

# **New species of dumbo octopus identified using minimally invasive techniques**

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A new species of deep-sea dwelling dumbo octopus called *Grimpoteuthis imperator* sp. nov. has been described using a combination of MRI, micro-CT and minimally invasive gene analysis rather than traditional dissection methods. The findings are presented in the open access journal *BMC Biology*.

The single specimen, which was identified as a mature male, was named *G. imperator* because it was discovered in the northern part of the Emperor Seamounts, an undersea mountain ridge in the Northwest Pacific Ocean. In addition to the scientific name in Latin, the authors suggest possible common names for this new species such as Emperor dumbo, Dumbo impérial (French), and Kaiserdumbo (German).

Finned or dumbo octopods, although considered rare organisms, form a significant part of the megafauna in deep-sea habitats down to at least 7,000 m depth. Current methods used to describe new cephalopod species often require dissection to examine [internal organs](#), which involves damage to or even partial destruction of a specimen and may thus preclude analysis of singular, endangered, rare, or otherwise valuable organisms.

Alexander Ziegler and Christina Sagorny at Rheinische Friedrich-Wilhelms-Universität Bonn, Germany combined non-invasive methods including [digital photography](#), standardized measurements, high-field magnetic resonance imaging (MRI), and micro-computed tomography (micro-CT), with minimally-invasive tissue sampling for DNA analysis to gather morphological as well as molecular information on the specimen collected during R/V SONNE's scientific cruise SO-249 BERING. Using this novel combination of non-invasive and minimally

invasive techniques allowed the authors to describe a large zoological specimen for the first time without damaging it.

The authors were able to identify details including shell and gill shape, digestive tract morphology, as well as more minute structures such as the [nervous system](#) and sensory organs, but also morphological characters so far not used in the description of octopus species, such as the shape of the systemic heart. By using micro-CT, which is more suitable than MRI for visualization of chitinous tissues, the authors were also able to build the first interactive 3D model of a cephalopod beak.

Characteristics including shell form, fin position, and arm length identified the specimen as belonging to the genus *Grimpoteuthis*. However, the number of suckers, half-orange-shaped gills, and details of the shell differentiate it from all previously described *Grimpoteuthis* [species](#).

Alexander Ziegler said: "The MRI and micro-CT datasets we have obtained here and which are publicly available from the repository MorphoBank could be used for further analyses that would not have been possible to this extent using conventional, invasive techniques. This may allow other researchers to draw conclusions about the life style and behaviour of hard-to-observe deep sea organisms."

**More information:** Holistic description of new deep sea megafauna (Cephalopoda: Cirrata) using a minimally invasive approach, *BMC Biology* (2021). [DOI: 10.1186/s12915-021-01000-9](https://doi.org/10.1186/s12915-021-01000-9)

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