

# ASCIDIANS FROM THE NORTH-WESTERN PACIFIC REGION. 1. POLYCITORIDAE

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## ABSTRACT

The ascidians (Asciacea) collected by several expeditions in the N.W. Pacific region were examined. Eight species of the family Polycitoridae were found of which three are new to science: *Eudistoma kurilense*, *Distaplia rzhavskii* and *Distaplia alaidi*.

*Key words:* North-Western Pacific, new species, Polycitoridae.

## INTRODUCTION

Ascidians of the family Polycitoridae are not abundant in the N.W. Pacific region. Few species, represented mainly by one or two colonies were found in the relatively rich material collected by several expeditions from Aleutian and Commander Islands, Bering Sea, Kamchatka, Sea of Okhotsk, Kurile Islands and Sea of Japan.

The following material was examined:

(A) R. V. "Lebed", 1954. North Kurile Islands (mainly Paramushir and Shumshu). Dredging. Coll. A. Spirina.

(B) R. V. "Ac. Oparin", 1986. Sea of Okhotsk and Kurile Islands. Dredging. Coll. A. Smirnov.

(C) R. V. "Ac. Oparin", 1988. Kurile Islands and Sea of Okhotsk. Dredging. Coll. E. N. Gruzov.

(D) R. V. "Ac. Oparin", 1991. Alaska, Aleutian, Commander and Kurile Islands, East Kamchatka. Dredging and SCUBA diving. Coll. A. Smirnov.

(E) Collection of the Far East State Sea Reservation (FESSR) from the Sea of Japan. 1980-1991. SCUBA diving. The collection was kindly placed at my disposal by the director of FESSR Dr. A. Osolinsh.

(F) Collection of the Kamchatka Institute of the Ecology and Environment (KIEE). 1984-1992. Commander Islands, East Kamchatka and Atlasov Island (North Kurile group). SCUBA diving and dredging. Collectors: collaborators of the Lab. of Benthic Communities.

The collections are deposited: A, B, C, D - Zoological Institute (ZIN), St. Petersburg. E, F - Kamchatka Institute of the Ecology and Environment (KIEE), Petropavlovsk-Kamchatsky.

## SUBFAMILY POLYCITORINAE

### *Cystodytes lobatus* (Ritter, 1900)

*Distoma lobata* Ritter 1900: 606.

For synonymy see Abbot & Newberry 1980: 192.

*Material examined*: (D) 17.8.1991, st. 39, 54°05.5'N, 162°10.0'W, Alaska Gulf, near Sanak Island, 115 m, 1 colony.

*Remarks*. The single flattened, but relatively thick colony with strongly contracted zooids conforms basically with descriptions of *C. lobatus* (Ritter 1900, Van Name 1945, Abbot & Newberry 1980). The specimen has a clear transparent test without calcareous spicules. The basal layer of the test filled with fecal pellets. This feature was not mentioned for *C. lobatus* in previous descriptions and, therefore, there is some doubt as to the present identification.

### *Eudistoma kurilense* sp.n.

Fig. 1

*Material examined*: Holotype - (C) 27.6.1988, st. 55, 49°33'N, 155°00.9'E, Onekotan Island (Kurile Islands), 150 m. Paratype - (C) 30.6.1988, st. 79, 46°53.8'N, 154°33.6'E, Shiashkotan Island (Kurile Islands), 250-197 m.

*Description*. Colony of holotype consists of a conical head 4 cm in height and 3.5 cm in maximum diameter on thick stalk 3 cm in diameter. Colony of paratype has two heads with peduncles knitted together all the way. Test soft, transparent, pinkish or whitish, without encrusting or embedded matter in holotype but with few minute sand grains on surface and inner layers of test in paratype. Zooids in head, systems absent. Atrial aperture of each zooid open to the exterior anterior to the branchial aperture. Test around zooids more dense and resembles honeycombs.

Pinkish zooids about 10 mm long. Both siphons very short with 6 wide lobes, each lobe subdivided into two pointed projections. 16 large branchial tentacles of which ventral, dorsal and two lateral are largest, and 16 small papill-like ones. Branchial sac with 3 stigmata rows, 39-42 stigmata per row in each side of branchial sac. About 10 dorsal stigmata of first row arranged along dorsomedial line. Very long dorsal languets displaced on left side of branchial sac. About 12 fine transverse and 30 longitudinal thoracic muscles. Oesophageal neck long, small

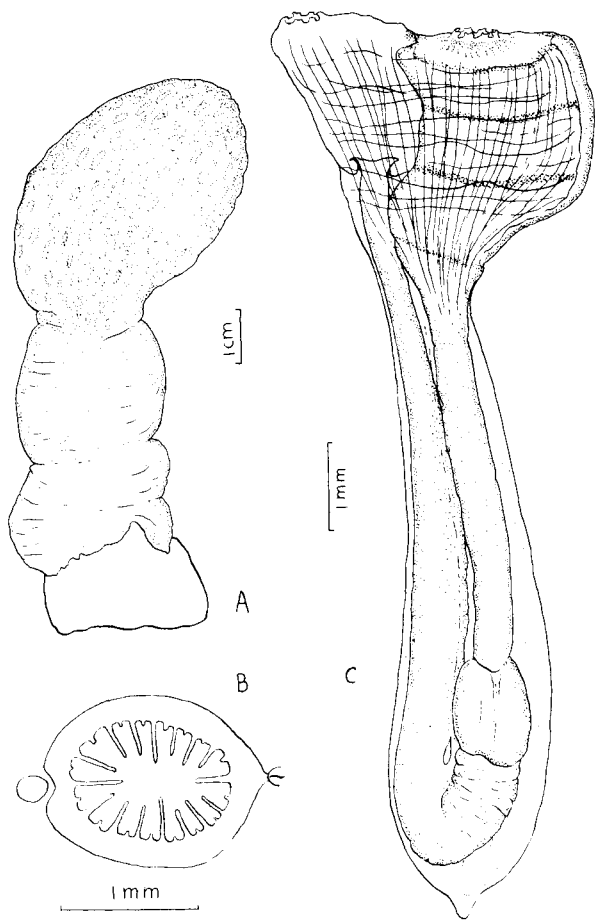


Fig. 1. *Eudistoma kurilense* n.sp. (Holotype) - A, colony; B, branchial tentacles; C, zooid.

smooth-walled stomach in posterior end of abdomen. Post-stomach in some zooids. V-shaped heart with one arm much longer than the other near intestine in posterior end of abdomen. Small gastric reservoir. No larvae or gonads were found in any zooids. All zooids have abdomen filled with parenchymal tissue.

*Remarks.* Kott (1990) defined a group of species with stalked colonies and zooids not being arranged in systems which are probably related: *E. globosum* Kott, *E. laysani* Tokioka and *E. elongatum* (Herdman). Some other species may also be included in this group (*E. albatrossae* Tokioka, from Japanese waters for example) especially because it is not known for all stalked species whether they possess systems or not. *Eudistoma kurilense* is also a member of the above-mentioned species group, it differs from other stalked *Eudistoma* species by having relatively large zooids and an extremely large number of stigmata per row.

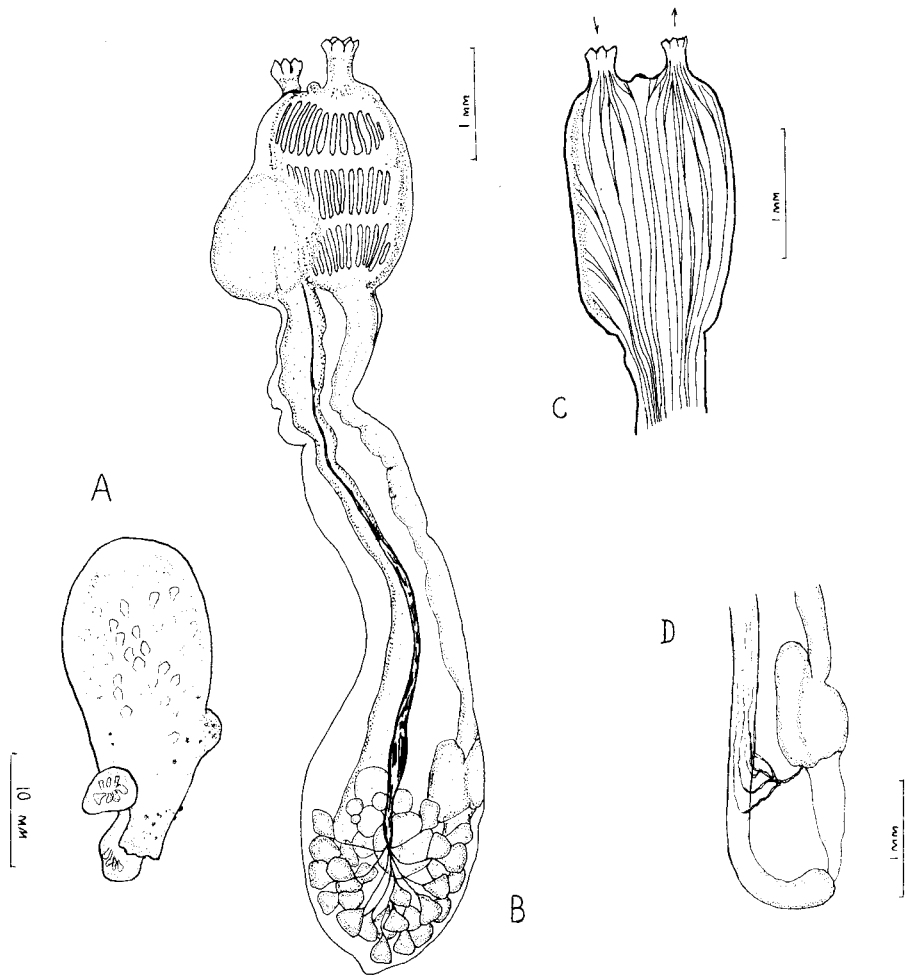


Fig. 2. *Eudistoma vitreum* - A, colony; B, zooid; C, thoracic muscles; D, pyloric gland.

*Eudistoma vitreum* (Sars, 1851)

Fig. 2

*Distomum vitreum* Sars 1851: 154.

*Eudistoma vitreum* Millar 1963: 387 and synonymy.

*Material examined:* (F) 12.7.1991, between Bering and Toporkov Islands (Commander Islands), 5-7 m, 4 colonies with several fragments.

*Description.* Upright ovate colony 2-3 cm in height and up to 1.5 cm wide. Test surface without encrusting matter. Embedded sand grains occur in inner layers of test, thin (1-2 mm) surface layer of test without sand grains and quite transparent.

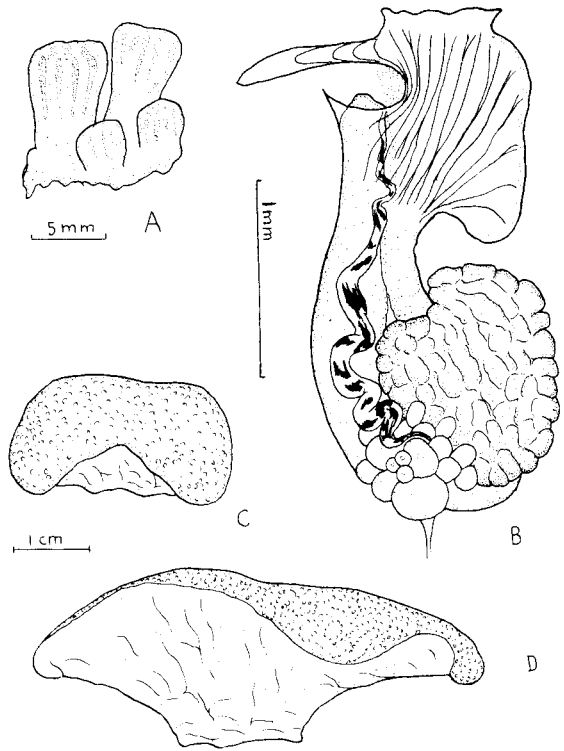


Fig. 3. *Eudistoma parvum* - A, colony.  
*Distaplia* sp. aff. *clavata* - B, zooid; C,  
 D, colony.

Zooid about 6 mm in length. Atrial and branchial apertures with 6 large pointed lobes. Branchial sac with 3 rows of stigmata, 10-13 stigmata per row. 15-20 thin longitudinal muscles on each side of thorax. Transverse muscles were not detected. Oesophageal neck long, stomach smooth-walled or with 1-2 indistinct longitudinal ridges, but it seems that they appear as a result of contraction during fixation. Pyloric gland represented by thin tubules. Several ova in gut loop, testicular follicles beside and behind it. Sperm duct very robust. In atrial cavity of several zooids 1-3 large ova occur but mature larvae were absent.

*Remarks.* The zooids of the present species are usually found with strongly contracted thoraxes and it was formerly believed to have 4 stigmata rows instead of 3 and, therefore, the species was placed in the genus *Polycitor*. Millar (1963) showed that it has only 3 rows and placed the species in the genus *Eudistoma*.

*Eudistoma parvum* (Oka, 1927)

Fig. 3 A

*Distoma parvum* Oka 1927b: 497.

*Eudistoma parvum* Tokioka 1954: 72.

*Material examined:* (E) 4.8.1986, Sea of Japan, Peter the Great Bay, south of the Bolshou Pelis Island, 4-10 m, 1 colony, coll. L. Moskalev

*Remarks.* The single specimen agrees well with the description given by Tokioka (1954) in the structure of zooids, colony form and colour. The colony, however, is not so distinctly divided on the stalk and corona, and the zooids have more stigmata per row - 12-14 instead of 8-10. This difference is of little taxonomic significance.

### SUBFAMILY HOLOZOINAE

*Distaplia* sp. aff. *clavata* (Sars, 1851)

Fig. 3 B,C,D, 6A

*Leptoclinum clavatum* Sars 1851: 154.

For synonymy see Huus & Knudsen 1950: 13, Iceland; Lützen 1959: 7, Greenland and synonymy.

*Material examined:* (F) 11.8.1988, Kamchatka, Avacha Bay, Baby Kamen Island, 8-15 m, 2 colonies.

*Description.* Massive hemispheric colony with slightly inturned margins, 3.5 cm in diameter and 2.5 cm in height attached to substratum by relatively narrow base. Test yellowish, with spongy consistency. Surface clear, no encrusting or embedded matter. Zooids in indistinct roundish or oval systems.

Zooid 3.2-3.5 mm in length. Branchial siphon wide, with 6 indistinct lobes; atrial opening narrow, with a simple lip. About 15 fine longitudinal or somewhat oblique muscles on both sides of the thorax. Branchial sac with 4 rows of stigmata, 17-18 stigmata per row. Very thin parastigmatic vessels. Stomach globular or slightly enlarged near oesophagus, with areolated wall, slightly obliquely oriented. No gastric reservoir was found. Gonads in right side or in gut loop. About 20-25 testicular follicles, 2-3 large ova and up to 9 small ones. Very robust vas deferens continuing along right side of rectum. A long brood pouch containing 6-7 larvae in some zooids. Larva with trunk 1.3-1.4 mm long. Otolith and ocellus in cerebral vesicle, triradially arranged adhesive organs, each has a single ampullary swelling (Fig. 6A).

*Remarks.* Typical *D. clavata* usually have a clavate colony with a short, but distinct peduncle. Flattened forms also occur, although I am not sure that they are correctly assigned to the present species. Zooids of Kamchatka specimens conform to those of *D. clavata* in the structure of the thorax, including number of stigmata per row and thoracic muscles. Both have an areolated stomach, similar position and structure of gonads and long brood pouches with numerous larvae, but the zooids of Kamchatka specimens are slightly smaller. *Distaplia clavata* is an Arctic

and Atlantic species and do not occur in the Pacific. Two colonies (ZIN, n843), collected from the Sea of Okhotsk and labelled *D. clavata* by Redikorzev and now kept in ZIN, are quite similar to specimens from Kamchatka in the colony form. Unfortunately I had no chance to examine typical specimens and compare them with Kamchatka specimens. I have only tentatively including the present material in *D. sp. aff. clavata* until new material will be available.

*Distaplia dubia* (Oka, 1927)

*Leptobotrylloides dubium* Oka 1927a: 607.

For synonymy see Tokioka 1963: 135 and Nishikawa 1990: 130.

*Material examined:* (E) 29.6.1988, Sea of Japan, Peter the Great Bay, south of the Bolshou Pelis Island, 0-5 m; Peter the Great Bay, Butakova Point, 2-5 m; 20.8.1988, Peter the Great Bay, Vera Island, 1 m; 1.8.1988, Poset Bay, Suslov Pen., 0-2 m; 23.8.1988, Furugelm Island, Kesar Point, 0-2 m.

*Remarks.* All specimens studied have colonies ranging from flat and encrusting to consisting of several small cormidia arising from a common base (specimen from Vera Island).

Only two *Distaplia* species were known from the Sea of Japan: *D. dubia* and *D. unigermis* Ivanova-Kazas, the last one was found in abundance near Vladivostok (Ivanova-Kazas 1965).

*Distaplia rzhavskii* n.sp.

Fig. 4, 6B

*Material examined:* Holotype - (F) 24.8.1985, Kamchatka, Afrika Point, 32 m, coll. A. V. Oshurkov. Paratype - (F) 1.8.1990, Verchoturovo Island (East Kamchatka), 16-17 m, 1 colony, coll. A. Bazhin.

*Description.* Colony consists of a number of lobes closely adhering to each other, upright cylindrical or slightly enlarged in the top forming a hemispheric mass about 6 cm in diameter and 4 cm in height. Colony from Verchoturovo Island (paratype) represented by single cushion-like lobe, about 1.5 cm in height and 3.5 cm wide. Test very soft, pinkish, with spongy consistency. Test surface without encrusting matter. Zooids arranged in circular or elongated systems in top of lobes, colony slightly damaged and true form of systems difficult to recognize. Several systems in each lobe.

Zooid about 4 mm long. Branchial aperture with 6 indistinct lobes. Atrial aperture narrow, with short trifid atrial languet. Four stigmata rows with well developed parastigmatic vessels. 18-20 stigmata per row in each side of branchial sac. About 20 transverse thoracic muscles, usually divided in two near the endostyle.

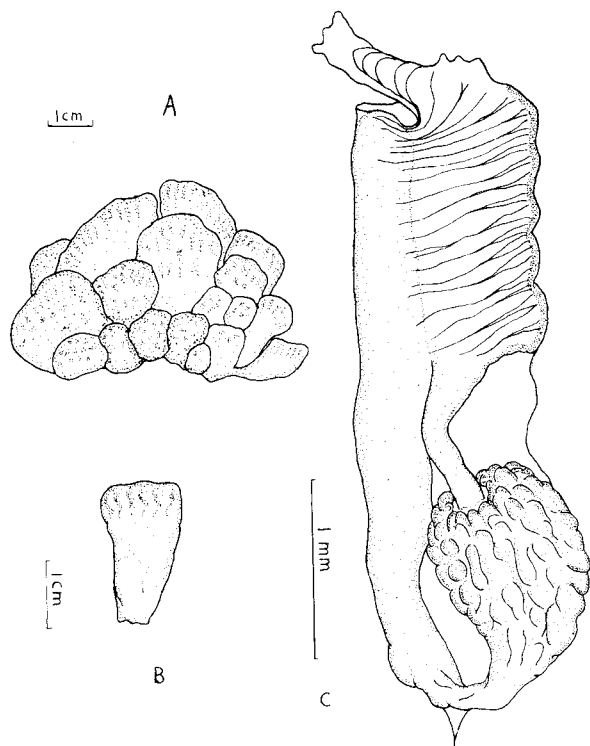


Fig. 4. *Distaplia rzhavskii* n.sp. (Holotype) – A, colony; B, lobe separated from the colony; C, zooid.

Because of strong transverse musculature, thoraxes of many zooids are contracted dorso-ventrally. Gut loop more or less vertical, oesophagus long, stomach slightly obliquely oriented, enlarged in anterior end and with areolated wall. No gastric reservoir was found. No gonads in any of examined zooids. Two larvae in each incubatory pouch. Larva with trunk 1.8-2 mm long and with typical *Distaplia* structure: otolith and ocellus present, triradially arranged adhesive papillae each with a single not very large ampullary swelling (Fig. 6B).

*Remarks.* In the structure of thoracic muscles, *D. rzhavskii* resembles the Japanese species *D. systematica* Tokioka (Tokioka 1958). The latter species has only transverse muscles. But *D. systematica* has smooth-walled stomach, smaller zooid (2.1 mm) and a different structure of the colony. *Distaplia racemosa* Kott (Kott 1990) also has only transverse musculature, larva of the same size (1.8 mm) and a few more stigmata per row (24-26), but differs in having a smooth-walled stomach.

*Etymology.* The species is named after Dr. Alexander V. Rzhavsky (KIEE, specialist in Spirorbidae) who introduced me to systematic work.

*Distaplia alaidi* n.sp.

Fig. 5



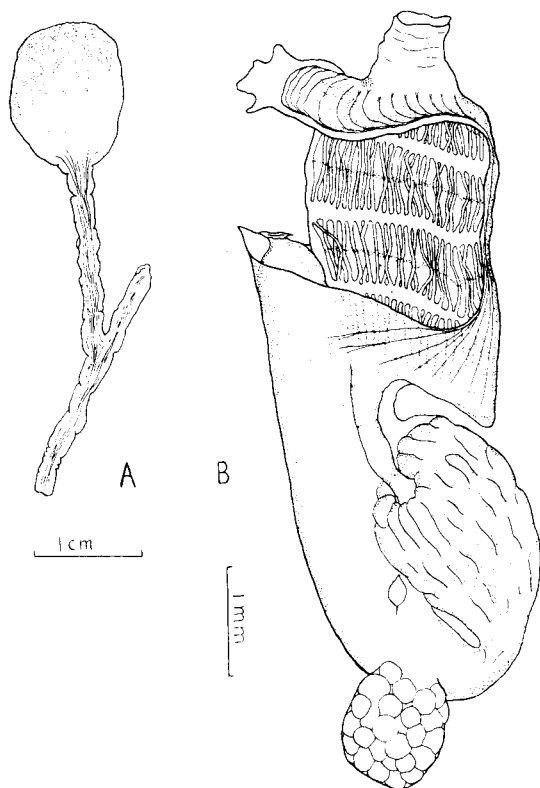


Fig. 5. *Distaplia alaidi* n.sp. (Holotype) -  
A, colony; B, zooid.

*Material examined:* Holotype - (F) 2.8.1989, Atlasov Island (North Kurile group), 17 m. Paratype - (F) same data, 1 colony.

*Description.* Colony consists of a nearly spherical zooid-bearing head 14 mm in height and 11 mm in diameter on long cylindrical branched stalk about 3 mm in diameter. Paratype has the same structure. Test clear, without encrusting matter. Outer layer of test glassy transparent, inner layers milky white and fibrous. Zooids clearly seen through test and concentrated in upper part of head. Nothing can be said about the structure of systems because the condition of the material is not very good.

Zooid 5.5-8 mm. Branchial siphon elongated, with plain margin, atrial opening very large, in some zooids all stigmata rows can be seen through it. Atrial languet wide and 3-lobed. About 10 fine thoracic muscles, arising near branchial siphon, extend along ventral side of thorax and ending under atrial opening, near base of thorax. Branchial sac with 4 stigmata rows. 24-28 stigmata per row. Parastigmatic vessels present.

Oesophagus not very long. Obliquely oriented stomach with indistinct irregular longitudinal ridges or areolated wall. Anus on level with second stigmata row.

Large gastric reservoir near the stomach in gut loop. About 50-60 male follicles in posterior abdominal sac in right side of intestinal loop. When well developed, testicular follicles fill right side of gut loop and space between intestine and stomach.

*Remarks.* The most conspicuous feature of the new species is the colony form – pedunculate head. Such a colony is more usual in the related genera *Sycozoa* and *Hypsistozoa*, but the new species seems rightly placed in *Distaplia* according to the structure of the zooid. Although many *Distaplia* species have their colony upright or clavate, the true pedunculate forms do not occur very often. Among these *D. smithi* Abbott and Trason (Abbott & Trason 1968) resembles *D. alaidi*. Unfortunately the structure of systems in *D. alaidi* is indistinguishable and cannot be compared with the conspicuous systems of *D. smithi*, but according to the position of zooids in the colony head and structure of the atrial opening of *D. alaidi* it seems that they are distinct. *Distaplia smithi* has colony lobes flattened distally, with all zooids opening on one flat surface, while *D. alaidi* has a spherical head with zooids in the top. Moreover, the zooid of *D. smithi* is smaller (4-5 mm) and has fewer stigmata per row (15-23).

*Etymology.* The species is named after the locality: “Alaid” is the name of a volcano on the Atlasov Island. In Russian Atlasov Island is often called “Alaid Island”.

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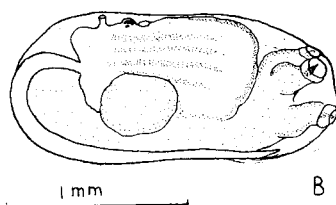
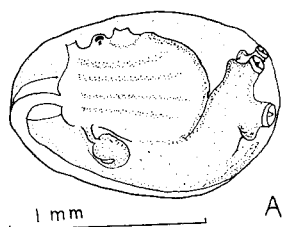


Fig. 6.

Larvae of A, *Distaplia* sp. aff. *clavata* and B, *D. rzhavskii*.

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