

New insights into the Antarctic icefish radiation:

Promises of the new congolli (*Pseudaphritis urvillii*)
genome

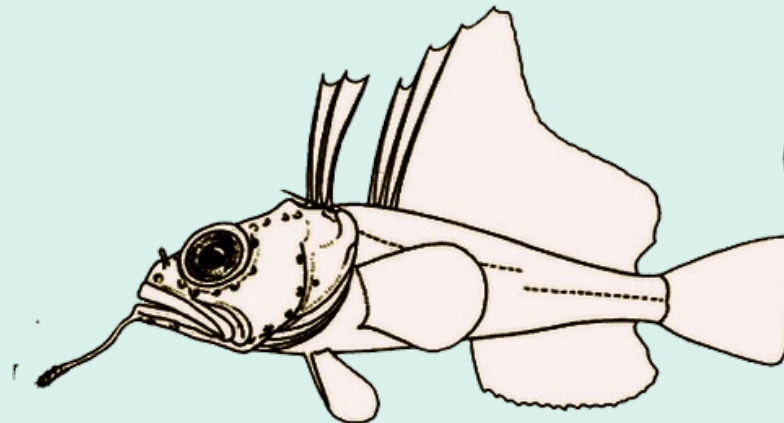
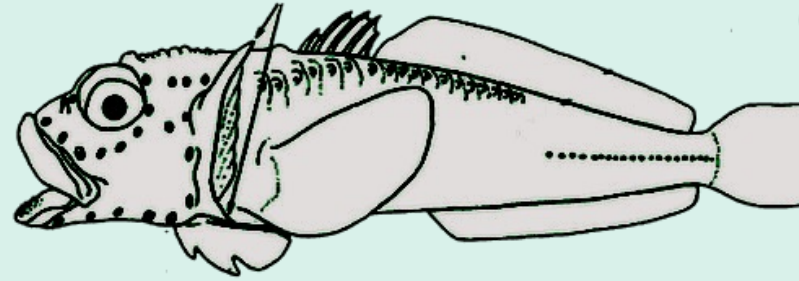
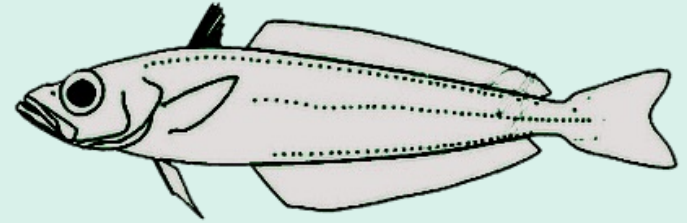
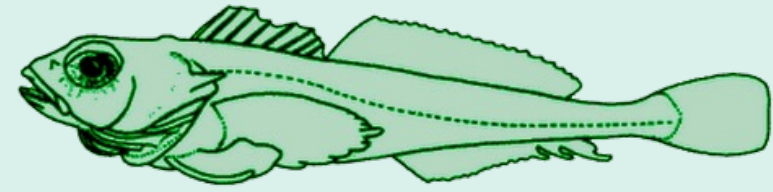
Benedicte Garmann-Aarhus
PhD Research Fellow, Evolutionary Genomics
The Natural History Museum, UiO

Notothenioid fishes

Incredibly diverse group

Adaptive radiation

95% of fish biomass

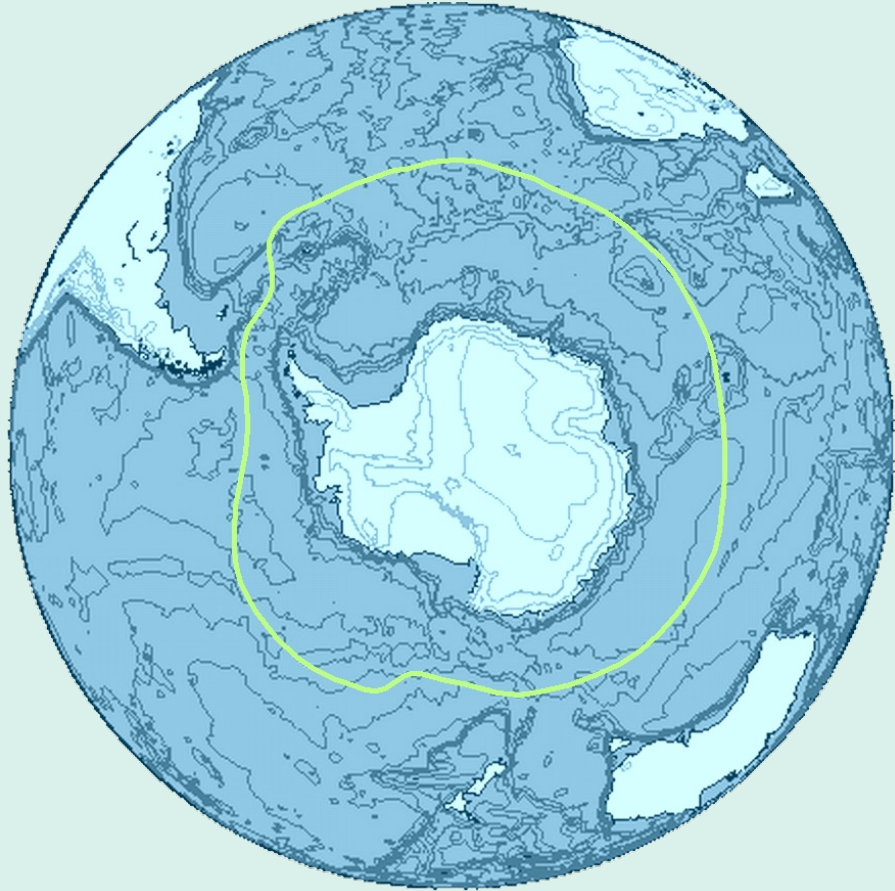


Antarctic notothenioids



<https://fishesofaustralia.net.au/home/species/4878>

Subantarctic notothenioids



Non-antarctic notothenioids



Image source: <https://fishesofaustralia.net.au/home/species/403>

Pseudaphritis urvillii – The congolli

Southeast Australia and Tasmania

Found in streams and estuaries

Catadromous

Monotypic

33 Gb HiFi

68 Gb HiC

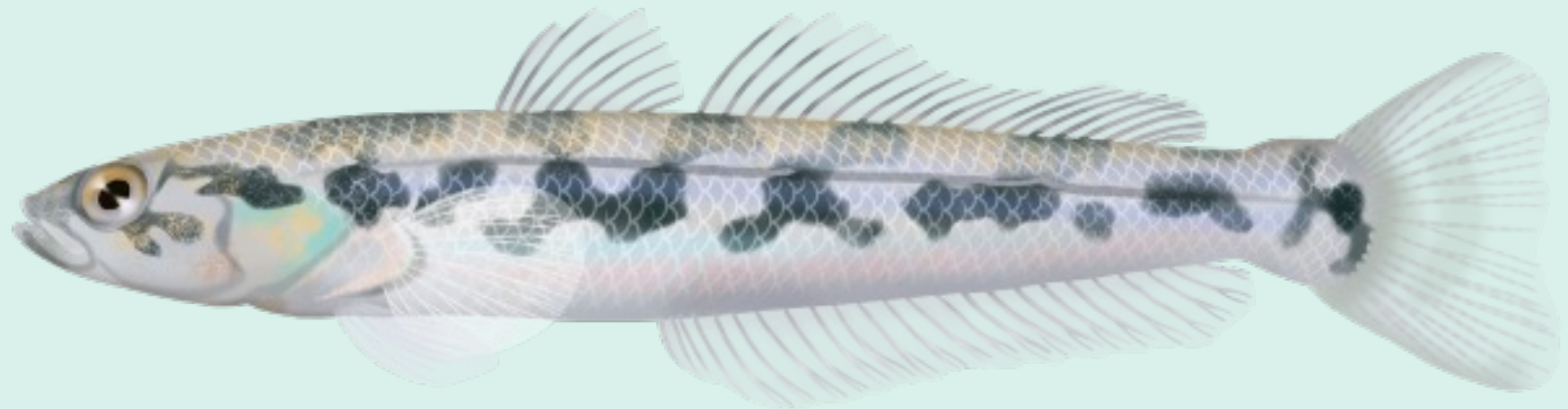


Image source: <https://marinewise.com.au/fish-species/congolli/>

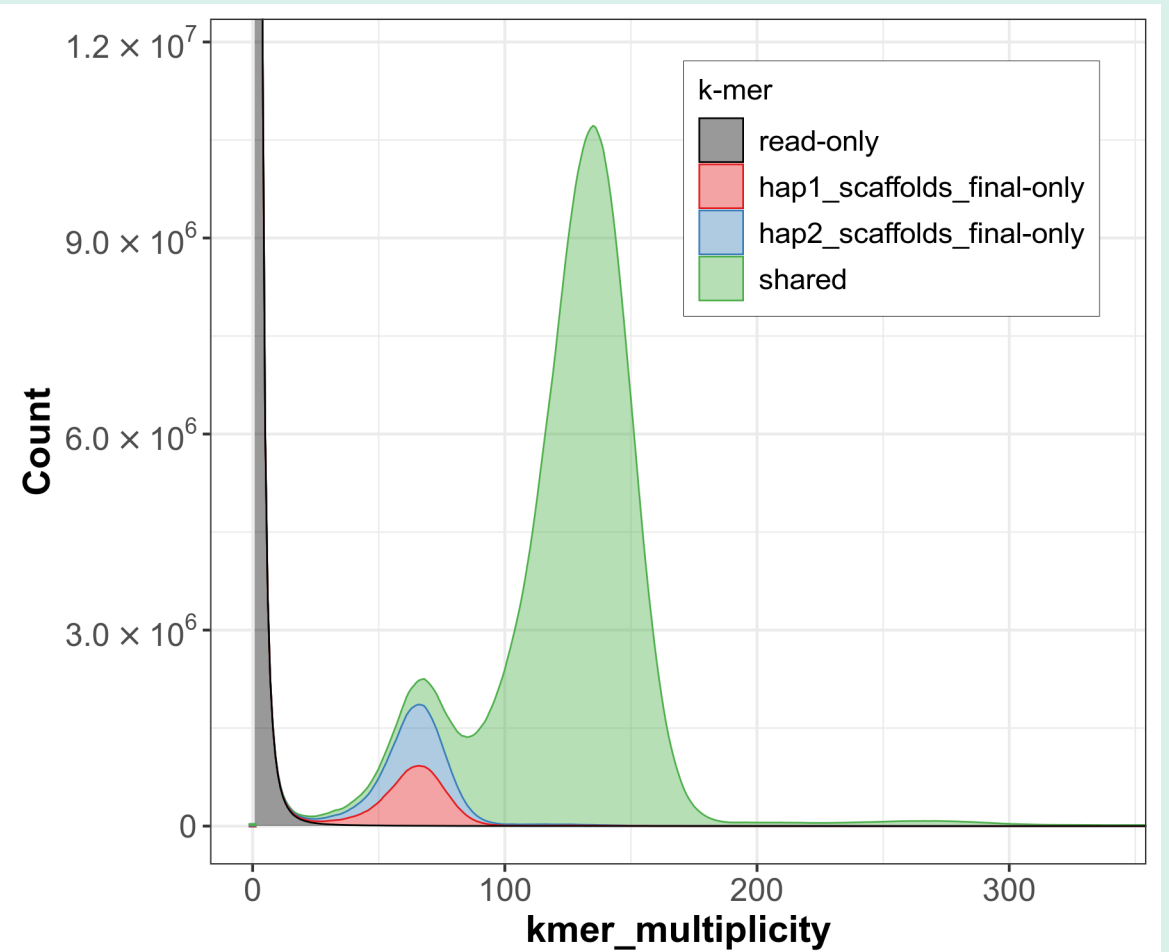
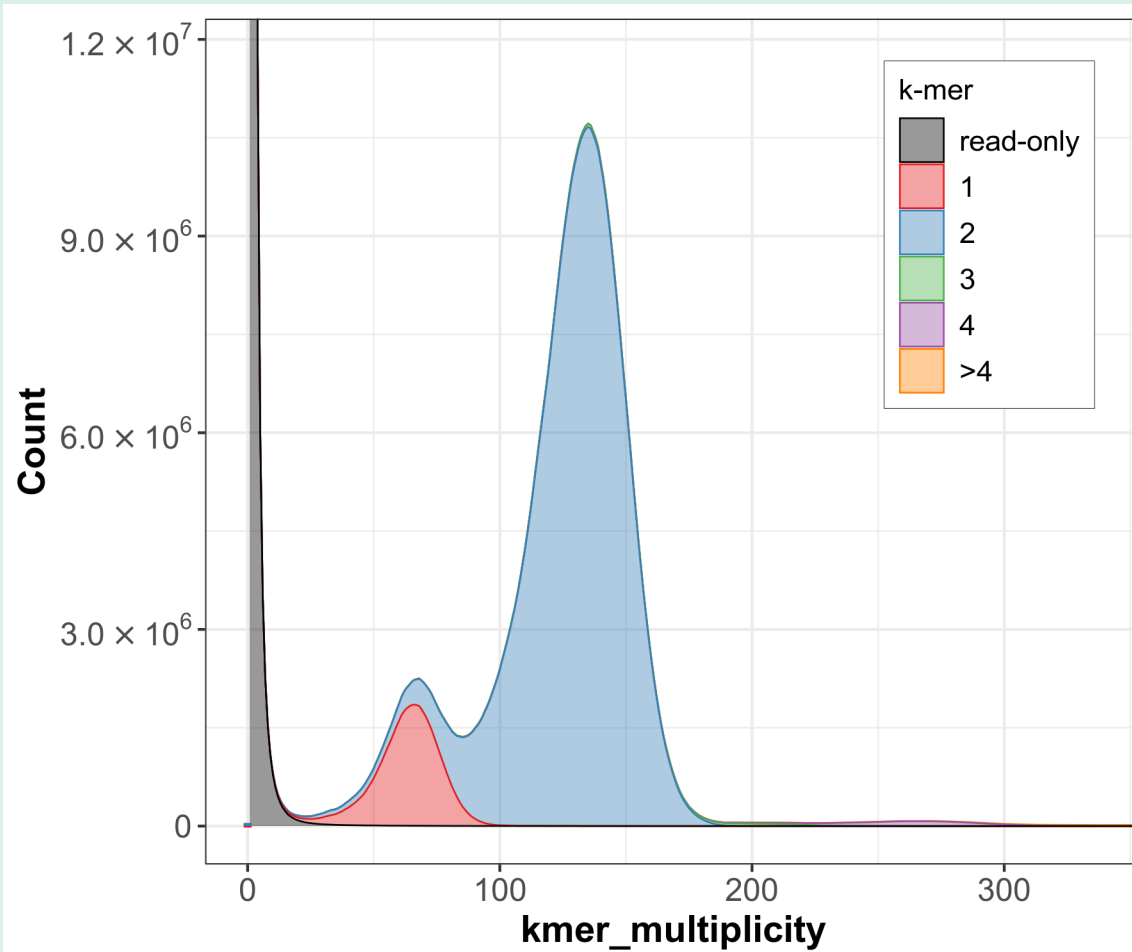
Genome statistics - gfastats

Assembly	Number of super-scaffolds	Number of scaffolds	Total scaffold length:	Average scaffold length:	Scaffold N50:	Largest scaffold:
Haplotype 1	24	459	663 Mbp	1,5 Mbp	27 Mpb	34 Mbp
Haplotype 2	24	395	685 Mbp	1,7 Mbp	26 Mbp	33 Mbp

Genome statistics - BUSCO

Assembly	% complete	Complete BUSCOs	Single BUSCOs	Duplicated BUSCOs	Fragmented BUSCOs	Missing BUSCOs	Total BUSCOs	Lineage
Haplotype 1	98.5 %	3587	3557	30	16	37	3640	Actinopterygii
Haplotype 2	98.9%	3600	3561	39	13	27	3640	Actinopterygii

K-mer plots



QV and K-mer completeness

Assembly	Quality value	Error rate	K-mer completeness
Haplotype 1	60.6153	$8.67898e^{-07}$	94.6932 %
Haplotype 2	60.7618	$8.39103e^{-07}$	94.9318 %
Both	60.6891	$8.53268e^{-07}$	99.8361 %

What can the congolli reference genome be used for?

Timing of diversification of early notothenioid lineages

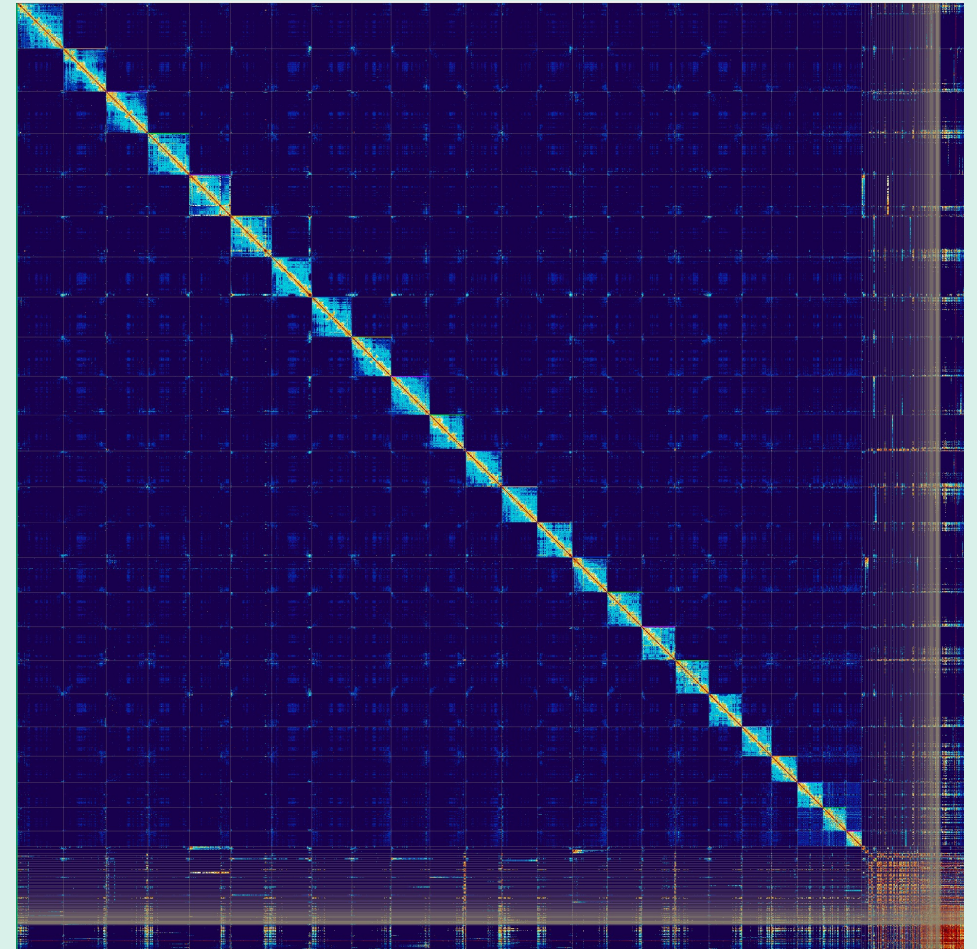
Addition to reconstructing the complete and dated species tree for the icefish adaptive radiation

What remains to be done?

Curation

Annotation

Analyses and comparisons to other early notothenioids



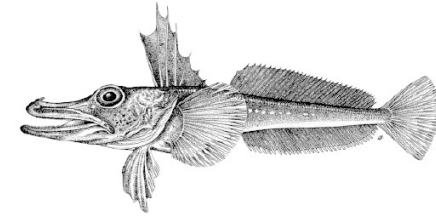
Introducing the ICEFISH project

Project I: Resolving the species status of *Channichthys* icefishes

Project II: Identifying genomic evidence for past ice sheet collapses

Project III: Reconstructing the complete species tree with gene flow for the Antarctic icefish radiation

The role of gene flow in the evolution of Antarctic icefishes



Description of the PhD project of **Benedicte Garmann-Aarhus**

To be conducted at
The Natural History Museum (University of Oslo)

Supervised by

Michael Matschiner
(main supervisor)

Natural History Museum, Oslo, Norway

Chiara Papetti
(co-supervisor)

University of Padova, Padova, Italy

Torsten Hugo Struck
(co-supervisor)

Natural History Museum, Oslo, Norway

Arild Johnsen
(co-supervisor)

Natural History Museum, Oslo, Norway

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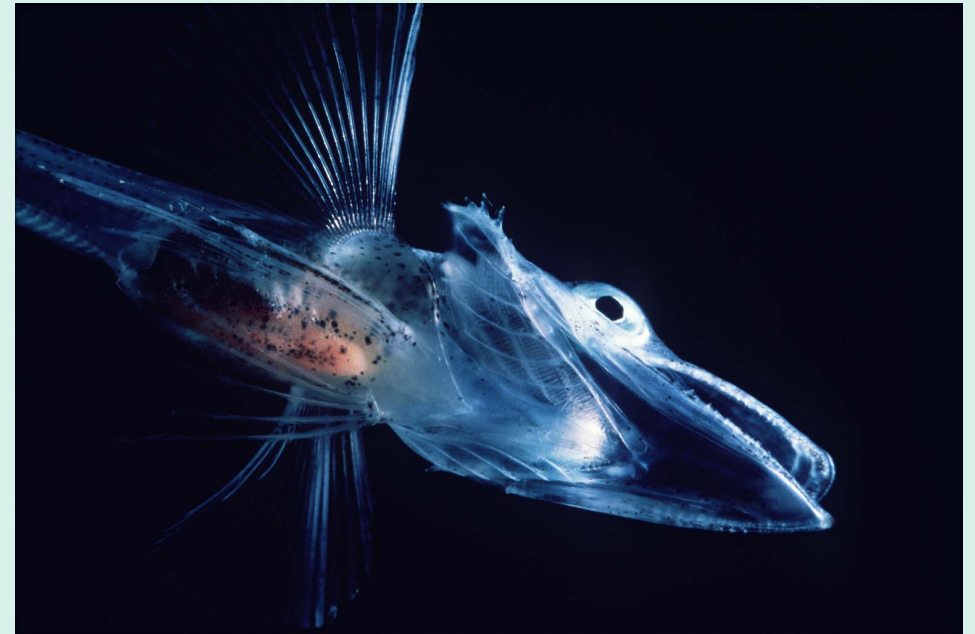


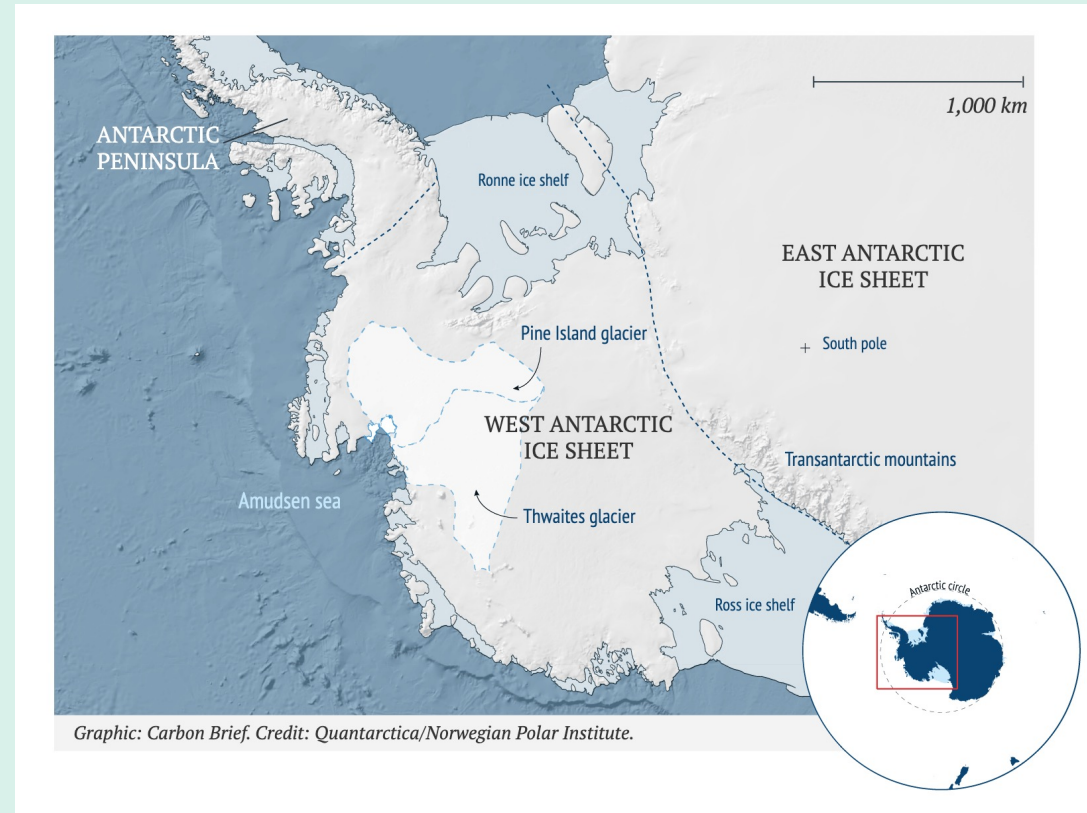
Image source: <https://www.scientificamerican.com/article/icefish-study-adds-another-color-to-the-story-of-blood/>

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<https://www.carbonbrief.org/guest-post-how-close-is-the-west-antarctic-ice-sheet-to-a-tipping-point/>

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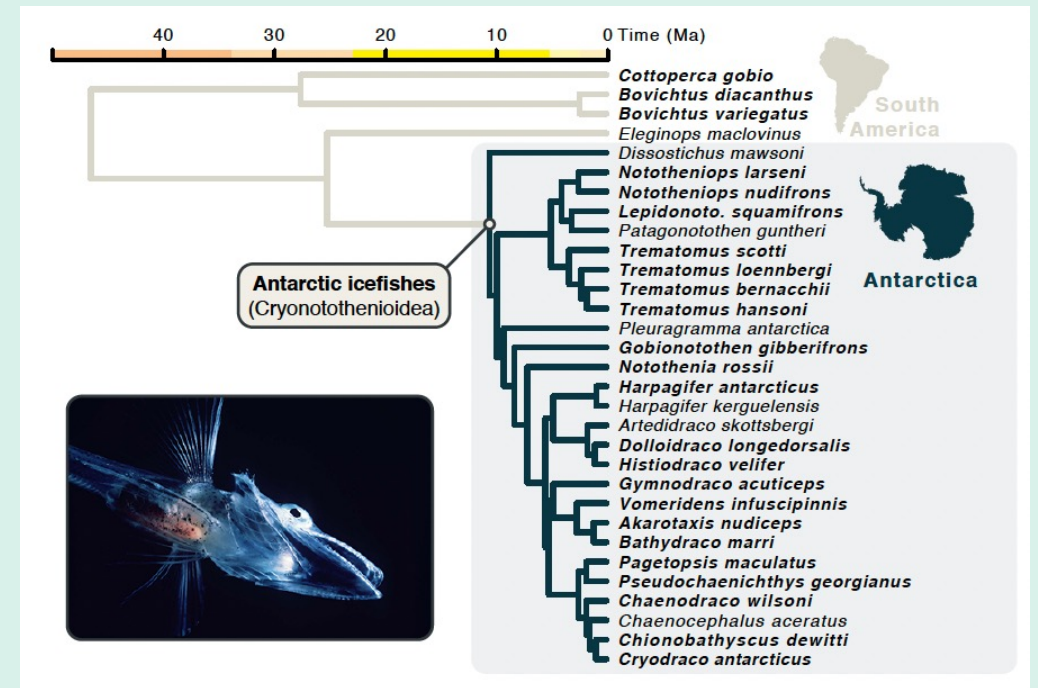




Image made by Michael Matschiner

Article | Published: 18 November 2020

Drivers and dynamics of a massive adaptive radiation in cichlid fishes

[Fabrizia Ronco](#) , [Michael Matschiner](#), [Astrid Böhne](#), [Anna Boila](#), [Heinz H. Büscher](#), [Athimed El Taher](#), [Adrian Indermaur](#), [Milan Malinsky](#), [Virginie Ricci](#), [Ansgar Kahmen](#), [Sissel Jentoft](#) & [Walter Salzburger](#) 

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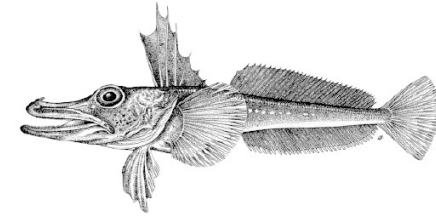
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