

THALIACEA

Thaliacea are the most speciose of the two planktonic tunicate classes. The geographic ranges of most species are vast, being defined by the courses of ocean currents, rather than geographic areas. No indigenous species are known in this group. New species are rare, and very few have been added to the list of known species in the last 50 years. Twenty-six species are known from Australian waters.

The class Thaliacea contains the salps and doliolids, both of which have solitary and colonial generations, and the pyrosomids which are only colonial. Each of these groups is given ordinal rank in the class as Cyclomyaria (or Doliolida), Desmomyaria (or Salpida) and Pyrosomatida. Each order contains only one family—the Doliolidae, the Salpidae and the Pyrosomatidae, respectively. Only the Salpidae are reasonably diverse, with two subfamilies, Cyclosalpinx and Salpinx.

Thaliacea are characterised by their translucent test, branchial and atrial siphons at opposite ends of the body and the atrial cavity posterior to the large pharynx. Budding takes place from an endostylar stolon. Species are separated by the numbers and arrangement of the muscle bands that encircle their bodies.

Thaliacea are most prolific. In certain seasons some species occur in vast swarms that exclude most other zooplankters from surface waters. Such swarms of *Thalia democratica* (Forskål, 1775) are characteristic of the Australian eastern coastal waters in autumn and spring. Thaliaceans gain the energy for their prolific sexual reproduction and vegetative replication from their voracious filter feeding activity as they pass through the water—jet-propelled by their ciliary feeding stream.

Most known taxa of the Thaliacea were described from the collections made on one or other of the great European scientific voyages of the 19th century, namely, the French *Astrolabe* (Quoy & Gaimard 1833, 1834), the British *Challenger* (Herdman 1888), the great German Plankton Expedition and the Deep Sea Expedition of the *Valdivia* (Traustedt 1893; Seeliger 1895; Apstein 1906a, 1906b; Neumann 1906, 1913), and the Dutch *Siboga* (Ihle 1910). Later, the American Fisheries Bureau *Albatross* (Metcalf 1919) also made collections in the western Pacific. The taxonomy and biology of Thaliacea have been reviewed in Bone (1998).

In Australian waters, a small plankton collection made by the German expedition to south-western Australia yielded only one thaliacean (*Doliolum denticulatum*) from Shark Bay (Lohmann 1909), and Russell & Coleman (1935) reported on collections made around Low Isles (Great Barrier Reef). Species occurring in eastern Australian waters from the Tropic of Capricorn to South Australia were determined and reported by Thompson (1945) from the collections made by the CSIRO research vessel FRV *Warreen* in just over two years (1938–1941). Since then, no systematic planktological work has been pursued in Australian waters; and neither have the western, southern or tropical Australian waters been surveyed for Thaliacea, although Heron (1972–1988), produced seminal work on the biology of *Thalia democratica*.

The whereabouts of the majority of the type specimens of thaliacean nominal species occurring in Australian waters are not known. Material reported by Quoy & Gaimard (1825, 1833, 1834) from the Voyage de l'*Astrolabe* was discovered in the Laboratoire de Biologie des Invertébrés marins et Malacologie in the Muséum National d'Histoire Naturelle, Paris. However, although there are vials labelled '*Biphores*' and '*Salpes*', the external labels have either been lost or never existed (C. Monniot, *pers. comm.*). Not one of the type specimens of the eleven species from Australian waters, ascribed to these authors, has been located. Type specimens of the four from the *Challenger* Expedition (1888) have not been located in the BMNH; nor are the types of the species described by Ritter (two species), Brooks (two species) and Metcalf (two species) to be found in the U.S. National Museum. Relevant type specimens from Tilesius, Otto, Desor, Dall, Vogt, Todara, Sigl, Borgert, Uljanin (each being the author of a single species) have not been located, and may never have been assigned. Similarly, the type specimens for species described by Bosc (two species), Sars (two species) and Traustedt (three species) and three of the four described by Apstein have not been located.

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Cuvier (six species) did not designate types, nor apparently did Forskål (six species), Blainville (four species), Chamisso (four species) and Pallas (one species). Of the six species described by Lesson, and by Péron and Lesueur in the early part of last century, only one (*Pyrosoma giganteum* Lesueur, 1815) has been located in the Muséum National d'Histoire Naturelle, Paris. The only other thaliacean type specimens located are *Thalia cicar* Van Soest, 1973 and *Thalia rhinoceros* Van Soest, 1975 in the Zoological Museum of Amsterdam, *Salpa amboinensis* Apstein, 1904 in the Muséum d'Histoire Naturelle, Geneva, and *Pyrosoma triangulum* Neumann, 1909 in the Museum für Naturkunde, Berlin.

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DOLIOLIDAE

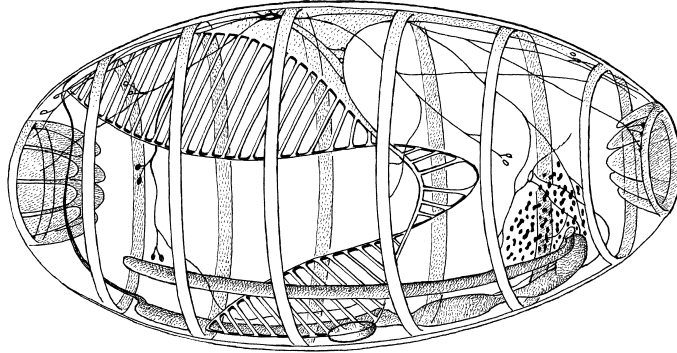


Fig. 23. *Doliolum denticulatum* Quoy & Gaimard, 1834. (Scale bar = 1.0 mm). [after Herdman 1888]

The Doliolidae Bronn, 1862 are the only family in the order Doliolida. All doliolids are free swimming barrel-shaped organisms with eight to nine circular muscle rings around the body, which is open at each end, the mouth anteriorly and atrial aperture posteriorly. Stigmata are in an S-shaped band at the posterior end of the pharynx.

Doliolids are polymorphic. Fertilisation is external, eggs being liberated through the atrial aperture. Tailed larvae are produced as in the Ascidiacea. Loss of the tail results in a functional oozoid with a ventral vegetative stolon from which a continuous series of buds (blastozooids) is produced. These migrate around the right side of the body to the postero-dorsal surface, forming a colony with the oozoid ('nurse'). The blastozooids, attached to the dorsal spur of the 'nurse', are trophozooids (or gastrozooids) in the lateral rows and phorozoids in a median line. The sexual gonozooids of the next generation are eventually produced by, and break free from, the phorozoids. This complex life cycle sometimes is abbreviated by the omission of one or more stages (Braconnot 1963).

Doliolidae are not diverse although both *Doliolum denticulatum* Quoy & Gaimard, 1834 and *Dolioletta gegenbauri* (Uljanin, 1884) are common components of the eastern Australian jelly plankton. The family has been reviewed by Garstang (1933) and Neumann (1935). Thompson (1945) has documented the group as it occurs in eastern Australian waters.

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***Dolioletta* Borgert, 1894**

Dolioletta Borgert, A.H.C. (1894). Die Thaliacea der Plankton-Expedition. C. Vertheilung der Doliolen. *Ergebn. Plankt.-Exped. Humboldt-Stiftung* 2(E.a.C.): 1–66 pls v–viii [1] [initially introduced as a subgenus of *Doliolum* Quoy & Gaimard, 1834].

Type species: *Doliolum gegenbauri* Uljanin, 1884 by original designation.

Compiled from secondary sources: Mueller, J. (1846). Bericht über einige neue Theiformen der Nordsee. *Müllers Arch. Anat. Phys. Wiss. Med.* 1846: 106; Mueller, J. (1847). Bericht über einige neue Theiformen der Nordsee. *Müllers Arch. Anat. Phys. Wiss. Med.* 1847: 158.

Extralimital distribution: cosmopolitan, Indian Ocean, Pacific Ocean, north Atlantic Ocean, south Atlantic Ocean; in cool waters. See: Berrill, N.J. (1950). The Tunicata. *Ray Soc. Publs* 133: 1–354; Tokioka, T. (1960). Studies on the distribution of appendicularians and some thaliaceans of the North Pacific, with some morphological notes. *Publ. Seto Mar. Biol. Lab. Kyoto Univ.* 8(2): 351–443.

***Dolioletta gegenbauri* (Uljanin, 1884)**

Doliolum gegenbauri Uljanin, B.N. (1884). Die Arten des Gattung *Doliolum* in Golfe von Neapel und den angrenzten den Meeresabschnitten. *Fauna und Flora des Golfes von Neapel*. pp. 1–140 pls i–xii [1].

Type data: type status and whereabouts unknown.

Type locality: Gulf of Naples, Mediterranean Sea.

Doliolum tritonis Herdman, W.A. (1888). Report upon the Tunicata collected during the voyage of H.M.S. 'Challenger', during the years 1873–1876. *Zool. Chall. Exped.* 27(76): 1–166 pls i–xi [47].

Type data: type status unknown BMNH (depository uncertain, not found).

Type locality: North Atlantic Ocean.

Taxonomic decision for synonymy: Garstang, W. (1933). Report on the Tunicata. 1. Doliolida. *Brit. Antarct. Terra Nova' Exped. 1910, Zool.* 4: 195–251 [195].

Distribution: TAS (Bass Strait*, Tas. coast*), VIC (Bass Strait*); cool waters in Indian and Pacific Oceans and north and south Atlantic.

Ecology: marine, planktonic; tolerant of colder waters, to 250 m; nurse forms to 3000 m.

References: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2); Tokioka, T. (1960). Studies on the distribution of appendicularians and some thaliaceans of the North Pacific, with some morphological notes. *Publ. Seto Mar. Biol. Lab. Kyoto Univ.* 8(2): 351–443.

***Doliolum* Quoy & Gaimard, 1834**

Doliolum Quoy, J.R.C. & Gaimard, J.P. (1834). Zoologie, Mollusques pp. 559–626. in, *Voyages de découvertes de l'Astrolabe 1826–1829*, Vol. 3. Paris : Pilet Ainé. [599].

Type species: *Doliolum denticulatum* Quoy & Gaimard, 1834 by original designation.

Extralimital distribution: cosmopolitan, warm waters of Indian Ocean, west and east Pacific Ocean, equatorial Atlantic Ocean currents. See: Tokioka, T. (1960). Studies on the distribution of appendicularians and some thaliaceans of the North Pacific, with some morphological notes. *Publ. Seto Mar. Biol. Lab. Kyoto Univ.* 8(2): 351–443.

***Doliolum denticulatum* Quoy & Gaimard, 1834**

Doliolum denticulatum Quoy, J.R.C. & Gaimard, J.P. (1834). Zoologie, Mollusques pp. 559–626. in, *Voyages de découvertes de l'Astrolabe 1826–1829*, Vol. 3. Paris : Pilet Ainé. [559].

Type data: type status unknown NHMP (depository uncertain, not found).

Type locality: Ile Vanikoro, Pacific Ocean.

Distribution: NSW (Central E coast), QLD (Central E coast, Great Barrier Reef); warmer waters of Indian, east and west Pacific, and Atlantic Oceans and Mediterranean.

Ecology: marine, planktonic; warm water species favours tropical, subtropical waters.

References: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2); Tokioka, T. (1960). Studies on the distribution of appendicularians and some thaliaceans of the North Pacific, with some morphological notes. *Publ. Seto Mar. Biol. Lab. Kyoto Univ.* 8(2): 351–443.

PYROSOMATIDAE

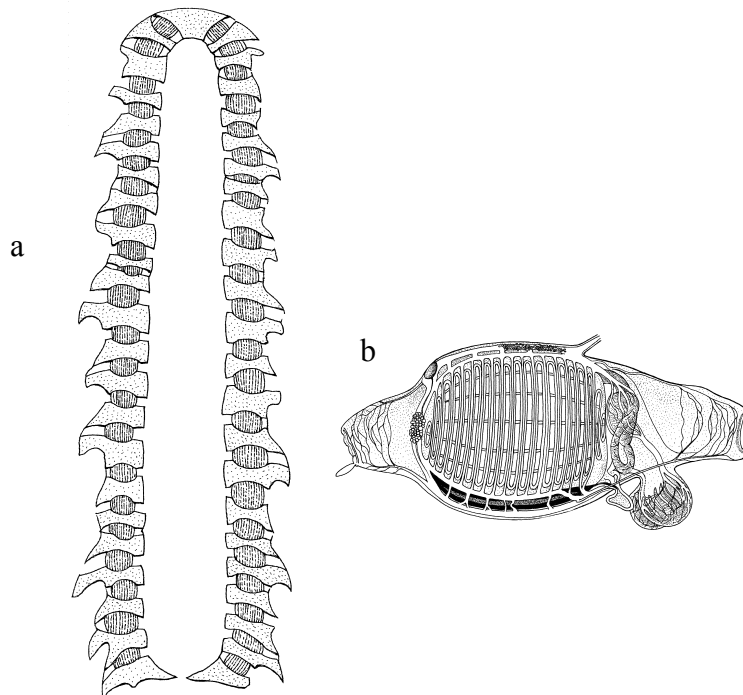


Fig. 24. *Pyrosoma atlanticum* Péron, 1804: **a**, diagrammatic longitudinal section through colony; **b**, schematic figure of a zooid. (a, about life size).
[a, after Burghause 1914; b, after Metcalf & Hopkins 1919]

The family Pyrosomatidae Lahille, 1888, the only known family of the thaliacean order Pyrosomatida, contains species with free swimming tubular colonies of numerous zooids embedded in common transparent test, with their branchial (incurrent) apertures around the outside of the colony and the atrial (excurrent) apertures opening into the central (cloacal) cavity. The central cavity is open at the posterior end of the colony and the excurrent stream of water is forced out through this opening, creating the jet by which the colony is propelled through the water. The pharynx is perforated by numerous long, parallel stigmata, and the short gut loop is postero-ventral to it. The atrial chamber opens at the posterior end of the zooid. Luminous organs are on each side of the anterior end of the pharynx. A vegetative stolon is at the posterior end of the endostyle.

There are two subfamilies, Pyrosomatinae (*Pyrosoma* Péron, 1804 and *Pyrosomella* Van Soest, 1979) and Pyrostremmatinae (*Pyrostremma* Garstang, 1929). In the Pyrosomatinae replication is by isolation of a bud (from the tip of a vegetative stolon) which moves towards the open end of the colony. In the Pyrostremmatinae, the buds form in continuous chains from the stolon, and even after separation lie more or less in rows in the colony. Eggs are fertilised *in situ* in the parent zooid, and develop into rudimentary colonies before liberation from the parental common cloaca.

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Pyrosomella differs from *Pyrosoma* in its strictly parallel rows of zooids. This genus has not been recorded from Australian waters although it is known in the tropical Indo-west Pacific. The order Pyrosomatida is reviewed by Neumann (1935) and Van Soest (1979, 1981). Thompson (1945) has reviewed the species recorded from Australian waters.

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PYROSOMATINAE

Pyrosoma Péron, 1804

Pyrosoma Péron, F. (1804). Mémoire sur le nouveau genre *Pyrosoma*. *Ann. Mus. Hist. Nat. Paris* **4**(12): 437–446 pl. lxxii [437].
Type species: *Pyrosoma atlanticum* Péron, 1804 by original designation.

Dipleurosoma Brooks, W.K. (1906). The affinities of pelagic tunicates. No. 1. On a new *Pyrosoma* and *Dipleurosoma elliptica*. *Mem. Natl Acad. Sci. Wash.* **10**: 149–156 [149, 154].
Type species: *Dipleurosoma ellipticum* Brooks, 1906 by monotypy.

Extralimital distribution: worldwide in tropical and temperate latitudes. See: Van Soest, R.W.M. (1981). A monograph of the order Pyrosomatida (Tunicata, Thaliacea). *J. Plankton Res.* **3**(4): 603–631.

Pyrosoma atlanticum Péron, 1804

Pyrosoma atlanticum Péron, F. (1804). Mémoire sur le nouveau genre *Pyrosoma*. *Ann. Mus. Hist. Nat. Paris* **4**(12): 437–446 pl. lxxii [437].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: equatorial Atlantic Ocean between Mauritius and Europe.

Compiled from secondary source: Herdman, W.A. (1888). Report upon the Tunicata collected during the voyage of H.M.S. 'Challenger', during the years 1873–1876. *Zool. Chall. Exped.* **27**(76): 1–166 pls i–xi.

Pyrosoma elegans Lesueur, C.A. (1813). Mémoire sur quelques nouvelle espèce d'animaux mollusques et radiates recueillies dans la Méditerranée, près de Nice. *Arch Naturg.* **3**: 281–285 [283].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: Nice, Mediterranean Sea.

Compiled from secondary source: Herdman, W.A. (1888). Report upon the Tunicata collected during the voyage of H.M.S. 'Challenger', during the years 1873–1876. *Zool. Chall. Exped.* **27**(76): 1–166 pls i–xi.

Pyrosoma giganteum Lesueur, C.A. (1815). Mémoire sur l'organisation des Pyrosomes et sur la place qu'ils semblent devoir occuper dans une classification naturel. *Bull. Soc. Philomath. Paris* **4**: 70–74 pl. i [70].

Type data: holotype (probable) MNHP TP163*.

Type locality: Nice, Mediterranean Sea.

Compiled from secondary source: Herdman, W.A. (1888).

Report upon the Tunicata collected during the voyage of H.M.S. 'Challenger', during the years 1873–1876. *Zool. Chall. Exped.* **27**(76): 1–166 pls i–xi.

Pyrosoma rufum Quoy, J.R.C. & Gaimard, J.P. (1824). Zoologie pp. 497–516. in, *Le voyage autour du Monde, sur les corvettes de S.M. l' Uranie et la Physicienne 1817–1820*. Paris : Pilet Ainé. [514].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: environs of the Cape of Good Hope, 4400 m S Atlantic [38°23'S 37°28'W].

Dipleurosoma ellipticum Brooks, W.K. (1906). The affinities of pelagic tunicates. No. 1. On a new *Pyrosoma* and *Dipleurosoma elliptica*. *Mem. Natl Acad. Sci. Wash.* **10**: 149–156 [151].

Type data: type status unknown USNM (depository uncertain, not found).

Type locality: Gulf Stream off Beaufort, North Carolina.

Pyrosoma triangulum Neumann, G. (1909). Mitteilung über eine neue Pyrosomen Art der Deutschen Tiefsee Expedition. *Zool. Anz.* **33**(24–25): 792 [792].

Type data: holotype ZMB 2978*.

Type locality: South Atlantic Ocean.

Pyrosoma benthica Monniot, C. & Monniot, F. (1966). Un pyrosome benthique: *Pyrosoma benthica* n.sp. *C.R. Seances Acad. Sci.* **263**(D): 368–370 [368].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: Cape Verde Is., between Boavista and Maio [15°34'30"N 23°11'30"W].

Taxonomic decision for synonymy: Van Soest, R.W.M. (1981). A monograph of the order Pyrosomatida (Tunicata, Thaliacea). *J. Plankton Res.* **3**(4): 603–631 [612].

Distribution: NSW (Lower E coast), SA (Great Australian Bight, S Gulfs coast), TAS (Bass Strait), VIC (Bass Strait); east and west Pacific, Atlantic and Indian Oceans and Mediterranean.

Ecology: marine, planktonic; most plentiful below 250 m, in waters of 7°C to 30°C.

References: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2); Ivanova-Kazas, O.M. (1962). Sur les forme primitive du développement chez les Pyrosomida. *Cahiers de Biologie Marine* **3**: 191–208.

PYROSTREMMATINAE

Pyrostremma Garstang, 1929

Pyrostremma Garstang, W. (1929). Tunicates. *Encyclopedia Britannica* **14**: 549–555 [549] [publication date established from Van Soest, R.W.M. (1981). A monograph of the order Pyrosomatida (Tunicata, Thaliacea). *J. Plankton Res.* **3**(4): 603–631; first introduced as a subgenus of *Pyrosoma* Péron, 1804].

Type species: *Pyrosoma spinosum* Herdman, 1888 by original designation.

Propyrosoma Ivanova-Kazas, O.M. (1962). Sur les forme primitive du développement chez les Pyrosomida. *Cahiers de Biologie Marine* **3**: 191–208 [193] [junior objective synonym of *Pyrostremma* Garstang, 1929].

Type species: *Pyrosoma spinosum* Herdman, 1888 by original designation.

Extralimital distribution: all oceans between 40°N and 45°S. See: Van Soest, R.W.M. (1981). A monograph of the order Pyrosomatida (Tunicata, Thaliacea). *J. Plankton Res.* **3**(4): 603–631.

Generic reference: Van Soest, R.W.M. (1981). A monograph of the order Pyrosomatida (Tunicata, Thaliacea). *J. Plankton Res.* **3**(4): 603–631 [607].

Pyrostremma spinosum (Herdman, 1888)

Pyrosoma excelsior Perrier, J.O.E. (1886). Les Ascidies. pp. 225–229 in, *Les Explorations sous-marines. Bibliothèque des Ecoles et des Familles*. Paris : Librairie Hachette et Cie. 332 pp. [229] [this is a little used name, and for stability in nomenclature, *Pyrostremma spinosum* Herdman, 1888 is maintained here as the valid name, pending an application to

the International Commission on Zoological Nomenclature].

Type data: type status and whereabouts unknown.

Type locality: tropical north Atlantic.

Pyrosoma spinosum Herdman, W.A. (1888). Report upon the Tunicata collected during the voyage of H.M.S. 'Challenger', during the years 1873–1876. *Zool. Chall. Exped.* **27**(76): 1–166 pls i–xi [29] [for stability in nomenclature this name is maintained here as the valid name, pending an application to the International Commission on Zoological Nomenclature to have it conserved].

Type data: type status unknown BMNH (depository uncertain, not found).

Type locality: 4400 m, S Atlantic Ocean [38°23'S 37°28'W].

Pyrosoma sedentarium Sebastian, V.O. (1971). *Pyrosoma sedentarium n.sp.*. *Bull. Dept. Mar. Biol. Oceanogr. Univ. Cochin* **5**: 77–79 [77].

Type data: type status unknown.

Type locality: Cochin to Puvar, Kerala Coast of India, below 200m.

Taxonomic decision for synonymy: Van Soest, R.W.M. (1981). A monograph of the order Pyrosomatida (Tunicata, Thaliacea). *J. Plankton Res.* **3**(4): 603–631 [607].

Distribution: New Zealand, NSW (Lower E coast); lower E coast, NSW, VIC; all oceans between 40°N and 45°S.

Ecology: marine, planktonic.

References: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2); Ivanova-Kazas, O.M. (1962). Sur les forme primitive du développement chez les Pyrosomida. *Cahiers de Biologie Marine* **3**: 191–208.

SALPIDAE

The family Salpidae Lahille, 1888 (with subfamilies Cyclosalpinidae and Salpinidae) is the most diverse of the thaliacean families, and the only family in the order Salpida. Salps are transparent, with atrial and branchial apertures at opposite ends of a more or less streamlined body. An aggregate (blastozoid) sexual generation alternates with a solitary (oozoid) vegetative generation. There is no tailed larva.

Circular muscles surrounding the body are divided into oral, atrial and body muscles. The oral muscle closes the mouth, while the body muscles contract to force water out posteriorly through the atrial aperture. Gill slits are absent, the atrial and branchial cavities being almost continuous, interrupted only by a large ciliated gill bar, the cilia driving the mucous net to the oesophageal opening. A tight, compact 'nucleus' at the posterior end of the body of the aggregate form contains the gut loop and gonads. Embryos (usually one at a time) develop attached to the atrial lining in the aggregated blastozoids.

The subfamily Cyclosalpinidae (*Cyclosalpa* Blainville, 1827 and *Helicosalpa* Todara, 1902) in which circular whorls of zooids are produced from the stolon of the solitary vegetative generation, has a particularly thin test and a straight gut stretched along the gill bar. In Salpinidae the test is often thick and firm, forming keels, spines, *etc.*, the aggregates of blastozoids are in double rows rather than whorls and the gut is coiled.

Eleven genera are recognised in the Salpinidae, and all are represented in Australian waters. The most commonly occurring species is *Thalia democratica* (Forskål, 1775), which occurs in two swarms, spring and autumn, off the coast of New South Wales. Its biology is discussed by Heron (1972) who observed that the population growth of the salp reflected that of the phytoplankton blooms it exploits as its food. The phytoplankton blooms presumably are associated with the incursions of nutrient rich deeper waters onto the continental shelf at those times of the year.

Ihle (1935) reviewed the Salpidae. Van Soest (1974a, 1974b, 1975) has more recently revised many of the genera. Thompson (1945) discussed their occurrence in Australian waters.

References

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- Ihle, J.E.W. (1935). *Desmomyaria*. pp. 401–544 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Vol. 5(2, 5) Berlin : Walter de Gruyter.
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SALPIDAE

- Van Soest, R.W.M. (1974b). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* **22**(293): 153–191
- Van Soest, R.W.M. (1975). Observations on taxonomy and distribution of some salps (Tunicata, Thaliacea), with descriptions of three new species. *Beaufortia* **23**: 105–130

CYCLOSALPINAE

Cyclosalpa Blainville, 1827

Cyclosalpa Blainville, H.M.D. de (1827). *Salpa*. *Bull. Zool. Nomencl.* **26**(3): 136–138 [108] [*nomen conservandum*, see Melville, R.V. (1969). *Salpa* Forskål, 1775 (Tunicata): Validated under the Plenary Powers with designation of a type species for *Thalia* Blumenbach, 1798. *Bull. Zool. Nomencl.* **26**(3): 136–138].

Type species: *Salpa pinnata* Forskål, 1775 by original designation.

Extralimital distribution: worldwide in tropical and temperate latitudes. See: Van Soest, R.W.M. (1974). Taxonomy of the subfamily Cyclosalpinae Yount, 1954, with descriptions of two new species. *Beaufortia* **22**(288): 17–55 [17].

Cyclosalpa affinis (Chamisso, 1819)

Salpa affinis Chamisso, A. von (1819). *De Animalibus quibusdam e classe Vermium Linnaeana. Circumnavigatione Terrae auspicante comite N. Romanzoff, duce Ottone de Kotzbue, annis 1815–1818 peracta*. Fasc. 1 De Salpha. Berolini : Apud. Ferd. Dummlerum 24 pp. 1 pl. [11].

Type data: type status and whereabouts unknown.

Type locality: Hawaii (as Sandwich Is.), Pacific Ocean.

Compiled from secondary source: Van Soest, R.W.M. (1974). Taxonomy of the subfamily Cyclosalpinae Yount, 1954, with descriptions of two new species. *Beaufortia* **22**(288): 17–55 [29].

Cyclosalpa chamissonis Brooks, W.K. (1893). The genus *Salpa*. A monograph, with a supplementary paper by Maynard M. Metcalf. *Mem. Biol. Lab. Johns Hopkins Univ.* **2**: 1–396 pls i–lvii [376].

Type data: type status and whereabouts unknown.

Type locality: Atlantic coast of North America.

Taxonomic decision for synonymy: Thompson, H. (1945). *Pelagic Tunicates of Australia*. Melbourne : Council for Scientific and Industrial Research 196 pp. 75 pls [108].

Distribution: NSW (Lower E coast); eastern, central and western north Atlantic, eastern and central equatorial Atlantic, Mediterranean, north-east and north-west Indian Ocean, east and north Pacific.

Ecology: marine, planktonic.

Reference: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2).

Cyclosalpa bakeri Ritter, 1905

Cyclosalpa bakeri Ritter, W.E. (1905). The pelagic Tunicata of the San Diego Region, excepting the Larvacea. *Univ. Calif. Publ. Zool.* **2**(3): 51–112 pls ii, iii [54].

Type data: type status and whereabouts unknown.

Type locality: San Diego region, California.

Distribution: NSW (Lower E coast), VIC (Bass Strait); east and west Pacific and warmer parts of Atlantic.

Ecology: marine, planktonic; 500 m to the surface.

References: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2); Thompson, H. (1945). *Pelagic Tunicates of Australia*. Melbourne : Council for Scientific and Industrial Research 196 pp. 75 pls [114].

Cyclosalpa floridana (Apstein, 1894)

Salpa floridana Apstein, C. (1894). Die Thaliacea der Plankton-Expedition. B. Vertheilung der Salpen. *Ergebn. Plankt.-Exped. Humboldt-Stiftung* **2**(E.a.B.): 1–68 pls ii–iv [9].

Type data: type status and whereabouts unknown (not in ZMB).

Type locality: 400 miles south of Newfoundland, west North Atlantic Ocean [32–41°N 56–63°W].

Compiled from secondary source: Van Soest, R.W.M. (1974). Taxonomy of the subfamily Cyclosalpinae Yount, 1954, with descriptions of two new species. *Beaufortia* **22**(288): 17–55.

Distribution: Indonesia, Mexico, Bahamas, QLD (Central E coast); west part of north Atlantic, Gulf of Mexico.

Ecology: marine, planktonic; rare.

References: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2); Thompson, H. (1945). *Pelagic Tunicates of Australia*. Melbourne : Council for Scientific and Industrial Research 196 pp. 75 pls [111] (as *Cyclosalpa floridana*).

Cyclosalpa polae Sigl, 1912

Cyclosalpa polae Sigl, M.A. (1912). *Cyclosalpa polae*, n.sp. aus dem östlichen mittelmeeer. *Zool. Anz.* **39**(2): 66–74 [68].

Type data: type status unknown ZMB (depository uncertain, not found).

Type locality: eastern Mediterranean Sea [31–39°N 19–34°E].

Compiled from secondary source: Van Soest, R.W.M. (1974). Taxonomy of the subfamily Cyclosalpinae Yount, 1954, with descriptions of two new species. *Beaufortia* **22**(288): 17–55.

Distribution: Indonesia, NSW (Central E coast*, Lower E coast), QLD (Central E coast*); warmer waters of Pacific Ocean and the Atlantic and Indian Oceans.

Ecology: marine, planktonic; favours temperate waters.

Reference: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2).

Cyclosalpa sewelli Metcalf, 1927

Cyclosalpa pinnata sewelli Metcalf, M.M. (1927). Seymour Sewell on 'Salps of the Indian Seas'. *Science N.Y.* **65**: 257 [257] [proposed with subspecific rank in *Cyclosalpa pinnata* Forskål, 1775].

Type data: type status and whereabouts unknown.

Type locality: Nankauri Harbour, Nicobar Is.

Compiled from secondary source: Van Soest, R.W.M. (1974). Taxonomy of the subfamily Cyclosalpiniae Yount, 1954, with descriptions of two new species. *Beaufortia* **22**(288): 17–55.

Distribution: QLD (NE oceanic), WA (NW oceanic, W oceanic); Indo-Pacific waters roughly between 30°N and 30°S, records not often distinguished from those of *Cyclosalpa polae* and *Cyclosalpa pinnata* [Salpidae].

Ecology: marine, planktonic.

Reference: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2).

Helicosalpa Todara, 1902

Helicosalpa Todara, F. (1902). Sopra gli organi scrittori delle Salpidi. *Atti Accad. Lincei* (5)**11**(1): 405–407 [405].

Type species: *Salpa virgula* Vogt, 1854 by original designation.

Extralimital distribution: between 50°N and 30°S in the Atlantic Ocean, 40°N and 40°S in the Indo-Pacific Ocean, Mediterranean Sea. See: Van Soest, R.W.M.

(1974). Taxonomy of the subfamily Cyclosalpiniae Yount, 1954, with descriptions of two new species. *Beaufortia* **22**(288): 17–55 [43].

Helicosalpa virgula (Vogt, 1854)

Salpa virgula Vogt, C. (1854). Recherches sur les animaux inférieurs de la Méditerranée. Sci. Mém. sur les Tuniciers nageants de la mer de Nice. *Mém. Inst. Genève* **2**(3): 1–102 pls v–x [11].

Type data: type status unknown.

Type locality: Villefranche-sur-Mer, Mediterranean Sea.

Salpa dolichosoma Todara, F. (1883). Sopra una nuova forma di *Salpa* (*S. dolichosoma*). *Atti. Accad. Lincei* **8**: 41–43 [41].

Type data: type status and whereabouts unknown.

Type locality: Mediterranean Sea.

Taxonomic decision for synonymy: Van Soest, R.W.M. (1974). Taxonomy of the subfamily Cyclosalpiniae Yount, 1954, with descriptions of two new species. *Beaufortia* **22**(288): 17–55 [41].

Distribution: NSW (Central E coast); Mediterranean, east equatorial Atlantic and central Indian Ocean.

Ecology: marine, planktonic.

Reference: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2).

SALPINAE

Brooksia Metcalf, 1918

Brooksia Metcalf, M.M. (1918). The Salpidae; a taxonomic study. *Bull. U.S. Natl Mus.* (2)100(2): 5–193 pls i–xiv [50]. Type species: *Salpa rostrata* Traustedt, 1893 by original designation.

Extralimital distribution: west Pacific, west Indian, Atlantic Oceans between 30°N and 20°S, and Mediterranean Sea. See: Van Soest, R.W.M. (1975). Observations on taxonomy and distribution of some salps (Tunicata, Thaliacea), with descriptions of three new species. *Beaufortia* 23: 105–130 [114].

Brooksia rostrata (Traustedt, 1893)

Salpa rostrata Traustedt, M.P.A. (1893). Die Thaliacea der Plankton-Expedition. A. Systematische Bearbeitung. In, *Ergebn. Plankt.-Exped. Humboldt-Stiftung*. Vol. 2(E.a.A.): 1–16 pl. I. [8].

Type data: type status unknown ZMUC (depository uncertain).

Type locality: Atlantic Ocean [31°07'N 42°07'–43°06'W; 28°03'–09'N 34°03'–35°W].

Distribution: NSW (Central E coast, Lower E coast), VIC (Bass Strait*); tropical Atlantic and Indian Oceans, west and east Pacific.

Ecology: marine, planktonic.

References: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin: Walter de Gruyter Vol. 5(2); Van Soest, R.W.M. (1975). Observations on taxonomy and distribution of some salps (Tunicata, Thaliacea), with descriptions of three new species. *Beaufortia* 23: 105–130 [115].

Iasis Savigny, 1816

Iasis Savigny, J.C. (1816). Recherches anatomiques sur les ascidies composées et sur les ascidies simples—Système de la classe des Ascidies pp. 1–239. In *Mémoires sur les Animaux sans Vertèbres*, Pt 2. Paris: G. Dufour. [125] [junior homonym of *Iasis* Savigny, 1816].

Type species: *Salpa cylindrica* Cuvier, 1804 by original designation.

Weelia Yount, J.L. (1954). The taxonomy of the Salpidae (Tunicata) of the Central Pacific Ocean. *Pac. Sci.* 8: 276–330 [304] [unnecessary *nom. nov.* for *Iasis* Savigny, 1816, not *Iasis* Lahille, 1890].

Extralimital distribution: warm waters of all oceans between 35°N and 30°S, and north Atlantic Ocean to about 42°N. See: Van Soest, R.W.M. (1975). Observations on taxonomy and distribution of some salps (Tunicata, Thaliacea), with descriptions of three new species. *Beaufortia* 23: 105–130.

Iasis cylindrica (Cuvier, 1804)

Salpa cylindrica Cuvier, G. (1804). Mémoire sur les Thalides (*Thalia* Browne) et sur les Biplores (*Salpa* Forskål). *Ann. Mus. Hist. Nat. Paris* 4: 360–382 pl. lxxviii [381].

Type data: type status unknown.

Type locality: unknown, see Van Soest, R.W.M. (1975). Observations on taxonomy and distribution of some salps (Tunicata, Thaliacea), with descriptions of three new species. *Beaufortia* 23: 105–130 [111].

Salpa coeruleascens Chamisso, A. von (1819). *De Animalibus quibusdam e classe Vermium Linnaeana. Circumnavigatione Terrae auspicante comite N. Romanzoff, duce Ottone de Kotzbue, annis 1815–1818 peracta*. Fasc. 1 De Salpha. Berolini: Apud. Ferd. Dummlerum 24 pp. 1 pl. [22].

Type data: type status and whereabouts unknown.

Type locality: equatorial Atlantic Ocean.

Compiled from secondary source: Deshayes, G.P. & Milne-Edwards, H. (1840). Tuniciers. pp. 473–541 in Lamarck, J.B.P.A. *Histoire naturelle des Animaux sans Vertèbres*. Paris: J.B. Ballière Vol. 3 2nd Edn 770 pp. [520].

Salpa elongata Blainville, H.M.D. de (1827). *Salpa*. *Bull. Zool. Nomencl.* 26(3): 136–138 [113].

Type data: syntypes (probable) whereabouts unknown.

Type locality: Straits of Gibraltar.

Taxonomic decision for synonymy: Traustedt, M.P.A. (1885). *Spolia Atlantica* 1. Bidrag til Kundskab om Salperne. *Danske Vid. Selsk. Skrift.* 6(2): 337–400 pls i, ii [377].

Distribution: NSW (Central E coast, Lower E coast), QLD (Central E coast, Great Barrier Reef); north-west, central and south-east north Atlantic, equatorial Atlantic, and south Atlantic, Indian Ocean, west and east Pacific.

Ecology: marine, planktonic; not below 100 m.

Ihlea Metcalf, 1919

Apsteinia Metcalf, M.M. (1918). The Salpidae; a taxonomic study. *Bull. U.S. Natl Mus.* (2)100(2): 5–193 pls i–xiv [71] [first introduced as a subgenus of *Salpa* Forskål, 1775; junior homonym of *Apsteinia* Schmeil, 1894 (Crustacea)]. Type species: *Salpa punctata* Forskål, 1775 by original designation.

Ihlea Metcalf, M.M. (1919). Metcalf and Bell upon Salpidae. *Science N.Y.* 50(1279): 19–20 [19] [*nom. nov.* for *Apsteinia* Metcalf, 1918].

Extralimital distribution: temperate and tropical waters of three oceans between 60°N in the north Atlantic Ocean to the Antarctic convergence. See: Van Soest, R.W.M. (1975). Observations on taxonomy and distribution of some salps (Tunicata, Thaliacea), with descriptions of three new species. *Beaufortia* 23: 105–130.

Ihlea magalhanica (Apstein, 1894)

Salpa magalhanica Apstein, C. (1894). Die Thaliacea der Plankton-Expedition. B. Vertheilung der Salpen. *Ergebn. Plankt.-Exped. Humboldt-Stiftung* 2(E.a.B.): 1–68 pls ii–iv [20].

Type data: type status unknown ZMB (depository uncertain, not found).

Type locality: Straits of Magellan.

Compiled from secondary source: Metcalf, M.M. (1918). The Salpidae; a taxonomic study. *Bull. U.S. Natl Mus.* (2)100(2): 5–193 pls i–xiv.

Distribution: TAS (Bass Strait*), VIC (Bass Strait*); Straits of Magellan and to the south, and Cape of Good Hope.

Ecology: marine, planktonic; low tolerance of warm water, favours water between 11.6° and 22.25°C.

Reference: Foxton, P. (1971). On *Ihlea magalhanica* and *Ihlea racovitzai*. *Discovery Rep.* 35: 179–198.

***Metcalfina* Ihle & Ihle-Landenberg, 1933**

***Metcalfina* Ihle, J.E.W. & Ihle-Landenberg, M.E. (1933).** Anatomische Untersuchungen über Salpen. III. Der Nucleus; IV. Allgemeines über den Darmkanal der Salpen. *Zool. Anz.* 104: 194–200 [199].

Type species: *Salpa hexagona* Quoy & Gaimard, 1824 by original designation.

Extralimital distribution: east Atlantic Ocean, north Indian Ocean, tropical west Pacific Ocean. See: Thompson, H. (1945). *Pelagic Tunicates of Australia*. Melbourne: Council for Scientific and Industrial Research 196 pp. 75 pls [129].

***Metcalfina hexagona* (Quoy & Gaimard, 1824)**

***Salpa hexagona* Quoy, J.R.C. & Gaimard, J.P. (1824).** Zoologie pp. 497–516. in, *Le voyage autour du Monde, sur les corvettes de S.M. l' Uranie et la Physicienne 1817–1820*. Paris: Pilet Ainé. [505].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: Madeira Is., NE Atlantic Ocean.

Distribution: QLD (Central E coast); from warm waters of Indian Ocean, Atlantic, Pacific Ocean.

Ecology: marine, planktonic; rare, often in deeper waters to 200 m.

Reference: Thompson, H. (1945). *Pelagic Tunicates of Australia*. Melbourne: Council for Scientific and Industrial Research 196 pp. 75 pls.

***Pegea* Savigny, 1816**

***Pegea* Savigny, J.C. (1816).** Recherches anatomiques sur les ascidies composées et sur les ascidies simples—Système de la classe des Ascidies pp. 1–239. In *Mémoires sur les Animaux sans Vertèbres*, Pt 2. Paris: G. Dufour. [124].

Type species: *Salpa confoederata* Forskål, 1775 by original designation.

Extralimital distribution: all oceans between 50°N and 45°S. See: Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* 22(293): 153–191 [170].

***Pegea confoederata* (Forskål, 1775)**

***Salpa confoederata* Forskål, P. (1775).** *Salpa*. pp. 112–117 in, *Descriptions Animalium ...; quae in itinere orientali observavit*. Haunia: Heineck & Faber 164 pp. [115] [publication date established from Melville, R.V. (1969).

Salpa Forskål, 1775 (Tunicata): Validated under the Plenary Powers with designation of a type species for *Thalia* Blumenbach, 1798. *Bull. Zool. Nomencl.* 26(3): 136–138].

Type data: type status and whereabouts unknown.

Type locality: eastern Mediterranean Sea.

Compiled from secondary source: Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* 22(293): 153–191 [171].

***Salpa gibba* Bosc, L.A.G. (1802).** *Histoire Naturelle des Vers*. In, *Encyclopédie Méthodique Paris and. Liege*: Panckoucke Vol. 2 [178].

Type data: type status unknown ZMUC (depository uncertain).

Type locality: Atlantic Ocean, see Blainville, H.M.D. de (1827). *Salpa*. *Bull. Zool. Nomencl.* 26(3): 136–138 [110].

***Salpa octophora* Cuvier, G. (1804).** Mémoire sur les Thalides (*Thalia* Browne) et sur les Biphores (*Salpa* Forskål). *Ann. Mus. Hist. Nat. Paris* 4: 360–382 pl. lxxviii [379].

Type data: type status unknown.

Type locality: unknown.

***Salpa scutigera* Cuvier, G. (1804).** Mémoire sur les Thalides (*Thalia* Browne) et sur les Biphores (*Salpa* Forskål). *Ann. Mus. Hist. Nat. Paris* 4: 360–382 pl. lxxviii [379].

Type data: type status unknown.

Type locality: unknown.

***Salpa vivipara* Péron, F. & Lesueur, C.A. (1807).** pp. 45–46, & c pls xxx, xxxi (part) in, *Voyage de découvertes aux Terres Australes ... 1800–1804*. Vol. 1. Paris. [pl. 31] [after Traustedt, M.P.A. (1885). *Spolia Atlantica* 1. Bidrag til Kundskab om Salperne. *Danske Vid. Selsk. Skrift.* 6(2): 337–400 pls i, ii].

Type data: type status unknown ZMUC (depository uncertain).

Type locality: unknown.

***Salpa ferruginea* Chamisso, A. von (1819).** *De Animalibus quibusdam e classe Vermium Linnaeana. Circumnavigatione Terrae auspicante comite N. Romanzoff, duce Ottone de Kotzbue, annis 1815–1818 peracta*. Fasc. 1 De Salpha. Berolini: Apud. Ferd. Dummlerum 24 pp. 1 pl. [23] [after Traustedt, M.P.A. (1885). *Spolia Atlantica* 1. Bidrag til Kundskab om Salperne. *Danske Vid. Selsk. Skrift.* 6(2): 337–400 pls i, ii].

Type data: type status unknown ZMUC (depository uncertain, not found).

Type locality: Mediterranean Sea.

***Salpa femoralis* Quoy, J.R.C. & Gaimard, J.P. (1834).** Zoologie, Mollusques pp. 559–626. in, *Voyages de découvertes de l'Astrolabe 1826–1829*, Vol. 3. Paris: Pilet Ainé. [577].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: Atlantic Ocean near Tropic of Cancer.

***Salpa quadrata* Herdman, W.A. (1888).** Report upon the Tunicata collected during the voyage of H.M.S. 'Challenger', during the years 1873–1876. *Zool. Chall. Exped.* 27(76): 1–166 pls i–xi [84].

Type data: type status unknown BMNH (depository uncertain, not found).

Type locality: North Atlantic Ocean [10°55'N 17°04'W].

Taxonomic decision for synonymy: Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* **22**(293): 153–191 [171]; Madin, L.P. & Harbison, G.R. (1978). Salps of the genus *Pegea* Savigny, 1816 (Tunicata: Thaliacea). *Bull. Mar. Sci.* **28**(2): 335–344.

Distribution: NSW (Central E coast, Lower E coast), QLD (Central E coast), SA (Great Australian Bight), TAS (Bass Strait*, Tas. coast), VIC (Bass Strait*); warm and temperate parts of all oceans and Mediterranean.

Ecology: marine, planktonic.

Ritteriella Metcalf, 1918

Ritteriella Metcalf, M.M. (1918). The Salpidae; a taxonomic study. *Bull. U.S. Natl Mus.* (2) **100**(2): 5–193 pls i–xiv [55]. Type species: *Salpa picteti* Apstein, 1904 by original designation.

Extralimital distribution: tropical and temperate latitudes in all oceans. See: Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* **22**(293): 153–191 [175].

Ritteriella amboinensis (Apstein, 1904)

Salpa amboinensis Apstein, C. (1904). Salpes d'Amboine. *Rev. Suisse Zool.* **12**: 649–656 pl. xii [651]. Type data: syntypes GMNH T1/98 (3 jars). Type locality: near Ambon, Indonesia.

Distribution: NSW (Central E coast), QLD (Central E coast), VIC (Bass Strait); Indian and Pacific Oceans between 30°S and 30°N.

Ecology: marine, planktonic; favours waters 200 m to surface, warmer waters, but coldest times of the year.

Reference: Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* **22**(293): 153–191 [177].

Ritteriella retracta (Ritter, 1906)

Salpa (Cyclosalpa) retracta Ritter, W.E. (1906). *Cyclosalpa retracta*, a new Salpoid from the coast of Japan. *Annot. Zool. Jpn.* **6**(1): 1–5 [1].

Type data: type status unknown USNM (depository uncertain, not found).

Type locality: Suruga Bay, Japan.

Compiled from secondary sources: Oka, A. (1931). Ueber *Myxobotrus*, eine neue Synascidien-Gattung. *Proc. Imp. Acad. Japan* **7**(6): 238–240; Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* **22**(293): 153–191 [179].

Distribution: QLD (Central E coast); all oceans between 40°S and 40°N, to 60°N in the Atlantic.

Ecology: benthic, marine.

Salpa Forskål, 1775

Salpa Forskål, P. (1775). *Salpa*. pp. 112–117 in, *Descriptions Animalium ...; quae in itinere orientali observavit*. Hauniae: Heineck & Faber 164 pp. [115] [publication date established from Melville, R.V. (1969)]. *Salpa* Forskål, 1775 (Tunicata): Validated under the Plenary Powers with designation of a type species for *Thalia* Blumenbach, 1798. *Bull. Zool. Nomencl.* **26**(3): 136–138; *nomen conservandum*; senior homonym, *Salpa* Edwards, 1771 (Pisces) suppressed].

Type species: *Salpa maxima* Forskål, 1775 by original designation.

Biphora Brugière, J.G. (1792). Histoire Naturelle des Vers. pp. 23–24, 26, 141–157, 178–188 pl. 75 fig. 5 in, *Encyclopédie Méthodique* Vol. 1. Paris and Liege: Panckoucke. [*nom. nov.* for *Salpa* Forskål, 1775].

Extralimital distribution: worldwide. See: Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* **22**(293): 153–191 [157].

Salpa fusiformis Cuvier, 1804

Salpa fusiformis Cuvier, G. (1804). Mémoire sur les Thalides (*Thalia* Browne) et sur les Biphores (*Salpa* Forskål). *Ann. Mus. Hist. Nat. Paris* **4**: 360–382 pl. lxxviii [382].

Type data: type status unknown.

Type locality: unknown.

Compiled from secondary source: Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* **22**(293): 153–191 [166].

Salpa runcinata Chamisso, A. von (1819). *De Animalibus quibusdam e classe Vermium Linnaeana. Circumnavigatione Terrae auspicante comite N. Romanzoff, duce Ottone de Kotzbue, annis 1815–1818 peracta*. Fasc. 1 De Salpha. Berolini: Apud. ferd. Dummlerum 24 pp. 1 pl. [16].

Type data: type status and whereabouts unknown.

Type locality: near the Azores, Atlantic Ocean.

Compiled from secondary source: Deshayes, G.P. & Milne-Edwards, H. (1840). Tuniciers. pp. 473–541 in Lamarck, J.B.P.A. *Histoire naturelle des Animaux sans Vertèbres*. Paris: J.B. Ballière Vol. 3 2nd Edn 770 pp.

Biphora depressa Sars, M. (1829). *Bidrag til Söedyrenes Naturhistorie*, Forste Haefte. Bergen. 160 pp. [51].

Type data: type status and whereabouts unknown.

Type locality: ?off Norway.

Biphora tricuspidata Sars, M. (1829). *Bidrag til Söedyrenes Naturhistorie*, Forste Haefte. Bergen. 160 pp. [56].

Type data: type status and whereabouts unknown.

Type locality: ?off Norway.

Salpa coerulea Quoy, J.R.C. & Gaimard, J.P. (1834). Zoologie, Mollusques pp. 559–626. in, *Voyages de découvertes de l'Astrolabe 1826–1829*, Vol. 3. Paris: Pilet Ainé. [589] ['biphore bleu' figured in Quoy, J.R.C. & Gaimard, J.P. (1833). Zoologie, Zoophytes pp. 304–306. in, *Voyage de découvertes de l'Astrolabe 1824–1829* Vol. 4. Paris: Pilet Ainé. (pl. 89, figs 20–24)].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: 30°S 51°W, Atlantic Ocean.

Taxonomic decision for synonymy: Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* 22(293): 153–191 [166].

Distribution: NSW (Central E coast, Lower E coast), QLD (Central E coast), TAS (Bass Strait*, Tas. coast), VIC (Bass Strait*); Atlantic between 55°S to 60°N, Mediterranean Sea, Indian Ocean, Pacific Ocean between 40°S and 30°N to Bering Sea.

Ecology: marine, planktonic; water temperature 7–25.7°C, able to withstand low temperatures.

References: Deshayes, G.P. & Milne-Edwards, H. (1840). Tuniciers. pp. 473–541 in Lamarck, J.B.P.A. *Histoire naturelle des Animaux sans Vertèbres*. Paris : J.B. Ballière Vol. 3 2nd Edn 770 pp. (*Salpa runcinata* Chamisso, 1819 as *Salpa ruminata* (sic), *Salpa coerulea* Quoy & Gaimard, 1834 as *Salpa caeculia* (sic)); Foxton, P. (1961). On *Salpa fusiformis* Cuvier and related species. *Discovery Rep.* 32: 1–32.

Salpa maxima Forskål, 1775

Salpa africana Forskål, P. (1775). *Salpa*. pp. 112–117 in, *Descriptions Animalium ...; quae in itinere orientali observavit*. Hauniae : Heineck & Faber 164 pp. [116] [publication date established from Melville, R.V. (1969). *Salpa* Forskål, 1775 (Tunicata): Validated under the Plenary Powers with designation of a type species for *Thalia* Blumenbach, 1798. *Bull. Zool. Nomencl.* 26(3): 136–138]. Type data: type status and whereabouts unknown. Type locality: near the Tunisian coast, Mediterranean Sea. Compiled from secondary source: Bosc, L.A.G. (1802). *Histoire Naturelle des Vers*. In, *Encyclopédie Méthodique Paris and. Liege* : Panckoucke Vol. 2 [180].

Salpa maxima Forskål, P. (1775). *Salpa*. pp. 112–117 in, *Descriptions Animalium ...; quae in itinere orientali observavit*. Hauniae : Heineck & Faber 164 pp. [112] [publication date established from Melville, R.V. (1969). *Salpa* Forskål, 1775 (Tunicata): Validated under the Plenary Powers with designation of a type species for *Thalia* Blumenbach, 1798. *Bull. Zool. Nomencl.* 26(3): 136–138]. Type data: type status and whereabouts unknown. Type locality: off Tunisian coast, Mediterranean Sea. Compiled from secondary source: Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* 22(293): 153–191.

Salpa birostrata Blainville, H.M.D. de (1827). *Salpa*. *Bull. Zool. Nomencl.* 26(3): 136–138 [119] [*nom. nov.* for *Salpa maxima* Forskål: Quoy & Gaimard, 1824].

Salpa forskalii Lesson, R.P. (1830). *Zoologie*. pp. 256–279, 433–440 in Lesson, R.P. *Voyage autour du Monde sur la Corvette La Coquille pendant 1822–1825*. Paris : P. Pourret Frères Vol. 2(1) [272].

Type data: type status and whereabouts unknown. Type locality: Mediterranean Sea.

Taxonomic decision for synonymy: Van Soest, R.W.M. (1974). A revision of the genera *Salpa* Forskål, 1775, *Pegea* Savigny, 1816 and *Ritteriella* Metcalf, 1919 (Tunicata, Thaliacea). *Beaufortia* 22(293): 153–191 [158].

Distribution: Chile, NSW (Lower E coast), TAS (Bass Strait*, Tas. coast), VIC (Bass Strait*); north Atlantic Ocean, Cape Horn and coast of Chile, east and west Pacific Ocean to Bering Sea, Mediterranean Sea.

Ecology: marine, planktonic; temperatures 12.7–23.8°C.

Reference: Neumann, G. (1935). Thaliacea. pp. 203–500 in Kükenthal, W. & Krumbach, T. (eds) *Handbuch der Zoologie*. Berlin : Walter de Gruyter Vol. 5(2).

Soestia Kott, 1998

Iasis Lahille, F. (1890). *Recherches sur les tuniciers des côtes de France*. Toulouse : Lagarde et Sebillé 330 pp. [11] [junior homonym of *Iasis* Savigny, 1816].

Type species: *Holothurium zonarium* Pallas, 1774 by monotypy, see Metcalf, M.M. (1918). The Salpidae; a taxonomic study. *Bull. U.S. Natl Mus.* (2)100(2): 5–193 pls i–xiv.

Soestia Kott, P. (1998). Tunicata. pp. 51–259 in Wells, A. & Houston, W.W.K. (eds) *Zoological Catalogue of Australia*. Hemichordata, Tunicata, Cephalochordata. Melbourne : CSIRO Publishing, Australia Vol. 34 298 pp. [231] [*nom. nov.* for *Iasis* Lahille, 1890].

Extralimital distribution: Atlantic Ocean between 40°S and Iceland, Mediterranean Sea, tropical Indo-west Pacific Ocean, Japan and east Pacific Ocean between Straits of Magellan and 56°N. See: Thompson, H. (1945). *Pelagic Tunicates of Australia*. Melbourne : Council for Scientific and Industrial Research 196 pp. 75 pls [132].

Soestia zonaria (Pallas, 1774)

Holothurium zonarium Pallas, P.S. (1774). In, *Spicelegia Zoologica. Pt 10*. Berolini : G.A. Lange Vol. 1 41 pp. [26].

Type data: type status unknown.

Type locality: near island of Antigua.

Compiled from secondary source: Deshayes, G.P. & Milne-Edwards, H. (1840). Tuniciers. pp. 473–541 in Lamarck, J.B.P.A. *Histoire naturelle des Animaux sans Vertèbres*. Paris : J.B. Ballière Vol. 3 2nd Edn 770 pp. [518].

Salpa polycratica Forskål, P. (1775). *Salpa*. pp. 112–117 in, *Descriptions Animalium ...; quae in itinere orientali observavit*. Hauniae : Heineck & Faber 164 pp. [116] [publication date established from Melville, R.V. (1969). *Salpa* Forskål, 1775 (Tunicata): Validated under the Plenary Powers with designation of a type species for *Thalia* Blumenbach, 1798. *Bull. Zool. Nomencl.* 26(3): 136–138].

Type data: type status unknown.

Type locality: Egypt, Mediterranean Sea.

Compiled from secondary source: Deshayes, G.P. & Milne-Edwards, H. (1840). Tuniciers. pp. 473–541 in Lamarck, J.B.P.A. *Histoire naturelle des Animaux sans Vertèbres*. Paris : J.B. Ballière Vol. 3 2nd Edn 770 pp.

Salpa cordiformis Blainville, H.M.D. de (1827). *Salpa. Bull. Zool. Nomencl.* **26**(3): 136–138 [120].

Type data: type status unknown.

Type locality: Straits of Gibraltar, Mediterranean Sea.

Salpa microstoma Quoy, J.R.C. & Gaimard, J.P. (1827). Observations zoologiques faites à bord de l'*Astrolabe* en mai 1826, dans le détroit de Gibraltar. *Ann. Sci. Nat.* **1**(10): 172–237 & c pls i, ii, viiiA [226].

Type data: type status unknown MNHP (not found).

Type locality: Straits of Gibraltar.

Salpa unicuspidata Blainville, H.M.D. de (1827). *Salpa. Bull. Zool. Nomencl.* **26**(3): 136–138 [116].

Type data: type status unknown.

Type locality: Straits of Gibraltar.

Salpa nitida Herdman, W.A. (1888). Report upon the Tunicata collected during the voyage of H.M.S. 'Challenger', during the years 1873–1876. *Zool. Chall. Exped.* **27**(76): 1–166 pls i–xi [81].

Type data: type status unknown BMNH (depository uncertain, not found).

Type locality: north of Admiralty Is. [2°15'N 146°16'E].

Taxonomic decision for synonymy: Metcalf, M.M. (1918). The Salpidae; a taxonomic study. *Bull. U.S. Natl Mus.* (2)**100**(2): 5–193 pls i–xiv [100].

Distribution: Japan, Alaska, NSW (Central E coast, Lower E coast), TAS (Bass Strait, Tas. coast), VIC (Bass Strait); Atlantic Ocean between 40°S and Iceland, western and central Mediterranean Sea, Indian Ocean, west Pacific Ocean to Japan, and east Pacific from Straits of Magellan to Alaska.

Ecology: marine, planktonic; common in most temperate waters.

Reference: Thompson, H. (1945). *Pelagic Tunicates of Australia*. Melbourne: Council for Scientific and Industrial Research 196 pp. 75 pls.

Thalia Blumenbach, 1798

Thalia Blumenbach, J.F. (1798). *Abbildungen naturhistorischer Gegenstände*. No. 30, pl. xxxi–*Thalia lingulata*. Göttingen. [30] [publication date established from Melville, R.V. (1969). *Salpa* Forskål, 1775 (Tunicata): Validated under the Plenary Powers with designation of a type species for *Thalia* Blumenbach, 1798. *Bull. Zool. Nomencl.* **26**(3): 136–138].

Type species: *Salpa democratica* Forskål, 1775 by subsequent designation, see Waal, J.P. (1966). *Salpa* Edwards, 1771 (Pisces): proposed suppression under the Plenary Powers in favour of *Salpa* Forskål, 1775 together with the designation of a type species for *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea): Z.N.(S.) 1651. *Bull. Zool. Nomencl.* **23**: 232 (under Plenary Powers, with all type designations for nominal genus *Thalia* Blumenbach made prior to 1969 ruling see above, being set aside).

Dubreuillia Lesson, R.P. (1832). Zoologie. pp. 256–279, 433–440 in Lesson, R.P. *Voyage autour du Monde sur la Corvette La Coquille pendant 1822–1825*. Paris: P. Pourret Freres Vol. 2(1) [433].

Type species: *Dubreuillia cirrhosa* Lesson, 1830 by monotypy.

Taxonomic decision for synonymy: Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212 [193].

Extralimital distribution: tropical and temperate Atlantic Ocean between 40°N and 40°S, west south Pacific Ocean, Red Sea, Mediterranean Sea. See: Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212.

Thalia cicar Van Soest, 1973

Thalia cicar Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212 [202].

Type data: holotype ZMA TU1355, TU1356–7.

Type locality: north of Curaçao [12°40'30"–09°N 68°55'W–69°02'36"W].

Distribution: Japan, Indonesia, QLD (Great Barrier Reef); tropical west Atlantic Ocean, central south Atlantic Ocean, Arabian Sea and Gulf of Eilat.

Ecology: marine, planktonic.

Thalia democratica (Forskål, 1775)

Salpa democratica Forskål, P. (1775). *Salpa. pp. 112–117 in, Descriptions Animalium ...; quae in itinere orientali observavit*. Hauniae: Heineck & Faber 164 pp. [113] [publication date established from Melville, R.V. (1969).

Salpa Forskål, 1775 (Tunicata): Validated under the Plenary Powers with designation of a type species for *Thalia* Blumenbach, 1798. *Bull. Zool. Nomencl.* **26**(3): 136–138].

Type data: type status unknown (Cole, L. (1989). Catalog of tunicate type specimens in the United States National Museum collections. *Smithson. Contrib. Zool.* **487**: 1–12 lists types USNM 6473, USNM 6474 from Luzon (Philippines) which are not types and are probably collections of the US Bureau of Fisheries Albatross, see Metcalf, M.M. (1918). The Salpidae; a taxonomic study. *Bull. U.S. Natl Mus.* (2)**100**(2): 5–193 pls i–xiv).

Type locality: Mallorca, west Mediterranean Sea.

Compiled from secondary source: Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212 [197].

Salpa mucronata Forskål, P. (1775). *Salpa. pp. 112–117 in, Descriptions Animalium ...; quae in itinere orientali observavit*. Hauniae: Heineck & Faber 164 pp. [114] [publication date established from Melville, R.V. (1969).

Salpa Forskål, 1775 (Tunicata): Validated under the Plenary Powers with designation of a type species for *Thalia* Blumenbach, 1798. *Bull. Zool. Nomencl.* **26**(3): 136–138].

Type data: type status unknown.

Type locality: Egypt, Mediterranean Sea.

Compiled from secondary source: Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212 [197].

Salpa spinosa Otto, A.W. (1823). Beschreibung einiger neuen Mollusken und Zoophyten. *Nova Acta Acad. Leop.-Caroe.* **11**(2): 273–314 [303].

Type data: type status unknown.

Type locality: Mediterranean Sea.

Compiled from secondary source: Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212 [197].

Dubreullia cirrhosa Lesson, R.P. (1830). Zoologie. pp. 256–279, 433–440 in Lesson, R.P. *Voyage autour du Monde sur la Corvette La Coquille pendant 1822–1825*. Paris: P. Pourret Frères Vol. 2(1) [278].

Type data: type status and whereabouts unknown.

Type locality: unknown.

Salpa caboti Desor, P.J.E. (1848). *Salpa caboti* sp.n. exhibited and described. *Proc. Bost. Soc. Nat. Hist.* **3**: 75–76 [75].

Type data: type status and whereabouts unknown.

Type locality: Nantucket, Atlantic coast of North America.

Taxonomic decision for synonymy: Waal, J.P. (1966). *Salpa* Edwards, 1771 (Pisces): proposed suppression under the Plenary Powers in favour of *Salpa* Forskål, 1775 together with the designation of a type species for *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea): Z.N.(S.) 1651. *Bull. Zool. Nomencl.* **23**: 232; Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212 [197].

Distribution: NSW (Central E coast, Lower E coast), QLD (Central E coast, Great Barrier Reef, NE coast), TAS (Bass Strait), VIC (Bass Strait); in all tropical and temperate seas except Mediterranean Sea and West Indies.

Ecology: marine, planktonic; favours warmer waters 11.5–25.6°C, in upper 25 m layer.

Thalia longicauda (Quoy & Gaimard, 1824)

Salpa longicauda Quoy, J.R.C. & Gaimard, J.P. (1824). Zoologie pp. 497–516. in, *Le voyage autour du Monde, sur les corvettes de S.M. l' Uranie et la Physicienne 1817–1820*. Paris: Pilet Ainé. [509].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: Port Jackson, NSW.

Salpa democratica flagellifera Traustedt, M.P.A. (1885). Spolia Atlantica I. Bidrag til Kundskab om Salperne. *Danske Vid. Selsk. Skrift.* **6**(2): 337–400 pls i, ii [369] [proposed with subspecific rank in *Salpa democratica* Forskål, 1775].

Type data: syntypes ZMUC 2 specimens.

Type locality: Benguela current, Atlantic Ocean.

Compiled from secondary source: Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212.

Taxonomic decision for synonymy: Godeaux, J. (1967). Une salpe peu connue, *Thalia longicauda* (Quoy & Gaimard, 1824). *Ann. Soc. R. Zool. Belg.* **97**(2): 91–102 [91].

Distribution: NSW (Central E coast); south Indian Ocean and south Atlantic Ocean, 15°S–55°S.

Ecology: marine, planktonic; water temperature 16°–21°C.

Reference: Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212 [205].

Thalia rhinoceros Van Soest, 1975

Thalia rhinoceros Van Soest, R.W.M. (1975). Observations on taxonomy and distribution of some salps (Tunicata, Thaliacea), with descriptions of three new species. *Beaufortia* **23**: 105–130 [123].

Type data: holotype BMNH 1930.4.3.27*, paratype(s) MSUMZ TU1370*.

Type locality: west Pacific between 21°N and 21°S and 124°E and 160°W, see Van Soest, R.W.M. (1975). Observations on taxonomy and distribution of some salps (Tunicata, Thaliacea), with descriptions of three new species. *Beaufortia* **23**: 105–130.

Distribution: QLD (Great Barrier Reef); other parts of west Pacific Ocean between 21°N and 21°S.

Ecology: marine, planktonic.

Thalia rhomboides (Quoy & Gaimard, 1824)

Salpa rhomboides Quoy, J.R.C. & Gaimard, J.P. (1824). Zoologie pp. 497–516. in, *Le voyage autour du Monde, sur les corvettes de S.M. l' Uranie et la Physicienne 1817–1820*. Paris: Pilet Ainé. [510].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: between Réunion and Australia (as New Holland).

Compiled from secondary source: Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212 [199].

Salpa pyramidalis Quoy, J.R.C. & Gaimard, J.P. (1834). Zoologie, Mollusques pp. 559–626. in, *Voyages de découvertes de l' Astrolabe 1826–1829*, Vol. 3. Paris: Pilet Ainé. [593].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: Agulhas Banks, off Cape Espérance, South Africa.

Taxonomic decision for synonymy: Van Soest, R.W.M. (1973). The genus *Thalia* Blumenbach, 1798 (Tunicata, Thaliacea) with descriptions of two new species. *Beaufortia* **20**: 193–212 [199].

Distribution: Indonesia, QLD (Great Barrier Reef); Coral Sea, central Pacific Ocean and north and south West Indian Ocean.

Ecology: marine, planktonic.

Thetys Tilesius, 1802

Thetys Tilesius, W.G. von (1802). Abbildung und Beschreibung eines sonderbaren Seebeutels oder einer neuen *Thetys*—Species aus dem Atlantischen Ocean, *Thetys vagina*. *Jahrb. Naturg. Leipzig* **1**: 150–165 [150].

Type species: *Thetys vagina* Tilesius, 1802 by monotypy.

Extralimital distribution: east Atlantic Ocean between 30°S and English Channel, west Atlantic Ocean (Bay of Fundy & Bahamas), Mediterranean Sea, south and

west Indian Ocean, central south and east Pacific Ocean between California and the Bering Sea. See: Thompson, H. (1945). *Pelagic Tunicates of Australia*. Melbourne: Council for Scientific and Industrial Research 196 pp. 75 pls [136].

Thetys vagina Tilesius, 1802

Thetys vagina Tilesius, W.G. von (1802). Abbildung und Beschreibung eines sonderbaren Seebeutels oder einer neuen *Thetys*—Species aus dem Atlantischen Ocean, *Thetys vagina*. *Jahrb. Naturg. Leipzig* 1: 150–165 [156].

Type data: type status unknown.

Type locality: east Atlantic Ocean.

Salpa tilesii Cuvier, G. (1804). Mémoire sur les Thalides (*Thalia* Browne) et sur les Biphores (*Salpa* Forskål). *Ann. Mus. Hist. Nat. Paris* 4: 360–382 pl. lxxviii [360].

Type data: type status unknown.

Type locality: unknown.

Salpa costata Quoy, J.R.C. & Gaimard, J.P. (1825). Observations sur les Biphores et les Béroës, faites pendant le voyage aultour du monde de la corvette *l'Uranie*, commandée par M. Louis de Freycinet. *Ann. Sci. Nat.* 16: 28–51 [37].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: Isles Bourbon, Indian Ocean.

Compiled from secondary source: Deshayes, G.P. & Milne-Edwards, H. (1840). Tuniciers. pp. 473–541 in Lamarck, J.B.P.A. *Histoire naturelle des Animaux sans Vertèbres*. Paris: J.B. Ballière Vol. 3 2nd Edn 770 pp. [521].

Salpa herculea Dall, W.H. (1872). Descriptions of sixty new forms of mollusks from the west coast of North America and the north Pacific Ocean. *Am. J. Conch.* 7: 157–159 [157].

Type data: type status unknown.

Type locality: north Pacific Ocean.

Taxonomic decision for synonymy: Yount, J.L. (1954). The taxonomy of the Salpidae (Tunicata) of the Central Pacific Ocean. *Pac. Sci.* 8: 276–330 [314].

Distribution: Japan, New Zealand, California, TAS (Tas. coast); east Atlantic Ocean between 30°S and the English Channel, west Atlantic Ocean east of Bahamas, the Bay of Fundy, west Mediterranean Sea, Indian Ocean, west Pacific Ocean from New Zealand to Japan, east Pacific Ocean from California to Bering Sea.

Ecology: marine, planktonic; tolerates colder waters than most salps.

Traustedia Metcalf, 1918

Traustedia Metcalf, M.M. (1918). The Salpidae; a taxonomic study. *Bull. U.S. Natl Mus.* (2)100(2): 5–193 pls i–xiv [143].

Type species: *Salpa multitentaculata* Quoy & Gaimard, 1834 by monotypy.

Extralimital distribution: warmer parts of all oceans between 40°N and 30°S. See: Van Soest, R.W.M. (1975). Observations on taxonomy and distribution of some salps (Tunicata, Thaliacea), with descriptions of three new species. *Beaufortia* 23: 105–130 [107].

Traustedia multitentaculata (Quoy & Gaimard, 1834)

Salpa multitentaculata Quoy, J.R.C. & Gaimard, J.P. (1834). Zoologie, Mollusques pp. 559–626. in, *Voyages de découvertes de l'Astrolabe 1826–1829*, Vol. 3. Paris: Pilet Ainé. [596].

Type data: type status unknown MNHP (depository uncertain, not found).

Type locality: near New Ireland, east of New Guinea.

Salpa henseni Traustedt, M.P.A. (1893). Die Thaliacea der Plankton-Expedition. A. Systematische Bearbeitung. In, *Ergebn. Plankt.-Exped. Humboldt-Stiftung*. Vol. 2(E.a.A.): 1–16 pl. I. [9].

Type data: type status unknown ZMUC (depository uncertain, not found).

Type locality: off Rio de Janeiro, Atlantic Ocean.

Compiled from secondary source: Thompson, H. (1945). *Pelagic Tunicates of Australia*. Melbourne: Council for Scientific and Industrial Research 196 pp. 75 pls.

Salpa verrucosa Apstein, C. (1894). Die Thaliacea der Plankton-Expedition. B. Vertheilung der Salpen. *Ergebn. Plankt.-Exped. Humboldt-Stiftung* 2(E.a.B.): 1–68 pls ii–iv [12].

Type data: type status unknown ZMB (depository uncertain, not found).

Type locality: warmer waters of the Atlantic Ocean.

Salpa radiata Metcalf, M.M. (1918). The Salpidae; a taxonomic study. *Bull. U.S. Natl Mus.* (2)100(2): 5–193 pls i–xiv [152].

Type data: type status unknown.

Type locality: unknown.

Taxonomic decision for synonymy: Van Soest, R.W.M. (1975). Observations on taxonomy and distribution of some salps (Tunicata, Thaliacea), with descriptions of three new species. *Beaufortia* 23: 105–130 [108].

Distribution: NSW (Lower E coast), QLD (Central E coast); tropical Atlantic, Indian Ocean, west Pacific.

Ecology: marine, planktonic; favours warmer waters, down to 200 m, water temperature 14.8–23.1°C.