

## Some deep-water ascidians from the NW Pacific (Tunicata: Ascidiacea)

K.E. Sanamyan & N.P. Sanamyan

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Five deep water ascidians are found in the material from the Commander Islands and East Kamchatka (NW Pacific), four of them are reported for the region for the first time. One new species is described: *Adagnesia pacifica* sp. n.

K.E. Sanamyan, N.P. Sanamyan, Kamchatka Institute of Ecology and Environment, Partizanskaya 6, Petropavlovsk-Kamchatsky 683000, Russia.

### Introduction

The present study is based on samples collected by RV "Akademik Keldish" from the waters around the Commander (Komandorskie) Islands (Institute of Oceanology, Moscow) and FV "Gefest" from East Kamchatka (Kamchatka Institute of Ecology and Environment, Petropavlovsk-Kamchatsky, KIE).

### *Adagnesia pacifica* sp. n.

(Fig. 1)

*Holotype* (KIE 916/1), "Keldish", st. 2316, 55° 36.8' N - 167° 23.04' E, 55° 35.0' N - 167° 24.4' E, 5-6. VIII.1990, 4294-4200 m.

*Paratypes* (KIE 916/2): same data, about 50 specimens.

*Description.* Specimens 3-10 mm in diameter, strongly contracted. Body ovoid, usually flat-topped, sometimes gradually tapering posteriorly, or of rather irregular shape. Test soft but firm, colourless, smooth and translucent, nearly free from foreign matter, except only attachment area, where sparse remains of sponge spicules and mud particles occur. Fine and sparse hair-like processes confined to posterior part of body. Both apertures sessile, on upper surface of body.

Circular muscles significantly better developed on atrial siphon than on branchial siphon. On each side of body there are 5-7 thick muscles radiating from atrial siphon and 7-10 muscles radiating from branchial siphon. They extend over half or more of the body width and terminate abruptly at approximately the same level. In some speci-

mens radial muscles discontinuous (Fig. 1C). Short, thick transverse muscles form a band along the dorsal and ventral mid-lines, but are absent between siphons.

About 50 thin and long tentacles arranged in 3 cycles. Inner cycle surrounded by high velum. Prebranchial area wide; peripharyngeal groove far from tentacles and from branchial sac; dorsal V shallow and inconspicuous. Dorsal tubercle small, with a simple opening. Very large elongated ganglion just behind the tubercle, attaining 0.8 mm in length in a 5 mm specimen. Neural gland situated along right side of ganglion.

Dorsal lamina subdivided into about 10 triangular languets. Spiral stigmata, each coiling 1-1.5 or, rarely, 2 times, are arranged in 9-12 single rows alternating with transverse vessels. There are 10-12 stigmata in each row and about the same number of bifid papillae arising on transverse vessels. Radial parastigmatic vessels often incomplete.

The gut occupies relatively small part of body. The gonad forms a compact mass in the gut loop, its detailed structure is hard to determine. Gonoduct extending parallel to rectum.

*Remarks.* The present species differs from the related *A. bifida* Millar, 1970 (from the West Pacific) and *A. charcoti* Monniot & Monniot, 1973 (from Atlantic and Indian Ocean) in having a band of short transverse muscles along the dorsal and ventral sides.

In *A. charcoti*, branchial papillae are more numerous than branchial spiral figures, and this species has a deep dorsal V.

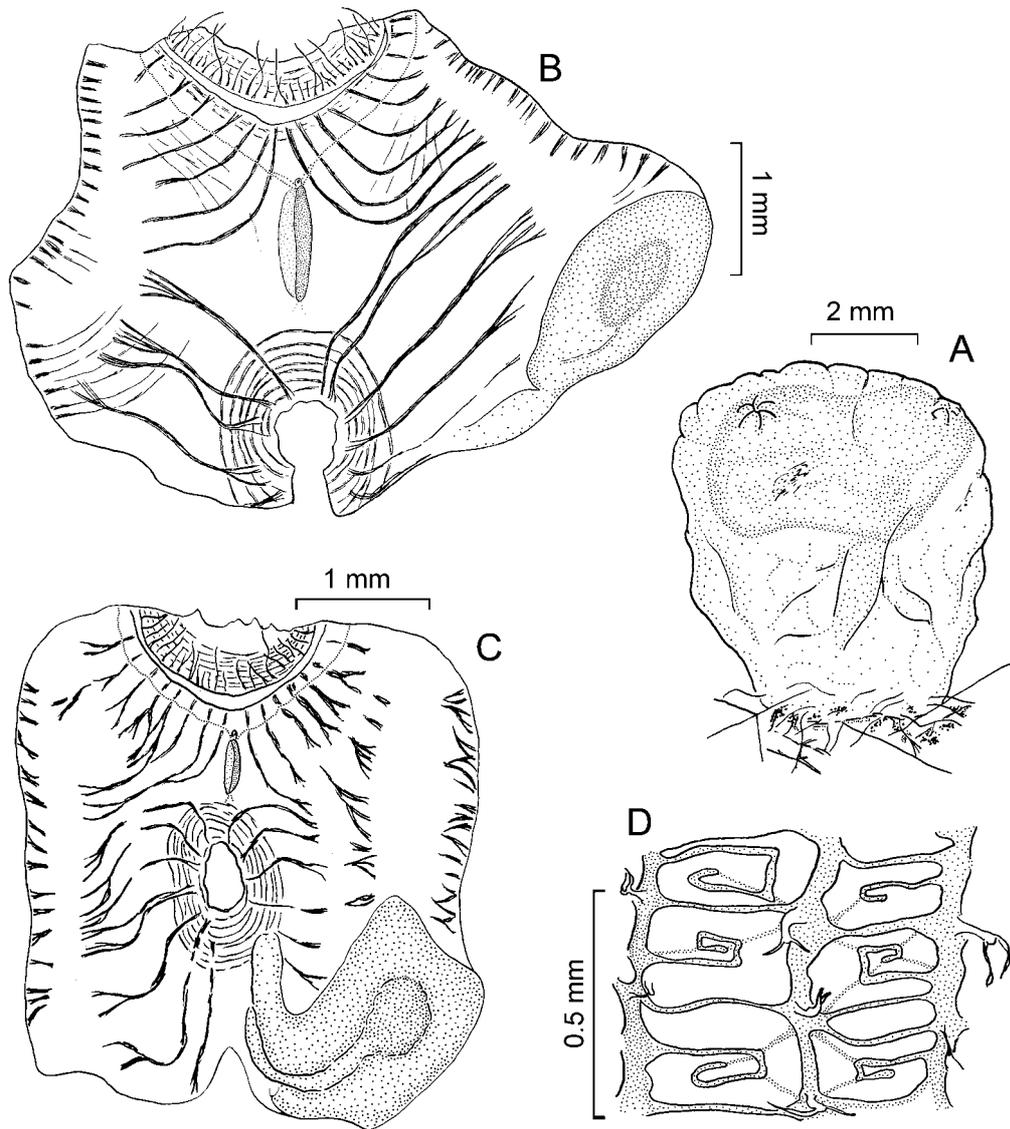


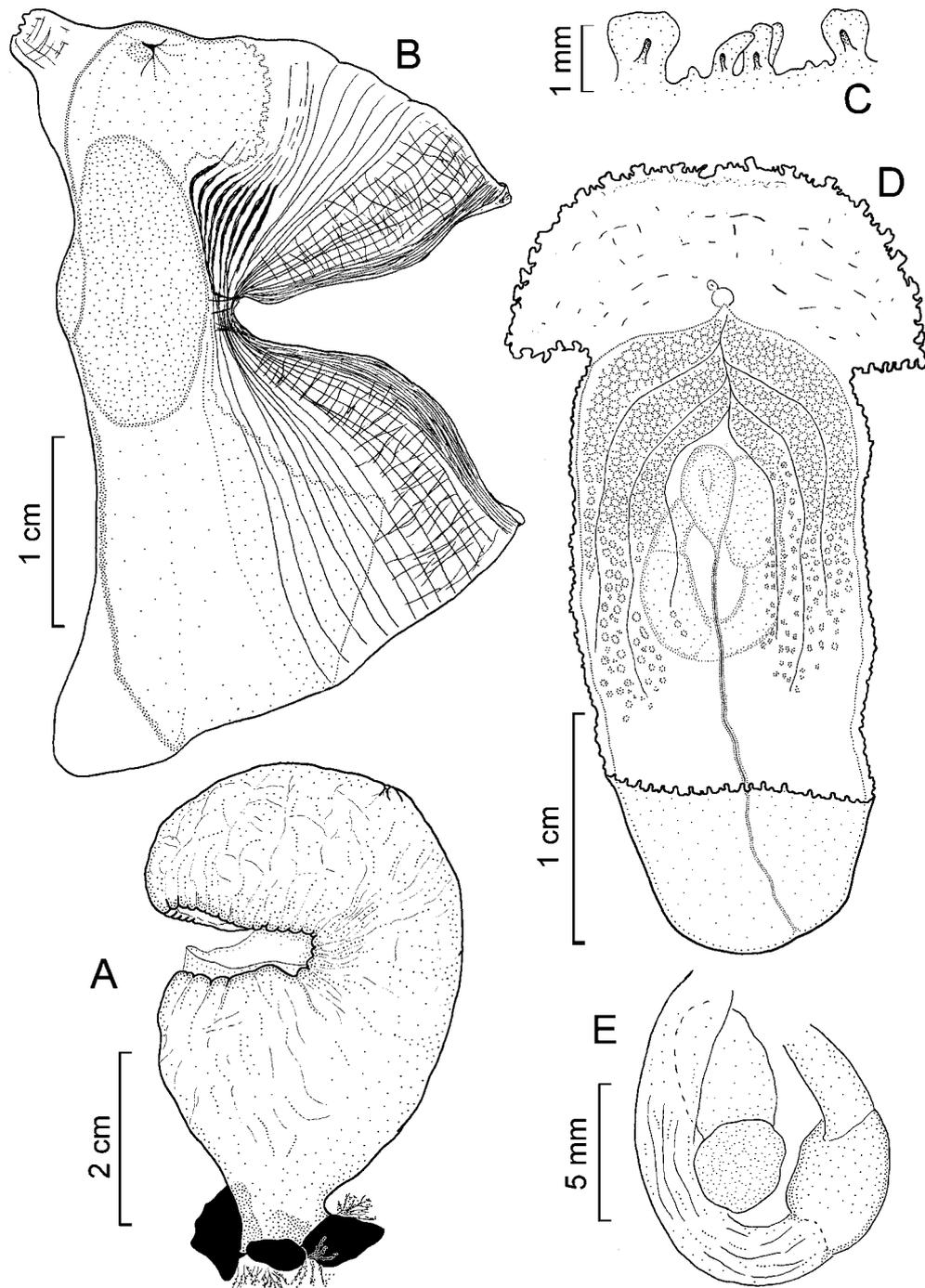
Fig. 1. *Adagnesia pacifica* sp. n. A, external appearance; B-C, body muscles of two specimens; D, part of the branchial sac.

*A. bifida* resembles the new species in having apparently the same number of branchial papillae and spirals in a row, but differs in the shape of the stigmata and body muscles. In *A. bifida*, the radial muscles are limited mainly by the intersiphonal area, and this species lacks transverse muscles along ventral and dorsal side of the body.

***Situla galeata* Monniot & Monniot, 1991**  
(Fig. 2)

*Situla galeata* Monniot & Monniot, 1991: 391.

*Material examined.* "Keldish", st. 2303, 54° 57.3' N - 165° 48.1' E, 54° 59.2' N - 165° 51.7' E, 28-29. VII. 1990, 4891-2926 m, single specimen in excellent condition collected by research submersible "Mir 1".



**Fig. 2.** *Situla galeata*. **A**, external appearance; **B**, body removed from the tunic; **C**, tentacles; **D**, branchial sac; **E**, intestine.

*Description.* Living specimens, observed from the submersible, elongated, attached to hard substratum by distinct peduncle. Body set at an angle with the peduncle and lies nearly horizontally; widely opened branchial aperture directed upwards.

Fixed specimen 6 cm in height, ovoid, gradually tapering to the short peduncle attached to small stones. Tunic soft, colourless, nearly smooth, with only fine sparse wrinkles and free from any kind of outgrowths and foreign matter, except only few hair-like processes on attachment area at the base of peduncle. Branchial aperture a deep transverse slit at middle part of body. Atrial aperture situated on short, inconspicuous and slightly displaced dorsally siphon. Margin of atrial siphon with indistinct lobes.

Body removed from the tunic nearly triangular in outline. Two large branchial lips completely cover branchial sac. Thin circular muscle fibers crowded around the margin of each lip; they are regularly spaced and less crowded behind the margin. There is a bunch of about 10 thick short muscle fibers on dorsal lip, just above its corner (Fig. 2 B). Radial muscles situated only on marginal area of lips, short, thin and anastomosing. Fine circular and radial muscles on atrial siphon.

Oral tentacles leaf-like, dorsally placed along wide semicircular line and far from the branchial sac, laterally placed close to the branchial sac, and ventrally placed on free upper rim of usual for *Situla* deep ventral "pocket". Tentacular line with distinct inflexion at the level of upper rim of perforated zone of the branchial sac (Fig. 2 D). Dorsal tentacles up to 1 mm long, lateral ones much smaller. Each tentacle with small finger-like offshoot (Fig. 2 C). Minute sensory papillae distributed between tentacles and peripharyngeal groove.

Small dorsal tubercle placed close to large spherical neural gland and triangular ganglion. Peripharyngeal groove forms plain oval line close to branchial sac. Branchial sac fiat, its dorsal part somewhat protruded to the atrial siphon. Perforations 0.2-0.4 mm in diameter, forming an interrupted ventrally ring around visceral mass and crowded dorsally, but becoming sparse and smaller below the level of oesophagus opening. There is a wide unperforated area in whole ventral portion of branchial sac. Endostyle long.

Gut forms a simple closed loop. Stomach small. Gonad in two compact masses in gut loop.

*Remarks.* Eight species belonging to the genus *Situla* are known, and six of them have been recorded only once.

The present specimen conforms with the original description of *S. galeata* in many features, including the general shape of the body, form of branchial sac, tentacular line, peripharyngeal band, body muscles and presence of finger-like offshoots (or ampullae) on tentacles. The only other species with ampullae on tentacles is *S. rineharti* Monniot & Monniot, 1989; it differs from *S. galeata* in many features, particularly in having long peritubercular area and different branchial sac (Monniot & Monniot, 1989).

Only *S. pelliculosa* Vinogradova, 1969, from Kurile-Kamchatka trench, was known previously from the North Pacific. It has a flat branchial sac, oval tentacular ring without lateral inflexions and branchial perforations in full ring around visceral mass, while in the present specimen this ring is interrupted ventrally. *S. pelliculosa* has no ampullae on the tentacles (Vinogradova, 1969, Fig. 3).

***Ascidia clementea* Ritter, 1907**  
(Fig. 3)

*Ascidia clementea* Ritter, 1907: 32; Monniot & Monniot, 1989: 22.

*Material examined.* "Keldish", st. 2316, 55° 36.8' N - 167° 23.04' E, 55° 35.0' N - 167° 24.4' E, 6.VIII.1990, 4294-4200 m, 4 specimens.

*Description.* Specimens 2.5-6 cm in height. Tunic soft, translucent, colourless, in two specimens covered sparsely with small conical papillae, up to 0.4 mm long and 0.3 mm in largest diameter, in other specimens papillae not detected.

Branchial siphon terminal; atrial siphon situated in middle of body; both siphons obscurely lobed. Body muscles form anastomosing network on right side of body with distinct dorsal and ventral bands of transverse parallel fibers. Most of the left side of body devoid of muscles.

About 50 long tentacles of at least 3 sizes. Peripharyngeal groove makes a shallow dorsal V. Dorsal tubercle small, with transverse slit-like opening. Longitudinal branchial vessels with intermediate papillae; about 70 vessels on the right and 55 on the left side of body. Stigmata wide and long, 3-5 stigmata per mesh. Gut forms simple open loop in posterior half of body. Stomach distinctly demarcated from oesophagus and intestine;

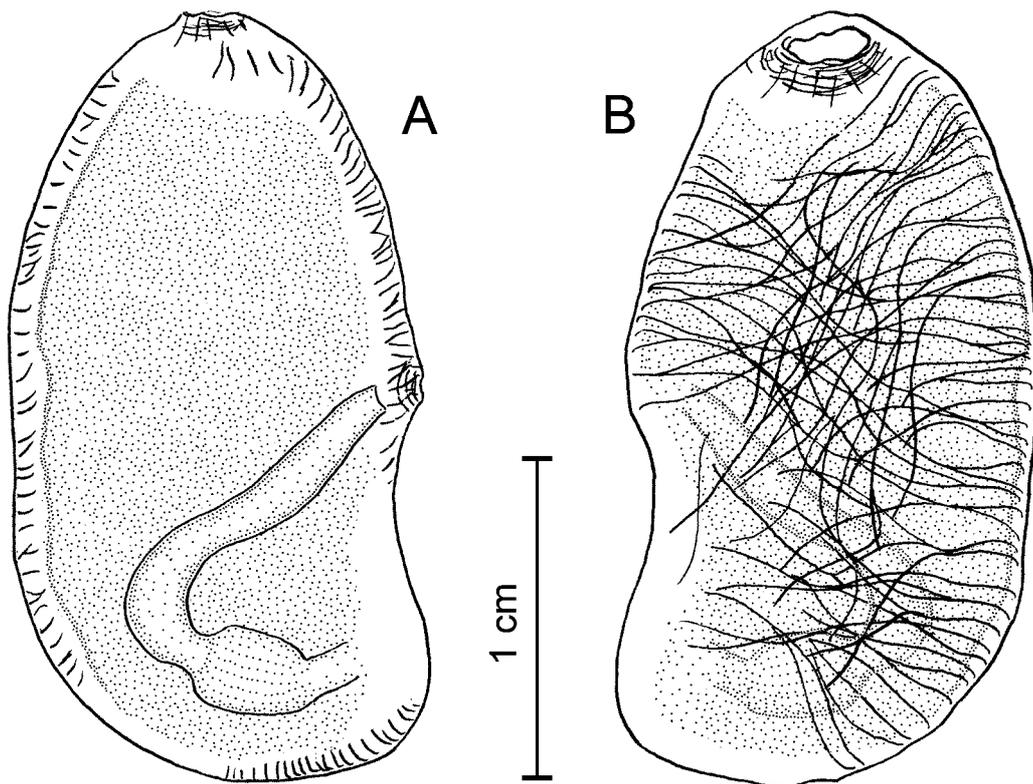


Fig. 3. *Ascidia clementea*. Body removed from the tunic from left (A) and right (B) side.

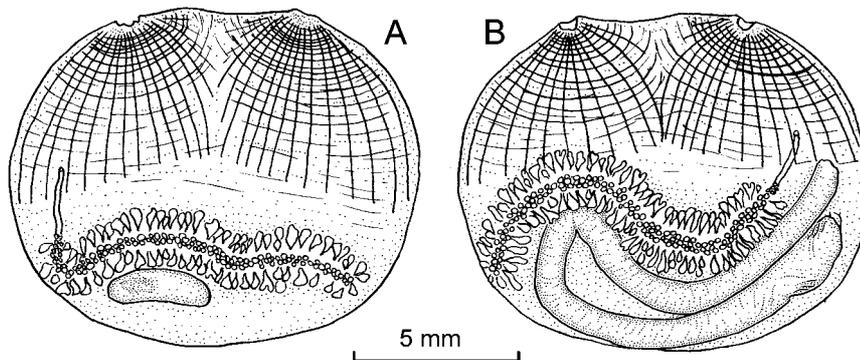


Fig. 4. *Molgula regularis*. Body removed from the tunic from left (A) and right (B) side.

its wall with indistinct longitudinal plications. Gonads not developed.

*Remarks.* This is the most northern and deep water record of the species, previously it was recorded only from California (San Clemente and San Nicolas Islands, 1190-2000 m) and Galapagos Islands (Isabella Island, 335 m).

The present specimens have about 50 tentacles instead of 75 indicated in the original description. The presence of tunic papillae, first mentioned by Monniot & Monniot (1989), is confirmed here. Other characters are in agreement with two previous descriptions of the species.

#### **Molgula regularis** Ritter, 1907

(Fig. 4)

*Molgula regularis* Ritter, 1907: 8; Van Name, 1945: 415.

*Material examined:* "Gefest", 52° 47.6' N - 158° 52.4' E, 52° 48.7' N - 158° 46.5' E, 19.VI.1994, 300-500 m, 2 specimens; 58° 17.1' N - 163° 57.0' E, 58° 13.6' N - 163° 58.3' E, 5.VII. 1994, 280-720 m, 1 specimen.

*Remarks.* The present specimens conform well with the original description of *M. regularis*, but have about 20 tentacles (instead of 10 indicated in the original description) and better developed gonads (Fig. 4). Longitudinal branchial vessels on the right side arranged as follows: E0(8)1(10)1(10)2(12)2(11)2(12)OD.

The species was previously recorded from California. *M. cooperi* (Huntsman, 1912), from British Columbia, is probably conspecific with *M. regularis*, but examination of more specimens is necessary to confirm this.

#### **Culeolus tenuis** Vinogradova, 1970

*Material examined.* "Keldish", st. 2295, 54° 57.3' N 165° 44.3' E, 54° 58.5' N 165° 44.0' E, 25-26.VII. 1990, 6074-5300 m, single specimen collected by research submersible "Mir 1".

*Description.* The specimen conforms well with the original description, but is much larger, body being 10 cm in height and stalk about 40 cm. It has two gonads on the right and three on the left side of the body. Two of the left gonads are above gut loop and one in the gut loop. There are 3 and 4 large lobes on right gonads and 4 lobes on each of the left gonads. Spicules abundant, especially in the hepatic diverticulae and heart wall. Branchial sac with 6 folds on each side, arrangement of longitudinal vessels on the

left side of branchial sac is as follows: D2(12)6(10)5(9)7(12)5(7)6(6)9E.

*Remarks.* *C. tenuis* was originally recorded from Kurile-Kamchatka trench from 5027-6282 m (Vinogradova, 1970). The present specimen comes from about the same depth and, despite its larger size, has about the same number of gonads and lobes on each gonad. *C. tenuis* was regarded as probably conspecific with *C. sluiteri* Ritter, 1913 (Monniot & Monniot, 1991, p. 421), the latter species, however, has only 5 branchial folds on each side of the body. *C. nadejdae* Sanamyan, 1992 is another closely related species recorded from the Sea of Okhotsk, from 1050-1040 m. It has more lobes on each gonad and lacks spicules.

A single small specimen of another species of *Culeolus* was found on st. 2306 (54° 57.1' N, 165° 49.9' E, 4401-3797 m). It has the body 10 mm long, one gonad on each side of the body, right gonad composed of 4 and left of 3 lobes. The specimen is too damaged to provide taxonomic description.

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