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## **Taxonomic review of the family Colatoeciidae Winston, 2005 (Bryozoa, Cheilostomata), with description of seven new species**

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## Abstract

Colatooeciidae includes the genera *Colatooecia*, *Cigclisula* and *Trematooecia*. While *Colatooecia* is considered a well-defined genus, the differences between *Cigclisula* and *Trematooecia* are poorly defined. This taxonomic review was undertaken to understand the morphological differences between *Cigclisula* and *Trematooecia*. The type species of *Cigclisula* is redescribed and the type species of *Trematooecia* is designated and redescribed. Diagnostic characters of both genera are redefined. Six new species of *Cigclisula* and one of *Trematooecia* are described: *Cigclisula australis* n. sp., *Cigclisula buski* n. sp., *Cigclisula fistulosa* n. sp., *Cigclisula osburni* n. sp., *Cigclisula perforata* n. sp., *Cigclisula winstonae* n. sp. and *Trematooecia rotunda* n. sp. Four species previously assigned to *Cigclisula* are transferred to *Trematooecia*: *Trematooecia arborescens* (Canu & Bassler, 1928) n. comb., *Trematooecia gemmea* (Winston & Woollacott, 2009) n. comb., *Trematooecia hexagonalis* (Canu & Bassler, 1930), and *Trematooecia verticalis* (Maplestone, 1910) n. comb. Two species previously assigned to *Trematooecia* are transferred to *Cigclisula*: *Cigclisula turrita* (Smitt, 1873) and *Cigclisula psammophila* (Winston & Håkansson, 1986) n. comb.

**Key words:** bryozoans, *Colatooecia*, *Cigclisula*, *Trematooecia*, new species, new combinations, redescription

*Cigclisula*, uniporous in *Trematooecia*. Subsidiary features of the frontal shield, primary and peristomial orifices and avicularia allow discrimination among the many species in these two genera, as is the case in many other cheilostome genera and families (e.g. Gordon 1993; Ostrovsky 2004; Vieira *et al.* 2010b; Vieira *et al.* 2014). However, in the absence of ooecia, it would be difficult to assign any new species of *Cigclisula* and *Trematooecia* to either genus using only morphological criteria.

Redescription of the type species of *Cigclisula* and *Trematooecia*, and characterization of the ooecium in relation to these species, has led us to several generic re-assignments, resulting in the following new combinations: *Cigclisula turrita* n. comb., *Cigclisula psammophila* n. comb., *Trematooecia arborescens* n. comb., *Trematooecia gemma* n. comb., *Trematooecia hexagonalis* n. comb. and *Trematooecia verticalis* n. comb. Seven new species are described: *Trematooecia rotunda* n. sp., *Cigclisula australis* n. sp., *C. buski* n. sp., *C. fistulosa* n. sp., *C. osburni* n. sp., *C. perforata* n. sp. and *C. winstonae* n. sp.

Species of Colatooeciidae are distributed from tropical to subtropical waters in the Atlantic and Indo-Pacific Oceans and one species is reported from the Mediterranean Sea (Fig. 36). Some records of *Cigclisula turrita* from the Indian Ocean and Red Sea still require reexamination and may belong to distinct species. Other species are known only from their type localities and have not been collected again or recognized.

Currently, we recognize one living species of *Colatooecia*, 14 of *Cigclisula* and 11 of *Trematooecia*. The recognition of seven new species of Colatooeciidae, some of them previously included in other named species, gives evidence that the number of known species can increase with the use of SEM imaging, which aids in the recognition of diagnostic characters.

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## References

- Ayari R., Taylor, P.D., Afli, A. & Aissa, P. (2008) A new species of the cheilostome bryozoan *Trematooecia* Osburn, 1940 from the Mediterranean Sea. *Cahiers de Biologie Marine*, 49, 261–267.
- Banta, W.C. & Carson, R.J.M (1977) Bryozoa from Costa Rica. *Pacific Science*, 31, 381–424.
- Bock, P. (2014) *Cigclisula rogickae* (Soule, 1961). In: Bock, P. & Gordon, D. (Eds.), *World List of Bryozoa. World Register of Marine Species*. Available from: <http://www.marinespecies.org/aphia.php?p=taxdetails&id=470592> (accessed 11 August 2014)
- Busk, G. (1852) An account of the Polyzoa, and sertularian zoophytes, collected in the voyage of the Rattlesnake, on the coasts of Australia and the Lousiade Archipelago, & C. In: MacGillivray, J. (Ed.), *Narrative of Voyage of H.M.S. Rattlesnake, commanded by the late Captain Owen Stanley, R.S., F.R.S. & C. during the years 1846–1850; including discoveries and surveys in New Guinea, the Lousiade Archipelago, etc., to which is added the Account of Mr. E. B. Kennedy's expedition for the exploration of the Cape York Peninsula, Vol. 1*. T.W. Boone, London, pp. 343–402. [appendix IV]
- Busk, G. (1884) Report on the Polyzoa collected by H.M.S. Challenger during the years 1873–1876. Part 1. The Cheilostomata. *Report on the Scientific Results of the Voyage of the H.M.S. "Challenger"*, *Zoology*, 10, 1–216.
- Canu, F. & Bassler, R.S. (1917) A synopsis of American Early Tertiary Cheilostome Bryozoa. *United States National Museum Bulletin*, 96, 1–87.
- Canu, F. & Bassler, R.S. (1919) Fossil Bryozoa from the West Indies. *Publications of the Carnegie Institution*, 291, 75–102.
- Canu, F. & Bassler, R.S. (1923) North American later Tertiary and Quaternary Bryozoa. *United States National Museum Bulletin*, 125, 1–302.

- Canu, F. & Bassler, R.S. (1927) Classification of the Cheilostomatous Bryozoa. *Proceedings of the United States National Museum*, 69 (3022), 1–43.
- Canu, F. & Bassler, R.S. (1928a) Fossil and Recent Bryozoa of the Gulf of Mexico region. *Proceedings of the United States National Museum*, 72, 1–199.
- Canu, F. & Bassler, R.S. (1928b) Bryozoaires du Brésil. *Bulletin de la Société des Sciences de Seine-et-Oise*, 9, 58–110.
- Canu, F. & Bassler, R.S. (1929) Bryozoa of the Philippine region. *United States National Museum Bulletin*, 100, 1–685.
- Canu, F. & Bassler, R.S. (1930a) The Bryozoan Fauna of the Galápagos Islands. *Proceedings of United States National Museum, Smithsonian Institution, Washington*, 76 (2810), 1–92.
- Canu, F. & Bassler, R.S. (1930b) Bryozoaires marins de Tunisie. *Annales de la Station Océanographique de Salammbô*, 5, 1–91.
- Charpin, F. (2014) Bleeding teeth bryozoan. Florent's Guide to the Tropical Reefs. Available from: <http://reefguide.org/bleedingteethbryozoan.html> (accessed 18 January 2014)
- Cheetham, A.H. & Sandberg, P.A. (1964) Quaternary Bryozoa from Louisiana mudlumps. *Journal of Paleontology*, 28, 1013–1046.
- Cheetham, A.H., Jackson, J.B.C., Sanner, J. & Ventocilla, Y. (1999) Neogene cheilostome Bryozoa of Tropical America: comparison and contrast between the Central American isthmus (Panama, Costa Rica) and the north-central Caribbean (Dominican Republic). In: Collins, L.S. & Coates, A.G. (Eds.), *A Paleobiotic Survey of Caribbean Faunas from the Neogene of the Isthmus of Panama. Bulletins of American Paleontology*, 357, 159–192.
- Dumont, J.P.C. (1981) A report on the cheilostome Bryozoa of the Sudanese Red Sea. *Journal of Natural History*, 15, 623–637. <http://dx.doi.org/10.1080/00222938100770441>
- Gautier, Y.V. (1957) Première faunule des Bryozoaires des côtes syriennes. *Vie et Milieu*, 7, 554–561.
- Gray, J.E. (1848) *List of the Specimens of British Animals in the Collections of the British Museum. Part 1. Centrionae or radiated animals*. Trustees of the British Museum, London, pp. 91–151.
- Gordon, D.P. (1993) Bryozoan frontal shields: studies on umbonulomorphs and impacts on classification. *Zoologica Scripta*, 22, 203–221. <http://dx.doi.org/10.1111/j.1463-6409.1993.tb00352.x>
- Hageman, S.J., Bock, P.E., Bone, Y. & McGowran, B. (1998) Bryozoan growth habits: classification and analysis. *Journal of Paleontology*, 72, 418–436.
- Håkansson, E. & Winston, J.E. (1985) Interstitial bryozoans: unexpected life forms in a high energy environment. In: Nielsen, C. & Larwood, G.P. (Eds.), *Bryozoa: Ordovician to Recent*. Olsen & Olsen, Fredensborg, pp. 125–134.
- Harmer, S.F. (1957) The Polyzoa of the Siboga Expedition, Part 4. Cheilostomata Ascophora II. *Siboga Expedition Reports*, 28d, 641–1147.
- Hastings, A.B. (1930) Cheilostomatous Polyzoa from the vicinity of the Panama Canal collected by Dr. A. Crossland on the cruise of the S.Y. "St George". *Proceedings of the Zoological Society of London*, 99, 697–740. <http://dx.doi.org/10.1111/j.1096-3642.1929.tb01453.x>
- Hastings, A.B. (1932) The Polyzoa, with a note on an associated hydroid. *Scientific Reports of the Great Barrier Reef Expedition*, 12, 399–458.
- Hayward, P.J. & Ryland, J.S. (1995) Bryozoa from Heron Island, Great Barrier Reef. 2. *Memoirs of the Queensland Museum*, 38, 533–573.
- Hincks, T. (1895) *Index [to "Marine Polyzoa: contributions towards a general history."]* Issued privately, London, 6 pp.
- Hondt, J.-L. d' (1985) Contribution à la systématique des Bryozoaires Eurystomes. Apports récents et nouvelles propositions. *Annales des Sciences naturelles, Zoologie & Biologie animale*, 7, 1–12.
- Johnston, G. (1838) *A History of British Zoophytes*. W.H. Lizars, Edinburgh, 341 pp. <http://dx.doi.org/10.5962/bhl.title.4834>
- Kirkpatrick, R. (1890) Report upon the Hydrozoa and Polyzoa collected by P.W.Bassett-Smith, Esq., Surgeon R.N., during the survey of the Tizard and MacClesfield Banks, in the China Sea, by H.M.S. 'Rambler', Commander W.U.Moore. *Annals and Magazine of Natural History, Series 6*, 5, 11–24. <http://dx.doi.org/10.1080/00222939009460773>
- Kirkpatrick, R. (1890) Polyzoa. *Journal of the Linnean Society, Zoology, London*, 20, 504–506.
- Lagaaij, R. (1952) The Pliocene Bryozoa of the Low Countries and their bearing marine stratigraphy of the North Sea region. *Mededelingen van de Geologische Stichting*, 5, 1–233.
- Lamouroux, J.V.F. (1821) *Exposition méthodique des genres de l'ordre des polypiers, avec leur description et celles des principales espèces figurées dans 84 planches; les 63 premiers appartenant à l'histoire naturelle des zoophytes d'Ellis et Solander*. V. Agasse, Paris, 115 pp.
- Linnaeus, C. (1767) *Systemae naturae per Regna Tria Naturae, secundum classes, ordines, genera, species, cum characteribus, differentiis, synonymis, locis Regnum Animale*. Laurentii Salvii, Holmiae, 824 pp.
- Livingstone, A.A. (1926) Studies on Australian Bryozoa. No. 3. *Records of the Australian Museum*, 15, 79–99. <http://dx.doi.org/10.3853/j.0067-1975.15.1926.801>
- Maplestone, C.M. (1910) On a new species of *Cellepora* from the south Australian coast. *Proceedings of the Royal Society of Victoria*, 23, 39–41.
- Marcus, E. (1923) Referat über die historische und moderne Auffassung und der systematischen Stellung der Bryozoen

- Gattung Adeona. *Verhandlungen der zoologisch–botanischen Gesellschaft in Wien*, 72, 42–61.
- Marcus, E. (1955) Notas sobre briozoos marinhos brasileiros. *Arquivos do Museu Nacional do Rio de Janeiro*, 42, 273–342.
- Maturo, F.J.S. (1968) The distributional pattern of the Bryozoa of the east coast of the United States exclusive of New England. *Atti della Società italiana di scienze naturali, e del Museo civico di storia naturale. Milano*, 108, 261–284.
- O'Donoghue, C.H. & Watteville, D. (1939) Bryozoa. Rep. No. 20. The fishery grounds near Alexandria. *Found Institute of Hydrobiology and Fisheries*, 34, 1–58.
- Ortmann, A. (1890) Die Japanische Bryozoenfauna. Bericht über die von Herrn Dr.L.Döderlein in Jahre 1880–81, gemachten Sammlungen. *Archiv für Naturgeschichte*, 56, 1–74.
- Osburn, R.C. (1914) The Bryozoa of the Tortugas Islands, Florida. *Carnegie Institution Washington*, 182, 183–222.
- Osburn, R.C. (1927) The Bryozoa of Curaçao. *Bijdragen tot de Dierkunde*, 25, 123–132.
- Osburn, R.C. (1940) Bryozoa of Puerto Rico with a resume of West Indian Bryozoan fauna. *Scientific Survey of Puerto Rico and the Virgin Islands*, 16, 321–486.
- Osburn, R.C. (1947) Bryozoa of the Allan Hancock Atlantic Expedition, 1939. *Report of the Allan Hancock Atlantic Expeditions*, 5, 1–47.
- Osburn, R.C. (1952) Bryozoa of the Pacific coast of America, part 2, Cheilostomata–Ascophora. *Report of the Allan Hancock Pacific Expeditions*, 14, 271–611.
- Ostrovsky, A.N. (2004) Brood chambers (ovicells) of cheilostome bryozoans (Bryozoa: Gymnolaemata): structure, research history, and modern problematics. *Russian Journal of Marine Biology*, 30, 43–55.  
<http://dx.doi.org/10.1007/s11179-005-0025-6>
- Powell, N.A. (1971) The marine Bryozoa near the Panama Canal. *Bulletin of Marine Science*, 21, 766–778.
- Ridley, S.O. (1881) Account of the zoological collections made during the survey of H.M.S. Alert in the straits of Magellan and on the coast of Patagonia. *Proceedings of the Zoological Society of London*, 44–61.  
<http://dx.doi.org/10.1111/j.1096-3642.1881.tb01270.x>
- Ristedt, H. & Hillmer, G. (1985) The cheilostomate bryozoan-fauna from shallow waters of the Hilutangan Channel, Cebu, Philippines: Part I. *The Philippine Scientist*, 22, 133–143.
- Robertson, A. (1921) Report on a collection of Bryozoa from the Bay of Bengal and other eastern seas. *Records of the Indian Museum*, 22, 33–65.
- Shier, D.E. (1964) Marine Bryozoa from northwest Florida. *Bulletin of Marine Science*, 14, 603–662.
- Smitt, F.A. (1873) Floridan Bryozoa collected by Count L.F. de Pourtales, Part 2. *Kongliga Svenska Vetenskaps–Akademiens Handlingar*, 11, 1–83.
- Soule, J.D. (1961) Results of the Puritan-American Museum of Natural History expedition to western Mexico. 13. Ascophoran Cheilostomata (Bryozoa) of the Gulf of California. *American Museum Novitates*, 2053, 1–66.
- Soule, D.F. & Soule, J.D. (1964) The Ectoprocta (Bryozoa) of Scammon's Lagoon, Baja California, Mexico. *American Museum Novitates*, 2199, 1–56.
- Souza, F.B.C. (1989) Espécies de briozoários da Bahia. *Anais do XI Congresso Brasileiro de Paleontologia*, 1, 493–507.
- Tilbrook, K.J. (2006) Cheilostomatous Bryozoa from the Solomon Islands. *Santa Barbara Museum of Natural History Monographs 4*, (Studies in Biodiversity Number 3), 1–386.
- Vieira, L.M., Migotto, A.E. & Winston, J.E. (2008) Synopsis and annotated checklist of Recent marine Bryozoa from Brazil. *Zootaxa*, 1810, 1–39.
- Vieira, L.M., Gordon, D.P., Souza, F.B.C. & Haddad, M.A. (2010a) New and little-known cheilostomatous Bryozoa from the south and southeastern Brazilian continental shelf and slope. *Zootaxa*, 2722, 1–30.
- Vieira, L.M., Migotto, A.E. & Winston, J.E. (2010b) *Marcusadoreia*, a new genus of lepralioid bryozoan from warm waters. *Zootaxa*, 2348, 57–68.
- Vieira, L.M., Spencer Jones, M.E., Winston, J.E., Migotto, A.E. & Marques, A.C. (2014) Evidence for polyphyly of the genus *Scrupocellaria* (Bryozoa: Candidae) based on a phylogenetic analysis of morphological characters. *PLoS One*, 9 (4), e95296.  
<http://dx.doi.org/10.1371/journal.pone.0095296>
- Vigneaux, M. (1949) Révision des Bryozoaires néogènes du Bassin d'Aquitaine et essai de classification. *Mémoires de la Société Géologique de France*, France, 28, 1–153.
- Waters, A.W. (1888) Supplementary Report on the Polyzoa collected by H.M.S. 'Challenger' during the years 1873–1876. *Report on the Scientific Results of the Voyage of the H.M.S. "Challenger"*, *Zoology*, 31, 1–41.
- Waters, A.W. (1909) Reports on the marine biology of the Sudanese Red Sea. 12. The Bryozoa, Part 1, Cheilostomata. *Journal of the Linnean Society*, 31, 123–181.
- Waters, A.W. (1913) The marine fauna of British East Africa and Zanzibar, from collections made by Cyril Crossland M.A., B.Sc., F.Z.S., in the years 1901–1902. Bryozoa – Cheilostomata. *Proceedings of the Zoological Society of London*, 458–537.
- Winston, J.E. (1982) Marine Bryozoans (Ectoprocta) of the Indian River area (Florida). *Bulletin of the American Museum of Natural History*, 173, 99–176.
- Winston, J.E. (1984) Shallow-water Bryozoans of Carrie Bow Cay, Belize. *American Museum Novitates*, 2799, 1–38.
- Winston, J.E. (1986) An annotated check-list of coral-associated bryozoans. *American Museum Novitates*, 2859, 1–39.
- Winston, J.E. & Håkansson, E. (1986) The Interstitial bryozoan fauna from Capron Shoal, Florida. *American Museum*

*Novitates*, 2865, 1–50.

Winston, J.E. (2005) Redescription and revision of Smitt's "Floridan Bryozoa" in the Collection of the Museum of Comparative Zoology, Harvard University. *Virginia Museum of Natural History Memoir*, 7, 1–150.

Winston, J.E. & Woollacott, R. (2009) Scientific results of the Hassler Expedition. Bryozoa. No. 1. Barbados. *Bulletin of the Museum of Comparative Zoology*, 159, 239–300.

<http://dx.doi.org/10.3099/0027-4100-159.5.239>

Winston, J.E., Vieira, L.M. & Woollacott, R.M. (in press). Scientific results of the *Hassler* Expedition. Bryozoa. No. 2. Brazil. *Bulletin of the Museum of Comparative Zoology*.

Zabala, M. & Maluquer, P. (1988) Illustrated keys for the classification of Mediterranean Bryozoa. *Treballs del Museu de Zoologia, Barcelona*, 4, 1–294.