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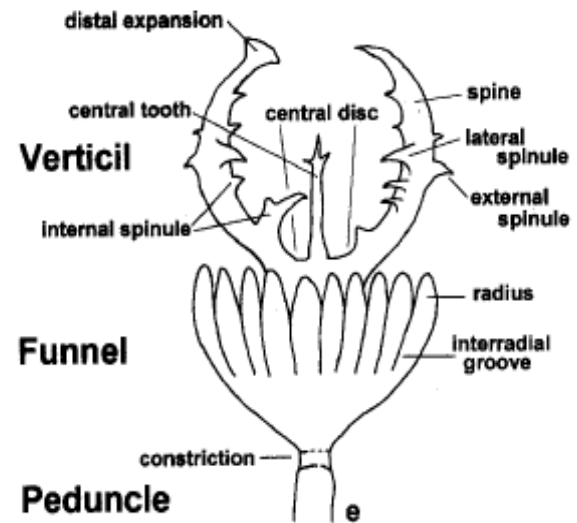
CO1 barcoding and novel mitochondrial genome of *Hydroides* (Serpulidae)

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Genus *Hydroides* Gunnerus, 1768

- The largest genus with > 100 nominal species
- Complex two-tiered operculum



Troubles bothering taxonomists

- Difficult to identify some species due to
 - High variability of opercula structure in one species



- Incomplete taxonomic descriptions in earlier studies
- Unsuccessful attempts to develop any molecular identification tools within *Hydrooides*

A difficult road: CO1 Barcoding of *Hydroides*



Primers
LCO1490/HCO2198

polyLCO/polyHLO
(Carr et al. 2011)

Hydro-CO1F/Hydro-CO1R

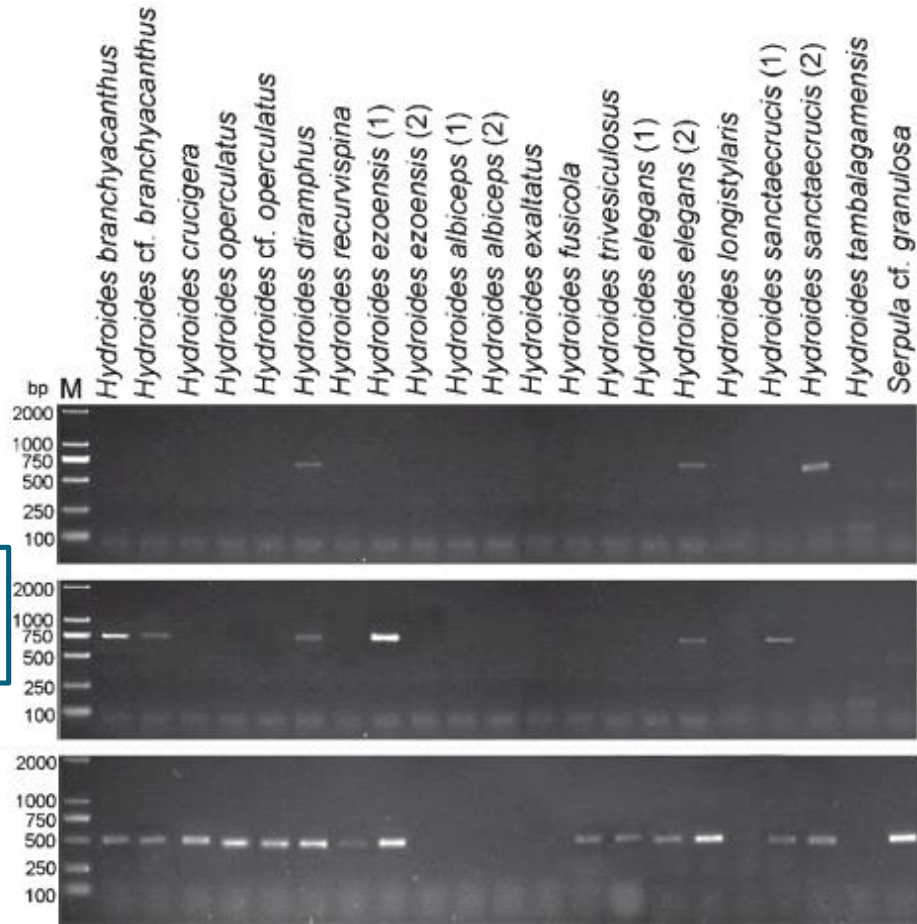
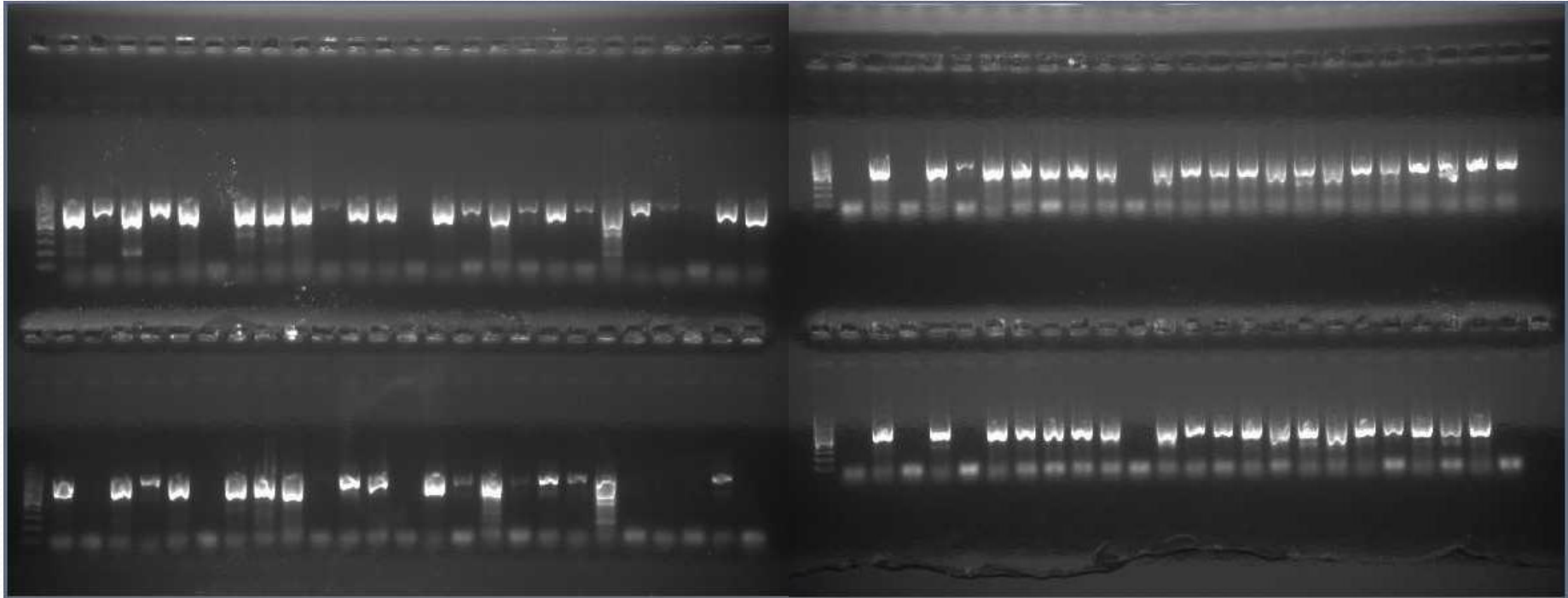


Fig. 1. Gel images of PCR amplicons for 20 *Hydroides* specimens and one *Serpula* specimen using LCO1490/HCO2198, polyLCO/polyHCO and Hydro-CO1F/Hydro-CO1R, respectively. 'M' denotes molecular size ladder in base pairs. The specimen labels are also shown in Table 1. (Sun et al. 2012)

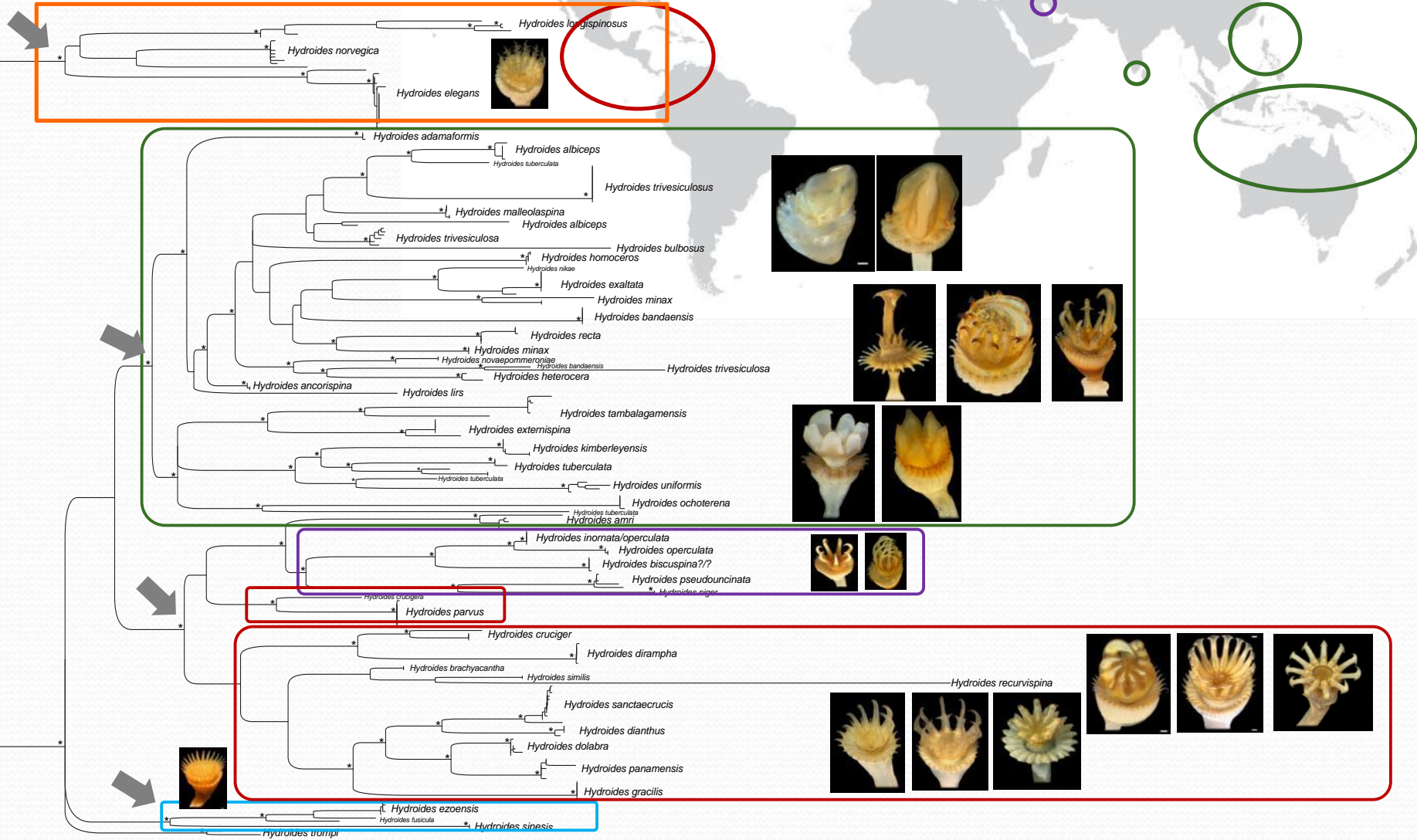
- Taxon-specific primers work only on 17 species
- No further reference sequences for new primer design

Testing of new primers

- Covers around 600 bp of CO1 barcoding region
- Works on all 45 tested species
- A database with 278 sequences of 45 *Hydroïdes* species world wide



Geographic relationship indicated by barcoding data



Mitochondrial genome of *Hydroides* spp.

- Genome length

Hydroides dirampha



Hydroides elegans (~ 19 kb)



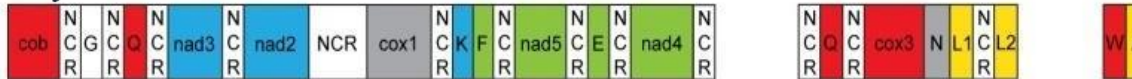
Hydroides ezoensis (~ 18 kb)



Hydroides homoceros



Hydroides minax



Hydroides operculata



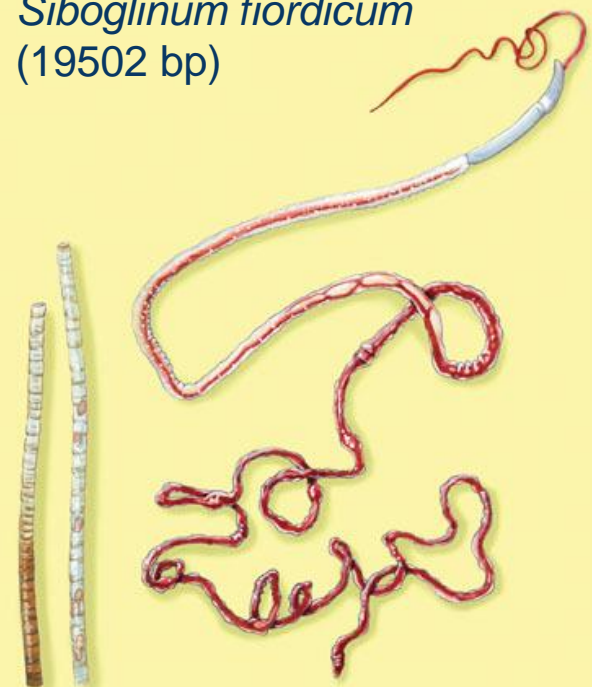
Hydroides pseudouncinata



Hydroides sanctaecrucis



Siboglinum fiordicum (19502 bp)



Mitochondrial gene order and rearrangements of *Hydroides* spp.

Hydroides dirampha



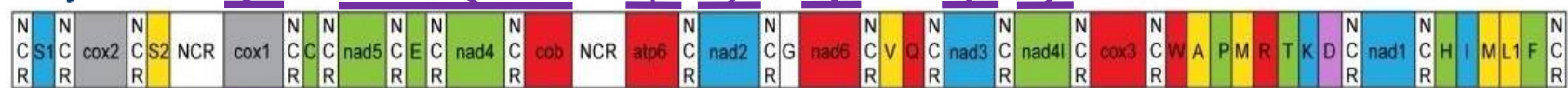
Hydroides elegans



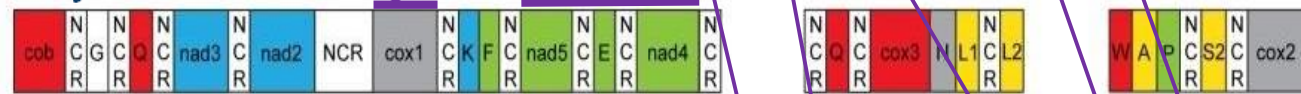
Hydroides ozoensis



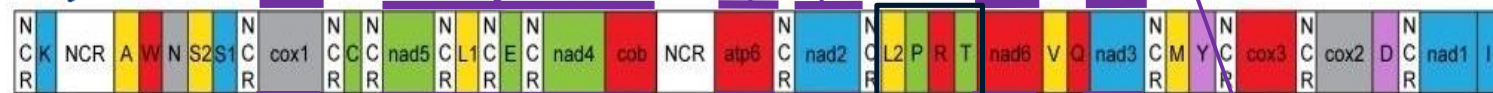
Hydroides homoceros



Hydroides minax



Hydroides operculata



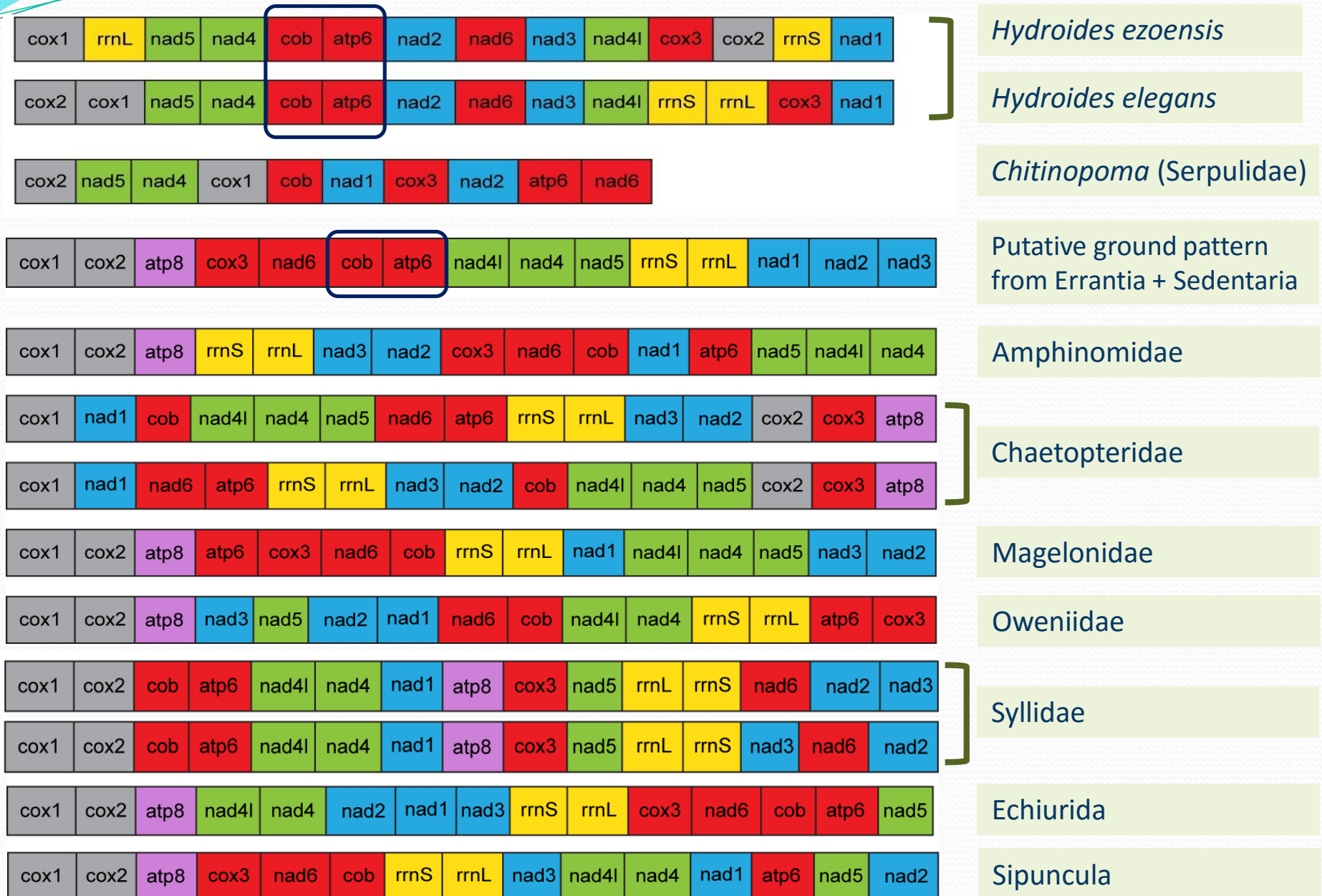
Hydroides pseudouncinata



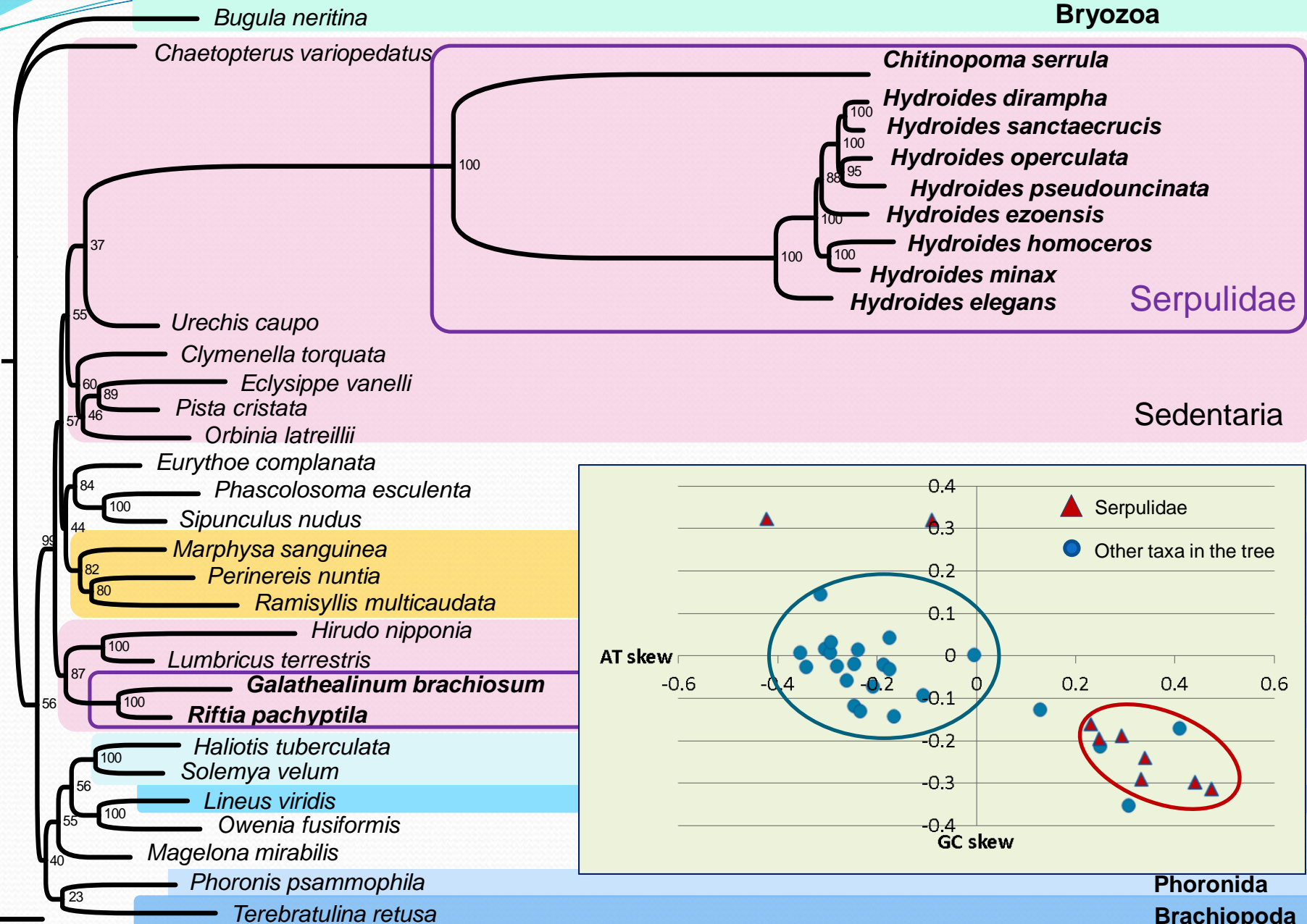
Hydroides sanctaecrucis



Comparison of gene order of Serpulids and the putative ground pattern from Annelida



Phylogenetic relationship based on mitochondrial genome data



Summary

- First CO1 Barcoding data of half species of the entire genus, reveals closer relationships among species of *Hydroides* from close geographic regions.
- Mitochondrial genomes of *Hydroides* show unusual large genome size, non-coding regions, gene order rearrangements, and high substitution rate.
- Phylogenetic analysis support the position of Serpulidae in Sedentaria.

Thanks to:



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Australian
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Resources
Study



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