Zootaxa 3920 (1): 171–197
www.mapress.com/zootaxa/

Article

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

http://dx.doi.org/10.11646/zootaxa.3920.1.9
http://zoobank.org/urn:lsid:zoobank.org:pub:C6BB0C5A-3317-4119-9C41-02F0EC487A9E

Pedunculate *Molgula* species (Ascidiidae, Molgulidae) from the French Antarctic sector. Redescription and taxonomic revision

FRANÇOISE MONNIOT[1] & AGNÈS DETTAI[2]

[1]*Muséum national d'Histoire naturelle, DMPA, 57 rue Cuvier Fr 75231 Paris cedex 05, France. E-mail: monniot@mnhn.fr*
[2]*Institut de systématique et Evolution, YSYEB-UMR 7205, UMPC EPHE Muséum national d'Histoire naturelle CP 26, 57 rue Cuvier 75231 Paris cedex 05 France. E-mail: adettai@mnhn.fr*

Abstract

Following the Challenger Expedition in the southern Hemisphere, several international surveys have studied Antarctic ascidians. Several pedunculate *Molgula* were successively described under various names. From the French part of the Antarctic continent and the Kerguelen area, numerous *Molgula* were recently collected. They are described here in different species, but closely allied. Their taxonomy is revised with an historical review of the most detailed publications and a link to the ancient names.

Key words: Antarctic, Ascidians, *Molgula* species

Introduction

From the nineteenth century successive expeditions have investigated the benthic marine invertebrate fauna around the Antarctic continent. The "Challenger Expedition" (1873–1876) was the first to collect a large amount of invertebrates at different depths. Later, simultaneous surveys have also explored the southern ocean: the "Deutsch Sud-Polar Expedition" (1901–1903), the British "National Expedition" (1901–1904), the "Swedish Antarctic Expedition" (1901–1903), the "French Antarctic Expedition" (1903–1905), the "Australian Antarctic Expedition" (1911–1914). All have collected ascidians, including large and spectacular pedunculate Molgulidae. These specimens were described successively by several authors as different species. Herdman (1881) was the first scientist to describe very accurately specimens collected by the "Challenger" and he dispatched several pedunculate species into 2 genera: *Molgula* (with spiral stigmata) and /Ascopera/ n.g. with straight stigmata. Further authors like Sluiter (1905, 1906, 1914), Hartmeyer (1911), Ärnbäck-Christie-Linde (1938), or Herdman himself (1910), while studying new collections, have adopted Herdman's species or have created new names for very similar forms. This introduced a large confusion of synonyms. Almost half a century later, American cruises brought abundant material from the Antarctic Peninsula. A part of these ascidians were studied by Kott (1969) and Monniot & Monniot (1983). A synonymy with species in the literature was listed. Later authors have only used the name *M. pedunculata* for Antarctic specimens collected from different regions but they have not given enough morphological details, and this often does not allow to compare these citations to one or other previous descriptions.

Recently, numerous specimens of pedunculate *Molgula* were collected during successive surveys in the Southern Ocean in a sector extending from Terre Adélie to the south of Kerguelen Islands: CEAMARC (2007–2008), REVOLTA (2011–2012) and POKER (2011–2013). This abundant material added to the specimens stored in the MNHN collections gives the opportunity for these very similar anatomies, to evaluate which characters are variable or constant in a population and can represent a species. New descriptions of 4 pedunculate *Molgula* are given and compared to old data. Sequences for the barcode region of the cytochrome oxidase I gene could be obtained for two of the four species following Monniot *et al.* (2011). While these sequences represent only a few specimens from a restricted area of the Southern Ocean, they can serve as a useful reference for future studies in other regions.

Accepted by R. Brunetti: 28 Jan. 2015; published: 19 Feb. 2015

References

Beaman, R.J. & O'Brien, P.E. (2009) Collaborative East Antarctic Marine Census (CEAMARC). Post survey Report, RSV *Aurora Australis* Voyage 3, December 2007–January 2008. *Geoscience Australia Record*, 2008/05, 1–61.

Cunningham, R.O. (1871) *Notes on the natural history of the Strait of Magellan and west coast of Patagonia made during the Voyage of H.M.S. "Nassau" in the years 1866–1869*. Edmonston and Douglas, Edinburgh, xvi + 517 pp.

Forbes, E. & Hanley, S. (1848) *A history of British molluscs and their shells*. Vol. I, II, IV. van Voorst, London, i–lxxx (1853), 1–486 (1848), pls. A–W, AA–ZZ, AAA–ZZZ (dates uncertain); 1–480 (1 dec. 1849), 481–557 (1850); 1–300 (1852), pls. 1–114F (dates uncertain).

Hartmeyer, R. (1909–11) Ascidien. *In*: Bronn, H.G. (Ed.), *Klassen und Ordnungen des Tier-Reichs*. 3 (Supplement), pp. 81–98 & pp. 1281–1773.

Hartmeyer, R. (1911) Die Ascidien der deutschen Südpolar-Expedition 1901–1903. *Deutsche Südpolar Expedition*, 12 (4), 225–392.

Herdman, W.A. (1880) Preliminary report on the Tunicata of the Challenger Expedition. Part II. *Proceedings of the Royal Society of Edinburgh*, 10, 714–726.

Herdman, W.A. (1882) Report on the Tunicata collected during the Voyage of H.M.S. Challenger during the years 1873–76; Part I. Ascidiae simplices. *Report of the Scientific Results of the Voyage of H.M.S. Challenger during the years 1873–76*, 6 (17), 1–296.

Herdman, W.A. (1910) Tunicata. *National Antarctic Expedition (S.S. Discovery) 1901–1904, Natural History*, 5, 1–26.

Herdman, W.A. (1923) Ascidiae simplices. *Australasian Antarctic Expedition 1911–1914, Scientific Reports, Series C (Zoology and Botany)*, 3 (3), 1–35.

Kott, P. (1969) Antarctic Ascidiacea. *Antarctic Research Series*, 13, 1–239.

Kott, P. (1971) Antarctic Ascidiacea II. *Antarctic Research Series,* 17, 11–82.
http://dx.doi.org/10.1029/AR017p0011

Kott, P. (1985) The Australian ascidiacea Part I, Phlebobranchia and Stolidobranchia. *Memoirs of the Queensland Museum*, 23, 1–440.

Michaelsen, W. (1904) Die Stolidobranchiaten der Deutschen Tiefsee-Expedition 1901–1903. *Deutschen Tiefsee Expedition 'Valdivia'*, 7, 181–260.

Millar, R.H. (1960) Ascidiacea. *Discovery Reports*, 30, 1–160.

Millar, R. H. (1968) Ascidians collected during 1928–1930 by the Norwegian Antarctic expeditions. *Det.Norske Videnskaps-Akad. Oslo,* I. *Mat-Nature. Klasse,* 10, 3–25.

Monniot, C. (1978) Ascidies Phlébobranches et Stolidobranches du Sud de l'Océan Indien. *Annales de l'institut Océanographique Paris,* 54 (2), 171–224.

Monniot, C. (1979) Répartition des Ascidies autour des îles Kerguelen. *Mémoires du Muséum national d'Histoire naturelle, Paris,* New Series*,* C, 43, 249–253.

Monniot, C. & Monniot, F. (1974) Ascidies de la 22e expédition antarctique Chilienne. *Boletino de la Societa de Biologia, Concepción,* 48, 365–383.

Monniot, C. & Monniot, F. (1980). - Sur quelques Ascidies récoltées sous le pack en baie de McMurdo, Antarctique. *Bulletin du Muséum national d' Histoire naturelle, Paris,* Série 4e, 2 (Section A), 1, 15–25.

Monniot, C. & Monniot, F. (1982) Some antarctic deep-sea tunicates in the Smithsonian collections. *Antarctic Research Series*, 32, 95–130.
http://dx.doi.org/10.1029/AR032p0095

Monniot, C. & Monniot, F. (1983) Ascidies antarctiques et subantarctiques : Morphologie et Biogeographie. *Mémoires du Muséum National d'Histoire Naturelle, Paris*, 125, 54, 1–168.

Monniot, C. & Monniot, F. (1994) Ascidians collected in the Weddell Sea by the RV 'Polarstern' (EPOS cruise leg 3). *Bulletin du Museum National d'Histoire Naturelle, Paris*, 16, 13–37.

Monniot, C., Monniot, F., Griffiths,C.L. & Schleyer, M. (2001) South African Ascidians. *Annals of the South African Museum*, 108 (1), 1–141.

Monniot, F., Dettai, A., Eleaume, M., Cruaud, C. & Ameziane, N. (2011) Antarctic ascidians (Tunicata) of the French-Australian survey CEAMARC in Terre Adélie*. Zootaxa,* 2817, 1–54.

Primo, C. & Vázquez, E. (2007) Ascidians collected during the Spanish Antarctic expedition CIEMAR 99/00 in the Bransfield and Peninsula, in the Scotia Arc and in the Magellan region. *Scientia Marina,* 69 (2), 215–223.

Ramos-Esplá, A.A., Carcel, J.A. & Varela, M. (2005) Zoogeographical relationships of the littoral ascidio fauna around the Antarctic Peninsula, in the Scotia Arc and in the Magellan region. *Scientia Marina*, 69 (Supplement 2), 215–223.

Sahade, R.,Tatián, M., Kowalke, J., Kühne, S. & Esnal, G.B. (1998) Benthic faunal associations on soft substrates at Potter Cove, King George Island, Antarctica. *Polar Biology*, 19, 85–91.
http://dx.doi.org/10.1007/s003000050218

Sluiter, C.P. (1905) Note préliminaire sur les ascidiens holosomates de l'Expédition antarctique Française commandée par le Dr Charcot. *Bulletin du Muséum d'histoire naturelle,* 6, 470–474.

Sluiter, C.P. (1906) Tuniciers. *In*: Expédition Antarctique Française (1903–1905). Masson et Cie, Paris, pp. 1–48.

Sluiter, C.P. (1914) Les Tuniciers *in :* Deuxième Expédition antarctique française (1908–1910) commandée par le Dr. J. Charcot. *Documents scientifiques : Sciences naturelles ,* Paris (Masson), 1–39.

Tatián, M., Sahade, R.J., Doucet, M.E. & Esnal, G.I. (1998) Ascidians (Tunicata, Ascidiacea) of Potter Cove, South Shetland Islands, Antarctica. *Antarctic Science*, 10 (2), 147–152. http://dx.doi.org/10.1017/S0954102098000194

Tatián, M., Antacli, J.C. & Sahade, R. (2005) Ascidians (Tunicata, Ascidiacea) : species distribution along the Scotia Arc. *Scientia Marina*, 69 (2), 205–214.

Torre,L., Abele,D., Lagger, C., Momo, F. & Sahade, R. (2014) When shape matters: strategies of different Antarctic morphotypes to deal with sedimentation. *Marine environment Research*, 99, 179–187. http://dx.doi.org/10.1016/j.marenvres.2014.05.014

Van Name, W.G. (1945) The North and South American ascidians. *Bulletin of the American Museum of Natural History*, 84, 1–146.