

Researchers find a new marine invertebrate species in the Weddell Sea, in the Antarctica

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The new species *Doto carinova* was captured at 277 metres under the Weddell sea. Credit: Manuel Ballesteros, UB-IRBio

The cold waters in Weddell, in the Antarctic ocean, are the site of the findings of a new marine invertebrate species –the nudibranchs *Doto carinova*— described in an article published in the journal *PLOS ONE* by an international research group.

The end of polar loneliness for Doto Antarctica

Nudibranchs from the Doto genre are found around the oceans and are gastropod molluscs that feed on hydroids and cnidarians. In Antarctic latitudes, the only identified species until now was *Doto antarctica*, which was found for the first time in the Ross Sea and described in 1907 by the British diplomat and malacologist Charles Norton E. Eliot.

The [new species](#) *D. carinova*, captured at 277 metres under the Weddell sea, enriches the biologic heritage of the polar continent and increases the number of invertebrates discovered by the experts of the projects Ecoquim, Actiquim and Distantcom, led by Professor Conxita Àvila (Faculty of Biology-IRBio) to study chemical ecology, philogeography and trophic ecology in invertebrate marine communities in the Antarctica.

According to Juan Moles, first author of the new article, "The new species *Doto carinova* differs from *D. Antarctica* for its external morphological characters: colouring, number and shape of the cerata, shape of the rhinophoral sheath. But other internal traits are also different, such as the salivary glands or several reproductive organs."

"Regarding the marine habitat, although it shares a similar habitat with the benthic beds, *D. carinova* is placed on gorgonians (*Primnoisis antarctica*) and *D. antarctica* on hydroid colonies, where they make their laying," says Moles.

Rebuilding a 3-D Antarctic species

During their study, experts also found new species of *Doto antarctica* –so far the only nudibranch of this genre in the Antarctica— in the Weddell Sea and Bouvet Island, which confirms the circumpolar

distribution of the species. They also found that the two associated cnidarian species (*Oswaldella* sp. and *Antarctosyphus* sp.), from which they probably feed.

To improve the taxonomy criteria that identify the species, experts applied a set of techniques (histology, micro-computed tomography and 3-D reconstruction) in the study of the organs and system of the species. Results show the existence of giant cells in the central nervous system. "We propose these cells correspond to giant neurons with some neurosecretion function. This is a unique finding, suggesting that all species from the genre could have these 'giant neurons' to a greater or lesser degree, although it is necessary to continue studying this issue," says Juan Moles.

The researchers also described the reproductive system, noting the blister, prostate, penis, and bursa copulatrix, which help to establish an evolutionary tendency of the genre globally. Particularly, in the *Doto* genre, experts say there is a gradual decrease of the bursa copulatrix, and a connection of the seminal receptacle with the proximal part of the nidamental or female glands.

An extreme habitat to find new bioactive molecules

The Antarctic continent has lots of specific habitats that are hard to study. Much of the current project is focused on the identification of molecules that take part in the relation between these organisms. "These chemical products can have a biological activity potentially useful as drugs," says Conxita Àvila. "There has only been one natural product described from a *Doto* species in the Atlantic Ocean, but it is believed that the glands placed in dorsal sides or cerata are the ones in charge of accumulating dissuasive substances when facing predation. In the case of Antarctic [species](#), there is still not enough information about these aspects of chemical ecology."

For now, the evolutionary scene of the Dotiae family is full of phylogenetic enigmas to be solved. Although it is considered to be a family belonging to Dendronotida, it is necessary to define the synapomorphic characters – that is, shared by two or more taxons— the group Dotiae with neighbouring families. For the experts, it is necessary to sequence enough representatives from these taxons and analyse them with philogenomic techniques to solve evolutionary enigmas that these marine invertebrates hide.

More information: Juan Moles et al. The End of the Cold Loneliness: 3D Comparison between *Doto antarctica* and a New Sympatric Species of *Doto* (Heterobranchia: Nudibranchia), *PLOS ONE* (2016). [DOI: 10.1371/journal.pone.0157941](https://doi.org/10.1371/journal.pone.0157941)

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