

Zoantharia of New Caledonia

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Although present in New Caledonia, zoanthids were poorly studied in that region. The “Mission Ranson en Océanie” in 1952 collected one species from New Caledonia. This sample was described as new species in 1956 by Pax and Muller. In 1979, Dr. B. Thomassin collected one sample and Dr. J. Picard in 1980 sampled two colonies. Unfortunately this material was not described and studied at the time of collection. After more than 20 years in formalin and stored in poor conditions, this material is of little scientific use. More recently, a few deep sea samples were collected by the Dr. B. Richer de Forges during different collecting missions. In 1989, two missions (SMIB4 and MUSORSTOM4) a very special zoanthid associated to a eunicid worm was observed *in situ* and collected. In 2005, during the EBISCO cruise three samples of zoanthids belonging to two different species were sampled. A mission focusing on new caledonian zoanthids was held in November 2006. The samples collected and analysed on this occasion completed the few data already available, mainly for the south-west part of the lagoon.

The actual status of zoanthid taxonomy is very confused due to many inaccurate species description, lost type samples and mainly due to the lack of taxonomically relevant morphological characters. The development of the molecular techniques offers a good alternative to histological and cytological methods. The future of zoanthid taxonomy probably relies on a combination of molecular, morphological and ecological characters (Sinniger *et al.* 2005, Reimer *et al.* 2004).

REFERENCES

- CARLGREN O. 1923. Ceriantharia und Zoantharia der Deutschen Tiefsee-Expedition. Deutsche Tiefsee-Expedition 1898-1899 **19** (7): 243-337.
- LABOUE P. & RICHER DE FORGES B. 2004. Lagons et récifs de Nouvelle-Calédonie, ed. C. Ledru, Nouméa, 520 pp.
- MUIRHEAD A. & RYLAND J.S. 1985. A review of the genus *Isaurus* Gray, 1828 (Zoanthidea), including new records from Fiji. *Journal of Natural History* **19**:323-335.
- PAX F. & MULLER I. 1956. Zoantharien der “Mission Ranson en Océanie” (1952). *Mémoires du Muséum National d’Histoire Naturelle*, (A) **8** (6) :225-248.
- REIMER J.D., ONO S., FUJIWARA Y., TAKISHITA K. & TSUKAHARA J. 2004. Reconsidering *Zoanthus* spp. diversity: Molecular evidence of conspecificity within four previously presumed species. *Zoological Science* **21**: 517-525.
- REIMER J.D., ONO S., TAKISHITA K., TSUKAHARA J. & MARUYAMA T. 2006. Molecular evidence suggesting species in zoanthid genera *Palythoa* and *Protopalythoa* (Anthozoa: Hexacorallia) are congeneric. *Zoological Science* **23**: 87-94.
- RYLAND J.S., BRASSEUR M.M. & LANCASTER J.E. 2004. Use of cnidae in taxonomy: implications from a study of *Acrozoanthus australiae* (Hexacorallia, Zoanthidea). *Journal of Natural History* **38**: 1193-1223
- SINNIGER F., MONTOYA-BURGOS J.I., CHEVALDONNE P. & PAWLOWSKI J. 2005. Phylogeny of the order Zoantharia (Anthozoa, Hexacorallia) based on the mitochondrial genes. *Marine Biology* **147**: 1121-1128.

Annotated list of the taxa

* indicates deep sea taxa.

Suborder Macrocnemina

Family Epizoanthidae Delage and Hirouard, 1901

Epizoanthus illoricatus Tichbierek 1930: This atypical *Epizoanthus* lives associated to eunicid worms tubes. This association seems not to disturb the worm as all the samples collected were containing alive eunicid worms. Found from 15 m to 60 m and probably below, this species is common on steep slopes, inside and outside of the lagoon exposed to water movement. This zoanthid is often confused with a *Parazoanthus*, but its association is typical in the area concerned. Moreover, this species can be distinguished from *Parazoanthus* species by the white tip of its tentacles.

**Epizoanthus* aff. *abyssorum*: According to Carlgren (1923) those *Epizoanthus* specimens would belong to the species *abyssorum*. However, this species was found only in north-east Atlantic. As we had no atlantic samples to compare, we cannot be totally confident on the specific status of those samples. This zoanthid grows on shells inhabited by pagurids forming a carcinoecium. The greyish-yellow coloration is given by the incrustations composed of Globigerina ooze (sediment mainly composed of planktonic foraminiferans tests). The colonies are composed of 7 side polyps and 1 to 3 dorsal polyps. The samples were collected off New Caledonia around SE Fairway between 883 m and 957 m deep. Similar samples were collected in Vanuatu during the mission "Santo" in 2006.

Epizoanthus spp.: Although no shallow water specimens were found yet in New Caledonia, the presence of this zoanthid is very likely below 10 m, maybe even higher. As those organisms once contracted look like a sandy crust on the substrate they are often ignored or missed.

Family Parazoanthidae Delage and Hirouard, 1901

Taxonomical note: This family is under revision, in a close future probably only the sponge associated parazoanthids will remain in the genus *Parazoanthus*. Species growing on hydrozoans (such as *P. gracilis* here) will probably be transferred into a new genus and possibly a new family. Deep sea species growing on hexactinellid spicules will be also probably transferred into a new genus.

*Undetermined Parazoanthidae: This epizoic zoanthid groups within the Parazoanthidae family. The hexactinellid spicule used as substrate is characteristic for a few species of *Epizoanthus* and *Isozoanthus* (Carlgren 1923). If molecular results exclude clearly this species from the genus *Epizoanthus*, the situation is less clear concerning *Isozoanthus*. More histological and molecular analyses would be necessary to answer this question. A polychaete worm is associated to both samples. Such an association (with *Eunice mindanavensis*) was also found by Carlgren with *E. fatuus*, *E. planus*, *I. valdiviae*, *I. arenosus* and *I. africanus*.

"*Parazoanthus*" *gracilis* (Lwowsky 1913): This species is growing usually on the hydrozoan *Plumularia habereri*. Specimens were found in the Indo-Pacific in Madagascar, Japan, Indonesia and New Caledonia. In New Caledonia this species was seen in various abundances in different localities all around the mainland as well as around Ouvea in the Loyalty Islands. It is found between 8 and 40 m, always in current zones (channels, canyons...). The polyps are rather small (2-4 mm high, 2-4 mm oral disc diameter) and the coloration varies from yellow to dark brown, probably due to the probable presence of *Symbiodinium* dinoflagellates.

Parazoanthus sp.: This sponge associated *Parazoanthus* was found in the South West of the lagoon. This species can be associated to *Clathrina* cf. *jullienii* at very shallow depth (5-25 m) on the edge of the reef flat or different sponges (Niphatidae? and orange encrusting sponges) at depths ranging from 3-15 m.

Parazoanthus sp.: Very similar if identical in appearance to the previous species, this *Parazoanthus* lives deeper (30-52 m). One colony was collected on a red encrusting sponge at 52 m depth, while another one was collected under an overhang on an encrusting orange sponge at 32 m. Molecular studies differentiate clearly the two species and substrate analyses (identification of the sponge species colonised) might be a potential tool to discriminate those species.

Parazoanthus spp.: Although no shallow water specimens were found yet in New Caledonia, the presence of species associated with hydrozoans or diverse anthozoans is sure. A picture in Laboute & Richer de Forges (2004) shows a “*Parazoanthus*” colonising a dead gorgonians skeleton. For the moment only one colony of this zoanthid is known in New Caledonia. The substrate used could be a characteristic of the genus *Savalia*, however this genus secretes its own skeleton and is usually restricted to temperate or deep sea waters. Minute examination of this zoanthid would be necessary to identify its genus. No similar species were found until now in the shallow tropical Pacific.

Suborder Brachycnemina

Family Sphenopidae Hertwig, 1882

Sphenopus marsupialis (Gmelin 1791): The single non-colonial brachycnemic zoanthid. It lives buried in the sand with tentacles expanding mostly at night. This species appears to be abundant in the canal Woodin but probably as well in other similar environments such as the “Chenal des 5 miles”.

Palythoa spp.: This genus includes the former genus *Protopalythoa* (Reimer *et al.* 2006). The single zoanthid species from New Caledonia described in the literature is *Palythoa poeciloderma* (Pax and Muller 1956). Three different specimens belonging to this genus were collected in intertidal reef environment by Dr. J. Piccard in 1980. However, due to conservation issues, those samples are unidentifiable at the specific level. The development of the coenenchyme of this colonial zoanthid is very variable among species. In some species the polyps can be totally immersed in the coenenchyme whereas in others the coenenchyme will be reduced to a thin basal layer encrusting the substrate. A few species of this genus, additional to those described below, are surely present in New Caledonia shallow waters.

Palythoa (Protopalythoa) mutuki (Haddon and Shackleton): This large species possess polyps up to 40 mm length for 13 mm diameter with expanded oral disk up to 20 mm. The length of the numerous tentacles (around 70) is about half of the expanded oral disk diameter. The column is usually heavily incrustated with sand and the oral disk colour is usually brown with some fluorescent (most of the time blue or green) radial marks. This species was regularly found between 2 m and 10 m.

Palythoa (Protopalythoa) heliodiscus (Ryland and Lancaster 2003): smaller than the previous species (up to 17 mm length for 6 mm column diameter with an open oral disk diameter of about 15 mm). The numerous (up to 100) tentacles are shorter, reaching at the most 20% of the expanded oral disk diameter. They are often masked by the well developed light tubercles formed by the knobbed capitular ridges. The column is also incrustated with sand (like in all Sphenopidae), but usually less abundant and thinner particles are incorporated. The colour of the oral disk is brown with lighter radial stripes. Two polyps of this species were found in only one locality, on the external slope of the reef at 35 m.

This depth is unusual for this species although it was seen at similar depth in Madagascar. The possibility of a secondary transport of the colony from shallow waters to deeper environment (through a storm for exemple) is unlikely considering the verticality of the locality where the polyps were found.

Palythoa aff. *caesia*: this zoanthid is the most common zoanthid found in shallow waters. The distinction with *P. tuberculosa* (Hertwig 1888) is unclear, and those two species might be synonymous. We use here *P. caesia* Dana 1846 as this species was clearly identified as the commonest species from the Great Barrier Reef. The polyps are deeply embedded in the coenenchyme. When expanded, only the ridges of the oral disk bearing numerous short tentacles overgrow the coenenchyme. The diameter of the polyps is up to 15 mm and the height of a colony can reach up to 65 mm. Colony size can measure up to 30 cm diameter over this size colonies usually split into smaller daughter colonies. The colour is variable from light to darker brown, a few colonies showed a fluorescent yellow colour. We do not know yet if this is a morphotype of the same species or a distinct species.

Family Zoanthidae Gray, 1840

Zoanthus spp.: They are some of the most common zoanthids present in tropical waters. A *Zoanthus* specimen was collected by Dr. B. Thomassin in 1979. This sample comes from the Isle of Pines but no indications on the depth are available. However this genus is likely to be found in shallow waters as it lives in symbiosis with *Symbiodinium* dinoflagellates. A few species of this genus are surely present in New Caledonia shallow waters. Two unidentified species were found in the SW lagoon, between 5 m and 10 m depth.

Isaurus spp: Characterised by an asymmetric column, the polyps of this genus are open only at night. Three species (*I. tuberculatus*, *I. cliftoni* and *I. maculatus*) were recorded from Fiji (Muirhead and Ryland 1985), they could be present in New Caledonia especially *I. tuberculatus* and *I. cliftoni* which are present in Australia too. One species was photographed in New Caledonia (Laboute & Richer de Forges, 2004), probably *I. tuberculatus*, however this zoanthid is not common and very difficult to find.

Acrozoanthus australiae Saville-Kent 1893: This monospecific genus is very similar to *Zoanthus* from which it differs mainly by the epizoic status, growing on eunicid worm tubes. Differences in asexual reproduction and cnidome composition distinguish this genus from other zoanthidae. It is known from Indonesia and Great Barrier Reef (Ryland *et al.* 2004), thus its presence in New Caledonia is possible.

INCERTAE SEDIS

*Undescribed zoanthid: This very particular zoanthid was collected in different localities (South of the île des Pins, Sponge Bank) at depth ranging between 490 and 650m. This zoanthid build arborescent colonies in association with a eunicid worm. It is not clear until now if the zoanthid colonises the worm's tube or if the worm installs himself in the zoanthid colonies. Observation of the samples would rather suggest that the arborescent shape of the colony results of the zoanthid as branches without worm were found. Polyps are regularly distributed at the surface of the very dense coenenchyme building the arborescent structure. The solidity of the coenenchyme results in the extremely important incrustation of sand particle. No similar species were ever collected or observed until now in other parts of the world. Unfortunately, due to formalin fixation those samples were not suitable for molecular analyses. This zoanthid was photographed in situ and mentioned, with the pictures, in Laboute and Richer de Forges (2004).

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