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# Hydrozoa, fjord Comau, Chile.

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**Abstract**
The shallow-water hydrozoan fauna of fjord Comau is surveyed. A total of thirty three species were recorded. They have been assigned to eight families of Athecata, eight families of Thecata, two families of Narcomedusae and one family of Trachymedusae. Their ecology is briefly discussed.

## Introduction

The Comau fjord (42°10' to 42°50' N and 72°40' to 72°60' W) is located in the northernmost part of the Chilean fjords region, which extends from 41°30' S to 56° S (Figure 1). It extends over more than 40 km, predominantly from South to North, turning towards the West at its connection with the Gulf of Ancud through the Comau channel. To the West, the fjord is limited by the Peninsula Huequi and to the East by the continental coast. In the northern part of the eastern shore two lateral small fjords, Cahuelmo and Quintupeu, branch off with slightly more than 6 km length each. Apart from Liliguapi Island, at the mouth of the Comau channel, there are no islands throughout the interior of the fjord.

The fjord Comau is characterized by steep slopes, both under and above the water line. The average depth of the fjord is in excess of 250 m, with a maximum of 490 m in the Comau channel. Although no proper sill can be defined from the bathymetrical charts, at the mouth depth decreases rapidly from almost 500 to around 300 m. Rocky granite substratum dominates the slopes which, in less steep portions, can be covered by shell or coral rubble, organic and inorganic material of terrestrial origin or by fine sediment from the water column. Larger sediment accumulations can only be found at river mouths, at very few beaches in protected bays and in the deeper parts towards the centre of the fjord.

Swell from the Gulf of Ancud rarely enters the fjord, due to its curved shape. The fjord receives freshwater from precipitation and rivers fluxes during winter and early spring (September-October) months. This freshwater influx produces a low salinity layer that varies between 0.5 m (in summer) and 10 m (at the head of the fjord, in winter) and shows salinities as low as 2 ‰.

Tides are diurnal, with maximum amplitude of more than 7 m. Hence, the phytal zone is not well developed. Below the halocline, however, one finds various types of flourishing benthic communities obviously dominated by sessile filtering organisms: large amounts of cnidarians such as sea anemones, corals and gorgonians, as well as sponges mixed with brachiopods in comparatively shallow water cover the rocky slopes falling steeply into the depths of the fjord ("cold water reefs", Försterra and Häussermann 2003; Häussermann and Försterra 2007).

As a part of the studies on Comau fjord, coordinated by the Huinay Scientific Field Station, focusing on an inventory of the fjord's invertebrate fauna (Cairns et al. 2005; Schrödl et al. 2005; Galea 2006a; b; Galea and Leclère 2007; Hajdu et al. 2006; Melzer et al. 2006; Schwabe et al. 2006; van Ofwegen et al. 2006) we have used SCUBA sampling techniques to study the sub-littoral hydrozoan fauna at the steep rocky slopes, have done plankton tows to survey hydromedusae, and give a survey of the collected species and their relative abundance.

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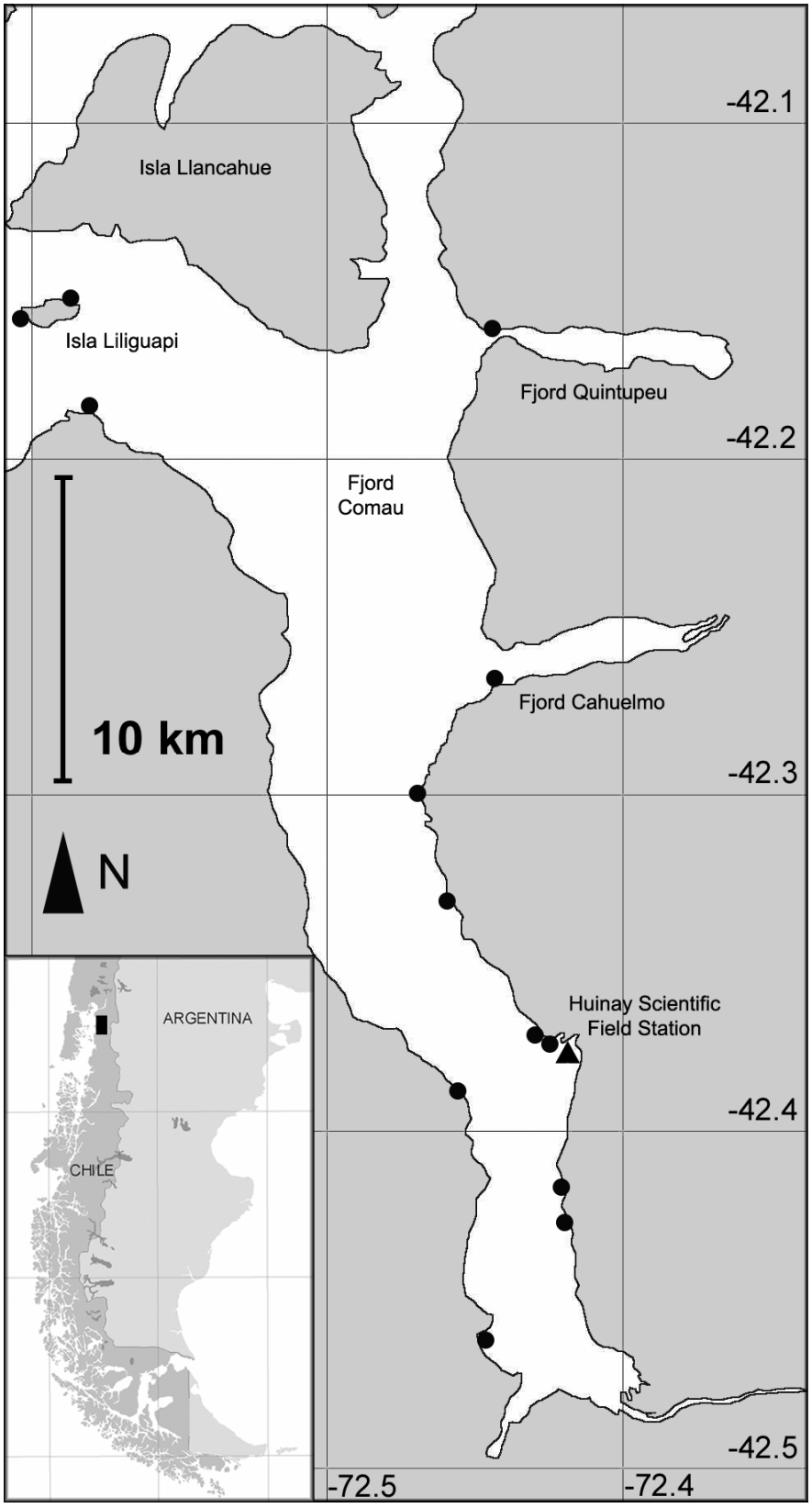


**Figure 1**. Map of fjord Comau.

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### Material and methods

The hydroid material was collected in the subtidal by SCUBA diving down to depths of 40 m. Besides the macroscopic hydroid colonies removed directly from rocks, other substrates such as algae, mollusk shells, crabs, ropes, buoys, wood etc. were examined for the presence of hydroids. Medusae were collected by towing a plankton net, either vertically or horizontally, at different depths (50-0 m), from a boat. Plankton hauls were regularly carried out in January and February 2006; additional samplings were realized in November 2006. The collected specimens were anesthetized with magnesium chloride, then fixed and preserved either in formalin or 70% ethanol. When possible, the specimens were studied alive. The taxonomic identifications were made on the literature specified in the references.

### Results and discussion

The species of hydroids and hydromedusae collected from the fjord Comau are listed in Table 1.

**Table 1.** List of families, genera and species of hydrozoans from the fjord Comau. Records of the polyp (P) and/or medusa (M) stages are indicated.

| Family | Genus, species | Sampled stage(s) |
|---|---|---|
| Bougainvilliidae Luetken, 1850 | *Bougainvillia muscoides* (M. Sars, 1846) | P + M |
| | *Bougainvillia pyramidata* (Forbes & Goodsir, 1851) | P + M |
| Oceaniidae Eschscholtz, 1829 | *Cordylophora caspia* (Pallas, 1771) | P |
| Hydractiniidae L. Agassiz, 1862 | *Hydractinia borealis* (Mayer, 1900) | P + M |
| | *Hydractinia pacifica* Hartlaub, 1905 | P |
| | *Hydractinia tenuis* (Browne, 1902) | M |
| Pandeidae Haeckel, 1879 | *Leuckartiara octona* (Fleming, 1823) | M |
| Proboscidactylidae Hand & Hendrickson, 1950 | *Proboscidactyla stellata* (Forbes, 1846) | M |
| Corymorphidae Allman, 1872 | *Euphysa aurata* Forbes, 1848 | M |
| Corynidae Johnston, 1836 | *Coryne eximia* Allman, 1859 | P + M |
| Tubulariidae Allman, 1864 | *Ectopleura dumortieri* (van Beneden, 1844) | P + M |
| | *Hybocodon chilensis* Hartlaub, 1905 | P + M |
| Phialellidae Russell, 1953 | *Phialella falklandica* Browne, 1902 | M |
| | *Phialella quadrata* (Forbes, 1848) | M |
| Tiarannidae Russell, 1940 | *Modeeria rotunda* (Quoi & Gaimard, 1827) | P |
| Lafoeidae Hincks, 1868 | *Filellum serratum* (Clarke, 1879) | P |
| | *Lafoea dumosa* (Fleming, 1828) | P |
| Haleciidae Hincks, 1868 | *Halecium delicatulum* Coughtrey, 1876 | P |
| | *Halecium* sp. | P |
| Sertulariidae Lamouroux, 1812 | *Sertularella gayi* (Lamouroux, 1821) | P |
| | *Sertularella polyzonias* (Linnaeus, 1758) | P |
| | *Symplectoscyphus filiformis* (Allman, 1888) | P |
| Halopteridídae Millard, 1962 | *Halopteris schucherti* Galea, 2006 | P |
| Plumulariidae Hincks, 1868 | *Plumularia setacea* (Linnaeus, 1758) | P |
| Campanulariidae Hincks, 1868 | *Clytia linearis* (Thornely, 1900) | P |
| | *Clytia simplex* (Browne, 1902) | M |
| | *Obelia dichotoma* (Linnaeus, 1758) | P |
| | *Obelia geniculata* (Linnaeus, 1758) | P |
| | *Obelia* spp. (*O. lucifera* and *O. nigra* types) | M |
| Aeginidae Gegenbaur, 1856 | *Solmundella bitentaculata* (Quoi & Gaimard, 1833) | M |
| Cuninidae Bigelow, 1913 | *Cunina octonaria* McCrady, 1857 | M |
| Rhopalonematidae Russell, 1953 | *Amphogona apicata* Kramp, 1957 | M |

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A total of thirty three hydrozoan species, including both hydroids and hydromedusae, are recorded from the fjord Comau, southern Chile. Of these, six species are new records for Chile, i.e. *Bougainvillia muscoides*, *B. pyramidata*, *Cordylophora caspia*, *Hydractinia tenuis*, *Sertularella gayi* and *Cunina octonaria*. One species, belonging to genus *Halecium*, is likely an undescribed taxon. Three hydroid species are endemic to Patagonia, i.e. *Hydractinia pacifica*, *Symplectoscyphus filiformis* and *Halopteris schucherti*. *Hybocodon chilensis*, previously found in Chile, was also recorded from New Zealand (see Galea 2006b). *Hydractinia borealis* has been recorded from both hemispheres (Schuchert 2001, Pagès and Orejas 1999), while *Phialella falklandica* and *Amphogona apicata* are found in the temperate to sub-Antarctic regions of the southern hemisphere (Kramp 1968). Finally, the remaining species are cosmopolitan or near-cosmopolitan.

Hydroids of *B. muscoides* and *B. pyramidata* were mainly found on hard substrates (essentially rocks and concretions), but also on mollusk shells, sponges or polychaete tubes. Smaller colonies may have an epizootic habit, growing on other hydroids such as *Lafoea dumosa*, *S. filiformis*, *Sertularella polyzonias*, *Plumularia setacea* and *Obelia dichotoma*. Medusae of *B. muscoides* and *B. pyramidata* (Figure 2) were regularly present in the plankton samples collected during January and February.

*Cordylophora caspia* is a typical brackish water species, which can tolerate pure salt water for short periods. Its occurrence in the fjord Comau is not unexpected, as the salinity of the superficial layers may be highly variable (see Introduction). Colonies of this species were found on mussel shells.

The hydroid stage of *H. borealis* was found for instance on gastropod shells, while the medusa was present in the plankton during January and February. *Hydractinia pacifica* (Figure 3) is an abundant hydroid in the fjord Comau. Its colonies essentially recover the tubes of the polychaete *Chaetopterus* sp., and are rarely found on other substrates (e.g. wood, hydroids). Besides the frequent occurrence in the plankton of the medusa of *H. tenuis* (Figure 4), its corresponding hydroid still belongs unknown. Hartlaub (1905) though that *H. humilis* could be its sessile stage, but this species is likely incompletely characterized and no additional records were mentioned since its original description.

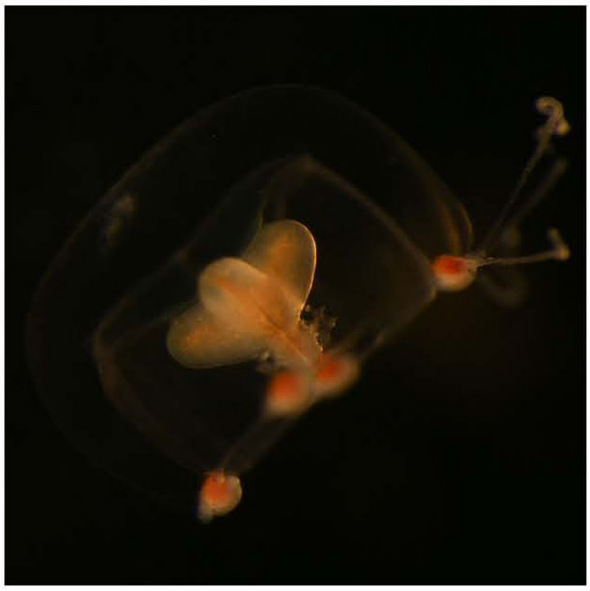

**Figure 2**. Lateral view of *Bougainvillia pyramidata* medusa; bell height up to 3 mm.

**Figure 3**. Colony of *Hydractinia pacifica* growing on polychaete tube; gastrozooids up to 4 mm high.

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**Figure 4**. Manubrium of *Hydractinia tenuis* in lateral view, showing medusa buds and lips not prolonged as mouth-arms; bell height about 600 µm.

Medusae of *Proboscidactyla stellata* (Figure 5) were collected at several occasions from the plankton but, despite an intensive search, the polyp stage was not found on tubes of sabellid polychaetes. This may be explained by an uncoupled distribution of both stages, the medusa being pelagic could therefore be dispersed far from the site of its liberation. Similarly, medusae of *Euphysa aurata* were constantly present in the plankton samples, but its hydroid was never found. The latter, due to its small size, could easily be overlooked, but careful search of mud samples was unsuccessful.

The hydroid stage of *Coryne eximia* was recorded at several occasions, when it was found on mollusk shells and polychaete tubes. Its medusa was present in the plankton in January and February.

Polyps of *Ectopleura dumortieri* and *H. chilensis* were relatively abundant within the studied area. They mainly occurred on hard substrates, but also on mollusk shells, dead gorgonians, polychaete tubes, pieces of wood and dock chains. The medusa stage of the former was regularly present in plankton hauls obtained during the day, while the medusae of the latter were only found in night hauls. Similarly, medusae of *Leuckartiara octona* were taken only during the night.

**Figure 5**. Apical view of *Proboscidactyla stellata* medusa, showing dichotomous ramification of radial canals; bell height up to 1.9 mm.

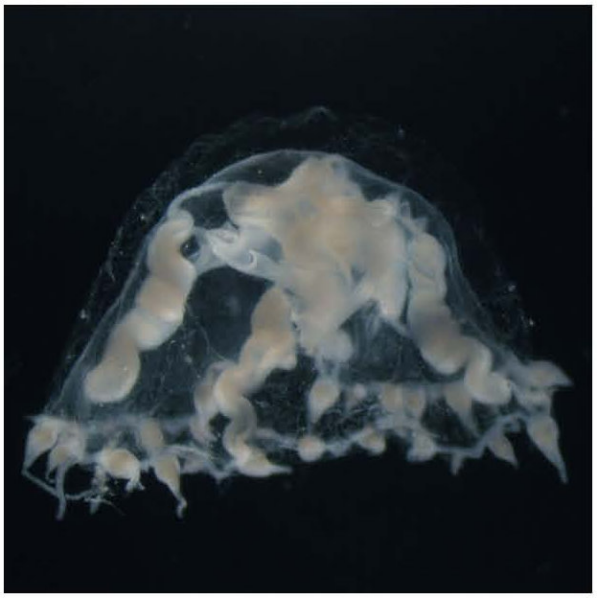

**Figure 6**. Lateral view of *Phialella falklandica* medusa; bell height up to 4 mm.

Only the medusa stage of *P. falklandica* (Figure 6) is known (Kramp 1968), and its occurrence was quite sporadic in the fjord Comau, with only a few specimens taken in November 2006.

Medusa of *P. quadrata* co-occurred in the plankton, but its corresponding hydroid stage was not recorded yet in the fjord Comau, but it is

largely present in the region of south-Chilean fjords (pers. observ., unpublished results).

The hydroid stage of *Modeeria rotunda* was largely found growing epizootically on other hydroids (e.g. *P. setacea* and *O. dichotoma*), but its medusa was never sampled from the studied area, nor mentioned in previous studies (Fagetti 1973, Palma et al. 2007).

*Filellum serratum* is essentially an epizootic species, living on various hydroids such as *P. setacea*, *S. polyzonias* and *O. dichotoma*. No fertile material of this species was obtained from the fjord Comau.

Colonies of *L. dumosa* were mainly found on hard substrates, but smaller specimens may live epizo-otically on larger hydroids, such as *B. pyramidata*.

*Halecium* sp. is here regarded as an undescribed species, and a complete account will be available in a separate publication. Its occurrence in the fjord Comau was relatively limited, with records from the mouth of fjord Cahuelmo, Punta Gruesa and the Huinay Scientific Field Station. Moreover, only sterile specimens were found and the gonophores still remain to be discovered. A second haleciid regularly sampled within the studied area, is *H. delicatulum*, mainly found epizoic on larger hydroids (e.g. *S. filiformis*, *H. chilensis*, *L. dumosa*) or polychaete tubes.

The three sertulariids, *S. polyzonias*, *S. gayi* and *S. filiformis* (Figure 7), generally occurred on hard substrates, but also on mollusk shells, polychaete tubes or wood. The recently described hydroid *H. schucherti* (Figure 8) was found for instance on immerged ropes, but it is expected to grow on various substrates.

*Plumularia setacea* is one of the most abundant hydroids present in the studied area. It mainly occurs in the form of the well-known normal stems, but peculiar, auto-epizootic specimens were found quite frequently. A detailed description of the latter forms is available in Galea and Leclère (2007). Normal stems were regularly found on a variety of substrates, such as dead gorgonians, mollusk shells, crab carapaces, or human-made objects (e.g. buoys, ropes, chains etc.). The epizootic forms occurred exclusively on normal stems of the same species.

**Figure 7**. Two gonothecae of *Symplectoscyphus filiformis*.

**Figure 8**. Fragment of cormoid of *Halopteris schucherti* bearing numerous gonothecae; colony height up to 7.5 cm.

The campanulariid hydroids *Clytia linearis*, *Obelia geniculata* and *O. dichotoma* were particularly abundant in the fjord Comau. The former mainly occurred on mollusk shells and

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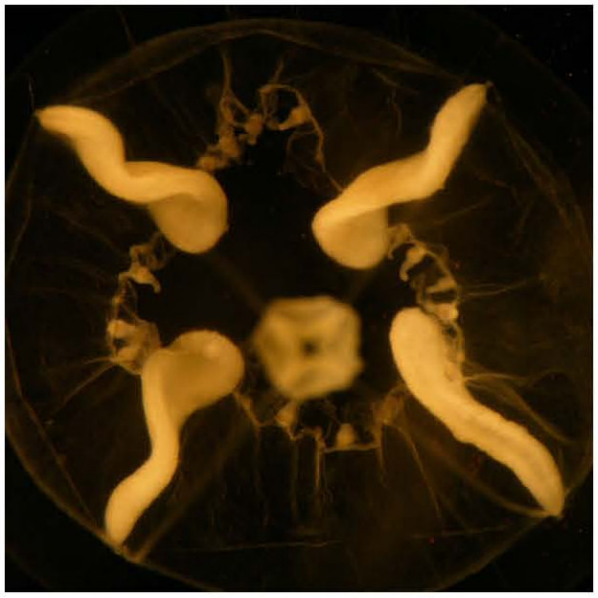

**Figure 9**. Subumbrellar view of medusa *Clytia simplex*, showing gonads; bell diameter up to 1 cm.

**Figure 10**. Lateral view of medusa *Amphogona apicata*; bell height up to 3.8 mm.

larger hydroids, while the third was mostly present on hard substrates, but also on dead gorgonians, sponges or mollusk shells. The second species is an obligate epiphyte and usually occurred on *Macrocystis pyrifera*. The medusa stage of *C. linearis* was never found in the plankton, while two forms of *Obelia* medusae were regularly sampled, i.e. *O. lucifera* type and *O. nigra* type. The former was reared to maturity from both *O. dichotoma* and *O. geniculata*, while the latter is supposed to be produced by *O. longissima* (Cornelius, 1975). However, the hydroid of *O. longissima* was never sampled during the present study, but its occurrence from Chile is mentioned by both Hartlaub (1905) and Leloup (1974).

Medusae of *Clytia simplex* (Figure 9) were frequently obtained from night hauls only. Its polyp stage is unknown, and rearing experiments are necessary in order to characterize it. The aeginid medusa *Solmundella bitentaculata* was an omnipresent representative in the plankton, while *C. octonaria* and *A. apicata* (Figure 10) were found only occasionally.

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