Zootaxa 3785 (3): 419–437
www.mapress.com/zootaxa/

Article

ISSN 1175-5326 (print edition)
ZOOTAXA
ISSN 1175-5334 (online edition)

http://dx.doi.org/10.11646/zootaxa.3785.3.5
http://zoobank.org/urn:lsid:zoobank.org:pub:C160D221-D032-48C6-A8D0-11ED1AE1C7FE

Two new species of free-living marine nematodes (Nematoda: Oncholaimida: Enchelidiidae) from Maemul Island, Korea

JUNG–HO HONG & WONCHOEL LEE[1]
Department of Life Science, College of Natural Sciences, Hanyang University, Seoul 133–791, Korea
[1]Corresponding author. E-mail: wlee@hanyang.ac.kr

Abstract

Two new species of the family Enchelidiidae Filipjev, 1918 were collected from marine sediments near Maemul Island in South Korea: a new species of *Abelbolla* Huang & Zhang, 2004 and a new species of *Ledovitia* Filipjev, 1927. *Abelbolla maemulensis* **sp. nov.** is characterized by its small size (1,493 × 38 µm, body length × maximum body diameter); the presence of a circular amphid; the gubernacular apophysis with swollen distal tip; and the complex structure of the gubernaculum. It is close to *Abelbolla huanghaiensis* Huang & Zhang, 2004, but differs by the structure of gubernacular apophysis and body length (1,493 *vs* 2,303 µm). *Ledovitia brevis* **sp. nov.** can be separated from its congeners by its small size of body, the length of gubernacular apophysis, and the length of the spicules. It is close to *Ledovitia pharetrata* Wieser, 1953a, but differs by the length of the body (1,699 *vs* 2,640 µm) and the spicules (40 *vs* 100 µm).

Key words: *Abelbolla, Ledovitia*, new species, morphology, taxonomy, South Korea

Introduction

About 7,000 species of free-living marine nematodes have been described (Appeltans *et al.* 2012). Many intensive taxonomic studies of free-living marine nematodes have been undertaken in Europe. Recently, several papers have been published on the marine free-living nematode fauna of China (about 192 species, Ma *et al.* 2012). From Korea, about 40 species of free-living marine nematodes of the family Draconematidae and Comesomatidae have been described (Rho & Min 2011, Barnes *et al.* 2012).

The family Enchelidiidae is comprised of one subfamily, 18 genera and 171 species (Hodda 2011). The genera *Abelbolla* and *Ledovitia* are characterized by having the pharynx without several bulbs. Many characters are similar in the two groups, but *Abelbolla* is strongly attenuated in the anterior end of the body, while *Ledovitia* has extremely long cervical setae and a weakly developed male genital apparatus (Smol & Coomans 2006).

The genus *Abelbolla* was established by Huang & Zhang in 2004 with type species *Abelbolla boucheri* Huang & Zhang, 2004. Three species of *Abelbolla* have been described from the Yellow Sea so far. The Genus *Ledovitia* was established by Filiepjev in 1927 with type species *Ledovitia hirsuta* Filipjev, 1927. Ten species of *Ledovitia* have been described to date. The present study aims to describe two new species belonging to these genera and collected from near Maemul Island, Korea.

Materials and methods

During a survey on the meiofauna community in the South Coast of Korea, specimens were collected at station SE 6 (34° 35′ 40″ N, 128° 45′ 13″ E), SE 19 (34° 34′ 46″ N, 128° 25′ 1″ E) around Southern parts of Maemul Island, Korea (Fig. 1) in December 2010. Sediment samples were taken using a 0.1 m^2 Van-Veen grab, and meiofauna samples were taken using a hand-held corer (surface area: 10 cm^2). All samples were fixed immediately in 4% neutral buffered formalin at air temperature. In the laboratory, meiofauna were extracted following the protocol of Burgess (2001) and nematodes were sorted using a grid Petri dish under a stereoscopic microscope (Olympus SZX-

Accepted by K. Davies: 13 Feb. 2014; published: 4 Apr. 2014

special characters, including having a circular amphidial fovea, a complex structure of the gubernaculum and a long gubernacular apophysis. In other species of *Abelbolla*, the amphid has been too faint for description. *Abelbolla warwicki* is the longest and broadest species in the genus. It also differs from other species of the genus by having reduced precloacal supplements. *Abelbolla boucheri*, *A. huanghaiensis*, and *A. maemulensis* **sp. nov.** have two winged precloacal supplements. *Abelbolla boucheri* differs from the new species by having a short, slender spicule and reduced gubernaculum (Table 2). The new species resembles *A. huanghaienesis* in the length of the spicule, spicule shape and in having a hook at the distal end of the spicule. However, the new species is distinguished from *A. huanghaienesis* by having a complex gubernaculum, gubernacular apophysis with swollen distal tip, short body, and relatively thicker body and shorter tail (Table 2).

The genus *Ledovitia* was established by Filipjev, 1927, and is characterized by having especially long cervical setae and a weakly developed gubernaculum. The new species differs from *L. fallae* from the Kerguelen Islands, Antarctica, *L. honorata* from Kievka Bay, Russia, and *L. obtusidens* (Stekhoven, 1950) Vitiello, 1970 from the Mediterranean Sea by having ten cephalic setae of equal length. *Ledovitia hirsuta* Filipjev, 1927 from the Kara Sea of the Arctic, can be separated from *L. brevis* **sp. nov.** by the absence of the preanal & caudal setae, long body, relatively short tail, and length of spicule (Table 4). The new species is close to *L. pharetrata* from Puerto Montt, Chile in having both preanal & caudal setae. Furthermore, the new species resembles *L. pharetrata* in the form of the spicule and gubernaculum. However, *L. brevis* **sp. nov.** can be distinguished from *L. pharetrata* by its short, thin body, the length of spicule and the ratio of spicule length to tail diameter (Table 4).

The genera *Abelbolla* (4 species) and *Ledovitia* (6 species) are part of a small group within the family Enchelidiidae (171 species). According to Smol & Coomans (2006) and Fonseca–Genevois *et al.* (2009), the genera *Abelbolla* and *Ledovitia* are easily differentiated from all other taxa of the Enchelidiidae by having no bulb–like muscular swellings in the pharynx (unlike the genera *Belbolla* and *Polygastrophora*); three teeth in the buccal cavity (unlike the genera *Aronema*, *Bathyeurystomina*, *Bernardius*, *Lyranema* and *Megeurystomina*); the conico–cylindrical tail (unlike the genera *Aronema*, *Bathyeurystomina*, *Belbolla*, *Bernardius*, *Calyptonema*, *Ditlevsenella*, *Eurystomina*, *Lyranema*, *Megeurystomina*, *Pareurystomina*, and *Thoonchus*); two ventrally situated pre–anal supplements in males (unlike *Aronema*, *Belbolla*, *Bernardius*, *Calyptonema*, *Ditlevsenella*, *Megeurystomina*, *Polygastrophora*, *Symplocostoma, Symplocostomella,* and *Thoonchus*). In addition, they lack sexual dimorphism in the structure of the buccal cavity and the amphid, as in the genera *Aronema*, *Bernardius*, *Calyptronema*, *Symplocostoma* and *Symplocostomella* (Smol & Coomans 2006; Fonseca–Genevois *et al.* 2009). Additional informative characters in the *Abelbolla* include the lack of denticles in the buccal cavity and the strongly narrowed anterior region (Huang & Zhang 2004). Also in the *Ledovitia*, having the extremely long cervical setae and weakly developed the male genital apparatus (Wieser 1953a; Belogurov *et al.* 1983) are major morphological features.

Acknowledgements

We are very grateful to Dr. T. J. Ferrero, N. Barnes and F. Semprucci for help in a variety of ways. Financial support was provided by the National Institute of Biological Resources (NIBR) of Ministry of Environment (MOE), Korea (NIBR No. 1834–302 & 2013–02–001).

References

Allgen, C. (1933) Freilebende nematoden aus dem Trondhjemsfjord. *Capita Zoologica*, 4, 1–162.

Appeltans, W., Ahyong, S.T., Anderson, G., Angel, M.V., Artois, T., Bailly, N., Bamber, R., Barber, A., Bartsch, I., Berta, A., Błażewicz-Paszkowycz, M., Bock, P., Boxshall, G., Boyko, C.B., Brandão, S.N., Bray, R.A., Bruce, N.L., Cairns, S.D., Chan, T.-Y., Cheng, L., Collins, A.G., Cribb, T., Curini-Galletti, M., Dahdouh-Guebas, F., Davie, P.J.F., Dawson, M.N., De Clerck, O., Decock, W., De Grave, S., de Voogd, N.J., Domning, D.P., Emig, C.C., Erséus, C., Eschmeyer, W., Fauchald, K., Fautin, D.G., Feist, S.W., Fransen, C.H.J.M., Furuya, H., Garcia-Alvarez, O., Gerken, S., Gibson, D., Gittenberger, A., Gofas, S., Gómez-Daglio, L., Gordon, D.P., Guiry, M.D., Hernandez, F., Hoeksema, B.W., Hopcroft, R.R., Jaume, D., Kirk, P., Koedam, N., Koenemann, S., Kolb, J.B., Kristensen, R.M., Kroh, A., Lambert, G., Lazarus, D.B., Lemaitre, R., Longshaw, M., Lowry, J., Macpherson, E., Madin, L.P., Mah, C., Mapstone, G., McLaughlin, P.A., Mees, J., Meland, K., Messing, C.G., Mills, C.E., Molodtsova, T.N., Mooi, R., Neuhaus, B., Ng, P.K.L., Nielsen, C., Norenburg, J., Opresko, D. M., Osawa, M., Paulay, G., Perrin, W., Pilger, J.F., Poore, G.C.B., Pugh, P., Read, G.B., Reimer, J.D., Rius, M., Rocha, R.M., Saiz-Salinas, J.I., Scarabino, V., Schierwater, B., Schmidt-Rhaesa, A., Schnabel, K., Schotte, M., Schuchert, P., Schwabe, E., Segers, H., Self-Sullivan, C., Shenkar, N., Siegel, V., Sterrer, W., Stöhr, S., Swalla, B., Tasker, M.L.,

Thuesen, E. V., Timm, T., Todaro, M.A., Turon, X., Tyler, S., Uetz, P., van der Land, J., Vanhoorne, B., van Ofwegen, L.P., van Soest, R.W.M., Vanaverbeke, J., Walker-Smith, G., Walter, T.C., Warren, A., Williams, G.C., Wilson, S.P. & Costello, M.J. (2012) The magnitude of global marine species diversity. *Current Biology*, 22, 2189–2202.

Barnes, N., Kim, H.G. & Lee, W. (2012) New species of free–living marine Sabatieriinae (Nematoda: Monhysterida: Comesomatidae) from around South Korea. *Zootaxa*, 3368, 263–290.

Belogurov, O.I., Fadeeva, N.P. & Belogurova, L.S. (1983) Studies of nematodes of the subfamily Eurystomininae (Enoplida, Enchelidiidae) from the far east seas of the USSR. *Zoologichesky Zhurnal*, 62, 14–24.

Burgess, R. (2001) An improved protocol for separating meiofauna from sediments using colloidal silica sols. *Marine Ecology Progress Series*, 214, 161–165.
http://dx.doi.org/10.3354/meps214161

De Coninck, L. (1965) Classe des Nématodes - Systématique des Nématodes et sous-classe des Adenophorea. *Traité de Zoologie: anatomie, systématique, biologie*, 4, 586–681.

Deprez, T., De Smet, G., Steyaert, M., Van Campemhort, J., Vanaverbeke, J., Vanhove, S. & Vincx, M. (2005) NeMys. World Wide Web electronic publication. Version July 2013, Available from: http://nemys.ugent.be (accessed 15 July 2013)

Filipjev, I. (1918) Nématodes libres marins des environds de Sébastopol. Partie I. *Trudy Osoboi Zoologicheskoi Laboratorii l Sevastopol'skoi Biologicheski Stantsii*, 4, 1–362. [English Translation by Raveh, M. (1968) Free-living marine nematodes in the vicinity of Sevastopol. Part I. Israel Program for Scientific Translations, Jerusalem, 255 pp.]

Filipjev, I.N. (1927) Les Nematodes libres des mers septentrionales appartenant a la famille des Enoplidae. *Archiv fuer Naturgeschicht, Berlin*, 91, 1–216.

Fonseca-Genevois, V., Smol, N., Decraemer, W. & Venekey, V. (2009) *Bernardius lineatus* gen. n., sp. n. (Enoplida: Enchelidiidae), a remarkable nematode with ornamented cuticle from a Brazilian tropical sandy beach. Nematology, 11, 275–287.
http://dx.doi.org/10.1163/156854109x429600

Gerlach, S.A. (1958) Freilebende Nematoden von den Korallenriffen des Roten Meeres. *Kieler Meeresforsch*, 14, 241–246.

Gerlach, S.A. & Riemann, F. (1974) The Bremerhaven checklist of aquatic nematodes. A catalogue of Nematoda Adenophorea, excluding the Doryaimida. Part 2. *Veroffentlichungen des Instituts fur Meeresforschung in Bremerhaven.* Supplement 4, Heft 2, 405–734.

Hodda, M. (2007) Phylum Nematoda. *Zootaxa*, 1668, 265–293.

Hodda, M. (2011) Phylum Nematoda Cobb 1932. *In:* Zhang, Z.-Q. (Ed.), Animal biodiversity: An outline of higher-level classification and survey of taxonomic richness. *Zootaxa*, 3148, 63–95.

Hooper, D. (1986) Drawing and measuring nematodes. In *Laboratory Methods for Work with Plant and Soil Nematodes*. London: Ministry of Agriculture, Fisheries and Food, Her Majesty's Stationery Office, pp. 87–94.

Huang, Y. & Zhang, Z. (2004) A new genus and three new species of free-living marine nematodes (Nematoda: Enoplida: Enchelidiidae) from the Yellow Sea, China. *Cahiers de biologie Marine*, 45, 343–354.

Inglis, W.G. (1983) An outline classification of the phylum Nematoda. *Australian Journal of Zoology*, 31, 243–255.
http://dx.doi.org/10.1071/zo9830243

Kreis, H. (1963) Marine Nematoda. *The Zoology of Iceland*, 2 (14), 1–68.

Lambshead, P.J.D. & Platt, H.M. (1979) Bathyeurystomina, a new genus of freeliving marine nematodes (Enchelidiidae) from the Rockall Trough. *Cahiers de Biologie Marine*, 20, 371–380.

Ma, K., Ji, L., Qin, H., Liu, J.Y., Yao, Y., Lin, C., Yan, H., Wang, L., Qiao, H. & Li, R. (2012) Species 2000 China Node Catalogue of Life China: 2012 Annual Checklist China. The Biodiversity Committee of Chinese Academy of Sciences, 2012, Catalogue of Life China: 2012 Annual Checklist, Science Press, Beijing, China. Available from: http://www.sp2000.cn (accessed 1 June 2013)

Mawson, P.M. (1958) Free-living nematodes. Section 3: Enoploidea from subantarctic stations. *B.A.N.Z. Antarctic Research Expedition Reports*, Series B, VI (Part 14), 307–358.

Micoletzky, H. (1930) Freilebende marine Nematoden von den Sunda-Inseln. I. Enoplidae. *Videnskabelige Meddeleser fra dansk naturhistorisk Forening i Kjobenhavn*, 87, 243–339.

Rho, H. & Min, W. (2011) Nematoda: Chromadorea: Desmodorida: Draconematidae. Marine dragon nematodes. *Invertebrate Fauna of Korea*, 13, 1–100.

Schuurmans Stekhoven, J.H.S. (1950) The freeliving marine nemas of the Mediterranean. I. The Bay of Villefranche. *Institut Royal des Sciences Naturelles de Belgique*, 37, 1–220.

Schuurmans Stekhoven, J.H.S. (1956) New names proposed for three homonyms. *Nematologica*, 1, 19–19.
http://dx.doi.org/10.1163/187529256x00186

Seinhorst, J.W. (1959) A rapid method for the transfer of nematodes from fixative to anhydrous glycerin. *Nematologica*, 4, 67–69.
http://dx.doi.org/10.1163/187529259x00381

Siddiqi, M.R. (1983) Phylogenetic relationships of the soil nematode orders Dorylaimida, Mononchida, Triplonchida and Alaimida, with a revised classification of the subclass Enoplia. *Pakistan Journal of Nematology*, 1, 79–110.

Smol, N. & Coomans, A. (2006) Order Enoplida. *In*: Eyualem, A., Andrassy, I. & Traunspurger, W. (Eds.), *Freshwater nematodes: ecology and taxonomy*. CABI, Wallingford, pp. 225–292.

Vitiello, P. (1970) Nematodes libres marins des vases profondes du golfe du lion. 1. Enoplida. *Tethys*, 2, 139–210.

Wieser, W. (1953a) Reports of the Lund University Chile Expedition 1948–1949. 10. Free–living nematodes. I. Enoploidea. *Lunds Universitets Arsskrift*, 49, 1–155.

Wieser, W. (1953b) Der Sexualdimorphismus der Enchelidiidae (Freilebende Marine Nematoden) als taxonomisches Problem. *Zoologischer Anzeiger*, 150, 152–170.