



<http://dx.doi.org/10.11646/zootaxa.3911.1.3>

<http://zoobank.org/urn:lsid:zoobank.org:pub:1F69EB9B-62F6-4D27-B773-749F292E4A05>

New deep-sea free-living marine nematodes from the Sea of Japan: the genera *Siphonolaimus* and *Halichoanolaimus* (Nematoda: Chromadorea) with keys to species identifications

ZOGRAF JULIA^{1,2,3}, TREBUKHOVA YULIA¹ & PAVLYUK OLGA¹

¹A.V. Zhirmunsky Institute of Marine Biology FEB RAS, 17 Paltchevsky Str., Vladivostok, 690041, Russia.

E-mail: zofulia@yandex.ru; trebukhova@gmail.com; styopa_05@mail.ru

²Far Eastern Federal University, 8 Sukhanova St., Vladivostok, 690950, Russia

³Corresponding author

Abstract

In deep-sea sediments from the Sea of Japan, two new species, *Halichoanolaimus brandtae* sp. n. and *Siphonolaimus japonicus* sp. n., were found and described. *Siphonolaimus japonicus* sp. n. is characterized by having short anterior sensillae, body length of 3670–4500 µm, buccal cavity with axial spear, and length of the spicules. *Halichoanolaimus brandtae* sp.n is characterized by the number of amphideal rings, long spicules, five precloacal supplements and by having a long cylindrical part of the tail. Keys to species level are provided.

Key words: taxonomy, SEM, DIC, nematodes, description, new species, identification key

Introduction

Benthic studies were carried out in the Sea of Japan during joint Russian–German expedition SoJaBio (Sea of Japan Biodiversity Studies) aimed at exploring the Sea of Japan deep-sea benthos biodiversity. The SoJaBio project covered the following main biological topic: benthos biodiversity patterns in the Sea of Japan in comparison with adjacent basins.

The deep-sea nematofauna remains very poorly studied at both global and regional scales. Information on the deep-sea free-living nematode species of the northwestern Pacific remains extremely limited. For the Western coast of the Pacific Ocean there is a shortage of knowledge about the biodiversity of deep-sea free-living nematodes. It is known that the seas of the Pacific region are reckoned to be the marine area with the greatest biodiversity of the earth (Fadeeva *et al.*, 2012).

As part of studies to improve knowledge of deep-sea nematodes, benthic studies were carried out in the Sea of Japan during joint Russian–German expedition SoJaBio (Sea of Japan Biodiversity Studies) aimed at exploring the Sea of Japan deep-sea benthic biodiversity, particularly in comparison with adjacent basins.

This paper presents descriptions of two new species: *Halichoanolaimus brandtae* sp. n. and *Siphonolaimus japonicus* sp. n. found during SoJaBio with keys to species of both genera.

Although representatives of *Siphonolaimus* and *Halichoanolaimus* are often found in meiofoua samples, the last revisions were made in the last century (Wieser, 1954; Daschenko & Belogurov, 1991) and identification to species level is difficult because of the absence of identification keys.

Material and methods

Study area. The scientific cruise “SoJaBio” was conducted by the Russian RV “Akademik Lavrentyev” in August 2010 (Fig. 1). The samples were taken along four transects (A, B, C, D). In total, 164 samples of meiofauna were

grateful to Denis Fomin (IMB FEB RAS) for technical help with scanning electron microscopy. The study was financially supported by the Russian Foundation for Fundamental Research through grant award N 14-04-00334; Far Eastern Branch of Russian Academy of Sciences through grant awards N 15-II-6-003, N 12-III-A-06-098; Russian Federation through grant award N 2010-220-01-180, and FEFU through the grant award N 14-08-01-21-и.

References

- Allgen, C.A. (1929) Freilebende marine Nematoden aus der Umgebund der Staatlichen Zoologischen Station Kristineberg as der Westkuste Schwedens. *Capita Zoologica*, 2, 1–52.
- Allgen, C.A. (1930) Uber enige neue odr wenig bekannte Brachwasser-Nematoden von der Litoralzone des Oresunds. *Zoologischer Anzeiger*, 85, 58–72.
- Allgen, C.A. (1932) Weitere Beitrage zur Kenntnis der marinen Nematode Fauna der Campbellinsel. *Nyt Magazin for Naturvidenskaberne*, 70, 97–198.
- Allgen, C.A. (1933) Freilebende Nematoden aus dem Trondhjemsfjord. *Capita Zoologica*, 4, 56–57.
- Allgen, C.A. (1940) Norwegische marine Nematoden. *Zoologische Jahrbuecher Jena Systematik*, 76, 267–322.
- Allgen, C.A. (1946) Westnorwegische marine Nematoden. *Arkiv fur Zoologi*, 37, 1–32.
- Allgen, C.A. (1953) Revision der freilebenden marinen Nematoden aus der Umgebung der Staatlichen Zoologischen Station Kristineberg an der Westkuste Schwedens. *Zoologische Jahrbuecher Jena Systematik*, 81, 548–603.
- Allgen, C.A. (1957) On a small collection of free-living marine nematodes from Greenland and some other arctic regions with reviews and analyses of the compositions of all hitherto known arctic nematode faunas. *Meddelelser om Gronland*, 159, 1–42.
- Allgen, C.A. (1959) Free-living marine nematodes. *Further zoological results of the Swedish Antarctic Expedition*, 5, 1–293. [1901–1903]
- Belogurov, O.I. & Fadeeva, N.P. (1980) Notes on the genus *Halichoanolaimus* (Nematoda, Choanolaimidae) with the description of two new species. *Zoologicheskii Zhurnal*, 59, 656–665. [in Russian]
- Barnett, P.R.O., Watson, J. & Connolly, D. (1984) A multiple corer for taking virtually undisturbed samples from shelf, bathyal and abyssal sediments. *Oceanologica Acta*, 7, 399–408.
- Bastian, H.C. (1865) Monograph on the Anguillulidae, or free Nematoids, marine, land and freshwater; with descriptions of 100 new species. *Transactions of the Linnean Society, London*, 25, 73–184.
<http://dx.doi.org/10.1111/j.1096-3642.1865.tb00179.x>
- Boucher, G. (1971) Deux Especes Nouvelles de Monchysterida (Nematodes) de la Vase Terrigene Cotiere de Banyuls-Sur-Mer. *Bulletin de la Societe Zoologique de France*, 96, 557–562.
- Boucher, G. & Helleouet, M.-N. (1977) Nematodes des sables fins infralittoraux de la Pierre Noire (Manche occidentale). III. Araeolaimida et Monchysterida. *Bulletin du Musee d'Histoire Naturelle de Paris*, 427, 85–122.
- Chen, G. & Vincx, M. (2000) New and known Nematodes (Monchysteroida, Nematoda) from the Strait of Magellan and the Beagle Channel (Chile). *Hydrobiologia*, 429, 9–23.
<http://dx.doi.org/10.1023/A:1003995005971>
- Chitwood, B.G. (1933) A revised classification of the Nematoda. *Journal of Parasitology*, 20, 1–131.
- Chitwood, B.G. (1936) Some marine nematodes from North Carolina. *Proceedings of the Helminthological Society of Washington*, 3, 1–16.
- Chitwood, B.G. (1951) North American marine nematodes. *The Texas Journal of Science*, 4, 617–672.
- Cobb, N.A. (1894) *Tricoma* and other new nematode genera. *Proceedings of the Linnean Society of New South Wales*, 8, 389–421.
- Cobb, N.A. (1898) Australian free-living marine nematodes. *Proceedings of the Linnean Society of New South Wales*, 23, 383–407.
- Cobb, N.A. (1915) *Selachinema*, a new Nematode genus with remarkable mandibles. *Contributions to a Science of Nematology*, 4, 113–116.
- Daschenko, O.I. & Belogurov, O.I. (1991) The morphology of free-living marine nematode *Halichoanolaimus bispirae* sp.n. (Nematoda, Chromadorida, Choniolaimidae) from polychaetes colony. In: Fadeev, V.I., Zvyagintsev, A.Yu., Kubanin, A.A. & Bagaveeva, E.V. (Eds.), *Biological studies of benthos and fouling in the Sea of Japan*. DVO AN USSR, Vladivostok, pp. 98–104.
- De Coninck, L.A. & Schuurmans Stekhoven, J.H. (1933) The free-living marine nemas of the Belgian coast II. *Mémoires du Mus é e royal d ' Histoire naturelle de Belgique*, 58, 1–163.
- De Grisse, A.T. (1969) Redescription ou modifications de quelques techniques utilisees dans l'etude des nematodes phytoparasitaires. *Mededelingen Rijksfakultiet Landbouwwetenschappen Gent*, 34, 352–369.
- De Man, J.G. (1886) *Anatomische untersuchungen uber freilebende Nordsee-Nematoden*. Froberg, Leipzig, 82 pp.
- De Man, J.G. (1893) Cinquieme note sur les nematodes libres de la mer du Nord et la Manche. *Memoires de la Societe Zoologique de France*, 6, 81–126.
- Ditlevsen, H. (1918) Marine free-living nematodes from Danish waters. *Videnskabelige Meddelelser fra Dansk naturhistorik Forening i Kjobenhavn*, 70, 147–214.
- Ditlevsen, H. (1921) Papers from Dr. Th. Mortensen's Pacific Expedition 1914–16. III. Marine free-living Nematodes from the Auckland and Campbell Islands. *Videnskabelige Meddelelser fra Dansk naturhistorik Forening i Kjobenhavn*, 73, 1–32.
- Ditlevsen, H. (1930) Papers from Dr. Th. Mortensen's Pacific Expedition 1914–16. Marine free-living nematodes from New

- Zealand. *Videnskabelige Meddelelser fra Dansk naturhistorisk Forening i Kjobenhaven*, 87, 1–242.
- Fadeeva, N.P., Mordukhovich, V.V. & Zograf, J.K. (2012) New species of the genus *Oxyonchus* (Enoplida: Thoracostomopsidae) from the Far Eastern Seas. *Journal of Marine Biological Association of the United Kingdom*, 92, 947–957.
<http://dx.doi.org/10.1017/S0025315411001937>
- Filipjev, I.N. (1918) Free-living marine nematodes of the Sevastopol area. *Transactions of the Zoological Laboratory and the Sevastopol Biological Station of the Russian Academy of Sciences.*, 4, 1–350. [Series II]
- Gerlach, S.A. (1955) Zur Kenntnis der freilebenden marinen Nematoden von San Salvador. *Zeitschrift für wissenschaftliche Zoologie*, 158, 249–303.
- Gerlach, S.A. (1964) Revision der Choniolaiminae und Selachinematinae (freilebende Meeres-Nematoden). *Mitteilungen aus dem Hamburgischen zoologischen Museum und Institut*, 61, 23–50.
- Gourbault, N. & Vincx, M. (1985) Nématodes Abyssaux (campagne Walda du N/O/ "Jean Charcot"). V.Espèces nouvelles des Selachinematidae, dépourvues d'anus. *Cahiers de Biologie Marine*, 26, 87–97.
- Hasbrouck, E.R. (1966) *Halichoanolaimus raritanensis* n. sp. (Chromadoroidea: Cyatholaimidae) from New Jersey. *Proceedings of the Helminthological Society of Washington*, 33, 23–25.
- Hopper, B.E. (1961) Marine nematodes from the coast line of the Gulf of Mexico *Canadian Journal of Zoology*, 39, 183–199.
- Inglis, W.G. (1968) Interstitial nematodes from St. Vincent's Bay, New-Caledonia. Expedition Francaise sur les Recifs Coralliens de la Nouvelle-Caledonie, Paris. *Editions de la Fondation Singer-Polignac*, 2, 29–74.
- Malakhov, V.V. & Yushin, V.V. (1984) Study of sensory organs of free-living marine nematodes. 3. *Parachanthochus macrodon* (Chromadorida, Cyatholaimidae). *Zoologicheskii zhurnal*, 63, 1137–1143. [in Russian]
- Ott, J.A. (1972) Twelve new species of nematodes from an intertidal sandflat in North Carolina. *Internationale Revue der gesamten Hydrobiologie und Hydrographie*, 57, 463–496.
<http://dx.doi.org/10.1002/iroh.19720570307>
- Pastor de Ward, C. (1989) Free-living marine nematodes of the Deseado River estuary (Siphonolaimoidea, Siphonolaimidae, Linchomoeidae) Santa Cruz, Argentina. 6. *Studies on Neotropical Fauna and Environment*, 24, 231–247.
<http://dx.doi.org/10.1080/01650528909360794>
- Saveljev, S. (1912) Zur Kenntnis der freilebenden Nematoden des Kolafjords und des Relictensee Mogilnoje. *Trudy Imperatorskogo Sankt-Peterburzhskogo Obschestva Estestvoispitelei*, 43, 108–126.
- Schuermans Stekhoven, J.H. & Adam, W. (1931) The free-living marine nemas of the Belgian coast. *Memoires du Musee royal d'histoire naturelle de Belgique*, 49, 1–58.
- Schuermans Stekhoven, J.H. (1950) The free-living marine nemas of the Mediterranean. I. The Bay of Villefranche. *Institut Royal des Sciences Naturelles de Belgique Memoires*, 37, 1–220.
- Seinhorst, J.W. (1959) A rapid method for the transfer of nematodes from fixative to anhydrous glycerin. *Nematologica*, 4, 97–69.
<http://dx.doi.org/10.1163/187529259X00381>
- Sergeeva, N.G. (1973) New species of free-living nematodes from the order Chromadorida in the Black Sea. *Russian Journal of Zoology*, 52, 1238–1241.
- Steiner, G. (1921) Beitrage zur Kenntnis mariner Nematoden. *Zoologische Jahrbucher*, 44, 1–68.
- Tchesunov, A.V. (2014) Order Chromadorida Chitwood 1933. In: Schmidt-Rhaesa, A. (Ed.), *Handbook of Zoology: Gastrotricha, Cycloneuralia and Gnatifera, Volume 2: Nematoda*, Walter de Gruyter GmbH, Berlin/Boston, pp. 373–398.
- Timm, R.W. (1954) *A survey of the marine nematodes of Chesapeake Bay, Maryland*. Washington, Catholic University of America Press, 70 pp.
- Timm, R.W. (1961) The marine nematodes of the Bay of Bengal. *Proceedings of the Pakistan Academy of Sciences*, 1, 25–88.
- Trebukhova, Yu.A., Miljutin, D.M., Pavlyuk, O.N., Mar'yash, A.A. & Brenke, N. (2013) Changes in deep-sea metazoan meiobenthic communities and nematode assemblages along a depth gradient (North-western Sea of Japan, Pacific). *Deep-sea Research*, II, (86–87), 56–65.
<http://dx.doi.org/10.1016/j.dsr2.2012.08.015>
- Turpeenniemi, T.A., Nasira, K. & Maqbool, M.A. (2001) A new genus, five new and five known species of free-living marine nematodes (Nematoda: Monhysterida; Chromadorida) from Arabian Sea of Pakistan. *Pakistan Journal of Nematology*, 19, 1–31.
- Vitiello, P. (1970) Nématodes libres marins des vases profondes du Golfe du Lion. II. Chromadorida, *Téthys*, 2, 449–500.
- Warwick, R.M. (1973) Free-living marine nematodes from the Indian Ocean. *Bulletin of the British Museum of Natural History (Zoology)*, 25, 85–117.
- Warwick, R.M. & Platt, H.M. (1973) New and known marine nematodes from a Scottish sandy beach. *Cahiers de Biologie Marine*, 14, 135–158.
- Warwick, R.M., Platt, H.M. & Somerfield, P.J. (1998) *Free-living marine nematodes: pictorial key to world genera and notes for the identification of British species. Part 3: Monhysterids*. No. 53. Shrewsbury: Field Studies Council, 296 pp.
- Wieser, W. (1956) Free-living marine nematodes. III. Axonolaimoidea and Monhysteroidea. Chile reports 26. *Lunds Universitets Arsskrift*, 52, 1–115.
- Wright, K.A. & Hope, W.D. (1968) Elaborations of the cuticle of the *Acanthonchus duplicatus* Wieser, 1959 (Nematoda: Cyatholaimidae) as revealed by light and electron microscopy. *Canadian Journal of Zoology*, 46, 1005–1011.
<http://dx.doi.org/10.1139/z68-140>
- Zhang, Y. & Zhang, Z.-N. (2010) A new species and a new record of the genus *Siphonolaimus* (Nematoda, Monhysterida) from the Yellow Sea and the East China Sea, China. *Acta Zootaxonomica Sinica*, 35, 16–19.
- Zur Strassen, O.L. (1904) *Anthraconema*, eine neue Gattung freilebender Nematoden. *Zoologische Jahrbucher*, Supplements 7, 301–343.