The feeding ecology of mesopelagic fishes off the South African west coast via stomach content and stable isotope analyses

Lanternfish (*Lampanyctodes hectoris*) **and Lightfish** (*Maurolicus walvisensis*)

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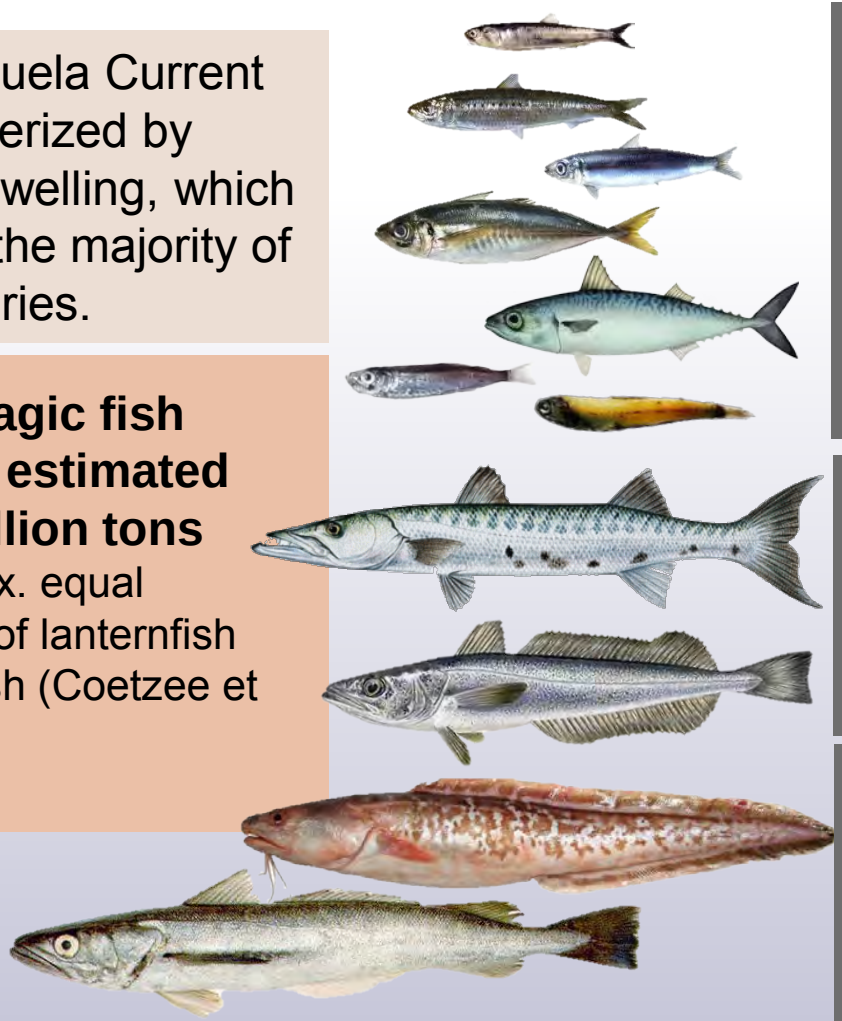
THE BENGUELA CURRENT ECOSYSTEM

The Benguela Current is characterized by pulsed upwelling, which supports the majority of SA's fisheries.

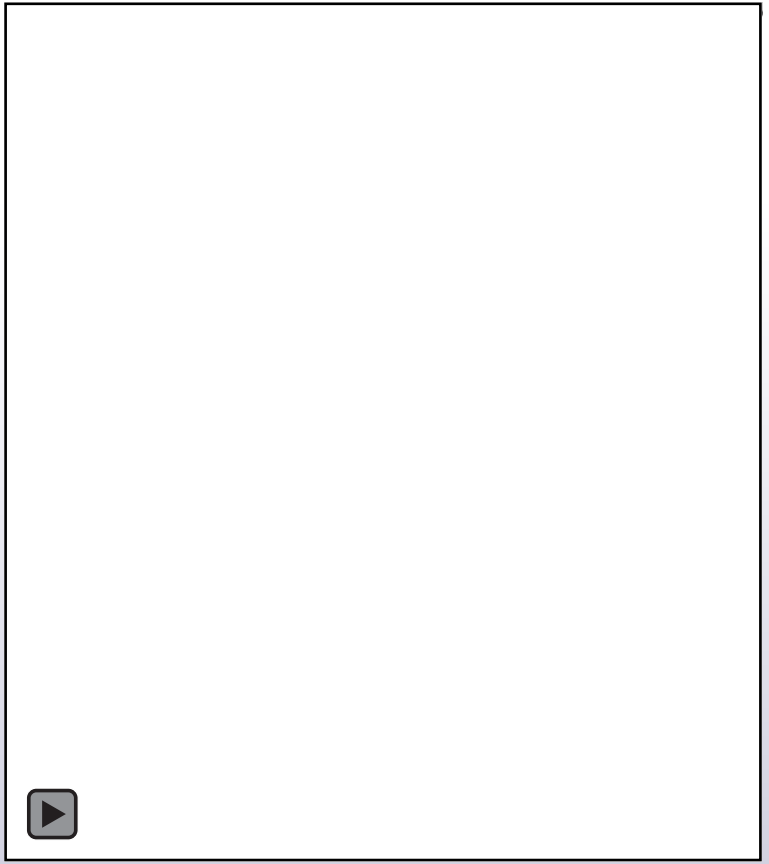
Mesopelagic fish biomass estimated at 1.7 million tons with approx. equal quantities of lanternfish and lightfish (Coetzee et al. 2006).

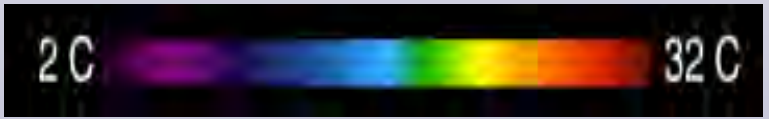


PELAGIC

LINE

DEMERSAL

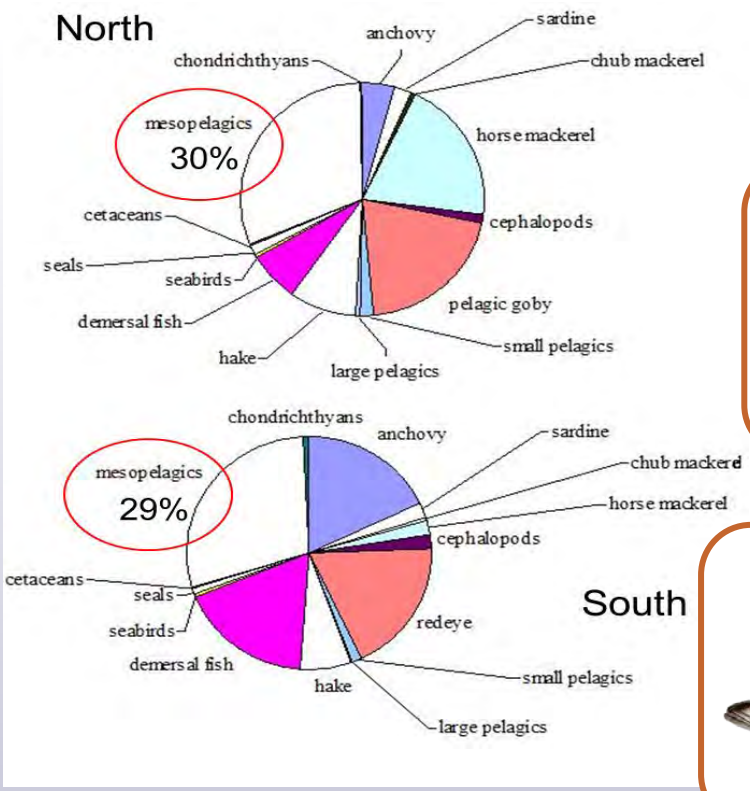




WHY MESOPELAGIC FISHES?

Well, they play a critical role in mediating energy transfers between…

LOWER & HIGHER TROPHIC LEVELS



(Shannon et al. 2003)

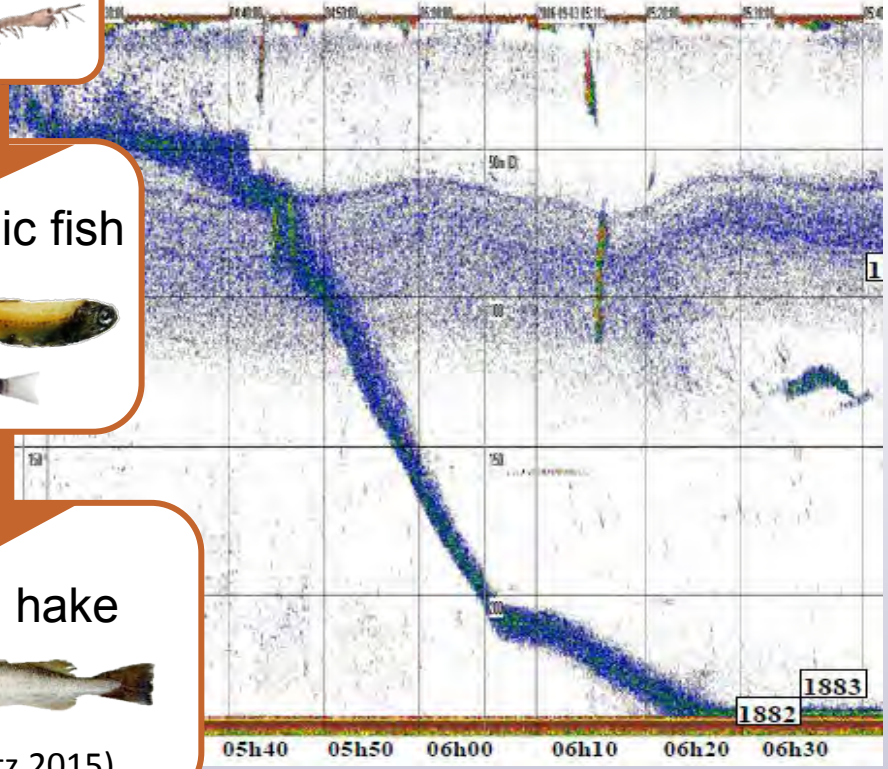
SURFACE & DEEP-SEA ECOSYSTEMS

Zooplankton

Mesopelagic fish

Deep-sea hake

78% (Durholtz 2015)

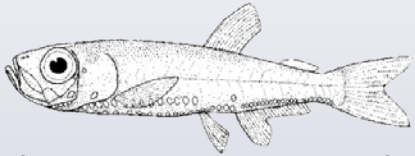


(Coetzee et al. 2006)

STUDY purpose & sampling

In terms of biomass, lanternfish & lightfish may exert notable feeding pressure on zooplankton communities. Yet dietary information is sparse for either species.

(*Lampanyctodes hectoris*)



(*Maurolicus walvisensis*)

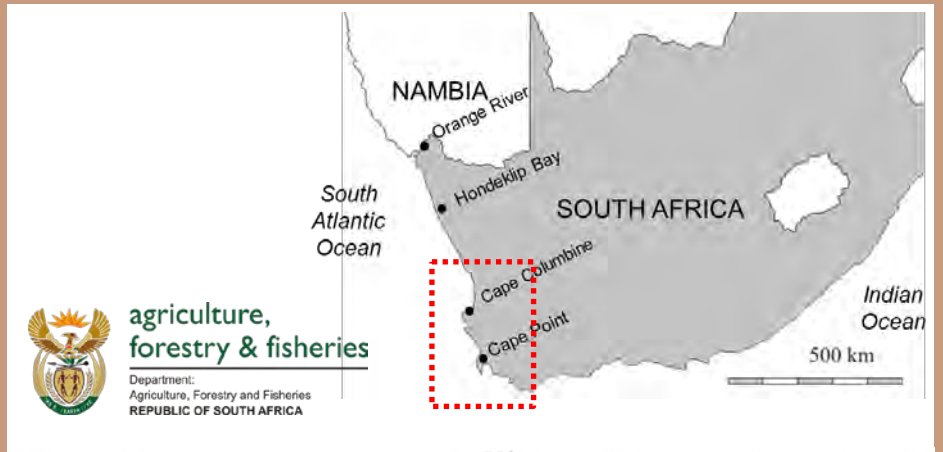
Some questions addressed:

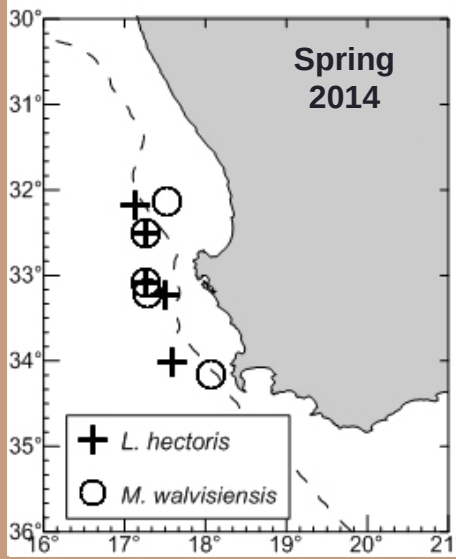
What trophic levels do they occupy?

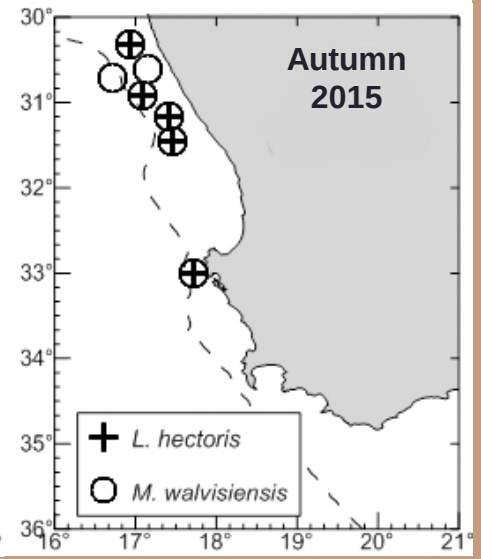
What are they eating?

Resource partitioning?

Foraging strategies?



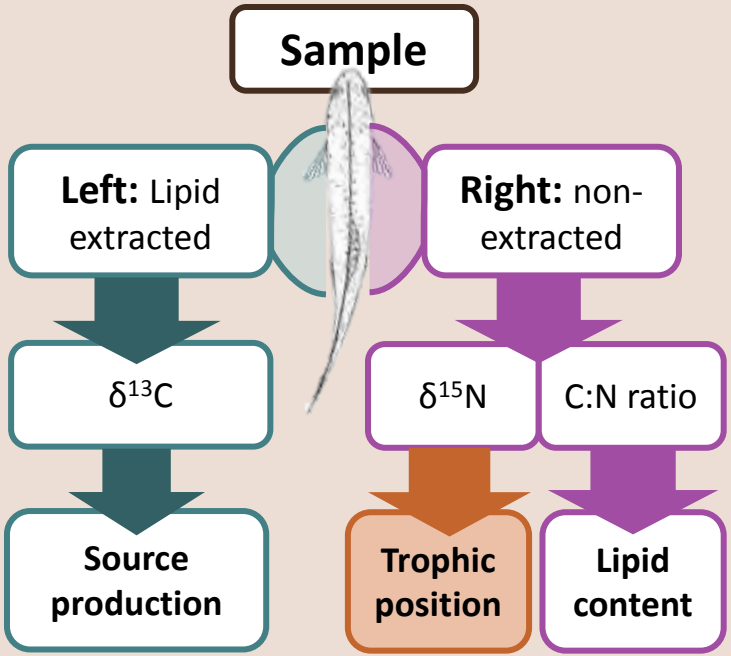




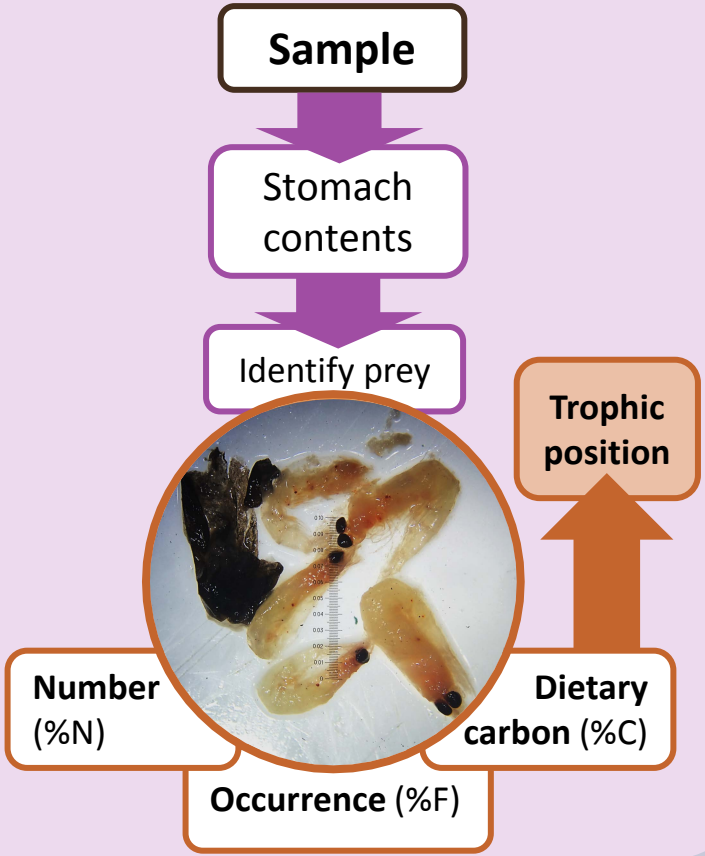
METHODOLOGICAL SUMMARY

STABLE ISOTOPE ANALYSIS (SIA)

Isotope signals represent the ratio of heavy and light isotopes ($^{15}N/^{14}N$; $\delta^{15}N$ and $^{13}C/^{12}C$; $\delta^{13}C$).

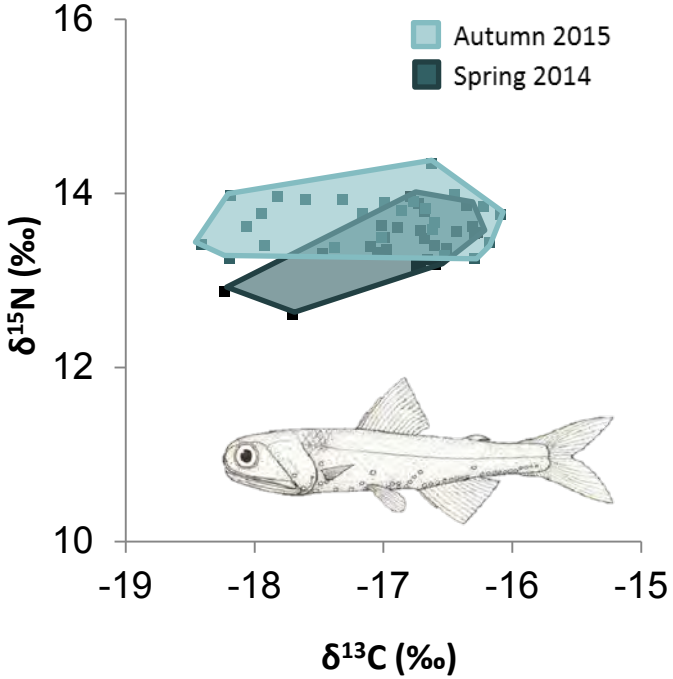


STOMACH CONTENT ANALYSIS (SCA)

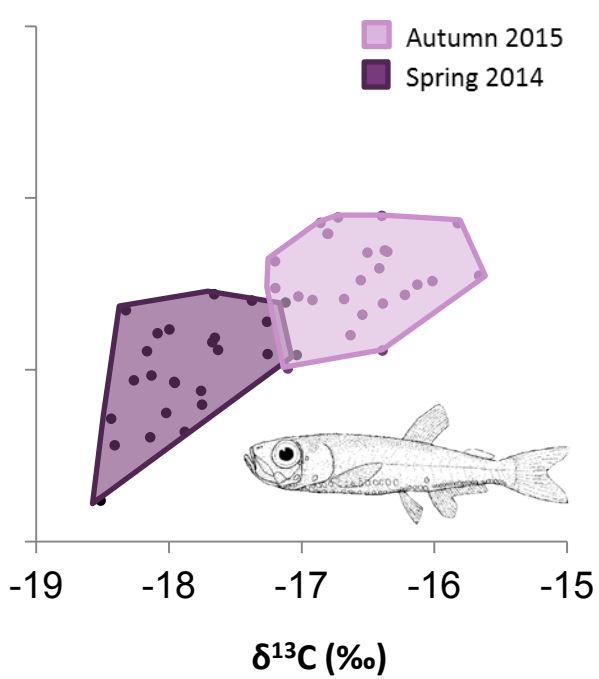


THE RELATIVE ISOSPACES of lanternfish and lightfish by season

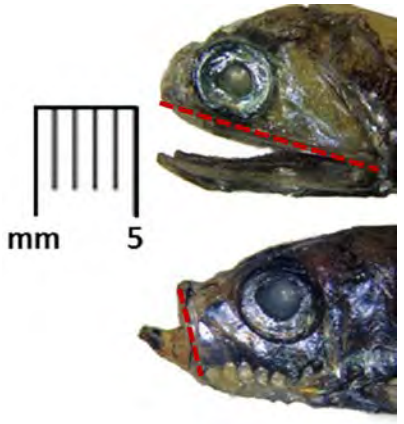
Lanternfish

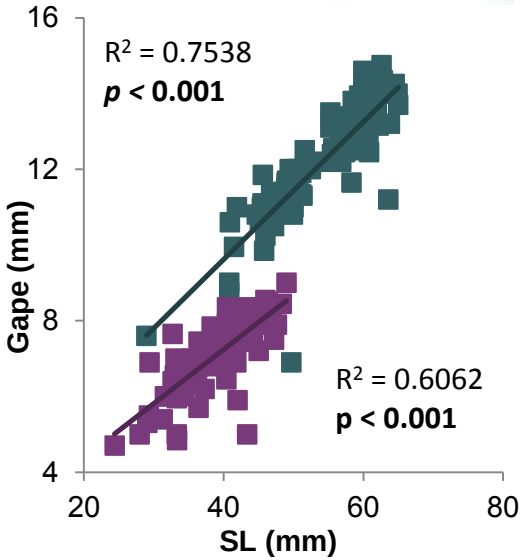


Lightfish



$\delta^{15}N$: Lanternfish 13.57±0.04 ‰ **P<0.001**
Lightfish 12.54±0.11‰

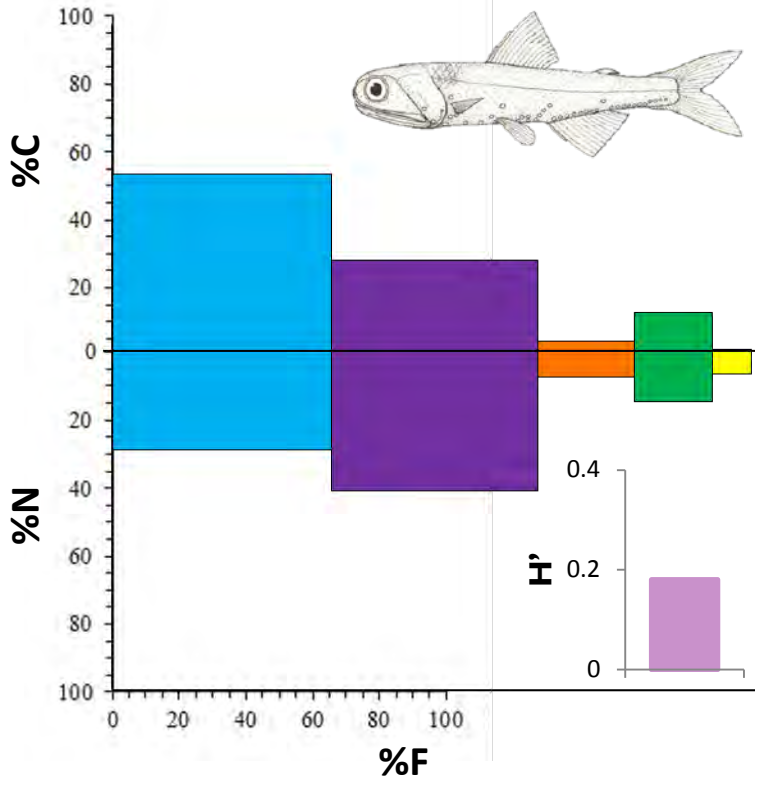




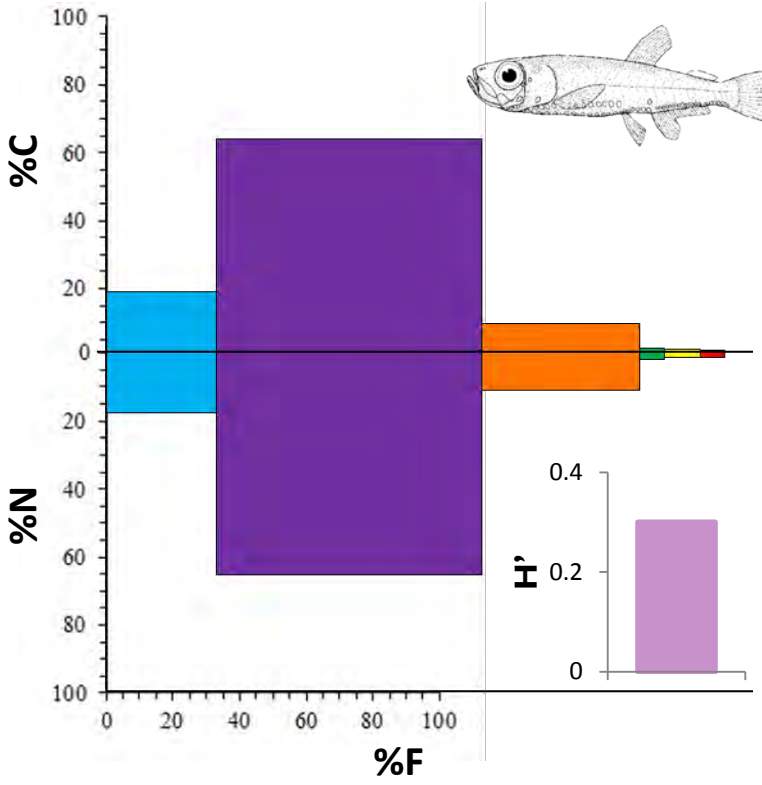
FEEDING BEHAVIOUR zooplanktivores



Lanternfish



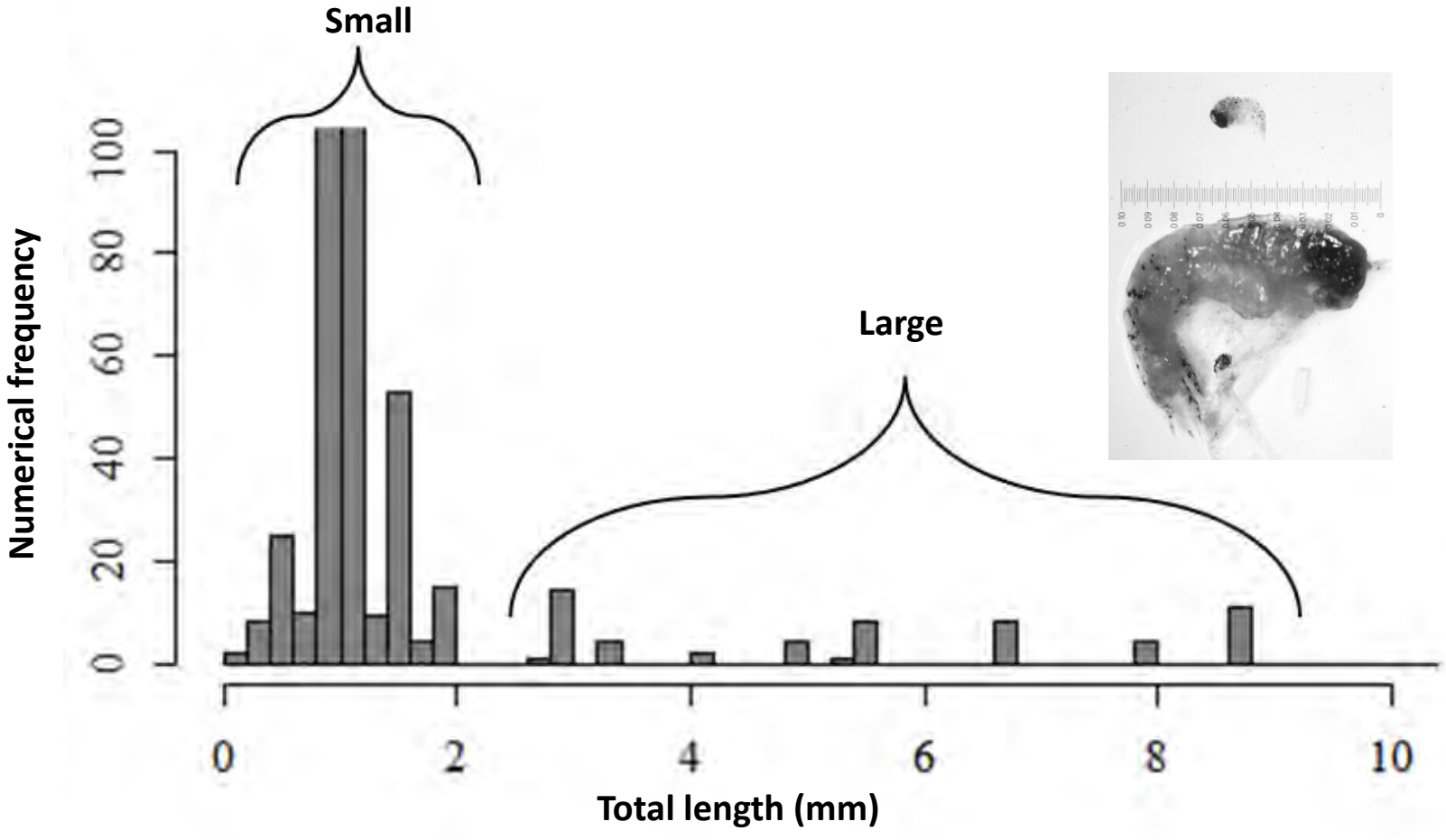
Lightfish



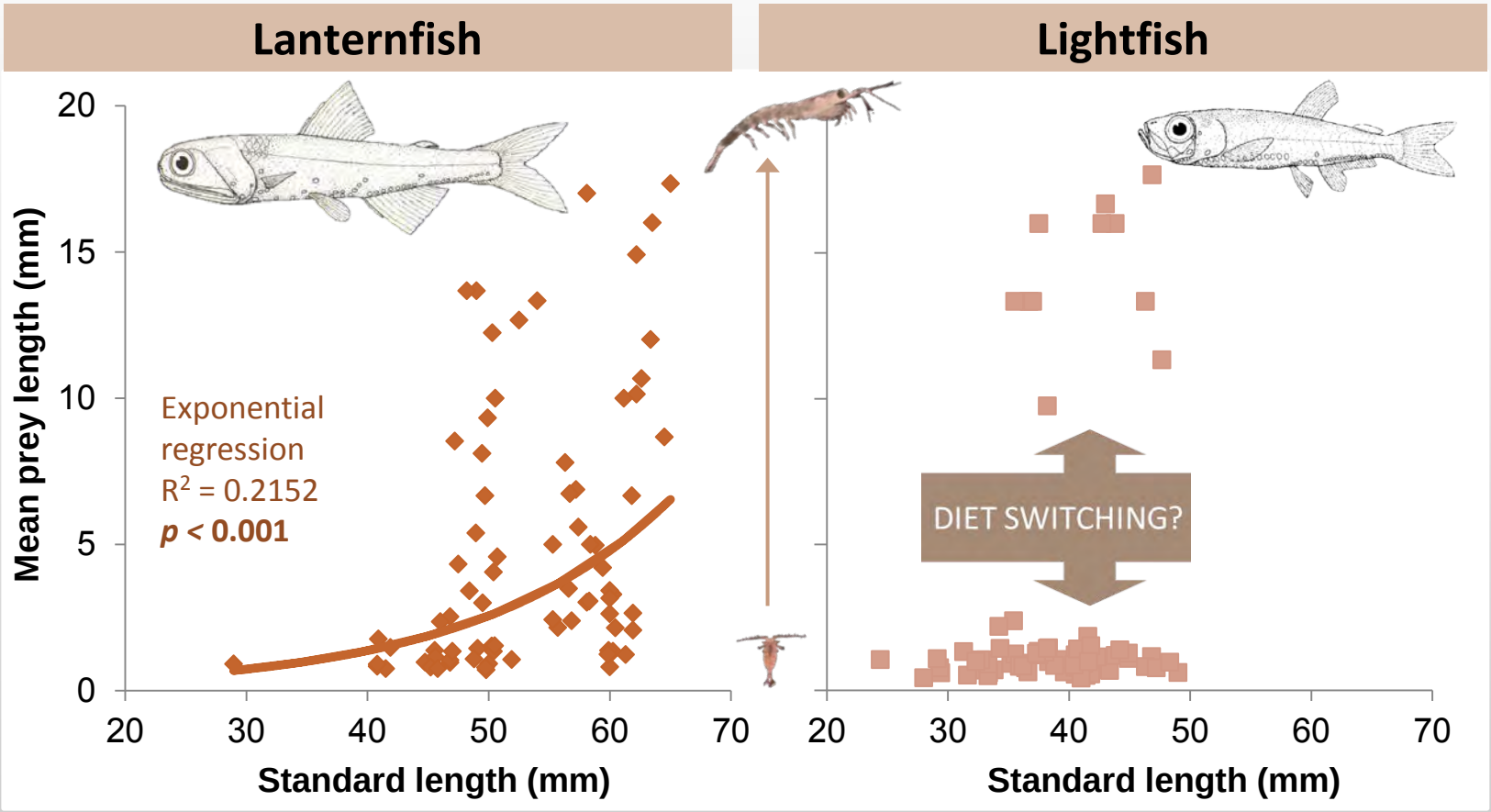
Krill
Copepods
Amphipods (Sm.)
Amphipods (Lg.)
Fish eggs
Mollusc larvae

FEEDING BEHAVIOUR zooplanktivores

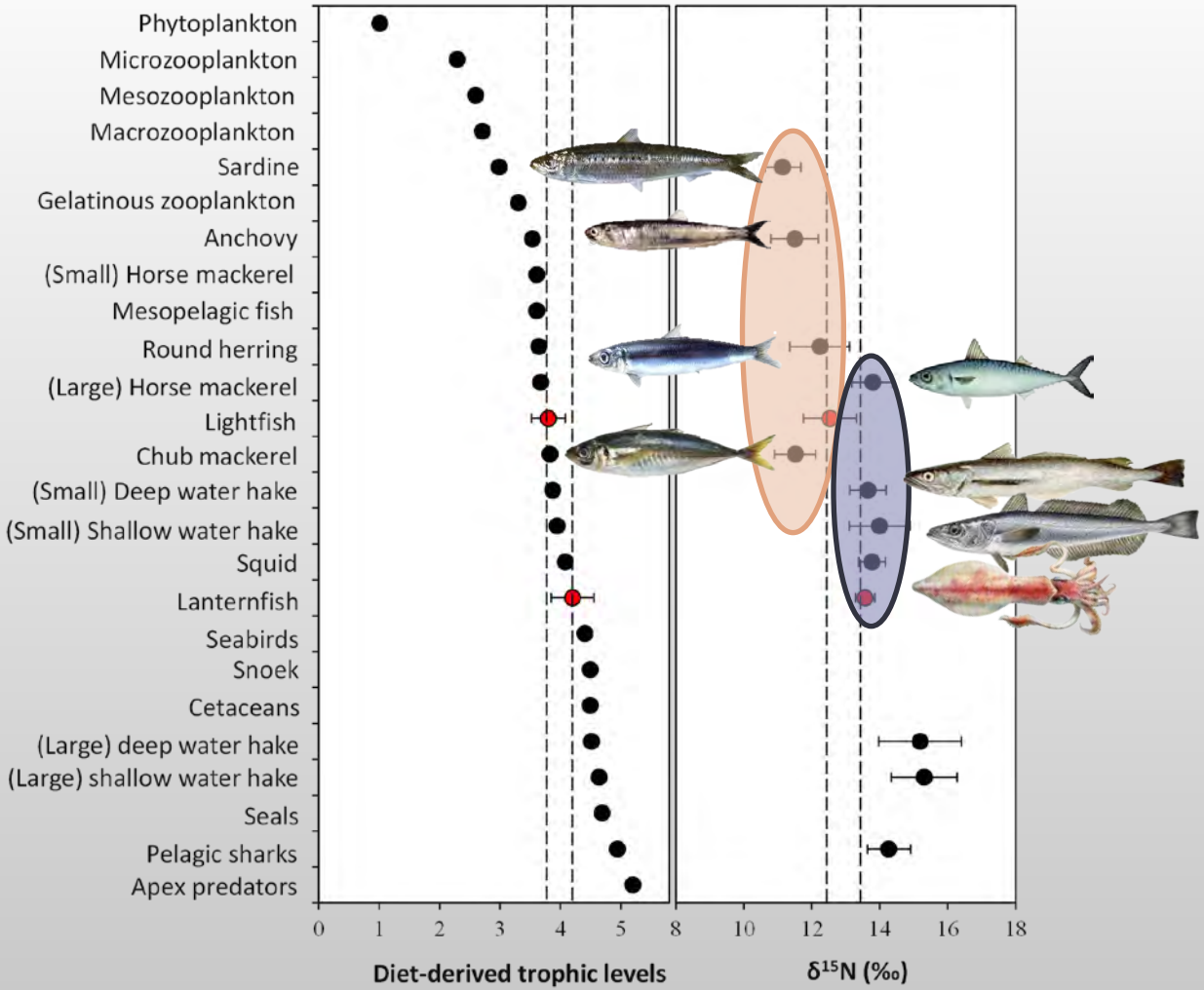


THE EFFECT OF FISH SIZE on ingested prey size

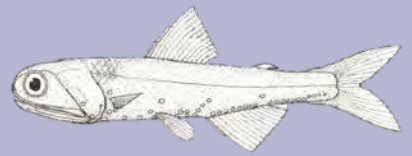


TROPHODYNAMICS in the southern Benguela



LANTERNFISH

- Higher trophic position
- Diet derived TL 4.21±0.03
- Macro-zooplanktivore
- More specialized predator



LIGHTFISH

- Lower trophic position
- Diet derived TL 3.85±0.03
- Meso-zooplanktivore
- Opportunistic predator (i.e. diet switching)

ACKNOWLEDGEMENTS

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