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Parasitic worms mainly from Celebes. Part 9. Nematodes of Fishes

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Parasitic worms mainly from Celebes. Part 9. Nematodes of Fishes*

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Abstract

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Parasitic worms mainly from Celebes
Part 9. Nematodes of Fishes

With 2 Plates

By

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CAMALLANIDAE Railliet et Henry, 1915

1. *Procamallanus annulatus* n. sp. (Pl. I, figs. 1–2)

Habitat and locality. Small intestine of *Siganus* sp.; Macassar.

Material. 7 males and 5 females, all mature.

Male. Body 10–20×0.26–0.39 mm. Head end truncate, with one pair of lateral amphids and two pairs of submedian papillae. Buccal capsule 150–120×105–130 μ, with a distinct circular ledge

internally near its basal ring. Two tubular glands (a dorsal and a ventral) are attached to the anterior end of the esophagus, probably functioning as salivary gland, with its opening between the basal ring of the buccal capsule and the anterior end of the esophagus. Nerve ring and excretory pore 0.28 – 0.35 mm and 0.49 – 0.61 mm respectively from head end. Anterior muscular part of esophagus 0.42 – 0.51 × 0.09 – 0.123 mm, posterior glandular part 0.5 – 0.74 × 0.09 – 0.14 mm. Posterior extremity curved ventrally in form of a hook, tail 0.24 – 0.3 mm long. Caudal alae supported on each side by a series of three preanal and five postanal papillae, which are long and slender except the two terminal. The ventral muscle fibers are converged toward the point where the caudal alae are continued anteriorly from one to the other. Spicules unequal, with sharp point; right one 0.37 – 0.42 mm long, left one 0.21 – 0.25 mm long. Gubernaculum 0.14 – 0.15 mm long.

Female. Body 28 – 43 × 0.5 – 0.84 mm. Buccal capsule 0.14 – 0.165 × 0.12 – 0.13 mm. Nerve ring and excretory pore 0.32 – 0.38 mm and 0.6 – 0.75 mm respectively from head end. Anterior part of esophagus 0.46 – 0.62 × 0.12 – 0.14 mm, posterior part 0.74 – 1.05 × 0.12 – 0.14 mm. Tail 0.35 – 0.42 mm long. Vulva 10 – 18 mm from anterior extremity, dividing body length in ratio of 1 : 1.4 – 1.8. Mature embryo 0.51 – 0.58 × 0.017 – 0.018 mm.

This species differs from the most closely related *Procamallanus sigani* Yamaguti, 1935, in body size, caudal papillae, spicules, and in the presence of a ring-like internal thickening of the buccal capsule. The specific name refers to the last mentioned character.

2. *Procamallanus spiralis* Baylis, 1923

Habitat and locality. Intestine of *Pseudorhombus arsius*; Macassar.

Material. A single female.

Female. Body 29 mm long by 0.4 mm wide. Buccal capsule 90 × 72 μ, with a dozen spiral markings. Anterior muscular part of esophagus 0.49 – 0.123 mm, with nerve ring 0.28 mm from head end; posterior part 0.78 × 0.12 mm. Tail stumpy, 0.17 mm in length exclusive of the digitiform terminal appendage which is 38 μ long by 18 μ wide and bears two minute spines as shown by Törnquist in his plate-fig. 14a. Vulva 13.5 mm from anterior end of body.

CUCULLANIDAE Cobbold, 1879

3. *Cucullanus sigani* n. sp. (Pl. I, figs. 3 - 4)

Habitat and locality. Small intestine of *Siganus* sp.; Macassar.

Material. Two males and three females.

Male. Body 8.2 - 9.7 × 0.35 - 0.38 mm. Nerve ring, cervical papillae and excretory pore 0.3 - 0.32 mm, 0.6 - 0.8 mm and 0.88 - 0.94 mm respectively from head end. False buccal capsule at anterior end of esophagus 0.12 - 0.13 mm in diameter, with a longitudinal chitinous thickening at each corner of its triradiate lumen. Esophagus 0.7 - 0.73 × 0.165 mm, with valvular appendage projecting into intestine. No intestinal cecum. Posterior extremity curved ventrally, tail 0.224 mm long. Preanal sucker 0.67 - 0.77 mm in front of cloacal aperture. Anterior lip of cloaca thickened, with bifurcated pulp. There are 5 pairs of preanal, and 5 pairs of postanal papillae; of the latter two are lateral. Spicules equal, similar, 1.2 - 1.4 mm long; gubernaculum 0.11 - 0.13 mm long.

Female. Body 11.1 - 12.4 × 0.39 - 0.45 mm. Nerve ring, cervical papillae and excretory pore 0.36 - 0.37 mm, 0.72 - 0.77 mm and 1.0 - 1.16 mm respectively from head end. False buccal capsule 0.13 - 0.14 mm in diameter. Esophagus 0.82 - 0.88 × 0.18 - 0.24 mm. Tail 0.29 - 0.32 mm. Vulva 6.7 - 7.6 mm from head end, dividing body length in ratio of 1.5 : 1. Vagina about 0.5 mm long. Eggs oval, thin-shelled, containing few blastomeres, 66 - 75 × 48 - 54 μ.

This species differs from the allied *C. heterochrous* Rud., 1802, in the anterior swelling of the esophagus being narrower than the posterior swelling and in the arrangement of the posterior tail papillae.

4. *Cucullanus armatus* n. sp.
(Pl. I, figs. 9 - 10; Pl. II, figs. 11 - 12)

Habitat and locality. Small intestine of *Arius* sp.; Banjermassin and Macassar.

Material. Three males and four females.

Male. Body 8.2 - 11.8 × 0.35 - 0.61 mm. Head 0.25 - 0.36 mm in diameter. Each lateral lip with a lateral amphid and two submedian papillae externally and four chitinous pads of different size and shape internally at the anterior end of the false buccal capsule; one of these pads, U- or V-shaped in cross section, lies at

the bottom of the lateral recess which is continued backward into the subdorsal recess of the triradiate lumen of the esophagus. At the ventral corner of the mouth toward which fine muscle fibers are converged, is another U-shaped chitinous pad, so that there are altogether 9 chitinous pads. False buccal capsule formed by anterior swelling of esophagus, with file-like rough surface and a pair of small chitinous pads at the level of the maximum diameter which is 0.21 – 0.32 mm dorsoventrally. Nerve ring and cervical papillae 0.43 – 0.58 mm and 0.78 – 1.08 mm respectively from head end. Esophagus 1.1 – 1.6 mm long, very narrow (0.1 – 0.125 mm) at nerve ring, 0.18 – 0.3 mm at posterior bulbous swelling. Posterior extremity curved ventrally, without sucker-like structure on ventral side ; tail tapering rapidly, 0.22 – 0.37 mm long. There are 5 pairs of preanal and 4 pairs of postanal papillae, of which one pair is lateral on a level with the second subventral postanal. Spicules subequal, 0.4 – 0.61 mm long, with a chitinous stick in the axis of the greater distal portion, which appears as if it were flanged laterally, while the shorter proximal portion is tubular and 63 – 90 μ wide. Gubernaculum 80 – 135 μ long by 33 – 35 μ wide.

Female. Body 13.8 – 17.1 × 0.56 – 0.7 mm. Head 0.35 – 0.37 mm in diameter. Nerve ring and cervical papillae at 0.57 – 0.65 mm and 1.0 – 1.15 mm respectively from head end. Esophagus 1.6 – 1.8 mm long, 0.3 – 0.37 mm wide at anterior swelling forming false buccal capsule, 0.12 – 0.14 mm wide at nerve ring, and 0.26 – 0.366 mm wide at posterior swelling. Tail 0.25 – 0.31 mm long, with a conical spike-like process at tip. Vulva 5.4 – 6.5 mm from posterior end, dividing body length in ratio of 1.5 – 1.7 : 1. As fixed in alcohol and measured in water the elliptical eggs containing segmenting ova are 78 – 93 μ by 45 – 60 μ.

This species is characterized by the structure of the spicules, and the armature at the anterior end and on the inner surface of the false buccal capsule. The specific name refers to this character.

5. *Cucullanus exiguus* n. sp. (Pl. II, figs. 13 – 15)

Habitat and locality. Small intestine of *Lates calcarifer* (Bleeker) ; Banjermassin.

Material. Two males and three females.

Male. Body 2.4 – 2.45 × 0.14 – 0.18 mm, finely striated transversely. Nerve ring, cervical papillae and excretory pore 0.14 –

0.165 mm, 0.3 – 0.33 mm and 0.4 mm respectively from head end. Esophagus 0.39 – 0.43 mm long, 78 – 81 μ at its anterior swelling, 60 – 63 μ at posterior swelling. Posterior extremity attenuated, curved ventrally in form of a hook, without sucker-like structure on ventral side. Tail 72 – 90 μ long, tapering rapidly to terminate in two acicular points. There are 7 pairs of subventral and 2 pairs of lateral anal papillae; one of the subventral papillae lies immediately in front of the cloacal aperture and another immediately behind it. One of the two lateral papillae is on the same level as the cloacal aperture, but the other lies very close to the tail end. Spicules slender, equal, 1.26 – 1.28 mm long, gubernaculum 20 – 30 μ long.

Female. Body 2.6 – 5.2×0.25 – 0.42 mm. Nerve ring, cervical papillae and excretory pore situated 0.21 – 0.22 mm, 0.36 – 0.49 mm and 0.6 – 0.62 mm respectively from head end. Esophagus 0.5 – 0.62 mm long, 108 – 120 μ wide at anterior swelling, 84 – 120 μ wide at posterior swelling. Tail 0.12 – 0.15 mm long, terminating in a spike with a few accessory points. Vulva behind middle of body but in front of it in the young specimen. Eggs immature.

This small species is distinguished from the related *Cucullanus parvus* Törnquist, 1931, in the arrangement of the anal papillae, and in the spicules being twice as long.

6. *Cucullanus arii* n. sp. (Pl. I, figs. 5 – 8)

Habitat and locality. Small intestine of *Arius* sp.; Banjermassin, Borneo.

Material. One gravid female and two mature males.

Male. Body 10.1 – 11.1 mm long, 0.6 mm in maximum breadth at about its middle; anterior extremity straight, posterior extremity curved ventrally. The neck is as broad as the head or rather slightly broader though seemingly narrower. Cuticle with extremely fine transverse striations, thickened in esophageal region, especially at and in front of level of nerve ring. Numerous fine longitudinal ridges of cuticle incised by transverse serrations extending throughout body length, especially distinctly in anterior part of body except for head and in preanal region. Lateral lip provided along its margin with a flange with bacillary denticulations and on outer surface with one lateral amphid and two submedian papillae. Nerve ring, cervical papillae and excretory pore situated 0.4 mm, 0.85 mm and 0.9 mm respectively from head end. Esophagus 1.2 –

1.3 mm long, 0.2 – 0.23 mm broad at posterior club-shaped swelling. In the end-on view the anterior end of the false buccal capsule shows on each side two chitinous pads of different thickness and a narrow recess. To the posterior end of the esophagus is attached a three-lobed bulbous appendage projecting into the intestine. Tail 0.37 – 0.39 mm long, terminating in a spike-like point. Testis originating a little in front of sucker, turning back on itself at level of valvular esophageal appendage. Ventral sucker large, about 0.25 mm in anteroposterior diameter, with its center 1.0 mm in front of cloacal aperture. There are on each side three preanal, three adanal and five postanal papillae; in the type the first preanal lies 1.2 mm in front of the cloacal aperture on the left and 1.1 mm on the right, the third 0.325 mm from the same aperture on the left and 0.3 mm on the right. Of the adanals the first two lie side by side, the inner being in the subventral line on a level with the anterior margin of the cloacal aperture; the third is also in the subventral line on a level with the posterior margin of the cloacal aperture. Of the postanals two are on the subventral row, the anterior being a little in front of the middle of the tail and the posterior at the base of the tail spike, while the other three are lateral, the first being just behind the level of the third adanal, the second is the smallest and lies at about the middle of the tail, and the third immediately anterolateral to the last postanal. Spicules subequal, with sharp point and two longitudinal ridges along the greater portion; right one 1.52 mm long, left one 1.62 mm long. Gubernaculum 0.09 – 0.11 mm long, 30 μ thick at base.

Female. Body rather robust 11.7×0.85 mm; anterior extremity straight, the posterior also rather straight. Cuticle with longitudinal ridges and coarse transverse serrations as in male, very thick at neck which is broader than head. Nerve ring, cervical papillae and excretory pore situated 0.43 mm, 0.91 mm and 1.08 mm respectively from head end. Lateral lip fringed with about 45 bacillary denticulations. In a transverse section of the head end cut with a free hand the lateral recess of the false buccal capsule is seen about midway between the dorsal submedian papilla and the lateral amphid. Esophagus 1.35 mm long, 0.21 mm broad at false buccal capsule, 0.21 mm broad at posterior swelling. Tail pointed, well marked off from body, about 0.5 mm long, 0.275 mm broad at base, with a pair of lateral papillae behind its middle. Anterior

ovarial coils reaching to near the nerve ring, the posterior to the rectum. Vagina arcuate, strongly muscular, 0.96 mm long, directed forward from vulva, which lies a little behind the middle of the body (5 mm from the posterior extremity). Eggs subglobular to oval, thin-shelled, 45 – 60×36 – 42 μ as measured on the lactophenol mount ; contained ovum not segmented or with two blastomeres of unequal size.

This species differs from the most closely allied members of the genus (*C. carettae* Baylis, 1923 and *C. serratus* (Lane, 1916), chiefly in the arrangement of the anal papillae. In the related representatives from Japan such as *C. himezi* Yamaguti, 1941, and *C. cyprini* Yamaguti, 1941, the spicules are only 0.7 – 0.83 mm and 0.8 mm long respectively, besides the differences in the arrangement of the anal papillae as well as in the egg size. In *C.* sp. from *Lotella phycis* the ovaries do not extend so far backward and forward as in the present species and the eggs are much larger. The lateral recesses of the false buccal capsule have so far been demonstrated by Barreto for his species *C. lintoni* and *C. stossichi.* Reexamination of my original specimens revealed the presence of this structure not only for *C. robustus, C. filiformis C. himezi, C. cyprini, C. amadai* and *C. girellae* but also for *Cucullanellus branchiostegi* and *Cucullanellus pleuronectidis.* As followed backwards under a microscope this recess is seen to be continuous with the subdorsal recess of the triradiate lumen of the esophagus, so that it should be common to all members of this kind of nematodes. On the other hand the chitinous pads at the anterior end of the false buccal capsule vary somewhat in number and shape according to species. In *C. filiformis, robustus, amadai* and *girellae* there is on each side only one semicircular or semielliptical pad as seen from above, while in *C. himezi* two crescent pads with finely serrate outer margin and continuous from end to end are seen on each side, and in C. *cyprini* there are also two pads on each side, but they are distinctly separated from each other, one being crescent and the other wedge-shaped.

HETEROCHEILIDAE Railliet et Henry, 1915

7. *Contracaecum arii* n. sp. (Pl. II, figs, 16 – 18)

Habitat and locality. Small intestine of *Arius* sp. ; Banjermassin, Borneo.

Material. Three mature males and 6 gravid females, fixed in 70% alcohol and mounted in lactophenol.

Male. Body 34–49×0.65–1.1 mm. Cuticle finely striated transversely. On each side there is a narrow transversely striated cervical ala arising a little posterior to the dorsal groove girdling round the base of each subventral lip. No cervical papillae have been observed. Head 0.17–0.23 mm in diameter at level of lip papillae. Lips 0.16–0.23 mm long, each with a conspicuous groove girdling each side of its base. On each side of the lip is a flat conical cuticular expansion and at the anterolateral corner is a saddle-shaped one, the inner side of which is produced inwards into two conical tooth-like prominences capable of being interlocked with the corresponding prominences of the opposite lip, and covered with thick half-chitinized cuticle. This thickening of the cuticle is continued backwards over the surface of the above-mentioned groove between the lip and the interlabium. In optical section it appears like a cordon arising from the anterior inner conical prominence and running backwards on the inner side of the lateral cuticular expansion to be continued at the base of the groove into the similar structure of the interlabium; pulp with a pair of nodular lobes anteriorly. Interlabia 0.07–0.1 mm long. Nerve ring and excretory pore situated 0.7–0.95 mm and 0.75–0.95 mm respectively from head end. Esophagus 3.9–5.4 mm long by 0.2–0.3 mm broad. Ventriculus 0.13–0.2×0.2–0.3 mm; ventricular appendix much elongated, 2.8–5.0 mm long. Intestinal cecum 3.0–3.9 mm long, reaching to near nerve ring. Tail conical 0.12–0.155 mm long, with its pointed tip covered with rudimentary spines. Spicules slender, alate, equal or subequal, 2.7–3.7 mm long. There are 14–20 pairs of preanal papillae, the first pair lying about 2.6–4 mm from cloacal aperture. On the tail there are two papillae on each side nearer to the cloacal aperture than to the tail tip; they may be separated one from the other, or may be confluent so as to appear a double papilla.

Female. Body 55–65×1.0–1.55 mm. Head 0.21–0.28 mm in diameter. Lips 0.22–0.28 mm long, interlabia 0.09–0.13 mm long. Nerve ring and excretory pore lying 0.73–0.98 mm and 0.8–1.0 mm from head end. Esophagus 5.6–6.9×0.27–0.42 mm. Ventriculus 0.23–0.31×0.32–0.4 mm. Ventricular appendix 4.7–6.3 mm long. Intestinal cecum 4.2–6.3 mm long. Tail stumpy, 0.3–0.5 mm in

length including spike covered with rudimentary spines. Vulva dividing body length in ratio of 1 : 1.5 – 2.2. Eggs subglobular, containing segmenting ova. In lactophenol they measure 54 – 63 μ by 36 – 51 μ, and in water 60 – 84×39 – 54 μ.

This species resembles *Contracaecum trichiuri* Thwaite, 1927, from Ceylon, in the possession of lateral alae, but differs from it in much greater length of the intestinal cecum, ventricular appendix and spicules, and in the smaller number of the preanal papillae.

8. *Contracaecum* sp.

Habitat and locality. Stomach of *Sphyrna zygaena* (Linne); Macassar.

Material. A single female.

Body 26×1.3 mm. Lips well defined, each with two teeth. Nerve ring and cervical papillae situated 0.4 mm and 0.52 mm respectively from head end. Esophagus 1.9 mm long. Ventriculus cylindrical, glandular, 0.78×0.25 mm. Ventricular appendage 2.5 mm long. Tail 0.35 mm long. Vulva 8 mm from head end. Eggs 42×36 μ.

9. *Anisakis* sp.

Habitat and locality. Small intestine of *Leiognathus dussumieri* (Cuv. et Valenc.); Macassar.

Material. A single male.

Body 11.6×0.28 mm. Head 105 μ in diameter at level of papillae; lips 70 μ long. Esophagus 0.924×0.126 mm, muscular anteriorly but glandular posteriorly, constricted off from ventriculus which is glandular and 80 μ long by 110 μ wide. Neither esophageal appendix nor intestinal cecum. Tail 0.14 mm long, conical. There are 17 pairs of preanal and 8 pairs of postanal papillae, the anteriormost papilla 0.58 mm from cloacal aperture. Spicules simple, subequal, right one 0.22 mm long, left one 0.29 mm long.

10. *Porrocaecum* sp.

Habitat and locality. Small intestine of *Arius* sp.; Banjermassin, Borneo.

Material. A single gravid female.

Body tapering anteriorly in esophageal region, ca. 30 mm long by 0.85 mm broad; cuticle very finely striated transversely. Head

end rather blunt-pointed, 0.15 mm in diameter at level of double papillae. Lips comparatively small, each with arcuate rim anteriorly and two small conical teeth internally, whose tips project slightly beyond the lip margin. Excretory pore between bases of two subventral lips. Nerve ring and cervical papillae 0.41 mm and 0.51 mm respectively from head end. Esophagus muscular anteriorly but glandular for the greater posterior part (from nerve ring backward) 2.0×0.18 mm, somewhat enlarged just before leading into ventriculus, not forming bulbous swelling at posterior end. Ventriculus oblong, glandular, only slightly enlarged posteriorly. Intestinal cecum slender digitiform, 1.58 mm long, 0.2 mm broad at base, reaching to a point 1.1 mm from head end. Tail 0.4 mm long, with its tip truncated probably owing to retraction. Vulva 8 mm from anterior extremity, dividing body length in ratio of 1 : 2.75. Eggs subglobular, thin-shelled, measuring 39 – 45 μ by 36 – 39 μ in lactophenol ; contained ovum not segmented.

It seems almost certain that this worm represents a new species of the genus *Porrocaecum*.

LARVAL NEMATODES

Larval nematodes belonging to *Contracaecum*, *Porrocaecum* or *Raphidascaris* were found in the body cavity of various marine fishes. The specific identification of them is unable to make in the absence of experimental evidences. Their measurements are given in the following tables.

11. *Contracaecum* larvae

Hosts	Body	Esophagus	Ventriculus	Ventricular appendage	Intestinal cecum	Tail	Tail spines	Boring tooth
Synagris tasniopterus	7.3	0.73	60 μ	4.4	0.42	0.1	—	+
Saurida gracilis	3.3	0.66	75 × 75 μ	2.9	0.12	0.12	—	+
,, male	3.6 × 0.1	0.43	30 × 33 μ	0.48	0.12	0.135	—	—
,, female	4.9 × 0.18	0.46	80 × 60 μ	0.5	0.18	0.12	—	—

Hosts	Body	Eso-phagus	Ventri-culus	Ventri-cular ap-pendage	Intesti-nal cecum	Tail	Tail spines	Boring tooth
Chorinemus moadetta	5.35 ×0.17	0.63	66×45 μ	0.5	0.15	0.19	+	—
Otolithes sp.	9.8-18.3 ×0.22-0.42	0.7-1.12	0.09-0.1	3.0-4.6	0.12-0.18	0.14-0.24	—	+

12. *Porrocaecum* larvae

Hosts	Body	Eso-phagus	Ventri-culus	Intestinal cecum	Tail	Boring tooth
Lethrinus sp.	6.3-8.7 ×0.22-0.25	0.77-0.98	0.27-0.38	0.51-0.7	0.12-0.14	+
Chorinemus moadetta	7.8	0.86	0.35	0.7	0.155	+
Megalops cyprinoides	8.0	0.84	0.28	0.6	0.15	+
Lutianus sp.	4.0-5.7	0.67-0.73	0.24-0.3	0.49-0.56	0.11-0.13	+

13. *Raphidascaris* larvae

Host	Body	Eso-phagus	Ventri-culus	Ventri-cular ap-pendage	Vulva from head end	Tail	Boring tooth
Decapterus russelli	7-8.6 ×0.25-0.3	0.77-1.08	60-80 μ	0.98-1.32	1.5-1.9	0.22-0.37	—

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Explanation of Plates

Plate I

Fig. 1. Anterior extremity of male of *Procamallanus annulatus*.
Fig. 2. Posterior extremity of male of *Procamallanus annulatus*.
Fig. 3. Anterior extremity of male of *Cucullanus sigani*.
Fig. 4. Posterior extremity of male of *Cucullanus sigani*.
Fig. 5. Anterior extremity of male of *Cucullanus arii*.
Fig. 6. Head of female of *Cucullanus arii*, end-on view.
Fig. 7. Posterior extremity of female of *Cucullanus arii*.
Fig. 8. Posterior extremity of male of *Cucullanus arii*.
Fig. 9. Head of female of *Cucullanus armatus*, end-on view.
Fig. 10. Posterior extremity of female of *Cucullanus armatus*.

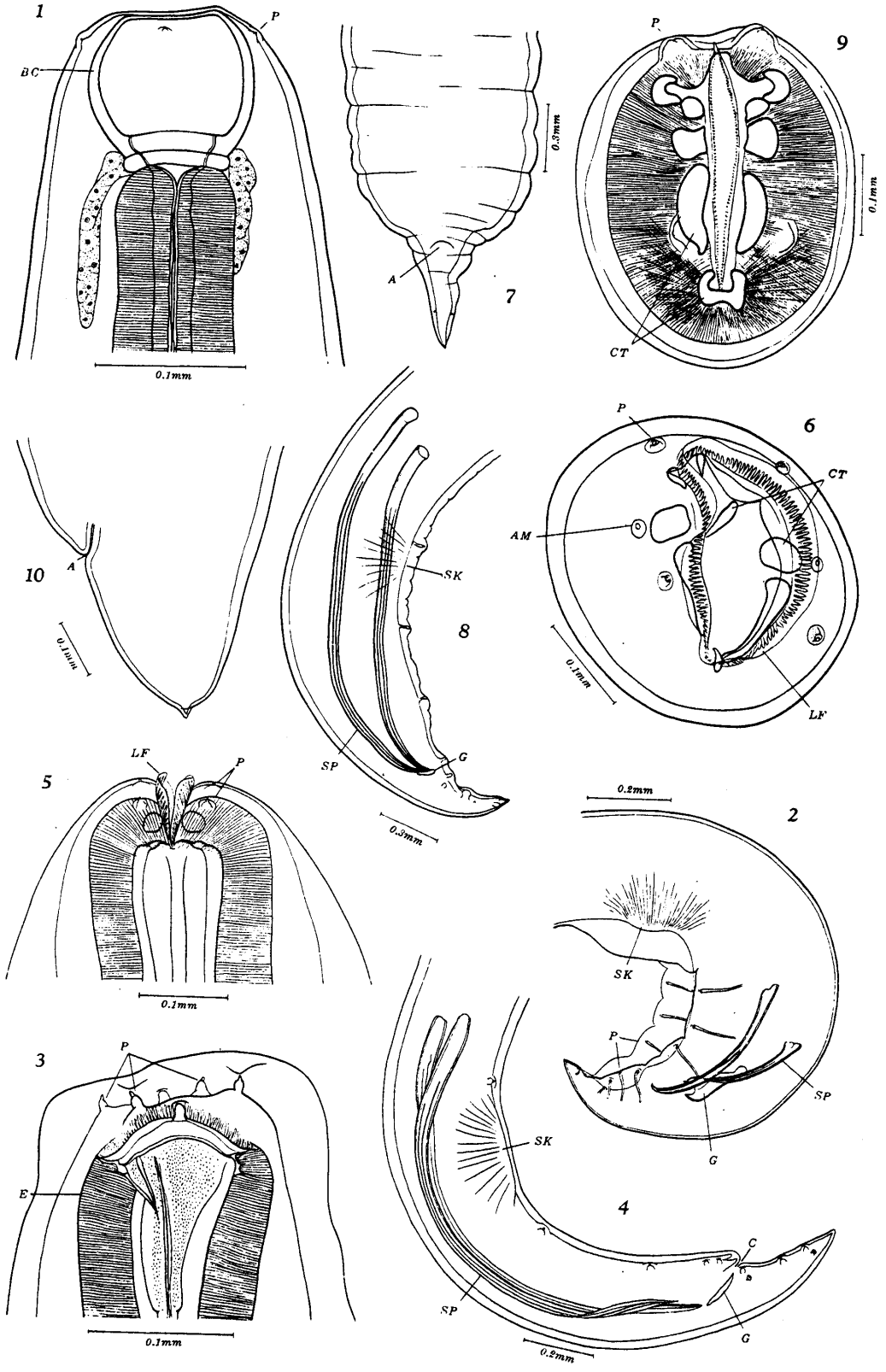
Plate II

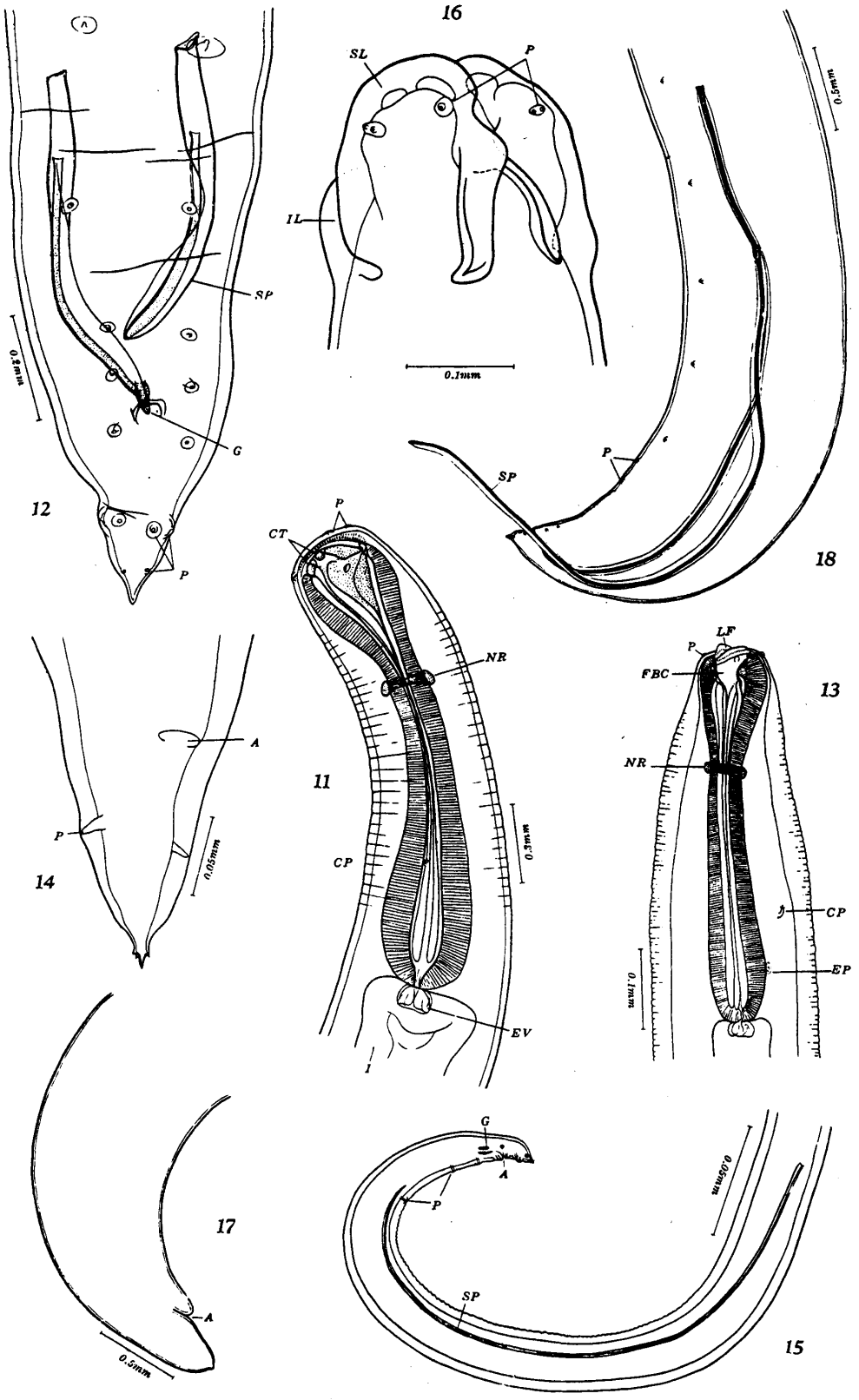
Fig. 11. Anterior extremity of male of *Cucullanus armatus*.
Fig. 12. Posterior extremity of male of *Cucullanus armatus*.
Fig. 13. Anterior extremity of male of *Cucullanus exiguus*.
Fig. 14. Posterior extremity of female of *Cucullanus exiguus*.
Fig. 15. Posterior extremity of male of *Cucullanus exiguus*.
Fig. 16. Anterior extremity of male of *Contracaecum arii*.
Fig: 17. Posterior extremity of female of *Contracaecum arii*.
Fig. 18. Posterior extremity of male of *Contracaecum arii*.

Abbreviations used in Figures

A = anus, AM = amphid, BC = buccal capsule, C = cloacal aperture, CP = cervical papilla, CT = chitinous thickening, E = esophagus, EP = excretory pore, EV = esophageal valve, FBC = false buccal capsule, G = gubernaculum, IL = interlabium, LF = lip flange, SK = sucker, SL = submedian lobe, SP = spicule.

YAMAGUTI : PARASITIC WORMS MAINLY FROM CELEBES—NEMATODES OF FISHES Pl. I




16
SL
P
IL
0.1mm
0.5mm
SP
P
18
12
SP
0.2mm
G
P
P
CT
NR
11
CP
0.3mm
EV
I
LF
P
FBC
13
NR
CP
EP
0.1mm
A
P
14
0.05mm
17
A
0.5mm
G
A
P
SP
0.05mm
15