

# Towards the characterisation of underwater forests

## Flash view on 3 studies about the trophic and phylogenetic diversity of protists in the global ocean

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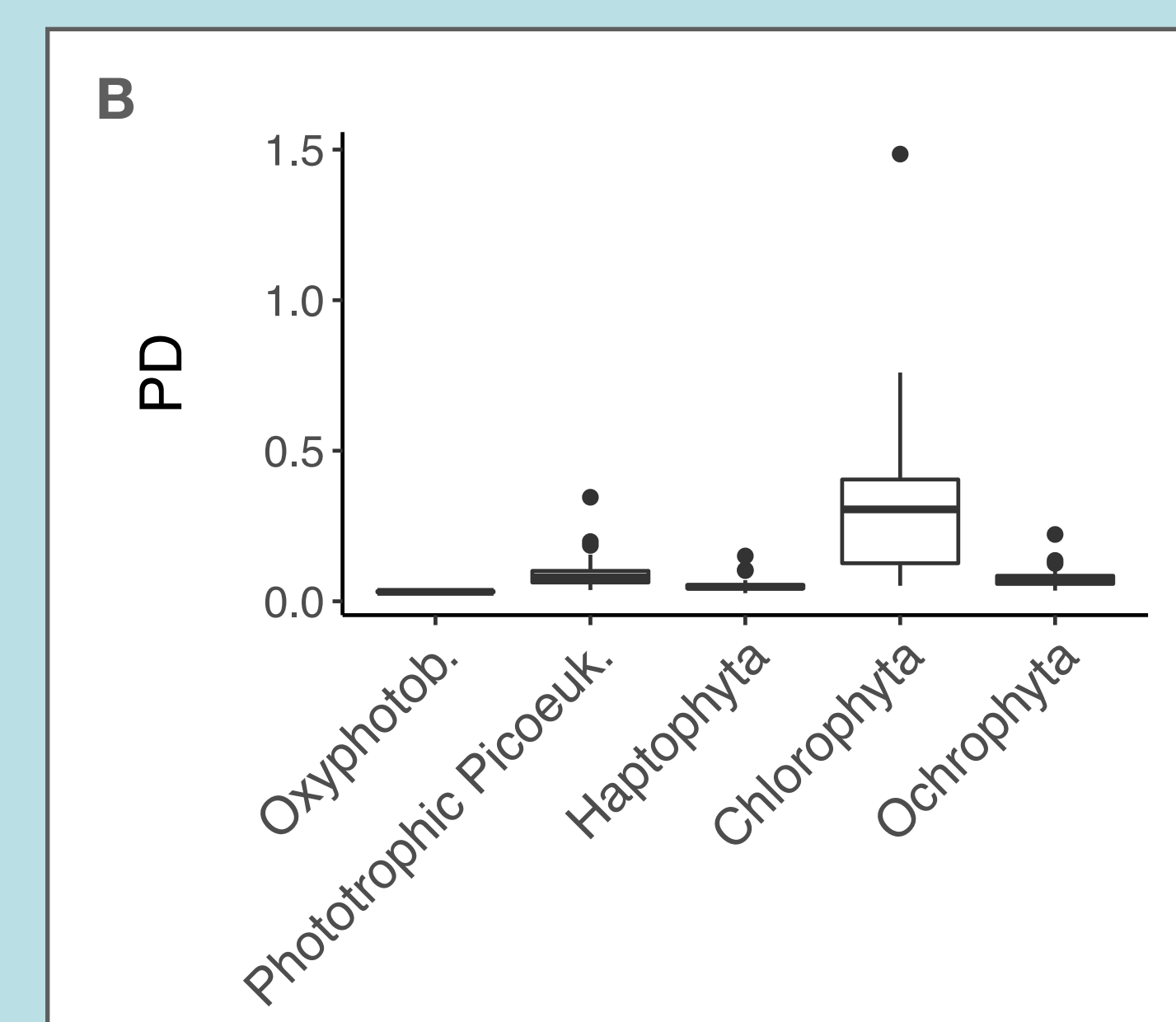
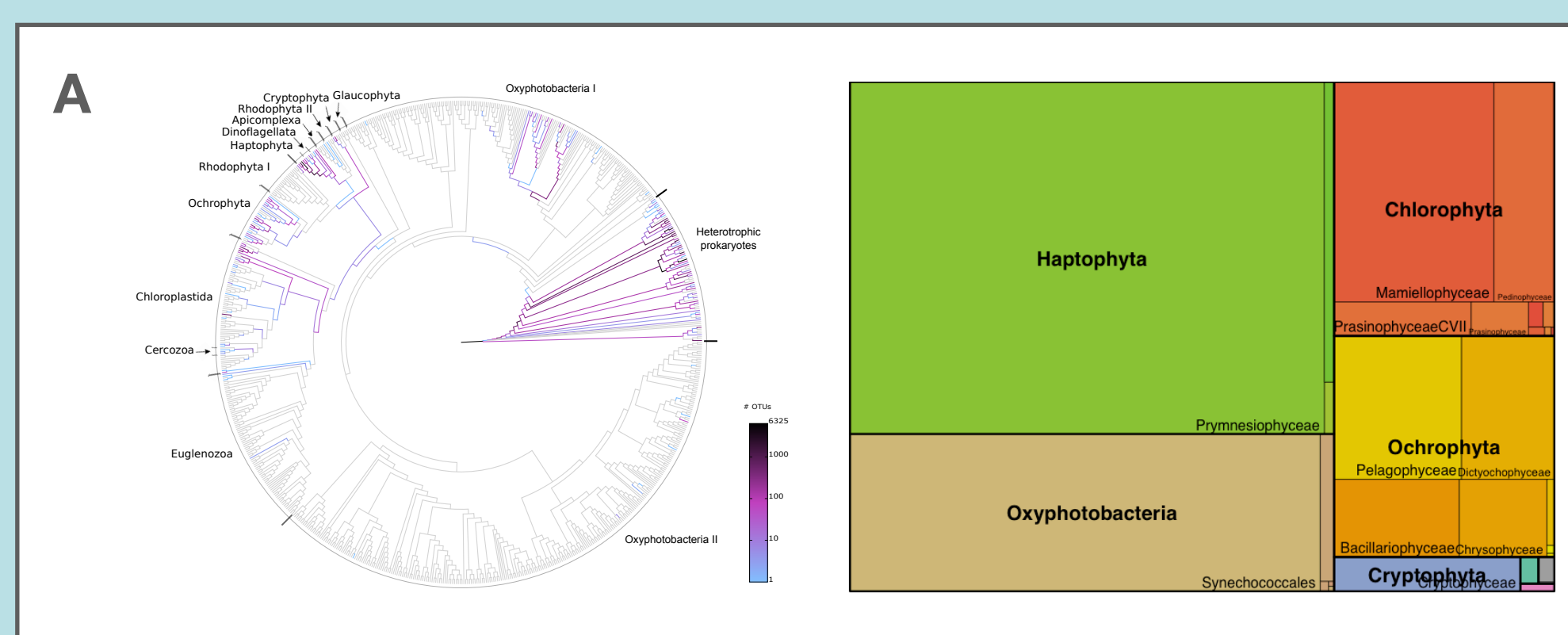
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### 1 Global comparative analysis of picophototrophs\*

We compared the abundance and diversity of prokaryotes and picoeukaryotes that contribute to photosynthesis in the oligotrophic ocean.

- Metagenomic and metabarcoding data showed that Cyanobacteria are 3 times more abundant than phototrophic picoeukaryotes but hold lower evolutionary diversity.

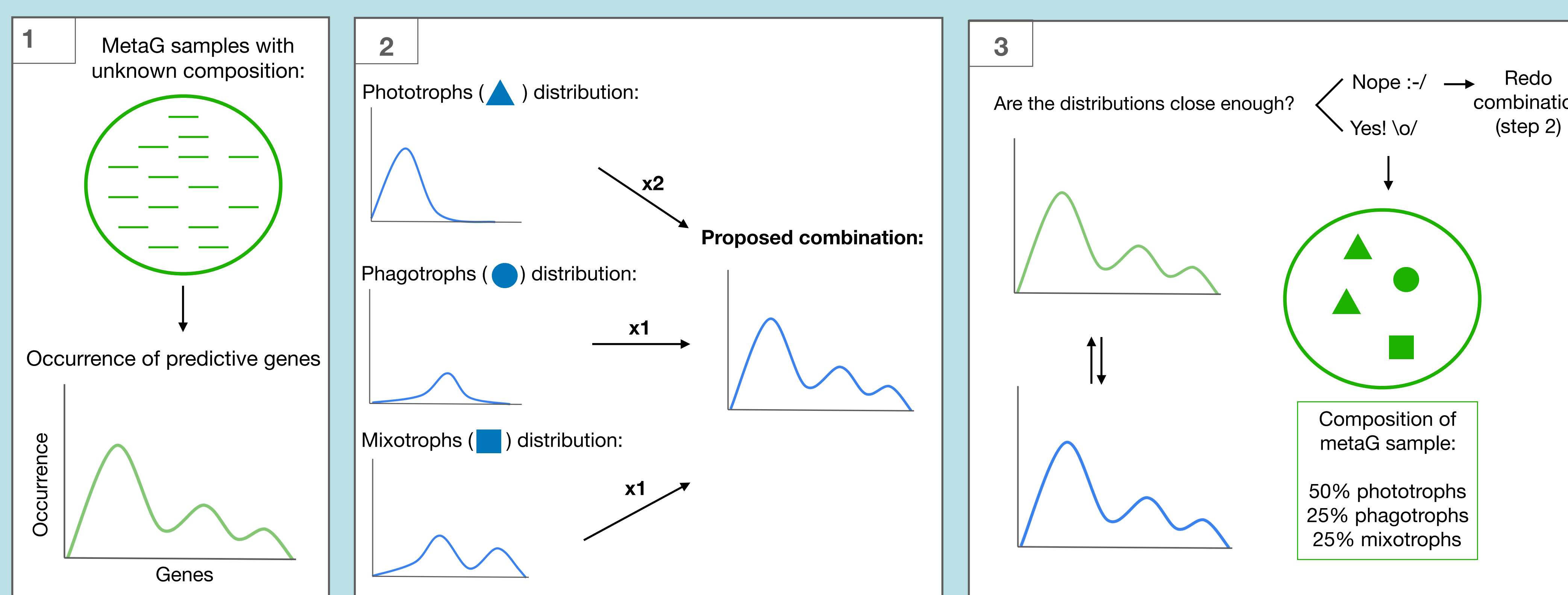
- Prymnesiophyceae, Mamiellophyceae, Dictyochophyceae and Pelagophyceae are the dominant eukaryotic groups.



\*In collaboration with Pierre Barbera, Lucas Czech, Nicolas Henry, Pelin Yilmaz, Ewen Corre and Cédric Berney.

### 2 Deciphering the global map of trophic modes\*

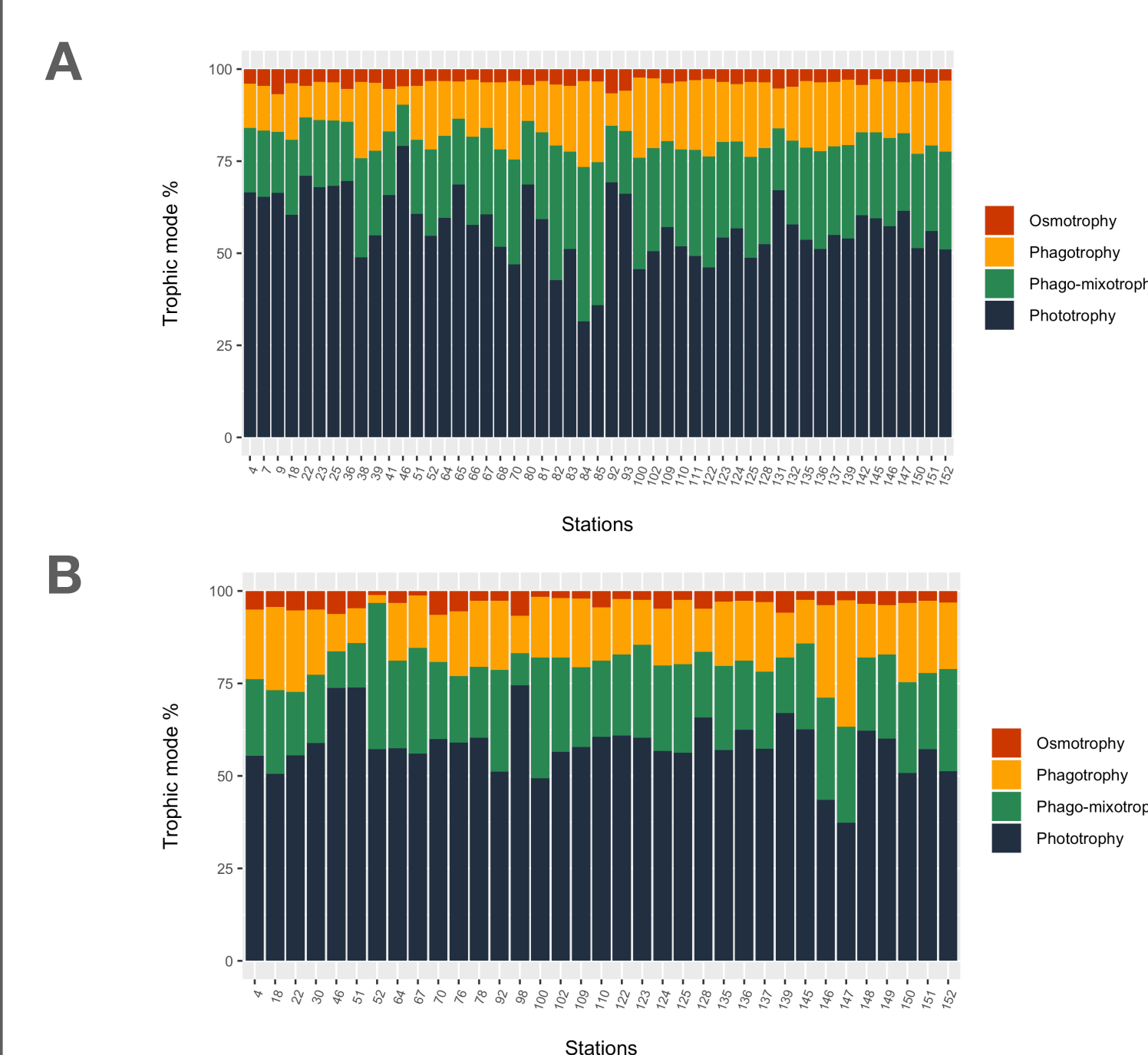
We adapted a model predictive for nutrition mode (2) to find out the proportion of the different trophic groups (including phago-, photo-, osmo- and mixo-trophs) in metagenomic data. The model follows these steps:



\*In collaboration with John Burns, Giulio Triglia, Eric Pelletier and Nicolas Henry

- We used the model to screen *Tara* Oceans metaG samples of piconano- (A) and nano- (B) size fraction.

- The results show dominance of phototrophs in most of the samples, followed by mixotrophs a phagotrophs.

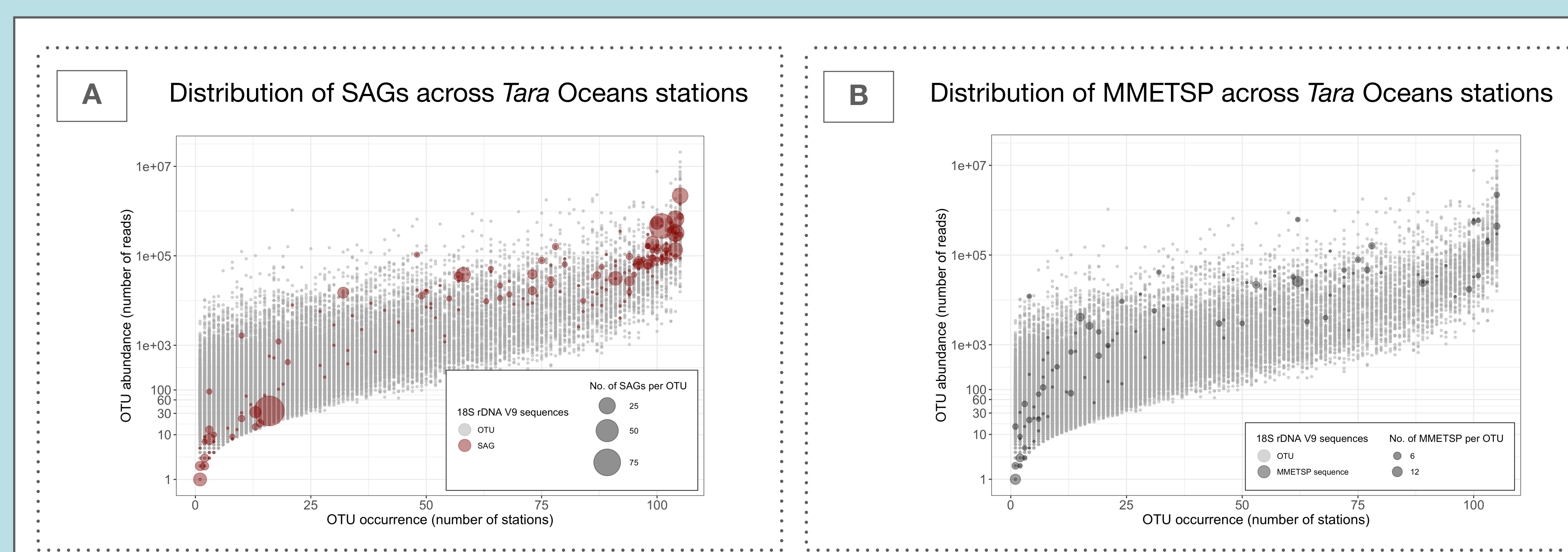


### 3 The potential of Single-Cell Genomics to recover the dominant protists in the ocean\*

We compared a collection of 903 SAGs<sup>3</sup> (single-cell amplified genomes) and the MMETSP against *Tara* Oceans 18S rDNA V9 metabarcodes to evaluate their global occurrence and abundance.

In comparison with MMETSP, SAGs dataset represents a number of cosmopolitan and abundant taxa. This suggests that SCG is a powerful technique for the recovery of the dominant taxa of protists in the ocean.

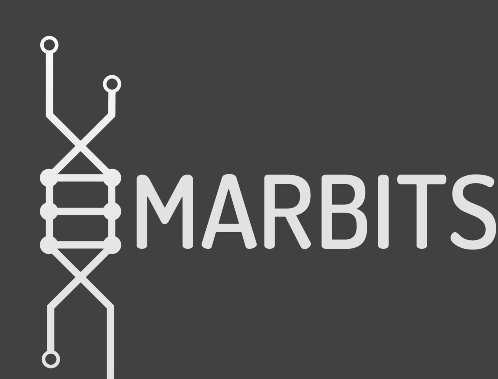
\*Work included in the study of Sieracki et al. (3)



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- J. Burns et al. (2018) Gene-based predictive models of trophic modes suggest Asgard archaea are not phagocytotic. *Nature Ecology & Evolution* volume 2, pages697–704.
- Sieracki et al. (2019) Single cell genomics yields a wide diversity of small planktonic protists across major ocean ecosystems. *Scientific Reports* volume 9, Article no.: 602