

Study compiles data on 958 types of South American jellyfish

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Jellyfish are a highly diverse group of aquatic animals. Their diameters range from 1 mm to over 1 m. Most have long tentacles, in some cases reaching more than 10 m in length. They come in a wide array of shapes and sizes. Some are bioluminescent; others are extremely poisonous. There are species that resemble delicate flowers rooted on the ocean floor but that turn out to be voracious predators when small crustaceans or fish larvae approach. What they all share, besides gelatinous bodies, is beauty and an air of mystery.

Detailed information on 958 distinct morphological types of jellyfish that inhabit the Atlantic and Pacific coasts of South America has been compiled in a census published in *Zootaxa*, the leading zoological taxonomy journal.

The paper details a study that involved scientists from Argentina, Chile, Peru, Colombia and Uruguay and was coordinated by two Brazilians: Antonio Carlos Marques, a professor at the University of São Paulo's Biosciences Institute (IB-USP) and the director of its Marine Biology Center (CEBIMAR), and Otto Muller Patrão de Oliveira, a professor at the Federal University of the ABC (UFABC).

The research was conducted under the aegis of the thematic project "Dimensions of marine life: Patterns and process of diversifications in planktonic and benthic cnidarians." with Marques serving as the principal investigator.

"The compilation presented in the article includes animals belonging to the phyla Ctenophora and Cnidaria. The former are commonly known as comb jellies and include jellyfish whose kinship with other animal groups is unclear. The latter include hydras, medusae, polyps, corals and sea anemones. However, the only [species](#) of Cnidaria included are from the subphylum Medusozoa, whose [life cycle](#) has a medusa, or jellyfish, phase," Marques explained.

The subphylum Medusozoa comprises five classes, he added: Cubozoa, Scyphozoa, Staurozoa, Hydrozoa, and the recently included Myxozoa.

The most toxic species belong to the class Cubozoa. They include *Chiropsalmus quadrumanus*, the diameter of which can exceed 10 cm and which can be found anywhere from the coast of Santa Catarina State in Brazil to the coast of North Carolina in the United States. Several researchers are currently investigating whether it is a single species found throughout the Atlantic or in fact consists of several morphologically similar species.

"Cubomedusae are widely feared because of the very strong toxin they produce," Marques said. "Some species cause severe envenomation and even death. They don't attack human beings, of course. Contact with humans is always accidental."

The class Scyphozoa includes *Chrysaora lactea*, an abundant species found along the Brazilian coast that can be as large as 20 cm in diameter.

"Its toxin is relatively weak but causes discomfort around the sting. A few years back, gigantic populations of this species approached the coast of Paraná State in Brazil, and more than 30,000 cases of envenomation were recorded," Marques said.

Species of the class Hydrozoa are the most abundant in the subphylum

Medusozoa. They occur in all kinds of marine environments as well as in fresh water. The marine species are more diversified, and their life cycle is characterized by two very different phases. Initially, they live as benthic organisms called polyps, attached to algae or rocks on the seafloor. Polyps reproduce asexually by budding, which gives rise to medusae, the sexual form. This form frees itself from the polyp; matures; and from then on, is able to swim in the water column. An example is *Dipurena reesi*, which forms small colonies in shells and seaweed during the polyp phase.

"They're two completely different organisms, yet the genome is the same. Moreover, the benthic and planktonic forms coexist. Their life cycle is very complex," Marques said.

The class Staurozoa, which Marques described for the first time in 2004 in partnership with a US colleague, zoologist Allen Collins, at the Smithsonian's National Museum of Natural History, is the only medusozoan class in which the medusae remain immobile on the seafloor throughout their life cycle. Examples include *Haliclystus antarcticus*, which can reach 5 cm in height.

"These species mainly inhabit the polar and subpolar regions. They're rare in warmer waters. There was just one species with permanent populations in Brazil—*Calvadosia corbini*—on the coast of Espírito Santo State, but these populations may have been wiped out by the environmental disaster caused by the collapse of a tailings dam last year near an iron ore mine in Mariana, Minas Gerais State," Marques said.

The phylum Ctenophora has few species but is very important ecologically, according to Marques. "Some species, such as *Mnemiopsis leidyi*, are known to be invasive in certain marine areas where the populations grow so huge that they damage the native ecosystems," he said.

The census lists 958 morphotypes altogether—800 of them identified as unique species based on their morphology—and for each one, provides information on areas of occurrence; previous records produced by other researchers, some more than 150 years ago; and ecological data such as type of habitat, water depth, and attachment substrate in the benthic phase.

Data collection covered the entire continent, from the equatorial waters of Colombia's Caribbean coast to the subpolar region of Tierra del Fuego in Argentina, and included the mouth of the Amazon River, the entire coast of Brazil, and the entire Pacific coast of South America.

In addition to an extensive review of the scientific literature, the researchers included data on thousands of specimens held by zoology museums and other institutions dedicated to the conservation of knowledge about marine organisms.

"Much of this material had been collected by authors of the article during oceanographic cruises, for example," Marques said. "We took the trouble of retrieving these collections and studying each of the specimens. The collections contain a wealth of material, and access to them is important. A sizable proportion of the data had never been published. Now, we have an enormous amount of organized information that can serve as a basis for many future investigations."

According to Marques, besides helping researchers understand the evolution and diversification of these animals, the knowledge created by the census project will help to identify the areas most urgently requiring conservation measures.

"As a result of this project, scientists are able to decide which areas have the most species, the greatest taxonomic complexity in the sense of having species in many different groups, and the most endemic species,

which occur only in certain areas, as well as any isolated populations. In conjunction with a geographical perspective, this knowledge will enable policymakers to establish priority areas for conservation based at least on data for cnidarians," Marques said.

More information will be included, he added, as well as new data that the scientists continue to collect in underexplored parts of South America. "The census has taken on a life of its own," he said. "It will continue to grow, and the database will be continually upgraded and refined."

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