding esophagus and preacetabular and posttesticular portions of intestine. They are continuous across the median line dorsal to the cirrus pouch but separated by the excretory vesicle behind the posterior testis. Transverse vitelline ducts running at level of anterior end of ovary and forming in median line a moderately large reservoir, whose anteriorly directed distal end is curved toward the right to open into the germiduct. Excretory vesicle tubular, middorsal, reaching to level of ovary, giving rise to a pair of collecting vessels at level of anterior end of anterior testis, narrowed at its dorsoterminal opening.

This species resembles the preceding very closely, but differs from it in the sucker ratio, the slightly posterior position of the testes, etc.

3. *Plagioporus* (*Caudotestis*) *spari* n. sp.
Pl. I, Fig. 3.

Habitat. Small intestine of *Sparus longispinis* (Temm. et Schleg.).

Locality and date. Hamazima ; April 15, 1941.

Material. A single gravid specimen, fixed in acetic sublimate under a cover slip, stained and mounted as usual.

Body elliptical in outline, with more or less pointed extremities, 0.85 mm long, 0.35 mm broad just behind its middle. Cuticle thin

and smooth. Subcuticular musclature poorly developed. Oral sucker subterminal, 0.105×0.11 mm, with wide aperture directed anteroventrad. Prepharynx very short, surrounded by accompanying cells. Pharynx 42×45 μ. Esophagus 70 μ long, with a thick coat of accompanying cells. Ceca simple, terminating at about middle of posterior third of body on a level with junction of two testes. Acetabulum 0.15×0.16 mm, at about middle of body.

Testes broader than long, with slight indentations, situated one immediately behind the other near posterior extremity; the anterior 0.08×0.13 mm, the posterior 0.105×0.12 mm. Cirrus pouch elongate, 0.15 mm long by 35 μ broad, with moderately thick wall of longitudinal muscle fibers, extending obliquely from behind intestinal bifurcation to genital atrium. Vesicula seminalis tubular, somewhat enlarged (12 μ wide) at base of cirrus pouch, forming a complete loop before leading into pars prostatica. Latter small, rather indistinct. Prostate cells filling all available space in cirrus pouch. Cirrus opening into genital atrium on the right of metraterm. Genital atrium provided with well developed circular and radial muscles at its opening, which is about 20 μ in diameter and lies in the left submedian line 0.16 mm from the anterior extremity.

Ovary subglobular, 90×80 μ, situated immediately in front of right end of anterior testis, slightly overlapping right cecum ventrally. The germiduct arising from the anterior end of the ovary proceeds inwards and backwards to join the receptaculum seminis and Laurer's canal dorsal to the medial border of the ovary, where it turns abruptly forward and soon unites with the vitelline reservoir. Receptaculum seminis club-shaped, 60 μ long, 20 μ wide at base, directed backwards dorsal to ovary. Laurer's canal opening dorsally in left submedian line at level of posterior end of ovary. Shell gland anteromedial and dorsal to ovary. Uterus coiled behind acetabulum as well as in front of it, containing 12 eggs, which measured in life 66–69 μ long by 33–39 μ broad. Metraterm well differentiated, especially at its distal portion, extending alongside cirrus pouch. Vitelline follicles comparatively large, mostly lateral, partly dorsal to ceca, extending from esophagus to posterior extremity, confluent dorsal to intestinal bifurcation. Right transverse vitelline duct dorsal to ovary, left one dorsal to anterior end of anterior testis; vitelline reservoir fusiform, 18 μ in diameter, situated obliquely in dorsal median field immediately in front of anterior testis.

Excretory vesicle opening terminally, enlarged anteriorly and reaching to posterior end of anterior testis, where it gives rise at

each lateral corner to a collecting vessel running forwards along the intestine on its ventral side.

This species is distinguished from any of the known members of the genus by its unusually small body.

4. *Plagioporus* (*Caudotestis*) *azurionis* n. sp.
Pl. I, Fig. 4.

Habitat. Small intestine of *Choerodon azurio* (Jord. et Snyd.).

Locality and date. Hamazima ; April 21, 1941.

Material. 10 gravid specimens fixed in acetic sublimate.

Body fusiform in dorsoventral view, with blunt-pointed extremities, 1.65 – 2.1 mm long, 0.5 – 0.72 mm broad at equatorial or postequatorial level. Cuticle thin, without spines. Oral sucker subterminal, 0.15 – 0.19 × 0.15 – 0.2 mm. Prepharynx 60 μ long in the type. Pharynx broader than long, 60 – 90 × 96 – 120 μ. Esophagus 0.15 – 0.25 mm long, bifurcating about midway between two suckers. Ceca simple, narrow, terminating beside anterior or posterior testis, occasionally slightly behind posterior testis. Acetabulum 0.18 – 0.3 × 0.2 – 0.31 mm, just pre-equatorial.

Testes rounded, 0.12 – 0.25 × 0.13 – 0.38 mm, with slight indentations or not, situated one immediately and only a little obliquely behind the other near posterior extremity; the posterior a little larger than the anterior and 0.2 – 0.38 mm apart from posterior extremity. The vas efferens arising from the posterior testis passes dorsal to the right end of the anterior testis and then between the ovary and the seminal receptacle. Cirrus pouch elongated club-shaped, 0.35 – 0.5 × 0.05 – 0.09 mm, with thick wall of longitudinal muscles, extending forward across commencement of left cecum from level of anterior end of acetabulum to genital atrium. Vesicula seminalis tubular, looped, 54 μ wide posteriorly in the type. Pars prostatica indistinct. Prostate cells poorly developed. Ductus ejaculatorius narrow, surrounded by accompanying cells. Cirrus protrusible, opening into shallow genital atrium alongside metraterm. Genital pore sinistral, level with anterior or middle portion of esophagus.

Ovary subglobular or oval, smooth, indented or distinctly 2- or 3-lobed, 0.15 – 0.23 × 0.08 – 0.24 mm, immediately anterodextral to anterior testis inside right cecum at posterior end of middle third of body, giving rise to Laurer's canal at its anterior end. Receptaculum seminis club-shaped, 60 – 90 μ in diameter, dorsal to ovary ; its base may or may not reach beyond the posterior end of the ovary. Laurer's canal opening dorsally in left submedian line at level of

ovary. Shell gland anterosinistral to ovary. Uterus twisted in front of anterior testis and then ascending sinistrodorsal to acetabulum, occasionally intruding into the space between ovary and posterior testis. Metraterm with distinct outer layer of circular muscle fibers, 0.14 mm long by 22 μ wide in the type. Eggs oval, 57 – 72×36 – 39 μ. Vitellaria consisting of comparatively large follicular acini, extending along ceca, mostly on their dorsal side, from immediately behind pharynx or level of genital pore to posterior extremity, distinctly separated by excretory vesicle or meeting each other in posttesticular area. Vitelline reservoir conspicuous, median, anteromedial to ovary.

Excretory vesicle tubular, extending in middorsal field from posterior extremity to pre-equatorial level of anterior tes is, where it divides into two wide collecting vessels.

From the posterior cecal extent it is certain that the present species represents a typical *Caudotestis*, but the vitellaria extend in the manner characteristic of *Plagioporus*. Such a transitional condition suggests close relationship between the two genera. In 1934 I raised Issaitschkow's subgenus *Caudotestis* to a generic rank on the basis of the caudal position of the testes and the limited posterior extent of the ceca and vitellaria, but the finding of the present species compels me to relegate *Caudotestis* to the original subgeneric rank.

5. *Plagioporus* (*Caudotestis*) *dorosomatis* n. sp
Pl. II, Fig. 5.

Habitat. Small intestine of *Dorosoma thrissa* (Linné).

Locality and date. Miya, Mikawa Province; April 20, 1941.

Material. A single fully gravid specimen flattened under cover glass pressure.

Body fusiform, 2 mm long, 0.72 mm in maximum breadth at ovarian level, blunt-pointed in front but rounded behind, with a slight notch at excretory pore. Cuticle thin and smooth, forming numerous rather flat papillae in forebody, especially at anterior extremity. Oral sucker subterminal, 0.16×0.195 mm. Prepharynx short. Pharynx longer than broad, 0.1×0.082 mm. Esophagus about 90 μ long, with well developed longitudinal muscles, bifurcating at about middle of anterior third of body. Ceca rather narrow, terminating one on each side of posterior testis, about 0.25 mm from posterior extremity. Acetabulum 0.275×0.31 mm, at junction of anterior with middle third of body.

Testes transversely elongated, with an indentation or incision on anterior and posterior margin, the anterior 0.2×0.425 mm, a

little to left of median line at junction of middle with posterior third of body, with its left end ventral to left cecum ; the posterior 0.31× 0.46 mm, situated immediately behind the anterior, 0.15 mm apart from posterior extremity, occupying entire space between two cecal ends. The vas efferens arising from the middle of the anterodorsal margin of the posterior testis passes forward on the dorsal side of the right portion of the anterior testis and of the ovary, and penetrates the cirrus pouch along with its fellow, which runs up almost in the median field dorsal to the uterus. Cirrus pouch club-shaped, 0.38×0.087 mm, reaching to anterodextral margin of acetabulum. Vesicula seminalis 50 μ wide at its swollen posterior part, turning back on itself two times, marked off from pars prostatica by slight constriction. Pars prostatica small, somewhat bulbous, 17 μ in diameter, surrounded by prostate cells. Ductus ejaculatorius about 90 μ long, surrounded by accompanying cells, widened distally. Genital atrium shallow, opening on the left of esophagus.

Ovary trilobate, broader than long, 0.2×0.238 mm, situated on the right of median line immediately in front of right end of anterior testis, giving rise to germiduct at its anterodorsal margin. Germiduct turning abruptly backward and inward to join receptaculum seminis and Laurer's canal in front of left end of ovary. Receptaculum seminis elongated saccular, 70 μ in diameter, extending obliquely backward dorsal to ovary to dorsal side of anterodextral end of anterior testis. Laurer's canal opening dorsally in left submedian line a little in front of anterior testis. Shell gland extending between ovary and acetabulum. Uterus winding from side to side between anterior testis and acetabulum, overreaching both ceca ventrally, containing fairly large number of eggs. Metraterm running obliquely forward on the left of cirrus pouch, with distinct circular muscles, opening into genital atrium alongside cirrus. Eggs oval, 66－72×36－42 μ, with slight knob-like thickening at antiopercular pole. Vitellaria consisting of follicular acini, extending in lateral fields from each side of pharynx to posterior extremity, reaching inwards here and there across ceca dorsally and ventrally, continuous in median field dorsal to esophagus and cirrus pouch. Vitelline reservoir middorsal, pre-ovarian.

Excretory vesicle wide, tubular, narrowed toward its terminal opening, reaching to left end of ovary, where it gives off a pair of collecting vessels running forward.

This species differs from the most closely related *Plagioporus* (*Caudotestis*) *azurionis* in the length of the esophagus, the position of the acetabulum, the size of the testes, etc.

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6. *Decemtestis callionymi* Yamaguti, 1934.

Two mature specimens of this worm were found in the small intestine of *Pleuronichthys cornutus* (Temm. et Schleg.) from the Sea of Ise on April 17, 1941.

The following account is to supplement the brief original description of the species.

Body lanceolate or flattened fusiform, with terminal notch at excretory pore, 1.18 – 1.5 mm long by 0.45 – 0.6 mm broad at about middle. Oral sucker subterminal, 0.105 – 0.138 × 0.14 – 0.162 mm, followed by distinct prepharynx. Pharynx contracted anteriorly, 72 – 105×72 – 90 μ. Esophagus 36 – 60 μ long, surrounded by accompanying cells. Ceca simple, terminating near posterior extremity. Acetabulum 0.18 – 0.21×0.18 – 0.24 mm, situated at anterior end of middle third of body.

Testes subglobular or ovoid, 60 – 90×54 – 120 μ, arranged in two somewhat zigzag rows of 4 – 6 each, making a total of 10[1]. Cirrus pouch slender, thin-walled, 0.55 – 0.63×0.036 – 0.057 mm, extending backward just medial to ovary to level of its middle or posterior end. Vesicula seminalis twisted in posterior dilatation of cirrus pouch, about 30 μ in diameter. Pars prostatica short, not very distinctly differentiated, though surrounded by distinct prostate cells. Ductus ejaculatorius long, narrow, winding, accompanied by gland-like cells, straightened when everted; protruded cirrus projecting into metraterm for a distance of 0.1 mm. Genital pore on the left of esophagus or pharynx.

Ovary coarsely lobed, 0.15 – 0.16×0.13 – 0.16 mm, situated on the right immediately behind middle of body, with its right portion overreaching right cecum ventrally. The germiduct arises from the anteromedial lobe of the ovary and joins the receptaculum seminis and Laurer's canal at the same point between the ovary and the vitelline reservoir dorsal to the posterior end of the cirrus pouch and after receiving the duct from the vitelline reservoir just on the left

1) The number of testes is 9 in the type from *Callionymus valenciennesi* as illustrated in Fig. 33 (1934), but 10 in all the original paratypes and the present material from *Pleuronichthys cornutus*.

of the median line turns backward to form the ootype. Receptaculum seminis club-shaped, 45 – 54 μ wide, extending obliquely backward from its junction with germiduct to anterior end of right anteriormost testis or to its dorsal surface when the hindbody is contracted. Laurer's canal opening outside dorsal to shell gland on the left of median line at level of ovary. In one specimen the uterus forms an S-shaped curve immediately in front of the left anteriormost testis and then intrudes into the space between the two rows of testes to near their posterior end, while in the other specimen it extends backward between the left vitellaria and the left anterior testes on the dorsal side of the left cecum. Metraterm well developed on the left of cirrus pouch, without special bulbous muscular thickening distally. Eggs oval, 54 – 69×33 – 36 μ. Vitellaria acinous, mostly extracecal, extending a little medially across dorsal side of cecal arch and surrounding posterior cecal ends on all sides ; they may or may not be interrupted at the level of the acetabulum. Their anterior extent is variable in heights ; it may be level with the pharynx or the posterior end of the esophagus. Vitelline reservoir approximately triangular, slightly to the left of median line in front of testes.

Excretory vesicle tubular, with terminal pore, reaching to level of vitelline reservoir, giving rise to collecting vessels near its anterior end.

Three additional specimens were obtained from the small intesine of *Spheroides spadiceus* (Richardson) at Taizi, Wakayama Prefecture. They gave the following measurements : Body 1.18 – 1.55×0.35–0.41 mm, oral sucker 0.1 –0.125×0.125–0.15 mm, pharynx 50 – 75×95 – 108 μ, acetabulum 36 – 120×54 – 120 μ, cirrus pouch 0.44 – 0.56×0.036 – 0.063 mm, protruded cirrus slender, up to 0.23 mm long and 20 μ broad, ovary four-lobed, 0.15 – 0.165×0.084 – 0.125 mm, receptaculum seminis 42 – 54 μ wide, eggs 54 – 63×33 – 36 μ.

This species is easily distinguished from any of the known members of the genus by the conspicuous inter- or extratesticular extent of the uterus.

7. *Decemtestis takanoha* n. sp.

Pl. II, Fig. 6.

Habitat. Small intestine of *Goniistius zonatus* (Cuv. et Valenc.).

Locality and date. Hamazima ; April 14, 1941.

Material. 10 mature specimens fixed in acetic sublimate, stained and mounted.

Body smooth, approximately fusiform in outline, 2.1 – 2.85 mm

in length, with maximum breadth of 0.58 – 0.8 mm at level of ovary. Oral sucker subterminal, 0.2 – 0.29×0.21 – 0.28 mm. Prepharynx up to 60 μ long, surrounded by dense mass of accompanying cells. Pharynx napiform, 0.11 – 0.15 × 0.105 – 0.18 mm. Esophagus 70 – 120 μ long. Ceca terminating at posterior extremity. Acetabulum 0.25 – 0.37×0.28 – 0.36 mm, confined to third sixth of body.

Testes 10 in number, rounded or transversely elongated with shallow indentations, 0.09 – 0.18 × 0.13 – 0.3 mm, arranged in two longitudinal rows except the posteriormost one which lies in the median field. Unless the hindbody is contracted, the testes terminate at about the middle of the posterior third of the body. In an example, in which the hindbody is contracted, the two posteriormost testes lie one behind the other in the median field of the anterior part of the caudal sixth of the body. Cirrus pouch elongated claviform, 0.42 – 0.6×0.06 – 0.075 mm, extending straight or somewhat sinuously from immediately or slightly in front of acetabulum to genital pore across commencement of left cecum. Vesicula seminalis occupying posterior part of cirrus pouch, 48 – 65 μ in diameter, twisted anteriorly. Pars prostatica short, rather bulbous, 24 μ in diameter in the type, surrounded by prostate cells. Ductus ejaculatorius narrow, somewhat winding. Genital pore in left submedian line at level of esophagus or pharynx.

Ovary coarsely and irregularly lobed, broader than long, 0.15 – 0.25×0.21 – 0.27 mm, situated on the right of median line at fourth sixth of body. Receptaculum seminis retort-shaped, 60 – 90 μ in diameter at its base, lying dorsal to ovary. Germiduct arising from dorsal side of ovary and joining receptaculum seminis and Laurer's canal at the same point as in the preceding species. Laurer's canal opening outside on the left of median line behind acetabulum. Uterus intercecal, coiled mainly between acetabulum and left anteriormost testis, occasionally intruding into space between the two anteriormost testes, but not so far backward as in *D. callionymi*. Metraterm running along left side of cirrus pouch, provided distally with thick coat of circular muscle fibers. Eggs oval, with conspicuous polar projection, 60 – 75×36 – 42 μ. Vitellaria follicular, profusely developed around esophagus and intestine, commencing at level of pharynx or immediately behind it, intruding medially across dorsal (eventually also ventral) side of intestine and almost confluent dorsal to cirrus pouch. In the hindbody they overreach the ceca both dorsally and ventrally and cover the outskirts of the testes, in the posttesticular region they completely encircle the ceca. Excretory vesicle tubular, reaching to level of ovary, opening at posterior end of body.

In one paratype the ceca are unusually wide and terminate at different levels, and the testes are just half as many, measuring 0.13 – 0.2×0.2 – 0.31 mm. This is undoubtedly an abnormal case.

The present species differs from the most closely related *Decemtestis megacotyla* Yamaguti, 1938, from the same host species, in the acetabulum being much smaller than that of the latter in relation to the body length. In *D. ditrematis* Yamaguti, 1934, and *D. goniistii* Yamaguti, 1938, the cirrus pouch extends further backward than in the species under consideration. In the related Indian species, *D. mehrai* Srivastava, 1936, from *Sillago sihama* the testes are much smaller and the vitellaria commence at the level of the intestinal bifurcation.

The specific name is the Japanese name for the host.

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8. *Opecoelus mutu* Yamaguti, 1940.

Re-examination of the original specimens of this species compelled me to correct the errors in my original description concerning the dorsal opening of the Laurer's canal and to discuss the generic status of *Opecoelus* and *Opegaster*.

In the type as well as in some of the paratypes the Laurer's canal can be traced further on than illustrated in Fig. 29 in my previous paper, i.e., it runs toward the left across the median line, forming a loop in the type and opens outside dorsal to the left anterior part of the ovary.

As stated in my original description the vitellaria may commence in front of the acetabulum in 23%, in the acetabular zone in 40% and behind this sucker in 37%; the testes are indented in 80% and separated by the vitellaria in 47%; the anterior testis may be out of the median line in 20%. These considerable degrees of variation necessarily lead us to conclude that the anterior extent of the vitellaria as well as some characters of the testes cannot be even of specific significance in *Opecoelus mutu*. In view of this fact I would rather doubt the generic validity of *Opegaster*, inasmuch as the same condition with respect to the vitellaria obtains also in *Opegaster syngnathi* and *Opegaster tamori*. As for the testes their

oblique or tandem position cannot be utilized for discriminating otherwise similar species. It seems certain therefore that *Opegaster rectus* Ozaki, 1928, is identical with *Opegaster ovatns* Ozaki, 1928, as suggested by Harshey (p. 117).

9. *Opecoelus nipponicus* n. sp.
Pl. III, Fig. 7.

Habitat. Small intestine of *Caranx equula* Temm. et Schleg. (type host) from Hamazima, *Sebastichthys oblongus* (Günther) from Miya, Mikawa Province, and *Hexagrammos otakii* Jord. et Starks from Toyama Bay.

Body elongate, 2.55 – 3.65 mm long, 0.4 – 0.48 mm broad in middle region; anterior extremity blunt-pointed, posterior extremity pointed or rounded. Cuticle unarmed. Cervical glands massed together on each side of esophagus. Oral sucker ventroterminal, 0.138 – 0.17×0.156 – 0.175 mm. Prepharynx 27 – 42 μ long. Pharynx 87 – 175×95 – 125 μ. Esophagus provided with well developed inner circular and outer longitudinal muscle fibers for its greater anterior part but with delicate wall at posterior end, where the cuticular lining is replaced by epithelium. Ceca comparatively wide; anus 60 μ from posterior tip of body in the type. Acetabulum short-stalked, 0.2 – 0.225 mm in diameter, with 3 pairs of digitiform marginal appendages, situated at second sixth of body.

Testes rounded, 0.225 – 0.34×0.22 – 0.3 mm, placed one directly or a short distance (up to 0.13 mm) behind the other at anterior part of posterior half of body, pressed against ceca. The space between the two testes may or may not be occupied by the intervening vitelline follicles. Vesicula seminalis consisting of fusiform or elliptical posterior and narrow sinuous anterior portion; the posterior portion 48 – 115 μ in diameter, reaching a little further backward than base of acetabulum. Cirrus pouch elongated oval, 80 – 100×40 – 50 μ, ventrosinistral to intestinal bifurcation. Genital pore on the left of posterior part of esophagus.

Ovary coarsely trilobate, 0.1 – 0.18×0.18 – 0.26 mm, equatorial in the type and one of the paratypes from *Hexagrammos otakii*, but may be occasionally pre-equatorial, slightly to right of median line. The twisted germiduct arises a little to the right of the anterior notch of the ovary and gives off the Laurer's canal just in front of the right lobe of the ovary and then turns toward the left to join the duct from the vitelline reservoir. In the type the Laurer's canal runs along the anterior border of the ovary, crossing the germiduct and vitelline reservoir dorsally, and describes a loop in front of the

left lobe of the ovary before opening outside dorsal to the vitelline reservoir. Shell gland rather compact, immediately in front of ovary. Uterus coiled several times from side to side overreaching ceca ventrally, functioning as receptaculum seminis at its proximal portion, containing not very numerous eggs. Metraterm running along vesicula seminalis and cirrus pouch on their left side. Eggs elliptical, light brown, 54 – 66 × 33 – 42 μ. Vitellaria commencing some distance behind acetabulum, occasionally immediately lateral to ceca in pre-ovarian field, intruding into space between ovary and anterior testis as well as between two testes, occupying all available space of posttesticular field. In the testicular zones they may or may not be interrupted. Vitelline reservoir round or oval, anterodorsal to ovary.

Excretory vesicle tubular, with terminal pore, giving off at its anterior end dorsal to ovary a pair of collecting vessels, each of which bifurcates into a short anterior and a long posterior branch by the side of the esophagus.

This species differs from the related *Opecoelus sphaericus* Ozaki, 1925, in the maximum size of the body and the size of the eggs. In view of these differences it seems certain that the specimens from the so-called blackeel, provisionally referred to *O. spaericus* in my 1940 paper, belong to the present species.

10. *Opecoelus sphaericus* Ozaki, 1925.

Three mature specimens of this worm from the small intestine of *Hexagrammos otakii* from the Inland Sea gave the following measurements.

Body 5.3 – 7.3 × 0.47 – 0.65 mm ; oral sucker 0.2 – 0.275 × 0.238 – 0.275 mm ; prepharynx 0.07 – 0.15 mm long ; pharynx 0.175 – 0.18 × 0.138 – 0.175 mm ; esophagus 0.25 – 0.55 mm long ; anus 0.12 – 0.15 mm from posterior extremity ; acetabulum pedunculated, 0.28 – 0.375 mm in diameter, with 6 digitiform marginal appendages, situated at anterior part of second sixth of body ; testes oval, 0.38 – 0.52 × 0.3 – 0.32 mm, at third quarter of body, separated one from the other by vitellaria ; vesicula seminalis 0.05 – 0.2 mm in diameter, surrounded by prostate cells at its tubular distal portion, may or may not reach to junction of anterior two thirds of body ; cirrus pouch 0.12 × 0.07 mm, containing small pyriform pars prostatica and narrow somewhat winding ductus ejaculatorius ; ovary coarsely trilobate, 0.2 – 0.21 × 0.23 – 0.28 mm, equatorial or pre-equatorial ; eggs elliptical, 66 – 72 × 39 – 42 μ in life.

Excretory vesicle tubular, somewhat bicornuate at its enlarged anterior end reaching to immediately behind ovary ; collecting

vessels ciliated at the point where they arise from the horns of the excretory vesicle.

11. *Opecoelus himezi* n. sp.
Pl. III, Fig. 8.

Habitat. Small intestine of *Upeneoides bensasi* (Temm. et Schleg.).

Locality and date. Taizi, Wakayama Prefecture; May 27, 1942.

Material. Two stained whole mounts.

Body 2.5–3.1 mm long, with nearly uniform breadth of 0.5–0.53 mm except at two blunt-pointed extremities. Oral sucker subglobular, 0.125–0.135×0.15 mm. Prepharynx 30 μ long; pharynx 65–80×72–75 μ; esophagus 70–80 μ long; with well developed cervical glands on each side. Anus ventral, 50–60 μ from posterior end of body. Acetabulum 0.22–0.23 mm in diameter, with 3 pairs of digitiform appendages, situated in posterior half of anterior third of body.

Testes 0.22–0.31×0.28–0.34 mm, deeply indented on anterior or posterior border or both, situated one immediately behind the other with center of anterior testis a little behind middle of body and that of posterior testis at junction of middle with posterior third of body. Vesicula seminalis 60–80 μ in diameter, extending a short distance back of acetabulum. Cirrus pouch extending from genital pore to ventral side of beginning of left cecum, where it encloses the pars prostatica and forms an inconspicuous fusiform swelling. Genital pore in left submedian line at level of esophagus.

Ovary bean-shaped, with the concavity directed forwards, 0.096–0.108×0.25–0.26 mm, immediately pretesticular. Shell gland complex immediately in front of ovary. Receptaculum seminis uterinum conspicuous. Uterus in close coils between shell gland and acetabulum; metraterm well developed. Eggs 54–60 μ long by 33–36 μ broad in life. Vitelline follicles close together, extending in lateral fields from posterior end of body to level of posterior end of acetabulum in the type but to near genital pore on the left in the paratype, filling entire posttesticular region; vitelline reservoir immediately in front of ovary ventral to shell gland. Excretory vesicle tubular, reaching to posterior border of ovary, with terminal pore.

This species differs from the most closely related *Opecoelus xenistii* Manter, 1940, in the body being more elongate and in the eggs being larger.

Literature.

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12. *Opegaster syngnathi* Yamaguti, 1934.

Habitat. Small intestine of *Syngnathus schlegeli* Kaup.

Locality and date. Ise Bay; April 16, 1941.

Material. Two mature specimens fixed in acetic sublimate, stained and mounted.

Body flattened subcylindrical, with blunt-pointed extremities, 1.3 - 1.58 mm long, 0.31 mm broad at ovariotesticular or acetabular zone. Cuticle unarmed. Oral sucker subterminal, 0.09 - 0.11 × 0.108 - 0.111 mm. Prepharynx distinct. Pharynx 60 - 70 × 68 - 75 μ. Esophagus only 20 - 27 μ long, provided with well developed longitudinal muscle fibers. Ceca united posteriorly, opening ventrally 60 - 70 μ from posterior extremity. Acetabulum 0.17 mm in transverse diameter, with six inconspicuous papillae (three on the anterior margin and three on the posterior), situated at second sixth of body.

Testes situated one directly behind the other; the anterior median or only slightly to the left, with its long axis in left submedian line, 0.16 - 0.165 × 0.17 - 0.18 mm; the posterior median, at junction of middle with posterior third of body, 0.165 - 0.225 × 0.16 - 0.186 mm. Vesicula seminalis elongated club-shaped, winding anteriorly, 42 μ in diameter at base, extending 40 - 60 μ back of acetabulum. Cirrus pouch 40 - 55 × 17 - 21 μ. Genital pore on the left of esophagus.

Ovary rounded triangular or coarsely trilobate, 75 - 90 × 144 - 145 μ, slightly to right of median line at middle of body. Laurer's canal opening outside dorsal to shell gland which lies immediately in front of the ovary. Uterus describing a few coils between shell gland and acetabulum, containing 14 or 15 eggs. Metraterm running alongside vesicula seminalis and cirrus pouch. Eggs elliptical,

57 – 63×31 – 34 μ in life. Vitelline follicles small, extending along entire length of ceca mostly on their outer side and partly on their inner side between acetabulum and posterior extremity. Vitelline reservoir immediately anterodorsal to ovary. Excretory vesicle tubular, with terminal pore, reaching to dorsal side of ovary.

Although the present worm differs from the original type of *Opegaster syngnathi* in the length of the esophagus, the anterior extent of the vitellaria and the size of the eggs, it seems more preferable to assign it to this species than to make it a new species, since intermediate conditions are found in the original paratypes with regard to these points of difference.

Literature.

Yamaguti, S., Studies on the helminth fauna of Japan. Part 2. Trematodes of fishes, I. Jap. Jour. Zool. 5 (3), 352 – 353, 1934.

13. *Pseudopecoeloides carangis* (Yamaguti, 1938) Yamaguti, 1940.

Examination of the additional material from *Caranx mertensi* Cuv. et Valenc. from Tarumi and *C. equula* Temm. et Schleg. from Hamazima compelled me to extend the range of variation given previously for the present species. The species may therefore be defined as follows.

Body rather slender, 1.2 – 5 × 0.15 – 0.5 mm; forebody short, hindbody long, tapering posteriorly to a more or less pointed end. Oral sucker 0.095 – 0.26 mm in diameter. Pharynx 0.07 – 0.138 × 0.063 – 0.15 mm. Esophagus 0.06 – 0.2 mm long. Acetabulum 0.08 – 0.2 mm in diameter, with long peduncle. Testes 0.12 – 0.48 × 0.075 – 0.35 mm; vesicula seminalis 35 – 114 μ wide. Ovary 0.06 – 0.25 × 0.075 – 0.26 mm. Eggs 60 – 75 × 30 – 54 μ.

Literature.

Yamaguti, S., Studies on the helminth fauna of Japan. Part 21. Trematodes of fishes, IV. Published by the author, 49 - 50, 1938. — Yamaguti, S., Studies on the helminth fauna of Japan. Part 31. Trematodes of fishes, VII. Jap. Jour. Zool. 9 (1), 35 & 108, 1940

14. *Notoporus carangis* n. sp.

Pl. IV, Fig. 10.

Habitat. Small intestine of *Caranx equula* Temm. et Schleg.
Locality and date. Taizi, Wakayama Prefecture; May 11, 1941.

Material. A single gravid specimen fixed in acetic sublimate under a cover slip, stained and mounted as usual.

Body elongate, 3.33 mm in length, with maximum breadth of 0.7 mm behind its middle. Posterior extremity produced into a cone 0.12 mm long by 0.2 mm broad, on the truncate tip of which opens the excretory vesicle. Cuticle unarmed, subcuticular circular and longitudinal muscle fibers well developed, diagonal muscle fibers absent. Eye-spots indistinct. Oral sucker terminal, flattened, with wide, anteroventrally directed aperture, 0.2×0.27 mm. Prepharynx extremely short. Pharynx barrel-shaped, 0.105×0.063 mm, guarded on each side by a string of muscle fibers arising from anterior end of esophagus and running toward oral sucker. Esophagus slender, with well developed longitudinal muscle, about 0.4 mm long, bifurcating 0.55 mm in front of acetabulum. Ceca simple, terminating just in front of tail cone. Acetabulum about 0.25 mm in diameter, situated in anterior half of middle third of body.

Testes irregularly lobed by shallow and deep incisions, contiguous and obliquely tandem, with their centers in anterior half of posterior third of body. Vesicula seminalis tubular, 75 μ wide, extending sinuously 0.3 mm back of acetabulum, with its proximal end turned forward, surrounded throughout by prostate cells, whose ducts are directed toward the pars prostatica. The vesicula seminalis, prostate cells and pars prostatica are inclosed in a tubular, arcuate, muscular false cirrus pouch, which is 0.2 mm in diameter and consists of weak inner longitudinal and strong outer circular muscles. Pars prostatica cylindrical, 54 μ in diameter, constricted at its junction with vesicula seminalis, opening directly into genital atrium. Genital pore very wide, dorsal, close to left margin of body a little in front of acetabulum, lined with cuticle and surrounded by radial muscle fibers, which are much stronger on the left than on the right.

Ovary 0.2×0.175 mm, divided into a dorsal central part and three rounded ventral lobes 75–100 μ in diameter, situated inside right cecum at about middle of fourth sixth of body. The germiduct arising from the central part describes a semicircle along the right border of the anterior lobe of the ovary, at the anterior end of which it turns forward and proceeds toward the ootype. The Laurer's canal is given off at this point of turning of the germiduct as if it were the direct continuation of the latter, and after forming a V-shaped loop opens on the middorsal surface at about the same level as the point of its origin. Vitelline follicles extending around

ceca from posterior end of esophagus to cecal ends, interrupted at the place where the left cecum crosses the metraterm and false cirrus pouch dorsally. Inconspicuous vitelline reservoir and its efferent duct situated in median line just in front of dorsal opening of Laurer's canal. Uterine coils confined to area bounded by acetabulum, left cecum, testes, ovary and vesicula seminalis. The metraterm is 36 μ wide as it passes dorsal to the acetabulum, narrows a little as it crosses the false cirrus pouch obliquely, but it becomes wider again toward its anterodextral end of the genital atrium. Eggs oval, light brown, 72 – 81 × 42 – 45 μ.

Excretory vesicle tubular, opening at tip of tail cone, extending on dorsal side between two testes in a gentle S shaped curve to level of posterior end of ovary, where it gives off a pair of collecting vessels.

This species is distinguished from the most closely allied *Notoporus trachuri* Yamaguti, 1938, by the distinct lobation of the ovary and testes, by the position of the genital pore, etc.

Literature.

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ACANTHOCOLPIDAE Lühe, 1909.

15. *Stephanochasmus carangis* n. sp.

Pl. III, Fig. 9.

Habitat. Small intestine of *Caranx equula* Temm. et Schleg.
Locality and date. Hamazima; April 21, 1941.
Material. Two fully gravid specimens fixed in acetic sublimate, stained with hematoxylin and mounted in balsam.

Body elongate, 2.7 – 3.5 mm long, 0.38 – 0.5 mm broad in testicular region; forebody tapering anteriorly and truncated at end, hindbody nearly parallel-sided, rounded behind. Cuticular spines recurved, up to 57 μ long, commencing at level of posterior end of oral sucker, attaining maximum size at a level in front of pharynx, then becoming gradually smaller and sparser posteriorly and completely disappearing at posterior extremity. Eye pigment scattered in neck region. Circumoral spines fusiform, 36 in number and arranged in two alternate rows of 18 each in the type, but 33 with same irregular arrangement in midventral line in the paratype.

Their size is also somewhat variable, ranging from 48 μ to 84 μ in length and from 7 μ to 12 μ in breadth in the type. In the paratype the rudimentary ventral spine is only 30 μ long by 5 μ broad, and the symmetrical midventral spines are 60 μ long by 12 μ broad, the others varying from 48 μ to 75 μ in length. Oral sucker terminal, somewhat flattened, 0.15 – 0.16 × 0.19 – 0.2 mm. Prepharynx 0.4 – 0.55 mm long. Pharynx acorn-shaped, 0.15 – 0.18 × 0.13 – 0.14 mm. Esophagus very short, about 0.1 mm in the type. Ceca terminating at posterior extremity. Whether they unite with the excretory vesicle or not is unable to determine on the whole mounts. Acetabulum 0.22 – 0.28 mm in diameter, situated at junction of anterior with middle third of body.

Testes oval to elliptical, contiguous, 0.31 – 0.5 × 0.25 – 0.3 mm, in posterior third of body, with the sides covered by vitellaria ; slightly larger posterior testis 0.13 – 0.17 mm apart from posterior end of body. Cirrus pouch 0.87 mm long and reaching to middle of body in the type, forming immediately behind acetabulum a horse shoe-shaped curve, in which the well developed prostate cells and the tubular pars prostatica 0.19 mm long by 30 μ wide are located. Vesicula seminalis 60 μ wide, occupying entire posterior portion of cirrus pouch. Cirrus 0.28 mm long, 48 μ wide at posterior end, densely covered inside with acicular spines, accompanied throughout by prostate cells, opening into ductus hermaphroditicus dorsolateral to acetabulum. Ductus hermaphroditicus about 0.21 mm long and running along anterolateral border of acetabulum in the type. Genital pore median, immediately pre-acetabular.

Ovary subglobular, 0.135 – 0.19 × 0.17 – 0.175 mm, slightly to right of median line in direct contact with anterior testis. Uterus winding in intercecal field between ovary and metraterm ; latter not spined, much shorter than cirrus pouch. Eggs elongate oval, 60 – 75 × 36 – 45 μ. Vitelline follicles surrounding ceca on all sides from level of genital pore to posterior end of body.

This species differs from *Stephanostomum megacephalum* Manter, 1940, from *Caranx hippos* (Linné) and *S. casum* (Linton) of Manter from *Lutianus* chiefly in the anterior extent of the vitellaria, and from *Stephaanochsmus japonicus* Yamaguti in the number of the circumoral spines and egg size.

16. *Echinostephanus pacificus* n. sp.

Pl. IV, Fig. 11.

Habitat. Small intestine of *Caranx equula* Temm. et Schleg.
Locality and date. Taizi, Wakayama Prefecture ; May 11, 1941.

Material. Three fully gravid specimens fixed in acetic sublimate, stained and mounted.

Body slender, 7.1 – 7.75 mm in length, with nearly uniform maximum breadth of 0.5 – 0.65 mm between anterior end of vitellaria and posterior testis; forebody tapering anteriorly and blunt-pointed, hindbody with rather blunt end. Cuticular spines commencing behind oral sucker, attaining maximum length of 40 μ and maximum breadth of 14 μ in front of pharynx, disappearing near posterior extremity. Of the subcuticular muscles the longitudinal and diagonal fibers are strongly developed in the entire forebody and the anterior part of the hindbody. Eye-spots at anterior part of prepharynx, inconspicuous.

Oral sucker projecting prominently at equatorial zone, so that it appears like a rhomb with truncate ends, 0.1 – 0.11 × 0.12 – 0.13 mm. Circumoral spines 36 in number with slit-like hollow, arranged in two alternating rows of 18 each; the aboral spines are more fusiform than the oral, which are rather club-shaped; the ventral spines of both rows are nearly of the same length (38 – 45 μ), but on the dorsal side the aboral spines are a little longer than the oral (48 – 54 : 52 – 60 μ). Prepharynx narrow, somewhat enlarged at posterior end, 0.35 – 0.6 mm long, inclosed in a sheath of strong longitudinal muscle, some fibers of which extend over the pharynx and are attached to the anterior end of the esophagus. The approximately funnel-shaped dilatation of the latter is doubtless due to this musculature. Pharynx elongated pyriform, 0.21 – 0.23 × 0.09 – 0.15 mm. Esophagus 0.09 – 0.18 mm long, consisting of thick cuticular lining, inner longitudinal and outer circular muscle fibers, surrounded by a thick layer of gland-like cells laterally and dorsally, bifurcating immediately in front of genital pore. Ceca narrow from beginning to ovarial region, whence they widen considerably, especially in the posttesticular area, each connected at its posterior end with the excretory vesicle by a narrow passage to form a terminal cloaca. Acetabulum 0 27 – 0.3 mm in diameter, at posterior end of anterior third of body.

Testes elliptical or fusiform, 0.75 – 0.95 × 0.33 – 0.36 mm, contiguous or separated a little one from the other by vitellaria; the anterior at junction of middle with posterior third of body, the posterior 1.0 – 1.2 mm apart from posterior extremity. Cirrus pouch elongated club-shaped, about 0.95 mm long by 0.16 mm broad, with comparatively thin wall of inner circular and outer longitudinal muscle fibers. Vesicula seminalis approximately club-shaped, 0.125 – 0.15 mm in diameter at its posterior swelling, surrounded by well developed prostate cells at its anterior tapering portion. Pars

prostatica tubular, surrounded by prostate cells, 0.13 – 0.21×0.038 – 0.04 mm, more or less winding, provided with inner circular muscle fibers, which are more conspicuous than those of the vesicula seminalis and of the cirrus. Cirrus tubular, 0.4 – 0.63×0.043 – 0.052 mm, densely spined, accompanied by prostate cells, projecting into ductus hermaphroditicus. Latter 0.4 – 0.45 mm long, covered inside with acicular spines, extending a short distance back of acetabulum, provided with weak inner circular and very strong outer longitudinal muscles. Genital pore immediately pre-acetabular.

Ovary ovoid, 0.22 – 0.3×0.31 – 0.36 mm, median or only slightly dextral, contiguous to anterior testis or separated from it by a narrow space into which the vitelline follicles are intruding, leaving the median line free. The germiduct arises from the anterodorsal side of the ovary, then turns at right angles to the left to give off the Laurer's canal, which is slightly enlarged at the beginning but maintains elsewhere a uniform width of about 9 μ, and after describing an S-shaped curve opens to the outside dorsal or immediately anterior to the ovary. Shell gland immediately in front of ovary. Ootype preovarian, a little to the left of median line. Receptaculum seminis uterinum present. Uterus tightly coiled in intercecal field between ovary and cirrus pouch, straightened out by the side of the vesicula seminalis, near the anterior portion of which it passes into the metraterm. Latter 0.5 – 0.75×0.08 – 0.088 mm, with thin wall of inner circular and outer longitudinal muscles, but densely covered with spines. Eggs oval, 51 – 66×36 – 42 μ. Vitelline follicles extending along ceca from level of posterior end of cirrus pouch to posterior extremity, on dorsal, ventral and lateral sides of ceca from beginning to ovarian level but on all sides further posteriorly except in the testicular region; transverse vitelline ducts uniting dorsal to ovary near origin of germiduct. Cloaca opening terminally. Anterior extent of excretory vesicle not determined. Collecting vessels dilated and twisted beside acetabulum and pharynx, especially the latter.

The present species is distinguished from the most closely related *Echinostephanus ditrematis* Yamaguti, 1939, in body size, sucker ratio, and position of ovary and testes.

Literature.

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ZOOGONIDAE Odhner, 1911.

17 *Deretrema plotosi* Yamaguti, 1940.

Habitat. Gall bladder of *Chelidonichthys kumu* (Lesson et Garnot).

Locality and date. Hamazima; April 11, 1941.

Material. Two mature specimens fixed in acetic sublimate under a cover slip, stained and mounted.

Body fusiform, blunt-pointed at extremities, 2.75 - 3.08 mm long by 0.87 - 0.9 mm broad at middle. Cuticular spines 12 - 18 μ long, very densely set in neck region and at posterior extremity, with their tip curved backward. Oral sucker terminal, inclined ventrally, 0.125 - 0.16 × 0.23 - 0.26 mm. Prepharynx 50 μ long. Pharynx ovoid, 0.11 - 0.114 × 0.11 - 0.12 mm, covered inside with spiniform teeth except at posterior portion. Esophagus 0.23 - 0.33 mm long, beset with acicular spines up to 14 μ long at greater posterior part; ceca spined likewise at their attenuated anterior ends, passing dorsomedial to testes and terminating a short distance behind these. Acetabulum 0.425 - 0.46 × 0.51 - 0.55 mm, pre-equatorial; ratio of its transverse dimension to that of oral sucker 1 : 2.1 - 2.2.

Testes subglobular to oval, 0.25 - 0.43 × 0.21 - 0.24 mm, placed symmetrically at about middle of body. Vasa efferentia united dorsal to acctabulum. Cirrus pouch club-shaped, 0.3 - 0.45 × 0.1 - 0.13 mm, crossing spined portion of left cecum ventrally and reaching to median point 65 - 75 μ in front of acetabulum. Vesicula seminalis club-shaped, 0.08 - 0.105 mm in maximum diameter. Pars prostatica fusiform, 18 - 21 μ wide. Ductus ejaculatorius short. Genital pore on left margin of body at level of posterior end of esophagus.

Ovary oval, 0.175 - 0.18 × 0.238 - 0.28 mm, posterodorsal to acetabulum; median or a little to right. The germiduct, arising from the posterior end of the ovary, forms a transverse fusiform dilatation 21 μ in diameter behind the ovary and soon unites with the receptabulum seminis and Laurer's canal at the same point. Receptaculum seminis oval, 45 - 87 × 75 - 123 μ. Laurer's canal describing a semicircle and opening outside dorsal to shell gland. Latter posterodorsal to ovary or posteromedial to it when the ovary

lies out of the median line. Uterus filling up posttesticular area and then forming one loop or two between left testis and acetabulum. Metraterm running along cirrus pouch and crossing it dorsally just before opening in front of male aperture. Eggs elliptical, thick-shelled, 42 – 45×24 – 27 μ. Vitelline follicles 9 on the right, 11 on the left, massed together in form of a grape-like bunch in extracecal fields anterolateral to acetabulum. Vitelline reservoir 50 μ in diameter, close to receptaculum seminis.

Excretory vesicle tubular, extending in middorsal field from its terminal pore to near intestinal terminations ; arms swollen anteriorly and terminating one on each side of pharynx or anterior end of esophagus.

It is interesting to note that this species, parasitic in littoral fish, was found in bottom fish too.

18. *Deretrema* sp.

Habitat Small intestine of *Goniistius zonatus* (Cu . et Valenc.).

Locality and date. Hamazima ; April 14, 1941.

Material. A single mature specimen fixed in acetic sublimate, stained and mounted.

Body fusiform, with blunt ends, 2.25 mm long, 0.7 mm broad at level of acetabulum, densely beset with spines 10 – 15 μ long except at anterior extremity and on acetabulum. Posterior extremity slightly notched at excretory pore. Oral sucker ventroterminal, 0.188×0.25 mm, followed by distinct prepharynx. Pharynx napiform, 0.12×0.114 mm, densely covered inside at its anterior half with spiniform teeth[1] 5 – 6 μ long by 3 μ broad at base, but smooth elsewhere. Esophagus wide, 0.15 mm long, lined with thick cuticle which is beset for the most part with acicular spines[2] up to 9 μ long and projecting over the surface. This armed lining continues onto the somewhat contracted beginning of the intestine and is suddenly replaced by the usual epithelia. Ceca comparatively wide, passing dorsomedial to testis and terminating on dorsal side at junction of anterior with middle third of body. Acetabulum 0.39×0.425 mm, occupying entire length of third sixth of body ; ratio of its transverse diameter to that of oral sucker 1 : 1.7.

Testes oval, situated one on each side behind acetabulum at fourth sixth of body. Cirrus pouch elongated, thin-walled, extend-

1) & 2) These armatures seem to be characteristic of the genus, for they have been confirmed by re-examination of my original specimens of *D. plotosi* and *D. hoplognathi*.

ing from an intercecal point 0.12 mm in front of acetabulum to genital pore, which lies on the left edge of the body at the level of the posterior end of the esophagus. Vesicula seminalis consisting of a sausage shaped proximal portion 0.185 mm long by 54 μ wide and a much narrower distal portion 80 μ long. Pars prostatica 40×20 μ, barrel-shaped, close to genital pore. Ductus ejaculatorius very short; protruded cirrus papilliform, 26 μ in diameter, projecting a little out of genital pore, apparently unarmed.

Ovary subglobular, 0.17×0.2 mm, posterodorsal to acetabulum, a little out of median line at equatorial level. The germiduct arises from the posterior end of the ovary and forms a bulbous swelling 30 μ in diameter just before joining the receptaculum seminis which is elongated saccular, only 20 μ in diameter and lies behind the ovary. Laurer's canal opening dorsally immediately behind ovary. Shell gland situated behind ovary at level of testes. Uterus occupying entire posttesticular region and finally running forward ventral to ovary and alongside acetabulum. Metraterm running along cirrus pouch on its posterodorsal side, crossing it dorsally very close to genital pore and opening immediately anterodorsal to cirrus. Eggs oval, light brown, embryonated, 39–45×24–29 μ. Vitelline follicles ovoid, large, forming a grape-like bunch in each extracecal field between intestinal bifurcation and middle level of acetabulum, numbering 9 on the right and 13 on the left. Vitelline reservoir small, immediately behind shell gland.

Excretory vesicle reaching to anterior end of posterior third of body, with terminal pore; arms terminating beside posterior end of pharynx.

This worm probably represents a new species, but I prefer to leave it unnamed at present. As for the sucker ratio it is intermediate between *Deretrema plotosi* and *D. hoplognathi.*

FELLODISTOMIDAE Nicolli, 1913.

19. *Tergestia laticollis* (Rud., 1819) Odhner, 1911.

Habitat. Small intestine of *Caranx equula* Temm. et Schleg.
Locality and date. Hamazima; April 21, 1941.
Material. 10 gravid specimens fixed in acetic sublimate under slight cover glass pressure, stained with hematoxylin and mounted in balsam.

Body elongate, 1.6–3.5×0.3–0.6 mm. Oral sucker terminal, 0.16–0.28×0.13–0.23 mm, with nodular thickening on each lateral margin of its longitudinally elongated aperture, surrounded dorsally

and laterally by a semicircle of 13 horn-like muscular projections up to 100 μ long by 36 μ broad at base. 6 pairs of cervical folds up to 82 μ in transverse length, at nearly equal intervals, the anteriormost usually level with anterior end of pharynx, the posteriormost a little behind pharynx. Pharynx subcylindrical, 0.17 – 0.23×0.08 – 0.13 mm. Esophagus 0.6 – 1.1 mm long, bifurcating behind acetabulum. Ceca near blunt-pointed posterior extremity. Acetabulum 0.3 – 0.46×0.27 – 0.5 mm; its center at junction of anterior with middle third of body, may be a little anterior or posterior to it.

Testes longitudinally elongated, somewhat indented, 0.16 – 0.4 ×0.075 – 0.25 mm, situated one obliquely behind the other in posterior third of body, contiguous or separated a little by uterus. Cirrus pouch membranous, divided into two distinct portions; posterior portion cylindrical, 0.26 – 0.53 × 0.04 – 0.08 mm, extending a little further backward than acetabulum, containing tubular vesicula seminalis 15 – 40 μ wide and part of prostate cells anteriorly; anterior portion saccular, 0.19 – 0.23×0.13 – 0.2 mm, containing well differentiated pars prostatica 85 – 120 μ long by 45 – 70 μ broad, compact mass of prostate cells and wide twisted cirrus of irregular outline, which opens into the genital atrium at its base. Genital atrium somewhat irregular in shape, covering part of cirrus pouch, opening outside by a very wide oval aperture anterolateral to acetabulum.

Ovary elongated, more or less indented, 0.17 – 0.33×0.1 – 0.15 mm, situated a little to the right of median line at posterior end of middle third of body or at its junction with posterior third, covered by uterus on its ventral side The germiduct arises from the left margin of the ovary and soon forms a loop, at the posterior end of which the Laurer's canal is given off. Then it proceeds straight forward and joins the inconspicuous vitelline reservoir anteromedial to the ovary. Shell gland extending longitudinally along germiduct on the left of ovary. The backwardly directed Laurer's canal appears to end blindly near its origin. The proximal portion of the uterus ascends on the dorsal side to near the acetabulum and then descends to be continued on the ventral side or behind the posterior testis into the distal ascending portion which winds its way forward from side to side, overlapping the testes, ovary, proximal uterus and vitellaria ventrally. Metraterm rather poorly differentiated, running alongside cirrus pouch and opening into genital atrium near its aperture. Eggs oval, 24×15 – 18 μ in life, 21 – 30× 16 – 18 μ in whole mounts. Vitellaria consisting mainly of tubular acini, extending along lateral margin of body from a short distance back of acetabulum to level of posterior, occasionally anterior,

testis. Right vitelline duct crossing uterine duct ventrally, left one crossing descending uterus dorsally, both meeting just anteromedial to ovary. Excretory vesicle bifurcating at level of ovary; pore ventroterminal.

The present material serves to extend the ranges of variation given for this species in my previous descriptions of 1934 and 1938.

Literature.

Odhner, T., Zum natürlichen System der digenen Trematoden. Zool. Anz., 38, 110, 1911. — Yamaguti, S., Studies on the helminth fauna of Japan. Part 2. Trematodes of fishes, I. Jap. Jour. Zool., 5 (3), 409, 1934. — Yamaguti, S., Studies on the helminth fauna of Japan. Part 21. Trematodes of fishes, IV. Published by the author, 96 – 97, 1938.

20. *Paradiscogaster piriformis* Yamaguti, 1934.

Habitat. Small intestine of *Pleuronichthys cornutus* (Temm. et Schleg.)[1].

Locality and date. Tokoname, Aiti Prefecture; April 17, 1941.

Eight full-grown specimens fixed in acetic sublimate under cover glass pressure, stained and mounted, gave greater measurements than the original as follows.

Body 1.0 – 1.83 × 0.5 – 1.08 mm; oral sucker 0.1 – 0.175 × 0.1 – 0.175 mm; pharynx 57 – 81 × 54 – 78 μ; esophagus 0.07 – 0.21 mm long; intestine 0.18 – 0.3 mm long; acetabulum 0.3 – 0.42 × 0.3 – 0.6 mm; testes 0.16 – 0.26 × 0.12 – 0.175 mm; cirrus pouch 0.24 – 0.4 × 0.12 – 0.21 mm; anterior portion of vesicula seminalis 45 – 84 × 50 – 123 μ, posterior portion 45 – 111 × 50 – 135 μ; ovary 0.12 – 0.21 × 0.11 – 0.17 mm; receptaculum seminis 90 – 130 × 45 – 100 μ. Eggs embryonated, 24 – 33 × 15 – 18 μ in life.

In the fresh state the posterior extremity may be produced backward by cover glass pressure in the form of a blunt-pointed cone, at the top of which the excretory pore opens. The main lateral excretory stems of the two sides join together at the excretory pore, so that there is no typical excretory vesicle. Each of them bifurcates at the level of the anterior part of the esophagus into a short anterior and a long posterior collecting vessel.

Literature.

Yamaguti, S., Studies on the helminth fauna of Japan. Part 2 Trematodes of fishes, I. Jap. Jour. Zool., 5 (3), 420 – 422, 1934.

1) The host for *Paradiscogaster piriformis*, given in my original description as "Hoso-garei," was determined to be *Pleuronichthys cornutus*.

MONORCHIIDAE Odhner, 1911.

21. *Lasiotocus himezi* n. sp.

Pl. V, Fig. 14.

Habitat. Small intestine of *Upeneoides bensasi* (Temm. et Schleg.).

Locality and date. Taizi, Wakayama Prefecture, May 27, 1942.

Body approximately fusiform, attenuated more rapidly toward anterior extremity than toward posterior, 1.7 – 2.5 mm long by 0.52 – 0.61 mm broad in whole mounts subjected to slight cover glass pressure. In this condition the following measurements were made.

Cuticle about 3 μ thick, beset throughout with small spines projecting slightly over the surface. Oral sucker terminal, inclined ventrally, finger-bowl-shaped, 0.11 – 0.15×0.12 – 0.18 mm. Prepharynx 10 – 45 μ long. Pharynx barrel-shaped, 60 – 75×57 – 75 μ. Esophagus narrow, 0.12 – 0.21 mm long. Ceca terminating at level of posterior end of testis or a little behind it. Acetabulum 0.09 – 0.12 mm in diameter, a little in front of middle of body.

Testis elongated oval to elliptical, 0.32 – 0.58×0.18 – 0.4 mm, situated a little behind middle of body with its center at about junction of middle with posterior third of body, giving rise to vas efferens at each anterolateral margin. Cirrus pouch elliptical or claviform, 0.3 – 0.57×0.13 – 0.18 mm, situated on the right, curving toward genital atrium with its posterior end in direct contact with anterior, inner or outer surface of ovary. Occasionally it may extend to the anterior end of the testis. Vesicula seminalis elliptical or claviform, 75 – 100 μ in diameter, occupying entire basal portion of cirrus pouch; its anterior end tapering to a duct, whose distal end widens and is differentiated into the pars prostatica. Prostate cells strongly developed and filling up all available space of cirrus pouch; their ducts are massed close together around the above mentioned duct between the vesicula seminalis and the pars prostatica, converging toward the latter. Cirrus stout, densely beset with bristle-like spines. The genital atrium is provided outside with muscle fibers, some of which surround the atrium, others radiating from it into the parenchyma. Genital pore immediately anterior to acetabulum.

Ovary 0.25 – 0.43×0.17 – 0.25 mm, consisting of 4 rounded lobes, situated in equatorial zone immediately anterior or anterolateral to testis. Vitellaria situated one on each side of body in front of testis, each forming a rosette of 7 to 9 pyriform lobes; efferent

ducts uniting in median line at anterior end of testis. Uterus winding behind testis and on left side as far as level of genital pore, sometimes passing on dorsal or ventral surface of testis, finally describing an S-shaped curve before leading into metraterm. Latter short, narrow, usually running transversely and opening into female terminal organ at junction of its two portions of different structure. The greater proximal portion of this organ is saccular, 0.12–0.21 mm in diameter, and contains large amount of sperm and a variable number of eggs. Its wall consists of a thin layer of longitudinal muscle fibers and is covered inside except at the base with bristles similar to those of the cirrus. The smaller distal portion corresponds to the neck of the organ and is provided with a very thick coat of circular muscle fibers, though lined with bristles like the proximal portion. Around the terminal organ, especially the armed proximal portion, are massed numerous elongate glandular cells. Eggs oval, 18 – 24×12 – 15 μ in life. Excretory vesicle tubular, with terminal pore ; its anterior extent not made out.

This species differs from the most closely related *Lasiotocus macrorchis* (Yamaguti, 1934,) in the structure of the female terminal organ, the position of the opening of the metraterm, the size of the eggs, etc.

Literature.

Yamaguti, S., Studies on the helminth fauna of Japan. Part 2. Trematodes of ishes, I Jap. Jour. Zool., 5 (3), 385 – 386, 1934.

22. *Octotestis iseensis* n. g., n. sp.

Pl. V, Fig. 15.

Habitat. *Spheroides niphobles* (Jord. et Snyd.) (location unknown, probably body cavity).

Locality and date. Tokoname, Aiti Prefecture ; April 15, 1941.

Material. A single gravid specimen fixed in acetic sublimate, stained with Heidenhain's hematoxylin.

Body flattened elliptical, rather pointed in front, rounded behind, with a distinct incision at excretory pore, 6.25 mm in length, 3 mm in maximum breadth just behind its middle. Cuticle thin, unarmed ; subcuticular musculature practically lacking, but dorsoventral muscles well developed. Parenchyma transparent owing to its loose succulent texture. Oral sucker terminal, inclined ventrally, 0.48×0.55 mm, with rather weak musculature, directly followed by glandular pharynx 0.2 mm in diameter. Esophagus lined with cuticle at very beginning alone, dilated and thin-walled like

intestine for the remaining part 0.35 mm long. Intestinal ceca distended with fibrinous ingesta for the entire length, with a thin membranous wall apparently devoid of epithelial lining, running sinuously just inside of vitellaria along outskirts of testes, and of ovary on the right, terminating blindly at posterior extremity one on each side of excretory vesicle and posterior end of uterus. Acetabulum 0.65×0.71 mm, rather feebly muscular, situated at junction of anterior with middle third of body.

Testes irregularly lobed, 8 in number, arranged one directly behind the other in two longitudinal rows of four each, with uterus and excretory vesicle between, occupying most of intercecal area in posterior half of body; the right row a little posterior to the left, 0.275 mm apart from posterior extremity. The right testes measured in mm from before backwards 0.5×0.65, 0.6×0.9, 0.6×1.0 and 1.1×0.68 respectively, the left ones 0.85×1.0, 0.5×1.025, 0.3×0.43 and 0.95×0.675 respectively. The right vas deferens formed by union of wide branches, each of which arises from the dorsal side of the testis, runs forwards dorsal to the shell gland and ovary, crossing the vitelline reservoir and germiduct dorsally, while the left one running ventral to the left testes as it receives a wide branch from each of them turns abruptly to the right at the anteromedial corner of the anteriormost testis, and after passing between the uterus and the excretory vesicle just in front of the left transverse vitelline duct, curves forwards and proceeds alongside its fellow dorsal to the left part of the acetabulum. Just before entering the cirrus pouch the two vasa deferentia are twisted and somewhat distended with spermatozoa at the anterior margin of the acetabulum. The rounded cirrus pouch 0.45 mm in diameter has a very thin membranous wall and lies just in front of the acetabulum; it contains a rounded vesicula seminalis 0.2 mm long by 0.3 mm broad, a small pars prostatica 63 μ in diameter and an eversible cirrus; the vesicula seminalis lying at the base of the cirrus pouch is connected with the pars prostatica by a very narrow duct which is only 5 μ wide and surrounded by a very compact mass of prostate cells. The cirrus is a large eversible organ, which is about 0.3 mm in diameter when everted, and whose inner surface is densely beset with acicular spines 27 – 36 μ long by 2 – 4 μ broad at the base. It opens in the median line a little behind the intestinal bifurcation. Around the anterior end of the cirrus pouch as well as the entire metraterm is a thick layer of gland cells apparently different in structure from the usual accompanying cells.

Ovary divided like mulberry into numerous (over 30) follicular lobules 0.11 – 0.23 mm in diameter, measuring in all 1.0×0.9 mm,

situated immediately posterodextral to acetabulum, bordering the right cecum and extending toward the left slightly beyond the median line. The germiduct, arising from the dorsal side of the ovary, runs backward and inward and joins the vitelline reservoir, developing near its origin a minute saccular outgrowth representing the receptaculum seminis, from which arises the Laurer's canal proceeding forward and opening dorsally immediately behind the acetabulum. Shell gland compact, dorsal and posterosinistral to ovary. The uterine duct, running obliquely forward through the shell gland, turns backwards at the left end of the ovary; the descending uterus lies in the median line between the dorsal excretory vesicle and the ventral ascending uterus, into which it continues at the posterior extremity. This ascending portion of the uterus fills up the ventral posttesticular area between the two cecal ends; anteriorly to the left testis it runs straight forwards by the left side of the acetabulum and passes into the large inwardly curved metraterm. The latter, 0.45 mm long by 0.22 mm wide, is covered inside with acicular spines similar to those of the cirrus and surrounded by a dense coat of glandular cells. It opens to the outside immediately anterosinistral to the cirrus. Eggs subglobular to oval, comparatively thin-shelled, $33-40\times24-33$ μ. Vitellaria forming a series of 10 grape-like bunches along each lateral margin from level of terminal genitalia to near posterior extremity; collecting vitelline ducts running convergently toward vitelline reservoir on dorsal side of ceca with gradual reduction of their number; vitelline reservoir 0.15 mm in diameter, intercalated between ovary and right anteriormost testis.

Excretory vesicle middoral, tubular, with marked dilatation dorsal to posterior end of uterus, constricted at its terminal pore, reaching to dorsal side of shell gland.

This genus is characterized by the number and arrangement of the testes, and the structure of the terminal genitalia. In the latter respect it bears a certain resemblance to Monorchiid genera, such as *Monorchis*, *Monorcheides*, etc.. Though different in other respects it may be included in the Monorchiidae Odhner, 1911. The number of testes is not of great significance in the classification of trematodes, because even within the same genus a single testis may be double as in *Asymphylodora diplorchis* and in the same family are included genera with more testes than in the type genus, such as *Monorcheides* Odhner, 1911 and *Paramonorcheides* Yamaguti, 1938 in the Monorchiidae, *Helicometrina* Linton, 1910, *Megalogonia* Surber, 1928, *Multitestis* Manter, 1931, *Rhagorchis* Manter, 1931, *Decemtestis* Yamaguti, 1934, *Gargorchis* Linton, 1940, in the

Allocreadiidae, *Novemtestis* Yamaguti, 1941, in the Heterophyidae.

The generic name refers to the number of the testes, and the specific name refers to the locality where the parasite was found.

Octotestis n. g.

Generic diagnosis. Monorchiidae Odhner, 1911. Body comparatively large, unarmed. Oral sucker terminal, inclined ventrally. Prepharynx practically absent. Intestinal ceca terminating blindly at posterior extremity. Acetabulum in anterior half of body. Testes 8, in two longitudinal rows of 4 each, occupying greater part of posterior half of body. Cirrus pouch preacetabular, thin-walled, containing vesicula seminalis, small pars prostatica, strongly developed prostate cells, and eversible cirrus covered with acicular spines. Genital pore median, postbifurcal. Ovary mulberry-like, submedian, immediately postacetabular. Receptaculum seminis and Laurer's canal present. Shell gland compact, median, postovarian. Uterus intertesticular, reaching to posterior extremity; metraterm voluminous, covered inside with acicular spines. Eggs comparatively thin-shelled. Vitellaria forming grape-like bunches, extending along lateral margins of body for a considerable distance. Excretory vesicle tubular, with terminal pore. Parasites of marine fishes.

Genotype. *Octotestis iseensis* n. sp.

Literature.

Linton, E., Helminth fauna of the Dry Tortugas, II. Trematodes. Pap. Tort. Lab. Carneg. Inst. Wash., 4, 33–34, 1910. — Linton, E., Trematodes from fishes mainly from the Woods Hole region Massachusetts. Pr. U.S. Nat. Mus., 88 (3078), 163, 1940. — Manter, H., Some digenetic trematodes of marine fishes of Beaufort, North Carolina. Parasit., 23, 396–411, 1931. — Odhner, T., Die Trematoden des arktischen Gebietes. Fauna arctica, Bd. 4, 319, 1905. — Surber, E. W., *Megalogonia ictaluri*, a new species of trematode from the channel catfish, *Ictalurus punctatus*. Jour. Par., 14 (4), 269–271, 1928. — Yamaguti, S., Studies on the helminth fauna of Japan. Part 2. Trematodes of fishes, I. Jap. Jour. Zool., 5 (3), 322, 1934. — Yamaguti, S., Studies on the helminth fauna of Japan. Part 21. Trematodes of fishes, IV. Published by the author, 83, 1938.

GORGODERIDAE Looss, 1901.

23. *Phyllodistomum pacificum* n. sp.

Pl. V; Fig. 16.

Habitat. Small intestine (?), probably urinary bladder, of *Caranx equula* Temm. et Schleg.

Locality and date. Hamazima; April 21, 1941.

Material. Four gravid specimens fixed in acetic sublimate, stained and mounted.

Body lanceolate, with more or less crenulated lateral margins, 2.2 – 3.1 mm in length, 0.57 – 0.93 mm in maximum breadth at about middle of hindbody. Cuticle thin and smooth; subcuticular musculature feebly developed Oral sucker terminal, with slight ventral inclination, 0.16 – 0.21 × 0.17 – 0.25 mm. Esophagus 0.2 – 0.3 mm long, very narrow at beginning, may form a bulbous swelling in front of its conical posterior dilatation. Ceca simple, terminating near posterior extremity. Acetabulum 0.15 – 0.2 × 0.15 – 0.23 mm, situated at junction of anterior with middle third of body or just behind it.

Testes indented or lobed on each side, 0.26 – 0.45 × 0.17 – 0.38 mm, placed one obliquely behind the other at middle of hindbody or a little further in front, the anterior on the right or the left. Vasa efferentia arising from anterior ends of testes, passing dorsal to vitellaria, converging in front of acetabulum toward posterior end of vesicula seminalis, into which they open together. Vesicula seminalis 0.11 – 0.16 mm long, divided by deep constriction into two unequal portions, of which the larger posterior is 0.09 – 0.13 mm in diameter. The attenuated distal end of the anterior portion turns backward and opens immediately in front of the female pore. No prostatic complex. Common genital pore ventral to vesicula seminalis, 0.62 – 0.8 mm from anterior extremity and 0.15 – 0.28 mm from intestinal bifurcation.

Ovary oval, 0.15 – 0.27 × 0.1 – 0.195 mm, slightly indented or entire, situated on the right or left of median line just in front of middle of body. The germiduct arises from the dorsal side of the ovary and soon forms a bulbous swelling, then gives off the Laurer's canal immediately posterodorsal to the junction of the two vitelline ducts. After crossing the left transverse vitelline duct it joins the common vitelline duct and penetrates the shell gland lying immediately behind the acetabulum. The descending uterus passes between the two testes and continues near the posterior extremity into the ascending uterus, which may overlap the peripheral portion of the testes and ovary, and extend outward across the ventral side of the ceca when fully developed. Metraterm twisted directly in front of acetabulum in form of an S, then running forward on ventral side of vesicula seminalis to open immediately behind male aperture. Eggs elliptical, thin-shelled, embryonated, 39 – 51 × 24 – 39 μ, smallest immature ones only 30 × 18 μ. Vitellaria compact, more or less indented, but entire in younger adults, situated sym-

metrically behind acetabulum, each giving rise to vitelline duct at

Species	*acceptum* Looss, 1901	*unicum* Odhner, 1902	*linguale* Odhner, 1902	*spatulae-forme* Odhner, 1902	*fausti* Pearse, 1924	*marinum* Layman, 1930	*carangis* Manter, 1947	*pacificum* n. sp.
Body	7.2×3.4	5.3–5.4× 2.3–2.33	,,	4.75×2.8	4.77×2	3.5×0.81	8×2.6	2.2–3.1× 0.57–0.93
Oral sucker	0.6	0.42–0.43	0.43–0.44	0.35	0.45	0.114–0.131	0.686	0.16–0.21× 0.17–0.25
Acetabulum	0.58	0.43–0.44	0.73–0.74	0.4	0.7	0.196×0.196	0.537	0.15–0.2× 0.15–0.23
Genital pore	about midway betw. two suckers	midway betw. int. bif. & acet.	midway betw. ant. extr. & acet.	,,	about midway betw. int. bif. & acet.	0.442 fr. ant. extrem.	midway betw. int. bif. & acet.	0.62–0.8 fr. ant. extrem.
Testes	at middle of hindb.	one entire, other slightly indented		fairly strongly lobed	deeply incised	0.327–0.393 × 0.196–0.213	0.255 round	indented or lobed, 0.26–0.45× 0.17–0.38
Ovary	indented, much smaller than testes	round, entire	clover-shaped	kidney-shaped	0.42×0.32	smaller than testes 0.113×0.098	ovoid	0.15–0.27× 0.1–0.195
Vitellaria	branched	entire, oval, small	not comletely entire	irregularly round	slightly lobed 0.25×0.13	0.131–0.147 × 0.065–0.114	tripartite	more or less indented
Eggs (in μ)	38×24	43–54×?	33–34×?	28×?	37×28	24–43× 13–21	32–36× 19–22	39–51× 24–36
Hosts	*Crenilabrus pavo* & *C. griseus*	*Serranus* sp.	*Gymnarchus niloticus*	*Malapterurus electricus*	*Aplodinotus grunniens*	*Spheroides borealis*	*Caranx ruber*	*Caranx equula*

posteromedial corner; transverse vitelline ducts uniting in median line just behind shell gland.

Excretory vesicle tubular, middorsal, giving off a pair of lateral collecting vessels at its anterior end at level of ovary; pore dorsal, 60 – 120 μ from posterior extremity.

The following comparative table shows the differences between the present species and the known members of the genus from marine fishes.

The present species is more closely related to *Phyllodistomum marinum* Layman, 1930, from *Spheroides borealis* than to any of the other known marine members of the genus but differs from it in the larger oral sucker, the posterior position of the genital pore, the larger egg size, etc.

Literature.

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Explanation of Plates.

Plate I.

Fig. 1. *Plagioporus lobatus* (Yamaguti, 1934), ventral view.
Fig. 2. *Plagioporus acanthogobii* n. sp., ventral view.
Fig. 3. *Plagioporus* (*Caudotestis*) *spari* n. sp., ventral view.

Plate II.

Fig. 4. *Plagioporus* (*Caudotestis*) *azurionis* n. sp., ventral view.
Fig. 5. *Plagioporus* (*Caudotestis*) *dorosomatis* n. sp., ventral view.
Fig. 6. *Decemtestis takanoha* n. sp., ventral view.

Plate III.

Fig. 7. *Opecoelus nipponicus* n. sp., ventral view.
Fig. 8. *Opecoelus himezi* n. sp., ventral view.
Fig. 9. *Stephanochasmus carangis* n. sp., ventral view.

Plate IV.

Fig. 10. *Notoporus carangis* n. sp., dorsal view.
Fig. 11. *Echinotephanus pacificus* n. sp., ventral view.

Fig. 12. *Deretrema* sp.. ventral view.
Fig. 13. *Tergestia laticollis* (Rud., 1819) Odhner, 1911, ventral view.

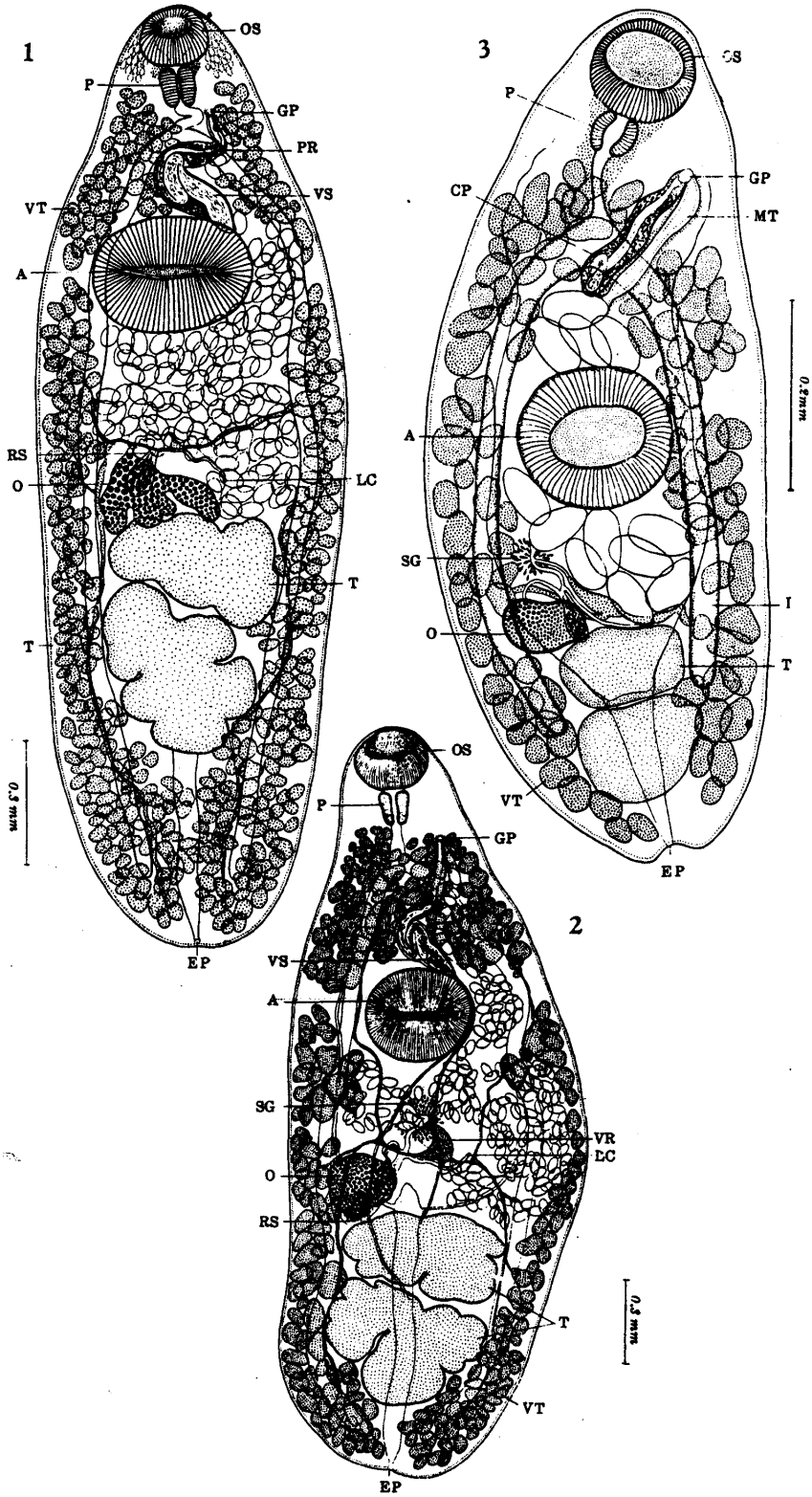
Plate V.

Fig. 14. *Lasiotocus himezi* n. sp., ventral view.
Fig. 15. *Octotestis iseensis* n. g., n. sp., ventral view.
Fig. 16. *Phyllodistomum pacificum* n. sp., ventral view.

Abbreviations used in Figures.

A = acetabulum, AN = anus, CA = cephalic appendage, CF = cervical fold, CL = cloaca, CP = cirrus pouch, DE = ductus ejaculatorius, DH = ductus hermaphroditicus, EP = excretory pore, ES = eye-spot, GP = genital pore, I = intestine, LC = Laurer's canal, MT = metraterm, O = ovary, OS = oral sucker, P = pharynx, PC = prostatic cell, PR = pars prostatica, RS = receptaculum seminis, SG = shell gland, SP = spine, T = testis, TO = terminal organ, U = uterus, VR = vitelline reservoir, VS = vesicula seminalis, VT = vitellarium.

YAMAGUTI: STUDIES ON THE HELMINTH FAUNA OF JAPAN XLIV Pl. I



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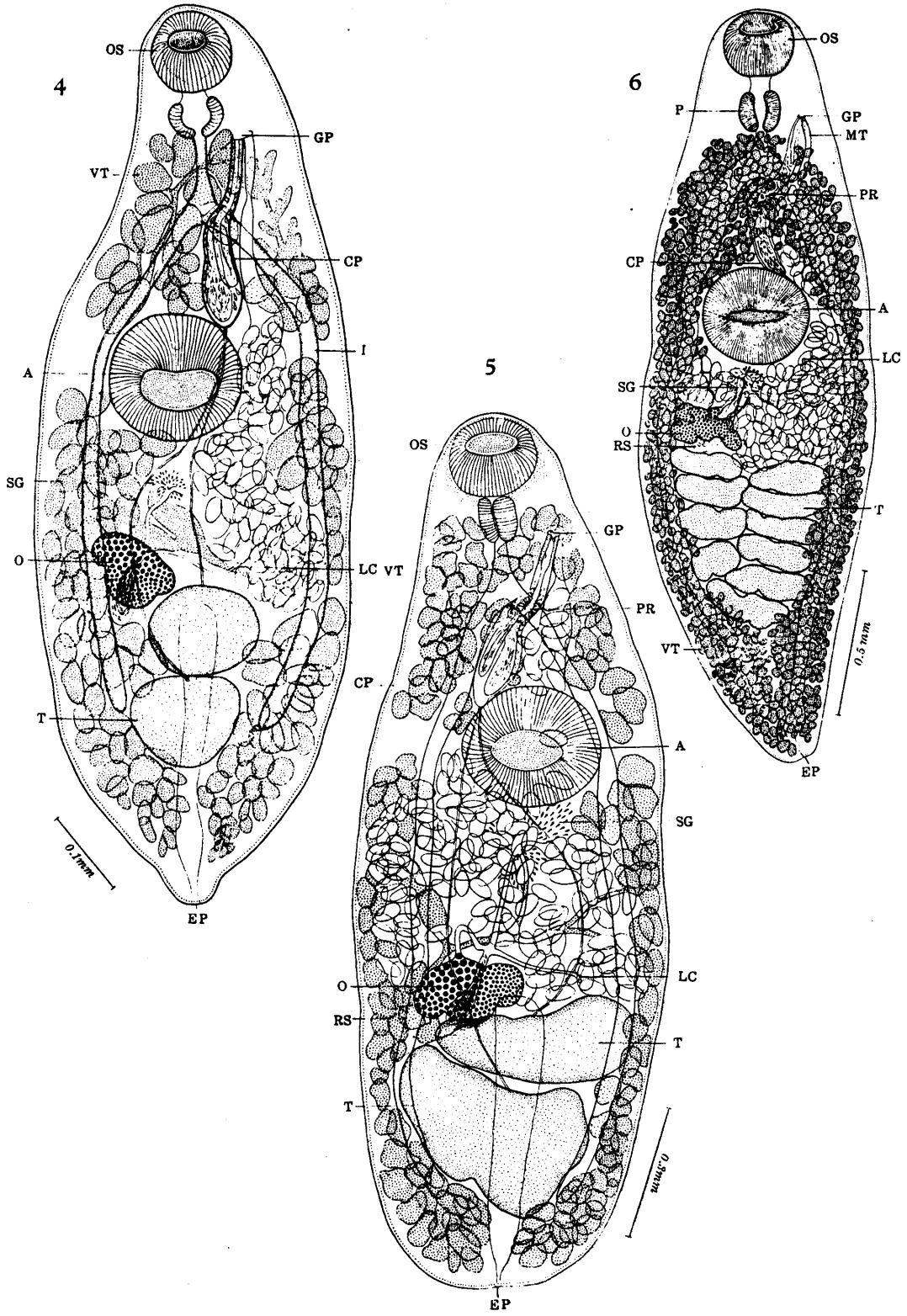

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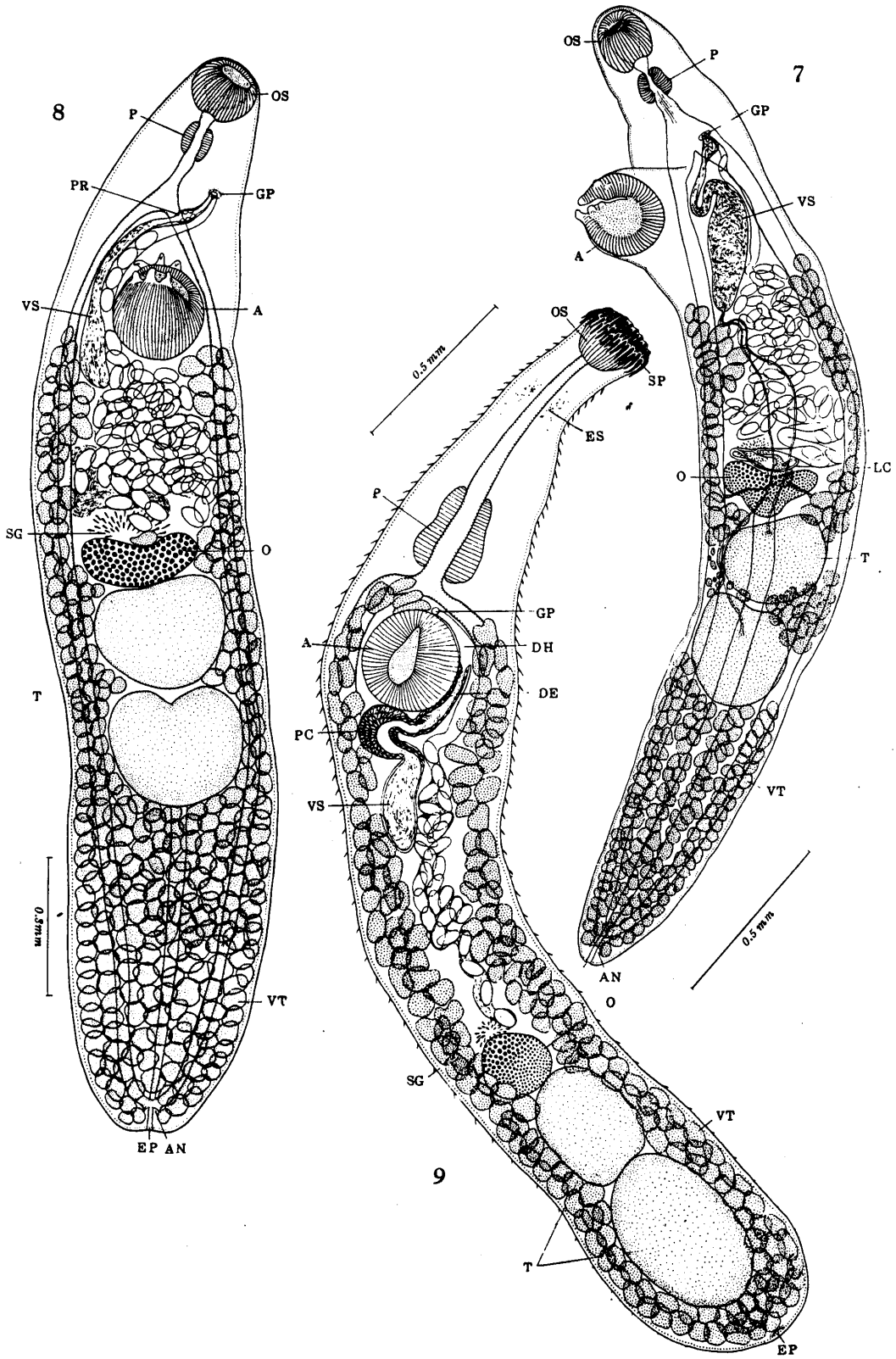

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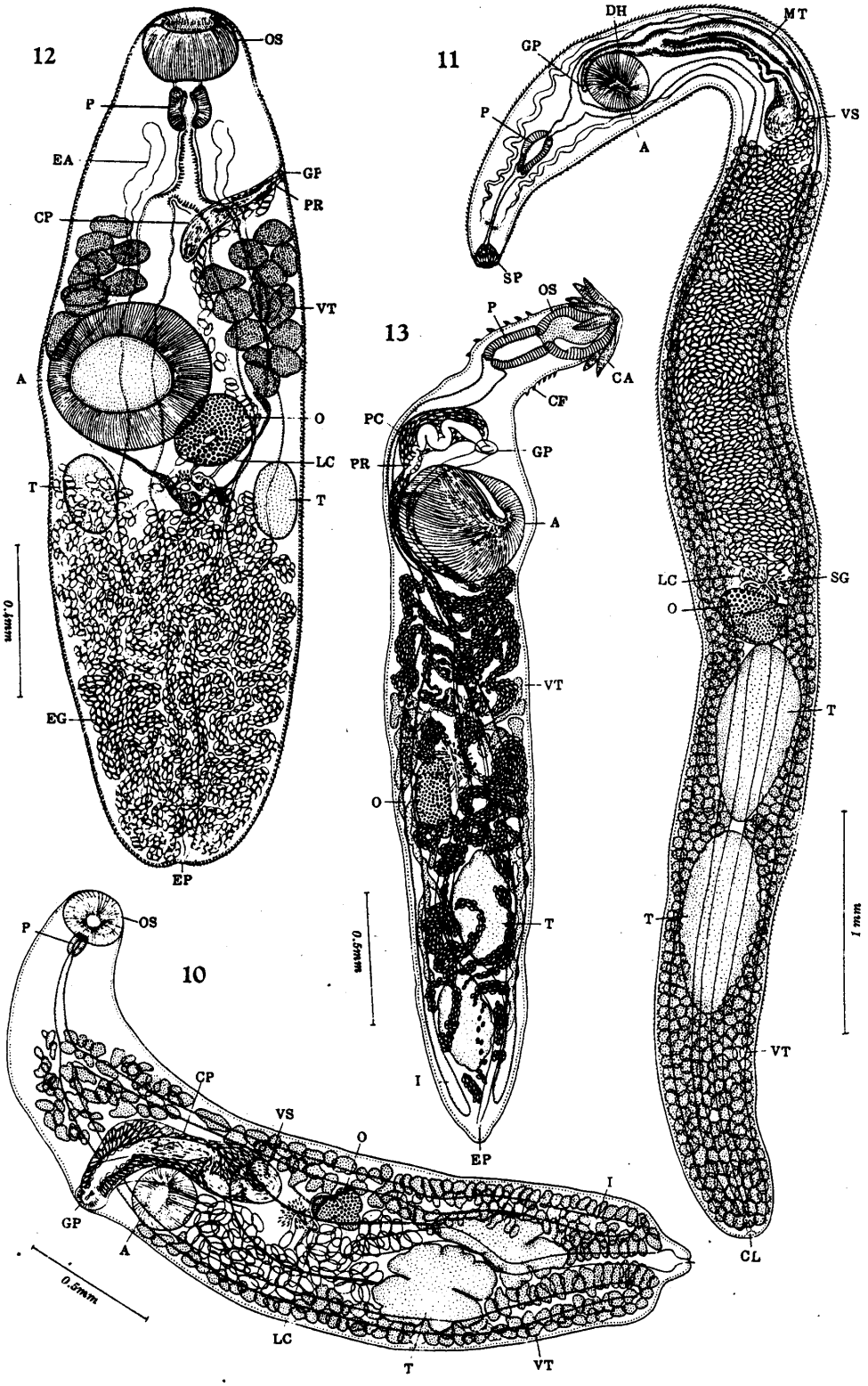

YAMAGUTI: STUDIES ON THE HELMINTH FAUNA OF JAPAN XLIV Pl. V