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AQUATIC *OLIGOCHAETA* FROM THE FARTHEST SOUTH-EAST OF THE USSR

1. *NAIDIDAE* AND *TUBIFICIDAE*

Introduction

The extreme south-eastern corner of the continental part of the USSR lies in the southern half of the Primorski Territory (Primorye), crossing the 43° N latitude near Vladivostok. Southern ranges of the Sikhote-Alin Mountains divide the local hydrographic network between the drainage areas of the Ussuri (a large affluent of the Amur River) and numerous smaller rivers discharging independently into the Japan Sea. Hardwood forests grow in river valleys, while hills are covered with southern taiga. Inland water-bodies belong to the Amur-Japanese transitional zoogeographical subregion (Сокольская, 1968, 1972; Sokol'skaya, 1980), which the author regards, with some hesitation, as a part of the Sino-Indian Region (Timm, 1980).

Aquatic *Oligochaeta* of the southern Primorye were studied by N. L. Sokol'skaya (1980; Сокольская, 1961, 1968, 1972; Сокольская, Локшина, 1972), with main attention to *Naididae*. Altogether 27 taxa of *Naididae* have been found here by her (*Stylaria lacustris*, *S. fossularis*, *Arcteonais lomondi*, *Ripistes parasita*, *Vejdovskyella comata*, *Slavina appendiculata*, *Dero digitata*, *D. obtusa*, *Aulophorus furcatus*, *Branchiodrilus hortensis*, *Nais variabilis*, *N. barbata*, *N. behningi*, *N. bretscheri*, *N. pardalis*, *N. elinguis*, *Specaria josinae*, *Piguetiella blanci amurensis*, *Haemonais waldvogeli*, *Uncinais uncinata*, *Chaetogaster diaphanus*, *Ch. limnaei bengalensis*, *Pristina longiseta longiseta*, *P. longiseta sinensis*, *P. biserrata*, *P.* sp. N 1 and N 2), and 9 taxa of *Tubificidae* (*Rhyacodrilus coccineus*, *R.* sp., *Bothrioneurum vejdovskyanum*, *Branchiura sowerbyi*, *Tubifex tubifex*, *Peloscolex nikolskyi*, *P. apapillatus*, *Limnodrilus udekemianus*, *L. helveticus*). Most of them are widely distributed or Holartic, some belong to the Sino-Indian Region, and only *Piguetiella blanci amurensis* seems to be endemic in the Amur-Japanese Subregion.

In a new material from the mountain streams several species new for the South Primorye were found, including those new for science and some of eastern origin.

Material and methods

The material was collected seasonally, from April to October mostly in 1984 (also in 1983 and 1986) in two streams, the Komarovka (the former Suputinka) and the Frolovka (the former Pensau) by the staff of Far East Scientific Center, Vladivostok. I am greatly indebted to Drs T. S. Vshivkova and I. M. Levanidova for the delivery of these collections to me. 51 samples with oligochaetes originate from Komarovka, 36 from Frolovka, and 2 additional samples from the coastal areas near Vladivostok. A part of the Komarovka material was dealt preliminarily earlier (Тимм, 1987). The samples were taken with a benthometer or by the kicking

method, worms were preserved in formalin or ethanol. In this paper, only the representatives of two families are dealt with. All other oligochaetes remain to be examined in further publications.

The Komarovka (Suputinka) is a first-order affluent of the River Razdolnaya (Suifun) falling into the Japan Sea west of Vladivostok. It is 70 km long but only the uppermost 36 km were studied, on 12 stations. The first 18 km with 9 stations lie in the submountaneous region, on the territory of the V. L. Komarov Ussuriisk State Nature Reserve, and are very clean. The lower half with 3 stations flows in a wide valley through fields, meadows and villages; it is slightly enriched here. The stream begins with a shallow spring pool (t° 3.5—10° C). On the lowest sampling spot, its width reaches 25 m and depth over 1 m. The current velocity on riffles is 0.5—1 m/sec, pH is neutral, the total sum of ions fluctuates around 30—40 mg/l. The stream is covered with ice (often frozen to the bottom) for more than four months a year, while in August the water temperature can reach 26—30° C on lower stations. The bottom is stony, with more sand and mud on lower reaches. (Вшивкова, 1987, and personal communication by Dr. T. S. Vshivkova).

The Frolovka (Pensau) is a first-order affluent of the River Partizanskaya (Suchan), falling into the Japan Sea east of Vladivostok and Nakhodka. It is situated higher and has a more rapid torrent than the Komarovka, only 22 km long, with its spring lying at a height of 1060 m, and the mouth only at 100 m. The Frolovka was studied on 11 stations, while only the lowest lies within a village.

More than 1500 specimens of *Naididae* and *Tubificidae* were studied, mostly as whole mounts in glycerine or Canada balsam, some as serial sections. The material including the slides with type specimens is deposited on the Võrtsjärv Limnological Station, Tartu District, Estonia.

Faunal results

16 species of *Naididae* and *Tubificidae* were found in the streams, among them 15 in the Komarovka and only 7 in the Frolovka. Only 6 of these species were known earlier in the southern Primorye. 8 species (including 2 new for science) and 2 undetermined taxa were found here for the first time. The third undetermined form of *Tubificidae* was observed in an additional sample from Popov Island (the Table). The faunal list of the southern Primorye includes now 28 species of *Naididae* and 12 species of *Tubificidae*, if we exclude the undetermined taxa as well as the subspecies *Pristina longiseta sinensis* merged with the nominative subspecies by Brinkhurst and Jamieson (1971) and Rodriguez (1987).

Among the 14 exactly determined species known from these two isolated streams with a weak human influence, 9 are widely distributed at least in the Holarctic, some of them are even cosmopolitan. The tenth, *Pristinella jenkinae*, has both a southern and at the same time a worldwide distribution. Common with North America are *Piguetiella michiganensis* and maybe also *Embolocephalus nikolskyi*, a trivial Far East species. Both new, possibly endemic species of *Rhyacodrilus* seem to have close relatives in Kamchatka. Thus, 4 species of 14 show eastern relations.

Epifaunal *Naididae* were almost evenly represented in both streams but more frequently and abundantly on lower reaches (especially *Nais behningi* and *Piguetiella michiganensis*). The distribution of cosmopolitan species of the mud-dwelling *Tubificidae* was limited with the lowermost, muddiest stations of the Komarovka. Only 2 species of *Rhyacodrilus* (*R. komarovi* and either *R. coccineus* or *R. suputensis*) were abundant on most sites in both streams. *Embolocephalus nikolskyi* was once discovered on

Species list of the two streams studied (asterisks mark taxa new for the southern Primorye)

Species	Komarovka			Frolovka		
	Specimens	Samples	Stations	Specimens	Samples	Stations
Naididae:						
Nais behningi Mich., 1923	169	6	4	1	1	1
Nais bretscheri Mich., 1899	87	11	6	7	4	2
**Nais communis* Pig., 1906	2	2	2	7	2	1
**Piguetiella michiganensis* Hilt., 1967	66	8	4	6	2	1
Slavina appendiculata (Udek., 1855)	2	2	2	—	—	—
**Pristinella jenkinae* (Steph., 1931)	13	3	3	1	1	1
**Chaetogaster diastrophus* (Gruith., 1828)	1	1	1	—	—	—
Tubificidae:						
Rhyacodrilus coccineus (Vejd., 1875)	—	—	—	150	12	5
**Rhyacodrilus suputensis* n. sp.	153	19	9	—	—	—
**Rhyacodrilus komarovi* n. sp.	520	22	8	291	17	9
**Limnodrilus hoffmeisteri* Clap., 1862	24	2	2	—	—	—
Tubifex tubifex (Müller, 1774)	2	1	1	—	—	—
Embolocephalus nikolskyi (Last. et Sok., 1953)	3	1	1	—	—	—
**Aulodrilus limnobius* Br., 1899	1	1	1	—	—	—
**Tubificidae* gen. sp. N 1	1	1	1	—	—	—
**Tubificidae* gen. sp. N 2 (On the Popov Island only)	—	—	—	—	—	—
**Tubificidae* gen. sp. N 3	2	1	1	—	—	—

the upper reach of the Komarovka. Hence, few species of *Rhyacodrilus*, *Nais*, and *Piguetiella* constituted the bulk of fauna.

The faunal differences between the two streams studied were of two kind. The more abundant and diverse oligochaete fauna of the Komarovka was determined by the lower disposition, slower current and finer bottom sediment of this waterflow. The vicariousness of *Rhyacodrilus coccineus* and *R. suputensis* was, without any doubt, a result of the geographical isolation. As the region is rich in such isolated rivers and streams, a considerable part of the local endemic fauna remains supposedly still undiscovered.

Systematic part

Piguetiella michiganensis Hiltunen, 1967. Fig. 1, *1—6*.

Intact worms 3—5 mm long, 0.15—0.3 mm thick, with ca 30 segments. No budding zones observed. 5 mature specimens collected on 10. VII and 20. IX; clitellum covers the lengthened VI segment, with edges on V and VII. Genital pores externally inconspicuous. Prostomium often flat and bent upwards as in *Uncinais uncinata*. Eyes lacking.

Ventral and dorsal locomotory setae similar (even at male pores), 4—9 per bundle, 90—120 μm long, nodulus nearly median, teeth of equal length, the upper one considerably thinner. No decreased number of ventral setae on VII, mentioned by Hiltunen (1967). No hair setae. Genital setae on V behind spermathecal pores, 3—4 per bundle, 150—160 μm long and 4 μm thick, scalpel-shaped. Every bundle of these spermathecal setae sits on a large tubercle concealing a muscular-glandular bulb, 80 μm thick. One maturing worm had its single genital seta at one side of VI.

Thick-roofed pharynx in III—IV. Intestinal dilatation begins in IX—X. Atrium in VI, oval, measurements 100—110×60—80 μm, or 115—

170×85—130 μm together with its prostatic cover, opens immediately into simple male pore. Short and straight vas deferens, ca 30 μm thick (lumen 7 μm) discharges into the distal half of the atrium. Atrial wall with thin muscular layer and high internal epithelium; lumen up to 20 μm wide. Spermatheca has a short duct and a long, not clearly distinguished ampulla, stretching through several segments backwards up to X, or forwards into IV. Its bulky thin-walled dilatations in every segment are filled with spermatozoa.

P. michiganensis is distinguishable from *P. blanci* (Piguet, 1906) by a consistent lack of eyes and hair setae (which can rarely lack or remain undiscovered also in *P. blanci*) and by the discharge of its vas deferens into distal part of atrium (apically in *P. blanci*). *P. blanci* lives in Europe and West Siberia*). *P. michiganensis* is found in the Great Lakes region of North America, and now for the first time in the USSR and the Old World. It may have remained undiscovered here due to its external appearance somewhat similar to *Uncinais uncinata* (e. g., confused with the latter by Тимм, 1987).

The diagnosis of the genus *Piguetiella* by Ch. Sperber (1948) was based on the type species *P. blanci* only. O. V. Chekanovskaya (1981; Чекановская, 1962) added the characters of *P. amurensis* (*P. blanci amurensis* Sokolskaja, 1958). Unfortunately, as Chekanovskaya herself suspected, *P. amurensis* does not suit to this genus due to its different, *Haemonais*-like setal apparatus. Its reproductive organs are unknown. Below I shall give an emended diagnosis of the genus *Piguetiella* consisting of two species, *P. blanci* and *P. michiganensis*:

Eyes present or absent. Ventral locomotory setae all of one type. Dorsal setae from VI on, double-pronged crotchets similar to ventral ones, sometimes with thin, short hair setae. Vascular system simple, with transverse vessels in I—V. Pharyngeal and oesophageal glands present; stomachal dilatation present. Coelomocytes present. Clitellum not absent round male pores; spermathecal setae present; vasa deferentia devoid of gland cells; atria with prostate glands; no penial setae.

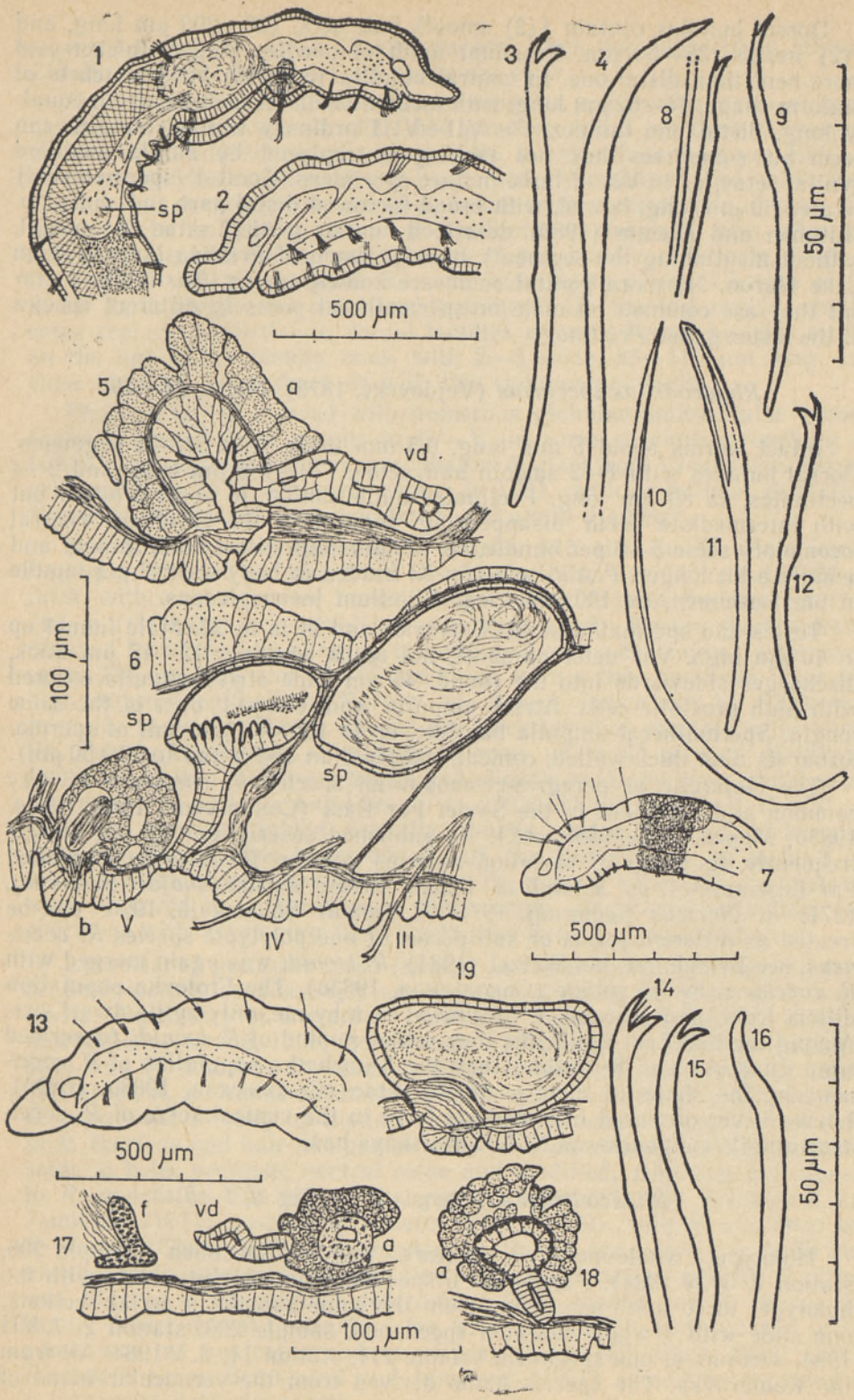
Pristinella jenkinae (Stephenson, 1931). Fig. 1, *7—12*

Naidium jenkinae: Stephenson (1931). *Pristina jenkinae*: Sperber (1948); Brinkhurst and Jamieson (1971). *Pristina idrensis*: Sperber (1948); Hiltunen and Klemm (1980). *Pristinella jenkinae*: Brinkhurst (1985); Kathman (1985).

Among 14 specimens studied, 12 were mature (collected on 20.—21. IX). Intact specimens 1.4—2 mm long, 0.13—0.2 mm thick. 18 segments in the first zooid, 23 in a mature specimen. Prostomium prolonged, without any proboscis. Clitellum on VIII. Intestine widening slowly in VII.

* Also in New Hampshire, USA (Strayer, 1983) (reccently in roduced?)

Fig. 1. *1—6*: *Piguetiella michiganensis*, Komarovka and (*2*) Frolovka (*1* — anterior end of a mature and *2* — of a juvenile worm; *3* — locomotory seta; *4* — spermathecal seta; *5* — atrium with vas deferens, and *6* — a forward-directed spermatheca, both from sagittal sections). *7—12*: *Pristinella jenkinae*, Komarovka (*7* — anterior end of a mature worm; *8* — hair and needle seta from VII; *9* — needle seta from V; *10* and *11* — spermathecal setae from VII; *12* — ventral seta from V). *13—19*: *Rhyacodrilus coccineus*, Frolovka (*13* — anterior end; *14* — pectinate seta and *15* — ventral locomotory seta from the anterior end; *16* — penial seta; *17* and *18* — parts of male duct, and *19* — spermatheca, both from sagittal sections). *a* — atrium; *b* — bulb of the spermathecal setal bundle; *f* — male funnel; *vd* — vas deferens. Roman numerals in *6* indicate the numbers of segments.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Dorsal bundles contain 1(2) smooth hair seta, 120—200 μm long, and 1(2) needle, 35—60 μm. Proximal tooth of needles longer, thicker and more bent than distal one. In ventral bundles (3,4)5(6) bifid crotchets of uniform shape, 44—52 μm long, with median or distal nodulus, teeth equally long, distal one thinner. On VII—VIII ordinary ventral bundles can occur but sometimes they are lacking or replaced by single modified genital setae, as in VII of three mature specimens. Genital (spermathecal) seta ca 60 μm long, bowed, with broad furrowed distal part and sharp tip. Hiltunen and Klemm (1980) described similar genital setae (as penial, without mentioning the segment) in a specimen of *Pristina idrensis* from Lake Huron. No more genital setae are known among *Pristinella* so far but they are common on male or spermathecal pores in different species of the sister genus *Pristina*.

Rhyacodrilus coccineus (Vejdovský, 1875). Fig. 1, *13—19*

Intact worms about 5 mm long, 0.3 mm thick, with 51—52 segments. Dorsal bundles with 1—2 smooth hair setae, 170—180 μm long, and 2—4 pectinates, ca 80 μm long. Pectinates quite similar to ventral bifids but with intermediate teeth disappearing soon after the clitellum. Ventral locomotory setae 3—5 per bundle, 60—70 μm long, distal tooth thinner and usually a bit longer. Penial setae on XI hidden in body wall; 2 per bundle in one specimen, ca 100 μm long. Clitellum inconspicuous.

Testes and spermathecae in X, ovaries and atria in XI. Male funnel up to 40 μm high. Vas deferens short, not much winding, 12—15 μm thick, discharges sidewards into the round, 45 μm wide atrial ampulla covered with high prostatic cells. Atrial ampulla and efferent duct of the same length. Spermathecal ampulla bag-like, up to 150×80 μm, full of spermatozoa; its duct thick-walled, conical, shorter than width (up to 30×50 μm).

The Holarctic or peregrin-cosmopolitan species *R. coccineus* is very common and abundant in the Soviet Far East (Сокольская, 1968, 1983*а*, 1983*б*; Морев, 1975, 1986, etc.). As published descriptions do not appear frequently, its range of variation remains unclear. Possibly some related Far East species, as *R. sinicus* (Chen, 1940); *R. sokolskajae* Semernoj, 1971; *R. sibiricus* Semernoj, 1971; *R. leonidi* Sokolskaja, 1976, can be treated as different forms or subspecies of one polytypic species *R. coccineus*: see Brinkhurst and Wetzel (1984). *R. leonidi* was again merged with *R. coccineus* by its author (Сокольская, 1983*а*). The Frolovka population differs from the European *R. coccineus*, seen by me, only by its dwarf size. Among the Far East tubificids, they rather remind of *R. leonidi* (described from Chukotka and Kunashir) than the Kamchatka population of *R. coccineus* by the shape of their pectinate setae (Сокольская, 1983*а*, 1983*б*). I have never observed intermediate teeth in the ventral setae of *R. coccineus* and its congeners, as N. L. Sokolskaya has.

Rhyacodrilus suputensis n. sp. Fig. 2, *1—8*

Holotype: whole-mounted, mature, tailless specimen (sample 206, station 7, 31. V 1984). Paratypes: 6 specimens on the same slide with the holotype; three more specimens from the same sample in serial sections; one slide with 7 whole-mounted specimens, sample 290, station 2, 7. VII 1984; sections of one specimen, sample 211, station 11, 3. V 1984. All from the Komarovka. The species name derived from the vernacular name of the stream, the Suputinka.

Length 5.5—22 mm, thickness 0.2—0.45 mm (up to 0.4—0.6 mm in genital region), number of segments 34—96 or even more. Body surface smooth and transparent, finely ringed when fixed in formalin (5 rings per

segment anteriorly, up to 15 afterwards), rings not apparent in ethanol. Clitellum weakly developed, its range not clear.

Hair setae 1—2(3) per bundle in anterior and middle parts of body, lacking on the tail, smooth, 200—550 μm long and 3 μm thick. Sometimes up to 3 small additional hairs per bundle. Besides these 1—4 pectinates of the same thickness, 45—110 μm long, with lyra-shaped tip: main teeth slender and symmetrically parallel, bound with a membrane of very thin intermediate teeth. The shape of pectinates maintained also after the clitellum. Ventral locomotory setae 3—8 per bundle anteriorly, 2—3 on the tail, 75—120 μm long, of the same kind: teeth of equal length or the distal tooth longer but considerably thinner. On the tail region, similar setae replace pectinates in dorsal bundles as well. Penial bundles on XI, on the line of locomotory ones, with 2—5 setae, 85—110 μm long; tips close together, bent, sharp or with two rudimentary teeth.

Pharynx in III covered with numerous globular multicellular glands. Compact oesophageal glands in IV—V, in some specimens reaching up to VII. Chloragogen tissue on oesophagus distinct from VI onwards, several cells already in V. Intestine begins in VIII, with or without dilatation. Numerous sphaerical coelomocytes, 8—20 μm in diameter.

Testes and spermathecae in X, ovaries and atria in XI. Male funnel flat, up to 90—130 μm broad and 15—35 μm thick. Vas deferens 15—20 μm thick, with a very narrow lumen, almost straight, joins the distal part of atrium (discharge into atrial lumen not observed). Atrium short, tubular, directed forwards and clinging to body wall when developing, later erect, up to 250 μm long and 30—55 μm thick, with a thin muscular layer and high internal epithelium. Narrow (5—8 μm) lumen can be filled with granular secretion. Dense, 25—35 μm thick layer of prostata cells covers the atrium. Distal part of atrium narrows up to 25 μm and discharges immediately into male pore before and slightly medially from penial setae. Spermathecal ampulla bag-like, up to 270×130 μm, the wall 15—20 μm thick and interiorly folded. Ampulla transits gradually into a thick-walled duct, 25—30 μm wide in its distal part, the lumen being up to 5—8 μm wide. Spermathecal pores on X before the ventral setae. No spermatozoa were observed in spermathecae, only some amorphous secretion. One specimen with developing male ducts was devoid of spermathecae.

Lyra-shaped pectinate setae (similar to those of e. g. *Spirosperma ferox* or *Embolocephalus nikolskyi*) are the most striking character of *R. suputensis*. Pectinates of a similar type are found, according to original descriptions (Hrabě, 1931; Дембицкий, 1975), in *R. punctatus* Hrabě, 1931 and *R. tauricus* Dembitsky, 1975, as well as, according to Hrabě (1974), in *R. altaianus* Michaelsen, 1935. All three can be separated from *R. suputensis* already by distinct external characters: spermathecal setae in *R. tauricus* and hair-like penial setae in *R. altaianus*, modified posterior setae in both, pectinate ventral setae and modified, ringulate hypodermis in *R. punctatus*. The key of the genus *Rhyacodrilus* by Brinkhurst and Jamieson (1971) leads to *R. sodalis* (Eisen, 1879), with *R. altaianus* and *R. sinicus* (Chen, 1940) as synonyms. Pectinates are said being "with long parallel teeth, intermediate teeth fine", which can be true only for *R. altaianus*. Figures in the original descriptions of *R. sodalis* and *R. sinicus* distinctly depict dorsal pectinate setae with asymmetric teeth curved in the same way as ventral crotchets (Eisen, 1879, 1885; Chen, 1940). Thus, *R. sodalis* sensu Brinkhurst and Jamieson (1971) should be regarded as a composite, artificial taxon.

Almost lyra-shaped anterior dorsal pectinates have also been depicted for *R. coccineus* from Kamchatka. A very long clitellum, from X to XIV (Сокольская, 1983*a*) also distinguishes the Kamchatka population both from the Estonian specimens, seen by me (with clitellum on XI—XII),

and from the possibly conspecific *R. leonidi* from Chukotka (X—XII; Сокольская, 1976). However, the pectinate ventral crotchets and the oval shape of the atrial ampulla do not remind of *R. suputensis*. The oblong atrium of *R. suputensis* with its distal mouth of vas deferens does not suit with any variant of *R. coccineus*.

The mutual exclusion of *R. coccineus* and *R. suputensis* in two streams studied can be explained either by a separate evolution of isolated sister populations on the spot (the widely distributed *R. coccineus* being the possible ancestor of *R. suputensis*), or by their invasion from different water-bodies and maybe at different times (in that case *R. suputensis* must have had a broader distribution range earlier and has perhaps also now).

Rhyacodrilus komarovi n. sp. Fig. 2, *9—17*

Holotype: whole-mounted mature specimen, 7 mm long, with 46 segments (Komarovka, sample 200, station 4, 31. V 1984). Paratypes: 10 whole-mounted specimens on the same slide, and 3 more as serial sections, all from the same sample. Etymology: named in the honour of V. L. Komarov, a Russian botanist, the founder of the Ussuriisk Nature Reserve.

Length 4—7 mm, thickness 0.3—0.35 mm, and up to 0.4—0.6 mm on clitellum. 31—47 segments. Komarovka worms are larger than Frolovka ones when mature. Shape of prostomium variable, often stretched. II—IV slightly inflated. Body surface smooth, intersegmental furrows noticeable. Clitellum thin (especially on the ventral side), on 1/2X—XII.

Locomotory setae all bifid, 4—6(7) per bundle but only 2—3 on clitellum and 3—5 on the tail, 60—100 μm long; distal tooth of the same length or a little longer than proximal one but always thinner; no intermediate teeth. Penial setae on XI 2—5 per bundle, 70—100 μm long and 4—5 μm thick; their converging tips blunt or with rudimentary distal tooth. Penial bundles hidden in body wall medially from male pores. The latter lie on the line of ventral locomotory setae. Sometimes two conical pseudopenes are protruded, 70—115 μm long and directed obliquely forwards. Spermathecal pores on the anterior edge of X, on the lateral line.

Pharynx in III covered with numerous globular, multicellular glands. Oesophageal glands begin in IV and reach at least up to VI. Chloragogen tissue on oesophagus from VI onwards. Beginning of intestine inconspicuous. Numerous sphaerical or slightly angular coelomocytes measure 5—15 μm.

Testes and spermathecae in X, ovaries and atria in XI. Sperm sacs can reach IX anteriorly and XIII or XIV posteriorly, egg sac up to XV. Male ducts paired. Male funnel flat, 55—70 μm broad and 20 μm thick. Vas deferens almost straight, ca 150 μm long and 12—20 μm thick, with very narrow lumen (2 μm), joining the distal part of atrium and then proceeding within epithelium to the proximal part where it opens into atrial lumen. Atrium short, tubular-pyriform, 70—110 μm long and 45—65 μm

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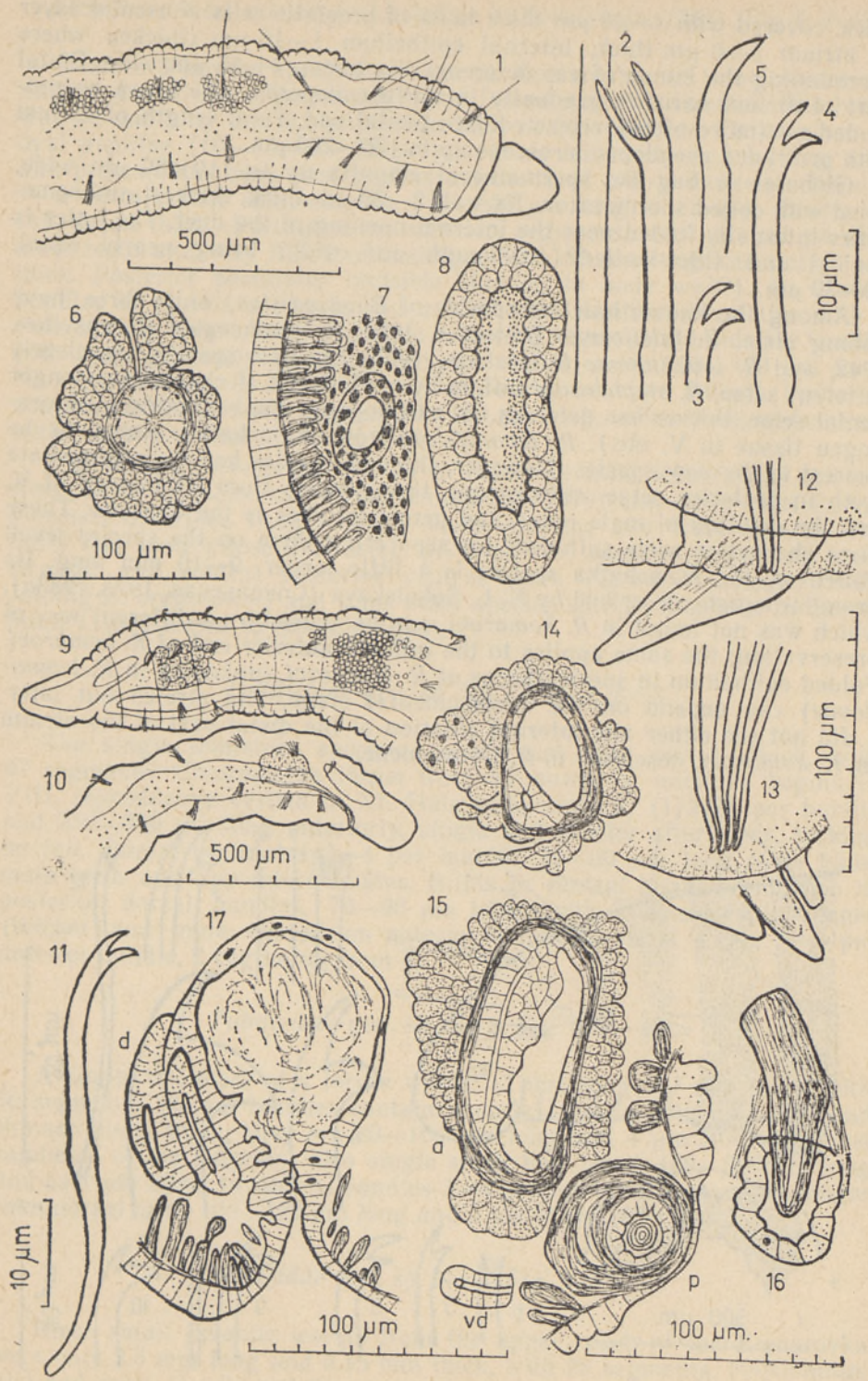
Fig. 2. *1—8*: *Rhyacodrilus suputensis*, Komarovka (*1* — anterior end; *2* — hair and pectinate seta; *3* and *4* — ventral locomotory setae; *5* — penial seta; *6* — cross section of a well-developed atrium; *7* — cross section of a developing atrium clinging to the body wall; *8* — cross section of a developing spermathecal ampulla). *9—17*: *Rhyacodrilus komarovi*, Komarovka (*9* and *10* — anterior ends; *11* — locomotory seta; *12* and *13* — penial bundles and protruded pseudopenes, from whole mounts; *14* — atrial ampulla in cross section; *15* — atrial ampulla in sagittal section, with parts of vas deferens and pseudopenis; *16* — pseudopenis and *17* — distal portion of spermatheca, both from cross sections. *a* — atrial ampulla; *d* — diverticula-like pockets between the epithelium folds of spermatheca; *p* — pseudopenis; *vd* — vas deferens.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thick, covered with 4—40 μm thick layer of prostatic cells. Muscular layer of atrium 5—6 μm thick, internal epithelium 1—18 μm (thicker where surrounding the lumen of vas deferens); its lumen 4—45 μm wide. Distal part of atrium narrows gradually in the pseudopenis, which can be protruded or (more often) retracted into penial sac. Total length of atrium with protruded pseudopenis reaches up to 180—200 μm.

Globular or bag-like spermathecal ampulla up to 110×80 μm wide, filled with coiled spermatozoa. Its wall 3—20 μm thick, thickest and sometimes internally folded near the internal opening of the duct. The latter is conical and thick-walled, its length and width being nearly equal, 30—70 μm.

Among the known hairless species of *Rhyacodrilus*, only three have oblong atria: *R. falciformis* Bretscher, 1901; *R. stephensoni* Cernosvitov, 1942, and *R. levanidovae* Sokolskaja, 1973. The first species has clearly different setae. *R. stephensoni* differs by a whole set of characters (longer penial setae, thicker vas deferens, no pseudopenis, the beginning of chloragogen tissue in V, etc.). *R. levanidovae* from Kamchatka seems to be nearest to the new species. However, the new species has no intermediate teeth in posterior setae, chloragogen tissue starts from VI instead of V, and the position of male pores and penial bundles is the opposite. These three characters seem sufficient for separating them on the species level. Moreover, the Kamchatka species is a little larger, 9—10 mm long. Its granular cuticle, described by N. L. Sokolskaya (Сокольская, 1973, 1983*a*), which was not found in *R. komarovi*, can be caused by a different way of preservation; the same applies to the inflated anterior end of *R. komarovi*. Folded epithelium in spermathecae of *R. komarovi* (unknown in *R. levanidovae*) can depend on the developmental stage, and stretch out later. I did not see either any internal ciliation of the distal part of the atrium in *R. komarovi*, described in *R. levanidovae*.

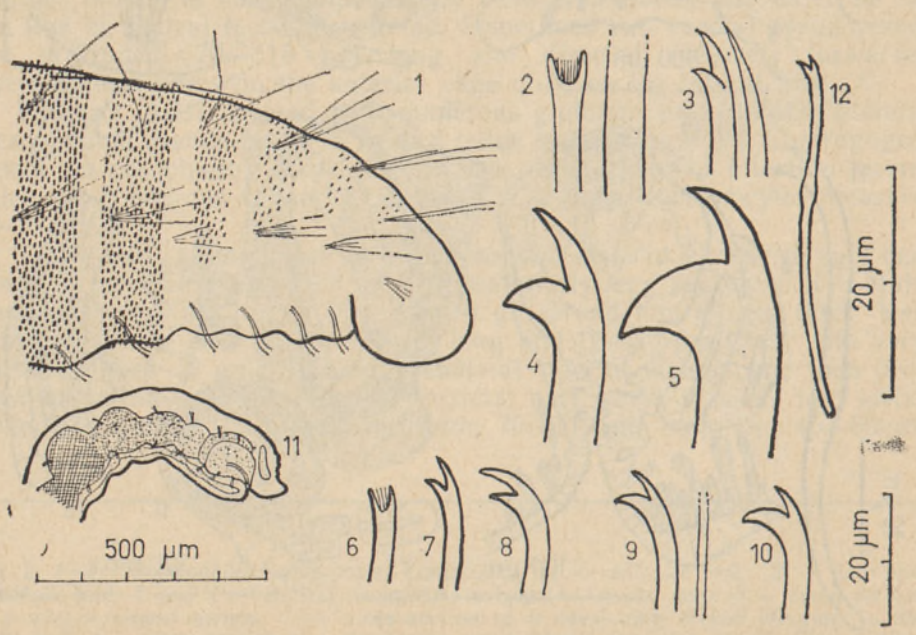

Fig. 3. *1—5*: *Embolocephalus nikolskyi*, Popov Island (*1* — anterior end; *2* — pectinate and hair seta; *3* — ventral setae of II; *4* — ventral seta of V; *5* — posterior ventral seta). *6—8*: *Tubificidae* gen. sp. N 1, Komarovka (*6* — pectinate seta; *7* — posterior dorsal bifid seta; *8* — anterior ventral seta). *9—10*: *Tubificidae* gen. sp. N 2, Popov Island (*9* — dorsal setae; *10* — ventral seta). *11—12*: *Tubificidae* gen. sp. N 3, Komarovka (*11* — anterior end; *12* — seta).

Embolocephalus nikolskyi (Lastočkin et Sokolskaja, 1935). Fig 3, *1—5*

Besides 3 injured specimens from the Komarovka, an intact postreproductive worm was collected on Popov Island near Vladivostok. The latter was 29 mm long and 0.8 mm thick, with ca 90 segments. Dense cover of oval papillae (10—15×20—25 μm), sparser anteriorly and lacking on I and prostomium. Hair and pectinate setae 2—4 per anteclitellar bundle, 1—2 on tail. Hair setae smooth, 350—550 μm long anteriorly, shorter on tail, 6 μm thick. Pectinates on anterior segments with almost parallel main teeth and very fine intermediates, 80—130 μm long and only 4 μm thick. Posterior pectinates invisible (hidden in body wall?). In ventral bundles of II—III a simple and a bifid seta together, the latter with a considerably longer distal tooth; on following segments 2 bifids per bundle, with teeth gradually equating. Anterior ventral setae 130—160 μm long. No ventral setae on X and XI in the postreproductive animal. Posterior ventral crotchets mostly single, 110—150 μm long, rather thick and curved, with robust and bent proximal tooth.

The worms correspond well to *E. nikolskyi* from Kamchatka and the Amur River (Сокольская, 1983*a*; Holmquist, 1979) and differ from *E. oregonensis* described from western North America and West Siberia. The latter has some pilose hair setae, pectinates of another shape, and more straight and conical posterior ventral setae (Тимм, Медведев, 1972), Joining *E. oregonensis* and some other species with *E. nikolskyi* by Brinkhurst (1986) seems to me unjustified.

Tubificidae gen. sp. No 1. Fig. 3, *6—8*

The single immature specimen was 6 mm long and 0.4 thick, with 47 segments. Chloragogen tissue from VI onwards, intestine begins in VIII, reproductive system in XI. Hair setae smooth, (1)2(3) per bundle and 250—380 μm long anteriorly, single and shorter afterwards, lacking on tail. Dorsal pectinates 3—4 per bundle, 70—90 μm long, with blunt main teeth and tiny intermediates. Bifids in ventral bundles and also in posterior dorsal bundles, 70—90 μm long, with a considerably longer (thicker and more curved on anterior bundles) distal tooth, 3—5 per anterior bundle, 2 beginning from X.

Tubificidae gen. sp. No 2. Fig. 3, *9—10*

A single tail piece of a larger worm: 12 mm long, 0.7 mm thick, with 60 segments. Dorsal bundles contain usually 3 bifids with a shorter and thinner distal tooth; they are 80—100 μm long and 4 μm thick. On first segments of the fragment also single small hair setae, 160—200 μm long and ca 1 μm thick. In ventral bundles 3—4 similar bifids, somewhat longer than dorsal ones, 100—120 μm long and 5 μm thick.

Tubificidae gen. sp. No 3. Fig. 3, *11—12*

These small juvenile worms from the upper reach of the Komarovka were only 2.5 mm long and 0.15 mm thick, with 28 segments. Prostomium tiny and erect, II—IV and the very tail inflated. Setae from II on, uniform bifids with equal or the distal one somewhat shorter. 4 setae in anterior bundles, only 1 on the tail; their length 20—45 μm (maximal on IV—V). Broad pharynx in III—IV covered with globular multicellular glands. Chloragogen tissue on oesophagus begins in VI, detrius-filled intestine in VIII.

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VEE-VÄHEHARJASUSSE NSV LIIDU KAGUNURGAST

1. *Naididae* ja *Tubificidae*

Primorje krai lõunaosast, peamiselt Komarovka ja Frolovka mägiojadest aastail 1983—1986 kogutud väheharjasusside seas leiti 7 liiki *Naididae* ning 10 liiki ja ligemalt määramata vormi *Tubificidae*. Neist on *Rhyacodrilus suputensis* ja *R. komarovi* teadusele uued liigid. *Piguetiella michiganensis* on uus NSV Liidu faunas ning veel 8 liiki ja vormi on uued Lõuna-Primorjes. Suured lahknevused kahe oja fauna vahel on põhjustatud osalt elutingimuste erinevusest, osalt geograafilisest isolatsioonist.

ТАРМО ТИММ

ВОДНЫЕ МАЛОЩЕТИНКОВЫЕ ЧЕРВИ С КРАЙНЕГО ЮГО-ВОСТОКА СССР

1. *Naididae* и *Tubificidae*

Среди малощетинковых червей, собранных в 1983—1986 гг. в южной части Приморского края, преимущественно из горных речек Комаровка и Фроловка, найдены 7 видов *Naididae*, 10 видов и форм *Tubificidae*. Среди них *Rhyacodrilus suputensis* (близкий к *R. coccineus*) и *R. komarovi* (близкий к *R. levanidovae*) — новые виды для науки, *Piguetiella michiganensis* — новый для фауны СССР, а еще 8 видов и форм — новые для Южного Приморья. Значительные различия между фауной обеих речек вызваны отчасти различиями в условиях среды, а отчасти — географической изоляцией.