



A new species of the genus *Chaetozone* (Annelida: Cirratulidae) from the seaward part of Chaunskaya Bay in the East Siberian Sea (Russia)

Новый вид рода *Chaetozone* (Annelida: Cirratulidae) из мористой части Чаунской губы Восточно-Сибирского моря (Россия)

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Abstract. Based on material collected by the author over several years and seasons in Chaunskaya Bay of the East Siberian Sea, a new species, *Chaetozone buzhinskajae* **sp. nov.**, is described. Morphologically, it is most similar to *Ch. setosa* Malmgren, 1867 and *Ch. pugettensis* Blake, 2015, which belong to a group of species characterised by an enlarged lobe or crest covering the peristomium. The new species is distinguished by the presence of neuropodial spines in the anterior part of the last third of the body (from the 48th to the 72nd setigerous segment), a complete achaetous segment that is well separated from the peristomium and setiger 1, and a distinctive methylene green staining pattern. Specimens were collected at depths ranging from 12 to 50 m in the seaward part of the bay.

Резюме. На основе материалов, собранных автором в различные годы и сезоны в Чаунской губе Восточно-Сибирского моря, описан вид *Chaetozone buzhinskajae* **sp. nov.** Морфологически новый вид наиболее близок к *Ch. setosa* Malmgren, 1867 и *Ch. pugettensis* Blake, 2015, принадлежащих к группе видов с увеличенной лопастью или гребнем, покрывающим перистомииум. Новый вид характеризуется наличием невроподиальных ацикуловидных щетинок в последней трети тела (с 48 по 72 щетинковый сегмент), наличием хорошо развитого бесщетинкового сегмента тела, полностью отделенного от перистомииума и первого щетинкового сегмента тела, и характерной окраской метиленовым зеленым. Вид встречается на глубинах от 12 до 50 м в мористой части залива.

Key words: benthos, East Arctic, taxonomy, Polychaeta, Cirratulidae, *Chaetozone*, new species

Ключевые слова: бентос, Восточная Арктика, таксономия, Polychaeta, Cirratulidae, *Chaetozone*, новый вид

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Introduction

The family Cirratulidae is one of the least taxonomically studied groups of polychaete worms in the Siberian sector of the Arctic Ocean. In a review of Arctic polychaetes, Zirkov (2001) mentioned only one species, *Chaetozone setosa* Malmgren, 1867, and did not provide an identification key for

this family, citing a lack of specialised studies on the fauna of cirratulids. Blake (1996, 2006) noted that within the materials previously assigned to a single species (*Ch. setosa*, the type species), there are numerous locally endemic species, each characterised by distinct habitat preferences, depth ranges, and geographical distributions. His research in the American Arctic revealed eight new species

within the genus *Chaetozone* Malmgren, 1867 and two species within *Tharyx* Webster et Benedict, 1887, most of which exhibit relatively narrow depth ranges and distributions (Blake, 2015). Within the genus *Chaetozone*, the author also identified three species-groups: (1) the *Ch. setosa* group, which includes species with an enlarged lobe or crest covering the peristomium; (2) the *Ch. bansei* group, comprising species with posteriorly displaced dorsal tentacles that overlap the bristle segment; and (3) the *Ch. curvata* group, which contains species with needle-like spines that have thin tips bending posteriorly and merging with the shaft, forming a blunt surface tip (Blake, 2015).

The genus *Chaetozone* is one of the largest and most diverse groups of cirratulids, consisting of species that exhibit uniform morphology. Currently, ten species of *Chaetozone* are recognised in the North Atlantic (*Ch. setosa*, *Ch. jubata* Chambers et Woodham, 2003, *Ch. gibber* Woodham et Chambers, 1994, *Ch. christiei* Chambers, 2000, *Ch. carpenteri* McIntosh, 1911, *Ch. pseudosetosa* Grosse, Capa et Bakken, 2021, *Ch. quinta* Grosse, Capa et Bakken, 2021, *Ch. barentsensis* Grosse, Capa et Bakken, 2021, *Ch. montevertii* Grosse, Capa et Bakken, 2021, and *Ch. chambersa* Grosse, Capa et Bakken, 2021), while eight species are recorded in the North Pacific (*Ch. pigmentata* Blake, 2015, *Ch. bathyala* Blake, 2015, *Ch. careyi* Blake, 2015, *Ch. ruffi* Blake, 2015, *Ch. malmgreni* Blake, 2015, *Ch. pugettensis* Blake, 2015, *Ch. hobsonae* Blake, 2015, and *Ch. camasetosa* Blake, 2015).

Despite the existence of over 80 species within the genus *Chaetozone* that inhabit various regions of the World Ocean (Read & Fauchald, 2024), only the type species, *Ch. setosa*, has been recorded from the eastern sector of the Russian Arctic seas (Gagaev, 1987, 1994, 2004, 2010). A new species of Cirratulidae from the Russian Arctic region, specifically from the seaward area of Chaunskaya Bay in the East Siberian Sea, is described in this article.

Material and methods

The material was collected by the author over several years using a 0.025 m² Petersen bottom grab, operated from aboard a vessel. During winter months, the grab was sometimes deployed through a hole in the ice. In the 1980s, live poly-

chaetes were placed in a magnesium chloride anesthetic solution, then fixed in a 5% formaldehyde solution, and two weeks later, transferred to 75% ethanol. Samples collected in the 1990s were directly fixed in formaldehyde. A small portion of the material was preserved directly in ethanol. All specimens were examined using light microscopy with a Biolar research microscope and an MSP-2 stereomicroscope. Photomicrographs were captured using a Nikon SMZ-25 and a ToupCam 5.1 MP cameras. Some specimens were additionally stained with a saturated solution of methyl green in ethyl alcohol to reveal the color patterns.

All the material examined, including the type specimens of the new species, is housed in the Annelid collection at the Zoological Institute of the Russian Academy of Sciences (ZIN).

Taxonomy

Family Cirratulidae

Genus *Chaetozone* Malmgren, 1867

Chaetozone buzhinskajae sp. nov.

(Figs 1, 2)

Chaetozone setosa (non Malmgren, 1867): Gagaev, 1987: 649–651, 1994: 148–177, 2004: 415–419, 2010: 8–40; Golikov et al., 1994: 4–111; Buzhinskaja, 2001: 52–66.

Holotype. ZIN 1/50690, male, **Russia**, *East Siberian Sea*, Chaunskaya Bay, Pevek Strait, R/V Hydrograph, 50 m, silt, 69°10'N 170°12'E, 18 July 1991, coll. S. Gagaev.

Paratypes. **Russia**, *East Siberian Sea*, Chaunskaya Bay: Pevek Strait: ZIN 2/50691, 2 females 22.0–25.3 mm long, R/V Hydrograph, 50 m, silt, 69°10'N 170°12'E, 18 July 1991, coll. S. Gagaev; ZIN 3/50692, 2 females, 13.0–20.0 mm long, through a hole in ice, 13 m, silt, 69°07'30"N 170°16'30"E, 5 Apr. 1985, coll. S. Gagaev; ZIN 4/50693, 2 females, 28.0–29.5 mm long, R/V Hydrograph, 18 m, silt, 69°16'30"N 170°22'30"E, 18 Aug. 1990, coll. S. Gagaev; off Shelagskiy Cape: ZIN 5/50694, 2 females, 22.5–26.5 mm long, R/V Vukvol, 12 m, silt, 70°00'N 170°22'E, 10 Aug. 1986, coll. S. Gagaev, V. Potin & V. Petryashev; ZIN 6/50695, 1 female, 1 presumable male, 24.0–26.0 mm long, R/V Vukvol, 24 m, silt, 70°00'N 170°18'E, 10 Aug. 1986, coll. S. Gagaev, V. Potin & V. Petryashev.

Additional material examined (of relatively poorer preservation). **Russia**, *East Siberian Sea*, Chaunskaya Bay: 34 specimens, R/V Hydrograph, 50 m, 69°10'30"N 170°12'E, through a hole in ice, 18 July, 10 Oct.

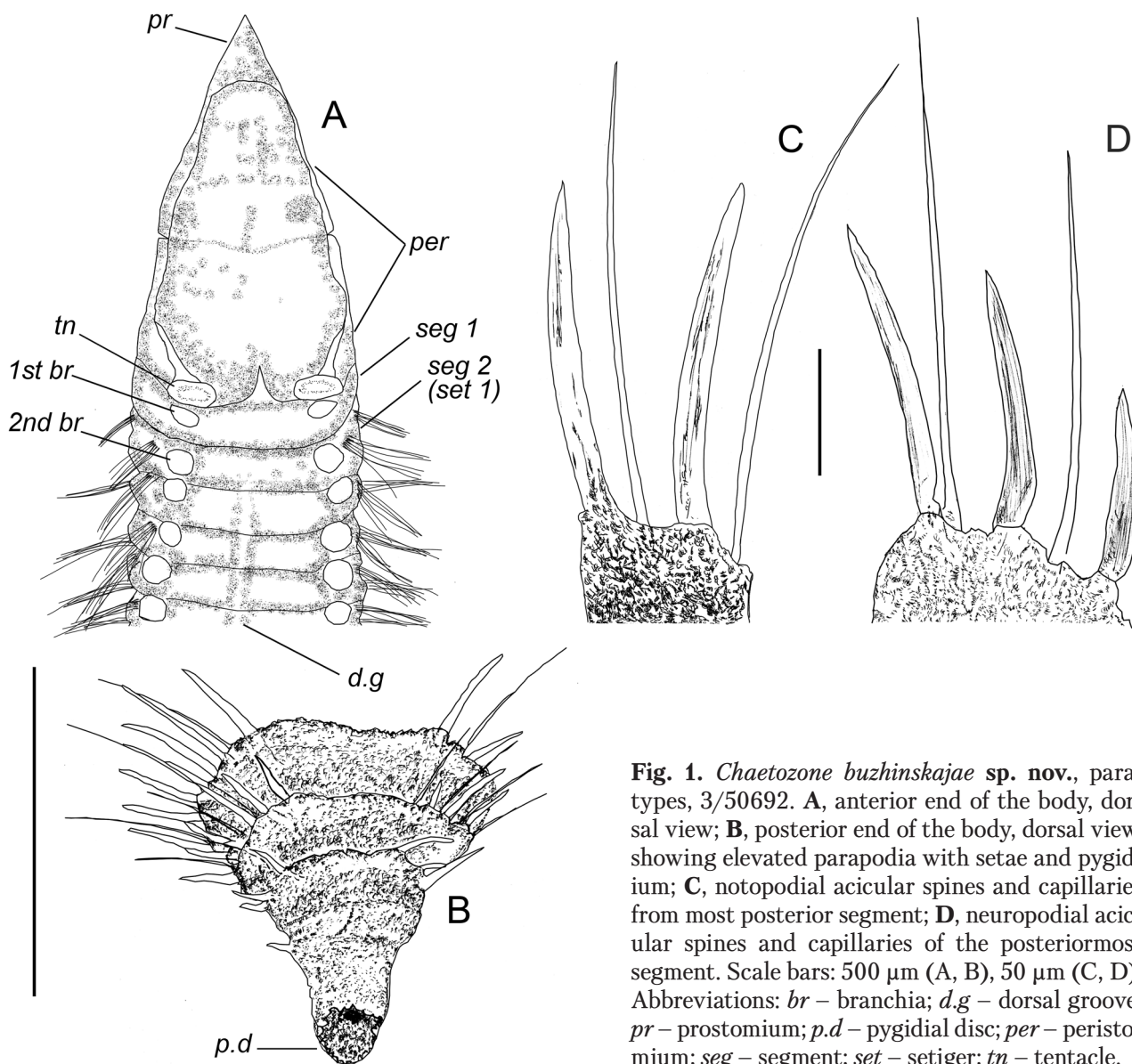


Fig. 1. *Chaetozone buzhinskajae* sp. nov., paratypes, 3/50692. **A**, anterior end of the body, dorsal view; **B**, posterior end of the body, dorsal view, showing elevated parapodia with setae and pygidium; **C**, notopodial acicular spines and capillaries from most posterior segment; **D**, neuropodial acicular spines and capillaries of the posteriormost segment. Scale bars: 500 µm (A, B), 50 µm (C, D). Abbreviations: *br* – branchia; *d.g* – dorsal groove; *pr* – prostomium; *p.d* – pygidial disc; *per* – peristomium; *seg* – segment; *set* – setiger; *tn* – tentacle.

1991, coll. S. Gagaev; 4 specimens, 13 m, 69°07'30"N 170°16'30"E, through a hole in ice, 5 Apr. 1985, coll. S. Gagaev; 27 specimens, R/V Hydrograph, 18 m, 69°16'30"N 170°22'30"E, 18 Aug. 1990, coll. S. Gagaev; 14 specimens, R/V Vukvol, 12 m, 70°00'N 170°22'E, 10 Aug. 1986, coll. S. Gagaev, V. Potin & V. Petryashev; 150 specimens, R/V Vukvol, 24 m, 70°00'N 170°18'E, 10 Aug. 1986, coll. S. Gagaev, V. Potin & V. Petryashev.

Diagnosis. Moderately sized species. Peristomium with prominent crest; achaetous segment complete, well separated from peristomium and setiger 1; neuropodial spines in posterior one third of body, from setigers 48 to 72; cinctures with 13 to 22 spines on each side; long, natatory-like noto-

setae absent; ventral groove well pronounced, occasionally extending to most posterior segments; methyl green staining pattern: peristomium with two dark spots resembling eyes.

Description (based on holotype and paratypes). Holotype, male, 25.5 mm long, 1.3 mm wide, consisting of 92 setiferous segments; paratypes up to 29.5 mm long, 1.6 mm wide, consisting of 105 setiferous segments (Table 1). Most preserved specimens (fixed in formaldehyde) coiled annularly. Body thickened in middle part, narrowing anteriorly and posteriorly. Setiferous segments in anterior part of body short, wide, gradually becoming nearly twice as long in middle segments

Table 1. Morphometric characters of *Chaetozone buzhinskajae* sp. nov.

Specimens	Sex	Body length / width (mm)	Number of setigers	Beginning of neuropodial spines, No. of setiger	Beginning of notopodial spines, No. of setiger	Maximum number of aciculars in neuropodia/notopodia
holotype 1/50690	male	25,5/1,3	92	51	58	7/8
2 paratypes 2/50691	female	25,3/1,0	91	48	56	7/8
	female	22/0,8	82	48	57	6/7
2 paratypes 3/50692	female	20/1,0	95	—	—	10/10
	female	13/0,6	85	51	59	7/8
2 paratypes 4/50693	female	29,5/1,6	105	72	79	11/11
	female	28/1,4	95	69	75	9/9
2 paratypes 5/50694	female	26,5/1,6	95	62	71	10/10
	female	22,5/1,2	94	55	63	8/9
2 paratypes 6/50695	female	26/1,5	95	59	68	10/10
	male?	24/1,5	99	64	70	8/9

compared to anterior ones. Middle segments consistently shorter than their width, except in individuals containing oocytes. Dorsal groove weakly pronounced, narrow, located only at anterior setiferous segments; ventral groove well pronounced, visible along entire length of body, reaching most of posterior cinctured segments (Figs 1A, 2A, C). Colour in alcohol varying from light yellow to brown, without distinct pigmentation.

Prostomium conical, narrow, pointed anteriorly (Fig. 1A, 2A, B); eyes absent; nuchal organs shaped as oval slits, pigmented. Peristomium with two distinct large rings, being most clearly visible in lateral view, along with elongated, swollen dorsal crest narrowing anteriorly, extending posteriorly to approximately anterior margin of achaetous segment 1 (Fig. 1A, 2A, *seg 1*); dorsal crest with weakly expressed or absent rings. Achaetous segment complete, well separated from peristomium and setiger 1, approximately equal in size to subsequent setigers (Fig. 1A, 2A).

Dorsal tentacles arising from notch at posterior margin of peristomium (Fig. 1A, 2A, B). First pair of branchiae located posterior to tentacles at achaetous segment (1A, 2A, *seg 1*). Second pair of branchiae located on setigerous segment 2 (Fig. 1A, 2A, *seg 2, set 1*). Branchiae thick in cross-section, located on anterior margins of segments (Fig. 1A, 2A).

Parapodial lobes of anterior and middle setigers reduced to inconspicuous ridges (Fig. 1A), on posterior setigers, enlarged, with distinct, raised ridges. Posterior setigers with cinctures bearing prominent acicular and capillary setae (Fig. 1B). Segment 2 (Fig. 1A, 2A, *set 1*) and subsequent segments with noto- and neurosetae being limbate capillaries at anterior setigers, numbering about five to eight per fascicle. Capillaries smooth, straight, thick, present beginning from approximately setigers 15 to 30, extending to posterior ones. They typically somewhat longer than anterior limbate and acicular setae, with noticeable increasing in length observed only in large, mature individuals (Fig. 2E). Long, natatory-like notosetae absent in mature individuals. In eleven specimens (Table 1) having 82 to 105 setigerous segments (mean = 92, SD = 6.2), acicular spines present starting from setigers 48 to 72 in neuropodia (mean = 58, SD = 8.7) and from setigers 56 to 79, in notopodia (mean = 66, SD = 8.1). Spines numbering one or two anteriorly, accompanied by thickened capillaries, reaching up to seven to eleven in notopodia and up to six to eleven in neuropodia posteriorly, forming complete posterior cinctures (Figs. 1B, 2D) bearing up to 22 spines on each side, alternating with thin capillaries (Fig. 1C–D). Spines with obtuse apices, slightly curved, with weak node or notch at extreme base,

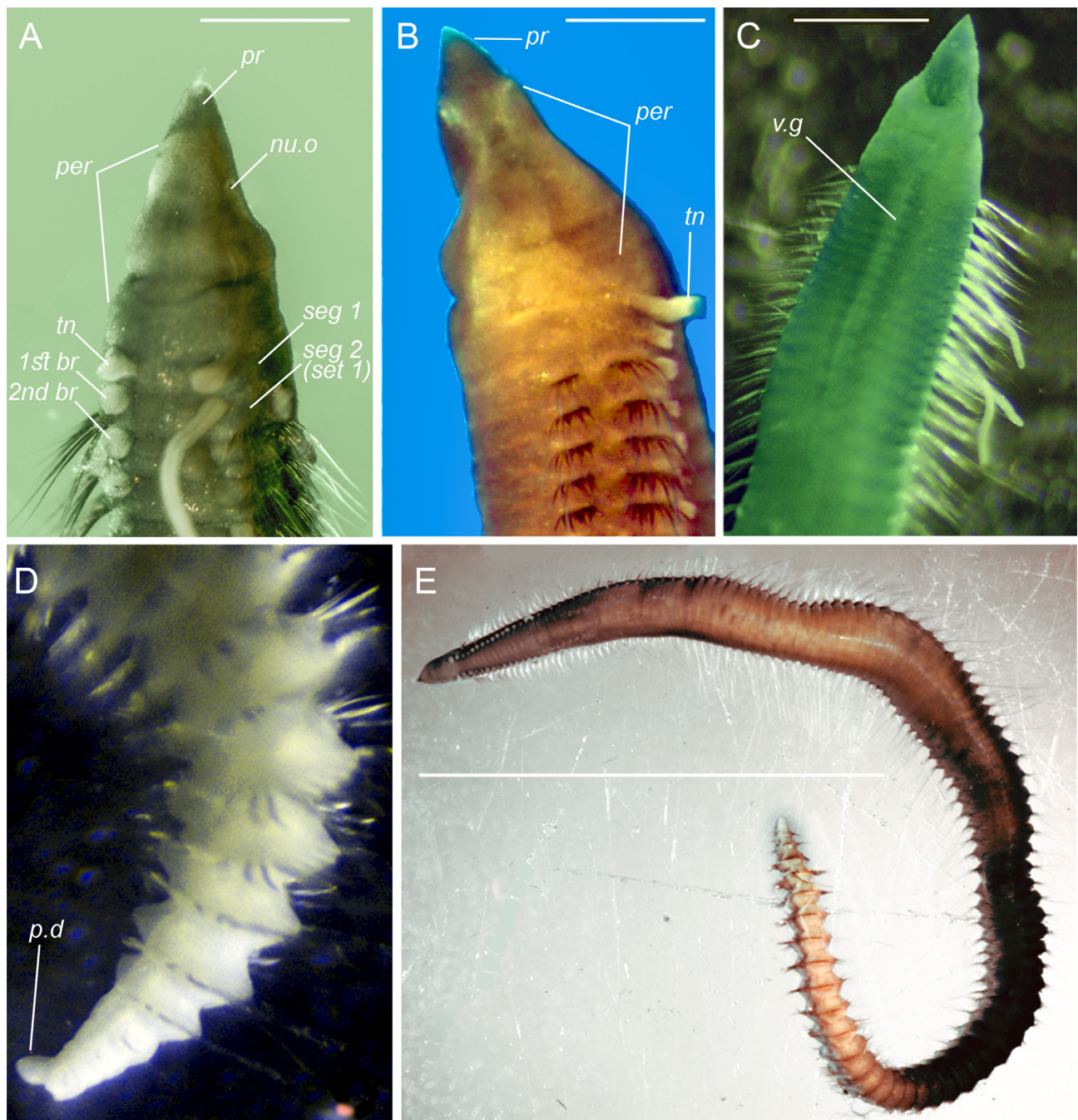


Fig. 2. *Chaetozone buzhinskajae* sp. nov. **A**, anterior end of the body, dorsal view; **B**, anterior end of the body, left lateral view; **C**, anterior end of the body, ventral view; **D**, posterior end of the body, left lateral view, showing elevated parapodia with setae and pygidium; **E**, general appearance. Holotype, 1/50690 (A–C); paratypes, 3/50692 (D); paratype, 4/50693 (E). Scale bars: 500 μ m (A, B, C), 250 μ m (D), 10 mm (E). Abbreviations as in Fig. 1; *nu.o* – nuchal organ.

with thick margins and fine internal striations (Fig. 1C, D). Spines never overlapping at midline dorsally, even in largest adult specimens (Fig. 1B). Most of the posterior setae, few in number, encircling setigers, tapering apically.

Pygidium with terminally located anus and small flattened ventral disk, occasionally having weakly serrated margin (Figs. 1B, 2D).

Methyl green staining pattern. Apex of prostomium and peristomial rings stained with strokes

extending dorsally and laterally. Occasionally, peristomium with pigment spots resembling eyes.

Comparison. The new species belongs to the *Chaetozone setosa* species-group, which includes species characterised by an enlarged lobe or crest that overlays the peristomium (*Ch. setosa*, *Ch. carpenteri* McIntosh, 1911, *Ch. corona* Berkeley et Berkeley, 1941, *Ch. platycera* Hutchings et Murray, 1984, and *Ch. pugettensis*). *Chaetozone buzhinskajae* sp. nov. closely resembles the type species, *Ch. setosa*, and *Ch. pugettensis*, particularly in the configuration of the two large peristomial rings, which are dorsally covered by an inflated and occasionally bulbous dorsal ridge or crest. Additionally, they share similarities in the position of the dorsal tentacles and the first pair of branchiae, as well as in the number and structure of the posterior spines. These three species exhibit weakly developed dorsal groove and well-defined ventral groove along the body. *Chaetozone buzhinskajae* sp. nov. shares a distinct methyl green staining pattern with *Ch. setosa*, a character that is not present in *Ch. pugettensis*.

The neuropodial spines of *Ch. buzhinskajae* sp. nov. emerge in the posterior one third of the body, beginning at setiger 48–72, in contrast to setiger 35–65 in *Ch. setosa* and setiger 50–53 in *Ch. pugettensis*. The new species is distinguished from *Ch. setosa* by the absence of true long, natatory-like capillaries and the presence of a complete achaetous segment that is well separated from setiger 1. *Chaetozone setosa* exhibits an incomplete achaetous segment that is partially fused to setiger 1. The presence or absence of natatory-like capillaries cannot be reliably used as a consistent taxonomic character, as their occurrence is influenced by sexual maturity in certain species (Blake, 2015). Nevertheless, this characteristic aligns the new species more closely with all other members of the genus *Chaetozone*.

Unlike *Ch. buzhinskajae* sp. nov., the Mediterranean species *Ch. carpentieri* has enlarged and elongated noto- and neuropodial acicular spines that first appear in the anterior setigers 6–9. *Chaetozone corona* from Southern California can be easily distinguished from *Ch. buzhinskajae* sp. nov. and other species with an enlarged crest overlaying the peristomium by the presence of neuropodial spines beginning at setiger 1, as well as a pair of black eyes. The noto- and neuroacicular spines

in the Australian species *Ch. platycera* commence on the anterior setigers (approximately from 23 in the notopodia and 47 in the neuropodia, with up to 11–13 spines per side) rather than in the posterior one third of the body, as observed in *Ch. buzhinskajae* sp. nov. (which has up to 13–22 spines per side).

Bionomics. The new species inhabits diverse benthic macrofaunal communities, comprising over 100 invertebrate species found in the shallow waters (12–50 m) off Bolshoy Routan Island, located in the seaward part of Chaunskaya Bay. The sediments in the study area are characterised by silt, with varying proportions of sand and small stones.

Additional information regarding the annelid fauna recorded in the studied area can be found in Gagaev (1994, 2004). The species *Ch. setosa* mentioned in the last two publications is now identified as *Ch. buzhinskajae* sp. nov. Notably, *Ch. setosa* was absent from the material collected in Chaunskaya Bay.

The most abundant polychaetes co-occurring with *Ch. buzhinskajae* sp. nov. were *Micronephthys minuta* (Theel, 1879) and *Nereimyra aphroditoides* (Fabricius, 1780). The abundance of the new species was 653 ± 232 individuals per m^2 , with a biomass of 6.5 ± 2.1 g/ m^2 and a production of 8.3 ± 3.5 kcal/ m^2 per year. Worms reach sexual maturity after one year of age and a length of 12–15 mm. The spawning period is extended, occurring from February (after the end of the polar night) to October. Individuals attain their maximum size at over four years of age and typically die with the onset of winter (Gagaev, 2004). The largest paratype observed has a body filled with oocytes approximately 300 μ m in diameter.

Etymology. The species is named in honor of the late Soviet and Russian taxonomist, Galina Nikolaevna Buzhinskaja (1938–2023) (ZIN).

Distribution. Known from Chaunskaya Bay in the East Siberian Sea at depths ranging from 12 to 50 meters.

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