

# Preliminary insights into the gastrotrich community of sublittoral sediments of the Azores Archipelago (Portugal) obtained during expedition M150 - BIODIAZ

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## Background

One aim of expedition M150 was the extensive sampling of sediments from the shelf (50 to 300 m) around 3 islands and 2 seamounts of the Azores Archipelago (Fig. 1) in order to gain insights into the role of such isolated biotopes for the trans-oceanic dispersal of interstitial meiofauna (Kieneke 2018). Shallow oceanic sand biotopes could act as 'stepping stones' for long-distance dispersal of these microscopic organisms that lack any dispersal stages (e.g. George 2013).

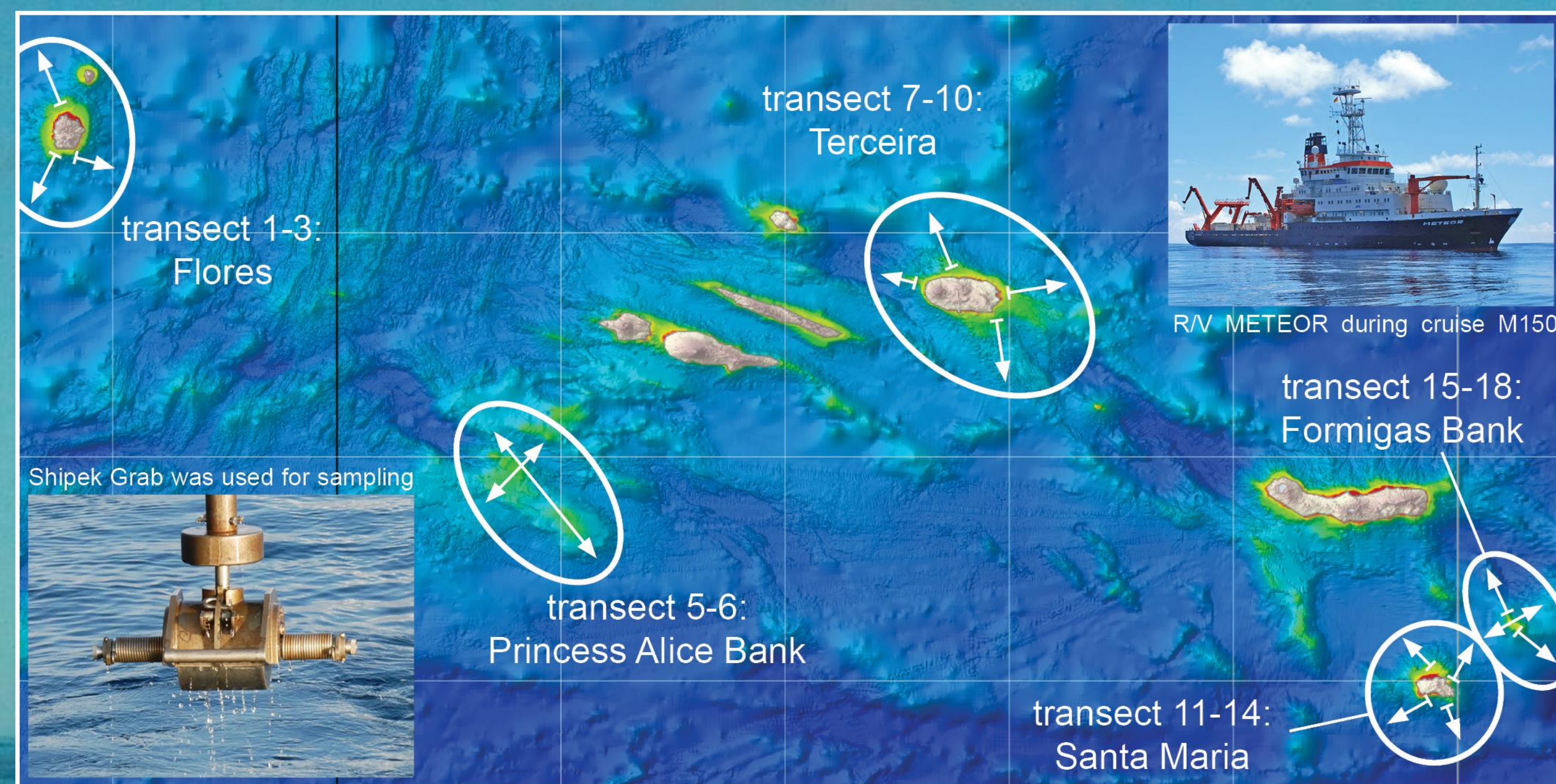


Fig. 1. Transects 1 to 18 of cruise M150/BIODIAZ of R/V METEOR (upper right inset). Samples for studying the Gastrotricha were retrieved with a Shipek® Grab (lower left inset; photo: A. Ostmann). Bathymetry: EMODnet.

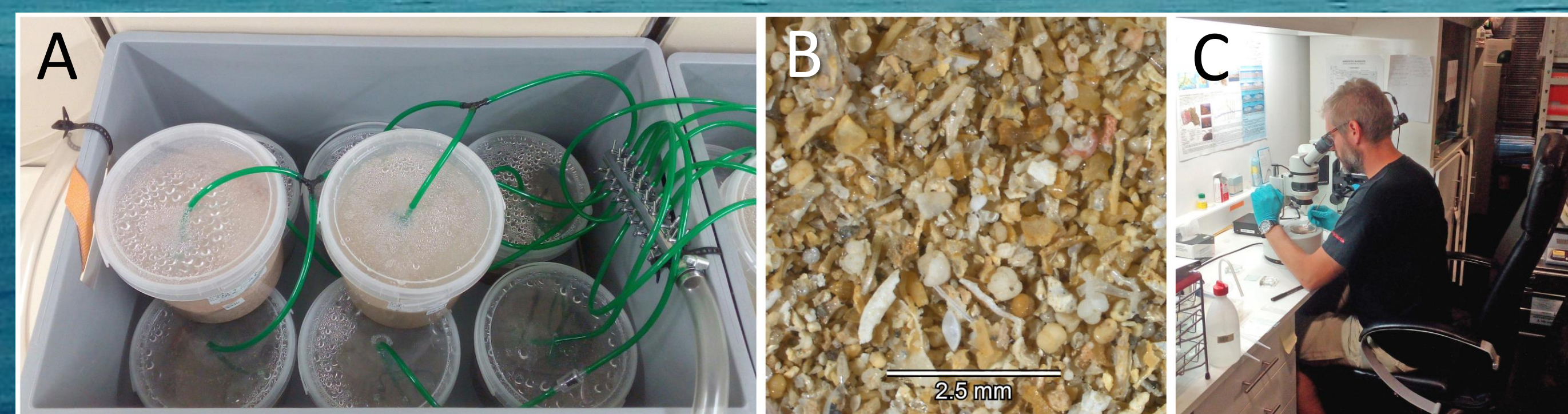


Fig. 2. A. Life samples were stored at 5°C in the cool room of R/V METEOR. B. Dried sediment of station #599-1 (303m) consisting of pure organogenic sand. C. Gastrotrichs were processed at the Universidade dos Açores.

## Methods

Sediment was sampled with the Shipek® Grab (Fig. 1). 22 sand samples with alive meiofauna were stored aboard at 5°C (Fig. 2A, B) until extraction (7% aqueous MgCl<sub>2</sub>, 40µm mesh size) and microscopic examination of living Gastrotricha at the Universidade dos Açores (Fig. 2C). Subsequently, DNA was extracted and mitochondrial and nuclear gene fragments (COI, 18S) were sequenced for further analyses.

## Results

So far, the life extractions yielded 18 morphospecies of the gastrotrich subclade Macrotrichia distributed across the archipelago and in a

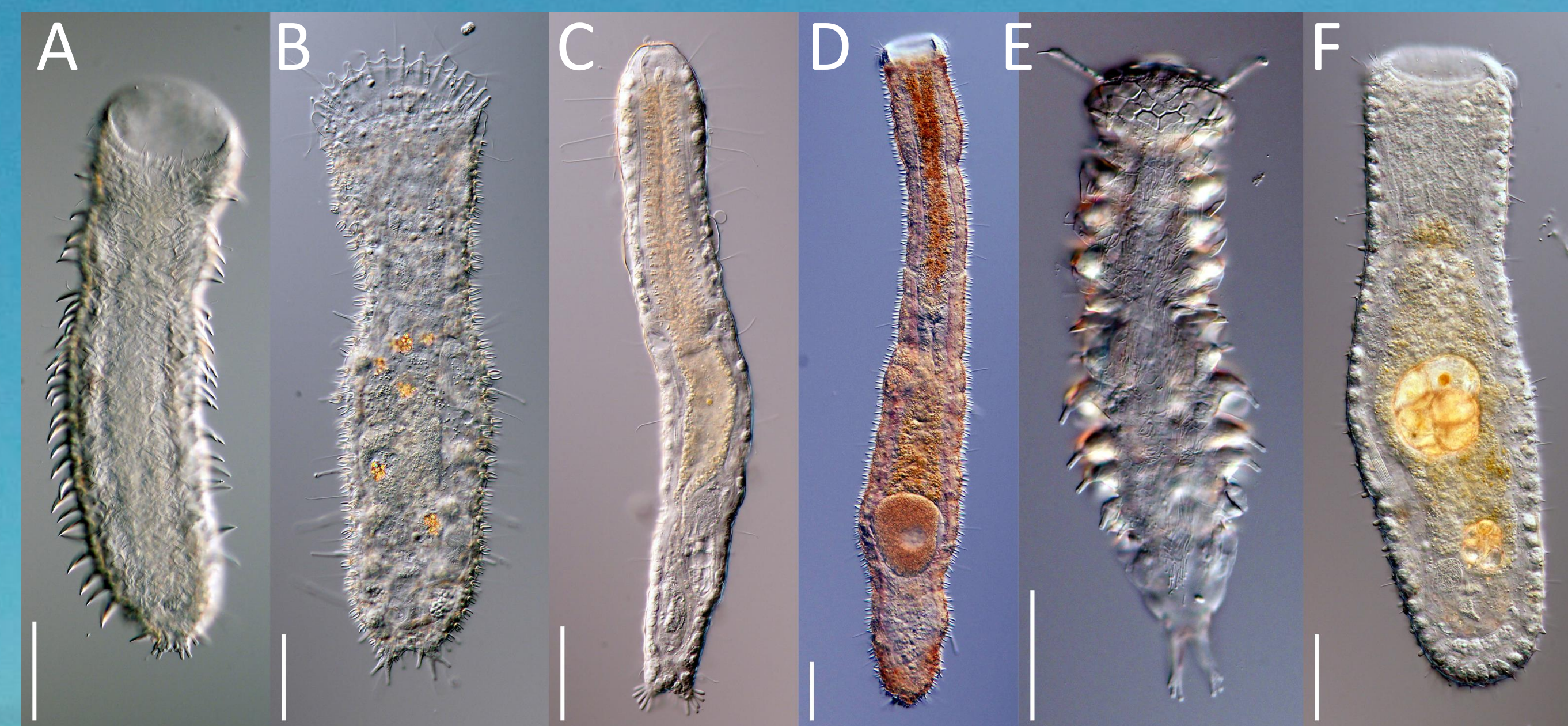


Fig. 3. Micrographs (DIC) of gastrotrichs discovered during M150. A. *Diplodasys* cf. *ankeli*. B. *Tetranchyroderma* sp. 3. C. *Crasidella azorensis*. D. *Acanthodasys* sp. E. *Xenodasys eknomios*. F. *Oregodasys* sp. Scale bars: 50 µm.

depth range between 50 and 300 m (Fig. 3A-F). Seven morphotypes could be assigned to known species, 11 are probably new to science.

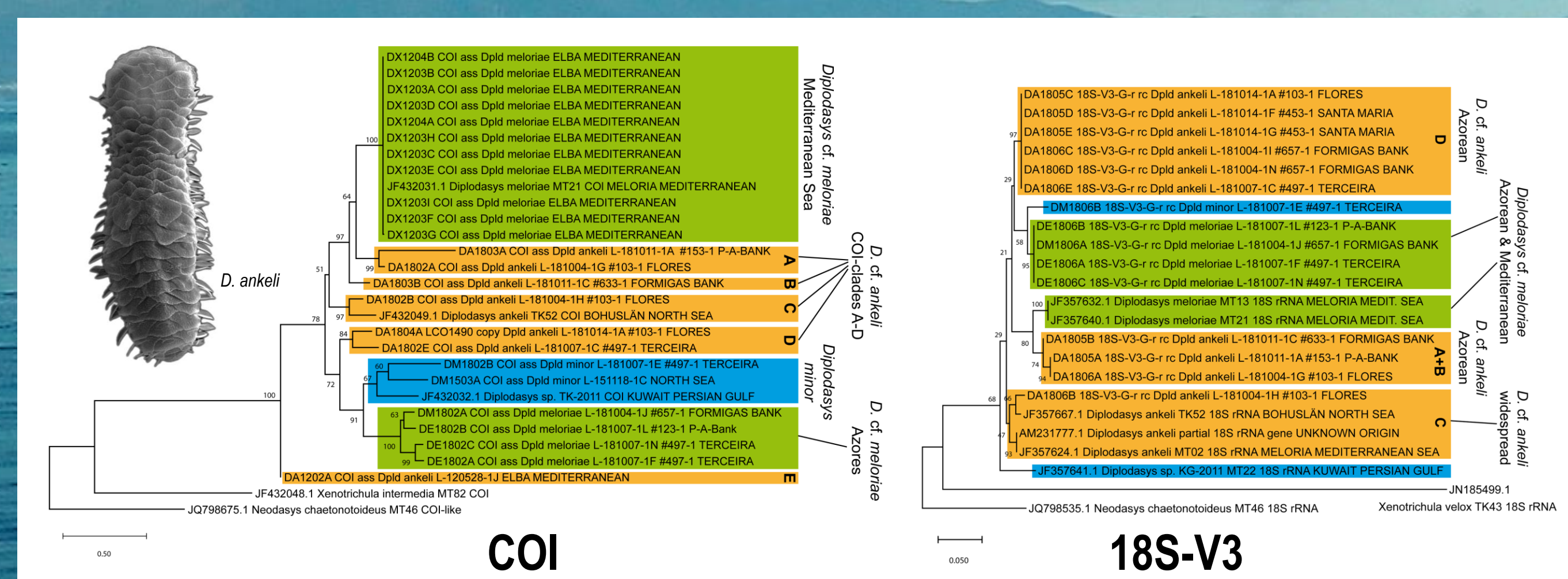


Fig. 4. Maximum likelihood analyses (GTR+G model) of mt COI (left tree) and nuclear 18S-V3 sequences (right tree) of different morphospecies of the genus *Diplodasys* (green: *D. meloriae*, blue: *D. minor*, orange: *D. ankei*). *D. ankei* represents at least three different entities (18S). Numbers at branches: bootstrap values (1000 replicates).

Initial phylogenetic analyses revealed the existence of at least two different genetic clades within *Diplodasys meloriae* (Fig. 4), one occurring across the Azores and the other at the Mediterranean Sea (Fig. 5A). Within *Diplodasys ankei*, however, there are even three genetically distinct clusters, two (clades A+B and D) occurring across the Azores and one (clade C) with a remarkably wide distribution with records from Flores (Azores Archipelago), the North Sea and the Mediterranean Sea (Figs. 4, 5A).

Based on mitochondrial COI sequences, the morphospecies *Diplodasys minor* seems to represent a single entity, with quite distant records from Flores, North Sea and even the Persian Gulf (Figs. 4, 5A).

Among the putatively new species there was a form with a completely unknown combination of characters. An integrative investigation combining microscopic and DNA sequence data led to the establishment of the new gastrotrich genus *Chimaeradasys* with the new species *C. oligotubulatus* from the shelf of Flores and *C. polytubulatus* from Sardinia (Mediterranean). The new taxa are characterized by the possession of a funnel-shaped mouth opening and an elongate, rod-like tail end that bears the posterior adhesive tubes (Fig. 5B-C). Phylogenetic analyses place the new taxon clearly into the Thaumastodermatidae (Kieneke & Todaro 2021).

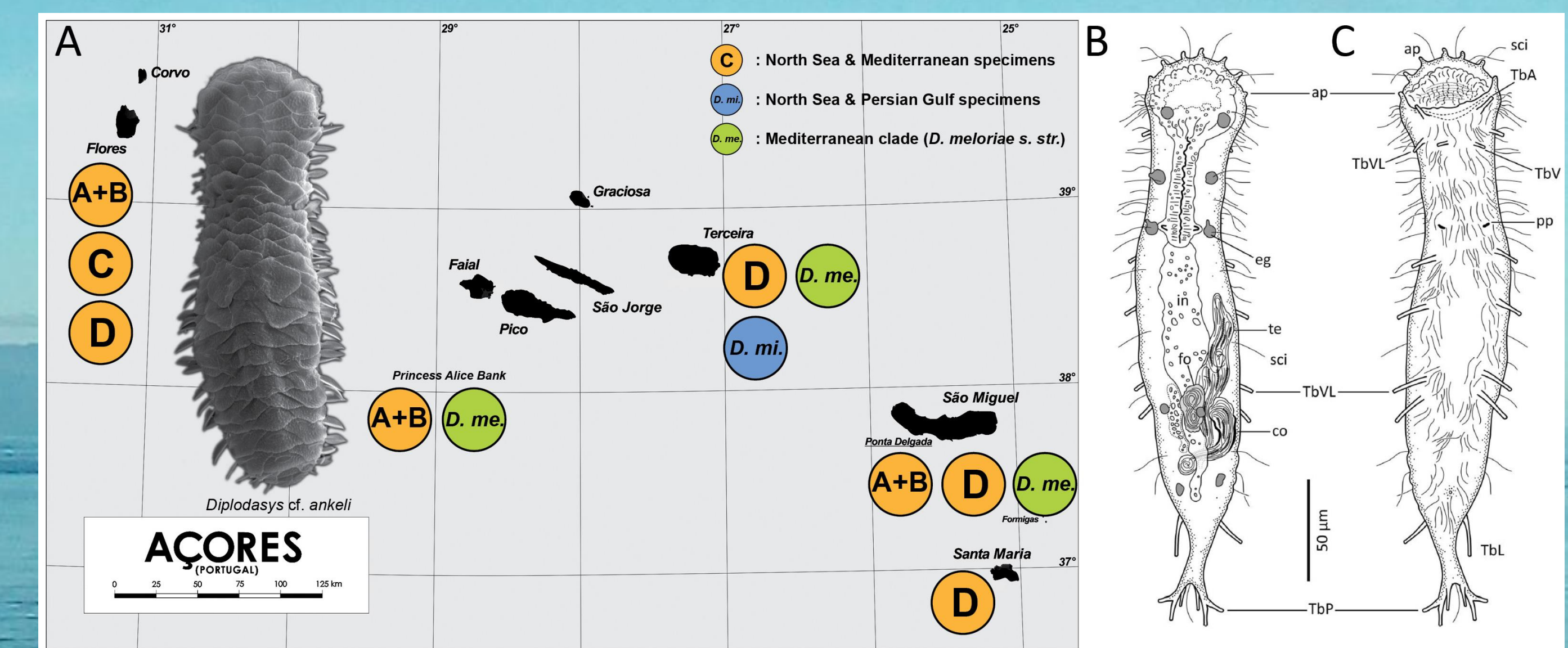


Fig. 5. A. Distribution of three morphospecies of *Diplodasys* and their genetic clades across the Azores (clade labelling and colour-coding: see Fig. 4). B-C. Internal and ventral views of the new genus and species *Chimaeradasys oligotubulatus* Kieneke & Todaro, 2021. Abbreviations: ap anterior papillae, co caudal organ, eg epidermal glands, fo frontal organ, in intestine, pp pharyngeal pores, sci sensory cilia, TbA/TbP/TbL/TbV/TbVL anterior/posterior/lateral/ventral/ventrolateral adhesive tubes, te testis.

## Discussion

So far, 34 species of marine Gastrotricha are reported from the Azores, many records are working species (Hummon 2008, 2010, Araújo & Hochberg 2021). Due to some concordance, at least 13 new species records of marine gastrotrichs can be added to the Azorean fauna from the sample material obtained during M150. Records of widespread morphospecies and genetic entities underpin a possible 'stepping stone function' of the Azores for certain taxa, while putative endemic taxa such as the new *Chimaeradasys oligotubulatus* may point to a more isolative effect with increase of speciation rate for other taxa.