

# *Apodontium bellum* sp. n. and *Aequalodontium gemellum* gen. n., sp. n. (Nematoda: Axonolaimidae) with remarks on *Apodontium* morphology

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**Summary.** *Apodontium bellum* sp. n. and *Aequalodontium gemellum* gen. n., sp. n. are described from coarse-sand bottom samples collected close to the East coast of Iturup Island (Kuril Archipelago). The original description of *Apodontium pacificum* Cobb, 1920 is discussed. Some structures mentioned by Cobb for *A. pacificum* are reconsidered. A new genus *Aequalodontium*, proposed for *A. gemellum* sp. n., resembles *Margonema*, *Apodontium* and *Parascolaimus* but differs from *Margonema* and *Apodontium* in having telamon, by the shape of the amphidial pouch and the spicula capitulum. *Aequalodontium* can be distinguished from *Parascolaimus* only by the presence of the anterior male gonad.

**Key words:** *Apodontium bellum* sp. n., *Aequalodontium gemellum* gen. n., sp. n., marine nematodes, Axonolaimidae, morphology.

The family Axonolaimidae is an important group for understanding nematode evolution and phylogeny. Despite their significance few data are available on the morphology of this family. Thirteen genera of Axonolaimidae have been described but not all diagnoses are equally informative. Intensive study of axonolaimids are now being performed at the Zoology Department of Far East State University in Vladivostok. The descriptions of two new axonolaimids are presented here.

## MATERIAL AND METHODS

The material for the present publication was collected during the cruise of the scientific vessel "Tichookeanskii" to the Kuril Archipelago in 1987. Nematodes were fixed in 4% formaldehyde and mounted on slides in glycerine.

## DESCRIPTION

### *Apodontium* Cobb, 1920

**Diagnosis** (compiled from Cobb, 1920; Belogurov & Koroljeva, 1975; Tarjan & Nguyen Ba Khuong, 1988, and original data).

Axonolaimidae. Cuticle with internal striation. Endocupola\* single, simple. Cephalic sensillae in 6+6+4 pattern. Cervical sensillae in complete and incomplete circles of submedian setae. Stoma anterior edge serrate, with 6 large and 18 smaller teeth. Males with single outstretched gonad. Spicules hookless, falcate, curved, with poorly developed capitula. Telamon and supplements absent. Females monodelphic, opistodelphic. Gonad outstretched. Tail conical.

Type species: *Apodontium pacificum* Cobb, 1920.

\*- all points where authors use the selferected terminology are indicated by the asterisk. Explanations of the terminology can be found in: Belogurov O. I. & Belogurova L. S. 1989. Morphology and systematics of free-living Oncholaimidae (Nematoda: Enoplida: Oncholaimidae). *Asian Marine Biology* 6: 31-38 (editorial notice).

*Apodontium bellum* sp. n.  
(Figs. 1 & 2)

**Holotype female:** L = 3330  $\mu\text{m}$ ; a = 30.0; b = 14.5; c = 19.6; V = 56%.

Body diameter at level of: cephalic sensillae - 19  $\mu\text{m}$ ; cardia - 68  $\mu\text{m}$ ; anal opening - 54  $\mu\text{m}$ . Maximal body diameter 110  $\mu\text{m}$ . External and internal labial sensillae 3  $\mu\text{m}$ ; cephalic sensillae 44  $\mu\text{m}$  long. Amphids 15  $\mu\text{m}$  from the anterior end, oviform, 15  $\mu\text{m}$  long (30% of corresponding body diameter), 8  $\mu\text{m}$  wide. Cervical sensillae 16-30  $\mu\text{m}$  long, in four longitudinal groups of 2-3 ones. Anterior cervical sensillae in two circles. Endocupola single, simple. Narrow stomatoidal ring\* bends close to contacts with stoma radii. Excretory pore 39  $\mu\text{m}$  from anterior end. Renette cell body 32 x 33  $\mu\text{m}$  (25% of corresponding body diameter). Short terminal duct with a prominent ampulla. Nerve ring 150  $\mu\text{m}$  from the anterior end.

Mouth terminal. Vestibulum with smooth, extensible walls, 3  $\mu\text{m}$  long. Stoma of general conical shape, 22  $\mu\text{m}$  long with 10  $\mu\text{m}$  maximal diameter. Anterior margin of stoma divided by deep grooves into 3 sectors with each sector further cleft by a shallow groove into 2 subsectors. One large central 1  $\mu\text{m}$  high tooth on each subsector accompanied by 1-2 additional smaller teeth from each side. Total number of teeth per subsector 4. Totally there are 24 teeth on the stoma anterior serrate edge: 6 large and 18 smaller ones. Oesophagus 230  $\mu\text{m}$  long, cylindrical, with 19  $\mu\text{m}$  anterior and 35  $\mu\text{m}$  posterior diameter; with 3 lobe-like projections running along stoma radii up to stomatoidal ring.

Monodelphic, opistodelphic. Outstretched ovary to right side of the intestine, 460  $\mu\text{m}$  long. Uterus length 176  $\mu\text{m}$ .

Conical tail 170  $\mu\text{m}$  long. Spinnerette consists of 3 separate glandular cells with inflated ducts, and independent channels and pores close to terminus. Special structures of spinnerette terminal apparatus as homeangoid\* and cone\* visible.

Males unknown.

**Type habitat and locality.** The specimen was found in a coarse-sand sample collected 12 August 1987 close to the East coast of Iturup Island, near Kinjal Cape at a depth of 198 m.

**Type material.** Holotype female (slide MH-6500) deposited in the nematode collection of the Zoology Department, Biological Faculty, Far East State University, Vladivostok.

**Differential diagnosis.** The new nematode female belongs to the family Axonolaimidae because of its very characteristic arrangement of anterior end sensillae and structure of the stoma. Despite some similarity with *Odontophoroides* and *Synodontium* in gonad structure (monodelphic, opistodelphic) the new nematode should be regarded as a member of the genus *Apodontium*, because of the similar amphidial structure. The comparison with type and single *Apodontium pacificum* Cobb, 1920 is hampered by the lack of males in our material and also by some incorrect interpretations of *A. pacificum* morphology in the original description (Cobb, 1920). *A. bellum* sp. n. can be distinguished from *A. pacificum* Cobb, 1920 by its longer cephalic setae (two head diameters), absence of subcephalic setae and by the length and shape of the tail.

### Remarks on *Apodontium* morphology

In the original description (Cobb, 1920) the amphids of *A. pacificum* were described as elliptical. The comparison of amphids in *A. pacificum* and *A. bellum* sp. n. reveals the striking similarity between them, but the anterior part of the amphid in Cobb's drawing of *A. pacificum* is absent.

Another vague point in Cobb's description of *A. pacificum* is the composition of the anterior sensillae set in this species. The number of cephalic sensillae was originally indicated as '8 (10?)'. No additional information on the number of cephalic sensillae was presented by Tarjan and Nguyen Ba Khuong (1988). These authors mentioned only 4 cephalic setae in the generic diagnosis for *Apodontium*. Probably the sensillae regarded as cephalic by Cobb (1920) are really subcephalic sensillae.

'Mandibles' in Cobb's description correspond by their form and number to the labial sensillae, which

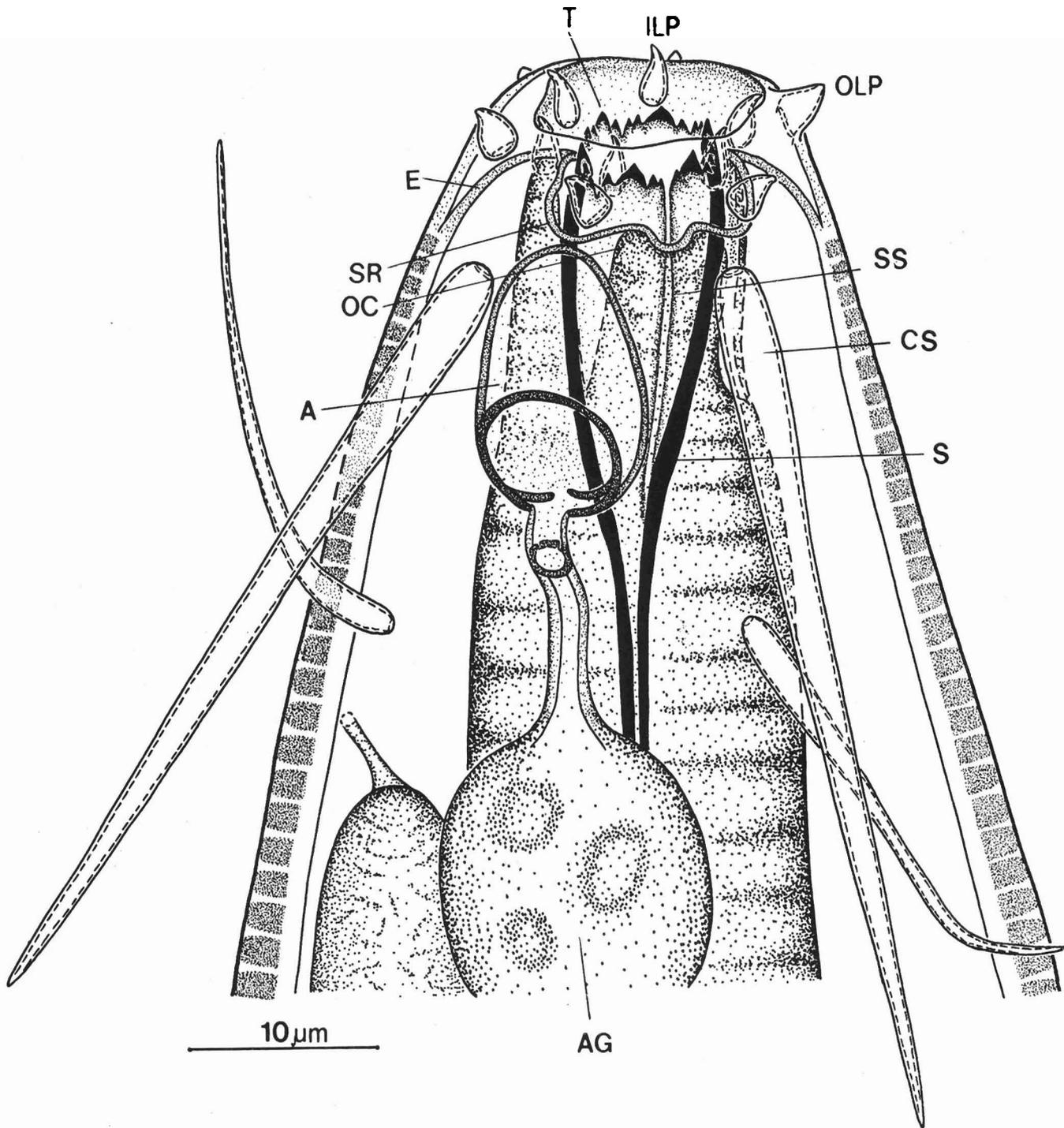


Fig. 1. Anterior end of *Apodontium bellum* sp.n. Female. A- amphid, AG- amphidial glandular cell, C- spinnerette cone, CS- cephalic seta, E- endocupola, ILP- papillae of inner labial circle, OC- anterior projections of oesophagus, OLP- papillae of outer labial circle, S- stoma, SR- stomatoidal ring, SS- stomatoidal seam, T- tooth.

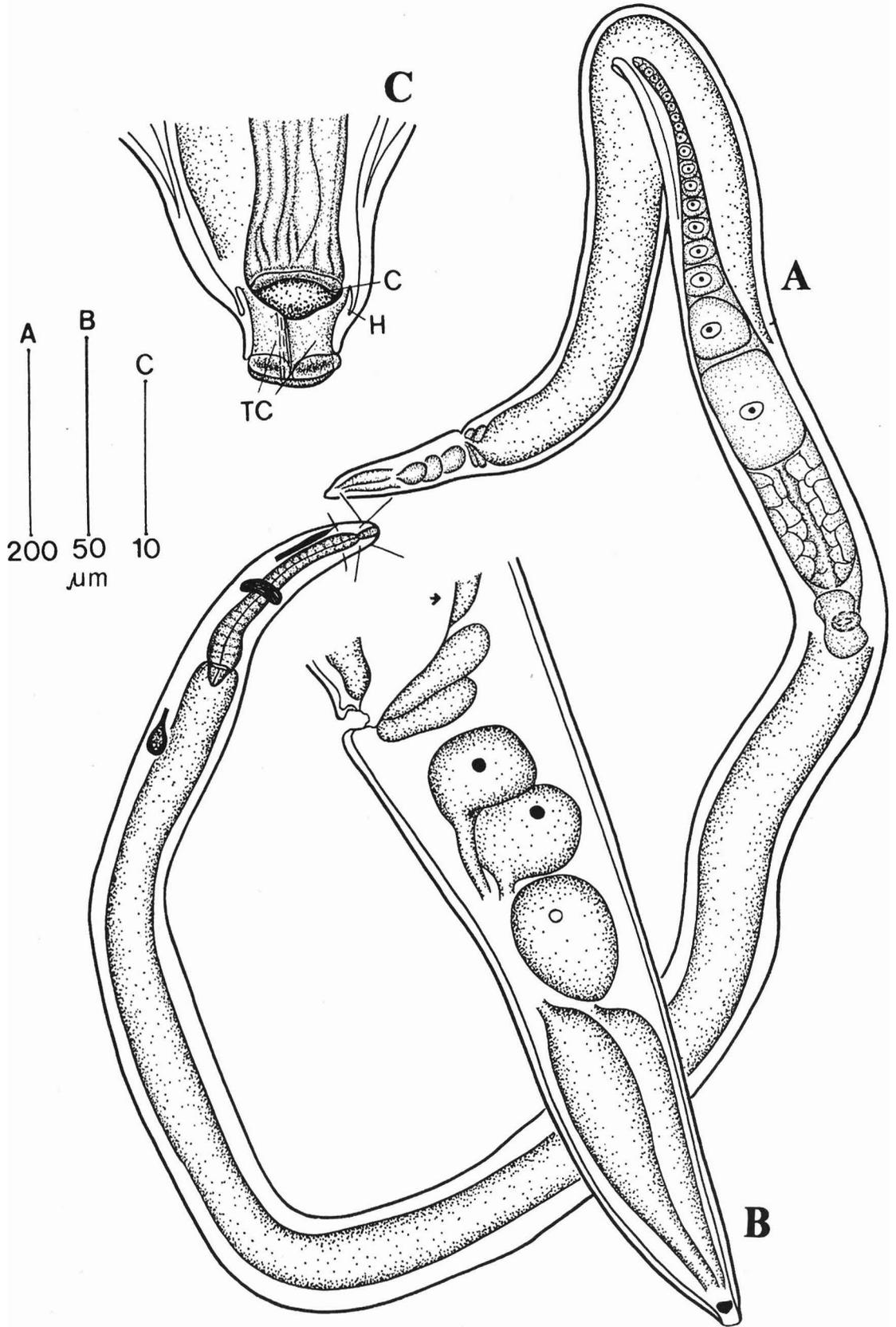


Fig. 2. *Apodontium bellum* sp.n. Female. A: Total view; B: Tail; C: Tail terminus. H - homenamgoid, TC - terminal channels.

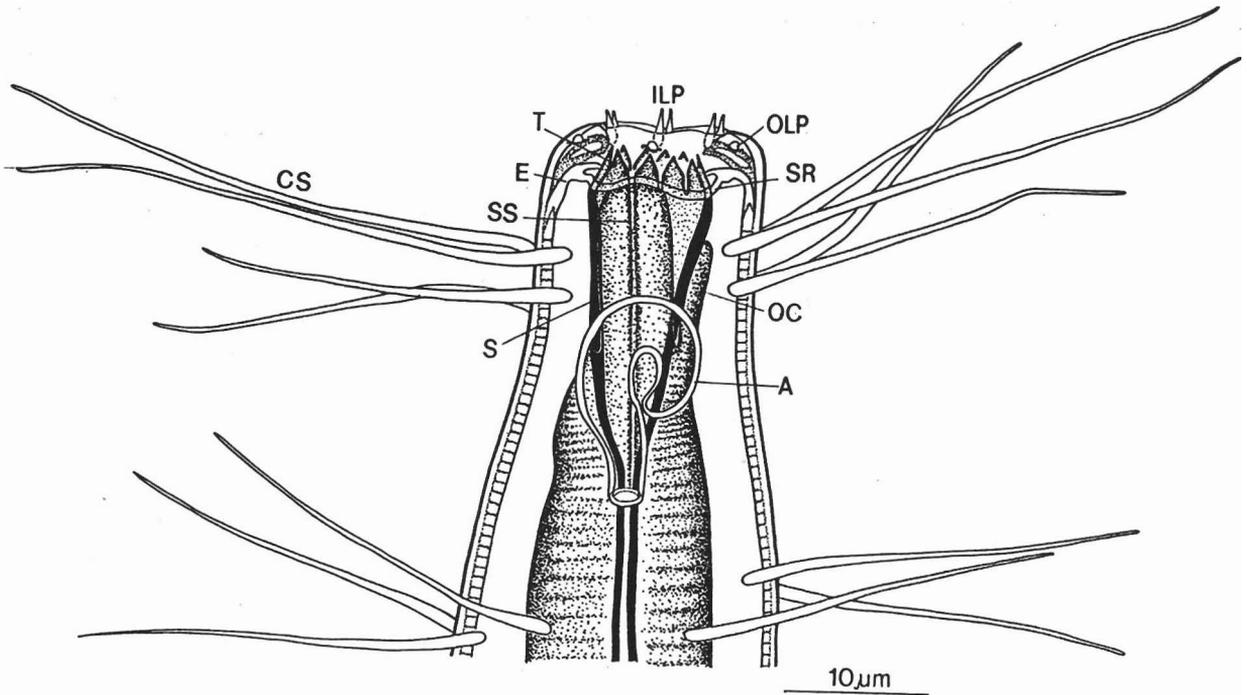


Fig.3. Anterior end of *Aequalodontium gemellum* gen.n., sp.n. Male.

in *Apodontium* are submerged inside the vestibulum.

Tarjan and Nguyen B. Khuong (1988) described the *A. pacificum* stoma as funnel-shaped, but in our specimen the stomatal cavity is conical. Nevertheless, examination of the drawings by Tarjan and Nguyen Ba Khuong leads to the conclusion that stoma shape varies in *A. pacificum* from funnel-shaped to almost conical.

### *Aequalodontium* gen. n.

**Diagnosis.** Axonolaimidae. Cuticle finely striated. Endocupola simple, single. Anterior end sensillae in 6+6+4 pattern. Four subcephalic setae adjacent to cephalic setae. Cervical sensillae in a single circle of 4 pairs. Loop-shaped amphid with short ventral branch on posterior stoma level. Excretory pore before nerve ring. Stoma consists of two pyramids, the first being truncate and composed of 12 equal, acute and flattened teeth. Oesophagus with a slight widening to the cardia. Male gonad single, stretched anteriorly. Spicules equal, strongly curved in proximal third. Gubernaculum with dorslo-caudal

apophyses. Supplements absent. Telamon paired. Spinnerette glands incaudal, with 3 separate terminal channels and pores. Tail conical.

Females unknown.

Type species: *A. gemellum* sp. n.

### *Aequalodontium gemellum* gen. n., sp. n. (Figs. 3 & 4)

Male: L = 2660  $\mu$ m, a = 62.0; b = 10.6; c = 14.0.

Body diameter at level of: cephalic sensillae - 15  $\mu$ m; oesophagus cardia - 36  $\mu$ m, cloacal opening - 44  $\mu$ m. Maximal body diameter 43  $\mu$ m. Cuticle 2  $\mu$ m thick, with fine internal striation, more prominent on tail. External and internal labial sensillae 2.5  $\mu$ m long; Cephalic sensillae 38-40  $\mu$ m long. Four subcephalic setae 28-30  $\mu$ m long, adjacent to cephalic setae. Circle of four submedian pairs of cervical sensillae behind the posterior stoma level; cervical sensillae length up to 28  $\mu$ m. Amphids 13  $\mu$ m long, 8  $\mu$ m wide (54% of corresponding body diameter); of closed loop shape with shorter ventral branch, 12  $\mu$ m from anterior end. Amphidial pore opens into dorsal branch. No cross-

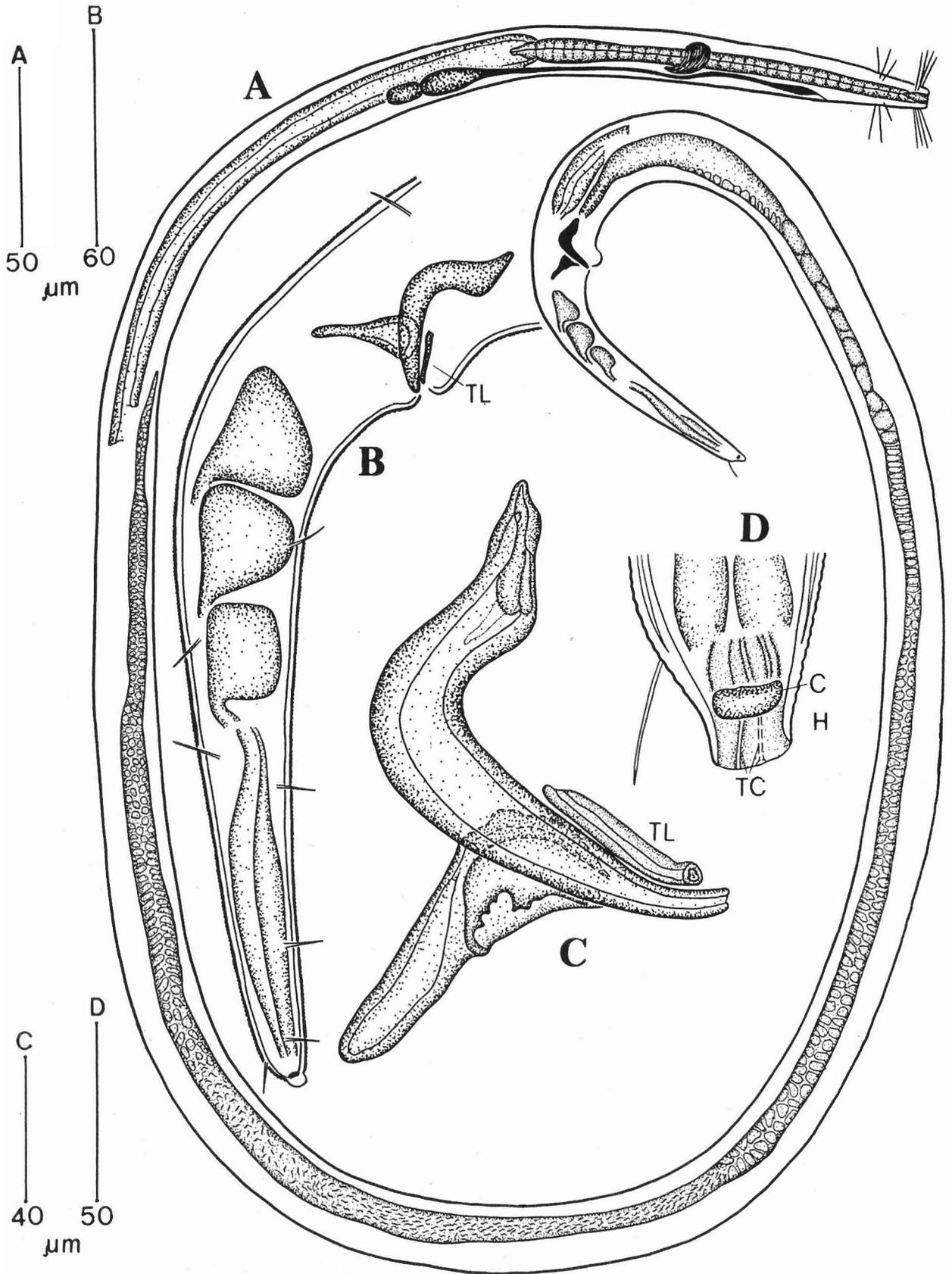


Fig. 4. *Aequalodontium gemellum* gen.n., sp.n. Male. A: Total view; B: Tail; C: Copulatory structures; D: Tail terminus. TL - telamon.

striation on the amphid.

Endocupola single, simple. Stomatoidal ring narrow with wave tops occupying the same radii as stomatoidal seams. Renette cell body  $35 \times 16 \mu\text{m}$  (43% of corresponding body diameter). Paraglandular cell  $27 \times 13 \mu\text{m}$ . Short terminal duct with well-developed ampulla. Excretory pore in  $73 \mu\text{m}$  from anterior end, far behind stoma bottom level. Nerve ring  $125 \mu\text{m}$  from anterior end.

Shallow vestibulum. Stoma  $20 \mu\text{m}$  long, with  $8 \mu\text{m}$  maximal diameter, consisting of two pyramids, first of which is truncate and composed of 12 equal, acute and flattened teeth of  $3 \mu\text{m}$  high. Club-like oesophagus  $260 \mu\text{m}$  long: anterior diameter  $9 \mu\text{m}$ , maximal diameter -  $19 \mu\text{m}$ , with 3 anterior projections not reaching stomatoidal ring.

Single anteriorly stretched gonad,  $700 \mu\text{m}$  long, ventral to the intestine. Two strongly curved spicules  $45 \mu\text{m}$  length along arc, with elongated acute capitule. Paired,  $23 \mu\text{m}$  long, dorso-caudal apophyses on the gubernaculum. Tube-like symmetrical halves of telamon protrude into the cloacal opening.

Tail conical, elongated,  $190 \mu\text{m}$  long. Spinnerette from 3 incaudal glandular cells of triangular rounded shape. Cone and separate pores at tail terminus.

**Differential diagnosis.** Because of the single testis, the described male specimen resembles *Apodontium* and *Margonema*, but can be

distinguished from these by the presence of a telamon, and the unique shape of amphids and spicular capitula. *Aequalodontium gemellum* sp. n. is similar to *Parascolaimus* in having a telamon (rare feature in nematodes) and common form of spicular capitula, but differs by single testis and shape of amphid.

**Type habitat and locality.** The specimen was found in a sample of coarse sand with pebbles collected 12 August 1987 close to the East coast of Iturup Island near Kinjal Cape at a depth of 198 m.

**Type material.** Holotype male (slide MH-6501) is deposited in the nematode collection of Zoology Department, Biological Faculty, Far East State University.

## REFERENCES

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Смолянок О. И., Белогуров О. И. *Apodontium bellum* sp. n. и *Aequalodontium gemellum* gen. n., sp. n. (Nematoda: Axonolaimidae) с заметками о морфологии рода *Apodontium*.

Резюме. Описываются *Apodontium bellum* sp. n. и *Aequalodontium gemellum* gen. n., sp. n. из пробы крупного песка, взятой на глубине 198 м близ тихоокеанского берега острова Итуруп (Курильская гряда). Обсуждается оригинальное описание *Apodontium pacificum* Cobb, 1920. Рассматриваются некоторые структуры упомянутые Коббом для *A. pacificum*. Новый род *Aequalodontium* с единственным видом *A. gemellum* sp. n. сходен с родами *Margonema*, *Apodontium* и *Parascolaimus*. От двух первых он отличается наличием теламона, формой амфид и головок спикул, от последнего - наличием у самцов только одного семенника.

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