ANNOTATIONES ZOOLOGICÆ JAPONENSES
VOL. X, ARTICLE 4

Two New Species of Myzostoma.

By

Jûta Hara *Rigakuhakushi*

and

Yaichirô Okada.

With two Text-figures.

Recently we had a good opportunity to study two undoubtedly new species of *Myzostomes*. The one was found encysted in the arm of *Metacrinus rotundus* CARP, *dredged by the "Dôsun Maru" from a 100–150 fathom basin of "inside Yodomi" in the Sagami Sea. The other species inhabits in the subdermal tissue of the disc close to the ambulacral groove of *Antedon macrodiscus* HARA, which occurs abundantly in shallow waters near the Misaki Marine Biological Station, and along the eastern coast of Japan.

1. Myzostoma robustum n. sp.

Text-figure 1.

Two individuals of *Myzostomes*, one measured 6mm. in length and 4.5mm. in breadth, the other 5.2mm. in length and 3mm. in breadth were found singly in two oval cysts 8mm. and 10mm. in diameter, provided one pore at each end and formed on the ventral side of arms of the *Metacrinus rotundus* CARP. The animal lies in the cyst with its mouth near one pore and its cloacal opening near the other. The body exhibits

* McCLENDON[1] describes four new species of *Myzostoma* from *Metacrinus rotundus* CARP, collected from the Suruga and Sagami Sea by the Albatross expedition : *M. clarki* McCLENDON being cysticolate and *M. antennatum* McCLENDON, *M. metacrinii* McCLENDON and *M. Wheeleri* McCLENDON being ectoparasi ic.

1) J. F. McCLENDON :— The Myzostomes of the Albatross expedition to Japan. Bulletin of the American Museum of Natural History 1906, vol. xxii, article vi, pp. 119–130, plates xv-xvii.

much the same appearance as that of robust, encysted forms, its lateral portions being so reflected dorsally that they nearly meet with each other. The median part of the body is much thickened and opaque, but the marginal zone between the suckers and the lateral border is somewhat thinner, being slightly marked off from the rest. The margin of the body is beset irregularly with very short, feeble cirri of variable numbers.

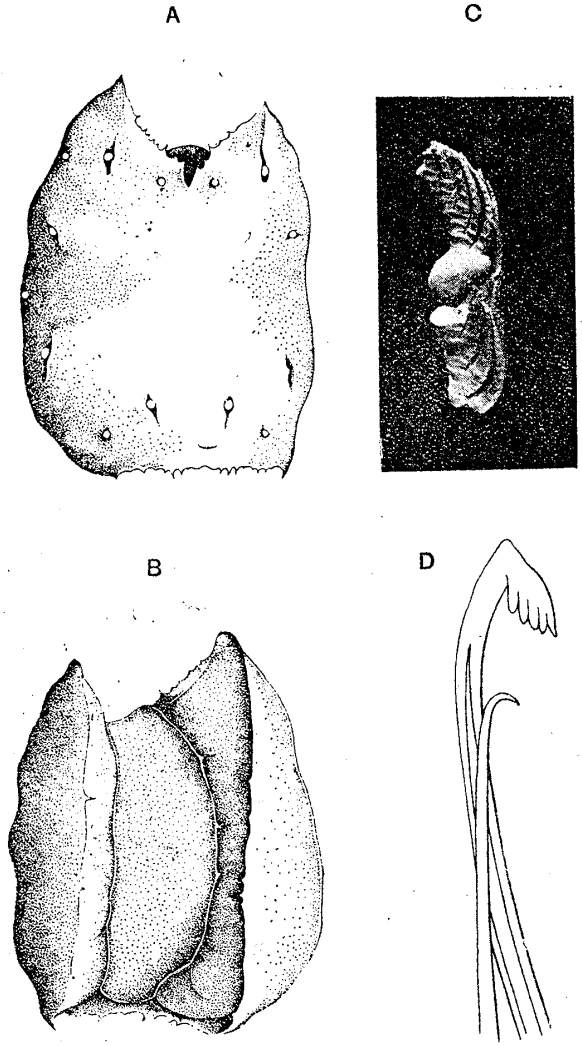

Fig. 1. *Myzostoma robustum* n. sp.
A. ventral view ×4.
B. dorsal view ×4.
C. cyst on the arm of *Metacrinus rotundus* ×2.
D. hook apparatus×150.

Along the two dorsally overlaping edges, a few inconspicuous cirri of various lengths exist. The ventral surface is extremely concave. The median portion is thicker than peripheral parts. Four pairs of parapodia of nearly the same size are disposed half way between the centre and the lateral margins of the body, to be more accurate, a little nearer the latter, they are small, conical warts measuring at their bases 0.6mm. in diameter and lie in shallow furrows. These four furrows are present near the lateral margins of the ventral surface, the first and the fourth ones being

shorter than the others. Each parapodium is provided with a hook (uncinus) and a manubrium. The inequality in length between their stalks is striking. The hook is nearly straight and is furnished with somewhat strongly bent tip, measuring 0.3mm. in length and 0.014mm. in diameter. The manubrium measuring 0.81nm. in length and 0.04mm. in thickness, is a convex plate at the tip of the stalk, with digitiform processes on its free margin. The sucker is much smaller than the parapodia and is situated in the interspaces between two parapodia. It is provided with an irregular stellate mouth. The first pair is situated near the notch of the anterior margin of the animal. The second lies between two parapodia, rather close to the posterior one. The mouth and cloacal orifice are minute; the former is on the dorsal side of the body and in a distinct notch at the anterior end, the latter near the posterior margin of the ventral surface. The pharynx is tolerably well developed, extending posteriorly nearly to the middle of the body. The stomach and its succeeding portion are short and near the anterior and posterior ends give off on each side, two main intestinal ramifications, which are subdivided near their bases and again near their tips. All these diverticula are slightly thick and extend almost to the margin of the body. Sections of the specimens under consideration showed that they are in functionally hermaphrodite phase with reduced male organs. We had great difficulty in detecting the ovaries, because we at first tried to find them at the place where they usually occur in other species, that is dorsal to the main branches of the intestine and near the center of the body. As a matter of fact in this species two deeply staining ovarian cell-masses were found, each attaching to the ventral side of the anterior pair of intestinal main diverticula. In the spacious body cavity numerous eggs are found, the mature ones floating freely in the body cavity, and the immature ones still attached to the walls. The nuclei of the accessory cells are found incorporated in the young oocytes at opposite poles, a cell-boundary between the cytoplasm of the accessory cells and that of the ovum being no longer visible. In structures the ovaries agree in every respect with those of *M. clarki* McClendon. Most of the testi-

cular cells are nearly or quite mature, and small masses of spermatozoa were found in the body cavities. The body cavity is well developed, and is situated all arround of the main gut. The largest compartment of the body cavity extends along the dorsal side of the main gut along the entire length of the body, and the others accompany the intestinal ramifications. The musculature of the body and the parapodium is feebly developed and the mesenchyma of the body is not so abundant as in other hitherto known species. The ventral nerve-ganglion lies in the middle of the body, beneath the stomach, as in other species of *Myzostoma*. It is evident that *Myzostoma clarki* McCLENDON and the present new species are in many respects much more closely related to each other than to any other belonging to the genus. Both species nearly agree in having dorsally curled lateral margins and in the arrangements of the suckers and of parapodia. The present species differs however, from *M. clarki* in the following characters : 1) the lack of a pair of the vestigial cirri at each end of the body, 2) the dorsal surface is not longitudinally wrinkled, 3) two main intestinal diverticula instead of three, 4) the mouth is in a notch at the anterior dorsal end of the body and, 5) the cloacal opening is not in the notch.

2. Myzostoma Ijimai n. sp.

Text-figure 2.

The present species is, as stated before, found in the subdermal tissue of the disc of *Antedon macrodiscus* HARA, close to the ambulacral groove. Generally the infested part of the host slightly swells up into a nodular prominence, in which one or two individuals are found. We examined fourteen specimens of the species ; the largest one measures 10mm., while the smallest 5mm., in diameter. All were fixed either with cold solution of sublimate saturated in sea water or with Flemming's fluid. The species, when fresh is of a dark flesh red tint but some individuals are dark brown or reddish orange in the central part of the body and yellowish in the marginal zone. It has the shape of a concavo-convex lens. The margin

is wavy and slightly bent dorsally. The ventral surface is embossed with peculiar elevations. They may be classified into a) the marginal, b) the central, c) the parapodial and d) the "sucker" elevations. The marginal elevations consist of two lateral ones and of anterior and posterior ones. The lateral ones show a crescent-like outline, provided with five indentations on the inner edge, close to each corner of the parapodial elevations. The anterior elevation is nearly oval in shape, as if two or three elevations were fused together. The posterior one shows likewise an oval form, being much smaller than the anterior. The central elevation is much elongated longitudinally, extending along the mid-ventral line of the body. The parapodial elevations are placed in connection with the inner end of the base of each parapodium. It is reniform in general outline, their concave side facing the base of the parapodium. The "sucker" elevations are found in the area between two adjacent lobes of the lateral marginal elevations. Each elevation has a sucker on its ventral surface. The dorsal surface of the body is slightly concave, and longitudinally corrugated. There are not traces of cirri along the margin. In a

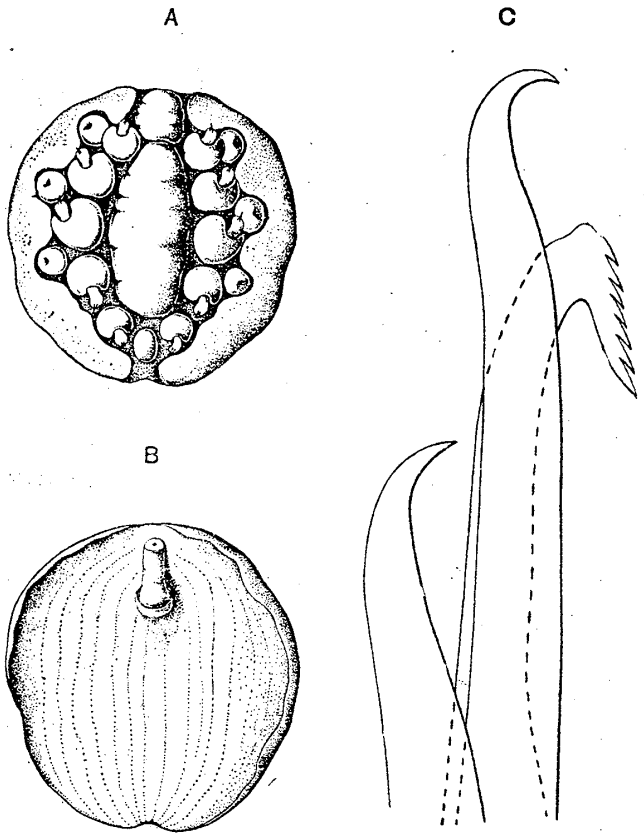

Fig. 2. *Myzostoma ijimai* n. sp.
A. ventral view ×4.
B. dorsal view ×4.
C. hook apparatus ×150.

radiate manner, five pairs of well developed parapodia, measuring 0.75mm. in length and 0.35–0.65mm., in breadth are disposed half way between the central and the lateral marginal elevations, the first and the fifth pairs being somewhat smaller than the others. The third is the largest of all. They are situated close to the reniform parapodial elevation as though they are projected from a small, slightly deep notch of that elevation. The first three parapodia are directed anteriorly or obliquely towards the lateral sides of the body, while the posterior two are pointed posteriorly. Each parapodium carries a couple of chaetae. The hook (0.58 to 0.95mm. in length and 0.07mm. in diameter) is furnished with a somewhat curved tip, making an obtuse angle to the axis of the shaft. The manubrium (1.5mm. in length and 0.12mm. in diameter) terminates in a slightly bent shovel-like plate with six or seven teeth. The toothed part is nearly one-fifth its entire length of the manubrium. The suckers are shallow and are situated at the center of "sucker" elevations. They are placed in a circle, between the insertions of the parapodia and the lateral marginal elevations. Three or sometimes four pairs of suckers are present. The first pair is placed between the first and the second lobes of the lateral elevations, closs to the base of the first pair of parapodia, the second lies between the second and the third lobes of lateral marginal elevations and so forth. The suckers gradually become smaller posteriorly. All the structures, such as parapodia, suckers, cordate elevations and linear median elevations, give the ventral surface of the animal a deeply sculptured or chiseled appearance. The oral orifice is present in the median line of the dorsal surface, near the anterior margin. It opens at the tip of a well-developed pharyngeal tube. The cloacal orifice lies on the ventral surface, just at the base of the posterior marginal elevation near the posterior margin of the body. The pharyngeal tube is tolerably long and bent towards the dorsal surface. There are three main intestinal diverticula branching on each side of the stomach, which are soon subdivided into four slender branches and then ramify several times. Narrow ramifications of the body cavity go along the intestinal diverticula, but they do not extend

to the edge of the body. The animal is hermaphroditic. The two symmetrically disposed testes are found in the parenchyma tissue, ventral to the intestinal ramifications and are at the same stages of development. The penis is a conical papilla and is situated on the ventral side between the third parapodium and the lateral marginal elevation. The ejaculatory duct is narrow, and opens externally at the tip of the penis. The sperm cells in the testicular follicles exhibit all stages of division and metamorphoses into the spermatozoa. A single pair of ovaries is present near the bases of the anterior pair of the intestinal diverticula attaching to the peritoneal epithelium. The eggs of later stages of growth are found from the ovary and float in the body cavity. As in many other cysticolous species, the body of this species is much parenchymatous. The musculature of the body and the parapodia is feebly developed. The slightly curved short nephridia open on either side into the "uterus" by means of indistinct nephrostomes and into the ventral side of the anterior end of the cloaca by means of their nephridiopores. The ventral nerve ganglion lies beneath the stomach and a little posterior to the middle of the body. It is slightly better developed as compared with the former species.

Zoolog. Inst., Sci. Coll., Tokyo Imp. Univ.

May 1, 1921.