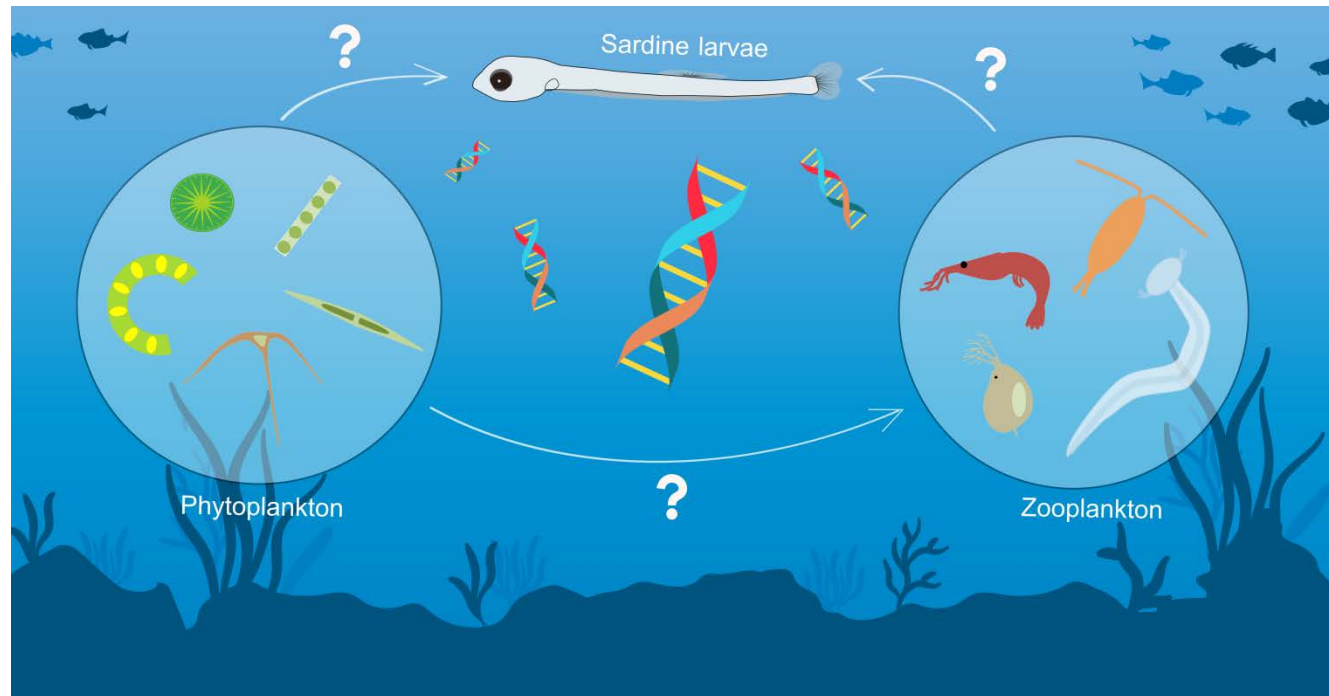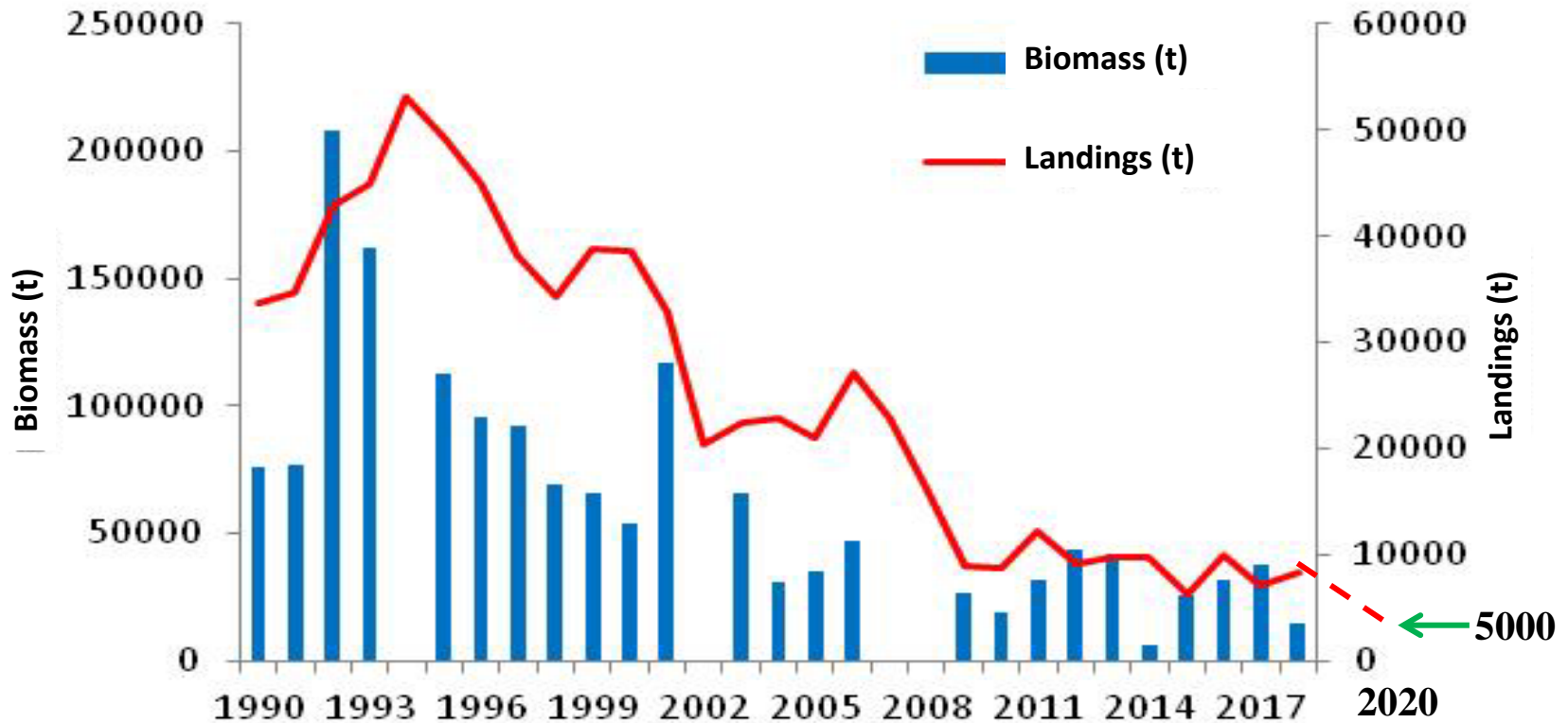# Molecular identification of the zooplanktonic diet of *Sardina pilchardus* larvae in the SW Mediterranean Sea

L. Yebra, A. Hernández de Rojas, N. Valcárcel-Pérez, C. García-Gómez, M.C. Castro, R. Laiz-Carrión, F. Gómez-Jakobsen, A. Uriarte, J.M. Quintanilla, J.M. Mercado

Mediterranean Sea small pelagic fisheries decline: size and condition
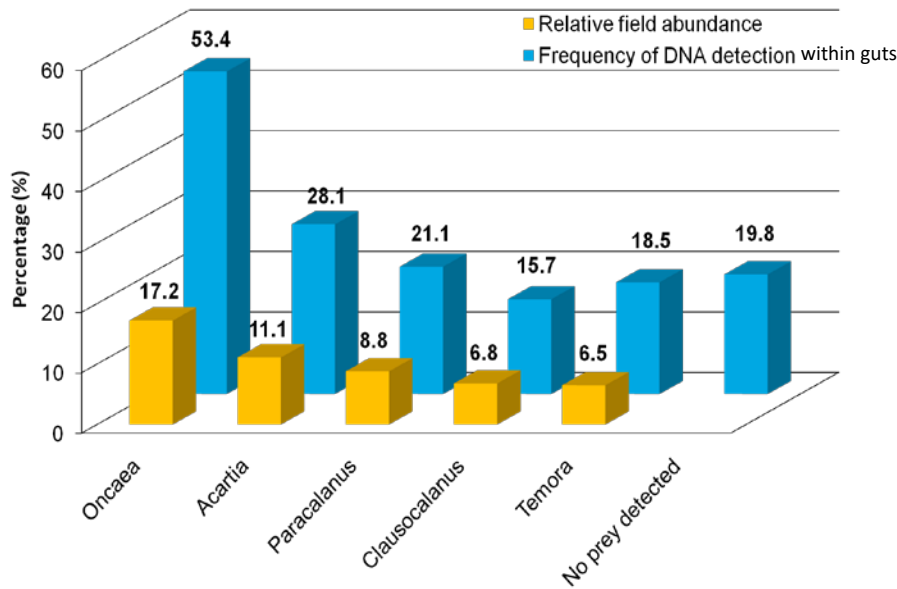

Sardina pilchardus, W Mediterranean. Torres et al. 2018

★ socio-economic consequences
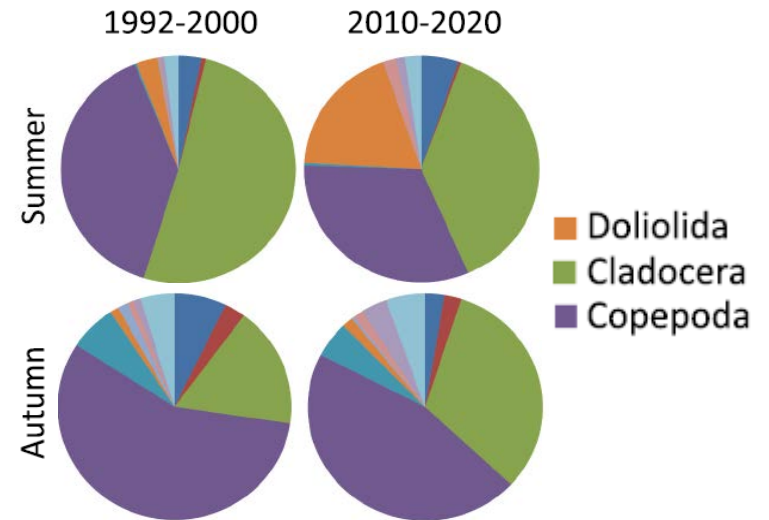
What causes this decline?

Fishing pressure & environmental changes
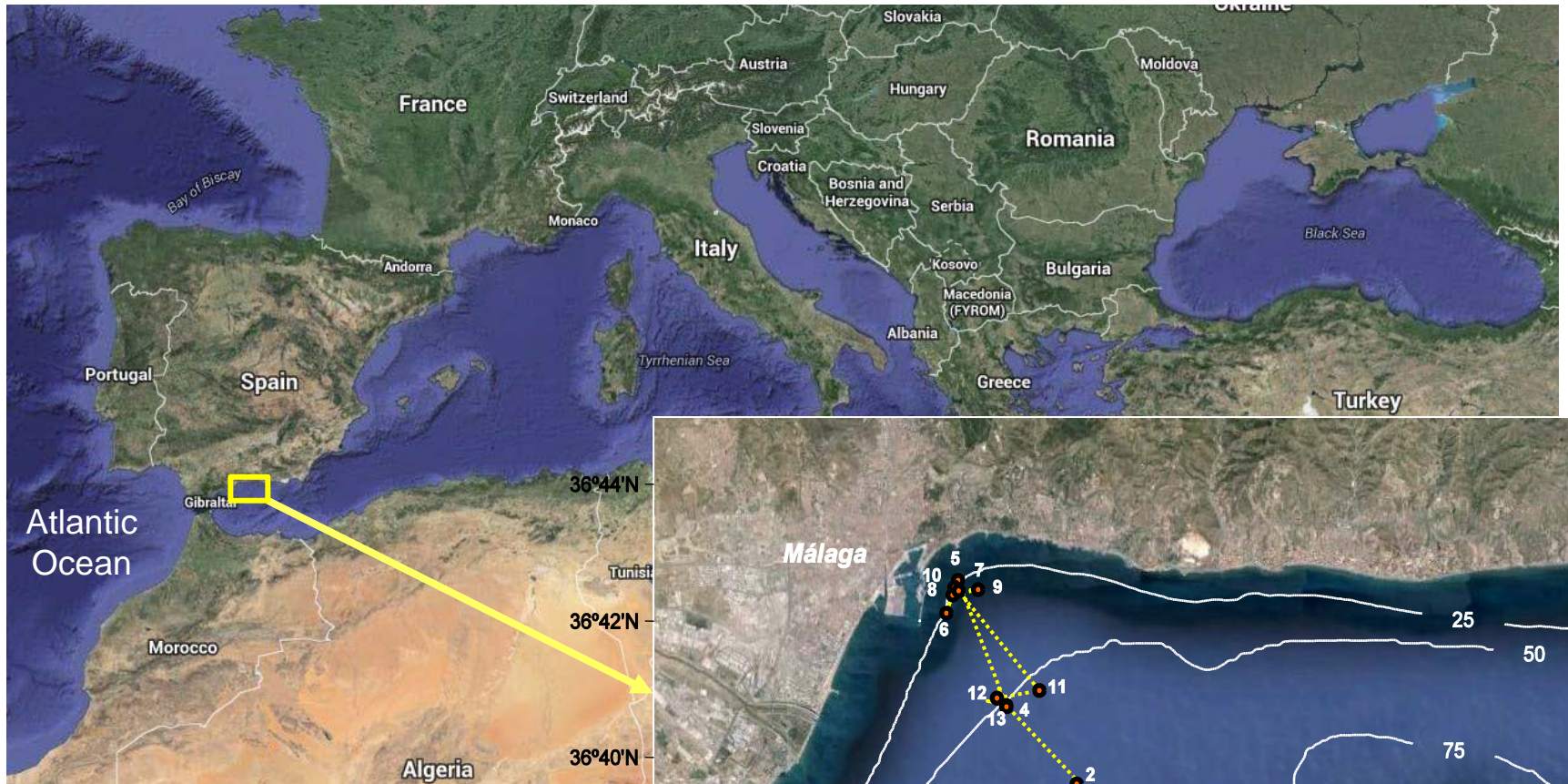
Opportunistic predators of copepod nauplii

Prey field has changed

Yebra et al. 2019

Yebra et al. 2022
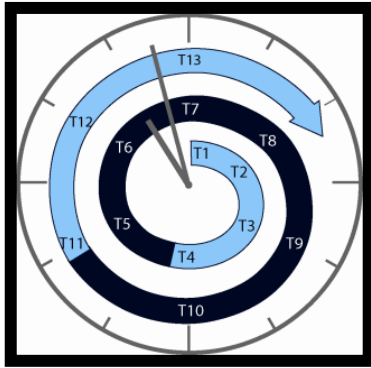
Do they prey on other organisms?

Study area: Málaga Bay

Atlantic
Ocean

- High plankton production

- Sardine and anchovy nursery

- Autumn spawning season

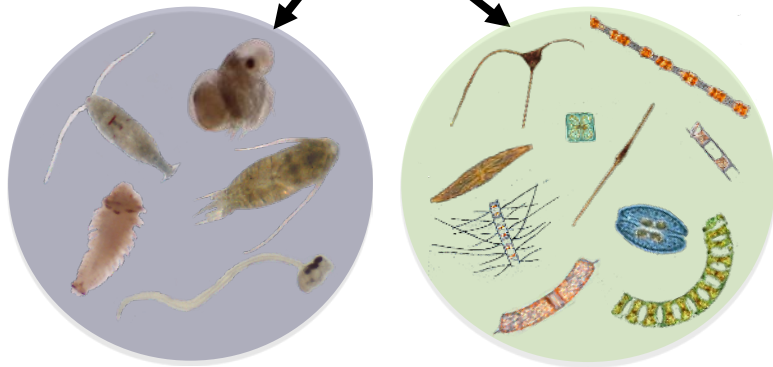Sampling stations location over time (26 hours cycle)

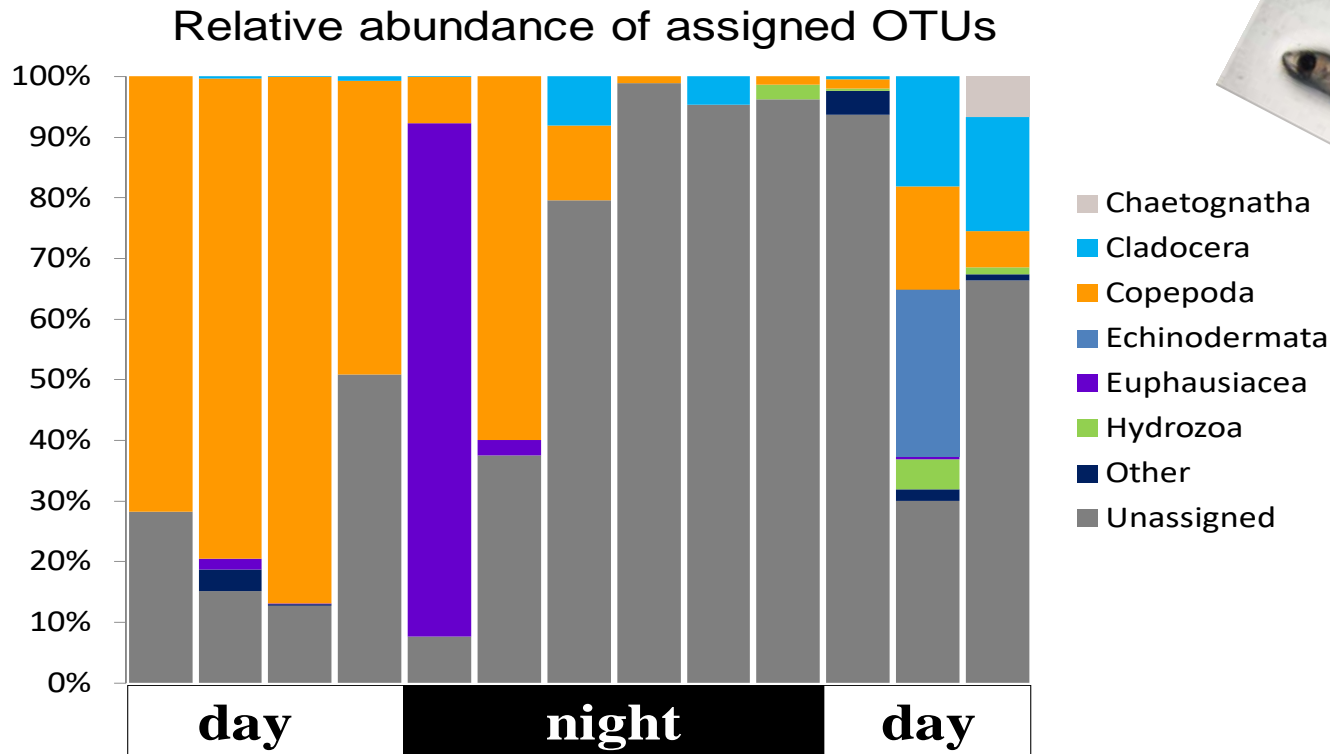# Molecular identification of sardine larval diet

- Sardines and zooplankton collected every 2 h during 26 hours diel cycle

- DNA extracted from larval guts
- Fish blocking primer
- Amplification of mtCOI gene
- Assigned OTUs GenBank

Sardine larval diet: mtCOI metabarcoding

Relative abundance of assigned OTUs

Legend:
- Chaetognatha
- Cladocera
- Copepoda
- Echinodermata
- Euphausiacea
- Hydrozoa
- Other
- Unassigned
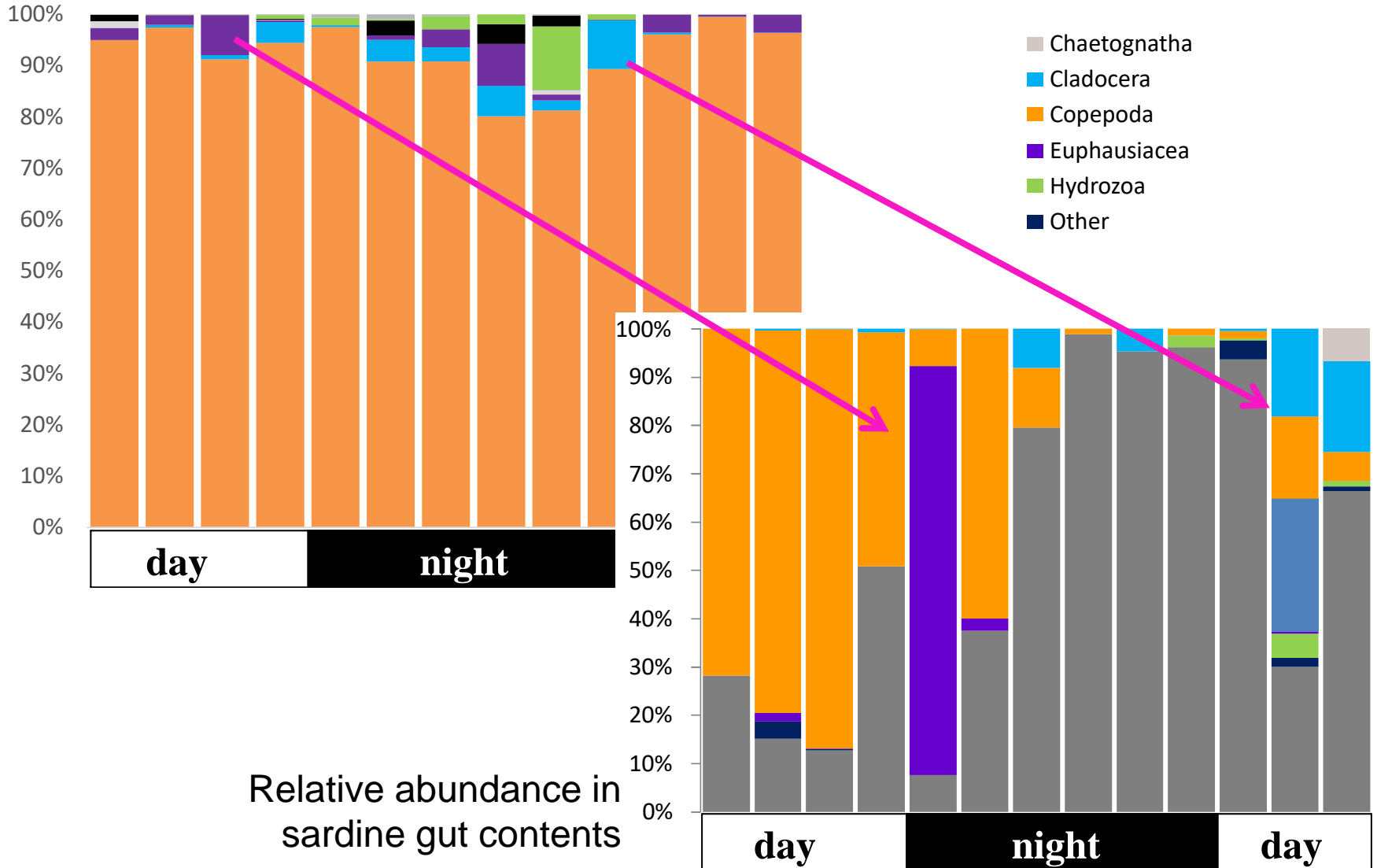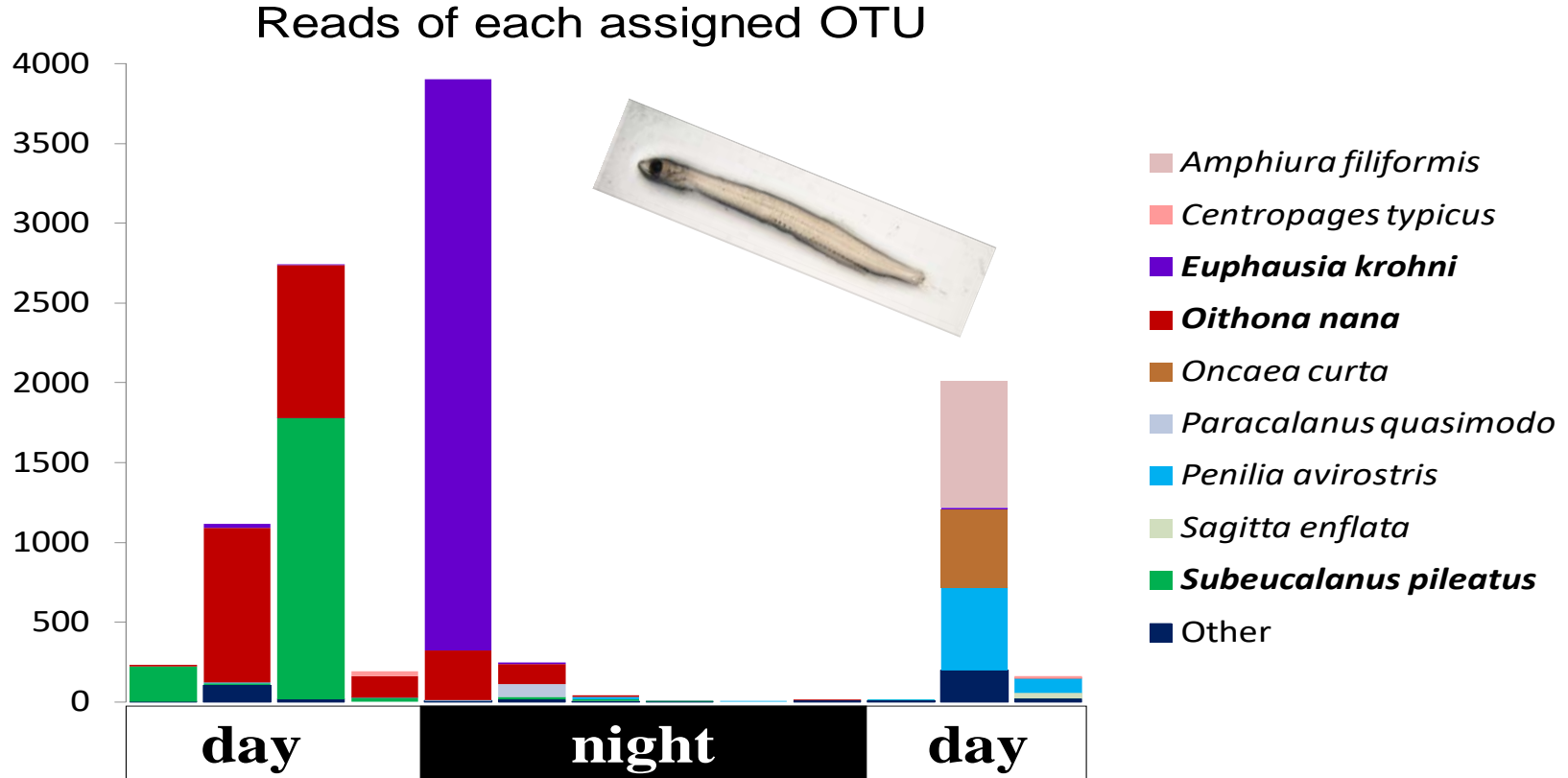
day — night — day

- Assignment of OTUs decreased at night

- Limitations of large amplicons (>300 bp) to identify digested preys

- Main prey group were copepods (6-87% of OTUs), but also euphausiids (0-85%) and cladocerans (0-19%)

Prey field variability: mtCOI metabarcoding

Relative abundance of field zooplankton assigned OTUs

Relative abundance in sardine gut contents

Legend:
- Chaetognatha
- Cladocera
- Copepoda
- Euphausiacea
- Hydrozoa
- Other

Generalist *vs* selective predator?

Reads of each assigned OTU

Legend:
- *Amphiura filiformis*
- *Centropages typicus*
- ***Euphausia krohni***
- ***Oithona nana***
- *Oncaea curta*
- *Paracalanus quasimodo*
- *Penilia avirostris*
- *Sagitta enflata*
- ***Subeucalanus pileatus***
- Other

X-axis: **day** | **night** | **day**

- Most frequent prey was *Oithona nana*
- Increased reads of *E. krohni* and *P. avirostris* 4 hours after field peaks
- Opportunistic feeding strategy of the larvae

Summary

- Characterized sardine larval diet composition and variability

- Opportunistic predator behavior, depending on available preys

- Changes in prey field composition and quality as potential causes behind sardine stock decline

- Zooplankton time series are key tools for fisheries management

Acknowledgements

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