Hydroids of New Caledonia from literature study

Nicole GRAVIER-BONNET
Université de La Réunion, Faculté des Sciences et Technologies, 15 Av. René Cassin, BP 7151
97715 Saint-Denis Messag Cedex 9, La Réunion
Nicole.garnier-Bonnet@univ-reunio.fr

Introduction

From a brief survey of the literature, it appears that until now only two articles were published during the last century by specialists that are dealing with New Caledonian hydroids. The first was by Redier (1966). From samples collected by Yves Plessis, he described 25 species (including 5 varieties), all already known. Most of them were from the littoral zone and were collected at low tide; a few were from deeper waters (to 40 m depth). The second article was published later on by Vervoort (1993) who studied representatives of the family Sertulariidae in several collections of the Natural History Museum of Paris. The specimens mostly originated from the following oceanographic cruises: Biocal (1985), Lagon (1984, 1985 and 1989), Musorstom 4 (1985), Chalcal 2 (1986), Biogeocal (1988), Smib 2 (1986), 4 and 5 (1989) and 6 (1990), with two additional sites, a station of the "Vauban" (1978) and a dive of H. Zibrowius (1989). Vervoort recorded 57 species of which 39 were new to Science. Most of the biological material from these cruises came from deep water: only 6 stations were from depths between 28 and 57m, and 77 were from a greater depth (125-860m).

More recently, Laboute & Richer de Forges (2004) published a book illustrating the high biodiversity of New Caledonia with many *in situ* photographs of marine plants and animals. This book includes several pages of beautiful photographs of hydroid colonies, exhibiting part of the macroscopic hydroid fauna observable underwater. It presents interesting illustrations of these animals that are usually little known with divers. Besides, pictures of several species of hydrocorals like milleporids and stylasterids, of pelagic hydroid colonies (*Velella* and *Porpita* spp) and of a hydromedusa (*Aequorea*) are also found in this book.

From these three publications and from an additional provisional list sent by Bertrand Richer de Forges, the aim for the author was to establish a reliable list of species and to comment on it bearing in mind well known data on hydroids. According to the time dedicated to this project it was not possible to study the entire literature to integrate scattered records from New Caledonia or to discuss additional data related to Pacific hydroids. Moreover, the author never personally studied the New Caledonian hydroid fauna or revised specimens in museum collections: she therefore does not feel responsible of misidentifications that could be found in the list.

Results

The documents cited below are very different regarding type and contents, even the first two taxonomic works, except for giving more or less precise data on where samples or pictures were taken. Redier (1966) gave a brief diagnosis and discussion of the species but he illustrated only some specimens in the collection by photographs, giving references of drawings by others. Vervoort (1993), on the contrary, did drawings of specimens for all species checked, and especially for new species described. Laboute & Richer de Forges (2004) gave colour photographs of specimens *in situ* but they did not discuss the species.

In the absence of time to revise specimens in collections, species checked by the hydroid specialists Redier and Vervoort are recorded here largely as cited by the authors except in case a name had to be changed for nomenclatural reasons. For the species cited by Laboute & Richer de Forges (2004), it has sometimes been necessary to correct species, genus and family names, and to re-arrange the classification. Moreover, genus names have been attributed to unidentified hydroid species due to easily recognizable characters on the photographs - as for instance the characteristic shape of the gonotheca in the genus *Gymnangium* (= *Halicornaria*) - or by similarity with species from the Indian Ocean well known to the author.

Thus a provisionally list of 109 species has been established for the hydroid fauna of New Caledonia (cf. list). The species in the list are divided in athecate and thecate hydroids; the families, genera and species are arranged inside these two groups in alphabetical order.

Table 1 shows the distribution of the 109 species in 15 athecates and 94 thecates, 16 families (athecates 8, thecates 8) and 34 genera (athecates 10, thecates 24).

Tab. 1 – Distribution of species into genera and families, and proportion of athecates versus thecates, within the entire collection including deep specimens.

	Families	Genera	Species	% species
ATHECATAE	8	10	15	14
THECATAE	8	24	94	86
TOTAL	16	34	109	100

The structure of the community is characterized by a large percentage of thecates (86%) dominating athecates (14%), and by the predominance of the family Sertulariidae (65) and Aglaopheniidae (14).

In order to compare this community with those already described from other islands, Table 2 exhibits the results of species from shallow waters only.

Tab. 2 – Distribution of species from littoral shallow waters only (0-60m).

	Families	Genera	Species	% species
ATHECATAE	8	10	15	26
THECATAE	8	18	42	74
TOTAL	16	28	57	100

When collections from deep waters (over 100m depth) are excluded, the percentage of thecates remains higher (74%) than that of the athecates (26%) but less distinctly so (less than three times higher instead of six), and the predominance of the family Sertulariidae (14 species) is shared with the family Aglaopheniidae (14 species).

Discussion

The hydroid fauna of New Caledonia exhibits high species richness (109 species). According to our present knowledge, a higher level is reached in a few places in the world involving large areas like Japan and South Africa (Gravier-Bonnet & Bourmaud, 2006a).

A characteristic of the high richness of the New Caledonian hydroid fauna is that it belongs for a greater part to deep waters. Great depths indeed have been extensively sampled during several oceanographic cruises, due to special research programs, and they provided a lot of species, about half of the total number (53 of the 109 species). Vervoort (1993) mentions 57 species for the single family Sertulariidae, of whom 39 were new for Science, with some of them belonging to a new genus (*Gonaxia*). This strikingly large number of new species brings New Caledonia in the range of the high hot spots of endemism for hydroids, if not the highest.

Regarding shallow waters, they have not been well enough prospected and too poorly studied in this archipelago, and thus we can hypothesize that species richness of the coastal areas is far below that illustrated by the present list, reaching none the less 57 species. This is confirmed by the absence in the list of several important families (like Haleciidae and Lafoeidae) and genera (like *Antennella*, here monospecicific, and *Hebella*) distributed either worldwide or between the tropics. As illustrated in Table 3, the number of families and genera is low compared to that of other locations of the tropics like Glorieuses and Juan de Nova, two islands of the Mozambique Channel in the Indian Ocean

where the shallow waters were recently studied (Gravier-Bonnet & Bourmaud, 2006a and 2006b). These numbers seem to be correlated to species richness as they increase accordingly.

Tab. 3 – Examples of number of families, genera and species and of proportion of athecates in shallow waters.

Number	New Caledonia	Glorieuses	Juan de Nova
Families	16	21	26
Genera	28	38	44
Species	57	88	95

Additional studies in shallow waters of New Caledonia will be necessary to increase present knowledge. It will be very interesting to investigate if endemism is also present at these depths as it is in deeper waters.

Results regarding community structure within the global list, with the family Sertulariidae widely dominating other families, are mainly due to two related facts: Vervoort studied this family in particular among others remaining to be studied (pers. com.), and a lot of the specimens studied were from deep waters where this family is known to be particularly well developed. About shallow waters, the dominance of the families Sertulariidae and Aglaopheniidae agrees with previous data obtained in other areas of the tropics (Gravier-Bonnet & Bourmaud, 2006a). However, as already said, it lacks entire families and genera. In addition, it seems that the microscopic fauna, usually including a lot of species, was not at all investigated until now.

In order to complete the present compilation of data, an accurate study of the literature should be done to discover scattered data dealing with New Caledonian hydroids that could be dispersed in older studies dealing with larger areas as for instance the entire Pacific.

Today, two collections of specimens from deep waters belonging to the families Lafoeidae and Aglaopheniidae have been committed respectively to Pr. W. Vervoort and Dr. Ansin Agis by the Museum of Natural History of Paris to be studied (Vervoort, pers. com.).

To conclude this brief comment, we recommend to continue hydroid studies in the rich environment of the New Caledonian archipelago where so many new species have been already discovered, with (a) much more detailed investigation of the shallow waters, including the microscopic fauna, (b) ongoing deep water explorations in the surroundings.

Aknowledgements

Many thanks are due to Wim Vervoort who amended the species list and improved the English.

REFERENCES

GRAVIER-BONNET & BOURMAUD, 2006a. Hydroids (Cnidaria, Hydrozoa) of coral reefs: preliminary results on community structure, species distribution and reproductive biology in the Îles Glorieuses (Southwest Indian Ocean). *Proceed. 10th ICRS, Okinawa, Japan*, pp. 188-196.

GRAVIER-BONNET & BOURMAUD, 2006b. Hydroids (Cnidaria, Hydrozoa) of coral reefs: preliminary results on community structure, species distribution and reproductive biology in Juan de Nova island (Southwest Indian Ocean). *Western Indian Ocean Journal of Marine Science* (accepted, mai 2006)

LABOUTE P. & B. RICHER DE FORGES, 2004. Lagons et récifs de Nouvelle-Calédonie. Ed. C. Ledru, Nouméa, 520 pp.

RÉDIER L., 1966 – Hydraires et Bryozoaires. *Cahiers du Pacifique*, **9**: 77-122.

VERVOORT W., 1993. Cnidaria, Hydrozoa, Hydroida : Hydroids from the Western Pacific (Philippines, Indonesia and New Caledonia). I: Sertulariidae (Part 1). *Mém. Mus. natn. Hist. Nat. Paris*, **158**: 89-298.

Additional references

ALLMAN. G.J., 1883. Report on the Hydroida dredged by H.M.S. Challenger during the years 1873-76. Part I. Plumularidae. Report on the scientific Results of the Voyage of H.M.S. Challenger, Zoology **7** (20):1-55, pl. 1-20.

ALLMAN. G.J., 1888. Report on the Hydroida dredged by H.M.S. Challenger during the years 1873-76. Part II. The Tubularinae, Corymorphinae, Campanularinae, Sertularinae and Thalamophora. *Rep. scient. Results Voy. Challenger, Zool.* **23** (70):1-90.

BALE, W.M., 1884. *Catalogue of the Australian hydroid zoophytes*. Australian Museum, **4**.

BALE . W.M., 1894. Furthers notes on Australian hydroids, with descriptions of some news species. *Proc. R. Soc. Vict.* n., ser., 6:93-117.

BALE W.M., 1915. Report on the Hydroida collected in the Great Australian Bight and other localities. Part 3. *Fish. Zool. (and Bot.) res. Fishing Exper. F. I. S. «Endeavour» 1909-1914* **3** (5):241-336.

BALE . W.M., 1919. Further Notes on Australian Hydroids. IV. *Proc. R. Soc. Vict.* n. ser., **38**:13-23.

BILLARD. A., 1925. Les Hydroïdes de l'expédition du «Siboga». II.Synthecidae et Sertularidae. *Siboga-Expeditie, Monogr.* 7b:117-232.

BOUILLON J., 1978. Hydroméduses de la mer de Bismarck (Papouasie, Nouvelle-Guinée). 1 - Anthomedusae Capitata (Hydrozoa-Cnidaria). *Cah. Biol. mar.,* **19** (3): 249-297.

BOUILLON J., 1978. Hydroméduses de la mer de Bismarck (Papouasie, Nouvelle-Guinée). 2 – Limnomedusa, Narcomedusa, Trachymedusa et Laingiomedusa (sous-classe nov.). *Cah. Biol. mar.,* **19**: 473-483.

BOUILLON J., 1980. Hydroméduses de la mer de Bismarck (Papouasie, Nouvelle-Guinée). 3 - Anthomedusae Filifera (Hydrozoa-Cnidaria). *Cah. Biol. mar.,* **21**: 307-344.

BOUILLON J 1984. Hydroméduses de la mer de Bismarck (Papouasie, Nouvelle-Guinée). 4 - Leptomedusae (Hydrozoa-Cnidaria). Indo-Malayan Zool. **1**: 25-112.

COOKE. W.J., 1977. Reef and shore fauna of Hawaii. Section 1: Protozoa trough Ctenophora. *Bernice P. Bishop Museum, Spec. Publ.* **64** (1):70-104.

COOKE . W.J., 1975. Shallow Waters Hydroids from Enewetak Atoll, Marshall Islands. *Micronesia*, **11** (1): 85-108.

GIBBONS M. J. and J. S. RYLAND, 1989. Intertidal and shallow water hydroids from Fiji. I. Athecata to Sertulariidae. *Mem. Queensl. Mus.*, **27** (2): 377-432.

HARGITT C.W., 1924. Hydroids of the Philippine Islands. *Philip. J. Sci.*, **24** (4):467-505.

HIROHITO, 1969. Some hydroids of the Amakusa islands. *Publ. Biol. Lab. Imperial Household*, **9**: 1-32.

HIROHITO, 1988. The Hydroids of Sagami Bay I Athecata. Biological Laboratory Imperial Household Tokyo Japan, pp 1-179, pl. 1-4

HIROHITO, 1995. The Hydroids of Sagami Bay II Thecata. Biological Laboratory Imperial Household, Tokio, Japan, pp 1-355, pl. 1-13.

KRAMP P. L., 1961. Synopsis of the medusae of the world. *J. Mar. Biol. Assoc. UK*, **40**: 469pp.

KRAMP P. L., 1965. The Hydromedusae of the Pacific and Indian oceans. *Dana Report*, **63**: 1-161.

KRAMP P. L., 1968. The hydromedusae of the Pacific and Indian Oceans. *Dana Report*, **72**: 1-200.

MERGNER H., 1987. Hydroids as indicator species of environmental factors on coral reefs. In: J. Bouillon *et al.* (eds) Modern Trends in the Systematics, Ecology, and Evolution of Hydroids and Hydromedusae, Oxford University Press, pp 171-184

PENNYCUIK. P.R., 1959. Faunistic records from Queensland. Part V.- Marine and brackish water hydroids. *Pap. Dept. Zool. Univ. Qd* 1(6):141-210.

RAZAK T.B. and B.W. HOEKSEMA, 2003. The hydrocoral genus *Millepora* (Hydrozoa: Capitata: Milleporidae) in Indonesia. *Zool. Verh. Leiden*, 345: 313-336.

RÉDIER L., 1971. Recherches sur les Hydraires et les Bryozoaires de la Polynésie française. *Cahiers du Pacifique*, **15**: 136-162.

VERVOORT W. and P. Vasseur, 1977. Hydroids from French Polynesia with notes on distribution and ecology. - *Zool. Verh. Leiden* **159**: 1-98.

WHITELEGGE T., 1899. The Hydrozoa, Scyphozoa, Actinozoa and Vermes of Funafuti. *Mem. Australian Mus.*, **3**: 71-394, pl. 23.

List of Hydroids

Order ATHECATAE (ANTHOMEDUSAE)

Family EUDENDRIIDAE

Eudendrium capillare Alder, 1856

Family HYDRACTINIDAE

Hydractinia carnea Sars, 1846

? Hydractinia sp.

Family HYDROCERATINIDAE

Clathrozoon wilsoni (Spencer, 1891)

Family MILLEPORIDAE

Millepora ? tenera Boschma, 1949

Millepora ? platyphylla Hemprich & Ehrenberg, 1834

Family PENNARIIDAE

Pennaria disticha (Goldfuss, 1820)

Family SOLANDERIDAE

Solanderia secunda minima (Hickson, 1903)

Family STYLASTERIDAE

Distichopora violacea (Pallas, 1766)

Stylaster brunneus Boschma, 1970

Stylaster sanguineus Valenciennes in Milne-Edwards and Haime, 1850

Stylaster sp. 1

Stylaster sp. 2

Family PORPITIDAE

Porpita pacifica Lesson, 1826

Velella velella (Linné, 1758)

Order THECATAE (LEPTOMEDUSAE)

Family AGLAOPHENIIDAE

Aglaophenia cupressina Lamouroux, 1816

Aglaophenia pluma Linné, 1758

Aglaophenia sibogae Billard, 1913

Aglaophenia postdentata Billard, 1913

Gymnangium sp. 1

? Gymnangium sp. 2

Macrorhynchia philippina (Kirchenpauer, 1872)

Macrorhynchia phoenicea (Busk, 1852)

Macrorhynchia sibogae (Billard, 1913)

Macrorhynchia sp.

Lytocarpia brevirostris (Busk, 1852)

Lytocarpia incisa (Coughtrey, 1875)

Lytocarpia orientalis Billard, 1908

Lytocarpia sp.

Family AEQUOREIDAE

Aequorea cf. australis Uchida, 1947

Family CAMPANULARIIDAE

Clytia gracilis (Sars, 1851)

Family HALOPTERIDIDAE

Antennella siliquosa (Hincks, 1877)

Halopteris diaphana (Heller, 1868)

Halopteris buskii (Bale, 1884)

Halopteris peculiaris (Billard, 1913)

Halopteris campunula (Busk, 1852)

Halopteris polymorpha Billard, 1913

Family PLUMULARIIDAE

Plumularia crater Billard, 1913
Plumularia habereri Stechow, 1909
Plumularia scabra Lamarck, 1816

Family SERTULARIIDAE

**Abietinaria immersa* Vervoort, 1993
Dictyocladium biseriale Vervoort, 1993
Diphasia attenuata (Hincks, 1868)
Diphasia digitalis (Busk, 1852)
Dynamena crisioides Lamouroux, 1824
Dynamena disticha (Bosc, 1802)
Dynamena heterodonta (Jarvis, 1922)
Dynamena quadridentata (Ellis & Solander, 1786)
Geminella ceramensis Billard, 1925
**Gonaxia amphorifera* Vervoort, 1993
**Gonaxia ampullacea* Vervoort, 1993
**Gonaxia anonyma* Vervoort, 1993
**Gonaxia bulbifera* Vervoort, 1993
**Gonaxia compacta* Vervoort, 1993
**Gonaxia complexa* Vervoort, 1993
**Gonaxia crassa* Vervoort, 1993
**Gonaxia crassicaulis* Vervoort, 1993
**Gonaxia crusgalli* Vervoort, 1993
**Gonaxia elegans* Vervoort, 1993
**Gonaxia errans* Vervoort, 1993
**Gonaxia intermedia* Vervoort, 1993
**Gonaxia pachyclados* Vervoort, 1993
**Gonaxia persimilis* Vervoort, 1993
**Gonaxia robusta* Vervoort, 1993
**Gonaxia scalariformis* Vervoort, 1993
**Gonaxia similis* Vervoort, 1993
**Gonaxia sinuosa* Vervoort, 1993
**Gonaxia stricta* Vervoort, 1993
**Hydrallmania falcata* (Linnaeus, 1758)
Idiellana pristis (Lamouroux, 1816)
Salacia tetracythara Lamouroux, 1816
**Sertularella acutidentata acutidentata* Billard, 1919
**Sertularella acutidentata profunda* Vervoort, 1993
**Sertularella anguina* Vervoort, 1993
**Sertularella areyi* Nutting, 1904
**Sertularella billardi* Vervoort, 1993
**Sertularella bipectinata* Vervoort, 1993
**Sertularella catena (*Allman, 1888)
**Sertularella crenulata* Nutting, 1905
Sertularella diaphana (Allman, 1885)
**Sertularella geodiae* Totton, 1930
**Sertularella helenae* Vervoort, 1993
Sertularella intricata Billard, 1919
**Sertularella leiocarpa* (Allman, 1888)
**Sertularella leiocarpoides* Vervoort, 1993
**Sertularella novaecaledoniae* Vervoort, 1993
**Sertularella paucicostata* Vervoort, 1993
**Sertularella pseudocostata* Vervoort, 1993
Sertularella polyzonias Linné, 1758
**Sertularella quadridens cornuta* Ritchie, 1909

Sertularella sinensis Jaderholm, 1896
Sertularella tenella (Alder, 1856)
Sertularia distans Lamouroux, 1816
**Symplectoscyphus bathyalis* Vervoort, 1972
**Symplectoscyphus bathypacificus* Vervoort, 1993
**Symplectoscyphus commensalis* Vervoort, 1993
**Symplectoscyphus effusus* Vervoort, 1993
**Symplectoscyphus jonhstoni subtropicus* Ralph, 1961
**Symplectoscyphus jonhstoni tropicus* Vervoort, 1993
**Symplectoscyphus pedunculatus* (Billard, 1919)
**Symplectoscyphus pseudocolumnarius* Vervoort, 1993
**Symplectoscyphus cf. pseudodivaricatus* Ralph, 1961
**Symplectoscyphus ralphae* Vervoort, 1993
**Symplectoscyphus tuba* Vervoort, 1993
**Symplectoscyphus watsonae* Vervoort, 1993

Family SYNTHECIIDAE

Synthecium samauense Billard, 1925

Family THYROSCYPHIDAE

Thyroscyphus fruticosus (Esper, 1793)
**Thyroscyphus scorpioides* Vervoort, 1993
Lytoscyphus junceus (Allman, 1876)

* Species checked in deep waters only (125-860m) (Vervoort, 1993)

DOCUMENTS
SCIENTIFIQUES
et TECHNIQUES

II7

Volume spécial

COMPENDIUM of marine species from New Caledonia

Edited by
CLAUDE E. PAYRI
Bertrand RICHER DE FORGES

IRD
Institut de recherche
pour le développement

CENTRE DE NOUMÉA

DOCUMENTS
SCIENTIFIQUES
et TECHNIQUES

Institut de recherche pour le développement

Publication éditée par:
Centre IRD de Nouméa
BP A5, 98848 Nouméa CEDEX
Nouvelle-Calédonie
Téléphone: (687) 26 10 00
Fax: (687) 26 43 26

L'IRD propose des programmes regroupés en 5 départements pluridisciplinaires:

I DME Département milieux et environnement
II DRV Département ressources vivantes
III DSS Département sociétés et santé
IV DEV Département expertise et valorisation
V DSF Département du soutien et de la formation des communautés scientifiques du Sud

Modèle de référence bibliographique à cette revue:
Adjeroud M. *et al.*, 2000. Premiers résultats concernant le benthos et les poissons au cours des missions TYPATOLL. *Doc. Sci. Tech.* II 3, 125 p.

ISSN 1297-9635
Numéro II7 - **Octobre 2006**

Distribué pour le Pacifique par le Centre de Nouméa.

Première de couverture : Récif corallien (Côte Ouest, NC) © IRD/C.Geoffray
Vignettes : voir les planches photographiques

Quatrième de couverture : *Platygyra sinensis* © IRD/C.Geoffray

Matériel de plongée sous-marine © IRD/C.Geoffray	L'Aldric, moyen naviguant de l'IRD © IRD/J.-M. Boré
Récoltes et photographies sous-marines en scaphandre autonome © IRD/J.-L. Menou	Traitement des récoltes en laboratoire © IRD/L. Mattio

CONCEPTION/MAQUETTE/MISE EN PAGE — JEAN PIERRE MERMOUD
MAQUETTE DE COUVERTURE — CATHY GEOFFRAY/ MINA VILAYLECK
PLANCHES PHOTOGRAPHIQUES — CATHY GEOFFRAY/JEAN-LOUIS MENOU/GEORGES BARGIBANT
TRAITEMENT DES PHOTOGRAPHIES — NOËL GALAUD

La traduction en anglais des textes d'introduction, des Ascidies et des Echinodermes a été assurée par EMMA ROCHELLE-NEWALL, la préface par MINA VILAYLECK.

Ce document a été produit par le Service ISC, imprimé par le Service de Reprographie du Centre IRD de Nouméa et relié avec l'aimable autorisation de la CPS, financé par le Ministère de la Recherche et de la Technologie.

ISSN 1297-9635
Numéro **II7 - Octobre 2006**

COMPENDIUM OF MARINE SPECIES FROM NEW CALEDONIA

Edited by
CLAUDE E. PAYRI, BERTRAND RICHER DE FORGES