



<http://dx.doi.org/10.11646/zootaxa.3790.4.4>

<http://zoobank.org/urn:lsid:zoobank.org:pub:121C061F-09D1-4C4E-80DB-3C3AFC7EA2EF>

Revision of *Lepidonopsis humilis* (Augener, 1922) and description of *L. barnichae* sp. nov. (Annelida: Polychaeta: Polynoidae) based upon morphological and molecular characters

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Abstract

Lepidonopsis humilis (Augener, 1922) has been considered as an amphiamerican species, widely recorded in both the Grand Caribbean region and the Tropical Eastern Pacific. Based on type material and additional materials, *L. humilis* is redescribed herein and its distribution clarified and restricted. Furthermore, the identity of specimens from the Mexican Pacific is clarified and a new species *L. barnichae* sp. nov. is described. This species is characterized by conical macro-tubercles with slightly curved tips; all elytra with a tuft of papillae on the surface, isolated from the marginal papillae; and the second segment dorsally projecting over the prostomium as a small lobe. Additionally, there is a 17.6% genetic divergence in the nucleotide sequence variation of COI between *L. humilis* and *L. barnichae* sp. nov., which supports the morphological differences observed. Thus, *L. humilis* does not have an amphiamerican distribution but is restricted to the Grand Caribbean region; whereas the specimens from the Tropical Eastern Pacific belong to the newly described species *L. barnichae* sp. nov. A key to the three known species of *Lepidonopsis* is included.

Key words: scaleworm, COI barcoding, cryptic species, Grand Caribbean, Tropical Eastern Pacific

Introduction

The members of Polynoidae can be distinguished by having segments with a dorsal pair of elytra alternating with segments with dorsal cirri, a bilobed prostomium and simple neurochaetae. The family is numerous in both species and genera, with about 815 species in 167 genera known worldwide (Wehe 2006). For the Tropical Eastern Pacific region 65 species in 26 genera have been recorded (Salazar-Silva 2009; Salazar-Silva 2013), whereas for the Grand Caribbean region 58 species in 28 genera are known (Salazar-Vallejo 1996). One of the main issues of polychaete taxonomy is to clarify the presence of some species considered as cosmopolitan or with a wide range of biogeographic distribution. The American tropics contain about 2300 polychaete species, of which 5% are considered amphiamerican (Dean 2012); however, recent studies have revealed that this distribution pattern is based on inadequate taxonomical studies (Carrera-Parra & Salazar-Vallejo 2011; Yáñez-Rivera & Carrera-Parra 2012). Further, cryptic species of different regions were synonymized or considered as part of a species complex and thus have not been formally described (Carrera-Parra & Salazar-Vallejo 2011; Nygren & Pleijel 2011).

Recently, the incorporation of molecular data in polychaete studies has allowed more robust arguments to be used in separating cryptic species, showing that the morphological data, which in the past were considered insufficient to distinguish species, are really consistent (Ferri *et al.* 2009; Nygren *et al.* 2010; Carrera-Parra & Salazar-Vallejo 2011; Nygren & Pleijel 2011; Yáñez-Rivera & Carrera-Parra 2012). These studies suggest the need to re-examine the morphology of species with questionable identity to improve their description.

Lepidonopsis humilis (Augener, 1922) was described from Kingston, Jamaica, and Tortugas, S.W. Channel, Florida. According to Barnich *et al.* (2004) the correct date of *L. humilis* is 1924; however, the corresponding

Etymology. This species is named in honor of Dr. Ruth Barnich, in recognition of her many contributions on the taxonomy of Polynoidae.

Type locality. Acapulco, Guerrero, Mexico.

Distribution. Mexican Pacific from Acapulco to Oaxaca.

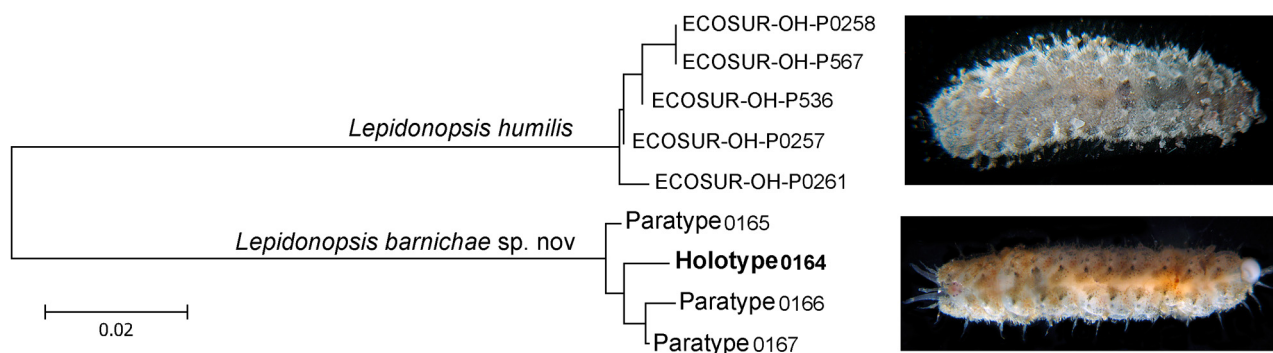


FIGURE 6. Neighbor-joining tree of COI sequences of *Lepidonopsis* species using K2P distance.

Key to species of *Lepidonopsis* Pettibone, 1977

1. Segment two dorsally projecting over prostomium as one or two lobes; bidentate neurochaetae 2
- Segment two without lobe; unidentate neurochaetae *L. collinifer* Barnich, Fiege & Sun, 2004
2. Segment two with one lobe dorsally projected over prostomium; elytra with conical macrotubercles slightly bent; tuft of papillae on all elytra, isolated from marginal papillae *L. barnichae* **sp. nov.**
- Segment two with two lobes dorsally projecting over prostomium; elytra with hemispherical macrotubercles covered by small nodules; tuft of papillae only on first pair of elytra. *L. humilis* (Augener, 1922)

Acknowledgements

We thank Leslie Harris (LACM-AHF), Norma Emilia González (ECOSUR), and Birger Neuhaus (ZMB) for making available some of the specimens that made this study possible. We thank Manuel Elías-Gutiérrez (ECOSUR) for helping us with the process of barcoding, as part of the Mexican Barcode of Life (MEXBOL) network. We also thank Kristian Fauchald and Sergio I. Salazar-Vallejo for their interesting comments to clarify the date of publication of the original description of *L. humilis*. Funding for this research was supplied by CONACYT (Project 61609).

References

- Augener, H. (1922) Ueber litorale Polychaeten von Westindien. *Sitzungsbericht der Gesellschaft Naturforschender Freunde zu Berlin*, 3–5, 38–53.
- Augener, H. (1927) Bijdragen tot de Kennis der Fauna van Curacao. Resultaten eener Reis van Dr. C.J. van der Horst in 1920. Polychaeten von Curaçao. *Bijdragen tot de dierkunde*, 25, 39–82.
- Augener, H. (1933) Polychaeten aus den Zoologischen Museen von Leiden und Amsterdam, part 1. *Zoologische Mededelingen*, 15, 177–260.
- Barnich, R., Fiege, D. & Sun, R. (2004) Polychaeta (Annelida) of Hainan Island, South China Sea, part III. Aphroditoidea. *Species Diversity*, 9, 285–329.
- Carrera-Parra, L.F. & Salazar-Vallejo, S.I. (2011) Redescriptions of *Eunice filamentosa* and *E. denticulata* and description of *E. tovarae* n. sp. (Polychaeta: Eunicidae), highlighted with morphological and molecular data. *Zootaxa*, 2880, 51–64.
- Dales, R.P. (1962) The polychaete stomodeum and the inter-relationships of the families of Polychaeta. *Proceedings of the Zoological Society of London*, 139, 389–428.
<http://dx.doi.org/10.1111/j.1469-7998.1962.tb01837.x>
- Dean, H.K. (2012) A literature review of the Polychaeta of the Caribbean Sea. *Zootaxa*, 3596, 1–86.
- Ferri, E., Barbuto, M., Bain, O., Galimberti, A., Uni, S., Guerrero, R., Ferté, H., Bandi, C., Martin, C. & Casiraghi, M. (2009)

- Integrated taxonomy: traditional approach and DNA barcoding for the identification of filarioid worms and related parasites (Nematoda). *Frontiers in zoology*, 6, 1–12.
<http://dx.doi.org/10.1186/1742-9994-6-1>
- Gómez, P., Mercado, J.A., Mitchell, L.M. & Salazar-Vallejo, S.I. (1997) Poliquetos de fondos duros (Polychaeta) de bahías de Huatulco y Puerto Angel, Oaxaca, México. *Revista de Biología Tropical*, 45, 1067–74.
- Grube, A.E. (1850) Die Familien der Anneliden. *Archiv für Naturgeschichte*, 16, 249–364.
- Hartman, O. (1944) Polychaetous annelids. *Allan Hancock Atlantic Expedition*, 3, 3–33.
- Hernández-Alcantara, P. & Solís-Weiss, V. (1999) Systematic and distribution of the polychaetes (Annelida: Polychaeta) from the sublittoral zone in the Gulf of California. *Océánides*, 13/14, 25–38.
- Jiménez-Cueto, M.S. & Salazar-Vallejo, S.I. (1991) Anélidos poliquetos de la Reserva de la biosfera de Sian Ka'an. In: Navarro, D. & Robinson, J.G. (Eds.), *Diversidad Biológica en la Reserva de Sian Ka'an, Quintana Roo, México*. CIQRO, Chetumal, México, pp. 147–150.
- Jones, W.J., Johnson, S.B., Rouse, G.W. & Vrijenhoek, R.C. (2008) Marine worms (genus *Osedax*) colonize cow bones. *Proceedings of the Royal Society, Series B*, 275, 387–391.
<http://dx.doi.org/10.1098/rspb.2007.1437>
- Kimura, M. (1980) A simple method of estimating evolutionary rate of base substitutions through comparative studies. *Journal of Molecular Evolution*, 16, 111–120.
- Kinberg, J.G.H. (1856) Nya sl gter och arter af Annelider. 1. Aphroditea Savigny. * fversigt af Kongl. Vetenskaps-Akademiens F rhandlingar, Stockholm*, 12, 381–388.
- Nygren, A., Eklof, J. & Pleijel, F. (2010) Cryptic species of *Notophyllum* (Polychaeta: Phyllodocidae) in Scandinavian waters. *Organisms Diversity & Evolution*, 10, 193–204.
<http://dx.doi.org/10.1007/s13127-010-0014-2>
- Nygren, A. & Pleijel, F. (2011) From one to ten in a single stroke – resolving the European *Eumida sanguinea* (Phyllodocidae, Annelida) species complex. *Molecular Phylogenetics and Evolution*, 58, 132–141.
<http://dx.doi.org/10.1016/j.ympev.2010.10.010>
- Pettibone, M.H. (1977) Review of *Halosydropsis* and related genera (Polychaeta: Polynoidae: Lepidonotinae). In: Reish, D.J. & Fauchald, K. (Eds.), *Essays on Polychaetous Annelids in Memory of Dr. Olga*. University of Southern California Los Angeles, pp. 39–62.
- Ratnasingham, S. & Hebert, P.D.N. (2007) BoLD: The Barcode of Life Data System (www.barcodinglife.org). *Molecular Ecology Notes*, 7, 355–364.
- Saitou, N. & Nei, M. (1987) The neighbor-joining method: a new method for reconstructing phylogenetic trees. *Molecular Biology and Evolution*, 4, 406–425.
- Salazar-Silva, P. (2006) Scaleworms (Polychaeta: Polynoidae) from the Mexican Pacific and some other Eastern Pacific sites. *Investigaciones Marinas*, 34, 143–161.
<http://dx.doi.org/10.4067/s0717-71782006000200014>
- Salazar-Silva, P. (2009) Polynoidae Kinberg, 1856. In: de León-González, J.A., Bastida-Zavala, J.R., Carrera-Parra, L.F., García-Garza, M.E., Peña-Rivera, A., Salazar-Vallejo, S.I., & Solís-Weiss, V. (Eds.), *Poliquetos (Annelida: Polychaeta) de México y América Tropical*. Universidad Autónoma de Nuevo León, Monterrey, México, pp. 449–471.
- Salazar-Silva, P. (2013) Revision of *Halosydna* Kinberg, 1856 (Annelida: Polychaeta: Polynoidae) from the Tropical Eastern Pacific and Grand Caribbean with description of new species. *Journal of Natural History*, 47, 1177–1242.
<http://dx.doi.org/10.1080/00222933.2012.752934>
- Salazar-Vallejo, S.I. (1996) Lista de especies y bibliografía de poliquetos (Polychaeta) del Gran Caribe. *Anales del Instituto de Biología UNAM, Serie Zoología*, 67, 11–50.
- Tamura, K., Dudley, J., Nei, M. & Kumar, S. (2007) MEGA4: Molecular Evolutionary Genetics Analysis (MEGA). *Molecular Biology and Evolution*, 24, 1596–1599.
<http://dx.doi.org/10.1093/molbev/msm092>
- Tovar-Hernández, M.A. & Carrera-Parra, L.F. (2011) *Megalomma* Johansson, 1925 (Polychaeta: Sabellidae) from America and other world-wide localities, and phylogenetic relationships within the genus. *Zootaxa*, 2861, 1–71.
- Vrijenhoek, R.C., Johnson, S.B. & Rouse, G.W. (2009) A remarkable diversity of bone-eating worms (*Osedax*; Siboglinidae; Annelida). *BioMed Central Biology*, 7, 1–13.
<http://dx.doi.org/10.1186/1741-7007-7-74>
- Webster, H.E. (1879) On the Annelida Chaetopoda of the Virginian Coast. *Transactions of the Albany Institute*, 9, 202–269.
- Wehe, T. (2006) Revision of the scale worms (Polychaeta: Aphroditoidea) occurring in the seas surrounding the Arabian Peninsula. Part I: Polynoidae. *Fauna of Arabia*, 22, 23–197.
- Wille, A. (1902) Polychaeta, report on the collections of Natural History made in the Antarctic regions during the voyage of the Southern Cross. *British Museum (Natural History), London*, 12, 262–283.
- Yáñez-Rivera, B. & Carrera-Parra, L.F. (2012) Reestablishment of *Notopygos megalops* McIntosh, description of *N. caribea* n. sp. from the Greater Caribbean and barcoding of “amphiamerican” *Notopygos* species (Annelida, Amphinomidae). *Zookeys*, 223, 69–84.
<http://dx.doi.org/10.3897/zookeys.223.3561>