

# The complete mitogenome of *Tristoma integrum* Diesing, 1850 (Platyhelminthes, Monopisthocotylea), a gill parasite swordfish *Xiphias gladius*

Chahinez Bouguerche <sup>1\*</sup>, Romain Gastineau <sup>2\*</sup>, Jean-Lou Justine <sup>3</sup>

<sup>1</sup> Department of Zoology, Swedish Museum of Natural History Naturhistoriska riksmuseet, Stockholm, Sweden

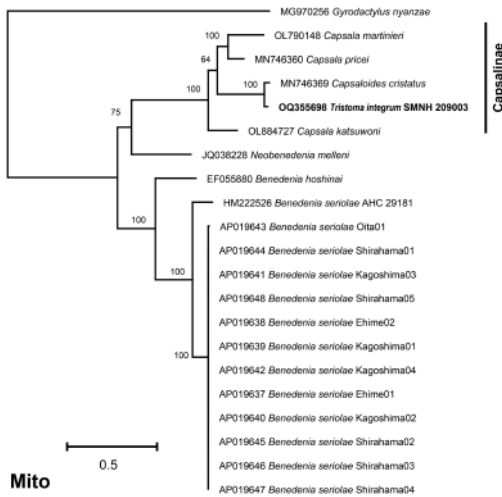
<sup>2</sup> Institute of Marine and Environmental Sciences, University of Szczecin, Poland

<sup>3</sup> Institut Systématique Évolution Biodiversité (ISYEB), Muséum National d'Histoire Naturelle, Paris, France

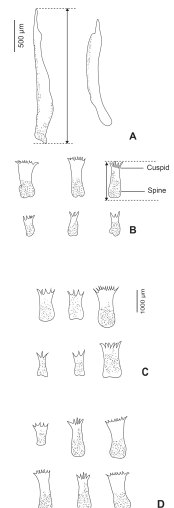
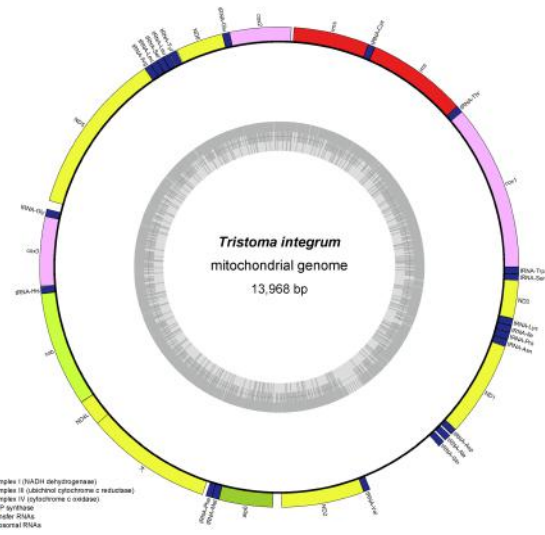
\* contributed equally

## Abstract

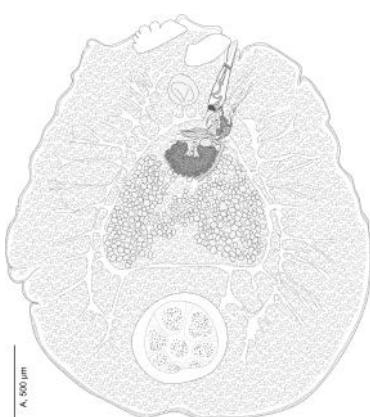
- ✓ Capsalids are monopisthocotylean parasitic flatworms, found on the skin and gills of fish. Species of *Tristoma* parasitise only the gills of swordfish *Xiphias gladius*. We investigated *T. integrum* from swordfish in the Western Mediterranean.
- ✓ One specimen was used for a next generation sequencing analysis but a part of it, including the sclerites was mounted on a permanent slide and studies using microscopy, including the key systematics characters of dorsolateral body sclerites.
- ✓ We characterised the complete mitogenome, the ribosomal cluster (including 18S and 28S) and additional genes such as Elongation factor 1 alpha (EF1a) and Histone 3, and we provided illustrations of its morphology and anatomy.
- ✓ We also retrieved molecular information from the host tissue present in the gut of the parasitic monopisthocotylean and provide the sequence of the complete rRNA cluster of the fish host, *X. gladius*.



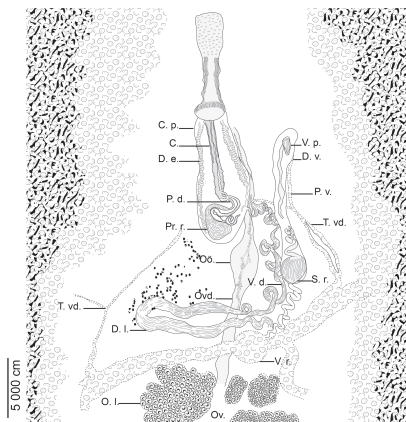
Maximum likelihood phylogenetic tree (MTZOA+G4+F model) obtained from concatenated amino-acid sequences of the mitochondrial proteins of *Tristoma integrum* and other Capsalidae.



The mitogenome of *Tristoma integrum*. The mitogenome includes 12 protein-coding genes, 2 rRNA and 22 tRNA, and is 13 968 bp lon. The corresponding sclerites utilized for morphological identification are depicted on the right. A, hamuli; B–D, dorsomarginal spines.



*Tristoma integrum*, morphology of whole body.



*Tristoma integrum*, anatomy of reproductive organs. For list of abbreviations, see full text.

## Discussion

- ➔ The mitogenome of *T. integrum* was 13 968 bp in length and codes for 12 protein, 2 rRNA and 22 tRNA.
- ➔ In the 28S phylogeny, most subfamilies based on morphology were not found to be monophyletic, but the Capsalinae were monophyletic.
- ➔ In both phylogenies, the closest member to *Tristoma* spp. was a member of the *Capsaloides*.



<https://www.parasite-journal.org/articles/parasite/pdf/2023/01/parasite230029.pdf>