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ASCIDIANS FROM THE SEA OF OKHOTSK COLLECTED BY R. V. "NOVOULYANOVSK"

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ABSTRACT

The ascidians (Tunicata, Ascidiacea) collected by R. V. "Novoulyanovsk" in the Sea of Okhotsk at depths from 90 to 1500 m were examined. Five species were found of which three are new to science: *Culeolus nadejdi, Cnemidocarpa ochotense* and *Styela maculata.*

Key words: Ascidians, Sea of Okhotsk, new species.

INTRODUCTION

A small collection of ascidians collected by R. V. "Novoulyanovsk" in 1984 in the Sea of Okhotsk contains about 20 specimens from 90 to 1500 m depth belonging to 5 species. Three species are new to science and one is recorded for the first time from the Sea of Okhotsk. All specimens, including the holotypes are deposited in the Zoological Institute (ZIN), St. Petersburg.

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FAMILY DIDEMNIDAE

Didemnum albidum (Verrill, 1871)

For synonymy see Van Name (1945), Romanov (1989) and Nishikawa (1990).

Material examined. "Novoulyanovsk", 15.9.1984. The Sea of Okhotsk, 90 m, 1 colony; 140 m, 1 colony. Without additional information.

Remarks: The specimens agree quite well with the description by Van Name (1945). The distribution of this species is given by Van Name (1945), see also Nishikawa (1990).

FAMILY PYURIDAE

Bathypera ovoida (Ritter, 1907)

Halomolgula ovoida Ritter, 1907: 3.
Bathypera ovoida: Van Name, 1945: 369 (synonymy); Nishikawa, 1981: 187.

Material examined: "Novoulyanovsk", 20.10.1984. The Sea of Okhotsk, 55°00'N, 150°00'E, 300 m, mud, Hyalospongia g. sp., 5 specimens.

Remarks: The present specimens, found in the central part of the Sea of Okhotsk, conform well with the previous descriptions.

Bathypera ovoida is recorded from Southern California (Ritter 1907) and Sagami Bay, Japan (Nishikawa 1981). Ten specimens, probably of the same species, were collected in the Saanich Inlet, Vancouver Island by Goodbody (Millar & Goodbody 1974).

Culeolus nadejdi n.sp.
Fig. 1

Material examined: "Novoulyanovsk", 24.6.1984. The Sea of Okhotsk, 50°00'N, 149°45'E, 1050-1040 m, sand, stones, Hyalospongia g.sp. Coll. Grebelny, 3 specimens (holotype ZIN 2690, paratypes ZIN 2691).

Etymology: Nadejda is a Russian girl's name.

Description: The body is ovoid or irregularly conical; the holotype is about 7 cm in length, the paratypes are smaller. The stalk is about 40 cm in length and 2-2.5 mm in diameter. The test is relatively thick but soft, nearly transparent, light gray. The surface is smooth, without folds or wrinkles, but with numerous dark, nearly black prominent papillae which are especially dense on the posterior end of the body. There is a distinct ridge of these papillae on the ventral side of the body, and an oblique line of more prominent papillae around it's anterior end at the level of the atrial aperture. The apertures have smooth margins.

All internal organs are distinctly seen through the thin and translucent body wall. Muscles are represented by a large number of strong circular fibres densely arranged around the apertures and numerous longitudinal bundles branched near the endostyle.

There are 14 large, compound, flattened oral tentacles. The dorsal tubercle is an oval cushion with a C-shaped opening and with inturned spiral horns. The dorsal lamina is represented by a series of large languets. The branchial sac has 6 folds on each side. The arrangement of longitudinal branchial bars are:
R:D2(9)5(7)4(10)5(7)5(5)4(5)4V, L:D2(7)4(8)4(8)5(6)3(5)3(5)3V.

The oesophagus is long and curved at a right angle. Along both sides of the thin-walled stomach occur serially arranged, strongly branched hepatic divertic-

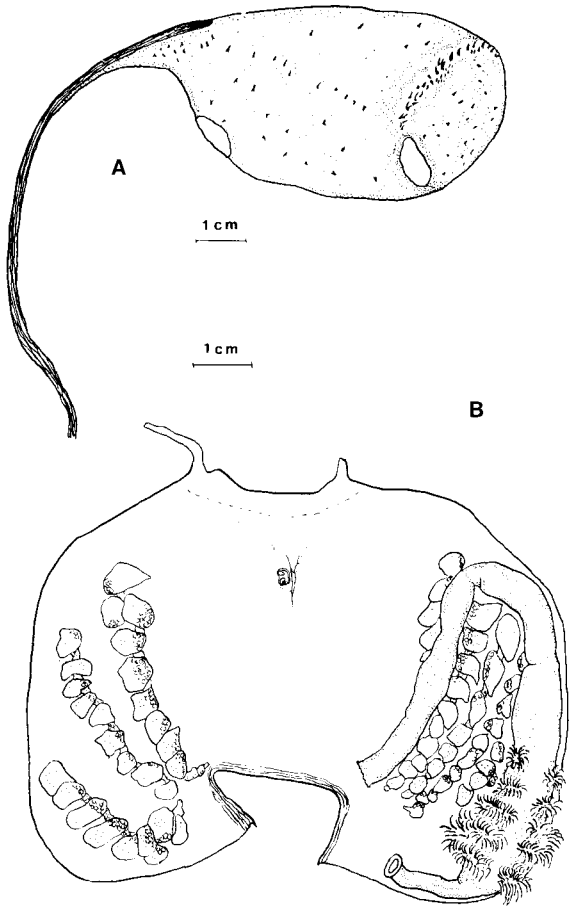

Fig. 1. *Culeolus nadejdi* n.sp. (Holotype). A: external appearance; B: inner body wall.

ula. The gut forms a simple open loop. The rectum is straight with a simple anus. Three gonads occur on the right and 2 to 5 on the left side, the latter within the gut loop. Each gonad consists of a tubular ovary and a series of large lobes. Each lobe contains ova in its lower part and testicular follicles in the upper. The number of lobes is:

holotype: 7,8,9 in the left, 4,11,10,8,8 in the right;
paratypes: 13,12,7 in the left, 13,12,9 in the right,
14,8,9 in the left, 12,7 in the right.

No spicules were found in any of the tissues.

Remarks: Culeolus nadejdi resembles *C. tenuis* Vinogradova, 1970 internally, though externally they are unlike. *C. tenuis* was described from the Kurilian-Kamchatka trench, from a depth of 5027-6282 m; it has 3 gonads on each side, but they contain fewer lobes: 3,5,4 on the right and 4,4,1 on the left. The main difference separating the two species is the complete absence of spicules in the internal or-

gans in *C. nadejdi* whereas in *C. tenuis* they are very numerous, especially in the hepatic diverticula and in the gonad wall.

A single symbiotic nemertean was found in the peribranchial cavity of each of the examined specimens, one in each *Culeolus*. I am sure that the strange additional ovary described for *C. sluiteri* Ritter (Ritter 1913) is also a symbiotic nemertean worm. *C. sluiteri* closely resembles the new species externally, but differs distinctly in having only 5 branchial folds and in the absence of concentration of muscle fibres around the orifices.

Except for the described species, only *C. murrayi* Herdman is known from the Sea of Okhotsk. It was described by Redikorzev (1941) from a single specimen as *C. uschakovi,* but later transferred to *C. murrayi* by Vinogradova (1970).

FAMILY STYELIDAE

Cnemidocarpa ochotense n.sp.
Fig. 2

Material examined: "Novoulyanovsk", 24.10.1984. The Sea of Okhotsk, 54°00'N, 149°55'E, 800 m, 1 specimen (holotype ZIN 2687). Without additional information.

Description: The body of the holotype is 3 cm in width and 4 cm in height. It is attached by its posterior end to a Hyalospongia. The surface is light brownish, free from encrusting matter, with small wrinkles, without hairs. The test is tough but relatively thin. Both apertures on the upper side of the body are 4-lobed and sessile, wide apart from each other.

The body wall is thin but muscular. There are 25 simple oral tentacles of various sizes. The dorsal tubercle has a U-shaped opening. The dorsal lamina is long, smooth-edged in the anterior part, otherwise with a distinctly dentated margin. There are 4 well developed branchial folds on each side of the body. The arrangement of the longitudinal branchial bars on the left side is: D(20)9(19)8(20)10 (13)14V. There are about 6 stigmata per mesh; parastigmatic vessels are present. The oesophagus is short and slightly curved; the stomach barrel-shaped, with 24 distinct, unbroken folds. The gut forms a simple, closed loop, slightly curved dorsally at the posterior end. The anal margin is divided into small lobes. There are one gonad on the left, two on the right side; each consists of a long undulating tubular ovary accompanied by groups of male follicles along each side. The gonads are only slightly attached to the body wall by a relatively high membrane, testicular follicles without contact with the body wall. Male and female parts are enclosed in a common sheathing membrane.

Remarks: The species is characterized by the dentate dorsal lamina, and the number and structure of the gonads, and cannot be identified with any described

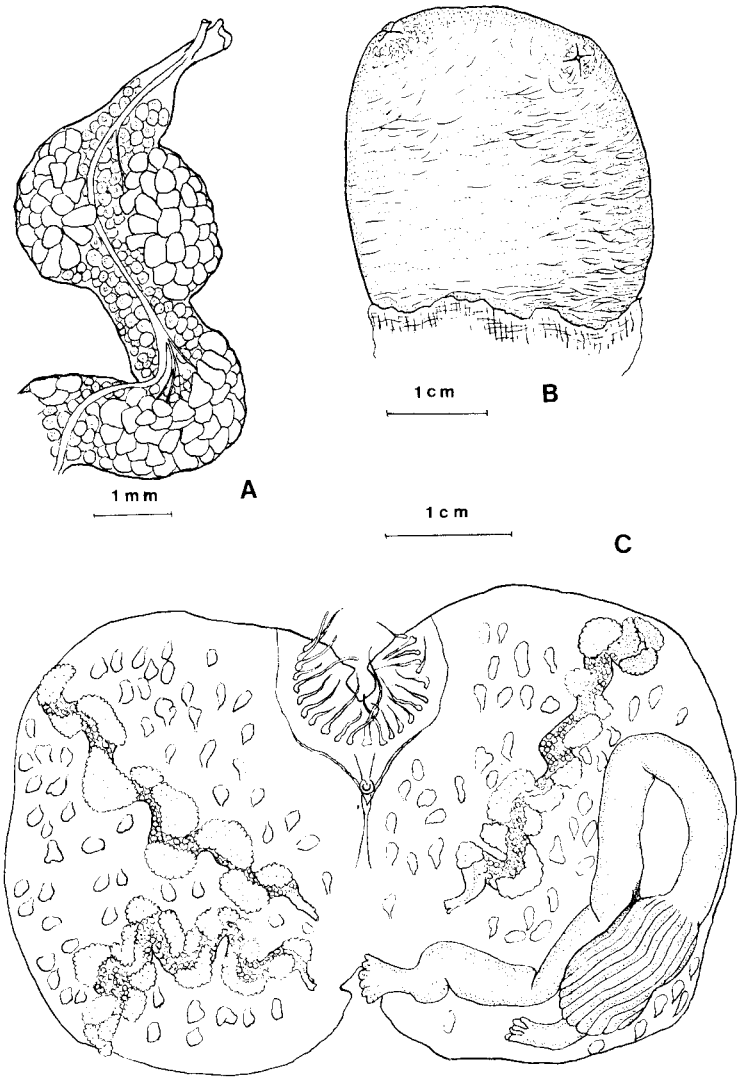

Fig. 2. *Cnemidocarpa ochotense* n.sp. (Holotype). A: gonad; B: external appearance; C: inner body wall.

Cnemidocarpa or *Styela* species. Some resemblance can be found with *C. bythia* (Hartmeyer) which also has a toothed dorsal lamina; But the latter species is much smaller and has only one gonad on each side. The gonads of *C. bythia* look externally as the gonads of *C. ochotense* (see Millar 1959, fig. 5D) but have another structure. The gonads of *C. ochotense* are similar to those of some *Styela* species which may have testicular follicles in contact with the ovary. Nevertheless, gonads of *C. ochotense* are attached to the body wall by a high membrane and the testicular

follicles and ovary are enclosed within a common membrane. Both features are characteristic for *Cnemidocarpa* and not for *Styela.*

Styela maculata n.sp.
Fig. 3

Material examined: "Novoulyanovsk", 13.10.1984. The Sea of Okhotsk, 52°42'N, 146°04'E, 1500 m, 9 specimens (holotype ZIN 2688, paratypes ZIN 2689). Without additional information.

Description: The holotype is 19 mm high and 16 mm wide, the other specimens are about the same size. Both apertures at the upper side of the body are sessile but distinct, 4-lobed, marked by thin wrinkles. The surface is quite clean except for the basal part of the body which is covered by remains of Hyalospongia. All specimens were found embedded in Hyalospongia, sometimes completely, except the aperture area. Test thin but tough, light gray, with large dark, nearly black areas.

The body wall is extremely thin and delicate, nearly transparent. There are 30-35 large and about 10 small simple oral tentacles. The tubercle has a straight or U-shaped opening. The dorsal lamina is long and high, with a smooth margin. Branchial sac with four well developed branchial folds on each side. The arrangement of the longitudinal bars on the right side of the holotype is: D4(16)7(17)7 (17)9(12)6V. There are up to 7-8 stigmata per mesh between the folds, generally 4-7; the meshes between the last fold and the endostyle contain up to 9 stigmata. There are thin parastigmatic vessels. The oesophagus is short and the stomach is elongate with a distinct enlargement in its anterior part. There are about 24 clearly visible ridges and a small straight pyloric caecum. The gut is S-shaped. The rectum is straight, ending in a triangular anus under the atrial opening. There is one gonad on each side of the body. The ovary is long and narrow, the left one is straight, immature, the right one sinuously curved. Numerous small testicular follicles are located around the distal part of each ovary.

Remarks: The body shape and internal structure closely resemble those of *Styela milleri* Ritter, 1907 from the deep waters of the Pacific coasts of North and South America (from California to Peru) and especially *S. gracilocarpa* Millar, 1982, from New Zealand. *Styela maculata* differs from *S. milleri* with far fewer internal longitudinal branchial bars.

Styela maculata has more stigmata per mesh and more oral tentacles than *S. gracilocarpa.* The stomach of *S. gracilocarpa* is spindle-shaped and lacks the anterior enlargement characteristic of *S. maculata.*

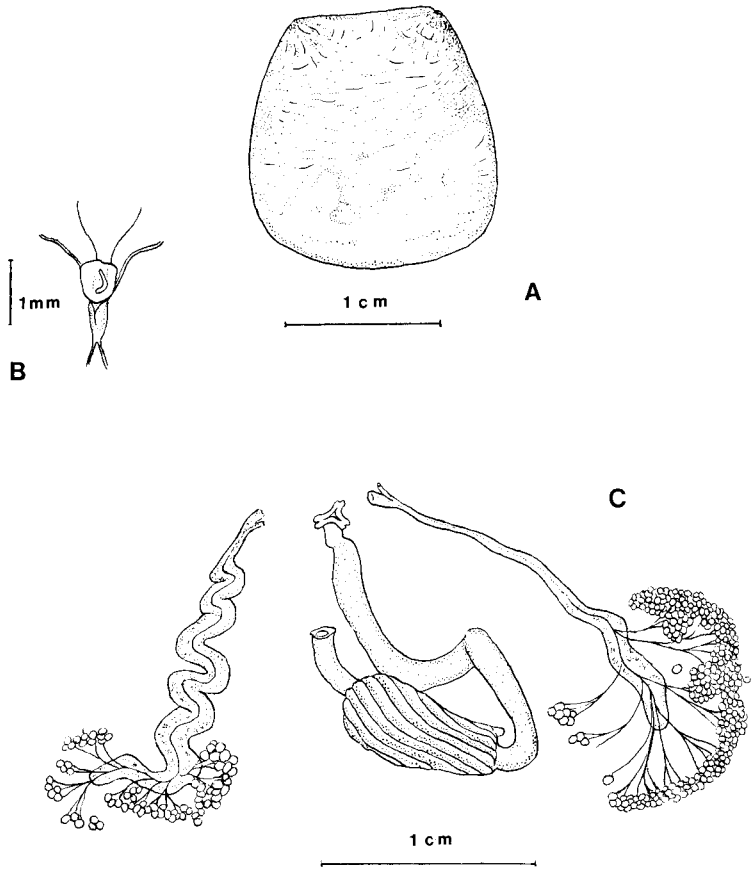

Fig. 3. *Styela maculata* n.sp. (Holotype). A: external appearance; B: dorsal tubercle and neural ganglion; C: gut and gonads.

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