

Catalogue of type specimens of molluscs in the collection of The Manchester Museum, The University of Manchester, UK

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Abstract

This paper presents the first published listing of the holdings of type specimens of mollusc in The Manchester Museum (University of Manchester, UK), the fourth largest mollusc collection in Britain. Type material relating to 480 taxa, including holotypes, paratypes and syntypes, are included in the present catalogue, mainly coming from the collections of A Abercrombie (India), RD Darbshire, Prof. AC Haddon (Torres Straits), Rev. J Hadfield (Lifu, Loyalty Islands), LJ Shackleford (especially *Marginella*), GC Spence (especially African land snails and *Urocoptis* and many specimens from M Connolly and HB Preston), FW Townsend (Persian Gulf), syntype material from the Scottish National Antarctic Expedition (1902–1904) and that received from the Smithsonian Institution in 1973 in exchange. There is undoubtedly more type material within the collection which is not identified as such as yet.

Keywords

Museums, type specimens, molluscs

Introduction

The Manchester Museum holds what is probably the fourth largest mollusc collection in Britain, with 166,000 lots (a previous count reported 80,000 lots and 400,000 specimens, see Hancock and Morgan 1980). This collection contains many type specimens, including holotypes, paratypes and syntypes. Specimens such as these are of fundamental importance to the study of taxonomy, systematics and biodiversity and are an irreplaceable resource. No catalogue of the type specimens contained within these

collections has hitherto been available to researchers and it is hoped that the present catalogue will serve to encourage researchers to make increased use of the Museum's extensive and important collections. The collections have been the subject of various databasing projects and are searchable using the museum's website (www.museum.manchester.ac.uk).

Type material is mainly found in the collections of A Abercrombie (India), RD Darbshire, Prof. AC Haddon (Torres Straits), Rev. J Hadfield (Lifu, Loyalty Islands), LJ Shackleford (especially *Marginella*), GC Spence (especially African land snails and *Urocoptis* and many specimens from M Connolly and HB Preston, see Jackson 1946), FW Townsend (Persian Gulf), syntype material from the Scottish National Antarctic Expedition (1902-1904) and that received from the Smithsonian Institution in 1973 in exchange. Material from the collections of A Abercrombie, Prof. AC Haddon, Rev. J Hadfield, LJ Shackleford, FW Townsend and the Scottish National Antarctic Expedition was described by JC Melvill who had close connections with The Manchester Museum; many species were described together with R Standen of the museum.

The bulk of JC Melvill's collection is housed in the National Museum of Wales, Cardiff and there is also type material in the Natural History Museum, London. The main collections from the Scottish National Antarctic Expedition described by Melvill are in the National Museums of Scotland, Edinburgh. Types from M Connolly's collection are also to be found in the Natural History Museum, London and the National Museum of Wales, Cardiff. Types from HB Preston's collection are widespread as he dealt in specimens; many are found in other British, European and American museums. The Wollaston collection, described by RT Lowe, is distributed between the Natural History Museum (London), National Museum of Wales (Cardiff), Oxford University Museum of Natural History and Cambridge University Museum of Zoology. Type material from American authors including WH Dall, HA Pilsbry and P Bartsch, is mainly to be found in the Smithsonian Institution (Washington DC), American Museum of Natural History (New York) and the Philadelphia Academy of Natural Sciences.

The collection grew around that of the Manchester Society for the Promotion of Natural History, which acquired one of William Swainson's shell collections in 1825 and which also included the collection of Captain Thomas Brown (see Dance 1966, 1986). Type specimens relating to these two collectors have not been located to date. It is very likely that there is additional type material in the collections which remains to be identified as such.

Methods and presentation

Only primary types, ie. holotypes, paratypes and syntypes, are included in this catalogue. Topotypes are not listed although there are many of these in the collections, particularly in those of EL Layard, GC Spence and LW Stratton. No attempt has been made to designate lectotypes or paralectotypes as this is outwith the scope of the present catalogue; similarly, any designations which have inadvertently been made by me should

not be regarded as proper designations. Lectotypes may already have been designated for some names (e.g. by Schouteden 1936 from some of HB Preston's names). In publications where a holotype or 'type' was not designated, names are recorded as syntypes. Specimens considered to have formed part of the type series (i.e. available to the author at the time of description) are listed as syntypes. Where an author clearly indicated an individual shell as a 'type' in the original description, such as by providing a museum accession number, this is taken to indicate the author's intention to select a 'holotype'. Where measurements alone are given, this is not taken as sufficient evidence to indicate a 'holotype' as, in many cases, although measurements from a single specimen are given, it is clear from the description that the author was referring to a number of specimens. Other specimens from the localities listed in descriptions and known or considered to have been in the possession of the author at the time have been referred to as 'paratypes' or 'possible paratypes'. All 'possible paratypes' are therefore at least topotypes. The locality from which the author's selected 'type' came is indicated where this is known. Where it is clear that only a single specimen was being described, the specimen has been referred to as a 'holotype' with the caveat, 'the only specimen described' in brackets. All original references were checked for the preparation of the present catalogue; references were traced using the Zoological Record, Boss et al. 1968, Adam 1971, Ruhoff 1973 and Trew 1987. The format of the catalogue largely follows that of Trew (1992), which was invaluable to the preparation of this work.

Each entry in the catalogue consists of the name as first published, arranged in alphabetical order of the lowest taxonomic ranking of the scientific name (species or subspecies). The reference to the first page of the original description, and references to figures (where there are any) are given. Where the name appeared in the paper before the description, both page references are given. Full bibliographic references are given at the end of the catalogue. Stated localities are exactly as they appear in original publications; additional locality information taken from specimen labels is provided in square brackets. The form of type, together with The Manchester Museum accession number, is provided, and the collection from which the specimens came is given in parentheses. Specimens are dry shells apart from a small number of eggs cited in descriptions and which are recorded as such.

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A

- abercrombiei, Raeta** Melvill 1893: 64; pl. 1, fig. 25. *Nomen nudum* in Melvill and Abercrombie 1893: 48. Bombay. Seven syntypes (one complete and 6 single valves) EE.3661 {Abercrombie}.
- abinsiensis, Limicolaria** Shackleford and Spence 1916: 127; text fig. Abinsi, Benue River, Northern Nigeria. Holotype (the only specimen described) EE.6333 {Spence}.
- aceraea, Barbatia (Acar)** Melvill and Standen 1899b: 186; pl. 10, fig. 15. Torres Straits. Two syntypes EE.3664 {Haddon}.
- acidalia, Microtheca** Melvill and Standen 1899b: 177; pl. 10, figs. 10, 10a. Torres Straits. One syntype EE.3665 {Haddon}.
- acklinense** Bartsch 1946: 210, 211; pl. 35, fig. 5. New subspecies of *Chondropoma (Chondropoma) glabratum* Reeve 1863. Jamaica Bay [Acklin Island, Bahamas]. Six paratypes EE.3681 {Smithsonian Institution}.
- adelpha, Cerithiopsis** Melvill and Standen 1896: 302; pl. 10, fig. 55. Loyalty Islands. Figured syntype EE.3697 and 2 syntypes EE.7664 {Hadfield}.
- adjacens, Subuliniscus** Connolly 1923a: 360; pl. 1, fig. 12. Kenya, Larogi Hills. Two syntypes EE.5414 {Spence ex Connolly}.
- admirabilis, Planispira** Smith 1896: 147; pl. 10, fig. 7. Jampea Island. One syntype EE.5064 {Spence}.
- aeolomites, Bittium** Melvill and Standen 1896: 298; pl. 10, fig. 46. Loyalty Islands. Figured syntype EE.3699 {Hadfield}.
- affinis, Buliminus** Preston 1910c: 165; text fig. Harar, Southern Abyssinia. Two possible syntypes EE.6078 {Spence ex Connolly ex Preston}.
- agapeta, Minolia** Melvill and Standen 1896: 312; pl. 11, fig. 77. Loyalty Islands. Figured syntype EE.3700 {Hadfield}.
- agna, Mangilia** Melvill and Standen 1896: 279; pl. 9, fig. 12. Loyalty Islands. Figured syntype EE.3770, 17 possible syntypes EE.8076 and 2 possible syntypes EE.8077 {Hadfield}.
- albaniense, Opeas** Connolly 1919a: 217; text fig. 2. Cape Province, Aicedale [locality of author's 'type', *vide* Connolly 1939: 352]; Grahamstown. Two paratypes [Aicedale] EE.5411 {Spence ex Connolly}.
- albocinctum, Bittium** Melvill and Standen 1896: 299; pl. 10, fig. 47. Loyalty Islands. Figured syntype EE.3702, 3 syntypes EE.7925 and 3 possible syntypes EE.8111 {Hadfield}.
- alchymista, Marginella (Gabella)** Melvill and Standen 1903a: 309; pl. 22, fig. 13. Maskat, Gulf of Oman, 1-15 fathoms; Gulf of Oman lat. 24°58'N., long. 56°54'E., 156 fathoms; lat. 24°05'N., long. 57°55'E., 205 fathoms. Seven possible syntypes [Gulf of Oman, 156 fathoms] EE.7640 {Townsend} and 7 possible syntypes [Gulf of Oman, 156 fathoms] EE.3164 {Shackleford ex Townsend}.
- algida, Turritella** Melvill and Standen 1912: 352; pl. 7, fig. 14. Trawl, Burdwood Bank, south of the Falklands, at 56 fathoms [lat. 54° 25'S., long. 57°32'W., 'Scotia' station 346]. Two syntypes EE.3666 {SNAE}.

- aliciae, Mangilia (Glyphostoma)** Melvill and Standen 1895: 95; pl. 2, fig. 15. Lifu. Figured syntype EE.3703 and 13 syntypes EE.7641, 33 possible syntypes EE.8060 and 39 possible syntypes EE.8061 {Hadfield}.
- altenai, Imparietula** Gittenberger 1967: 130; text figs. 2-4. Three km südlich von Hamisköy [Trebizond Province, Turkey]. One paratype EE.7642 {Biggs}.
- amydrozona, Marginella (Volvaria)** Melvill 1906: 76; pl. 8, fig. 18. Persian Gulf, Gulf of Oman, Maskat, 15 fathoms. Three possible syntypes EE.3340 {Shacklford}, 3 possible syntypes EE.6524 {Shackleford ex Townsend} and 2 sets of 3 possible syntypes EE.7643 EE.7644 {collection unknown}.
- anceyi, Plectopylis** Gude 1901: 208; pl. 6, figs. 6a-c . Bac-Kan [locality of author's 'type']; secteur de Nac-Ri; ente Cho-Moi et That Khé. One paratype [Tonkin] EE.4788 {Spence}.
- angelicae, Cypraea** Clover 1974: 213; pl. 8, figs. 1, 2. West coast of Africa. Holotype EE.3667 {Clover}.
- anguidens, Cadulus** Melvill and Standen 1898a: 32; pl. 1, fig. 6. Madras. Figured syntype and one syntype EE.7645 {Henderson}.
- angustior, Opeas** Preston 1911: 475; pl. 12, fig. 33. Between Rumruti and Mount Kenia, British East Africa. Five syntypes [Rumruti] EE.5536 {Spence ex Preston}.
- antarctica, Mya** Melvill and Standen 1914: 134; pl. 7, figs. 6, 6a. N.W. Falklands. Holotype (the only specimen described) EE.7646 {Vallentin}.
- antarctica, Thracia** Melvill and Standen 1898b: 105; pl. 1, figs. 13, 13a. Shallow Bay, Lively Island, Falkland Islands. Holotype (the only specimen described) EE.7647 {Cobb}.
- antarctica, Tugalia** Melvill and Standen 1907b: 128; pl., fig. 1. Trawl, Burdwood Bank, south of the Falkland Islands, at 56 fathoms [lat. 54° 25'S., long. 57°32'W, 'Scotia' station 346]. One syntype EE.7648 {SNAE}. Renamed *Tugalia melvilli* Thiele 1912: 97 (*q.v.*) as *antarctica* was preoccupied.
- appalanata, Rissoina (Zebina)** Melvill 1893: 60; pl. 1, fig. 16. *Nomen nudum* in Melvill and Abercrombie 1893: 35. Bombay. Two syntypes EE.7649 (one previously sent to Smithsonian Institution){Abercrombie}.
- arcinella, H[elix]. (Rimula)** Lowe 1855: 181. α. et β. fossilis ad Caniçal Maderae. Two syntypes EE.1721 {Preston 1907, ex Wollaston}.
- arthuri, Malvinasia** Cooper and Preston 1910: 113; pl. 4, figs. 7, 8. Falkland Islands. Ten possible syntypes EE.7650 {Cooper}.
- atkana** Dall 1886: 211. New variety of *Littorina sitkana* Philippi 1846. Bering Island. Three syntypes EE.3694 {Smithsonian Institution}.
- atkinsi** Clench and Torre in Torre and Clench 1930: 15; pl. 2, figs. 5, 6. New variety of *Urocoptis livida* Torre. Vilches Potrero, Central Soledad, Cienfuegos, Cuba. Three paratypes EE.3625 {Spence}, 29 possible paratypes EE.4820 {Spence ex Clench} and 9 possible paratypes EE.4866 {Spence ex Clench}.
- attrita** Lowe 1831: 54. New form of *Helix polymorpha* Lowe 1831: 54. In collibus montisubve Portū Sti. Two syntypes [Pico l'Anna Ferreira, Porto Santo, Madeira] EE.1714 {Preston 1907, ex Wollaston}.

- audax, Drillia** Melvill and Standen 1903a: 313; pl. 23, fig. 1. Gulf of Oman, lat 24°58'N., 56°54'E., 156 fathoms. One possible syntype EE.7651 {Townsend}.
- aurantiaca, Cerithiopsis** Melvill and Standen 1896: 300; pl. 10, fig. 50. Loyalty Islands. Figured syntype EE.3705 {Hadfield}.
- aurea** Shackleford and Spence 1916: 128; text fig. New variety of *Limicolaria absensiensis* Shackleford and Spence 1916. Abinsi, Benué River, Northern Nigeria. Holotype (the only specimen described) EE.6334 {Spence}.
- aurea** Powell 1946: 113; pl. 10, figs. 7-8. New subspecies of *Paryphanta (Powelliophanta) gilliesi* (Smith 1880). Mangarakau, 600 feet N. of Paturau R., West Nelson. Four paratypes EE.7553.2849 {Stratton}.
- aurifera, Assimania** Preston 1912a: 191; pl. 31, fig. 9. Gazi, British East Africa. Ten syntypes EE.5156 {Spence ex Preston}.
- australasiaca, Eulima** Melvill and Standen 1899b: 173; pl. 10, fig. 7. Torres Straits [vide p.150]. One syntype EE.7652 {Haddon}.

B

- baculum-pastoris, Rissoina** Melvill and Standen 1896: 306; pl. 11, fig. 61. Loyalty Islands. Figured syntype EE.3698 {Hadfield}.
- bairdii, Turcicula** Dall 1889: 376, 378. 'Albatross' station 2839, off San Clemente Island, California, in 414 fathoms, sand. One syntype EE.3684 {Smithsonian Institution} and two possible syntypes E.7814 {Darbishre}.
- bandorensis, Cerithiopsis (Seila)** Melvill 1893: 62; pl. 1, fig. 19. *Nomen nudum* in Melvill and Abercrombie 1893: 33. Bombay. One syntype EE.7663 {Abercrombie}.
- barbarae, Gulella** Connolly 1929: 219, 221; pl. 14, figs. 1, 2. Zululand. Mfongosi District. Four syntypes EE.5118 {Spence ex Connolly}.
- barbouri** Torre and Clench 1930: 15; pl. 2, figs. 7-9. New variety of *Urocoptis livida* Torre. La Portuguesa, Central Soledad, Cienfuegos, Cuba. Three paratypes EE.3624 {Spence}, 10 possible paratypes EE.4865 {Spence ex Clench}, 10 possible paratypes [Harvard House (3 Miles North West) and Between Guabairo & Dolores] EE.4832 {Spence ex Clench}.
- bascauda, Mangilia** Melvill and Standen 1896: 279; pl. 9, fig. 13. Loyalty Islands. Figured syntype EE.3706, 3 syntypes EE.7665, one possible syntype EE.8083 and 2 possible syntypes EE.8084 {Hadfield}.
- basseinensis, Siphonaria** Melvill 1893: 63; pl. 1, fig. 21. *Nomen nudum* in Melvill and Abercrombie 1893: 24. Bombay. Six syntypes EE.3702 {Abercrombie}.
- batesi, Pseudoglossula** Connolly 1923a: 348; pl. 1, fig. 6. Camerun, Bitze. Two possible syntypes EE.5431 {Spence ex Connolly}.
- behnii, Vitrina** Lowe 1852: 112. Madeira. Two syntypes EE.1731 {Preston 1907, ex Wollaston}.
- belonis, Turbonilla** Melvill and Standen 1896: 303; pl. 10, fig. 56. Loyalty Islands. Holotype (the only specimen described) EE.3707 {Hadfield}.

- beluchistana*, *Thalotia*** Melvill 1897: 17; pl. 6, fig. 19. Charbar, 7 fathoms. One possible syntype EE.7666 {Townsend}.
- benedictus*, *Murex (Ocinebra)*** Melvill and Standen 1895: 108; pl. 2, fig. 12. Lifu. Figured syntype EE.3708, 4 possible syntypes EE.7667, 2 possible syntypes EE.7668, 8 possible syntypes EE.7669 and 4 possible syntypes EE.8115 {all Hadfield}.
- berthae*, *Ennea*** Melvill and Ponsonby 1901: 315; pl. 2, fig. 1. Karloof Bush, 25 miles N. of Pietermaritzburg, Natal. One possible syntype EE.5859 {Spence} and one possible syntype EE.5865 {Spence ex Burnup}.
- bicrenatus*, *Alycaeus*** Godwin-Austen 1874: 148; pl. 3, fig. 5. Kopamedza Peak Naga Hills, 8-9,000 feet, in forest. Three syntypes EE.3512/76 {Collier}.
- biggsi*, *Cyclotus (Procyclotus)*** Schlesch 1934: 45; pl. 5, figs. 1, 2. 'Gebirge b. Kerman' [Mountains East of Kerman, S. Persia]. Two paratypes EE.7673 {Biggs}.
- bitzeensis*, *Gulella*** Connolly 1922b: 491. Fig. in Connolly 1930: 38; pl. 6, fig. 6. [Locality not mentioned, probably Bitze, Camerun (*vide* Adam 1971)]. One possible syntype EE.5870 {Spence}.
- blakeanus*, *Brachyodontes (Hormomya)*** Melvill and Standen 1914: 129; pl. 7, figs. 4, 4a. Roy Cove [Falkland Islands]. Holotype (the only specimen described) EE.7674 {Vallentin}.
- blanfordi*, *Purpura (Stramonita)*** Melvill 1893: 53; pl. 1, fig. 3. *Nomen nudum* in Melvill and Abercrombie 1893: 31. Bombay and Ratnagiri. One syntype EE.7675 {Abercrombie}.
- bombayanus*, *Murex (Ocinebra)*** Melvill 1893: 52; pl. 1, fig. 1. *Nomen nudum* in Melvill and Abercrombie 1893: 30. Bombay; Ratnagiri. Four syntypes [Bombay] EE.7676 {Abercrombie}.
- boothi*, *Buliminus (Cerastus)*** Tomlin 1910: 54; text fig. Gan Libbah, at an elevation of about 5,600 feet, in British Somaliland. Two possible syntypes EE.5150 {Spence ex Booth}.
- brachys*, *Murex (Ocinebra)*** Melvill and Standen 1896: 273; pl. 9, fig. 1. Loyalty Islands. Holotype (the only specimen described) EE.3709 {Hadfield}.
- brunnea*, *Tindaria*** Dall 1916b: 401. 'Albatross' station 3604, Bering Sea, in 1401 fathoms. Six paratypes [Midway between St Paul and Unmak Ids., Bering Sea] EE.3696 {Smithsonian Institution}.
- buhambaënsis*, *Trochozonites*** Preston 1914: 804; pl. 2, fig. 23. Buhamba, near Lake Kivu, Belgian Congo. Three syntypes EE.6037 {Spence}.
- bumbaensis*, *Homorus (Subulona)*** Spence 1923: 22; pl. 1, fig. 7. Bumba. Holotype (the only specimen described) EE.6335 {Spence}.
- burdwoodianum*, *Bittium*** Melvill and Standen 1912: 351; pl., fig. 12. From interior of *Liothyrina*. Station 346, Burdwood Bank, at 56 fathoms [Falkland Islands lat. 54° 25' S., long. 57° 32' W., 'Scotia' station 346]. Two syntypes EE.7677 {SNAE}.
- burnessi*, *Homorus*** Connolly 1923a: 351; pl. 1, fig. 1. Kenya, Kiu District. One possible syntype EE.5294 [Mukaa Hills]{Spence ex Kennard}.

burnupi, Ennea Melvill and Ponsonby 1897: 634; pl. 17, fig. 2. Town Bush, Maritzburg; Gordon Falls on the Zwaartkop Mountain, Natal. One possible syntype [Gordon Falls] EE.5860 {Spence ex Burnup}.

burnupi, Opeas Connolly 1919b: 144; text fig. 3. Cape Province. The Gorge, Somerset East [locality of author's 'type', *vide* Connolly 1939: 357]; Natal, Karloof, Nottingham Road, Bulwer, Inhluzani, Fort Nottingham. Three syntypes [Natal] EE.5130 {Spence ex Connolly}.

butleri, Diplommatina Godwin-Austen 1892: 512. Laisen Peak and Trigonometrical Station, Manipur [*vide Diplommatina tumida* var.] ... Prowi, Lapuha Hills, at the head of the Lanier River, where it drains into the Kyengdwen of Burmah... Kezakenomih. Three syntypes [Prowi, Lapuha Hills] EE.3511/109 {Collier}.

C

cadmani, Ennea (Gulella) Preston 1916: 260; text fig. Idah, at an altitude of about 1300 feet, Zaria Province, Northern Nigeria [25 miles north of Abuja, *vide* p.259]. One syntype EE.5836 {Spence ex Peile}.

cairnsi, Ennea Melvill and Ponsonby 1897: 634; pl. 17, fig. 1. Mouth of the Buffalo River, S. Africa. One syntype EE.6336 {Spence ex Cairns}.

cairnsiana Melvill and Standen 1904: 118. New variety of *Cypraea caurica* Linnaeus 1758. Karachi. Figured syntype EE.3710 {Townsend}.

cairnsiana, Haminea Melvill and Standen 1895: 89; pl. 2, fig. 1. Lifu. Figured syntype EE.3710 and 8 possible syntypes EE.7678 {Hadfield}.

calathiscus, Mangilia Melvill and Standen 1896: 280; pl. 9, fig. 14. Loyalty Islands. Figured syntype EE.3711 and 4 possible syntypes EE.7679 {Hadfield}.

calcicinta, Mangilia (Glyphostoma) Melvill and Standen 1895: 95; pl. 3, fig. 21. Lifu. Holotype (the only specimen described) EE.3712 {Hadfield}.

calcigena Lowe 1831: 56. New form of *Helix polymorpha* Lowe 1831. In solo calcareo insulae cuiusdam, "Baxo" dictae, juxta Portum Stum. One syntype EE.1720 {Preston 1907, ex Wollaston}. Renamed *Helix papilio* Lowe 1852: 116 (*q.v.*).

calculus, H[elix]. (Craspedopoma) Lowe 1855: 184. In Portu S^{to} rariss. Two syntypes EE.1715 {Preston 1907, ex Wollaston}.

caletria, Clathurella Melvill and Standen 1896: 293; pl. 10, fig. 36. Loyalty Islands. Holotype (the only specimen described) EE.3713 {Hadfield}.

callista, Ennea Melvill and Ponsonby 1909: 485; pl. 8, fig. 1. Dassy Krantz, Grahamstown. One possible syntype EE.5769 {Spence}.

calophthalma Melvill 1888: 236. Figured in Sowerby 1870: pl. 26, fig. 243. New variety of *Cypraea ocellata* Linnaeus 1758. Ceylon. Holotype (the only specimen described) {Walton} EE.7691.

caloraphe, Curvella Preston 1910a: 533; pl. 9, fig. 21. Shimbi Hills, British East Africa. Five possible syntypes EE.5475 {Spence}.

- calva, Helix** Lowe 1831: 49. In Madera sylvis. Two syntypes EE.1717 {Preston 1907, ex Wollaston}.
- canaryensis, Persicula** Clover 1972: 504; pl. 19, figs. 3-5. Off Tarfaya, Morocco, to areas around Fuerteventura in the Canary Is; 30-60 fms. Holotype EE.3660 {Clover}.
- cara, Urocoptis (Gonglyostoma)** Pilsbry and Henderson 1913: 110; pl. 6, figs. 27-30. "San José rocks" about 2 miles northeast of Sancti Spiritus, Province of Santa Clara, Cuba. Three syntypes EE.4555 {Spence ex Pilsbry} and 6 possible syntypes EE.4560 {Spence ex Lowe}.
- carnaticum, Cerithium** Melvill and Standen 1898a: 31; pl. 1, fig. 1. Madras. Figured syntype EE.7690 {Henderson}.
- carpenteri, Bocageia (Liobocageia)** Connolly 1931: 319; pl. 12, fig. 5 and text figs. 4, 5. Uganda: North Bugishu District, Mt. Elgon, 7000-11,000 feet [locality of author's 'type']; Tororo District; Abyssinia; Baka Mts.; Kaffa. Two possible paratypes [Butadinga, Mt. Elgon] EE.5629 {Spence ex Hale Carpenter}.
- catena, Succinea** Spence 1925: 249, 250; text figs. 2, 3. Victoria, Cameroons [in the botanical gardens]. Figured syntype and one syntype EE.6337 {Spence}.
- catenaria, Cerithiopsis** Melvill and Standen 1896: 300; pl. 10, fig. 51. Loyalty Islands. Figured syntype EE.3714 {Hadfield}.
- catharia, Callocardia (Agriopoma)** Dall 1902: 402; pl. 14, fig. 2. Off Guyamas Mexico 65.2°F, 'Albatross' station 3037; 20 fms. Five syntypes (young) EE.3690 {Smithsonian Institution}.
- catholica, Rissoina** Melvill and Standen 1896: 306; pl. 11, fig. 62. Loyalty Islands. Figured syntype EE.3715, 67 possible syntypes EE.8089 and 2 possible syntypes EE.8090 {Hadfield}.
- cedo-nulli, Trichotropis** Adams 1860: 411. Off Mino-Sima, Japan, 63 fathoms. One syntype E.10082 {Darbshire}. Note from SP Dance, 1960s *A label (apparently in the handwriting of R.F. Geale, the man who, as a dealer, sold the collection of A. Adams) has 'Ad: type' on it. The species is not in the Brit. Mus.. This is one of several lots of Trichotropis in the Darbshire colln ex A. Adams but is the only one labelled 'type'. Darbshire's own label has 'Coll. Ad.'*
- ceroplasta, Bullia** Melvill 1898: 2, 17; pl. 2, fig. 13. Mekran Coast. Eight possible syntypes EE.7692 {Townsend}.
- chalmersi, Marginella** Tomlin and Shackleford 1912: 320; pl. 4, figs. 3, 4. S Thomé Island. Eighteen paratypes EE.2441 {Shackleford}.
- charbarensis, Marginella (Gibberula)** Melvill 1897: 7; pl. 6, fig. 16. Charbar, Mekran coast also Persian Gulf. Seven possible syntypes EE.3339 {Shackleford}, 5 possible syntypes EE.6541 {Spence ex Shackleford} and 7 possible syntypes EE.7694 {collection unknown} [all are marked as coming from Charbar].
- chasteri, Barleeria** Melvill and Standen 1895: 120; pl. 3; fig. 22. Lifu. Figured syntype EE.3716, 29 syntypes EE.7693 and 69 possible syntypes EE.8091{Hadfield}.
- chennelli, Diplommatina** Godwin-Austen 1892: 512. Lhota, Naga Hills. Three possible syntypes EE.3511/129 {Collier}.

- cholmondeleyi** Melvill 1888: 216; pl. 2, fig. 15. New variety of *Cypraea fimbriata* Gmelin 1791. Australia. Figured syntype EE.7695 {Cholmondeley}.
- cholmondeleyi, Conus** Melvill 1900: 308; text fig. No locality information. Holotype (the only specimen described) EE.7696 {Cholmondeley}.
- chrysalchyma** Melvill and Standen 1903a: 309. New variety of *Marginella (Glabella) alchymista* Melvill and Standen 1903. Maskat, Gulf of Oman, 10-15 fathoms. Two possible syntypes [Gulf of Oman] EE.6529 {Shackleford}.
- chrysolitha, Mangilia** Melvill and Standen 1896: 286; pl. 9, fig. 25. Loyalty Islands. Holotype (the only specimen described) EE.3718 {Hadfield}.
- chrysomela, Barleeia** Melvill and Standen 1896: 309; pl. 11, fig. 68. Loyalty Islands. Figured syntype EE.3717, 55 possible syntypes EE.7697, 25 possible syntypes EE.8092, 6 possible syntypes EE.8093 and 20 possible syntypes EE.8094 {Hadfield}.
- churchilliana, Achatina** Melvill and Ponsonby 1895: 164; pl. 12, fig. 3. Natal. Holotype (the only specimen described) EE.7698 {Cholmondeley ex Churchill}.
- cingarus, Planispira** Fulton 1906: 247; pl. 9, fig. 8. Halmahera Island. One syntype EE.7699 {Spence ex Waterstradt}.
- cionis, Ennea** Melvill and Ponsonby 1898a: 25; pl. 8, fig. 4. Port Elizabeth [5 miles from Port Elizabeth]. Two possible syntypes EE.7700 {Spence ex Crawford}.
- clytospira, Conus (Cylinder)** Melvill and Standen 1899a: 461. Figured in Melvill and Standen 1901, pl. 21, fig. 12. Arabian Sea, about 125 miles W.S.W. of Bombay, long $71^{\circ}30'$ to $71^{\circ}45'$ E, lat. $18^{\circ}43'$ N., adhering to the submarine cable of the Eastern Telegraph Co., hauled up from 45 fathoms. One syntype EE.7701 {Townsend}.
- cnephaea, Clathurella** Melvill and Standen 1896: 293; pl. 10, fig. 37. Loyalty Islands. Figured syntype EE.3719 and 30 possible syntypes EE.7705 {Hadfield}.
- coatsianum, Cyclostrema** Melvill and Standen 1912: 346; pl. 7, figs. 4, 4a. Trawl, Burdwood Bank, lat. $54^{\circ}25'S.$, long. $57^{\circ}32'W.$, 56 fathoms ['Scotia' Station 346]. Two paratypes EE.7706 {SNAE}.
- collaris** Burnup 1925: 109; pl. 8, figs. 9-14. New subspecies of *Gulella arnoldi* (Sturany 1898). Port Shepstone, Natal. One paratype EE.5111 {Spence}.
- colletti, Corilla** Sykes 1897: 233; pl. 16, figs. 11-13. Balangoda, Ceylon. Two syntypes EE.5076 {Spence ex Collett}.
- collieri, Ennea** Melvill and Ponsonby 1893a: 23; pl. 3, fig. 13. Pretoria. Two syntypes EE.6338 {Collier}.
- columnella, Ennea** Melvill and Ponsonby 1901: 316; pl. 2, fig. 2. Karloof Bush, Pietermaritzburg, Natal. Four possible syntypes [Natal] EE.5489 {Spence ex Burnup}.
- compacta, Diplommatina** Godwin-Austen 1892: 515. South of Barak in Munipur. Four syntypes EE.3511/99 {Collier}.
- compacta, Natalina** Connolly 1939: 108; pl. 3, figs. 1-3. Cape Province: Mountain Drive, Grahamstown [locality of author's 'type'], East London; Hog's Back, Amatola Mts. One possible paratype [Grahamstown] EE.5691 {Spence ex Connolly}.

- compressilabris*, *Bulimus*** Benson 1856: 434. Ad insulum Sanctae Helenae in horto publico non infrequens. Two syntypes EE.7707 {Layard}.
- congesta*, *Plectopylis*** Gude 1899: 332; text figs. 96a-f. Tonkin. One paratype (original of figs. 96d-f) EE.6339 {Spence}.
- conicus*, *Alycaeus*** Godwin-Austen 1871: 87; pl. 3, fig. 1. Abundant on the Limestone Hill east of Kopili river, North Cachar District, and was also found in other places, but rare. One syntype [Khasi Hills] EE3512/41 {Collier}.
- connollyi*, *Achatina*** Preston 1912b: 71; text fig. 5. Victoria Falls, Rhodesia. Two syntypes EE.7708 {Spence? ex Connolly}.
- connollyi*, *Ptychotrema (Parennea)*** Dupuis and Putzeys 1922: 40; text fig. 1. Nsendwe [Belgian Congo]. One syntype EE.5140 {Spence ex Dupuis}. Designated as paralectotype in van Bruggen 1989: 35.
- connollyi*, *Succinea*** Preston 1912c: 445; text fig. Victoria Falls, Zambesi River. Four syntypes EE.5406 {Spence ex Connolly} and 3 syntypes EE.5407 {Spence}.
- connollyi*, *Trachycystis*** Melvill and Ponsonby 1909: 491; pl. 8, figs. 15, 15a. Montagu, 50 miles from Zwelldam, Cape Colony. Six syntypes EE.6083 {Spence ex Connolly}.
- consobrina*, *Kaliella*** Preston 1912a: 186; pl. 31, fig. 11. Between the Igembi Hills and Nyeri, British East Africa. Six syntypes EE.5161 {Spence ex Preston}.
- consors*, *Helix*** Lowe 1831: 51. In Insula Portus Sti. cum praecedente; rarior. Two syntypes EE.1718 {Preston 1907, ex Wollaston}.
- corolla*, *Scala (Cirsotrema)*** Melvill and Standen 1903b: 348; pl. 7, fig. 18. Gulf of Oman, lat 24°58'N., long. 56°54'E., 156 fathoms. One possible syntype EE.7709 {Townsend}.
- coromandelica*, *Turbonilla*** Melvill and Standen 1898a: 32; pl. 1, fig. 5. Madras. Figured syntype EE.7717 and 8 syntypes EE.7718 {Henderson}.
- corpulenta*, *Urocoptis*** Spence 1936: 13; text figs 1, 3. Vinales, W. Cuba. Holotype EE.3652 and 2 paratypes EE.3653 {Spence ex Fulton}. Type locality restricted to "Sierra de la Catuna" in Clench 1968.
- crassicostatus*, *Chrysodomus (Sipho)*** Melvill and Standen 1907b: 138; pl., figs. 10, 10a. Station 325, Scotia Bay, South Orkneys, 9-10 fathoms, off weed and stones [lat. 60°32'42"S., long. 44°38'33"W., 'Scotia' station 325]. One syntype EE.7719 {SNAE}.
- cremonilla*, *Mangilia (Glyphostoma)*** Melvill and Standen 1895: 314; pl. 9, fig. 80. Lifu. Figured syntype EE.3720 {Hadfield}.
- crenatus*, *Alycaeus*** Godwin-Austen 1871: 90; pl. 3, fig. 5. On Burrail Range, N. Cachar, at about 5,000 feet. One syntype [Kezakenomih, Naga] EE.3512/40 {Collier}; 3 syntypes [Hengdan Peak] EE.3512/72 {Collier}.
- cressyi*, *Opeas*** Connolly 1922a: 120. Figured in Connolly 1925a: 185; pl. 4, fig. 27. District north of Macequece. Two syntypes EE.5129 {Spence ex Connolly}.
- cressyi*, *Pseudoglossula (Pseudocerastus)*** Connolly 1925a: 174; pl. 4, fig. 28, pl. 7, figs. 1-7 and text fig. 20. L. Marques, District north of Macequece. One syntype EE.5134 {Spence ex Connolly}.

crispatus, Alycaeus Godwin-Austen 1871: 91; pl. 4, fig. 1. Khasia, Jaintia and N. Cachar Hills, abundant. Six syntypes [Shibak, W Khasi] EE.3512/25 {Collier}, 3 syntypes [Nangjinghi] EE.3512/82 {Collier}, one syntype [N Cachar Hills] EE.3903 {Spence} and two syntypes [Khasia Hills] EE.3994 {Spence}.

cygnea, Drillia Melvill and Standen 1897a: 379; pl. 11, fig. 82. Loyalty Islands. Figured syntype EE.3721 and one syntype EE.7729 {Hadfield}.

cylindrica, Streptostele (Raffraya) Connolly 1922b: 512; pl. 14, fig. 41. Uganda, Mt. Elgon. Thirteen syntypes EE.5931 {Spence ex Connolly}.

cymatodes, Onoba Melvill and Standen 1916: 120; text fig. Burdwood Bank, south of the Falkland Isles [56 fathoms, lat. 54° 25'S., long. 57°32'W., 'Scotia' station 346]. One syntype EE.7730 {SNAE}.

D

daedalea, Ennea Melvill and Ponsonby 1903: 598; pl. 31, fig. 12. Lower Umfolosi Drift, Zululand. Three syntypes EE.5122 {Spence ex Burnup}.

dahlakensis, Cerithidea Biggs 1965: 338; text fig. 1. Entedebir Island, Dahlak Archipelago [Red Sea]. Two paratypes EE.7731 {Biggs}.

damsangensis, Alycaeus Godwin-Austen 1886: 192; pl. 43, figs. 3-3c. Damsang Peak, W Bhutan. Three syntypes EE.3512/39 {Collier}.

dancei Biggs 1959: 332. New variety of *Eremina desertorum* Forskal 1775. El Firdan, Canal Zone, Egypt. Four paratypes EE.7732 {Dance}.

danielsi, Holospira Pilsbry and Ferriss 1915: 373; pl. 14, figs. 1-3a. Dragoon Mountains, Tweed Canyon (station 2), Arizona. Five syntypes EE.4143 {Spence ex Pilsbry}.

dautzenbergi, Marginella Tomlin and Shackleford 1912: 319; pl. 4, figs. 1, 2. S. Thomé Island, Gulf of Guinea. Thirty-five paratypes (nb. the author's 'type' is cited on p.320 under *M. chalmersi*) EE.2442 {Shackleford}.

dautzenbergi, Plectopylis Gude 1901: 198; pl. 6, figs. 1a-c. That Khé [locality of author's 'type']; entre Cho-Moï et Bac-Kau; enter Bac-Kau et Nac-Ri [Tonkin]. One paratype EE.7624 {Spence}.

decoratum, Cyamium (Cyamionema) Melvill and Standen 1914: 131; pl. 7, figs. 5-5b. N.W. Falkland Islands. Figured syntype EE.7733 and 4 syntypes (2 single valves) EE.7734 {Vallentin}.

decorosa, Diplommatina Godwin-Austen 1892: 510. North of Burrail... the peak of Shiroifurar, in the Lapuha Naga Hills, north of Munipur... Phunggam... Ko-pamedza Peak... Prowi. Three paratypes [Phunggam, of small var., unnamed by Godwin-Austen] EE.3511/38 {Collier}.

delectabile, Solarium (Torinia) Melvill 1893: 57; pl. 1, fig. 11. *Nomen nudum* in Melvill and Abercrombie 1893: 35. Bombay. Two syntypes EE.7735 {Abercrombie}.

delphinuloides, Helix Lowe 1860a: 42, 44; pl., figs. 1-3. Ad terram inter gramina et herbas in declivibus dumosis ad basin rupium convallis Ribêiro do Fayal dic-

tae Maderae ad alt. 4000 fere ped. One syntype [Madeira] EE.1703 {leg. Preston 1907, ex Wollaston}, one presumed syntype [Madeira] EE.7559.1 {Schill ex Sowerby and Fulton} and one presumed syntype [Madeira] EE.7551.1874 {VAG Brown}. The species has been found on one occasion only.

depressa, Diplomatina Godwin-Austen 1870: 2; pl. 1, figs. 2-2b. Woods at Jawai, Jaintia Hills; also at Lailangkote, about 4000 feet, where the specimens were larger. Four syntypes [Khasi Hills] EE.3511/16 {Collier}.

dialitha, Mangilia (Glyphostoma) Melvill and Standen 1896: 287; pl. 9, fig. 26. Loyalty Islands. Holotype (the only specimen described) EE.3722 {Hadfield}.

dianthinum, Cardium (Trachycardium) Melvill and Standen 1899b: 190; pl. 11, figs. 25, 25a. Station 10, Channel between Hammond Island and Wednesday Spit [Torres Straits]. Five syntypes (2 single valves) EE.7738 {Haddon}.

diauges, Leiostraca Tomlin and Shackleford 1915: 308; pl. 5, fig. 6. S. Thomé. Two paratypes ['type' in British Museum (Natural History), *vide* p.309] EE.7739 {Shackleford}.

didinganus, Homorus (Subulinus) Connolly 1927: 171; text fig. 1. Nagichot, Didinga District, S.E. Sudan. Two syntypes [Didinga Mts., alt. 6,000 feet] EE.5169 {Spence ex Connolly}.

diegensis, Limopsis Dall 1908: 395; pl. 15, figs. 13, 15. 'Albatross' station 2923, in 822 fathoms, mud, off San Diego, California, bottom temperature 39°f. Five syntypes EE.3695 {Smithsonian Institution}.

discina, Helix Lowe 1852: 117. In Portu Sto vulg. Two syntypes EE.1716 {Preston 1907, ex Wollaston}.

distephanotis, Columbarium Melvill 1891: 405; pl. 2, fig. 4. Torres Straits, Nov. Guinea mer. Holotype (the only specimen described) EE.3651 {Cholmondeley}.

distinctus, Alycaeus Godwin-Austen 1893: 592. Naga Hills. Three syntypes [Jatinga Valley, N Cachar] EE.3512/36 {Collier}.

domuncula, Diplomatina Godwin-Austen 1892: 518. E Naga Hills. Three syntypes [Margarita, Naga Hills] EE.3511/9 {Collier}.

donnae, Anachis Moolenbeek and Dance 1994: 122; text figs. 1-3. Masirah Island, west coast near Sur, Oman. One paratype EE.7740 {Dance}.

dorotheae, Mitra (Costellaria) Melvill and Standen 1896: 297; pl. 10, fig. 45. Loyalty Islands. Figured syntype EE.3723 and one syntype EE.7741 {Hadfield}.

dupuisii, Cleopatra Spence 1923: 24; pl. 1, fig. 8. Ngandu on the French side of the river [Congo] about ten miles from Kwamouth, roughly 3°15' S.; 16°15' E.. Holotype (figured) and two paratypes EE.6340 {Spence}.

dykei, Thiara (Melanoides) Spence 1925: 248, 249; text fig. 1. Buenga, Cameroons. Holotype (figured) EE.6341 and one paratype EE.7741 {Spence}.

dykeiana, Ptychotrema (Parennea) Spence 1923: 20; pl. 1, fig. 6. Leverville. Holotype (the only specimen described) EE.6342 {Spence}.

E

- ecstilba*, *Nassa (Telasco)*** Melvill and Standen 1896: 274; pl. 9, fig. 4. Loyalty Islands. Figured syntype EE.3724, 14 possible syntypes EE.7742 and 5 possible syntypes EE.8059 {Hadfield}.
- edgariana*, *Rissoa*** Melvill and Standen 1907b: 132; pl., fig. 4. Scotia Bay, South Orkneys, 9–15 fathoms [lat. 60°32'42"S., long. 44°38'33"W., 'Scotia' station 325]. Three paratypes EE.7743 {SNAE}.
- elgonensis*, *Ledoulxia*** Preston 1914: 807; pl. 1, fig. 4. Mt Elgon. Four possible syntypes EE.5159 {Spence ex Connolly}.
- eloiseae*, *Umbonium*** Dance, Moolenbeek and Dekker 1992: 231; text figs. 1–14. Sur Masirah, West Masirah Island, Oman. Two paratypes EE.7744 {Dance}.
- elongata*, *Diplommatina*** Godwin-Austen 1892: 511. Kézákenomih, Naga Hills. One syntype [Japva Peak 10,000 ft] EE.3511/66 {Collier}.
- embrithes*, *Chione (Omphalocladthrum)*** Melvill and Standen 1899b: 195; pl. 11, figs. 23, 23a. Station 8, Albany Pass; Station 4, Ormans Reef [Torres Straits]. Three syntypes (unpaired valves) EE.7745 {Haddon}.
- emerita*, *Brachypodella (Gyraxis)*** Spence 1927: 136; text fig. Cuba. Holotype (author's 'type') EE.3654 and one paratype EE.3655 {Spence}.
- enneadon*, *Gulella*** Connolly 1922a: 114. District north of Macequece. Two syntypes EE.5892 {Spence ex Connolly}.
- ensifera*, *Yoldia*** Dall 1897: 9; pl. 2, fig. 4. From the Aleutian Islands to Monterey, California. Four syntypes [Monterey Bay, California, 'Albatross' Station 3133, 37 fms] EE.3671 {Smithsonian Institution}.
- enteles*, *Rissoina*** Melvill and Standen 1896: 307; pl. 11, fig. 63. Loyalty Islands. Figured syntype EE.3725 {Hadfield}.
- episema*, *Clathurella*** Melvill and Standen 1896: 294; pl. 10, fig. 38. Loyalty Islands. Figured syntype EE.3726 {Hadfield}.
- eranna*, *Scalaria*** Melvill and Standen 1896: 276; pl. 9, fig. 7. Loyalty Islands. Holotype (the only specimen described) EE.3727 {Hadfield}.
- estephomenos*** Melvill 1881: 157. New variety of *Hemifusus corona* Gmelin 1791. Key West. One syntype EE.7746 {Melvill}.
- eumerista*, *Mangilia*** Melvill and Standen 1896: 280; pl. 9, fig. 15. Loyalty Islands. Figured syntype EE.3728 and 31 possible syntypes EE.8064 {Hadfield}.
- eupatrides*, *Dentalium*** Melvill and Standen 1907b: 142; pl., fig. 12. In lat. 71°22'S., long. 16°34'W., at 1410 fathoms, Station 417 ['Scotia' station 417]. Two syntypes EE.7747 {SNAE}. See Melvill 1909: 88. Type locality omitted from the original description, provided in Melvill and Standen 1912: 358.
- eurytima*, *Mathilda*** Melvill and Standen 1896: 310; pl. 11, fig. 73. Loyalty Islands. Figured syntype EE.3729 {Hadfield}.
- eusehma*, *Mangilia (Cythara)*** Melvill and Standen 1896: 284; pl. 9, fig. 22. Loyalty Islands. Figured syntype EE.3730 and 2 syntypes EE.7748 {Hadfield}. Figured syntype designated as lectotype in Kilburn 1992: 505, figured as figs. 66–67.

- euterpe, Columbella (Mitrella)** Melvill 1893: 56; pl. 1, fig. 9. *Nomen nudum* in Melvill and Abercrombie 1893: 30. Bombay. Two syntypes EE.7749 {Abercrombie}.
- euthrioides, Lachesis** Melvill and Standen 1898b: 98; pl. 1, fig. 9. Shallow Bay, Lively Island, Falklands. Figured syntype EE.7750 and 2 syntypes EE.7751 {Cobb}.
- eutrapela, Cerithiopsis** Melvill and Standen 1896: 301; pl. 10, fig. 52. Loyalty Islands. Figured syntype EE.3731 {Hadfield}.
- eveleighi, Marginella** Tomlin and Shackleford 1913a: 11; pl. 1, figs. 5, 6. S. Thomé Island, Gulf of Guinea. Nine paratypes EE.7752 {Shackleford}.
- excellens** Melvill and Standen 1907a: 9; pl., fig. 7. New variety of *Helicarion nyassanus* Smith 1899. Petauke, 25 miles E. of Loangwa River [then Rhodesia, now Zambia] at 2,400 feet. Figured syntype EE.7753 and 2 syntypes EE.7754 {Neave}.
- excelsior, Triforis (Ino)** Melvill and Standen 1899b: 166; pl. 10, fig. 5. Torres Straits. Two syntypes EE.7755 {Haddon}.
- exigua, Clausilia** Lowe 1831: 66. In Maderae. Two syntypes EE.1733 {Preston 1907, ex Wollaston}.
- exomila, Scalaria** Melvill and Standen 1896: 277; pl. 9, fig. 8. Loyalty Islands. Holotype (the only specimen described) EE.3733 {Hadfield}.
- exquisita, Falloonella** Preston 1914: 809; pl. 1, figs. 9-9b. Urguess. Four possible syntypes EE.5160 {Spence ex Tomlin}.

F

- falconi, Gulella** Burnup 1925: 137; pl. 9, figs. 43-44. Port Shepstone, Natal. One paratype EE.5117 {Spence ex Burnup}.
- falklandicum, Cyamium** Melvill and Standen 1898b: 104; pl. 1, fig. 12. Shallow Bay, Lively Island, Falklands. Figured syntype EE.7756 and 4 syntypes EE.7757 {Cobb}.
- fallooni, Streptosteple** Connolly 1922b: 503; pl. 14, fig. 3. Kenya, near Nairobi, Mau Escarpment. Five syntypes [Nairobi] EE.5804 {Spence ex Connolly}.
- farquhari, Curvella** Connolly 1919a: 217, 219; text fig. 4. Cape Province: Mountain Drive, Grahamstown. Two possible syntypes EE.5371 {Spence ex Connolly}.
- farreri, Pecten (Chlamys)** Jones and Preston 1904: 149; text fig. Shi Tao, Shantung. Two syntypes EE.3510 {Jones}. Neither specimen matches the figure or dimensions in the paper according to SP Dance.
- favosus, Euchelus** Melvill and Standen 1896: 311; pl. 11, fig. 74. Loyalty Islands. Figured syntype EE.3734 {Hadfield}.
- featheri, Buliminus (Cerastus)** Tomlin 1910: 54; text fig. Gan Libbah, at an elevation of about 5,600 feet, in British Somaliland. One possible syntype EE.5151 {Spence ex Booth}.
- fidelium, Kellia** Melvill and Standen 1895: 128; pl. 3, fig. 30. Lifu. Holotype (the only specimen described) EE.3735 {Hadfield}.
- filia, Amathis** Melvill 1893: 58; pl. 1, fig. 14. *Nomen nudum* in Melvill and Abercrombie 1893: 38. Bombay. Three syntypes EE.7758 {Abercrombie}.

flavescens, Craspedopoma Lowe 1860b: 115. In Maderae sylvaticus dumosive humidis ad alt. 3000 fere ped. convaxillum Rib. Frio et Rib. da Metade, cum *C. lucido a* et β *commixta*. Two syntypes [Madeira] EE.1708 {Preston 1907, ex Wollaston}.

flavilinea, Columbella (Mitrella) Melvill 1893: 56; pl. 1, fig. 8. *Nomen nudum* in Melvill and Abercrombie 1893: 30. Bombay. Five syntypes EE.7759 {Abercrombie}.

florentiae, Hypolysia Melvill and Ponsonby 1901: 318; pl. 2, fig. 8. Refigured in Melvill and Ponsonby 1903: pl. 32, fig. 13. Durban, Natal. Two possible syntypes EE.6344 {Spence ex Collier ex Ponsonby}.

foliatum, Pseudopeas Connolly 1928: 545; pl. 18, fig. 13. Sierra Leone: Jaima [locality of author's 'type']; Langranna. Two paratypes [Jaima] EE.5131 {Spence ex Connolly}.

fosterae, Cerithiopsis Melvill and Standen 1896: 301; pl. 10, fig. 53. Loyalty Islands. Figured syntype EE.3736, 3 syntypes EE.7760 and 2 possible syntypes EE.8118 {Hadfield}.

foveolatum, Cyclostoma Melvill and Ponsonby 1895: 164; pl. 12, figs. 4, 4a. S. Africa. One syntype [Port Alfred] EE.5232 {Spence ex Melvill}.

G

galtsoffi, Pictada Bartsch 1931: 1; pl. 1, figs. 1-3 and pl. 2, figs. 1-3. Pearl and Hermes Reefs [Hawaiian Islands]. One syntype EE.3675 {Smithsonian Institution}.

gaziensis, Zingis Preston 1911: 467; pl. 11, fig. 10. Gazi, British East Africa. One syntype EE.5913 {Spence}.

gibberosa, Diplommatina Godwin-Austen 1892: 519. South of the Barak River between Munipur and Imphal. Three syntypes EE.3511/97 {Collier}.

glaphyrella, Minolia Melvill and Standen 1895: 276, 277; pl. 9, fig. 7. Lifu. Figured syntype EE.3737 {Hadfield}.

gliriella, Pyrgulina Melvill and Standen 1896: 303; pl. 10, fig. 57. Loyalty Islands. Figured syntype EE.3738 {Hadfield}.

globulus, Alycaeus Godwin-Austen 1874: 147; pl. 3, figs. 4-4b. Phunggum. Three syntypes EE.3512/31 and 3 syntypes EE.3512/31 {Collier}.

glycisma, Pyrgulina Melvill 1899: 95; pl. 1, fig. 16. Karachi. Seven possible syntypes EE.7761 {Townsend}.

goughensis, Lima (Mantellum) Melvill and Standen 1907b: 148; pl., figs. 18, 18a. Trawl, 100 fathoms, Gough Island [lat. 40°20'S., long. 09°56'W., 'Scotia' station 461]. Three syntypes (single valves) EE.7762 {SNAE}.

gracilior, Pseudoglessula Smith 1904: 69; text fig. 3. Ukami, German East Africa, about 100 miles south-west of Zanzibar [*vide* p.68]. One syntype EE.5468 {Spence ex Fulton}.

gradatula, Elusa Melvill and Standen 1897a: 380; pl. 11, fig. 84. Loyalty Islands. Figured syntype EE.3739 and 2 syntypes EE.7763 {Hadfield}.

- graueri, Achatina** Thiele 1911: 205; pl. 5, fig. 43. Lake Kivu, Kwidjwi Island, Congo Belge. One syntype EE.5213 {Spence}. Lectotype and paralectotype were designated in Kilias 1992, and are in the Museum für Naturkunde, Berlin.
- greegori** Ford 1893a: 112; pl. 2, figs. 4-5. New variety of *Cypraea cruenta* Dillwyn 1817. Raised to specific rank and redescribed by Ford 1893b: 40; 2 text figs. [Ceylon]. One syntype EE.3670 {Smithsonian Institution}.
- gwendolinae, Ennea** Preston 1910a: 527; pl. 7, fig. 3. Shimbi Hills, British East Africa. Five possible syntypes (3 juvenile shells) EE.5878 {Spence ex Preston}.

H

- haddoni, Pholadomya (Parilimya)** Melvill and Standen 1899b: 202; pl. 11, figs. 22-22b. Station 2, Warrior Island, at 5.5 fathoms, amongst broken shells and sand [Torres Straits]. Three syntypes (single valves) EE.7776 {Haddon}.
- badfieldi** Melvill and Standen 1895: 102; pl. 2, fig. 14. New variety of *Mitra (Costellaria) exasperata* (Gmelin 1791). Loyalty Islands. Nine syntypes EE.7777 and one possible syntype EE.8113 {Hadfield}.
- badfieldi, Pleurotoma (Drillia)** Melvill and Standen 1895: 94; pl. 3, fig. 23. Lifu. Figured syntype EE.3740 {Hadfield}.
- badfieldi, Tornatina** Melvill and Standen 1896: 314; pl. 11, fig. 80. Loyalty Islands. Figured syntype EE.3741, 208 possible syntypes EE.8065 and 121 possible syntypes EE.8066 {Hadfield}.
- haliarchus, Zizyphinus** Melvill 1889: 32; pl. 2, fig. 3. Ad oras Australiae?. Holotype (the only specimen described) EE.7778 {Cholmondeley}.
- hardingii, Limposis** Melvill and Standen 1914: 128; pl. 7, figs. 2, 2a. Roy Cove [Falkland Islands]. Holotype (a single valve, the only specimen described) EE.7779 {Valentin}.
- hardyi, Diala** Melvill and Standen 1895: 118; pl. 2, fig. 10. [Lifu and Uvea, locality data given under var. *prolongata*]. Figured syntype EE.3742, 28 syntypes EE.7780, 39 possible syntypes EE.7781, 9 possible syntypes EE.8067 and 2 possible syntypes EE.8085.2 {Hadfield}.
- bedista, Cerithiopsis** Melvill and Standen 1896: 302; pl. 10, fig. 54. Loyalty Islands. Holotype (the only specimen described) EE.3743 {Hadfield}.
- heliocaustus, Trigonephrus** Connolly 1929: 219, 230; pl. 14, fig. 23. Cape Province. Klaver, Van Rhynsdorp District. One possible syntype EE.5704 {Spence ex Ross Frames}.
- hendersoni, Sanguinolaria** Melvill and Standen 1898a: 33; pl. 1, fig. 7. Madras. Figured syntype EE.7782 {Henderson}.
- hieroglyphicus, Rachis** Preston 1910a: 531; pl. 8, fig. 16. Shimbi Hills, British East Africa. Four possible syntypes EE.6055 {Spence ex Preston}.
- bimerodes, Mangilia** Melvill and Standen 1896: 281; pl. 9, fig. 16. Loyalty Islands. Figured syntype EE.3744, 2 syntypes EE.7783, 57 possible syntypes EE.7784, 12 possible syntypes EE.8081 and 42 possible syntypes EE.8082 {Hadfield}.

himerta, Mangilia Melvill and Standen 1896: 281; pl. 9, fig. 17. Loyalty Islands.

Figured syntype EE.3745 and one syntype EE.7785 {Hadfield}.

honesta, Mitra (Volutomitra) Melvill and Standen 1895: 101; pl. 3, fig. 17. Lifu.
One syntype EE.3746 {Hadfield}.

hosei, Alycaeus Godwin-Austen 1889: 347; pl. 37, fig. 2. Busan Hills [Borneo]. Three
possible syntypes EE.3932 {Spence}.

bottentota, Helix Melvill and Ponsonby 1891: 239. Figured in Melvill and Ponsonby
1892a: pl. 4, fig. 6. Port Elizabeth. Five possible syntypes EE.5825 {Spence}.

boylei, Pectunculus Melvill and Standen 1899b: 187; pl. 11, fig. 24. Station 2, War-
rior Island; Station 5, Boydong Cays [Torres Straits]. Nine syntypes (single valves)
EE.7786 {Haddon}.

huberti, Marginella Clover 1972: 503; pl. 19, figs. 1, 2. Baia Dos Elephantes 83 miles
south of Lobito, Angola, W. Africa; 15 fms with coral rubbish. Holotype EE.3659
{Clover}.

I

infans, Ennea Craven 1881: 616; pl. 57, fig. 6. Leydenburg, Transvaal. One syntype
EE.5896 {Spence}.

inflatula, Macoma Dall 1897: 11; pl. 1, fig. 20. Aleutian Islands to Puget Sound. Ten
syntypes (2 pairs and 8 single valves) [Captain's Bay, Unalaska, Alaska] EE.3678
{Smithsonian Institution}.

inopina, Eussoia Preston 1912a: 192; pl. 32, fig. 10. Banks of the Eusso Nyiro River,
British East Africa. Two syntypes EE.5155 {Spence ex R Kemp}.

insignis, Diplommatina Godwin-Austen 1870: 6; pl. 2, fig. 1. In the forests of Burrail
range, at about 3000 feet, Asalu, particularly the forest near Garilo or Chota Asalu.
Two syntypes EE.3511/33 and 2 possible syntypes EE.3511/73 {Collier}.

insulae-cygni, Brachypodella Clapp 1914: 99; pl. 6, fig. 10. Swan Island, Caribbean
Sea [*vide p.97*]. Two paratypes EE.5163 {Spence ex Clapp}.

insularis, Archachatina (Tholachatina) Crowley and Pain 1961: 149; text fig. 7.
Congo Republic; Bas-Congo, Matadi, island in the mouth of the Congo Museum.
One paratype [on an island in the Congo Estuary, at the mouth of the Mpoto
River] EE.7787 {Crowley}.

ione, Drillia Melvill and Standen 1896: 277; pl. 9, fig. 9. Loyalty Islands. Figured
syntype EE.3747, 3 syntypes EE.7788, 23 possible syntypes EE.8086, one possible
syntype EE.8087 and 3 possible syntypes EE.8088 {Hadfield}.

J

jaculum, Syrnola Melvill and Standen 1896: 304; pl. 11, fig. 58. Loyalty Islands.
Figured syntype EE.3748 {Hadfield}.

- jaintiaca, Diplomatina** Godwin-Austen 1870: 4. Figured in Blanford 1868: pl. 3, fig. 3. Locally plentiful in damp woods near Jawai, Jaintia hills, at about 4500 ft. elevation; very rare in west Khasi Hills. Two syntypes [Jaintia, Jawai] EE.3511/42 {Collier}.
- jaintiacus, Alycaeus** Godwin-Austen 1871: 92; pl. 5, fig. 3. Nongjinghi Hills, Jaintia. Two syntypes [Jawai] EE.3511/42 {Collier}.
- japvoensis, Diplomatina** Godwin-Austen 1892: 516. Japvo Peak, Anghami Naga Hills, 10,000 ft. Three syntypes EE.3511/108 {Collier}.
- jatingana, Diplomatina** Godwin-Austen 1870: 1; pl. 1, figs. 1-1b. Hills at the junction of the Kayeng and Jatinga rivers, N. Cachar Hills. Three syntypes [Nr Asulu, N Cachar] EE.3511/144 {Collier}.
- jonathani, Turbo** Dekker, Moolenbeek and Dance 1992: 225; text figs. 1-6. Beach 7km E. of Marbat Dhofar, Oman. Two paratypes EE.7791 {Dance}.
- joviana, Rissoia** Melvill and Standen 1896: 309; pl. 11, fig. 69. Loyalty Islands. Holotype (the only specimen described) EE.3749 {Hadfield}.
- jugosa, Dahlakia** Biggs 1971: 222; pl. 7, fig. 2. Entedebir Island, Dahlak Archipelago, Red Sea. One paratype EE.7792 {Biggs}.

K

- kaokoensis, Conulinus** Connolly 1929: 219, 231; pl. 14, fig. 24. Kaoko Veld, S.W.A. Hoarusib River, near Kaoko Otavi. One syntype EE.6075 {Spence ex Connolly, coll Barnard}.
- karachiensis, Syrnola** Melvill 1897: 12; pl. 6, fig. 9. Karachi. Two possible syntypes EE.7793 {Townsend}.
- keniana, Ennea** Preston 1911: 464; pl. 11, fig. 3. Mount Kenia, at an altitude of 6000-8000 feet, British East Africa; a single specimen was also taken in the lower country between Rumruti and Mount Kenia. Three syntypes [Mount Kenia] EE.5119 {Spence ex Preston}.
- kenianum, Pisidium** Preston 1911: 475; pl. 12, fig. 36. Between Rumruti and Mount Kenia, British East Africa; a few specimens were also collected on Mount Kenia at an altitude of from 9000-10,000 feet. Five syntypes (3 complete and 2 single valves) [Mount Kenia] EE.6324 {Spence ex Preston}.
- khasiacus, Alycaeus** Godwin-Austen 1871: 90; pl. 3, fig. 4. On the highest parts of the Khasi and Jaintia Hills, abundant. Three syntypes EE.3512/28 {Collier} and two syntypes EE.3907 {Spence}.
- kolabana, Tellina** Melvill 1893: 49, 64; pl. 1, fig. 23. Bombay. Six syntypes (single valves) EE.7794 {Abercrombie}.
- konkanensis, Ricinula (Sistrum)** Melvill 1893: 54; pl. 1, fig. 5. *Nomen nudum* in Melvill and Abercrombie 1893: 31. Bombay. Two syntypes EE.7795 {Abercrombie}.

L

- lacrimosus, Gymnarion** Connolly 1929: 219, 224; pl. 14, figs. 6-9 and text fig. 1. Kaoko Veld, S.W.A. Kaoko Otavi. Two syntypes EE.5158 {Spence ex Connolly}.
- lactea, Vitrina** Connolly 1925b: 461; text figs. 1, 2. Kenya, Mt. Kenya. Five possible syntypes EE.5147 {Spence ex Tomlin}.
- lanceolata** Melvill and Standen 1907a: 13; pl., fig. 5. New variety of *Achatina rhodesiaca* Melvill and Standen 1907. Kapopo [then Rhodesia, now Zambia]. Figured syntype EE.7796 and one syntype EE.7797 {Neave}.
- lateritia, Marginella (Glabella)** Melvill and Sykes 1903: 410; text fig. Ad insulas Andamanenses. Two possible syntypes EE.7798 {ex Melvill?}.
- latirella, Mangilia (Glyphostoma)** Melvill and Standen 1896: 287; pl. 9, fig. 27. Loyalty Islands. Figured syntype EE.3750 {Hadfield}.
- lechriogramma, Tellina (Maera)** Melvill 1893: 65; pl. 1, fig. 22. *Nomen nudum* in Melvill and Abercrombie 1893: 50. Bombay. Four syntypes (single valves) EE.7799 {Abercrombie}.
- leilae, Dahlakia** Biggs 1971: 221; pl. 7, fig. 3. Entebbedir Island, Dahlak Archipelago, Red Sea. One paratype EE.7800 {Biggs}.
- leucalchyma** Melvill and Standen 1903a: 309. New variety of *Marginella (Glabella) alchymista* Melvill and Standen 1903. Persian Gulf, Gulf of Oman, Maskat, 10-15 fathoms; also at 156 fathoms, lat 24°58'N., long. 56°54'E., and at 205 fathoms, lat. 24°5'N., long. 57°55'E.. Two possible syntypes [Gulf of Oman] EE.6529 {Spence? ex Shackleford, coll Townsend}.
- leucocion, Gulella** Connolly 1929: 219, 223; pl. 14, fig. 5. Zululand. Mfongosi District. Four syntypes EE.5121 {Spence ex Connolly}.
- leucopasa** Melvill and Standen 1907a: 13; pl., fig. 9. New variety of *Achatina rhodesiaca* Melvill and Standen 1907. Kapopo, Rhodesia [now Zambia]. Figured syntype (holotype?) EE.7801 {Neave}.
- levigatus, Diplommatina** Godwin-Austen 1876: 179; pl. 7, fig. 7. The Dikrang Valley, Dafla Hills. Three syntypes EE.3511/25 {Collier}.
- lifuensis, Cerithium armatum** Philippi 1848. Loyalty Islands. Holotype (the only specimen described) EE.3704 {Hadfield}.
- lifuensis, Alcyona** Melvill and Standen 1896: 312; pl. 11, fig. 76. Loyalty Islands. Holotype (the only specimen described) EE.3753 {Hadfield}.
- limnophysa, Litiopa** Melvill and Standen 1896: 305; pl. 11, fig. 72. Loyalty Islands. One syntype EE.3754 {Hadfield}.
- lingua-viverrae, Phenacolepas** Melvill and Standen 1899b: 179; pl. 10, fig. 11. Torres Straits [vide p. 150]. One paratype EE.7802 {Haddon}.
- liparozona, Marginella** Tomlin and Shackleford 1913b: 43. Island of S. Thomé, Gulf of Guinea. Three paratypes EE.7803 {Shackleford}.
- lita, Clathurella** Melvill and Standen 1896: 294; pl. 10, fig. 39. Loyalty Islands. Figured syntype EE.3755, 4 possible syntypes EE.7804, 2 possible syntypes EE.8104

and one possible syntype EE.8105 {Hadfield}. Figured syntype designated as lectotype in Kilburn 1994 and refigured as figs. 90-91.

longa, Clathurella Melvill and Standen 1896: 295; pl. 10, fig. 40. Loyalty Islands.

Figured syntype EE.3756, 69 syntypes EE.7805, 105 possible EE.7806 syntypes, 36 possible syntypes EE.8095 and 69 possible syntypes EE.8096 {Hadfield}.

longa, Urocoptis (Gonglyostoma) Pilsbry and Henderson 1913: 109; pl. 8, figs. 9, 10.

A small rocky hill at Zaza del Medio, at the junction of the Sancti Spiritus branch with the Cuban Central R. R., Province of Santa Clara. Three syntypes EE.4483 {Spence ex Pilsbry}.

lucidum, Cyclostoma Lowe 1831: 66. In Maderae humidis sylvaticis. Two syntypes

EE.1713 {Preston 1907, ex Wollaston}.

ludens, Diala Melvill and Standen 1895: 118, 119; pl. 2, fig. 9. Uvea. Figured syntype EE.3757 and one syntype EE.8085.1 {Hadfield}.

lyonnetianum, Craspedopoma Lowe 1852: 279. In Madera. Two syntypes EE.1712 {Preston 1907, ex Wollaston}.

M

macroura, Cerithiopsis Melvill and Standen 1912: 352; pl. 7, fig. 13. Station 346, Burdwood Bank, 56 fathoms [Falkland Islands, lat. 54° 25'S., long. 57°32'W., 'Scotia' station 346]. One syntype EE.7807 {SNAE}.

maderaspatana, Syrnola Melvill and Standen 1898a: 32; pl. 1, fig. 4. Madras. Holotype (the only specimen described) EE.7925 {Henderson}.

major Dall 1919: 325. New variety of *Buccinum pemphigus* Dall 1919. U.S. Fish Commission station 3643, in the western part of Bering Sea, in 100 fathoms, gravel; bottom temperature 31.7°F. One paratype [E of Kamchatka, Bering Sea, 'Albatross' station 3643] EE.3682 {Smithsonian Institution}.

major Connolly 1923a: 348; pl. 1, fig. 7. New variety of *Pseudoglessula batesi* Connolly 1923a. Camerun, Bitze. One syntype EE.5431 {Spence ex Connolly}.

malcolmensis, Mitra (Costellaria) Melvill and Standen 1901: 421; pl. 23, fig. 18. Persian Gulf: Linjah, 3½ fathoms, mud. Elphinstone Inlet, Mussandam. 15 fathoms, mud. Gulf of Oman: Malcolm Inlet (Kubbatt Ghazira), near Maskat. 24 fathoms, mud. Lat 24°55'N., long. 57°59'E. 37 fathoms, sand and mud; abundant. Lat. 24°5'N., long. 57°35'E., 205 fathoms, mud. Five possible paratypes [lat 24°55'N., long. 57°59'E.] EE.7808 {Townsend}.

malleatus, Homorus Connolly 1931: 315; pl. 12, fig. 4. Uganda: North Bugishu District, Mt. Elgon, 7000-9000 feet. One possible paratype EE.5436 {Spence ex Hale Carpenter}.

manueli, Homorus Preston 1910b: 54; text fig. Two hundred miles due east of Loanda, Angola. Seven syntypes EE.5458 {Spence ex Tomlin ex Preston}.

marileutes, Bittium Melvill and Standen 1896: 299; pl. 10, fig. 48. Loyalty Islands. Figured syntype EE.3758 {Hadfield}.

- mars*, *Limnaea*** Jones and Preston 1904: 141; text fig. 2. Liu Shi Tao, north-east promontory of Shantung, in a large fresh-water lagoon. One syntype EE.7809 {Jones}.
- mazagonica*, *Marginella (Gibberula)*** Melvill 1893: 57; pl. 1, fig. 10. *Nomen nudum* in Melvill and Abercrombie 1893: 28. Bombay. Seven syntypes EE.7810 {Abercrombie}.
- media*, *Vitrina*** Lowe 1855: 164. In Madera (Rib. Frio) rario, et in Port Sto. Two syntypes [Porto Santo] EE.1729 {Preston 1907, ex Wollaston}.
- melitoma*, *Columbella (Seminella)*** Melvill and Standen 1901: 405; pl. 23, fig. 5. Karachi. Four possible syntypes EE.7818 {Townsend}.
- melvilli*, *Marginella*** Tomlin and Shackleford 1913a: 11; pl. 1, figs. 1, 2. S. Thomé. One paratype EE.3247 {Shackleford}.
- melvilli*, *Tugalia*** Thiele 1912: 97; pl. 12, fig. 6. New name for *Tugalia antarctica* Melvill and Standen 1907b: 128; pl., fig. 1 (*q.v.*). Trawl, Burdwood Bank, south of the Falkland Islands, at 56 fathoms [lat. 54° 25'S., long. 57°32'W, 'Scotia' station 346]. One syntype EE.7648 {SNAE}.
- meneleki*, *Subulina (Itiopiana)*** Preston 1910c: 169; text fig. Harar, Southern Abyssinia [*vide p.163*]. Four possible syntypes EE.5373 {Spence}.
- meridaensis*, *Pomacea (Limnopomus)*** Pain 1950: 109. Merida, Venezuela. One paratype EE.3638 {Alderson ex Pain}.
- meridionale*, *Cyclostrema*** Melvill and Standen 1912: 346; pl. 7, figs. 6, 6a, 22, 22a. Gregariously, on various Algae (Fucus and Macrocystis), Station 325, Scotia Bay, South Orkneys, 9-10 fathoms [lat. 60°43'42"S., long. 44°38'33"W., 'Scotia' station 325]. Seventeen syntypes EE.7811 {SNAE}.
- mfongosiensis*, *Gulella*** Burnup 1925: 146; pl. 9, figs. 52-54. Mfongosi, Zululand; Bushman's River Falls, Weenen. Six possible paratypes [Mfongosi] EE.5779 {Spence ex Connolly}.
- minor*** Godwin-Austen 1892: 515. New variety of *Diplommatina khunhoensis* Godwin-Austen 1892. Sikamih, in the Lapuha Naga Hills. Three syntypes [Gaziphima] EE.3511/28 {Collier}.
- minutus*, *Trophon*** (Strebel MS) Melvill and Standen 1907b: 137; pl., figs. 7, 7a. Station 325, Scotia Bay, South Orkneys, 9-15 fathoms [lat. 60°43'42"S., long. 44°38'33"W., 'Scotia' station 325]. One syntype E.4778 {SNAE}.
- mirabilis*, *Rictocyma*** Dall 1871: 151; pl. 14, fig. 6. North Harbour, Unga Island of the Shumagin group [Alaska], in 8 fathoms, muddy bottom. Six syntypes (single valves) EE.3686 {Smithsonian Institution}.
- monaense*, *Cerion*** Clench 1951: 274; pl., figs. 7-11. Isabella Anchorage [Mona Island, off west Puerto Rico]. Six paratypes EE.3673 {Smithsonian Institution}.
- monclovana*, *Holospira (Holospira)*** Bartsch 1925b: 2; pl. 1, figs. 1-2. SE Monclova, Coahuila, Mexico. Two syntypes EE.5126 {Spence ex Bartsch}.
- monizianum*, *Craspedopoma*** Lowe 1860b: 116. In Promontorio "Garajão" vel "Brazen Head" dicto Maderae in scaturigine v. rupe madida". Two syntypes EE.1711 {Preston 1907, ex Wollaston}.

montereyensis, *Yoldia* Dall 1893: 29. US Fish Commission station 3202, in 382 fathoms, green mud, Monterey Bay, California, bottom temperature 41° Fahrenheit [‘Albatross’ station 3202]. Three syntypes EE.3676 {Smithsonian Institution}.

mossiana, *Syrnola* Melvill and Standen 1895: 122; pl. 2, fig. 16. Lifu. Figured syntype EE.3759, 48 possible syntypes EE.8062 and 11 possible syntypes EE.8063 {Hadfield}.

mterizensis, *Cleopatra* Melvill and Standen 1907a: 5; pl., fig. 2. Bed of Mterize River, a tributary of the Loangwa River. Figured syntype (holotype?) EE.7812 {Neave}.

multicolor, *Pecten* Melvill and Standen 1907b: 146; pl., figs. 21, 21a. Gough Island. Two syntypes EE.7813 {SNAE}.

mundula, *Engina* Melvill and Standen 1895: 105; pl. 2, fig. 6. Lifu. Figured syntype EE.3760 and 26 possible syntypes EE.7814 {Hadfield}.

munipurensis, *Diplommatina* Godwin-Austen 1892: 518. South of the Barak River, between the Mao villages and Munipur. Two syntypes EE.3511/87 {Collier}.

munita, *Ennea* Melvill and Ponsonby 1892b: 86; pl. 6, fig. 5. Griqualand East. Two possible syntypes EE.6155 {Spence}.

mustelina, *H[elix]*. (*Hystricella*) Lowe 1855: 186. In Portu Sto, T. V. Wollaston, 1849. Two syntypes EE.1701 {Preston 1907, ex Wollaston}.

N

nagaensis, *Alycaeus* Godwin-Austen 1871: 92. New variety of *Alycaeus ingrami* Blanford. Neighbourhood of Asálú, rather local in its distribution [East Burrail]. Three syntypes EE.3911{Spence} and 2 syntypes EE.3512/6 {Collier}.

neavei, *Lanistes* Melvill and Standen 1907a: 6; pl., fig. 1. Kapopo [then Rhodesia, now Zambia]. Figured syntype EE.7815 and 7 syntypes EE.7816 {Neave}.

necopium, *Chondropoma* (*Chondropoma*) Bartsch 1946: 203, 207; pl. 34, fig. 6. Lightborn Creek, Grand Caicos, Bahamas. Five paratypes EE.3680 {Smithsonian Institution}.

neritoides, *Craspedopoma* Lowe 1860b: 115. In Maderae sylvaticus humidis ad alt. 2000 fere ped. Loco “Lombo da Vaca” dicto ad S. Vincente orae Septentr. Maderae. Two syntypes EE.1709 {Preston 1907, ex Wollaston}.

nesiotes, *Rissoina* Melvill and Standen 1896: 307; pl. 11, fig. 64. Loyalty Islands. Figured syntype EE.3761, 127 possible syntypes EE.7817, 27 possible syntypes EE.8116 and 100 possible syntypes EE.8117 {Hadfield}

niahensis, *Diplommatina* Godwin-Austen 1889: 349; pl. 38, figs. 6, 6a. Niah Hills. Two syntypes EE.3511/63 {Collier}.

nidicostata, *Brachypodella* Spence 1920: 86; pl. 2, figs. 1-3. Chichirivichi, Venezuela. Holotype (author’s ‘type’, original of figs. 1 and 2) EE.6345 and 2 paratypes (one of which is original of fig. 3) EE.7819 {Spence}.

nitidissima, *Mitra* Melvill and Standen 1896: 102; pl. 3, fig. 19. Loyalty Islands. Figured syntype EE.3762 and 11 possible syntypes EE.8097 {Hadfield}.

nitidum, Cyathopoma (Jerdonia) Beddome 1875: 445; pl. 52, fig. 12. Annamalaiy mountains, 6000 feet elevation. South-Canara ghats, 4000 feet. One syntype EE.4358 {Spence}.

notopyrrha, Mangilia (Glyphostoma) Melvill and Standen 1896: 288; pl. 9, fig. 28. Loyalty Islands. Figured syntype EE.3763 and 3 possible syntypes EE.8114 {Hadfield}.

notorcadensis, Lacuna Melvill and Standen 1907b: 131; pl., figs. 3, 3a. Station 325, Scotia Bay, South Orkneys, 9-10 fathoms [lat. 60°43'42"S., long. 44°38'33"W., 'Scotia' station 325]. Two syntypes EE.7820 {SNAE}.

notorcadensis, Lissarca Melvill and Standen 1907b: 144; pl., figs. 14, 14a. Off weed, and attached to Bryozoa, etc., Station 325, Scotia Bay, South Orkneys, 9-15 fathoms [lat. 60°43'42"S., long. 44°38'33"W., 'Scotia' station 325]. Eight syntypes EE.7821 {SNAE}.

nyiroensis Connolly 1923b: 635; pl. 19, fig. 30. New subspecies of *Euonyma fulgens* Connolly 1923. Kenya, Mt. Nyiro, S. of L. Rudolph, 8300 ft. Two possible syntypes EE.5612 {Spence ex Preston}.

nyiroensis, Ennea Preston 1913b: 211; pl. 35, figs. 1, 1a. Mount Nyiro, to the south of Lake Rudolph, 8300 feet. Three syntypes EE.5898 {Spence ex Preston}.

nyongensis, Potadoma Spence 1928: 215; pl. 2, figs. 1-3. Nyong River [Cameroons, lat. 10° 10'E, long. 3°35'N]. Holotype (author's 'type', original of fig. 1) EE.6346.1 and one paratype (original of fig. 3) EE.6346.2 {Spence}.

O

obserata, Helix Lowe 1852: 118. In Madera. Two syntypes EE.1722 {Preston 1907, ex Wollaston}.

omanensis, Drillia Melvill and Standen 1901: 438; pl. 24, fig. 1. Gulf of Oman, lat. 24°55'N., long. 57°59'E., 37 fathoms. Three possible syntypes EE.7822 {Townsend}.

odes, Marginella (Persicula) Melvill 1898: 16; pl. 1, fig. 16. Bushire (Persian Gulf). Three syntypes EE.6385 {Shackleford ex Townsend} and 5 possible syntypes EE.7823 {Townsend}.

opephora, Miralda Melvill 1898: 21; pl. 1, fig. 7. Karachi. One possible syntype EE.7824 {Townsend}.

opoboense, Pseudopeas Spence 1928: 214; pl. 2, fig. 6. Opobo. Holotype (the only specimen described) EE.6347 {Spence}.

orcitti, Holospira (Holospira) Bartsch 1925b: 1; pl. 1, figs. 5, 6. Coahuila, Mexico. One possible syntype EE.5125 {Spence ex Bartsch}.

ordinarius, Homorus Preston 1910a: 534; pl. 9, fig. 25. Shimbi Hills, British East Africa. Five possible syntypes EE.5593 {Spence ex Tomlin}.

orestias, Africarion Preston 1914: 788; pl. 2, fig. 15. Slopes of Mount Kenia, British East Africa. Three syntypes EE.6105 {Spence}.

- orestias, Opeas** Preston 1911: 474; pl. 12, fig. 30. Mount Kenia, at an altitude of 9,000–10,000 feet, British East Africa. Twelve syntypes EE.5537 {Spence ex Preston}.
- orientalis, Gulella** Connolly 1929: 219, 222; pl. 14, fig. 3. Zululand, Mfongosi. One syntype EE.5113 {Spence ex Connolly}.
- orophoma, Mangilia** Melvill and Standen 1896: 282; pl. 9, fig. 18. Loyalty Islands. Holotype (the only specimen described) EE.3764 {Hadfield}.
- oropouchensis, Brachypodella** Spence 1919a: 42; pl. 1, figs. 2–4. Forest on banks of Oropouche River, Trinidad. Holotype (author's 'type', original of figs. 2 and 3) EE.3629, one paratype (author's 'cotype') EE.3412 and 4 paratypes EE.6348 {Spence}.
- oxytropis, Helix** Lowe 1831: 57. In collibus maritimis Portūs Sti. Two syntypes EE.1719 {Preston 1907, ex Wollaston}.

P

- pacei, Columbella (Seminella)** Melvill and Standen 1896: 275; pl. 9, fig. 5. Loyalty Islands. Figured syntype EE.3765 {Hadfield}. Name preoccupied, new name *stepheni* (*q.v.*) given by Melvill and Standen 1897b: 407.
- palatha** Melvill 1888: 43; pl. 1; fig. 14. New variety of *Cypraea ocellata* Linnaeus 1758. No locality data. Holotype (the only specimen described) EE.7825 {Cholmondeley}.
- palmeri, Hendersonia** Dall 1905: 187; pl. 43, figs. 1–4 and text figs. 22–25. Alvarez Mountains, San Luis Potosi, Mexico. Four syntypes EE.4454 {Smithsonian Institution}.
- papilio, Helix** Lowe 1852: 116. In insula Baxto juxta Portum Sm. One syntype EE.1720 {Preston 1907, ex Wollaston}. New name for *Helix polymorpha calcigena* Lowe 1831: 56 (*q.v.*).
- pelidna** Melvill 1888: 120. New variety of *Cypraea ocellata* Linnaeus 1758. Karachi. Holotype (the only specimen described) EE.7826 {Townsend}.
- penestes, Achatina** Melvill and Ponsonby 1893b: 104; pl. 3, fig. 3. Pretoria. Two possible syntypes EE.5504 {Spence}.
- percivali, Streptaxis** Preston 1913b: 94; pl. 32, fig. 4. Slopes of Mt. Marsabit. One syntype EE.5141 {Spence}.
- pergrandis, Volvarina** Clover 1974: 214; pl. 8, figs. 3, 4. Muscat, Gulf of Oman; sand and coral rubble. One paratype EE.3751 {Clover}.
- pericalles** Melvill and Standen 1904: 121. Figured in Kiener 1845; pl. 23, fig. 2a. New variety of *Cypraea pulchella* (Swainson 1823). Four miles north of Barkha Island, at 40 fathoms. Gulf of Oman. Telegraph cable, from fifty fathoms, mud. Off Mussandam, on the cable, fifty-seven fathoms; also from Fao, on the cable, fifteen fathoms. One syntype [Persian Gulf] EE.7827 {Townsend}.
- perlucida, Homorus** Preston 1910c: 168; text fig. Harar, Southern Abyssinia [*vide p.163*]. Five syntypes (one juvenile) EE.5164 {Spence ex Tomlin ex Preston}.

- persimilis*, *Plectopylis*** Gude 1901: 209; pl. 6, figs. 7a-c. Environs de That-Khé. One syntype EE.4787 {Spence}.
- pervitreum*, *Opeas*** Connolly 1923b: 652; pl. 19, fig. 34. Kenya, Gazi. Three possible syntypes EE.5535 {Spence}.
- pettiti*, *Limnaea*** Jones and Preston 1904: 142; text fig. 3. Near Chefoo, Shantung. Five syntypes EE.8054 {Jones}.
- picsingense*, *Opisthostoma*** Smith 1905: 190; text fig. 1. Picsing, Upper Sadong, Sarawak. One syntype EE.3514/3 {Collier ex Tomlin}.
- pigafettae*, *Nucula*** Dall 1908: 369. Off Valvidia, Chile, 38°08'S., 81°00'W., 'Albatross' station 2791, 677 fathoms. One syntype EE.3693 {Smithsonian Institution}.
- pilsbryana*, *Urocoptis (Idiostemma)*** Ramsden 1914: 4; pl. 1, figs. 3, 4. "La Hembrita", Monte Toro, Guantanamo [Cuba]. One syntype EE.4037 {Spence ex Ramsden}.
- pilula*, *Ennea*** Preston 1911: 465; pl. 11, fig. 5. Mount Kenia, at an altitude of 6000-8000 feet, British East Africa. One syntype EE.5955 {Spence ex Peile ex Preston}.
- pineria*, *Cerion (Maynardia)*** Dall 1896: 6. Isle of Pines, Cuba. Seven syntypes EE.3669 {Smithsonian Institution}.
- pirenelloides*, *Dablakia*** Biggs 1971: 222; pl. 7, fig. 4. Entedebir Island, Dahlak Archipelago, Red Sea. One paratype EE.7828 {Biggs}.
- pisinna*, *Alvania*** Melvill and Standen 1896: 305; pl. 11, fig. 60. Loyalty Islands. Holotype (the only specimen described) EE.3766 {Hadfield}.
- pithus*, *Odostomia*** Tomlin and Shackleford 1915: 308; pl. 5, fig. 4. S. Thomé Island, Gulf of Guinea. Two paratypes ['type' in British Museum (Natural History), *vide* p.309] EE.7829 {Shackleford}.
- pitmani*, *Helicarion (Granularion)*** Connolly 1925b: 465; text figs. 6, 7. Kenya, Cherangani Hills. Four paratypes EE.5157 {Spence ex Connolly}.
- polystephes*, *Peltatus*** Tomlin 1915: 319; 2 text figs. Teita Hills, British East Africa, between 4,500 and 6,000 feet. Four syntypes EE.6111 {Spence ex Tomlin}.
- ponsonbyi*, *Palaina*** Sykes 1903: 66. Waigiou. One syntype EE.3846 {Spence}.
- powelli*, *Spondylus*** Smith 1892: 70. Madeira, at a depth of four fathoms; Porto Grande, San Vincent, Cape Verde Islands. One possible syntype [Madeira at 4 fms] EE.2715 {Shackleford}.
- praeclara*, *Pleurotoma (Clavus)*** Melvill 1893: 52; pl. 1, fig. 2. *Nomen nudum*, as *C. praeclara*, in Melvill and Abercrombie 1893: 26. Bombay. Two syntypes EE.7834 {Abercrombie}.
- praelonga*** Connolly 1939: 444; text fig. 39. New variety of *Succinea badia* Morel 1868. Bechuanaland: Thaungs. Seven paratypes EE.5154 {Spence ex Connolly}.
- prestoni*, *Pseudoglossula*** Smith 1904: 68; text fig. 2. Ukami, German East Africa, about 100 miles south-west of Zanzibar. One syntype EE.5468 {Spence ex Fulton}.
- pribiloffensis*, *Chrysodomus*** Dall 1919: 323. Off the Pribilof Islands, Bering Sea, in 50 to 100 fathoms. One paratype [West of Pribiloff Island, Bering Sea, Alaska, 'Albatross' station 3554; 62 fathoms, mud, 39°F] EE.3668 {Smithsonian Institution}.
- princei*, *Ennea*** Preston 1911: 466; pl. 11, fig. 7. Mount Kenia, at an altitude of 9,000-10,000 feet, British East Africa. One syntype [8,000 feet] EE.5871 {Spence}.

pruizenensis, Euonyma Connolly 1910: 261; pl. 6, fig. 11. Northern Transvaal, Pruizen [locality of author's 'type' according to Connolly 1939: 341]. Five possible syntypes (juvenile shells) [Pruizen] EE.5143 {Spence ex Connolly}.

psalterium, Mangilia (Cythara) Melvill and Standen 1896: 285; pl. 9, fig. 23. Loyalty Islands. Figured syntype EE.3767 and 2 syntypes EE.7830 {Hadfield}. Figured syntype designated as lectotype in Kilburn 1992: 492, figured as fig. 45.

psammophora, Helix Lowe 1852: 113. Semifoss. in P^{tu} S^{to}. Two syntypes EE.1740.

pteriola, Pecten Melvill and Standen 1907b: 147; pl., figs. 16, 16a. Station 325. Dredged in Scotia Bay, South Orkneys, at 9-10½ fathoms [lat. 60°32'42"S., long. 44°38'33"W., 'Scotia' station 325]. Twenty-three syntypes (21 complete and two single valves) EE.7831 {SNAE}.

pulchella, Pseudoglessula (Ischnoglessula) Spence 1923: 20; pl. 1, fig. 5. Leverville. Holotype (the only specimen described) and egg obtained from holotype (cited in original description) EE.6349 {Spence}.

pusillus, Alycaeus Godwin-Austen 1871: 89; pl. 3, fig. 3. Near Jawai, it is an abundant form in some localities, especially on the banks of the Kopili river on the road from Jawai to Asálú, viâ Súfai. Two syntypes [Banks of the Kapili] EE.3512/65 {Collier}.

puzeyi, Gulella Connolly 1939: 91; pl. 1, fig. 8. Cape Province: Port St. John's. One paratype EE.5112 {Spence ex Connolly}.

pyrgidium, Turbonilla Tomlin and Shackleford 1915: 309; pl. 5, fig. 3. S. Thomé. Two paratypes ['type' in British Museum (Natural History), *vide* p.309] EE.7832 {Shackleford}.

pyrrhocme, Rissobia Melvill and Standen 1896: 310; pl. 11, fig. 70. Loyalty Islands. Figured syntype EE.3768, 2 syntypes EE.7832, 8 possible syntypes EE.8108 and 8 possible syntypes EE.8109 {Hadfield}.

Q

quadrilateralis, Ennea Preston 1910a: 527; pl. 7, fig. 2. Shimbi Hills, British East Africa. Six possible syntypes EE.6165 {Spence ex Preston}.

quasillus, Rissoina (Phosinella) Melvill and Standen 1896: 308; pl. 11, fig. 65. Loyalty Islands. Figured syntype EE.3769, one syntype EE.7835, 70 possible syntypes EE.8078, 23 possible syntypes EE.8079 and 3 possible syntypes EE.8080 {Hadfield}.

R

redimita Melvill 1888: 226; pl. 2, fig. 16. New variety of *Cypraea lamarckii* Gray 1825. No locality data. Holotype EE.7836 {Cholmondeley}.

regularis, Diplommatina Fulton 1901: 245. Darjeeling, India. Two syntypes EE.3511/6 {Collier}.

- rhodacme, Mangilia (Glyphostoma)*** Melvill and Standen 1896: 288; pl. 9, fig. 29. Loyalty Islands. Holotype (the only specimen described) EE.3770 {Hadfield}.
- rhodesiaca, Achatina*** Melvill and Standen 1907a: 13; pl., figs. 4, 6. Kapopo, Rhodesia [now Zambia]. Figured syntype (original of fig. 4) EE.7837 and 6 syntypes (one of which is original of fig. 6) EE.7838 {Neave}.
- richardsoni*** Powell 1946: 110; text fig A3. New subspecies of *Paryphanta superba* Powell 1930. Two miles from Blue Duck Creek Hut, Jouland Downs, West Nelson. Three paratypes EE.7553.2876 {Stratton}.
- rogersi, Clathurella*** Melvill and Standen 1896: 295; pl. 10, fig. 41. Loyalty Islands. Figured syntype E.3771 and 82 possible syntypes EE.8071 {Hadfield}.
- rosenbergiana, Ennea*** Preston 1910b: 52; text fig. Two hundred miles due east of Loanda, Angola. Four syntypes EE.5139 {Spence}.
- rosini*** Haas. 1936: 41; pl. 3, fig. 2. New subspecies of *Corbicula albida* Haas 1936. S. Rhodesia: Hunyani Drift, 20km. S. of Salisbury [now Zimbabwe]. Two syntypes EE.5505 {Spence ex Schlesch, coll Haas}.
- rotunda, Nassa (Niotha)*** Melvill and Standen 1896: 273; pl. 9, fig. 2. Loyalty Islands. Figured syntype E.3772 {Hadfield}.
- rugosa, Achatina*** Putzeys 1898: 83; text fig. Forêt de Micici (zone de Manyéma). Two syntypes EE.6268, EE.6270 {Spence ex Dupuis}
- rumrutiensis, Opeas*** Preston 1911: 474; pl. 12, fig. 32. Between Rumruti and Mount Kenia, British East Africa. Twelve syntypes [Rumruti] EE.5534 {Spence ex Preston} and 12 syntypes [Rumruti] EE.6243 {Spence}.
- rumrutiensis, Physa*** Preston 1913a: 57. Between Rumruti and Mount Kenia, British East Africa. Ten syntypes [Rumruti] EE.5149 {Spence ex Preston}.

S

- sagittula, Nothapalus*** Connolly 1930: 48; pl. 6, fig. 11. Uganda, North Bugishu District, Mt. Elgon, 7,000-9,000 feet. Holotype ('the type') EE.5145 {Spence ex Connolly}.
- salmoneus, Murex (Ocinebra)*** Melvill and Standen 1899b: 162; pl. 10, fig. 2. Torres Straits. Three syntypes EE.7839 {Haddon}.
- salsetensis, Thracia*** Melvill 1893: 65; pl. 1, fig. 24. *Nomen nudum* in Melvill and Abercrombie 1893: 51. Bombay. Thirteen syntypes EE.7840 {Abercrombie}.
- saltuense, Diplommatina*** Godwin-Austen 1886: 178; pl. 45, figs. 6, 6a. Jatinga Valley, N Cachar. Four syntypes EE.3511/12 {Collier}.
- sanjosensis*** Morrison 1946: 6; pl. 1, fig. 1. New variety of *Pomacea cumingii* (King 1831). Three small streams (not of contiguous drainage) on the west side of San José Island. One paratype [water supply stream, W. side San José Island] EE.3683 {Smithsonian Institution}.
- sadongense, Opisthostoma*** Smith 1905: 189; text fig. 2. Picsing, Upper Sadong, Sarawak. One syntype EE.3514/7 {Collier}.

- scobinata, Urocoptis (Arangia)** Torre and Ramsden in Ramsden 1915: 133; pl. 6, fig. 3. Subida a “La Hembrita”, Monte Toro, Guantánamo [Cuba]. Two paratypes EE.4773 {Spence ex Ramsden}.
- scotiana, Rissoa (Onoba)** Melvill and Standen 1907b: 133; pl., fig. 5. Station 325, Scotia Bay, South Orkneys, 9-15 fathoms [lat. 60°32'42"S., long. 44°38'33"W., ‘Scotia’ station 325]. Two syntypes EE.7841 {SNAE}.
- selecta, Colina** Melvill and Standen 1898a: 31; pl. 1, fig. 2. Madras. Figured syntype (holotype?) EE.7842 {Henderson}.
- semicolorata, Urocoptis** Spence 1936: 13; text figs. 2, 4. Province of Vinales, West Cuba. Holotype EE.3656 (original of fig. 2) and 2 paratypes EE.3657 {Spence}. Clench (1968: 101) restricted the type locality to “Viñales: Sitio del Infierno, Sierra del Infierno”.
- semifusca** Spence 1923: 20; pl. 1, fig. 4. New variety of *Achatina schweinfurthi* Martens 1873. Leverville. Holotype (the only specimen described) EE.6350 {Spence}.
- sempervirens, Ryssota (Lamarckiella)** Bartsch 1939: 42, 46. Badajos, Tablas, Philippines. Two paratypes EE.3674 {Smithsonian Institution}.
- septenarium, Calliostoma (Eutrochus)** Melvill and Standen 1899b: 176; pl. 10, fig. 9. Station 8, Albany Pass, Torres Straits, 10 fathoms. Two syntypes EE.7843 {Haddon}.
- shacklefordi, Nassa (Telasco)** Melvill and Standen 1896: 274; pl. 9, fig. 3. Loyalty Islands. Figured syntype EE.3773, 2 possible syntypes EE.8100 and 2 possible syntypes EE.8101 {Hadfield}.
- shandae, Gulella** Connolly 1930: 46; pl. 6, fig. 5. Kenya, Cherangani. Holotype? (‘type’) EE.5114 {Spence ex Connolly}.
- shantungensis, Limnaea** Jones and Preston 1904: 142; text fig. 4. Wei Hai Wei, Shantung. Six syntypes EE.7844 {Jones}.
- sherfaensis, Diplommatina** Godwin-Austen 1870: 3; pl. 1, figs. 3-3b. On the highest ridges of the north Cachar Hills, particularly the peaks “Sherfaisip” and “Marang-ski”, about 5,500 feet, in dense forest. Three syntypes [Shaerfaisip] EE.3511/104 {Collier}.
- shimbiense, Martlesia** Preston 1910a: 530; pl. 8, fig. 12. Shimbi Hills, British East Africa. Three possible syntypes EE.6032 {Spence ex Tomlin}.
- sigaloessa, Columbella (Mitrella)** Melvill and Standen 1896: 276; pl. 9, fig. 6. Loyalty Islands. Figured syntype EE.3774 {Hadfield}.
- signum, Mangilia (Cythara)** Melvill and Standen 1896: 286; pl. 9, fig. 24. Loyalty Islands. Figured syntype EE.3775 {Hadfield}.
- silvicola, Diplommatina** Godwin-Austen 1886: 45; pl. 45, figs. 3, 3a, (var. figs. 5, 5a). ‘Small var’. Khasi Hills. One syntype EE.3511/140 {Collier}.
- sincera, Rissoina** Melvill and Standen 1896: 308; pl. 11, fig. 66. Loyalty Islands. Figured syntype E.3776 and 2 possible syntypes EE.8120 {Hadfield}.
- solariellum, Cyclostrema** Melvill 1893: 63; pl. 1, fig. 20. *Nomen nudum* in Melvill and Abercrombie 1893: 40. Bombay. Three syntypes EE.7845 {Abercrombie}.
- soror, Leucochilooides** Preston 1912a: 188; pl. 31, fig. 17. Chanler Falls, Eusso Nyiro, British East Africa. Six possible syntypes EE.5997 {Spence ex Tomlin}.

- spryi, Marginella** Clover 1974: 503. Under stones at Mozambique, about 150 miles S. of Porto Amelia, Mozambique, E. Africa. One paratype EE.3752 {Clover}
- spyridula, Clathurella** Melvill and Standen 1896: 296; pl. 10, fig. 42. Loyalty Islands. Holotype EE. 3777 {Hadfield}.
- standeni, Tropidophora** Spence 1919: 43; pl. 1, figs. 5,6. Madagascar. Holotype (the only specimen described) EE.6351 {Spence}.
- stepheni, Columbella (Seminella)** Melvill and Standen 1897: 407. New name for *Columbella (Seminella) pacei* Melvill and Standen 1896 (qv). Loyalty Islands. Figured syntype EE.3765, figured as *C. pacei*, 18 possible syntypes EE.8072 and 5 possible syntypes EE.8073 {Hadfield}.
- stibarochila, Mangilia** Melvill and Standen 1896: 283; pl. 9, fig. 19. Loyalty Islands. Holotype (the only specimen described) EE.3779 {Hadfield}.
- stoliczki, Alycaeus** Godwin-Austen 1874: 147; pl. 3, figs. 3-3b. Naga Hills. One syntype EE.3512/21 {Collier}.
- strattoni, Placostylus** Pain 1955: 18; fig. 9. New Caledonia. Holotype EE.7846 {Stratton}.
- striata, Dablkaria** Biggs 1971: 222; pl. 7, fig. 1. Entedebir Island, Dahlak Archipelago, Red Sea. One paratype EE.7847 {Biggs}.
- sturyani** Burnup 1925: 113; pl. 8, figs. 15-17. New variety of *Gulella isipingoensis* (Sturany 1898). Ntimbankulu, Pietermaritzburg, Howick, Dargle, Zwaart Kop, Hilton, Karloof. One possible syntype [Natal] EE.5867 {Spence}.
- subframesi, Gulella** Connolly 1929: 219, 222; pl. 14, fig. 4. Zululand; Mfongosi {Spence ex Connolly, coll. WE Jones}. Four syntypes EE.5115.
- sulcosum** Torre and Bartsch 1941: 177; pl. 13, fig. 12. New subspecies of *Opisthosiphon (Bermudezsiphona) obturatum* Torre and Henderson 1921. Salto del Paso Tinaja, about 1.5km. from the north entrance to the pass [Cubitas Mts., Camaguey Province, Cuba]. Six syntypes EE.3687 {Smithsonian Institution}.
- superbum, Chondropoma** Henderson and Simpson 1902: 88; text fig. Found on a high limestone hill back of Thomazeau, Haiti. Four syntypes EE.3688 {Smithsonian Institution}.
- superbum, Farcimen (Farcimen)** Torre and Bartsch 1942: 35; pl. 7, figs. 28-30. *Nomen nudum* in Torre and Bartsch 1942: 34. Sierra de los Acostas, Luis Lazo, Pinar del Río, Cuba. Three paratypes EE.3672 {Smithsonian Institution}.

T

- tagbilleranus, Geophorus (Diplopinax)** Bartsch 1918: 656. *Nomen nudum* in Bartsch 1918: 655. Tagbileran, Bohol, Philippines. Seven paratypes E.3677 {Smithsonian Institution}.
- taphrodes, Tropidorissoia** Tomlin and Shackleford 1915: 307; pl. 5, fig. 5. S. Thomé. Four paratypes ['type' in British Museum (Natural History), *vide* p.309] {Shackleford}.

- terina, Daphnella** Melvill and Standen 1896: 296; pl. 10, fig. 43. Loyalty Islands.
Figured syntype EE.3780 and one syntype EE.7848 {Hadfield}.
- texistriatum, Ceras** Spence 1923: 21; pl. 1, fig. 3. Elizabetha. Holotype (the only specimen described) EE.6352 {Spence}.
- thalera, Mangilia** Melvill and Standen 1896: 289; pl. 10, fig. 30. Loyalty Islands.
Figured syntype EE.3781 and 22 possible syntypes EE.7849 {Hadfield}.
- thalycra, Mangilia** Melvill and Standen 1896: 283; pl. 9, fig. 20. Loyalty Islands.
Figured syntype EE.3782, 20 possible syntypes EE.7850, 10 possible syntypes EE.8068, 2 possible syntypes EE.8069 and 8 possible syntypes EE.8070 {Hadfield}.
- thaumasia, Rissoina (Morchiella)** Melvill and Standen 1898a: 31; pl. 1, fig. 3. Madras. Holotype (the only specimen described) EE.7851 {Henderson}.
- themeropsis, Drillia** Melvill and Standen 1896: 278; pl. 9, fig. 10. Loyalty Islands.
Holotype (or figured syntype) EE.3783 and one possible paratype/syntype EE.8110 {Hadfield}. Refigured in Kilburn 1994: figs. 84-85, and referred to as holotype (p. 223).
- theoteles, Mangilia (Glyphostoma)** Melvill and Standen 1896: 283; pl. 10, fig. 31. Loyalty Islands. Figured syntype EE.3784 {Hadfield}.
- thepalea, Mangilia (Glyphostoma)** Melvill and Standen 1896: 289; pl. 10, fig. 32. Loyalty Islands. Figured syntype EE.3785, 14 possible syntypes EE.7852, 7 possible syntypes EE.8102 and 7 possible syntypes EE.8103 {Hadfield}.
- thereganum, Mangilia (Glyphostoma)** Melvill and Standen 1896: 291; pl. 10, fig. 33. Loyalty Islands. Figured syntype EE.3786 {Hadfield}.
- thesaurista, Mangilia (Glyphostoma)** Melvill and Standen 1896: 291; pl. 10, fig. 34. Loyalty Islands. Figured syntype EE.3787 {Hadfield}.
- theskela, Mangilia (Glyphostoma)** Melvill and Standen 1895: 97; pl. 3, fig. 26. Lifu. Holotype (the only specimen described) EE.3788 {Hadfield}.
- thespesia, Daphnella** Melvill and Standen 1896: 297; pl. 10, fig. 44. Loyalty Islands.
Figured syntype EE.3789 and 2 possible syntypes EE.8107 {Hadfield}.
- thiasotes, Mangilia (Glyphostoma)** Melvill and Standen 1896: 284; pl. 9, fig. 21. Loyalty Islands. Figured syntype EE.3790 and one syntype EE.7853 {Hadfield}.
- thomsoni, Diplomatina** Godwin-Austen 1892: 514. South Burrail. Three syntypes EE.3511/130 {Collier}.
- thyridota, Mangilia (Glyphostoma)** Melvill and Standen 1896: 292; pl. 10, fig. 35. Loyalty Islands. Holotype (the only specimen described) EE.3791 {Hadfield}.
- tigrinum, Potadoma** Connolly 1938: 8; text fig. French Congo, Indo Sibiti [Kays River]. Seven syntypes EE.7907 {Spence ex Connolly}.
- topazon, Euonyma** Connolly 1923b: 637; pl. 19, fig. 20. Kenya, Urquess. Four paratypes EE.5616 {Spence ex Preston}.
- torresiense, Bittium** Melvill and Standen 1899b: 168; pl. 10, fig. 6. Station 14, channels between reefs, Mèr [Torres Straits]. Two syntypes EE.7854 {Haddon}.
- tragema, Solariella (Conotrochus)** Melvill and Standen 1896: 313; pl. 11, fig. 78. Loyalty Islands. Figured syntype EE.3792 and one syntype EE.7908 {Hadfield}.

transcendens, *Cardium (Trachycardium)* Melvill and Standen 1899b: 191; pl. 11, fig. 21. Torres Straits [*vide p.150*]. One syntype EE.7909 {Haddon}.

tricarinata, *Leucorhynchia* Melvill and Standen 1896: 311; pl. 11, fig. 75. Loyalty Islands. Holotype (the only specimen described) EE.3793 {Hadfield}.

trochoideum, *Craspedopoma* Lowe 1860b: 117. In convalle “Rib. do Inferno” dicta orae Septentr. Maderae. Two syntypes [‘Madeira’] EE.1710 {Preston 1907, ex Wollaston}.

tumida, *Diplommatina* Godwin-Austen 1870: 6; pl. 2, fig. 1. Burrail range near Nenglo, N. Cachar hills, in forest, and as usual among decaying leaves. Two syntypes [nr. Asala, N Cachar] EE.3511/141 {Collier}.

turricula, *Rachis* Preston 1911: 469; pl. 11, fig. 19. Between Rumruti and Mount Kenia, British East Africa. Five syntypes EE.6076 {Spence ex Preston}.

U

ugandanus, *Nothapalus* Connolly 1923a: 354; pl. 1, fig. 26. Uganda, Kigezi, 6000 ft; Ingezi, Mfumburu Mountains; Belgian Congo, Buhamba; Burunga, Mt. Mikeno. Six syntypes (with egg) [Kizegi] EE.5146 {Spence ex Connolly}.

umblicata, *Perideriopsis* Putzeys 1898: 3; fig. 5. Nsendwe, Congo. One syntype EE.5198 {Spence ex Dupuis}.

unicolor Melvill and Standen 1907a: 6; pl., fig. 3. New variety of *Lanistes neavei* Melvill and Standen 1907a. Kapopo [Rhodesia, now Ndola, Zambia]. Figured syntype EE.7910 {Neave}.

unicornis, *Euonyma* Connolly 1910: 265; pl. 6, fig. 3. Transvaal, Schanz Kop, Pretoria [locality of author’s ‘type’ according to Connolly 1939: 342]; Potchefstroom. Cape Colony, Cradock. Six paratypes EE.5400 {Spence ex Connolly}.

urguessensis, *Streptostele* Connolly 1922b: 502; pl. 14, fig. 2. Kenya, Urguress. One syntype EE.5694 {Spence ex Connolly}.

uveanum, *Bittium* Melvill and Standen 1896: 299; pl. 10, fig. 49. Loyalty Islands. Figured syntype EE.3794 {Hadfield}.

V

vallentinianum, *Sphaerium* Melvill and Standen 1914: 132; pl. 7, figs. 3-3b. Herbert Stream, Roy Cove, on mud; also in large pond, Port North [Falkland Islands]. Figured syntype (original of fig. 3) EE.7911 and 3 syntypes EE.7912 [all Herbert Stream] {Vallentin}.

varia, *Euonyma* Connolly 1910: 263; pl. 6, figs. 5-7. Transvaal, Pienaars Port; Pretoria District; Potchefstroom; Zoutpansberg. Four paratypes EE.5398 {Spence ex Connolly}.

vaughani, *Opisthosiphon* Bartsch 1946: 222, 230; pl. 37, fig. 1. Below Lisbon Creek, Mangrove Key, Bahamas. Six paratypes EE.3692 {Smithsonian Institution}.

velutinus, Homorus Connolly 1931: 316; pl. 11, figs. 6-7 and text figs. 2-3. Uganda: North Bugisha District, Mt. Elgon, 7000-9000 feet. Two possible paratypes EE.5381 {Spence ex Hale Carpenter}.

versicolor, Odostomia Melvill and Standen 1897a: 379; pl. 11, fig. 83. Loyalty Islands. Figured syntype EE.3795 and one possible syntype EE.8121 {Hadfield}.

versoverana, Rissoa Melvill 1893: 61; pl. 1, fig. 15. *Nomen nudum* in Melvill and Abercrombie 1893: 35. Bombay. Nine syntypes EE.7913 {Abercrombie}.

villarensis, Urocoptis Torre 1911: 42; pl. 4, figs. 1, 5. Central Cuba; El Purio, near Calabazar de Sagua and El Capiro, near Santa Clara, Province of Santa Clara. A locality also called "Las "Villas". One possible syntype EE.4620 {Spence ex Tomlin}.

violacea, Syrnola Melvill and Standen 1896: 304; pl. 11, fig. 59. Loyalty Islands. Figured syntype EE.3796 and 2 possible syntypes EE.8119 {Hadfield}.

viperidens, Cadulus Melvill and Standen 1896: 314; pl. 11, fig. 79. Loyalty Islands. Figured syntype EE.3797 {Hadfield}.

W

waterstoni, Anodonta Tomlin 1923: 68; 2 text figs. Lake Beschik [Salonika]. Three paratypes (single valves) EE.7914 {Tomlin ex Waterston}.

whartoni, Limnaea Jones and Preston 1904: 142; text fig. 1. Liu Shi Tao, north-east promontory of Shantung. One syntype EE.7920 {Jones}.

wildemanni, Acbatina Dautzenberg 1908. Kasai, Manghay. One syntype EE.5507 {Spence ex Connolly}. See also Pilsbry 1919 regarding type locality.

williamsi, Olivella Melvill and Standen 1897a: 380; 2 text figs. Loyalty Islands. Figured syntype EE.3798 {Hadfield}.

woodhousei, Homorus Connolly 1923a: 352; pl. 1, fig. 9. Uganda, Mt. Elgon. Six syntypes (with egg) EE.5438 and one syntype (with 3 eggs) EE.5435 {Spence ex Kennard ex Woodhouse}.

worcesteri, Cochlostyla Bartsch 1909: 295; pl. 29, figs. 14, 16. Bantayan Island [off N.W. coast of Cebu, Philippines]. Six paratypes EE.3679 {Smithsonian Institution}.

X

xanthoporphyria, Drillia Melvill and Standen 1896: 278; pl. 9, fig. 11. Loyalty Islands. Holotype EE.3799 {Hadfield}. Holotype refigured in Kilburn 1994: fig. 86, and referred to as holotype (p. 223).

xenophyes, Turbonilla Melvill and Standen 1912: 353; pl. 7, figs. 16, 16a. Trawl, Burdwood Bank, south of the Falkland Islands, 56 fathoms. Station 346 [lat. 54° 25'S., long. 57°32'W.]. Four syntypes EE.7921 {SNAE}.

xuthedra, Ricinula (Sistrum) Melvill 1893: 55; pl. 1, fig. 4. *Nomen nudum* in Melvill and Abercrombie 1893: 31. Ratnagiri. Two syntypes EE.7922 {Abercrombie}.

Y

yoshidai Bartsch 1925a: 72. New subspecies of *Katayama nosophora* Robson 1915. Kurume, Kyushu, Japan. Nine syntypes EE.3691 {Smithsonian Institution}.

Z

zadela, Alaba Melvill and Standen 1896: 305; pl. 11, fig. 71. Loyalty Islands. Holotype (the only specimen described) EE.3800 {Hadfield}.

zambesiensis, Unio Preston 1905: 301; text fig. 1. Just above Victoria Falls, Zambezi River. Two possible syntypes (single valves) EE.5741 {Spence ex Preston}.

zatricium, Engina Melvill 1894: 51; text fig. Lifu, Loyalty Islands. Nine possible syntypes EE.2589 {Hadfield}.

zea, Engina Melvill 1893: 55; pl. 1, fig. 7. *Nomen nudum* in Melvill and Abercrombie 1893: 29. Bombay. Four syntypes EE.7923 {Abercrombie}.

zonata Connolly 1925b: 474. New variety of *Halolimnohelix iredalei* Connolly 1925. Kenya, Rumruti; Cherangani Hills. Seven syntypes [Cherangani] EE.6139 {Spence ex Connolly}.

zonula, Rissoina Melvill and Standen 1896: 308; pl. 11, fig. 67. Loyalty Islands. One syntype EE.3802 {Hadfield}.

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New data on the distribution and biology of the invasive species *Hydrotaea aenescens* (Wiedemann, 1830) (Diptera, Muscidae)

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Abstract

Introduced from the New World, *H. aenescens* has spread rapidly in Europe. This paper reports new records of *H. aenescens* from Eastern Europe. Among these records, the one from the far north of European Russia is the most remarkable. New data on the seasonal activity and mating behaviour of *H. aenescens* are also given. A peak of *H. aenescens* imago activity in southern Turkey takes place during very early spring. The mating behaviour of *H. aenescens* differs from that of other members of the genus *Hydrotaea*.

Keywords

Hydrotaea aenescens, Muscidae, invasive species, introduced species, faunistic records, mating behaviour, courtship, phenology, seasonal activity, Russia, Turkey

Introduction

Hydrotaea aenescens is widely distributed in the Neotropical and Nearctic regions, and was introduced into Europe around 1960 (Saccà 1964). Current data on the dispersal of *H. aenescens* in Europe is given in Pont *et al.* (2007).

From my experience, the most attractive substrate for *H. aenescens* is vertebrate carrion. On the same substrate, I usually found *H. aenescens* together with another *Hydrotaea* – our common indigenous *H. ignava* (Harris). Both flies look alike due to their unmodified fore femur and strong metallic shine (previously they were placed in the genus *Ophyra*), and they have obvious synanthropic trends. When caught, *H. aenescens* is unmistakable due to its yellow palpi. In the field *H. aenescens* is slightly

smaller and has a greenish shine instead of the bluish shine in *H. ignava*. I decided that it would be interesting to compare the behaviour, and especially the courtship and mating strategies, of these two species.

Material and methods

To attract *H. aenescens*, I used vertebrate carcasses (dog, cat) found near roads. These animals had been killed in road accidents and were in various stages of decomposition. Usually I had to move the carcass away from the road to a more suitable place where neither the flies nor I would be disturbed.

Observations took place in Turkey near Antalya and in Russia near Sochi and near Narjan-Mar (Fig. 1), between September 2007 and July 2008.

The collected material is stored in the Zoological Museum of Moscow State University, Russia.

To understand the mating behaviour, I simply used visual observations, and I recorded what I saw using photography (CanonD20 digital camera with Canon 100mm/2.8 macro lens).

Results and discussion

I. Distribution and phenology

Records. Turkey, Antalya, near Side, sand dune with pine trees, 02-04 October 2007, cat carcass.

The only female of *H. aenescens* was collected among 15-20 females of *H. ignava*. No males recorded.

Turkey, Antalya, near Side, sand dune with pine trees, 21-27 February 2008, dog carcass. *H. aenescens* was numerous, with a male/female ratio 2 : 1. *H. ignava* was not recorded at all.

Turkey, Antalya, near Side, Lake Titreyen, 21-27 February 2008, another dog carcass, half-buried under sand. *H. aenescens* was common, with a male/female ratio 2 : 1. *H. ignava* was not recorded at all.

Turkey, Antalya, near Side, Lake Titreyen, 30-31 March 2008, the same dog carcass, half-buried under sand. *H. aenescens* was less common than one month previously, with a male/female ratio about 1 : 1. *H. ignava*, on the contrary, appeared in great numbers, with more males than females. Males of *H. ignava* hovered above carrion at a height of 10-50 cm.

Turkey, Antalya, near Side, sand dune with pine trees, 28-31 May 2008, cat carcass. *H. aenescens* was not recorded, but several specimens of *H. ignava* were collected, all females.

Russia, Sochi region, Black Sea beach near Veseloe, 23-25 October 2007, dog carcass. Only females of *H. aenescens* and *H. ignava* were collected. *H. ignava* was 3-4 times more abundant than *H. aenescens*.

Russia, Nenetsk Nat. Res., 60 km north of Narjan-Mar, 68.15N 53.65E, 9-11 July 2008. Males and females of *H. aenescens* were found in and around a refuse pit for rotten fish waste and kitchen garbage. This refuse pit was near a fishing shack used by fishermen and scientists. The hut was situated at least 50 km away from the nearest inhabited village.

Phenology. It might be thought that *H. aenescens*, being originally a Neotropical species, might be a warmth-loving species. On the contrary, however, in South Turkey it is among the very few Diptera that emerge as early as in February. The high percentage of males and high courtship-mating activity observed in February testify to the fact that these were not overwintering flies but rather a freshly emerged generation.

When it comes to comparing different field observations, there must always be some doubt as to whether the situations are strictly comparable – an observer may suppose the sites and the substrates to be approximately the same, but the flies may not see things in the same way. The dog carcass discovered near Lake Titreyen was placed so as to rule out such a possibility. Because it was half-buried under the sand, decomposition was definitely proceeding more slowly than usual and the carcass remained attractive to carrion visitors for a long time. Observations of this carcass showed that *H. aenescens* appeared one month earlier than *H. ignava*. We could also observe that in hot periods *H. aenescens* became much less common than *H. ignava*.

The larvae of *H. aenescens* are often regarded as potential antagonists of the larvae of *Musca domestica* Linnaeus (Skidmore 1985). I doubt that such antagonism takes place, at least in Southern Turkey. The activity of *M. domestica* occurs chiefly in the hot season, and *H. ignava* seems much more suited to be a *M. domestica* antagonist than *H. aenescens*.

Distribution. Russia is a new record for *H. aenescens*. In the map (Fig.1), the countries from which *H. aenescens* has been recorded (Pont *et al.* 2007) are marked in green. The map shows that the report of *H. aenescens* from the southern part of European Russia was rather predictable. However, the record from the Pechora River delta was unexpected. It is interesting that the most northern previously known locality for *H. aenescens* was southern Norway (Rognes 1982), but there are significant differences between the more gentle Atlantic climate of Norway and the extremely severe conditions of the Russian polar tundra. Under these conditions, most of the temperate Diptera fauna is replaced by a boreal fauna. The cold-resistance of *H. aenescens* discussed above is likely to account for its occurrence in a boreal region. Another consideration is the distinct synanthropic trend in *H. aenescens*. My indoor collection of several specimens of *H. aenescens* in February-March in Turkey supports this possibility, as I have never collected other members of the genus *Hydrotaea* indoors.



Fig. 1. Map showing the records of *H. aenescens*: 1 – Turkey, Antalya, near Side; 2 – Russia, Sochi region, near Veseloe; 3 – Russia, 60 km North of Narjan-Mar, 68.15N 53.65E. Countries where *H.aenescens* was previously recorded (Pont *et al.* 2007) are marked in green.

II. Mating behaviour

Mating behaviour was observed on the dog carcasses during the period 22-27 February 2008. Males were found sitting on and around carrion, often changing positions but clearly avoiding shaded sites. I would characterize the mating behaviour of *H. aenescens* as follows: trying to copulate with any fly of the same size or bigger (preferred), with a metallic shine, in sunlight. Females spent more time in the shade under the carcass, where it was suitable for oviposition, and were not commonly the object of such courtship, but male-to-male mating attempts were regular and numerous. This behaviour was difficult to record on camera since the male underneath immediately tried to escape or to change his position to the upper one. To make an image of an immobile copulating pair attacked by another male was a much easier task.

Calliphoridae of both sexes also attract *H. aenescens* males. Fig. 3 shows *Lucilia sericata* (Meigen) (large and shining, as *H. aenescens* prefers) and *Calliphora vomitoria* (Linnaeus) (not very shining, but large in size) with *H. aenescens* males.



Fig. 2. Copulating pair of *H. aenescens* attacked by another male.



Fig. 3. Males of *H.aenescens* attempting to copulate with *L.sericata* (left) and *C.vomitoria* (right)

However, the species that suffers the most from this sexual harassment is *Chrysomya albiceps* (Wiedemann). This can be described as a case of ‘the biter being bitten himself’, because, in their turn, males of *C. albiceps* display the same mating behaviour with male-to-male attempts and the disturbance of copulating pairs by another male(s). The next photograph will illustrate this (Fig.4).

Piophilidae, Sarcophagidae and Fanniidae were totally ignored, probably because they were too small or not shining.

A normal copulation of *H. aenescens* was also observed, although not very often. Copulation was on or around carrion and lasted for 2-6 minutes.

In late March, males of *H. ignava* exhibited a very spectacular hovering behaviour above carrion.

No hovering/swarming by *H. aenescens* was observed during my observations. Furthermore, I am certain that it never happens because swarming is replaced by the mating behaviour described above. To my knowledge, the non-swarming courtship of *H. aenescens* is unique in the genus *Hydrotaea*.



Fig. 4. A copulating pair of *C. albiceps* attacked by males of *H. aenescens* and *C. albiceps* at the same time.



Fig. 5. Copulating pair of *H. aenescens*

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The fossil crown wasp *Electrostephanus petiolatus* Brues in Baltic Amber (Hymenoptera, Stephanidae): designation of a neotype, revised classification, and a key to amber Stephanidae

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Abstract

The fossil crown wasp *Electrostephanus petiolatus* Brues **comb. rev.** (Stephanidae, Electrostephaninae) is re-described from a single male preserved in middle Eocene Baltic Amber. The holotype was lost or destroyed around the time of World War II and subsequent interpretations of its identity have been based solely on the brief descriptive comments provided by Brues in his original account. The new specimen matches the original description and illustration provided by Brues in every detail and we hereby consider them to be conspecific, selecting the specimen as a neotype for the purpose of stabilizing the nomenclature for this fossil species. This neotype exhibits a free first metasomal tergum and sternum, contrary to the assertion of previous workers who indicated these to be fused. Accordingly, this species does indeed belong to the genus *Electrostephanus* Brues rather than to *Denaeostephanus* Engel & Grimaldi (Stephaninae). *Electrostephanus petiolatus* is transferred to a new subgenus, *Electrostephanodes* **n. subgen.**, based on its elongate pseudo-petiole and slender gaster, but may eventually warrant generic status as the phylogenetic placement of these fossil lineages continues to be clarified. A revised key to the Baltic amber crown wasps is provided.

Keywords

Hymenoptera, Stephanomorpha, Stephanoidea, Stephanidae, Electrostephaninae, *Electrostephanus*, neotype, taxonomy, Tertiary, Eocene, amber

Introduction

The crown wasps (Stephanidae) occupy a distinguished position among the diversity of parasitoid Hymenoptera (Euhymenoptera). The family is the basalmost living lineage of apocritan wasps, representing the sole survivors of the initial diversification of Apocrita (e.g., Rasnitsyn, 1975, 1980; Königsmann, 1978; Whitfield, 1992, 1998; Vilhelmsen, 1996, 2001; Grimaldi and Engel, 2005). Despite their apparent antiquity, fossil stephanids are rare and of relatively recent age. The oldest definitive stephanid is *Archaeostephanus corae* Engel & Grimaldi, a schlettereriine in Late Cretaceous (Turonian) amber from New Jersey (Engel and Grimaldi, 2004). All other records of stephanids are from the Tertiary and largely from the middle Eocene or Eocene-Oligocene boundary. The youngest and also the first discovered stephanid fossil is *Protostephanus ashmeadi*, described by Cockerell (1906) from a single female preserved as a compression with little relief from the Florissant shales in Colorado, USA. The remaining Tertiary species are all preserved as inclusions in middle Eocene (Lutetian) amber from the Baltic region. Brues (1933) described three species, assigning them to the extinct genus *Electrostephanus* Brues. Subsequently Aguiar and Janzen (1999) discussed two new species, placing them in Brues's genus and simultaneously attempting to evaluate Brues's taxa. Engel (2005) later reported the discovery of the first female for *Electrostephanus* based on males and females of a new species, the material serving to clarify the placement of the genus as sister to but distinctly outside of the Stephaninae. To date these represent our sole insights into the geological past of one of the most phylogenetically and biologically interesting parasitoid wasp families.

Herein we report the discovery of a new male crown wasp in Baltic amber. The new specimen is identical with the male described by Brues (1933) as *Electrostephanus petiolatus*. Brues's holotype was in the Albertus Universität, Königsberg collection which was largely destroyed by fire during the bombings of World War II. Some material from this important collection does survive to this day in the Institut und Museum für Geologie und Paläontologie, Göttingen and a few specimens have turned up in other locations [e.g., the rediscovery of the holotype of the gall wasp *Aulacidea succinea* Kinsey (now *Kinsey cynips succinea*) in the Kinsey Collection at the American Museum of Natural History: Liu et al., 2007]. However, a personal examination of the Göttingen material by the senior author in July 1999 recovered no specimen of *Electrostephanus*. Accordingly we have selected the new specimen as a neotype in order to stabilize the application of the names for fossil stephanids and provided a clarification of its identity.

Material and methods

The specimen reported herein is from the Amber Fossil Collection, Division of Invertebrate Zoology, American Museum of Natural History (AMNH), New York and was formerly part of the Jens-Wilhelm Janzen Collection of Baltic amber Hymenoptera. For the description the format follows that of Engel (2005), with the morphological terminology following that used elsewhere for crown wasps (e.g., Aguiar and Janzen, 1999; Achterberg, 2002; Engel, 2005).

Systematic paleontology

Family Stephanidae Leach, 1815

Subfamily Electrostephaninae Engel, 2005

Genus *Electrostephanus* Brues, 1933

Subgenus *Electrostephanodes* Engel & Ortega-Blanco, subgen. n.

urn:lsid:zoobank.org:act:6AD1C5DF-A254-475D-8873-933E67E2959A

Type species. *Electrostephanus petiolatus* Brues, 1933.

Diagnosis. *Male*: Body of moderate-size (ca. 9 mm); slender. Antenna with more than 20 articles (23 in type species). Metacoxa without dorsal tooth; ventral surface of metafemur with three principal teeth, one blunt tooth near base, one larger blunt tooth near midlength, and one blunt tooth near apex, with seven minor, blunt teeth between principal teeth; tarsi pentamerous; pretarsal unguis simple; arolium present. Forewing with long, arched basal vein; vein $Rs+M_b$ absent; bullae absent; $2Cu_a$ and $2Cu_b$ present and tubular; $2A$, $3A$, and $2cu-a$ nebulous; hind wing with only $Sc+R$ present. First metasomal terga and sterna elongate, about five times longer than wide, but distinctly separate (not fused as in Stephaninae, such as *Denaeostephanus* Engel & Grimaldi, also in Baltic amber), thus forming “pseudo-petiole”, pseudo-petiole nearly as long as mesosoma; gaster slender, not distinctly thickened relative to pseudo-petiole, width gently tapering along its length. *Female*: Unknown.

Etymology. The new genus-group name is a combination of *Electrostephanus* and an adjectival derivative of *eidos* (Greek, meaning, “kind” or “having the form of”). The name is masculine (while generic words ending in the noun *eidos* are neuter, those ending in the adjectival derivatives, such as *-odes* or *-oides*, may be in practice any gender [masculine, feminine, or neuter]: Brown, 1954).

Electrostephanus (Electrostephanodes) petiolatus Brues, *combinatio revivisco*

Electrostephanus petiolatus Brues, 1933: 14 [holotype male, in ill-fated Königsberg Collection, presumed destroyed]; Aguiar and Janzen, 1999: 444 [key]; Achterberg, 2002: 12 [mentioned in Schlettereriinae]; Aguiar, 2004: 14 [catalogue].

Denaeostephanus petiolatus (Brues), Engel and Grimaldi, 2004: 1194 [tentative transfer to genus based on description of petiole by Aguiar and Janzen (1999)]; Engel, 2005: 318 [mentioned].

Type material. Neotype (**here designated**) male; AMNH B-JWJ-260, Baltic amber, Eocene (Lutetian), and labeled “Neotype, *Electrostephanus petiolatus* Brues, desig. Engel & Ortega-Blanco [red label]”. Formerly part of the Jens-Wilhelm Janzen collection.

Diagnosis. As for the subgenus (*vide supra*).

Description. *Male*: Total body length (from head anterior margin to metasoma posterior margin) 9.84 mm; forewing length (from tegula to apex) 5.04 mm. Integument dark brown to black (where evident) with scattered, thin, simple, erect or suberect setae as noted. Head globular, with compound eyes occupying around one-half of lateral surface, eyes well separated from preoccipital area; “crown” composed of 5 tubercles arising anterior to series of four transverse carinae between lateral ocelli around compound eyes, median ocellus set just anterior to series of carinae; tubercles arranged with anteriormost tubercle medial on frons, lateral tubercles paired in longitudinal series parallel to compound eye; integument of face rugulose, integument posterior to carinae and on gena impunctate and smooth. Antennae with 23 articles, arising from clypeus boundary at about compound eye midlength; scape about twice as long as wide, somewhat ovoid, surface bordering malar space slightly flattened; pedicel about one-half scape length, almost as wide as long; first flagellomere as long as pedicel but one-half width; second flagellomere around four times longer than wide, slightly less than twice length of first flagellomere; third through fifth subequal in length and shape; remaining flagellomeres progressively shorter, except apicalmost flagellomere with tapered apex. Maxillary palpus 5-segmented, elongate, elbowed between MP₂ (maxillary palpomere II) and MP₃, MP₁ and MP₂ thicker than MP₃₋₅, MP₁ shortest, MP₂ about twice length of MP₁, MP₃ slightly less than twice length of MP₂, MP₄ and MP₅ equal in length to MP₃. Labial palpus short, apparently 3-segmented (base obscured), slightly widening apically except LP₃ with acutely pointed apex.



Fig. 1. Neotype male of *Electrostephanus petiolatus* Brues in Baltic amber (AMNH B-JWJ-260).

Pronotum long, transversely striate along neck, near articulation with head, remainder of surface imbricate and irregular, laterally and dorsoventrally micro-rugulose, posterior portion with sparse, erect, long, simple setae; propleuron finely imbricate, with scattered shallow punctures. Mesoscutum, mesoscutellum, and metanotum apparently largely imbricate, with scattered shallow punctures (direct view of this surface slightly obscured), with sparse, erect, long, simple setae; pleura largely coarsely and irregularly punctured, punctures deep, large, and nearly contiguous, forming irregular network, except posterior half of mesopleuron with large, impunctate and imbricate area bordered posteriorly by dorsoventral column of coarse, large, punctures along boundary with metapleuron; metapleuron with longitudinal series of irregular rugae, posteriorly with coarse, irregular, contiguous punctures like those on anterior portion of mesopleuron except more deeply impressed.

Pro- and mesocoxae short and cylindrical, imbricate; metacoxa massive, wider at base, oriented posteriorly, imbricate except basally somewhat rugose; trochanters narrow at base, gently and slightly widening apically, with distinct trochantellus; femora finely imbricate; pro- and mesofemora with proximal thirds narrowly petiolate; metafemur fusiform, widest at mid-point; ventral surface of metafemur with a blunt, triangular, principal tooth at first third of length, a more acute and longer tooth near midlength, and a tooth near apex in apical third of length; three minor teeth or protuberances between medial tooth and others, such protuberances slightly closer to medial tooth, another protuberance just prior to distalmost principal tooth; a thin, long seta arising from each protuberance; metafemur with scattered, erect, long, slightly fuscous setae; tibiae finely imbricate, thin and elongate, with nearly basal halves narrowly petiolate, with a row of short spines on anterior and posterior surfaces of pro- and mesotibia; metatibia with several long setae at apex, inner surface with thin patch of microtrichia; tibial spurs 1-2-2, stout and short; metabasitarsus with a row of stouter setae anteriorly and posteriorly; remaining tarsomeres with two distinct long, thick distal setae; tarsal relative proportions – (all in comparison to associated basitarsus = 1) foreleg: 1 : 0.5 : 0.3 : 0.3 : 0.4; midlegs: 1 : 0.4 : 0.4 : 0.3 : 0.4; hind legs: 1 : 0.4 : 0.25 : 0.8 : 0.5; fourth tarsomere with distal ventral surface elongate, extending under most of fifth tarsomere; fifth tarsomere arising from near midlength of fourth tarsomere; pretarsal unguis (= claws) long, curved, and simple.

Wing membranes hyaline. Forewing with parallel-sided, dark brown pterostigma, slightly more than three times longer than high; Rs apex not reaching completely wing margin but extending well beyond pterostigma, demarcating a long, open marginal cell; basal vein (first free abscissa of M) arched proximally along basal half, about three times as long as first free abscissa of Rs, about twice 1m-cu length and approximately parallel to 1m-cu, demarcating a trapezoidal medial cell (= discal cell); Rs+M_b and buliae absent; submarginal cell pentagonal, wider apically, r-rs slightly less than one-half length of second free abscissa Rs; cubital cell rectangular, three times longer than high; M and Cu almost reaching wing margin as nebulous veins; 3A, 2cu-a, and apical third of 2A nebulous; posterior margin of wing with very short, thin setae. Hind wing with four distal hamuli; only Sc+R present, thin and tubular.

Metasoma slender, elongate, terga and sterna not fused laterally, integument finely imbricate except pseudo-petiole rugulose, sternum with irregular transverse rugae ba-

sally; first metasomal tergum and sternum forming a narrow, tubular pseudo-petiole (a “true” petiole in Stephanidae have the tergum and sternum fused laterally), about five times longer than wide; metasomal segments II–V subequal in length, remaining terga progressively shorter, second and third metasomal segments about three times longer than wide; gastral terga with exceptionally sparse setae, setae suberect, simple and long; gastral sterna with sparse, erect or suberect, elongate setae; parameres exposed, broad, tapering gradually to bluntly rounded apices, with fringe of dense, erect, moderate-length, slightly fuscous setae at apex.

Female: Unknown.

Discussion

Aguiar and Janzen (1999) presented a key to the species of *Electrostephanus*, *sensu* Brues (1933), and noted at that time that *E. petiolatus* had the first metasomal tergum and sternum fused to form a long, tubular petiole like *E. tridentatus* Brues and *E. sulcatus* Aguiar & Janzen. Engel and Grimaldi (2004) noted that the condition of a fused tergum and sternum was derived and indicated a relationship closer to typical Stephaninae, while the plesiomorphic free condition was similar to that retained in the subfamily Schlettereriinae. Accordingly, those species with the first metasomal tergum and sternum fused were transferred to the genus *Denaeostephanus*, and based on the assertion by Aguiar and Janzen (1999) that *E. petiolatus* was of this form the species was tentatively placed therein as *Denaeostephanus petiolatus* (Brues).

The new specimen reported herein is immediately recognizable as *E. petiolatus* based on the form of the male metasoma. Indeed, the specimen matches all those traits described by Brues (1933) except that the overall size is slightly larger, the base of the pterostigma does not appear lighter (“pale” basally according to Brues but uniformly brown in the new specimen, likely differences in preservation as color is often off in Baltic amber specimens), and the pterostigma is about 3.5 times longer than high rather than merely thrice as long as high. All of these are very minor differences and may either be due to preservation (coloration of pterostigma) or be associated with variations in size. While the species was considered to have a more derived petiole, like Stephaninae, the petiolar tergum and sternum are clearly separate. Although the wings obscure some of the view of the metasomal base, the lateral surface of the first metasomal segment can be clearly seen in left lateral aspect (and from a slightly ventrally oblique view) where a clear separation between the sclerites is observed. This is a remarkable feature in that the species retains the primitively separate first metasomal tergum and sternum while possessing the more elongate form (nearly as long as the mesosoma) of many other genera. Given this revelation, the assignment of *E. petiolatus* to *Denaeostephanus* (Stephaninae) is no longer founded and the species is returned to *Electrostephanus* and the Electrostephaninae.

Brues placed his three fossil species in a single, extinct genus based on their relatively low number of antennal articles in comparison to modern stephanids, but noted that other features of importance were heterogeneous among his species (e.g., the formation of

the petiole). As such, his grouping was not natural and reflected more the notion that the species were primitive and were in Baltic amber (i.e., the genus was named more for the fauna rather than the phylogenetic affinities of the individual taxa). Accordingly, the genus was unnatural in composition and, not surprisingly, the fauna was more heterogeneous in lineages represented than Brues's classification implied. This was also noted correctly to some degree by Aguiar and Janzen (1999), although in the absence of more material, particularly females, they chose to follow Brues's system of considering all Baltic amber species as "*Electrostephanus*". Engel and Grimaldi (2004) and Engel (2005) attempted to more accurately represent the phylogenetic heterogeneity of the fauna by segregating the primitive *Electrostephanus* from the clearly derived *Denaeostephanus*, the latter belonging to the Stephaninae. We have here further highlighted the diversity of these species by segregating *E. petiolatus* into a distinct subgenus relative to its congeners. The elongate pseudo-petiole, tapered gaster, and more elongate antenna of *E. petiolatus* are derived features relative to other *Electrostephanus*. Indeed, *Electrostephanodes* could warrant generic status but we have hesitated from fully pulling the species out of *Electrostephanus* until more material is located (the current supraspecific classification of the family is summarized in table 1).

Table I. Supraspecific classification of living and fossil crown wasps (Stephanidae) (updated from Engel, 2005).

Family STEPHANIDAE Leach
Subfamily SCHLETTERERIINAE Orfila
Genus † <i>Archaeostephanus</i> Engel & Grimaldi
Genus <i>Schlettererius</i> Ashmead
Subfamily †ELECTROSTEPHANINAE Engel
Genus † <i>Electrostephanus</i> Brues
Subgenus † <i>Electrostephanodes</i> Engel & Ortega-Blanco n. subgen.
Subgenus † <i>Electrostephanus</i> Brues
Subfamily STEPHANINAE Leach
Genus † <i>Protostephanus</i> Cockerell
Genus † <i>Denaeostephanus</i> Engel & Grimaldi
Tribe Stephanini Leach
Genus <i>Stephanus</i> Jurine
Tribe Megischini Engel & Grimaldi
Genus <i>Hemistephanus</i> Enderlein
Genus <i>Megischus</i> Brullé
Genus <i>Pseudomegischus</i> Achterberg
Subgenus <i>Pseudomegischus</i> Achterberg
Subgenus <i>Callomegischus</i> Achterberg
Tribe Foenatopodini Enderlein
Subtribe Madegafoenina Engel & Grimaldi
Genus <i>Madegafoenus</i> Benoit
Genus <i>Afromegischus</i> Achterberg
Subtribe Foenatopodina Enderlein
Genus <i>Parastephanellus</i> Enderlein
Genus <i>Comnatopus</i> Achterberg
Genus <i>Profoenatopus</i> Achterberg
Genus <i>Foenatopus</i> Smith

Electrostephanus neovenatus Aguiar & Janzen is another enigmatic species, primitively retaining the separated and short first and second metasomal terga, but with a more derived wing venation. Unfortunately, the antennae are incomplete in the holotype and it is difficult to ascertain at this time whether it should be segregated into its own genus. Hopefully more completely preserved material will be recovered and the species elaborated upon.

Based on the wealth of new information available for *E. petiolatus* we provide here a revised key to the Baltic amber species of Stephanidae.

Revised key to Baltic Amber Stephanidae

- 1 First metasomal tergum and sternum fused laterally to form distinct petiole (*Denaeostephanus* Engel & Grimaldi) 2
- First metasomal tergum and sternum not fused, separated by small membranous area (“pseudo-petiole”) (*Electrostephanus* Brues) 3
- 2 Metafemur with two principal teeth, one near midlength and one near apical quarter *D. sulcatus* (Aguiar & Janzen)
- Metafemur with three principal teeth, one near proximal quarter, one near midlength, and one near apex *D. tridentatus* (Brues)
- 3 Forewing vein $Rs+M_b$ absent or scarcely present; bullae absent 4
- Forewing vein $Rs+M_b$ distinctly present; bullae present *E. neovenatus* Aguiar & Janzen
- 4 Forewing $2Cu_a$ and $2Cu_b$ absent or nebulous; $Rs+M_b$ absent or scarcely present; pseudo-petiole short, one-half mesosomal length or less; gaster relatively robust, distinctly thicker than pseudo-petiole; metafemur with two principal teeth, one near midlength, one near apex; antenna with fewer than 20 articles; smaller species, males 4–7.1 mm in length 5
- Forewing $2Cu_a$ and $2Cu_b$ present and tubular; $Rs+M_b$ absent; petiole elongate, nearly as long as mesosoma; gaster slender, tapering gradually from pseudo-petiole to apex; metafemur with three principal teeth, one proximally, one near midlength, one near apex; antenna with 23 articles; larger species, males 9.0–10.0 mm in length (subgenus *Electrostephanodes* n. subgen.) *E. petiolatus* Brues
- 5 Male antenna with 14 articles; second through fourth flagellar articles each widened apically and about three times longer than wide; forewing $Rs+M_b$ scarcely present (exceedingly short), $2Cu_a$ and $2Cu_b$ nebulous; moderate-sized species, males 6.0–7.1 mm in length *E. janzani* Engel
- Male antenna with 17 articles; second and third flagellar articles each widened apically and 2.5 times longer than wide, fourth flagellar article not widened apically and three times longer than wide; forewing $Rs+M_b$, $2Cu_a$, and $2Cu_b$ absent; smaller species, male 4.2 mm in length *E. brevicornis* Brues

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Studies of Tiger Beetles. CLXXVIII. A new *Lophyra* (*Lophyra*) from Somaliland (Coleoptera, Cicindelidae)

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Abstract

A new tiger beetle species, *Lophyra* (*Lophyra*) *praetermissa* n. sp. (Coleoptera, Cicindelidae), obviously a close relative of *L. (L.) histrio* (Tschitschérine, 1903), is described from the environs of Erigavo, Somaliland (northern Somalia). Its discovery thus brings to 73 the number of the species of this genus presently known worldwide (39 species of which – 29 from Africa – belong to the typonominal subgenus).

Keywords

Tiger Beetles, Cicindelidae, *Lophyra*, Somaliland

Introduction

From 28 May to 11 June 2005 John Miskell and the author visited Somaliland (northern Somalia) where they collected eight tiger beetle species [*Prothyma* (*Prothyma*) *bottegoi* (W. Horn, 1897); *Calomera alboguttata* (Klug, 1832); *Calomera aulica* (Dejean, 1831); *Lophyra* (*Lophyrina*) *latelimbata* (Müller, 1941); *Chaetodera regalis* (Dejean, 1831); *Chaetodera blanchardi* (Fairmaire, 1882); *Myriochila* (*Myriochila*) *melancholica* (Fabricius, 1798); *Myriochila* (*Monelica*) *hauseri* (W. Horn, 1898); *Hypaetha singularis* (Chaudoir, 1876)], and a previously undescribed *Lophyra* (*Lophyra*) species, in the environs of Erigavo (Cassola and Miskell 1990), which is described herein. The genus

Lophyra (Motschulsky 1859, 1861), which was subdivided in a few subgenera by Rivier (1948, 1950, 1957, 1961), Cassola (1977) and Matalin and Cherkasov (2004), is mostly characterized by a peculiar ear-like shaped inner sac of the aedeagus.

***Lophyra (Lophyra) praetermissa* Cassola, n. sp. (Fig. 1)**

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Material examined. Holotype, ♂, and one paratype, ♀, from Somaliland (northern Somalia), Al Afweyn-Erigavo, 3.4 km S of Erigavo ($10^{\circ}35.9\text{N}$, $47^{\circ}21.1\text{E}$), 1800 m, 4 June 2005, F. Cassola leg., in author's collection (FCC).

Diagnosis. A small *Lophyra* (*Lophyra*) species, especially resembling *L. (L.) histrio* (Tschitschérine, 1903), with all the elytral markings confluent with each other. A continuous wide marginal band from the shoulder to the elytral apex, connected with the anterior juxta-sutural spot (and sometimes to the second one as well) via a continuous scutellar band below the base. Humeral lunule emitting on disc a wide, rounded, transversal spur; middle band slightly bowed on disc; apical lunule wide, slightly advanced in front along the suture. Second juxta-sutural spot elongated, pointing backwards near the suture. Labrum testaceous, wide and rounded in both sexes, slightly toothed in front, with four setae or setigerous punctures near forward margins (two in the middle, two at the lateral sides). Head, including genae, glabrous, with a fan of white recumbent hairs behind the eyes. Ground colour of head, pronotum and elytra slightly cupreous. Antennomeres 1-4 metallic dark-cupreous; antennomeres 5-11 yellowish, a bit darkened; antennomere 4 without any penicillum (Cassola 1983).

Description. Head dark bronze with cupreous reflections, finely striated on frons and vertex, a few stronger and longitudinal striae on the declivities of eyes; surface glabrous, a fan of white recumbent hairs behind each eye. Genae glabrous. Two setigerous punctures near the orbital margins at fixed loci. Labrum testaceous, large, roundish in both sexes, feebly tridentate in front, with four setae or setigerous punctures near forward margins (two in the middle, two at the lateral sides). Mandibles shiny piceous-black, shortly testaceous on basal outer sides. Maxillary and labial palpi testaceous with the last joint metallic greenish-black. Antennae as long as to the first third of the elytral length, a bit shorter in female; scape and antennomeres 2-4 metallic dark-cupreous; antennomeres 5-11 yellowish, a bit darkened; antennomere 4 of male without any penicillum (Cassola 1983).

Thorax: pronotum wider than long, of the same colour as the head, finely and evenly sculpted. Anterior and posterior grooves well-marked. Surface covered with a number of recumbent white hairs especially on the lateral sides. Notopleural sutures well-marked, proepisterna reddish-violet, mostly glabrous with long white recumbent hairs near the anterior margin and the coxae. Mesepisterna also partially setose; mesepimera and metepisterna covered with white recumbent pubescence. Coupling sulci poorly developed, consisting of a shallow puncture in the upper corners of the female mesepisterna.

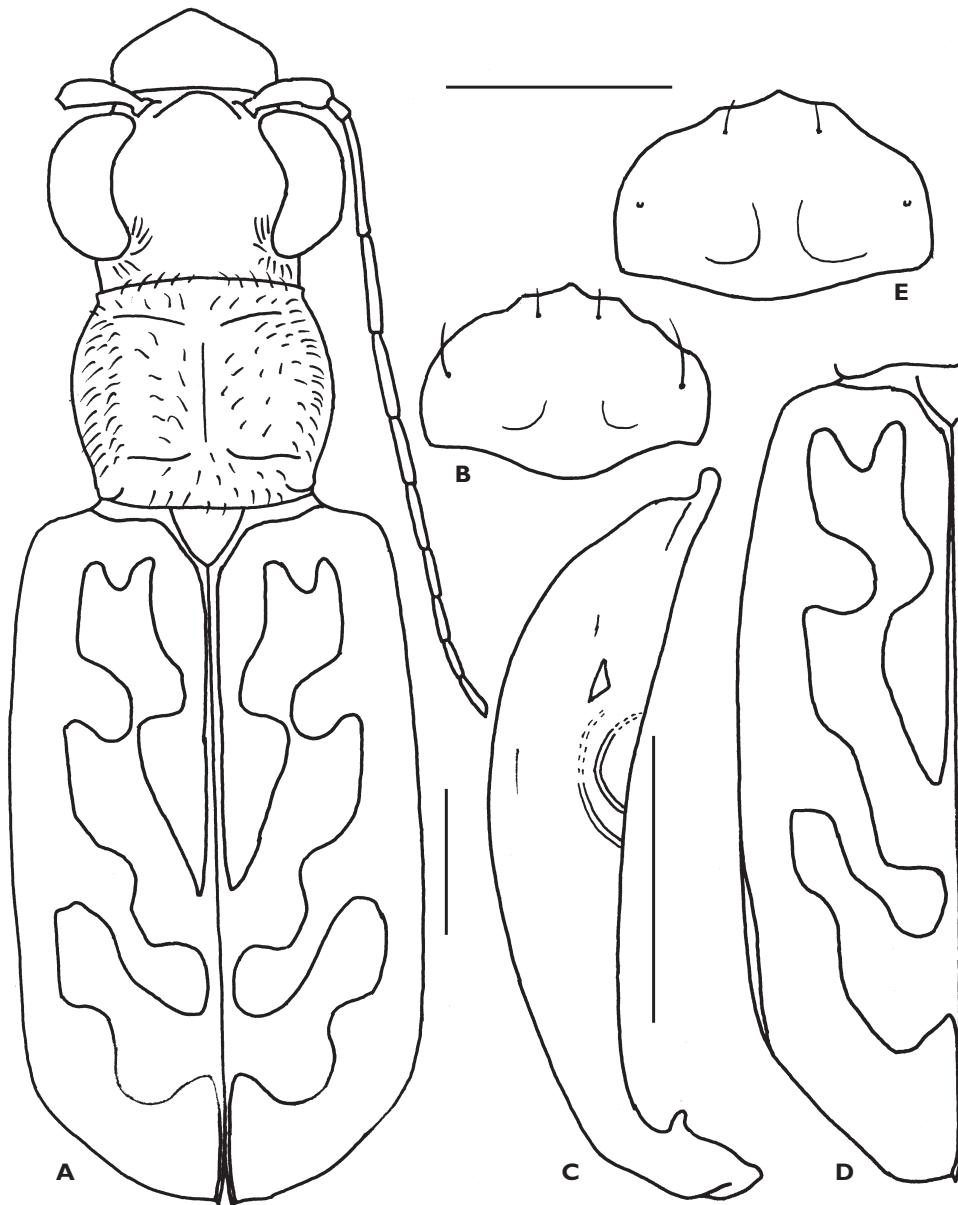


Fig. I. *Lophyra (Lophyra) praetermissa* n. sp., holotype, ♂, from 3.4 km S of Erigavo, northern Somalia (Somaliland): A. habitus, B. labrum, C. aedeagus; paratype, ♀, from same locality: D. left elytron, E. labrum.

Elytra: Elytral ground colour bronze with cupreous reflections, covered with small, evenly spaced, bluish punctures. All elytral markings confluent with each other, forming a continuous wide marginal band from the shoulder to the elytral apex, this band being connected with the anterior juxta-sutural spot (and narrowly to the second one

as well) through a continuous scutellar band below the base. Humeral lunule emitting on disc a wide, rounded, transversal spur; middle band slightly elbowed on disc; apical lunule wide, shortly extending forward along the suture. Second juxta-sutural spot elongated, pointing behind near the suture. Elytra rounded at apex, with a small sutural tooth in both sexes.

Underside bronze with cupreous reflections. Sides of sternum, coxae and abdominal sternites more or less pubescent. Trochanters piceous-black. Legs dark-bronze to black, with cupreous reflections especially on “knees” and tibiae.

Length: 8-9 mm (without labrum).

Etymology. The name of this new *Lophyra* species refers to the fact that it was at first overlooked and mixed with *Lophyra (Lophyrina) latelimbata* (Müller, 1941), a species similar in size.

Remarks. The shape of the male aedeagus, with a triangular preapical tooth on the left side only and a rounded, slightly directed upwards apex, clearly places this new species in the group of *Lophyra (Lophyra) neglecta* Dejean, 1825 (Rivalier 1948; Rivalier 1950), however, the much smaller size and the different elytral markings easily help to distinguish it. The distinct elytral markings also distinguish *L. (L.) praetermissa* n. sp. from both the similarly sized species *L. (L.) cassoliana* Werner, 1997, from Tanzania (which, however, is slightly larger and has a reddish general ground colour), and *L. (Lophyrina) latelimbata* (Müller, 1941), from Somalia and Ethiopia, (which has different elytral markings and exhibits a distinct inner sac of aedeagus) (Cassola 1977). This new species looks like a small *L. (L.) histrio*, described from north-eastern Iran (Tschitschérine 1903) and also recently recorded from the Arabian peninsula (Wiesner 1993; Cassola and Rihane 1996; Cassola and Schneider 1997). These two species are likely closely related and distinguished by the large, roundish labrum and the smaller size of the new species. This discovery of an additional *Lophyra* species in Somaliland (northern Somalia) brings to 73 the number of the species of this genus presently known worldwide (39 species of which – 29 from Africa – belong to the typonominal subgenus).

Key to the similar species

- | | | |
|---|--|---|
| 1 | Genae haired..... | 2 |
| - | Genae glabrous | 3 |
| 2 | Fourth male antennomere devoid of <i>penicillum</i> (Tanzania) | |
| | <i>cassoliana</i> Werner, 1997 | |
| - | Fourth male anntenomere with a <i>penicillum</i> (Somalia, Ethiopia) | |
| | <i>latelimbata</i> Müller, 1941 | |
| 3 | Body size larger than 10 mm (Iran, Arabian Gulf area, Oman) | |
| | <i>histrio</i> Tschitschérine, 1903 | |
| - | Body size smaller than 10 mm (Somaliland) <i>praetermissa</i> Cassola, sp. nov. | |

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Rare sponges from marine caves: discovery of *Neophrissospongia nana* nov. sp. (Demospongiae, Corallistidae) from Sardinia with an annotated checklist of Mediterranean lithistids

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Abstract

A new record of lithistid demosponges is reported from a western Sardinian karstic cave. The new specimen matches the trait of the genus *Neophrissospongia* (Corallistidae) for an ectosomal skeleton of radial dichotriaenes, a choanosomal skeleton as a network of dicranoclone desmas, and streptaster/amphiaster microsclethes with short spiny rays bearing blunt tips. The cave-dwelling *N. nana* nov. sp. diverges from the other species of the genus in diagnostic characters such as the large irregular plate-like growth form, the topographic distribution of inhalant and exhalant apertures, and a smaller size of all spicular types. Moreover it displays an additional rare second type of dichotriaenes with smooth cladomes, shared with other genera of Corallistidae but never reported before for the genus *Neophrissospongia*. In addition *N. nana* nov. sp. bears style-like sub-ectosomal spicules shared with *N. microstylifer* from deep water of New Caledonia. As for the latter trait, a present in-depth analysis of *N. nolitangere* from the Atlantic Ocean contrasts with previous historical records reporting monaxial spicules as oxeas/anisoxeas. The diagnosis of the genus *Neophrissospongia* is therefore emended for the growth form and for the micro-trait of dichotriaenes and monaxial sub-ectosomal spicules. Morphological data indicate that the new species is allied to *N. nolitangere* and *N. microstylifer* from Eastern Atlantic and New Caledonian deep water, respectively, and its record confirms the highly disjunct geographic range of the genus *Neophrissospongia* in the Lusitanian-Macaronesian-Mediterranean area and the western Pacific Ocean supporting the relic condition of the genus in the Mediterranean Sea. This discovery stresses the key status of Mediterranean palaeoendemics as possible remnants of an ancient Tethyan fauna and focuses the need to plan conservation measures for these rare cave-dwelling sponges.

Keywords

Biodiversity, Mediterranean palaeoendemics, new morpho-trait, cryptic habitat, relict disjunct distribution, conservation

Introduction

Among Demospongiae the archaic polyphyletic group of Lithistid (*sensu* Pisera and Lévi 2002) is present in Europe and North Africa with a highly diversified Jurassic and Cretaceous fossil palaeofauna but apparently very few living representatives have been recorded in the Mediterranean Sea and this recent fauna is poorly-known. Nine species belonging to 9 genera of 6 families have been until now recorded in the Mediterranean Sea (Appendix 1) (Topsent 1892a, 1893, 1925; Vacelet 1960, 1969; Pouliquen 1969, 1972; Pulitzer-Finali 1970, 1972 1983; Pansini 1992, 1995; Boury-Esnault et al. 1994; Magnino et al. 1999; Pansini and Longo, 2003; Perez et al. 2004; Longo et al. 2005; Manconi et al. 2006; Zibrowius and Taviani 2005). The taxonomic richness appears to be notably higher in the tropics (Lévi 1991; Pisera and Lévi 2002; Schlacher-Hoenlinger et al. 2005) whereas the low values in the Mediterranean may be explained by the occurrence of extinction phenomena due to harsh environmental/climatic changes during the history of this basin (e.g. cooling phases in Plio-Pleistocene time, see Wiedenmayer 1994:107). All Mediterranean records refer to genera characterised by a highly disjunct distribution with a spot-like pattern in tropical/subtropical latitudinal ranges of the Atlantic, Indian and western Pacific oceans. These taxonomic and biogeographic patterns suggest the condition of lithistids as remnants of an ancient Tethyan fauna (Reid 1967; Perez et al. 2004; Manconi et al. 2006; Pisera and Vacelet 2006).

We report here the discovery of the genus *Neophrissospongia* Pisera & Lévi, 2002 from a shallow water cave in the western Mediterranean with description of a new species based on a comparative analysis of morphological diagnostic traits *versus* the other species of the genus.

Materials and methods

A large specimen was discovered, photographed *in situ* and collected in part from a shallow water cave of NW-Sardinia by SCUBA diving. The sponge was dissected under a stereomicroscope to observe macro-trait and to obtain representative fragments of the skeleton to be processed by boiling in nitric acid to prepare slides for light microscopy (LM) and stubs for scanning electron microscopy (SEM, ZEISS DSM 962) following standard methods. Growth form, architecture of the ectosomal and choanosomal skeleton, spicular morphology and micrometries, and the topographic localization of spicular types have been considered as diagnostic characters. The number of measured spicules (n) is reported for each spicular type. As for dichotriaenes measurements of

the cladome refer to the total diameter of a virtual circle made by the end points of the clades. Measurements of protoclades and deuteroclades refer to the length of the cladome branches from origin on the shaft to the first dichotomy (protoclade) and from that point to the end of the branch (deuteroclade).

Institutional Acronyms cited in the text:

MSNG Museo civico di Storia Naturale 'G. Doria', Genova, Italy

MNHN Muséum national d'Histoire Naturelle, Paris, France

MOM Musée Océanographique de Monaco, Monaco.

Systematic accounts

Class Demospongiae Sollas, 1885

Family Corallistidae Sollas, 1888

Genus *Neophrissospongia* Pisera & Lévi, 2002

Definition (emended from Pisera and Lévi, 2002)

Cup-shaped, ear-shaped, plate-shaped growth form. Ectosomal skeleton with radially arranged dichotriaenes with tubercled to less frequent smooth cladomes and from smooth to tubercled/spiny rhabdomes. Sub-ectosomal spicules as asterose microscleres (streptaster/amphiaster) and relatively large style-like monaxons. Choanosomal skeleton as a relatively loose network of dicranoclonal desmas.

***Neophrissospongia nana* Manconi & Serusi, nov. sp.**

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(Figs 1-4; Table 1; Appendix 1)

Type locality: Grotta delle Terrazze n. 2740 Catasto Speleologico Regionale (40°34'16"N 08°13'43"E), Punta Giglio Promontory, Alghero, NW Sardinia, 10.iv.2004, R. Barbieri coll. by SCUBA diving.

Type material. Holotype MSNG 54599, fragment of a living specimen. Schizotypes (TER 2) on SEM stubs and slides are deposited at present in the collection of R. Manconi.

Material studied: *Corallistes nolitangere* Schmidt, 1870, p. 23, MNHN DT 781, Fayal, Campagne Prince Albert de Monaco Azores I, leg. E. Topsent, 1 slide; MOM 2144-0-04-0191, large specimen, collection E. Topsent, presumably Azores; AZR 71, collection G. Pulitzer-Finali, 4 slides, unknown locality of Azores.

Description. Known from a single specimen. Growth form as a large thick encrusting plate (10-12 x 5-7 cm) with a wide base adhering to the substrate and rounded margins. The sampled portion (holotype, 5 x 3.5 cm in width, ca. 1.2 cm in thickness) is one third of the entire living specimen. Colour white ice both in vivo

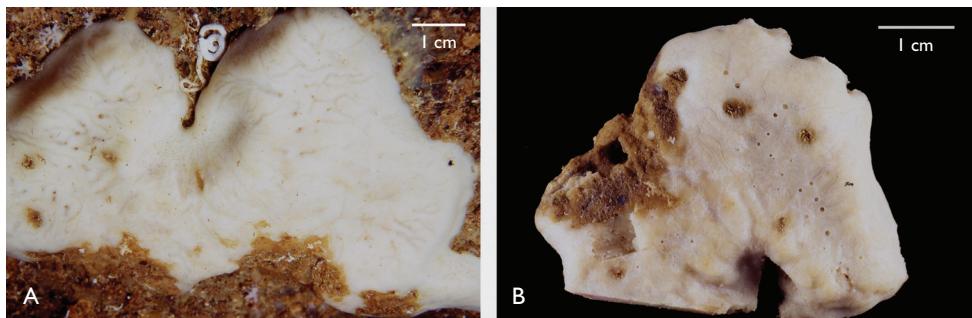


Fig. 1. Habitus of the cave-dwelling Mediterranean *Neophrissospongia nana* nov. sp. from north-western Sardinia. A. *In situ* plate-like growth form in the type locality Grotta delle Terrazze (photo by R. Barbieri), B. Holotype MSNG 54599 (top view) (photo by G. Delitala).

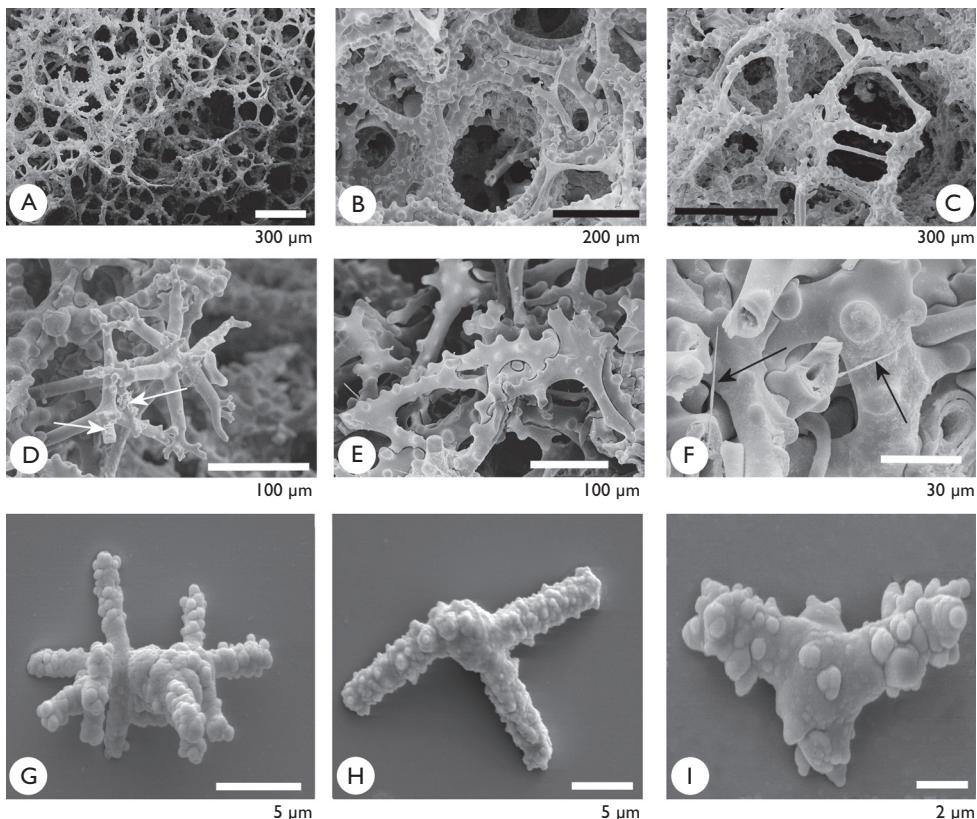


Fig. 2. *Neophrissospongia nana* nov. sp., holotype MSNG 54599, photomicrographs of the skeletal architecture and spicular complement. A-C. Subectosomal skeletal network of dicranoclone desmas. D. Dichotriaene (top) and simple triaene (bottom, arrows) radially arranged in the ectosome with tubercled cladomes. E. Articulation among desmas with scattered styles/sub-tylostyles in the sub-ectosome. F. Detail showing the arrangement of silica in dicranoclone desmas (cross section) and styles/sub-tylostyles (arrows). G-I. Streptaster/amphiaster microscleres with spines/tubercles.

and in spirit, except for a brown degenerated portion at the margin. Consistency stony, harder toward the basal portion. Surface even without asperities, aconulose. Ectosome with irregular sub-dermal canals. Inhalant apertures (0.2-1.2 mm in diameter) grouped in slight concavities along the sponge margins. Exhalant areas scattered on the top surface with grouped oscules (0.5-1 mm in diameter) each with a well-developed vertical atrial canal. Ectosomal skeleton armed by a layer of radially arranged dichotriaenes megascleres of two types. Dichotriaenes with cladomes (145-270 µm in diameter) bearing few tubercles (10-20 µm in height) rarely subdivided at the upper surface of protoclades (20-50 x 10-20 µm, usually 20-30 µm in length) and deuteroclades (50-100 x 10-20 µm, usually 50-70 µm in length). Deuteroclades sometime with branched tips. Rare dichotriaenes with entirely smooth cladomes (93-172 µm in diameter) and scarcely developed clades also present with no differential localization. Rhabdomes with blunt to acute tips (290-540 µm in length) usually smooth, sometimes bearing a few large acute spines or tubercles (up to 30 µm in length) along the axis. Extremely rare triaenes with a few tubercles on the clades also present. Other ectosomal spicules of two types, namely asterose and monaxial. Microscleres as streptaster/amphiaster with short spiny rays (5-15 µm in length) in a variable number (3-7) with blunt tips. Notably thin styles/sub-tylostyles (59-86 µm, < 3 µm in thickness) scattered and tangentially embedded in subectosomal membranes in both the inhalant and exhalant areas.

Architecture of the choanosomal skeleton as a loose network of slender dicranoclone desmas, strongly articulated along the canals of the aquiferous system. Desmas (280-360 µm) with rounded tubercles (5-35 µm in height, usually 10-15 µm) bearing smooth heads. Slender small young desmas with a smooth surface also present.

Diagnosis. *N. nana* nov. sp. is characterised by growth form as a large thick plate with inhalant apertures in concavities along the sponge margins and few conspicuous

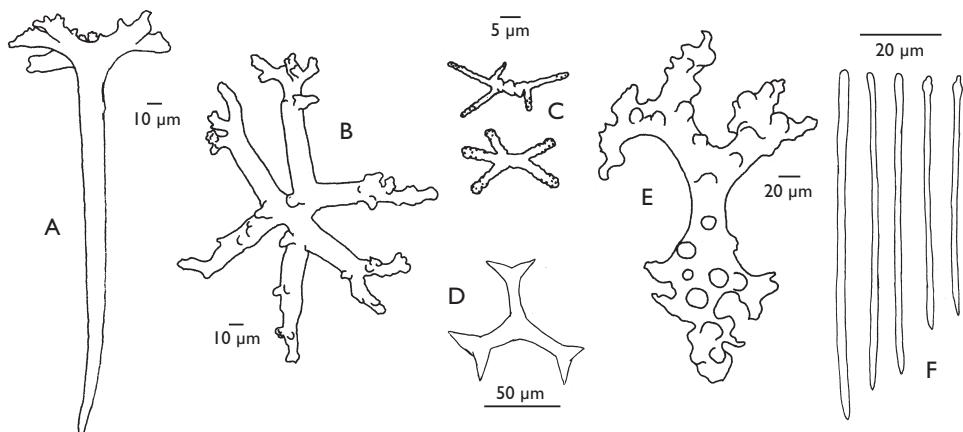


Fig. 3. *Neophrissospongia nana* nov. sp., holotype MSNG 54599, spicular complement. A. Dichotriaene. B. Cladome of a tubercled dichotriaene (top view). C. Streptaster/amphiaster microscleres with tubercles. D. Cladome of a smooth dichotriaene (top view). E. Dicranoclone desma. F. Styles/sub-tylostyles.

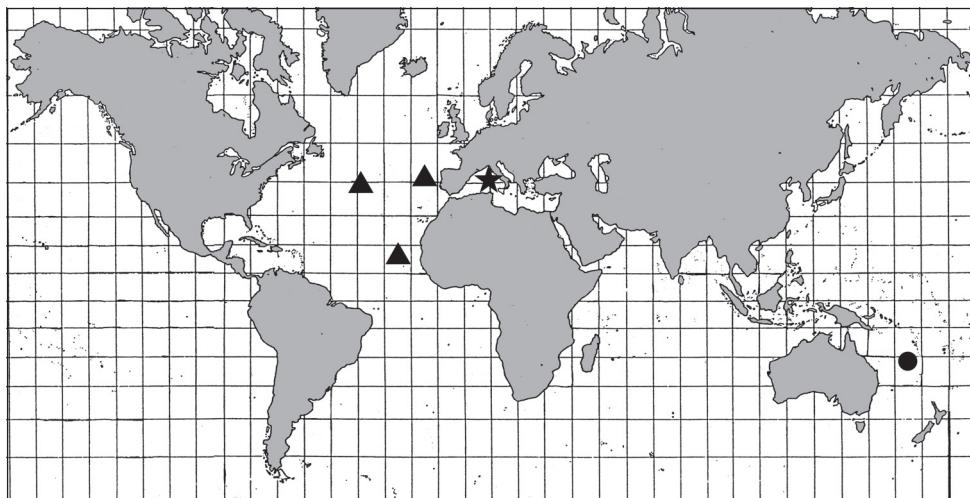


Fig. 4. Geographic range of the genus *Neophrissospongia* with occurrences of the known species *N. nolitangere* in the Atlantic and *N. microstylifer* in the Pacific Ocean. The type locality of *N. nana* nov. sp. from Sardinia is indicated by a star.

exhalant apertures grouped at the top. The spicular complement is characterised by a smaller size of spicules when compared to the other species of the genus. Ectosomal skeleton with tubercled to smooth dichotriaenes (rarely triaenes) radially arranged with no differential topographic distribution. Sub-ectosomal membranes bear styles/subtylostyles tangentially embedded and spiny streptaster/amphiaster microscleres.

Etymology. The specific epithet refers to the small size of the skeletal spicules.

Distribution. Known until now exclusively from the western Sardinian cave Grotta delle Terrazze (type locality).

Habitat. Shallow water (6 m) on the rocky wall in the innermost part of a dark horizontal tunnel (80 m in length) of a submerged cave (160 m along an N-S axis, main entrance at 17 m of depth, 40 m in length, 7 m in width). Another tunnel at the left of the entrance harbours a small population of *Petrobiona massiliiana* Vacelet & Lévi (Manconi et al. in press). The absence of sand deposits and the presence of abundant large boulders suggest the cave is subjected to a notably high water movement (south-western winds). In April water temperature was 14 °C. Few serpulids and foraminifers were found associated with the sponge on an almost bared rocky surface.

Discussion

The genus *Neophrissospongia* was recently erected with *Neophrissospongia nolitangere* (Schmidt, 1870) as type species by Pisera and Lévi (2002) for the species of Corallistidae, characterised by tubercled dichotriaenes, previously ascribed to the genus *Corallistes* Schmidt, 1870. Only two species, *N. nolitangere* (off Portugal,

Tab. I. Distribution, bathymetric range and spicule measurements (length x width) of the species belonging to the genus *Neophrissospongia*.

Species Distribution Depth	Dicrano- clone desma μm	Dichotriaene tubercl/spiny μm	Dicho- triaene smooth μm	Monaxial spicule μm	Streptaster/ Amphiaster μm
<i>N. nolitangere</i> Portugal Schmidt 1870	350-500*	230-310* clad 450-1200*rhabd	not rec	oxea not meas not rec*	10-13x 8-10*
Azores, Fayal Topsent 1892b 1904 365 m	35 thick	45-50 prot 90-100 deut 450-1200 rhabd	not rec	70-100 oxea	10-13
Azores, Fayal MNHN DT 781 present paper	not meas	151-280 clad n=36 35-50x18-20 prot 50-100x18-20 deut 366-1030 x28 rhabd n=15	not meas	style/sub-tylostyle slightly bent/sinu- ous 51-87 x < 3 n=50	not meas
Azores, AZR 71 Pulitzer not publ. present paper depth unknown	not meas	47-58 prot n=20 70-116 deut n=20 478-1200x23-35 rhabd n=16	47-120 prot 47-151 deut	style-like 52-96 x < 3 n=30	9-14 n=15
Sao Tiago Cape Verde Isl. Lendenfeld 1903	35 thick	550 rhabd	not rec	not meas	not rec
<i>N. microstylifer</i> New Caledonia 22°48'S, 167°09'E Lévi & Lévi 1983 355-360 m	250-300 clone	250-350 clad 30-40 prot 100 deut 350-600x30-45 rhabd	not rec.	strongyle 25-45x3 subtylostyle 110-170x2	not rec.
<i>N. nana</i> nov. sp. W-Sardinia Terrazze Cave 6 m	280-360 n=30	145-270 clad n=30 20-50x10-20 prot 50-100x10-20 deut 290-540 rhabd n=30	93-172 clad	59-86 x < 3 n=30 subtylostyle	5-15 n=30

* Holotype, Pisera & Lèvi (2002); not meas = not measured; not rec = not recorded; clad = cladome in diameter; prot = protoclade; deut = deuteroclade; rhabd = rhabdome; thick = thickness; n = number of measured spicules.

Azores and Cape Verde Islands) and *N. microstylifer* (New Caledonia) (Schmidt 1870; Carter 1873; Sollas 1888; Lendenfeld 1903; Topsent 1892b, 1904; Desqueiroux and Stone 1992; Lévi and Lévi 1983) have been until now recorded. The most strictly allied taxon of these living forms seems to be the Late Cretaceous fossil genus *Phrissospongia* Moret, 1926 of the family Phrissospongiidae Lagneau-Hérenger, 1962 now junior synonym of Corallistidae (Lévi 1991; Pisera and Lévi 2002; Pisera 2002) characterised by dichotriaenes with deuteroclades vertically oriented (Wiedenmayr 1994: 91).

N. nana nov. sp. matches the diagnostic traits reported for the genus *Neophrisospongia* sharing an ectosomal skeleton of radial dichotriaenes and a choanosomal skeleton as a network of slender dicranoclone desmas. This new species diverges from the other species belonging to the genus in the growth form, smaller spicular size, ornate-ments of dichotriaenes (i.e. tubercled cladomes with rarely spined rhabdomes *vs.* entirely smooth) and two types of sub-ectosomal spicules, namely asterose and monaxial. In addition desmas of *N. nana* nov. sp. bear scattered small tubercles with smooth apices as in *N. microstylifer* whereas their surface is microtubercled in *N. nolitangere* (Schmidt 1870; Topsent 1904; Pisera and Lévi 2002).

The ectosomal dichotriaenes of *N. nana* nov. sp. belong to two types, namely with tubercled cladomes to entirely smooth cladomes differing from the typical ones of *N. nolitangere* reported exclusively as tubercled (Schmidt 1870; Topsent 1904; Pisera and Lévi 2002). It may be however that smooth dichotriaenes (Table 1; Figs 2, 3) notably smaller when compared to the tubercled ones, we found also in the Topsent material of *N. nolitangere*, represent young forms.

At the same time, the topographic distribution of streptaster/amphiaster micro-scleres in the subectosomal skeleton, together with their morphology characterised by short spiny rays bearing blunt tips is shared with *N. microstylifer* and *N. nolitangere*. As for monaxial ectosomal spicules *N. nana* nov. sp. displays styles/sub-tylostyles never recorded before in *N. nolitangere* while they are typical of *N. microstylifer*. Although monaxial spicules has been reported as oxeas/anisoxeas by Carter (1873), Sollas (1888), Lendenfeld (1903) and Topsent (1892, 1904), Pisera and Lévi (2002) did not find this spicular type in the Schmidt's type material of *N. nolitangere*. During the present investigation styles/sub-tylostyles straight to slightly sinuous were also found in the Topsent specimen of *N. nolitangere* we recently rediscovered (MOM) and in the Topsent slide of *N. nolitangere* (MNHN) from Fayal although they have not been found by Pisera and Lévi (2002) probably because they are present exclusively along margins of the slide (MNHN) and are grouped in small fragments of thin membranes like those discovered in *N. nana* nov. sp. in sub-ectosomal membranes. Moreover abundant style-like monaxons have been found also in the material identified by Pulitzer (? *N. nolitangere*, unpubl.) from Azores.

The growth form displayed by *N. nana* nov. sp., as a large thick plate with a peculiar distribution of inhalant areas in concavities, diverges from the shallow cup/ear shape previously recorded for *N. nolitangere*, and the massive or clavate shape typical of *N. microstylifer*. The new species resembles, however the topographic localization of

inhalant and exhalant apertures of the latter species. Spicules of *N. nana* nov. sp. do not match the measurements of the genus and the size range of dichotriaenes, desmas, and streptaster/amphiaster microscleres appears to be notably smaller when compared with *N. nolitangere* reported by Topsent (1892b, 1904) and Pisera and Lévi (2002) together with present measurements. Some spicule measurements match better those of *N. microstylifer* (Lévi and Lévi 1983).

The co-occurrence of two, until now apparently neglected, spicular morpho-trait such as style-like and two types of dichotriaenes also in the Topsent and Pulitzer-Finali material of *N. nolitangere* from Azores supports the need of new samplings and a revision of the genus. The *Neophrissopongia* material (as *Corallistes*) in the Schmidt collection (Desqueiroux-Faúndez and Stone 1992) from Strasbourg and Graz is not considered with confidence by Desqueiroux-Faúndez (*in litt.*) and also Pisera and Lévi (2002) are dubious on the type material. At the same time the style-like sub-ectosomal spicules strengthen the phylogenetic relationships between the Atlanto-Mediterranean and Pacific lineages of the genus whereas the smooth morph of dichotriaenes, although rare, may support the relationships among the lineages of the family Corallistidae.

In contrast with the deep bathymetric range of the genus in the Eastern Atlantic and Western Pacific (355–365 m of depth) the discovery of *N. nana* nov. sp. in the innermost dark zone of shallow water cave (6 m of depth) of NW-Sardinia suggests its presence may be relictual. This condition seems to be confirmed by the presence of *Neophrissopongia* spp. also in a few other karstic caves of the Marseille coast and northern Adriatic Sea (Pisera and Vacelet 2006). The presence of *N. nana* nov. sp. in the Mediterranean area fills in part a distributional gap towards the western Pacific oceanic region and supports their relic condition suggested by the present day highly disjunct geographic range of the genus *Neophrissopongia* in the Lusitanian-Macaronesian area (*N. nolitangere*) and in the western Pacific Ocean (*N. microstylifer*) (Fig. 4). This geographic pattern confirms the existence of a biogeographic track (*sensu* Croizat 1958) shared with other taxa (e.g. other lithistids). Mediterranean species of the genus *Neophrissopongia* may be representative of a survived stock allied to a highly diverse fossil assemblage mainly dated to Late Jurassic and Late Cretaceous of western-central Europe and North Africa (Reid 1967; Rigby 1983, 1991; Wiedenmayer 1994; Pisera 1999; Finks et al. 2004). Although at present is not possible to clearly discriminate between the hypothetical survival of their ancestors during the harsh climatic/environmental fluctuations of the Mediterranean basin *versus* an immigration process from the Atlantic, this discovery stresses the key status of Mediterranean palaeoendemics as remnants of an ancient Tethyan marine fauna together the need to point out on biodiversity conservation.

The knowledge on the marine palaeoendemic fauna represents a main factor to understand the dynamics and evolution of the Mediterranean basin from the historical biogeography point of view. Investigations focused on this general topic need to be supported by data on taxa characterised by low dispersal power and peculiar geographic patterns. In this field, sponges, in particular, could be useful targets. Sponges

display a life cycle strategy with a meroplanktonic larval stage characterised by a scarce swimming potential that presumably allows only a short planktonic phase with hard constraints on the long distance dispersal.

Key to the species of *Neophrissospongia*

- 1 Growth form cup- to ear-shaped with small inhalant and large exhalant apertures on opposite sides of the lamella bearing an ectosomal skeleton of dichotriaenes, styles/sub-tylostyles and aster-like microscleres..... *N. nolitangere*
- Growth form clavate to plate-like with inhalant and exhalant areas in different regions of the same sponge surface 2
- 2 Growth form clavate, ectosomal skeleton of dichotriaenes and styles/sub-tylostyles *N. microstylifer*
- Growth form plate-like, ectosomal skeleton of dichotriaenes, styles/sub-tylostyles and aster-like microscleres *N. nana* nov. sp.

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Appendix I. Annotated checklist of lithistid sponges in the Mediterranean Sea.

Family Scleritodermidae Sollas, 1888

Genus *Aciculites* Schmidt, 1879

Distribution: Barbados, Cuba, Mediterranean, Madagascar, Kenya, Sri Lanka, New Caledonia, New Zealand, Philippines (Pisera and Lévi 2002; Manconi et al. 2006).

Aciculites mediterranea Manconi, Serusi & Pisera, 2006

Sardinia Sea, Grotta dei Laghi, 40°34'N 81°4'E, dark cave, 7.5 m of depth, VIII.2000, R. Barbieri leg., SCUBA diving, formalin/alcohol (Manconi et al. 2006)
Distribution. Only known from the type locality aW-Mediterranean cave.

Genus *Microscleroderma* Kirkpatrick, 1903

Distribution: Off KwaZulu-Natal, south Arabia, Sri Lanka, Philippines, New Caledonia, Caribbean, Mediterranean (Pisera and Lévi 2002; Perez et al. 2004).

Microscleroderma lamina Perez, Vacelet, Bitar & Zibrowius, 2004

MNHN D JV 76-77-78, Levant basin, N-Lebanon, Chak El Hatab, lithistid dark cave, 34°17'63N 35°40'27E, 2 m of depth, 21.ix.2002, G. Bitar and H. Zibrowius leg., SCUBA diving, dry/formalin/alcohol (Perez et al. 2004)

Distribution: Only known from the type locality an E-Mediterranean cave.

Family Corallistidae Sollas, 1888

Genus *Corallistes* Schmidt, 1870

Distribution: Florida, Caribbean, Mexican Gulf, Brazil, southern Africa (KwaZulu-Natal coast), New Caledonia, Papua New Guinea (Pisera and Lévi 2002).

Corallistes masoni (Bowerbank, 1869)

Lion Gulf, Marseille coast, Figuier dark cave, 43°20'N 5°25'E, 12 m of depth, SCUBA diving (Pouliquen 1972)

Lion Gulf, Marseille coast, Morgiou, dark cave, 30 m of depth, SCUBA diving (Pouliquen 1972)

NE-Ligurian Sea, S. Lucia Bank, 43°34'N 09°28'E, seamount, muddy bottom, 550-640 m of depth, trawling (Magnino et al. 1999);

Central Tyrrhenian Sea, white corals bank, 400-600 m of depth, trawling (Magnino et al. 1999)

Distribution: W-Mediterranean, Cape Verde Islands, Madeira.

Genus *Neophrissospongia* Pisera & Lévi, 2002

Distribution. Eastern Atlantic Ocean, Mediterranean Sea and western Pacific Ocean (Pisera and Lévi 2002; present paper).

Neophrissospongia nana Manconi & Serusi, nov. sp.

Sardinia Sea, NW Sardinia, Punta Giglio Promontory, Grotta delle Terrazze n. 2740 Catasto Speleologico Regionale, 40°34'16"N 08°13'43"E, R. Barbieri leg., 10.IV.2004, SCUBA diving, (present paper).

Distribution: Only known from the type locality, a cave in W-Mediterranean.

Family Theonellidae Lendenfeld, 1903

Genus *Discodermia* Du Bocage, 1870

Distribution: Atlantic Ocean, Mediterranean Sea (Pisera and Lévi 2002).

Discodermia polydiscus (Bowerbank, 1869)

Lion Gulf, Marseille coast, Figuier dark cave, 43°20'N 5°25'E, 12 m of depth, SCUBA diving (Pouliquen 1972)

Lion Gulf, Marseille coast, Trémies dark cave, 43°20'N 5°30'E, shallow water, SCUBA diving (Pouliquen 1972)

Lion Gulf, Marseille coast, Castelviel dark cave, SCUBA diving (Pouliquen 1972)

Lion Gulf, Marseille coast, Morgiou dark cave, 43°12'N 5°26'E, 30 m of depth, SCUBA diving (Pouliquen 1972)

Aegean Sea, 36°26'N 25°21'E, muddy bottom and white corals bank, 210 m of depth, by dredge, 20.V.1964 (Vacelet 1969)

Aegean Sea, Canal of Cerigotto, between Crete and Peloponneso, 35°45'N 23°25'E, 360 m of depth, by dredge, muddy bottom and white coral bank, alcohol (Vacelet 1969)

Aegean Sea, Athene Bay, 37°58'N 23°43'E, 60 m of depth (in Pouliquen 1972 p. 751)

Distribution: Caribbean, Atlantic Ocean and Mediterranean Sea, Caribbean, Atlantic Ocean.

Family Siphoniidae Lendenfeld, 1903

Genus *Siphonidium* Schmidt, 1879

Distribution: Florida, Caribbean, Azores, Western Africa, Mediterranean, Indonesia, New Caledonia (Pisera and Lévi 2002).

Siphonidium ramosum (Schmidt, 1870)

Lion Gulf, Canyon of Cassidaigne, Marseille, 43°13'N 5°4'E, on fossil oysters, deep water, by dredge, 20.IX.1966, alcohol (Vacelet 1969)

Northern Tyrrhenian Sea, E-Corsica, epibathyal muddy bottoms, 565-610 m of depth trawling (Vacelet 1960, 1969);

Central Tyrrhenian Sea, Bay of Naples, Posillipo, 40°49'N 14°13'E, 20 m of depth, associated with *Phakellia robusta* (Vosmer 1935; Topsent 1925; Vacelet 1969);

Ionian Sea, Apulia, off Cape S. Maria di Leuca, st. 4-6-8-9, 39°31'/39°37'N 18°23'/18°39'E, 14-16.II.2001, 640-681 m of depth, by "ingegno", formalin (Longo et al. 2005)

Straight of Sicily, Cruise CS96, RV Uran, on deep corals, 250-1000 m of depth (Zibrowius and Taviani 2005)

Distribution: Atlantic Ocean, Mediterranean Sea, Indonesia.

Genus *Gastrophanella* Schmidt, 1879

Distribution: West Indies, Belize, Pacific coast of Mexico, Brazil, Mediterranean, South Africa (Muricy and Minervino 2000; Pisera and Lévi 2002; Perez et al. 2004).

Gastrophanella phoeniciensis Perez, Vacelet, Bitar & Zibrowius, 2004

MNHN D JV 73-74-75, Levant basin, N-Lebanon, Chak El Hatab, Lithistid cave, 34°17'63N 35°40'27E, 21.IX.2002, G. Bitar and H. Zibrowius leg., 2 m of depth, SCUBA diving, formalin/alcohol (Perez et al. 2004)

Distribution: Only known from the type locality an E-Mediterranean cave.

Family Azoricidae Sollas, 1888

Genus *Leiodermatium* Schmidt, 1870

Distribution: Atlantic, Mediterranean Sea, Pacific Ocean, (Pisera and Lévi 2002).

Leiodermatium lynceus Schmidt, 1870

Central Tyrrhenian Sea, muddy bottom and white coral bank, 700 m of depth, trawling (Magnino et al. 1999)

Aegean Sea (Vamvakas 1971)

Ionian Sea, Apulia, off Cape S. Maria di Leuca, st. 15, 39°36'/39°37'N 18°23'E, 16.II.2001, 430-469 m of depth, by "ingegno", formalin (Longo et al. 2005)

Distribution: Mediterranean Sea, Atlantic and Pacific Ocean.

Family Desmantidae Topsent, 1893

Genus *Desmanthus* Topsent, 1894

Distribution: Caribbean, southern Atlantic, Mediterranean, Madagascar, Indian Ocean, Pacific coast of Panama, Philippines, Papua New Guinea (Pisera and Lévi 2002).

Desmanthus incrassans (Topsent 1889)

Lion Gulf, Banyuls, 42°28'N 3°7'E (Topsent 1893);

Lion Gulf, Cap l'Abeille, 42°28'N 3°8'60"E, 30-40 m of depth (in Pouliquen 1972 p. 751)

Lion Gulf, Marseille coast, Trémies dark cave, 43°20'N 5°30'E, SCUBA diving (Pouliquen 1969, 1972)

Ligurian Sea, Portofino, Aurora, 44°18'N 9°12'E, 13 m of depth rocky bottom, XI.1976, SCUBA diving (Pulitzer-Finali 1983)

Ligurian Sea, Bogliasco, 44°22'N 9°4'E, 10-15 m, coralligenous on vertical cliffs, SCUBA diving (Pansini and Pronzato 1973)

Central Tyrrhenian Sea, Ischia, Monte Vico, 40°43'N 13°54'E, semi-dark cave, 3-4 m of depth, SCUBA diving, 7.VIII.1968 (Pulitzer-Finali 1972)

Ionian Sea, Leuca, 39°47'N 18°20'E, 2-3 m of depth, shallow water cave, SCUBA diving, 9.VII.1967 (Pulitzer-Finali 1983)

Distribution: Western and Central Mediterranean Sea, Caribbean, Indian Ocean, Philippines, Papua New Guinea (van Soest and Hajdu, 2000; Pisera and Lévi 2002).

Genus *Sulcastrella* Schmidt, 1879

Distribution: Florida, Barbados and Western Mediterranean Sea (Pisera and Lévi 2002).

Sulcastrella tenens (Vacelet, 1969)

Lion Gulf, eastern Canyon of Cassidaigne, 43°13'N 5°4'E, 235 m of depth, by dredge, encrusting on rock, dry (Vacelet 1969)

Corsica Sea, W-Corsica, 210-240 m of depth, 1965, by dredge, on madreporesians, alcohol (Vacelet 1969)

Distribution: Only known from the Western Mediterranean Sea.

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