

# Does decreasing benthic biomass trigger shift in the functional trait composition over time?

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International Workshop on Trait-based approaches to Ocean Life, Copenhagen, 26-28 August 2013

## Introduction

Ecological studies based on time series often investigate community changes based on species density or diversity but rarely focus on the resulting functional aspects of the changes. Here we analyse the effects of a decrease in zoobenthic biomass on the functional trait composition in a well-studied area of the Åland islands, Northern Baltic Sea, over 12 years (1994-2006).

## Study area and benthic biomass progression

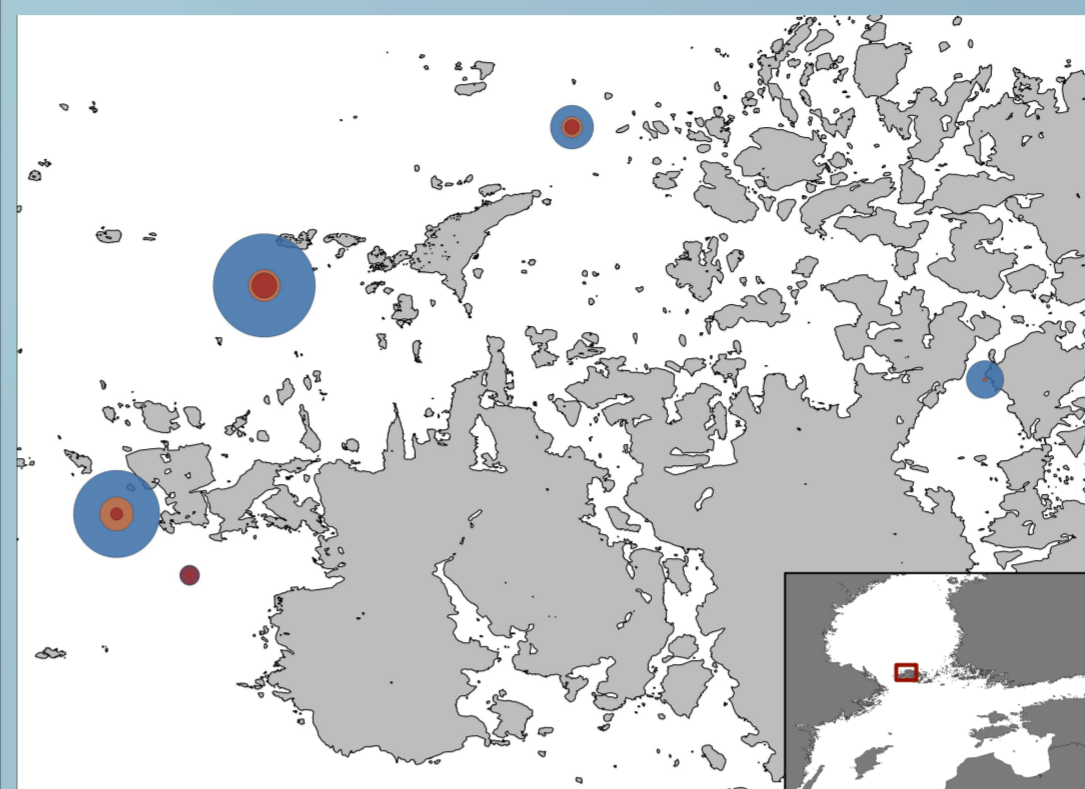


Figure 1: Five sampling sites NW Åland Islands; size of station represents relative biomass values in years, 1994 (blue), 2000 (orange) and 2006 (red)

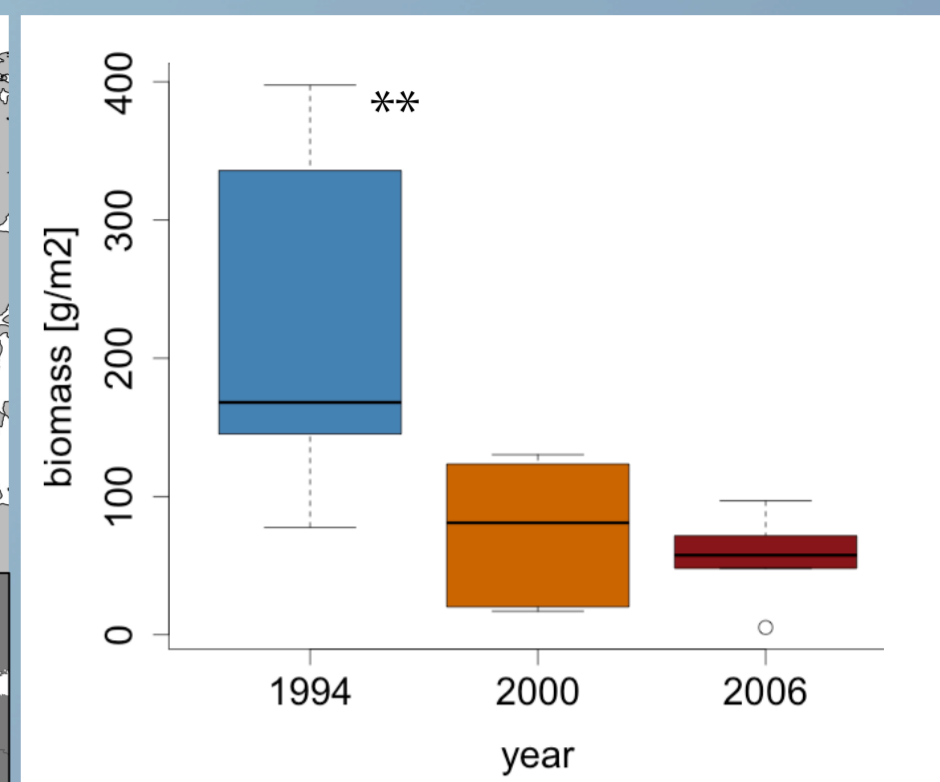


Figure 2: Box-whisker plots of total biomass from investigated stations per year. Black horizontal line in boxes indicates median, whiskers indicate interquartile range

## “type organism”

Medium size (1-3 cm)  
Solitary  
Diffusive mixing  
Local dispersal  
Detritivore  
Mobile  
Epibenthically

Sexual reproduction  
Gonochoristic (separate sexes)  
Direct development  
Permanent in/on sediment  
Top 2 cm

Törnroos & Bonsdorff 2012

## Methods

**Relating** benthic biomass, via scoring system, to 23 categorical functional traits including 89 modalities (sensu Törnroos & Bonsdorff, 2012)

**Describing** common trait modalities over time by selecting modalities > 90% of highest score

**Analysing** composition of modalities which increase in their relative expression/importance over time

**Reducing** traits and modalities to a subset (10 traits, 41 modalities), focusing on functions which are relevant from a fish predation point of view

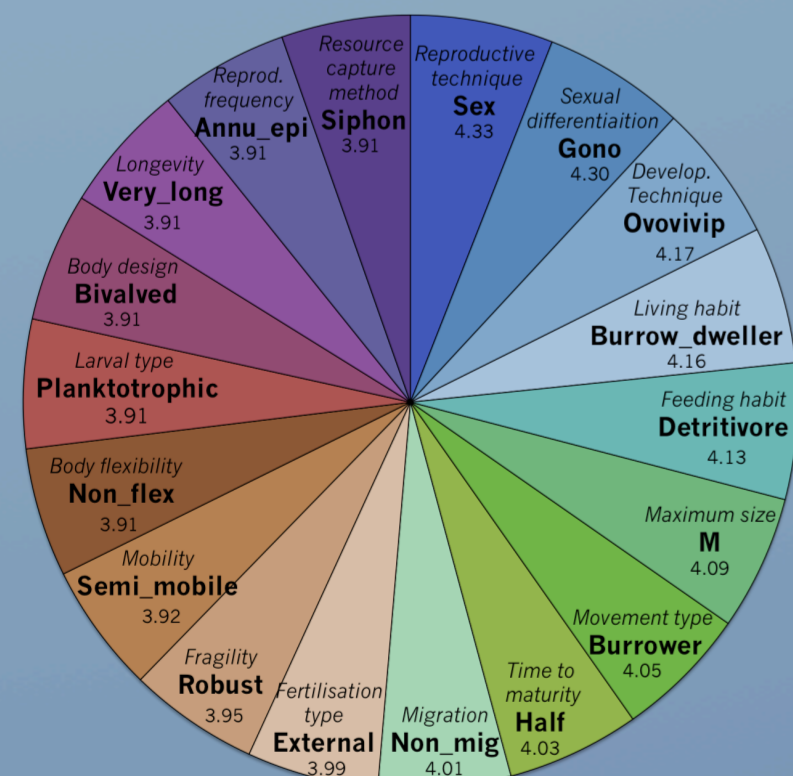
## Conclusion

Preliminary results indicate that despite a decrease in biomass, common modalities remain similar. Biomass change seems to alter the relative importance of the top modalities (type organism). Further it promotes the expression level of potential new modalities over time. Hence this could serve as indication for an upcoming functional shift in the system.

## Type organism

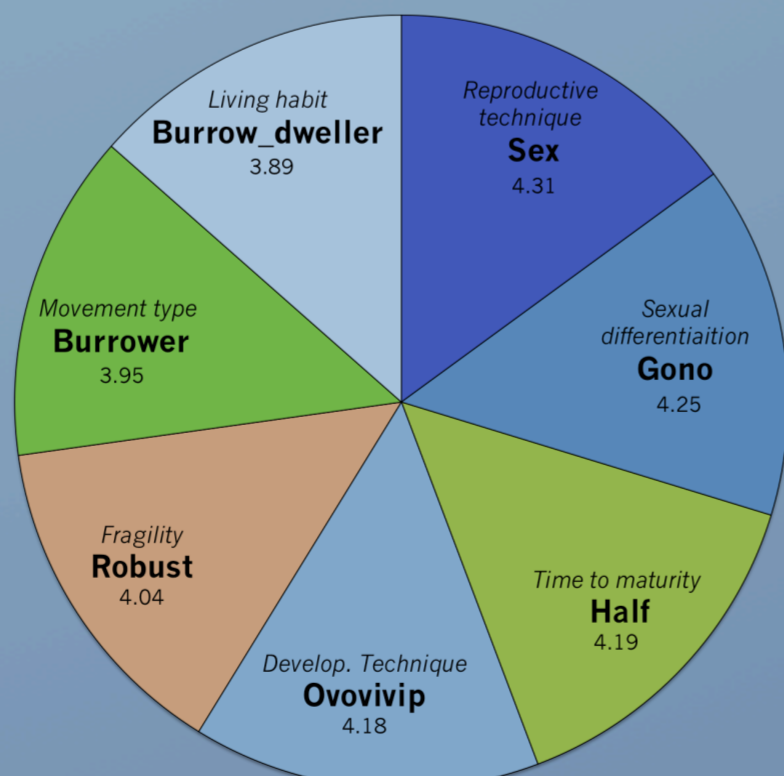
Full trait matrix

1994



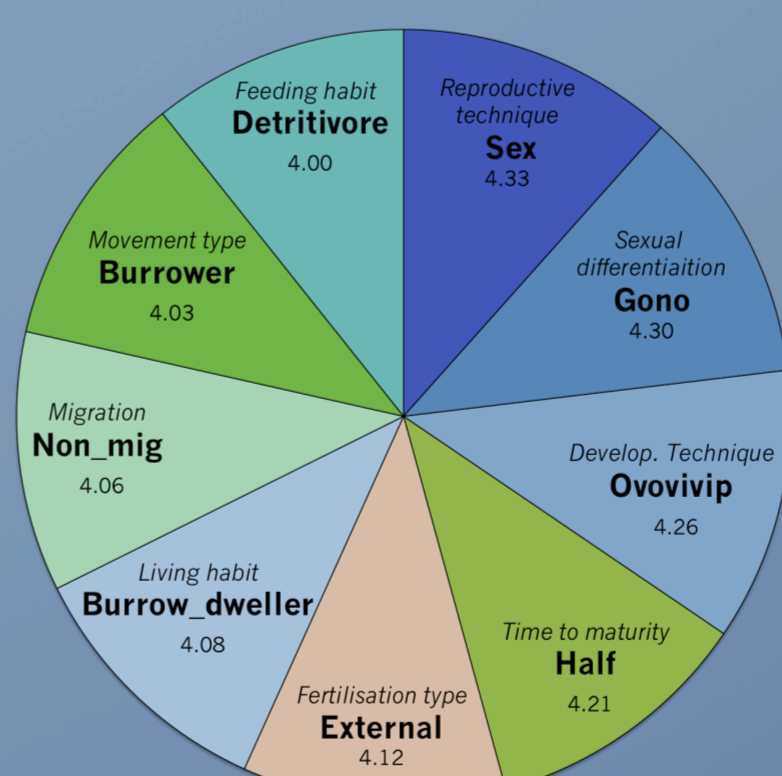
18

2000



7

2006

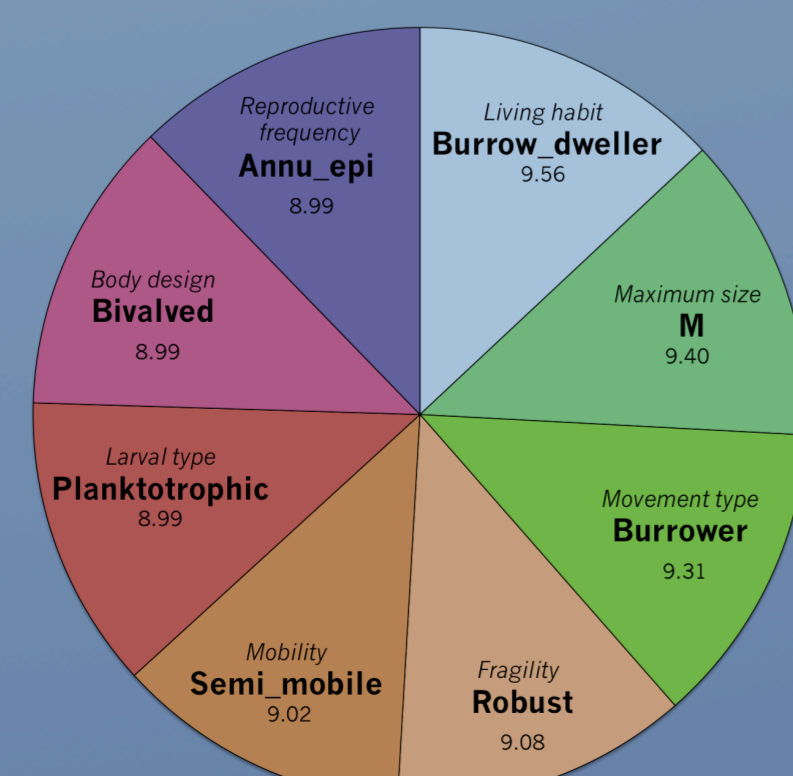


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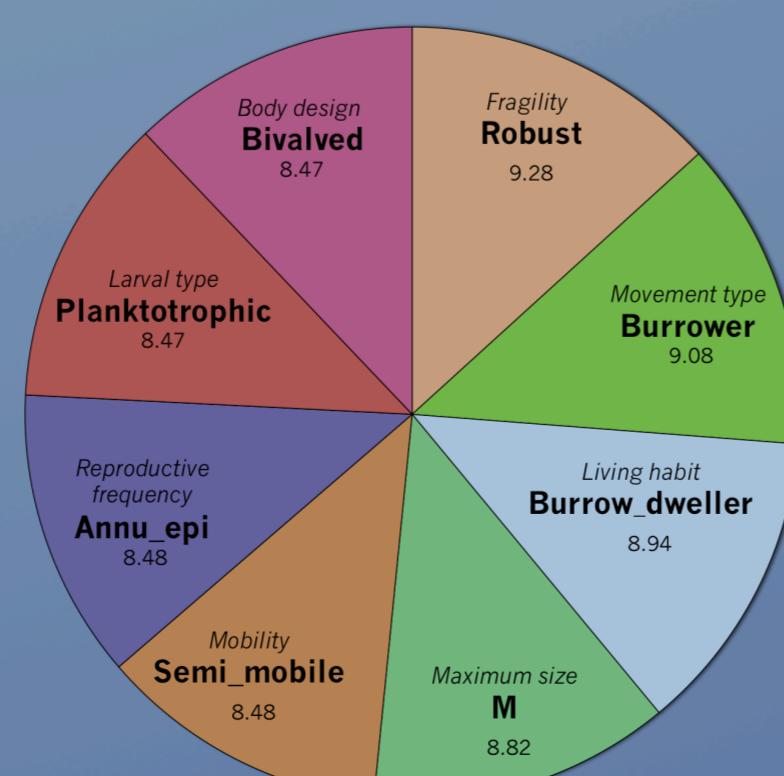
Number of top score modalities

Fish predation relevant trait matrix

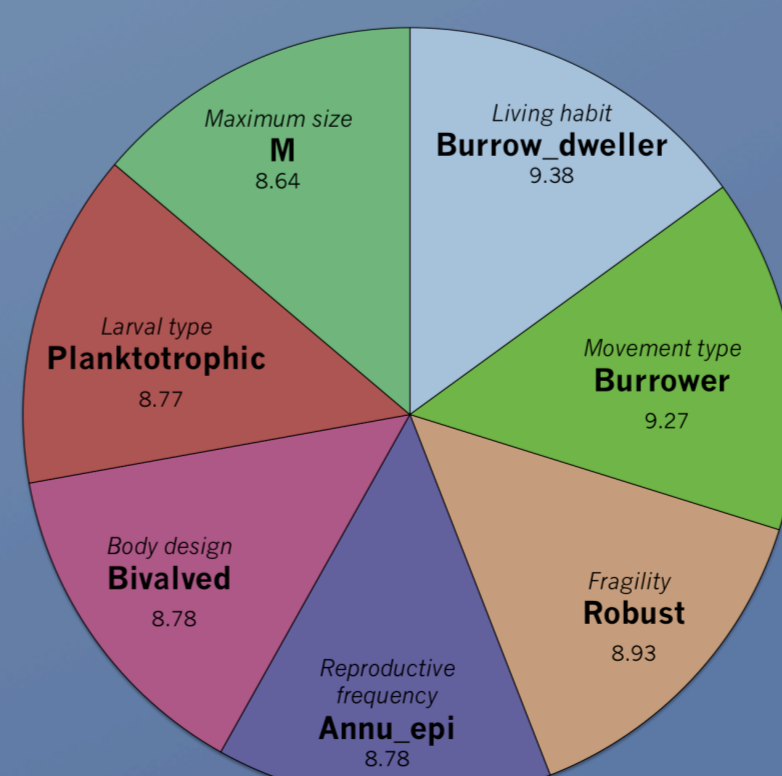
8



8

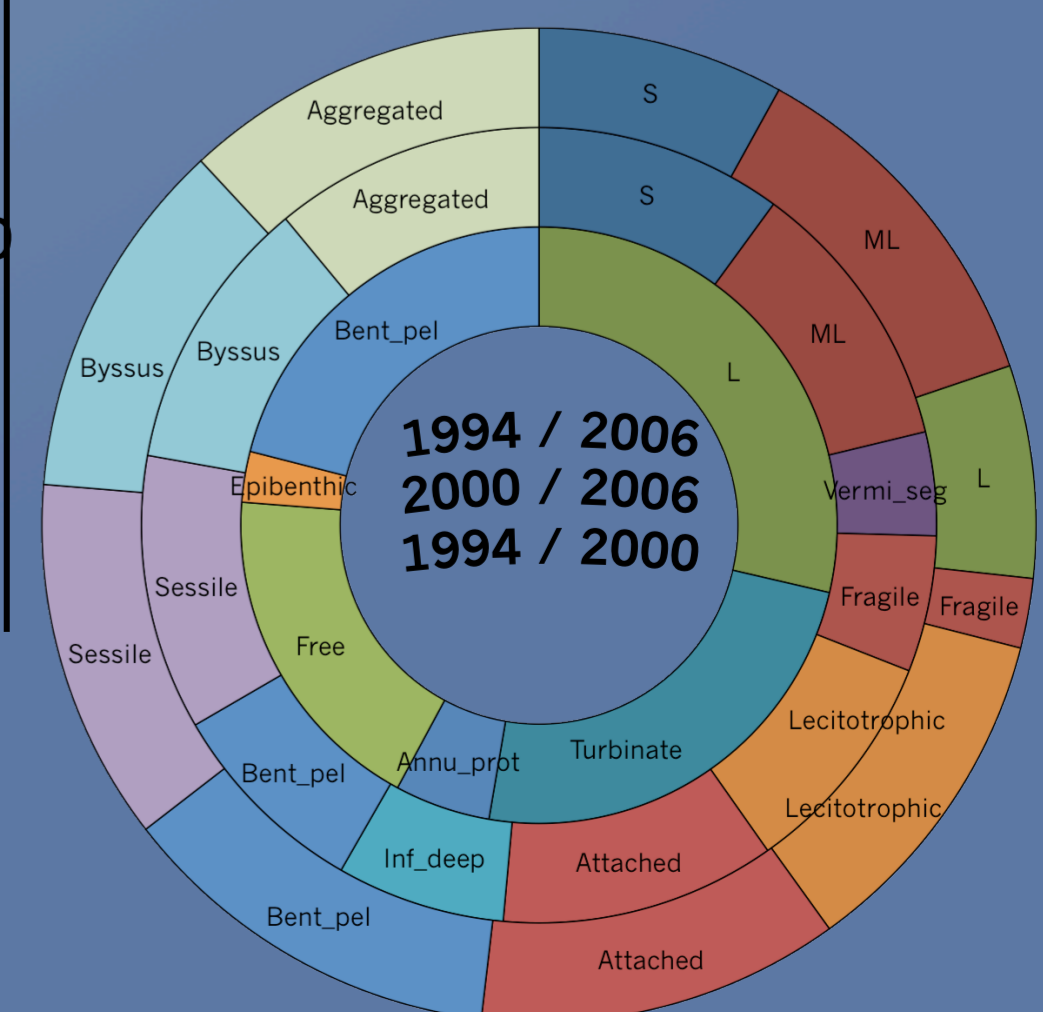
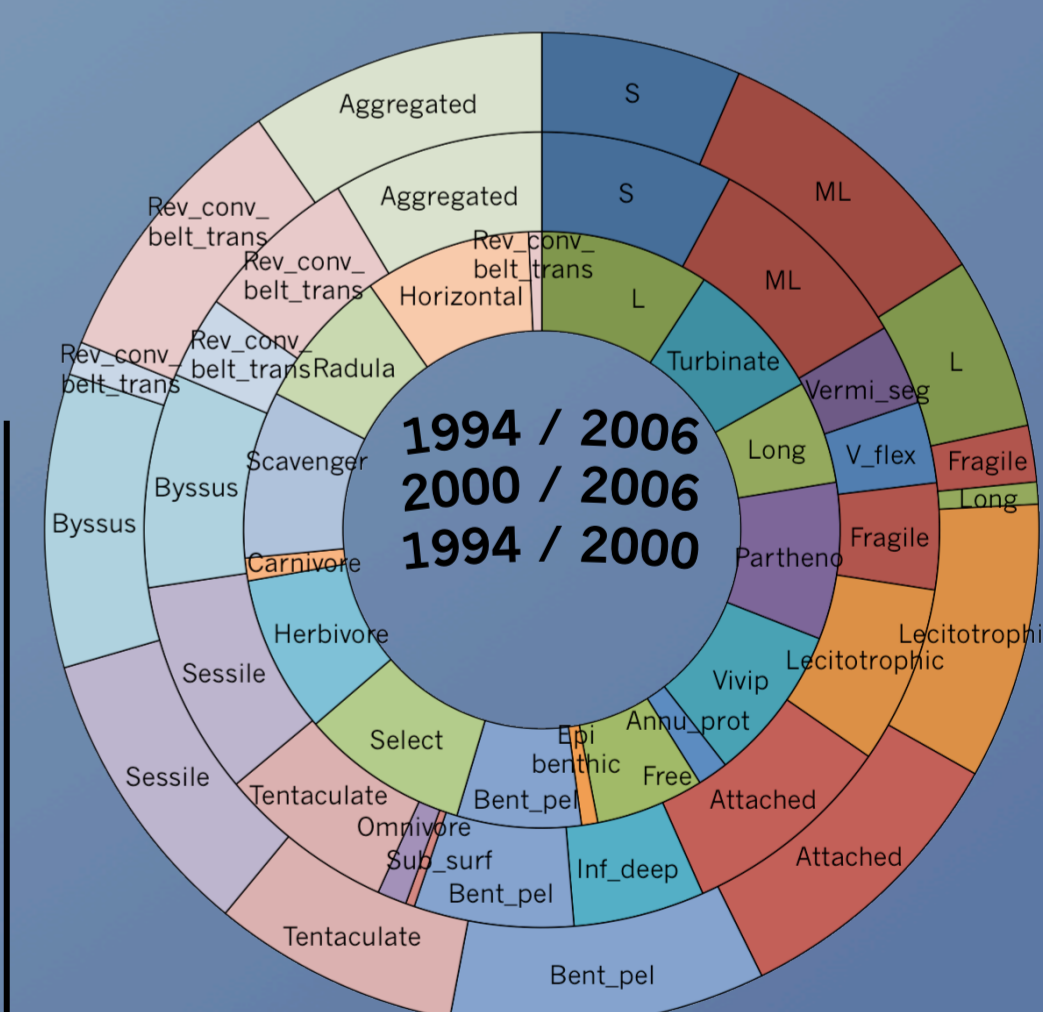


7



Number of top score modalities

Increasing modalities over time



## Reference:

Törnroos, A., & Bonsdorff, E. (2012). Developing the multitrait concept for functional diversity: Lessons from a system rich in functions but poor in species. *Ecological Applications*, 22(8), 2221–2236.

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