

The Cirripedia of New Caledonia

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The Indo-Pacific deep-sea benthos was investigated by major expeditions such as those of «Challenger» (1873-1876), «Investigator» (1884-1887), «Valdiva» (1898-1899), «Siboga» (1899-1900), «Albatross» (1907-1910) and «Galathea» (1950-52). However, none of these expeditions collected in the waters of New Caledonia and its surrounding areas. The cirripede fauna of the region was first documented through the brief report of Fischer (1884), who described the shallow water barnacles of New Caledonia. Fischer briefly listed 15 species from specimens deposited in the Musée de Bordeaux by the missionaries Montrouzier and Lambert. From that time, there was no documentation of the fauna until the latter half of the 20th century, when a rigorous collection and taxonomic program was conducted in the region supported through IRD (ORSTOM) and the Muséum national d'Histoire naturelle, Paris. Since 1978, numerous barnacle specimens have been collected in the deep waters off Vanuatu (MUSORSTOM 8 1994), New Caledonia, the Chesterfield and Loyalty Islands (BIOCAL 1985, MUSORSTOM 4 1985, LAGON 1985, MUSORSTOM 5 1986, CHALCAL 2 1986, SMIB 2 1986, SMIB 3 1987, CORAIL 2 1988, MUSORSTOM 6 1989, VAUBAN 1989, ALIS 1989, SMIB 6 1990, BERYX 2 1992, BATHUS 2 1993, SMIB 8 1993, HALIPRO 2 1996), the Wallace and Futuna Islands, Combe, Field, Tuscarora and Waterwich Banks (MUSORSTOM 7 1992), the Norfolk Ridge (SMIB 4 1989, SMIB 5 1989, BATHUS 3 1993, BATHUS 4 1994) and the Matthew and Hunter Islands (VOLSMAR 1989).

Examination of these collections has yielded an exceptional diversity of thoracican cirripedes. Buckeridge (1994, 1997) provided a comprehensive account of the deep-sea Verrucomorpha (Cirripedia) from collections made by several French cruises in the New Caledonian area and the Wallace and Futuna Islands. Seventeen species were described, including 10 new species from the New Caledonian area, of which eight are endemic. Two new coral barnacles (Balanomorpha: Pyrogomatidae) were described from the shallow waters of New Caledonia, *Parahoekia aster* Ross and Newman (1995) and *Cionophora guillaumae* Achituv (in Achituv and Newman, 2002), respectively. The living fossil, *Waikalasma boucheti* (Balanomorpha: Pachylasmatidae), was described by Buckeridge (1996) from bathyal waters of Vanuatu and a new, relictual chionelasmatine, *Chionelasmus crosnieri* (Balanomorpha: Chionelasmatidae) from the Norfolk Ridge (Buckeridge 1998).

More recently, Jones (2000) reviewed the balanomorph superfamilies Chionelasmatoidea and Pachylasmatoidea, describing 23 new taxa from material collected from New Caledonia, Vanuatu and the Wallis and Futuna Islands. Of the 21 species reported, 18 were new to science, of which 14 were considered endemic to the Vanuatu/New Caledonian region, with the remaining three occurring in a broader area that included the Futuna and Wallis Islands region. In addition, four new genera and one new subfamily were described. An exceptional diversity of species in the Pachylasmatidae (Pachylasmatinae and Hexelasmatinae) was recorded. The number of new pachylasmatines represented 46% of the known species and that of the new hexelasmatines 40%, indicating the richness of these waters.

With the further addition of barnacle species collected by these French expeditions (being described by Jones, *in prep.*) the New Caledonian cirripede fauna currently consists of 166 species in 53 genera, 19 families, five suborders, three orders (Lepadiformes, Scalpelliformes, Sessilia) and one superorder (Thoracica). Twenty-seven species (16%) are recorded from shallow water (0-100 m) and 139 (84%) from deep water (>100 m). The most diverse fauna occurs in New Caledonian waters (113 species), followed by Vanuatu (54), the Loyalty Islands (47) and the Norfolk Ridge (43). Lesser numbers are recorded at the Loyalty Ridge and the Chesterfield Islands (both with 16 species).

The cirripede fauna demonstrates a high level of endemism, with 91 species (55%) endemic to the New Caledonia area (10 shallow: 81 deep water species). Of the remainder, 12% (20 species) are widely distributed in the Indo-west Pacific faunal province (i.e. from east African shores through to the Hawaiian Islands, Pacific Ocean, and from Australia through the South China Sea to Japan). Eighteen species (11%) have cosmopolitan distributions and 11% (18 species) occur in the Pacific Ocean. Seventeen species (10%) occur in the Indo-Australian sub-province of the Indo-west Pacific region (i.e. the area defined by the Indo-Malayan Archipelago, Australia and New Guinea, to Japan) and 1% (2 species) in eastern Australia and the Western Pacific Ocean. The occurrence of three relictual species, the chionelasmates *Chionelasmus crosnieri* and *C. darwini*, and the eolasmate, *Waikalasma boucheti*, in the waters of the New Caledonian region supports the hypothesis that the south-west Pacific is a relictual area (Newman, 1991).

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List of Shallow and deep water Cirripedia of New Caledonia

Following the name of each species, the locality of the first description

Subclass **CIRRIPEDIA** Burmeister, 1834
 Superorder **THORACICA** Darwin, 1854
 Order **LEPADIFORMES** Buckeridge and Newman, 2006
 Suborder **Heteralepdomorpha** Newman, 1987

HETERALEPADIDAE Nilsson-Cantell, 1921

- Heteralepas* sp. nov. 1 (New Caledonia)
Heteralepas smilium Ren, 1983 (E China Sea)
Heteralepas utinomii Newman, 1970 (Tasmania)
Paralepas nodulosa (Broch, 1922) (Philippine Archipelago)
Paralepas dannevigii (Broch, 1922) (SE Australia)
Paralepas morula (Hoek, 1907) (Indonesia)

MICROLEPADIDAE Zevina, 1980

Microlepas echinotrichae Grygier and Newman, 1991 (New Caledonia)

Suborder **Lepadomorpha Gruvel, 1905**

OXYNASPIDIDAE Gruvel, 1905

Oxynaspis sp. nov. 1 (New Caledonia)

Oxynaspis sp. nov. 2 (New Caledonia)

Oxynaspis sp. nov. 3 (Norfolk Ridge)

Oxynaspis sp. nov. 4 (New Caledonia)

Oxynaspis sp. nov. 5 (Loyalty Ridge)

Oxynaspis sp. nov. 6 (Norfolk Ridge)

Oxynaspis sp. nov. 7 (Loyalty Islands)

Oxynaspis celata Darwin, 1851 (Madeira)

Oxynaspis connectens Broch, 1931 (Kei Is)

POECILASMATIDAE Annandale, 1909

Glyptelasma annandalei Pilsbry, 1907 (North Carolina)

Arcoscalpellum michelottianum (Seguenza, 1876) (unknown)

Glyptelasma gigas (Annandale) (Bali Straits)

Megalasma elegans Zullo and Newman, 1964 (SE Pacific Ocean)

Megalasma minus Annandale, 1906 (Andaman Sea)

Megalasma striatum Hoek, 1883 (Philippine Archipelago)

Temnaspis amygdalum (Aurivillius, 1894) (Java Sea)

Octolasmis sp. nov. 1 (New Caledonia)

Octolasmis hawaiiensis Pilsbry, 1907 (Hawaiian Islands)

Octolasmis weberi (Hoek, 1907) (Banda Sea)

LEPADIDAE Darwin, 1851

Lepas (Anatifa) anatifera Linnaeus, 1758 (unknown)

Lepas (Anatifa) ?anserifera Linnaeus, 1767 (Loyalty Islands)

Lepas (Anatifa) hilli (Leach, 1818) (S Atlantic)

Lepas (Anatifa) pectinata Spengler, 1793 (S Atlantic)

Order **SCALPELLIFORMES Buckeridge and Newman 2006**

Suborder **Scalpellomorpha Newman, 1987**

CALANTICIDAE Zevina, 1978

Scillaelepas sp. nov. 2 (Loyalty Islands)

Scillaelepas sp. nov. 3 (New Caledonia)

Scillaelepas sp. nov. 4 (Loyalty Islands)

Calantica sp. nov. B (New Caledonia)

Calantica sp. nov. 1 (New Caledonia)

Calantica sp. nov. 2 (New Caledonia)

Calantica studeri (Weltner, 1922) (NW Australia)

Crosnieriella sp. nov. (Chesterfield Islands)

Smilium vaubanianum Rosell, 1981 (Philippine Archipelago)

Smilium sp. nov. 2 (New Caledonia)

Smilium sp. nov. 3 (New Caledonia)

Smilium sp. nov. 4 (Loyalty Islands)

Smilium sp. nov. 6 (Loyalty Islands)

Smilium sp. nov. 7 (New Caledonia)

Smilium sp. nov. 8 (Norfolk Ridge)

Smilium sp. nov. 9 (Vanuatu)

Smilium acutum Hoek, 1883 (Azores and N of New Zealand)

LITHOTRYIDAE Gruvel, 1905

Lithotrya valentiana (Gray, 1825: 102) (unknown)

POLLICIPEDIDAE Gruvel, 1905

Capitulum mitella (Linnaeus, 1758: 668) (unknown)

SCALPELLIDAE Pilsbry, 1907

- Scalpellum* sp. nov. 1 (Vanuatu)
Alcockianum alcockianum (Annandale, 1905) (Andaman Sea)
Annandaleum lambda Annandale, 1910: 115 (Andaman Sea)
Gymnoscalpellum sp. nov. 1 (Loyalty Islands)
Neoscalpellum sp. nov. 1 (New Caledonia)
Neoscalpellum sp. nov. 2 (New Caledonia)
Neoscalpellum debile (Aurivillius, 1898) (E Atlantic)
Amigdoscalpellum sp. nov. 1 (New Caledonia)
Amigdoscalpellum sp. nov. 2 (Vanuatu)
Amigdoscalpellum sp. nov. 3 (Loyalty Islands)
Amigdoscalpellum sp. nov. 4 (Loyalty Islands)
Amigdoscalpellum sp. nov. 5 (Loyalty Islands)
Amigdoscalpellum praeceps (Hoek, 1907) (Moluccas)
Amigdoscalpellum vitreum (Hoek, 1883) (Japan)
Anguloscalpellum sp. 1 (New Caledonia)
Anguloscalpellum microceros Macdonald, 1929 (Caribbean Sea)
Anguloscalpellum pedunculatum (Hoek, 1883) (SW Pacific Ocean)
Arcoscalpellum sp. nov. A (Loyalty Islands)
Arcoscalpellum sp. nov. B (New Caledonia)
Arcoscalpellum sp. nov. 1 (Loyalty Islands)
Arcoscalpellum sp. nov. 2 (New Caledonia)
Arcoscalpellum sp. nov. 3 (New Caledonia)
Arcoscalpellum sp. nov. 4 (New Caledonia)
Arcoscalpellum sp. nov. 5 (Loyalty Islands)
Arcoscalpellum ?galapaganum Pilsbry, 1907 (Galapagos Islands)
Arcoscalpellum ?discolor (Hoek, 1907) (Indonesia)
Arcoscalpellum mendeleevi Zevina, 1981 (SE Indian Ocean)
Arcoscalpellum michelottianum (Seguenza, 1876) (unknown)
Arcoscalpellum moluccanum (Hoek, 1883) (Banda Sea)
Arcoscalpellum regium (Thomson, 1877) (Atlantic Ocean)
Catherinum ?perlongum (Pilsbry, 1907) (California)
Pilsbryiscalpellum sp. nov. 1 (New Caledonia)
Planoscalpellum sp. nov. 1 (Vanuatu)
Planoscalpellum sp. nov. 2 (New Caledonia)
Trianguloscalpellum sp. nov. 2 (New Caledonia)
Trianguloscalpellum balanoides (Hoek, 1883) (Banda Sea)
Trianguloscalpellum rubrum (Hoek, 1883) (Philippine Archipelago)
Verum sp. nov. 1 (New Caledonia)
Verum sp. nov. 2 (New Caledonia)
Verum sp. nov. 3 (New Caledonia)
Verum sp. nov. 4 (New Caledonia)
Verum sp. nov. 5 (New Caledonia)
Verum sp. nov. 6 (Vanuatu)
Verum sp. nov. 7 (Vanuatu)
Verum sp. nov. 8 (Vanuatu)
Verum virgatum (Hoek, 1907) (Indonesia)

Order **SESSILIA** Lamarck, 1818

Suborder **Verrucomorpha** Pilsbry, 1916

VERRUCIDAE Darwin, 1854

- Altiverruca cristallina* (Gruvel, 1907) (Andaman Islands)
Altiverruca galapagosa Zevina, 1987 (Galapagos Islands)
Altiverruca jonesae Buckeridge, 1997 (Vanuatu)

Altiverruca laeviscuta Buckeridge, 1994: 96 (New Caledonia)
Altiverruca navicula (Hoek, 1913) (Indonesia and Moluccas)
Altiverruca nitida (Hoek, 1883) (Moluccas)
Brochiverruca crosnieri Buckeridge, 1997 (Loyalty Ridge)
Brochiverruca polystriata Buckeridge, 1994 (New Caledonia)
Cameraverruca nodiscuta Buckeridge, 1994 (Chesterfield Islands)
Metaverruca defayae Buckeridge, 1994 (S of Vanuatu)
Metaverruca maclaughlinae Buckeridge, 1997 (Vanuatu)
Metaverruca norfolkensis Buckeridge, 1994 (New Caledonia)
Metaverruca pacifica Buckeridge, 1994 (Chesterfield Islands)
Metaverruca plicata Buckeridge, 1994 (Loyalty Islands)
Metaverruca recta (Aurivillius, 1898) (Azores)
Rostratoverruca intexta (Pilsbry, 1912) (Philippine Archipelago)
Rostratoverruca kruegeri (Broch, 1922) (Philippine Archipelago)

Suborder **Balanomorpha Pilsbry, 1916**
 Superfamily **Chionolasmatoidea Buckeridge, 1983**

CHIONOLASMATIDAE Buckeridge, 1983

Chionelasmus crosnieri Buckeridge, 1998 (Norfolk Ridge)
Chionelasmus darwini (Pilsbry, 1907) (Hawaiian Islands)

PACHYLASMATIDAE Utinomi, 1968 (emend. Jones, 2000)

Waikalasma boucheti Buckeridge, 1996 (Vanuatu)
Eutomolasma maclaughlinae Jones, 2000 (New Caledonia)
Eutomolasma orbiculatum Jones, 2000 (Loyalty Islands)
Microlasma fragile Jones, 2000 (Loyalty Islands)
Pachylasma bacum Jones, 2000 (Vanuatu)
Pachylasma laeviscutum Jones, 2000 (Futuna Island)
Pachylasma ovatum Jones, 2000 (New Caledonia)
Eurylasma angustum Jones, 2000 (Loyalty Islands)
Eurylasma ferulum Jones, 2000 (Norfolk Ridge)
Eurylasma pyramidale Jones, 2000 (Norfolk Ridge)
Tetrapachylasma arcuatum Jones, 2000 (Loyalty Islands)
Metalasma crassum Jones, 2000 (Loyalty Islands)
Bathylasma alearum (Foster, 1978) (SE of New Zealand)
Hexelasma aureolum Jones, 2000 (Norfolk Ridge)
Hexelasma flavidum Jones, 2000 (New Caledonia)
Hexelasma foratum Jones, 2000 (Loyalty Islands)
Hexelasma globosum Jones, 2000 (New Caledonia)
Hexelasma persicum Jones, 2000 (Loyalty Islands)
Hexelasma sandaracum Jones, 2000 (New Caledonia)

CHTHAMALIDAE Darwin, 1854

Chinochthamalus scutelliformis (Darwin, 1854) (?China Sea)

CHELONIBIIDAE Pilsbry, 1916

Chelonibia testudinaria (Linnaeus, 1758) (unknown)

PLATYLEPADIDAE Newman and Ross, 1976

Platylepas hexastylus (Fabricius, 1798) (unknown)

CORONULIDAE Leach, 1817

Coronula diadema (Linnaeus, 1767) (unknown)

TETRACLITIDAE Gruvel, 1903

Tetraclitella costata Darwin, 1854 (Philippine Archipelago)

Newmanella vitiata (Darwin, 1854) (unknown)

Tetraclita squamosa (Bruguère, 1789) (unknown)

ARCHAEOBALANIDAE Newman and Ross, 1976

Acasta sp. nov. 1 (New Caledonia)

Acasta sp. nov. 2 (New Caledonia)
Acasta sp. nov. 3 (New Caledonia)
Acasta sp. nov. 4 (Norfolk Ridge)
Acasta sp. nov. 5 (New Caledonia)
Acasta sp. nov. 6 (New Caledonia)
Acasta sp. nov. 7 (New Caledonia)
Striatobalanus amaryllis (Darwin, 1854) (unknown)
Striatobalanus tenuis (Hoek, 1883) (Philippine Archipelago)
Conopea cymbiformis (Darwin, 1854) (Madras)
Conopea ?pygmaea Broch, 1931 (Kei Islands)
Conopea sp. nov. 3 (Loyalty Islands)
Conopea sp. nov. 4 (New Caledonia)
Conopea sp. nov. 5 (Norfolk Ridge)
Conopea sp. nov. 6 (New Caledonia)
Solidobalanus (Solidobalanus) auricoma (Hoek, 1913) (Moluccas)
Solidobalanus (Solidobalanus) maldivensis (Borradaile, 1903) (E Indian Ocean)
Solidobalanus (Solidobalanus) pseudauricoma (Broch, 1931) (Philippine Archipelago and Japan)
Solidobalanus (Bathysalanus) sp. nov. (Loyalty Ridge)

PYRGOMATIDAE Gray, 1825

Cantellius iwayama (Hiro, 1938) (Palau Island)
Cionophora guillaumae Achituv, 2002 (Palau Islands)
Hiroa stubbingsi Ross and Newman, 1973: 153 (Truk Islands)
Parahoekia aster Ross and Newman, 1995 (New Caledonia)
Pyrogoma cancellata Leach, 1818 (?West Indies)

BALANIDAE Leach, 1817

Amphibalanus amphitrite amphitrite (Darwin, 1854) (S Africa)
Megabalanus ajax (Darwin, 1854) (Philippine Archipelago)

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