Institut océanographique
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An updated briefing about Giant Squid

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"It was Thursday, the 29th of October, 2012. I was in the main entrance of the Majestic Palace Hotel in Florianópolis (Brazil) during a break in the Cephalopod International Advisory Council symposium. Tsunemi Kubodera approached. After a respectful greeting, he said: 'we did it.' Not one word more was necessary. I understood that the evasive giant of the depths had been filmed! I gave Tsunemi my warmest congratulation."

Figure 1. Female of giant squid (*Architeuthis dux*). Manuel Uhía's drawing.

In search of the giant squid

Since 1996 researchers of different nationalities had been journeying to the depths of the ocean in search of the mysterious creature, seeking images with different techniques. First in the Azores, then off New Zealand, later off northern Spain, but all attempts were fruitless until 2004. That year, Kubodera and Mori took the first photos of a live giant squid in its natural habitat. The long wait for video images captured of this elusive marine creature concluded in July, 2012, when the manned submarine *Triton*, with Kubodera on board, met face to face with the mythical Kraken at 630 meters depth near the Ogasawara Islands off Japan. On January 13, 2013, the Japanese broadcasting network NHK and the Discovery Channel publicized the event as "the first film of one giant squid in its natural habitat". The world impact of this news was huge.

Why so much interest?

The existence of these gigantic, aggressive and tentacled marine creatures, capable even of sinking ships, has captured the imagination of human beings for at least 3,000 years. For an extended period, the seafarers that saw these creatures could not identify them accurately. What were they really? The fantastic explanations provoked by these huge, elusive and fascinating creatures shaped an authentic legend, which

in the Scandinavian countries was known as Kraken. Some of them were real giant squids, other not. Some people managed to describe them as a monk dressed in scarlet clothes. This way there was born the fable of the Sea Monk or merman.

The Danish naturalist Japetus Steenstrup concluded in 1857 that many of these enormous marine creatures were giant squids, which he included within the genus *Architeuthis* (the largest or the "prince" of the squids). They have been the subject of considerable interest and speculation both in the scientific community and in popular literature, inspiring authors such as Jules Verne and Herman Melville. The first close encounter with a real giant squid occurred on November 30, 1861 off Tenerife (Canary Islands). The crew of the French warship *Alecton* was able to recover some fragments of the animal. The first photograph of a giant squid was taken in 1874. The Reverend Moses Harvey had the carcass dragged from shore in Newfoundland and deposited in his bathtub. Afterwards, 21 species of *Architeuthis* were described primarily from remains in sperm whale stomachs, from carcasses of dead or moribund animals found floating on the ocean surface or washed up on beaches and, rarely, from fresh specimens caught by deep-sea trawling activity. This forensic zoology allowed a description of the main morphological and anatomical features of these marine molluscs. However, a review paper of 1982 evidenced the limited knowledge about the giant squid. A giant so relatively close to man, which populates all the oceans of the world from about 250 to 1,300 m depth, but so unknown, was a challenge for scientists of middle of the 20th century.

Figure 2. *Architeuthis dux*'s world distribution.

One of the largest invertebrates

The most realistic maximum size of the giant squid is a total length of 18 meters for females and a weight of roughly 250 kg; with males reaching slightly smaller sizes (6 m).

Figure 3. *Architeuthis dux* female of 13 m total length and 135 kg. Dissection by Angel Guerra (left) and Luis Laria (right) in Luarca (North Spain).

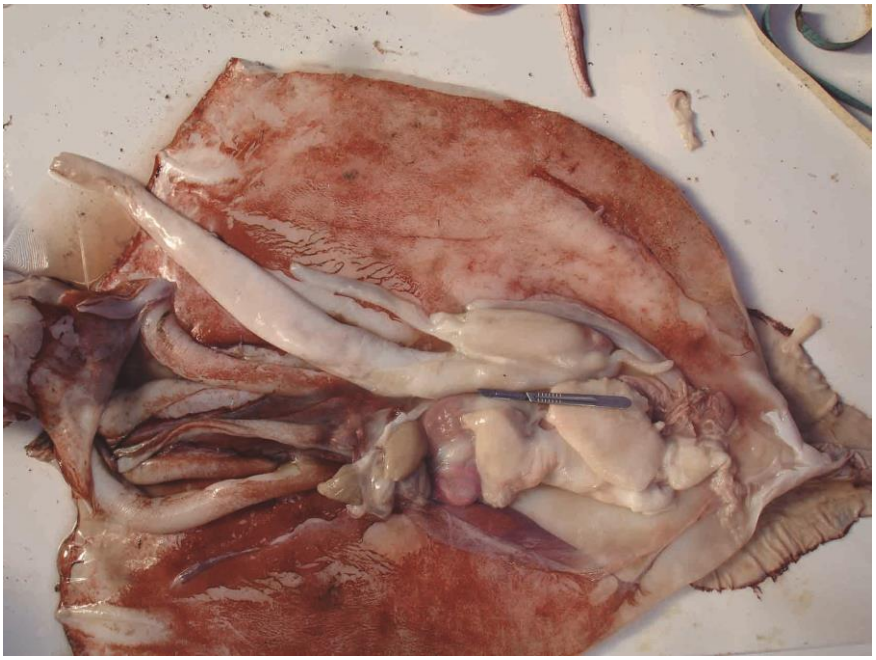

Figure 4. Mantle opened of a male giant squid of 60 kg showing its enormous penis.

What is shown by the distribution of the 684 specimens and sightings recorded around the world from 1545 until present is that, with the exception of the Polar Regions, the giant squid is globally distributed. Furthermore, it is likely a voracious carnivore, preying upon fish, but also cephalopods, including cannibalistic behaviour. Chemical analyses from upper beaks suggest *Architeuthis* undergoes a diet shift, forsaking smaller prey of relatively low trophic status in favour of larger prey of higher status as they age.

The main predators of giant squid include fish and marine mammals, especially the sperm whale, *Physeter macrocephalus*, but also sea birds. It is likely (although unverified) that the giant squid population must be large, in order to sustain such levels of predation by whales. A number of other characteristics are more uncertain.

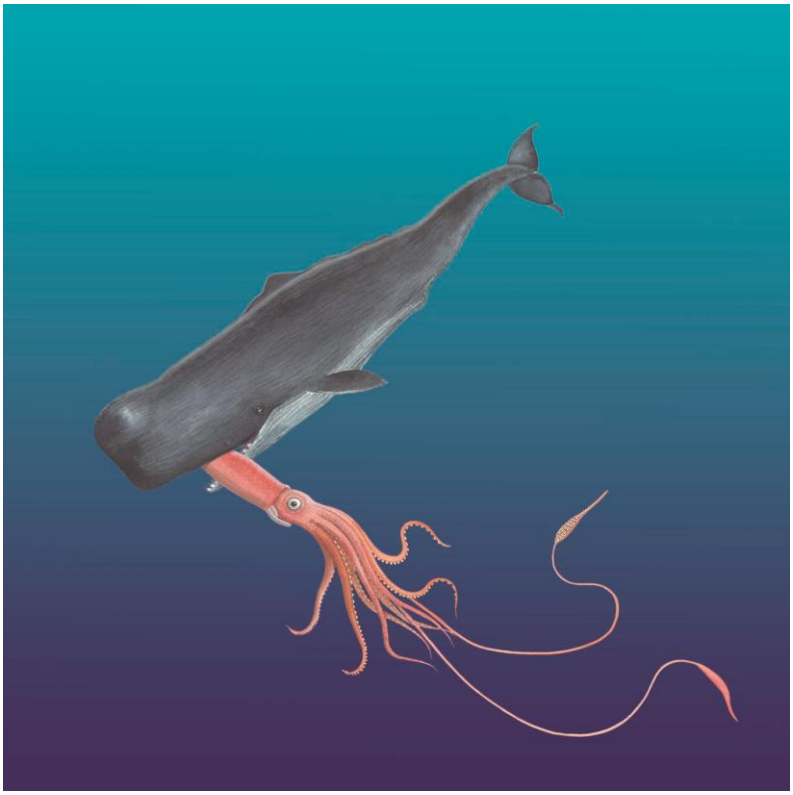

Figure 5. Giant squid and sperm whale: giants of the deep.

There is some discussion, for example, about the activity level and metabolism of *Architeuthis*. Although many scientists have concluded that giant squids must be sluggish, ambush predators, more recent data appears to support quite the opposite, consistent with recent video evidence; the giant squid captured in these images seems to be a highly active predator with considerable strength.

Figure 6. Tentacular club of a giant squid: two powerful "hands" to hold firmly on to its preys.

Growth rate remains enigmatic, as do reproductive strategy and longevity, with many estimates of maximum age ranging from 5 to 15 years**.**

Genetics sheds new light

The taxonomy of the giant squid remained controversial until 2013. Since the first description by Steenstrup in 1857, as many as 21 nominal species of the genus *Architeuthis* had been described. The majority of these have been considered likely to be synonymous. Until February 2013 different opinions suggested there may be as many as eight or as few as one species (with three subspecies). The characterization of the mitochondrial genome diversity of 43 giant squid samples collected from across the range of the species has provide results which are consistent with the hypotheses that there is only one global species of giant squid, *Architeuthis dux* Steenstrup, 1857.

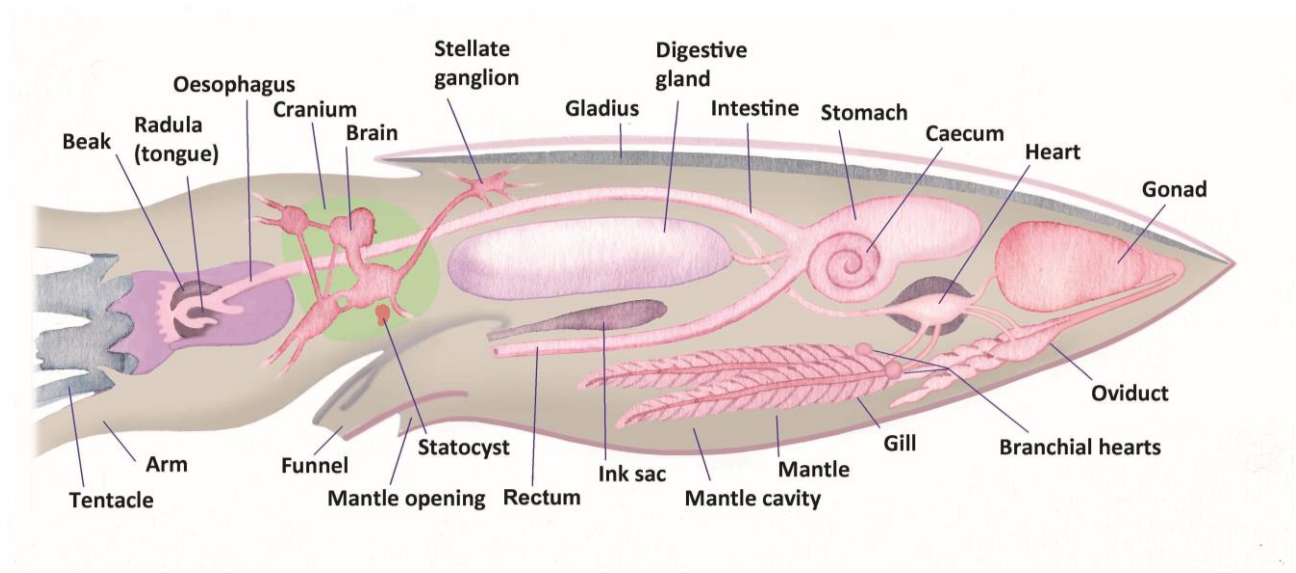

Figure 7. General scheme of the internal organs of a female giant squid.

***Architeuthis dux*: the deep ocean's panda bear?**

The current public perception is that there is little reason for concern about conservation of marine invertebrates, in part due to the scarcity of emblematic species to represent that diverse group. However, giant squid can be considered a flagship species to represent concern for the conservation of marine invertebrate biodiversity because it satisfies all the requirements of an emblematic species. That opinion has been accepted by a number of marine experts, and a group of biologists are proposing that the giant squid be adopted as a mascot for the conservation of the world's oceans, like the panda bear is for wildlife conservation. *Architeuthis* attracts public interest. ***Architeuthis* is an indicator of ocean climate change**. *Architeuthis* can also represent concerns for vulnerable marine ecosystems associated with submarine canyons**. *Architeuthis* is an indicator of overfishing**. *Architeuthis* is an indicator of damage from noise pollution and seismic surveys and, possibly, pollutants. In short, *Architeuthis dux* meets the criteria of an emblematic species.

Figure 8. First specimen of giant squid exhibited in France. Biarritz Sea Museum, France (2001)

For more information:

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