

## 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 20<sup>th</sup> 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 Wallis 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 Wallis 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: Chionolasmatinae) 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 Wallis and Futuna 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 chionelasmatine *Chionelasmus crosnieri* and *C. darwini*, and the eolasmatine, *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) hillii* (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 mohoccanum* (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

- Altierruca cristallina* (Gruvel, 1907) (Andaman Islands)
- Altierruca galapagosa* Zevina, 1987 (Galapagos Islands)
- Altierruca jonesae* Buckeridge, 1997 (Vanuatu)
- Altierruca laeviscuta* Buckeridge, 1994: 96 (New Caledonia)
- Altierruca navicula* (Hoek, 1913) (Indonesia and Moluccas)
- Altierruca 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* (Bruguière, 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 (Bathybalanus) 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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