



Size-based changes in the trophic ecology of *Aurelia labiata*

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Zooplankton Production Symposium - 19 March 2024

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ACKNOWLEDGMENTS

Support: Lauren Portner (Pelagic Ecosystems Lab, UBC), Hakai Institute Staff, Miki Shimomura & Qi Liu (Pacific Science Enterprise Center, DFO)

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BIOMARKERS IN ECOLOGY

Two popular options:

- Stable isotopes (C & N)
- Fatty acids

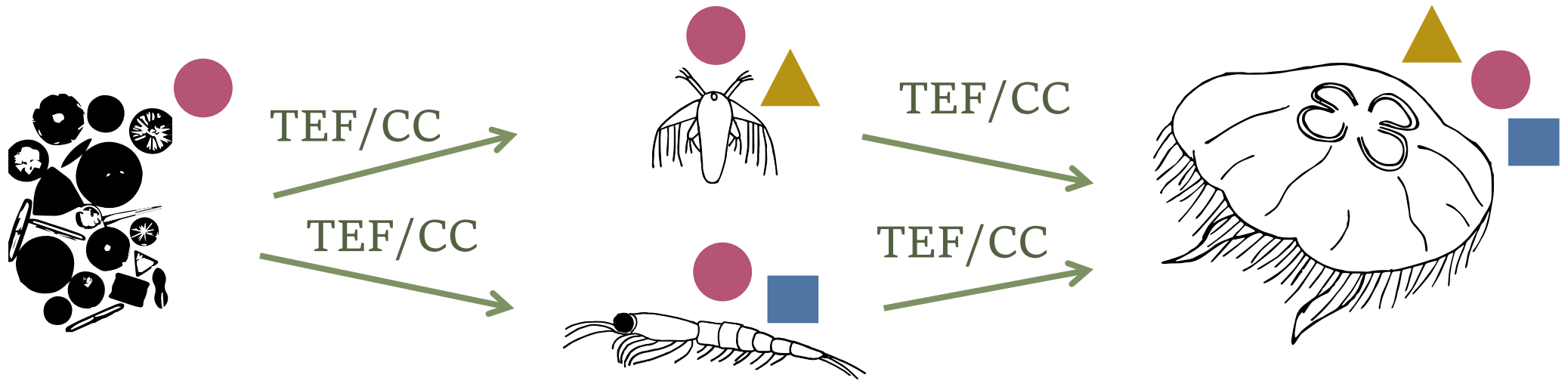
Can be used for:

- Tracing prey sources
- Nutritional composition

Advantages: time-integrated & multiple applications



TRACING PREY SOURCES WITH CORRECTION FACTORS



TEF = trophic enrichment factor (SI)
CC = calibration coefficient (FA)

Need to be calibrated for the predator of interest (moon jellyfish)
Schaub et al. 2021, JEMBE

NUTRITIONAL COMPOSITION

STABLE ISOTOPES

C:N, where N is usually limiting for animals

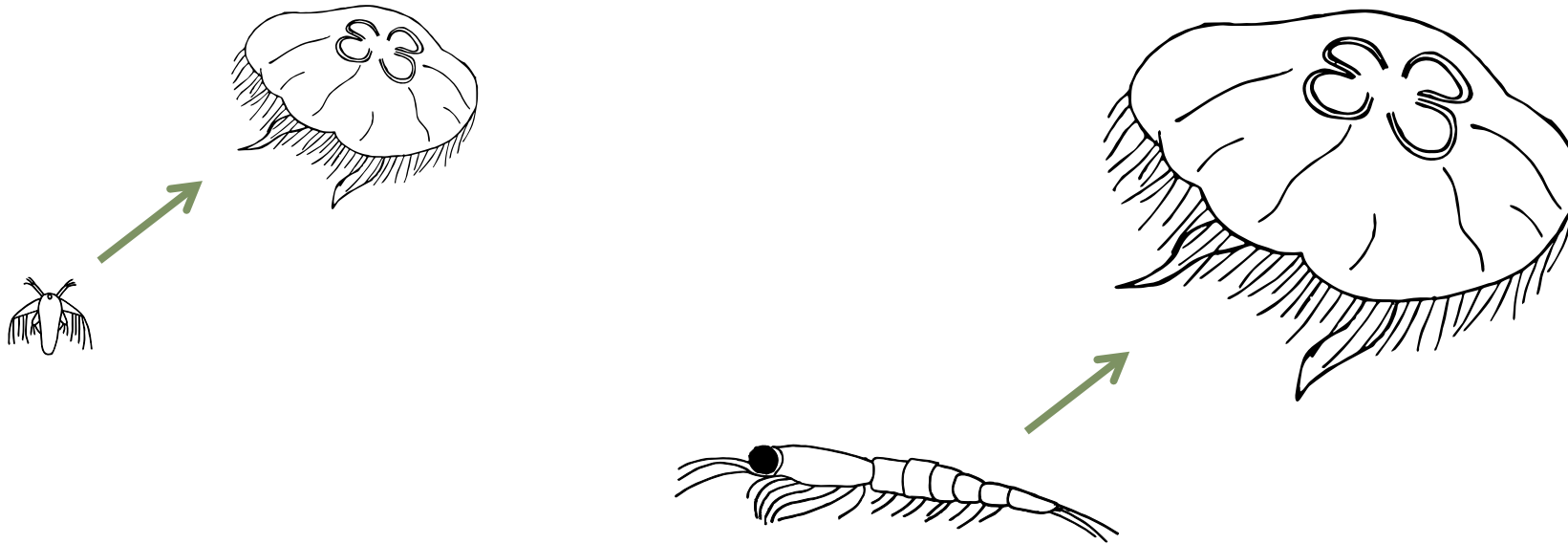
FATTY ACIDS

‘Healthy fats’, like omega-3 and omega-6

Essential fatty acids: ARA, EPA, DHA



LARGE JELLYFISH EAT LARGER PREY, LEADS TO HIGHER TROPHIC LEVEL



OBJECTIVES

Investigate size-based changes in jellyfish trophic level and nutritional composition

Do these patterns relate to patterns in their diet?

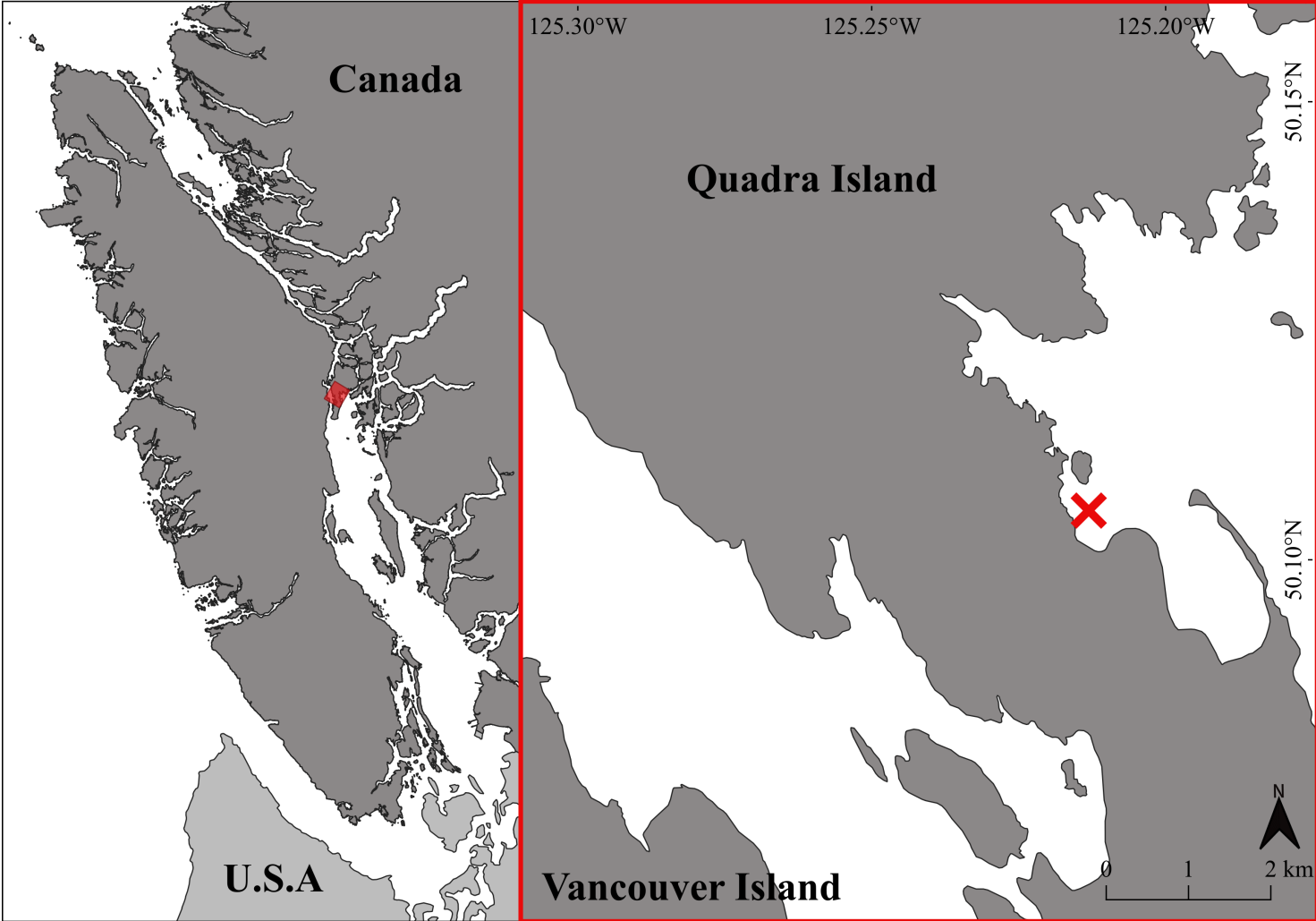


SAMPLING DATES AND LOCATION

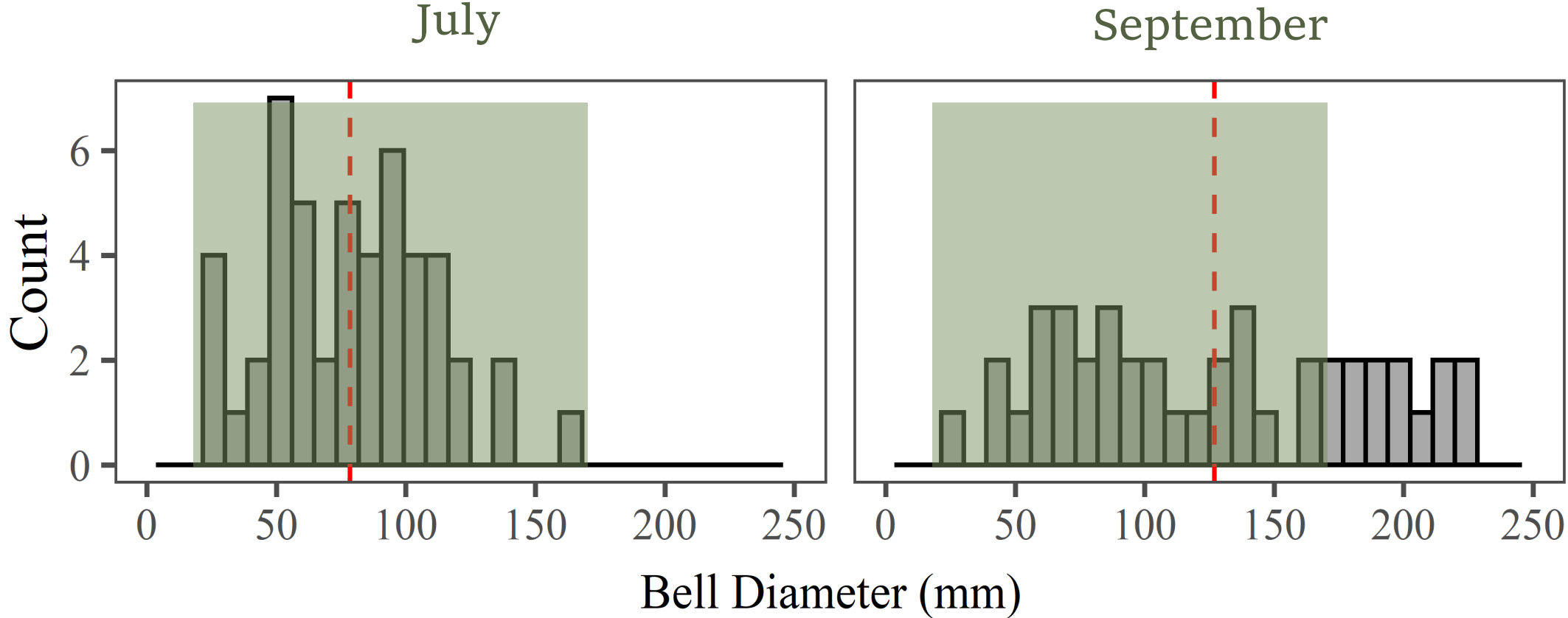
Heriot Bay, BC, Canada

July (Summer)
September (Fall)

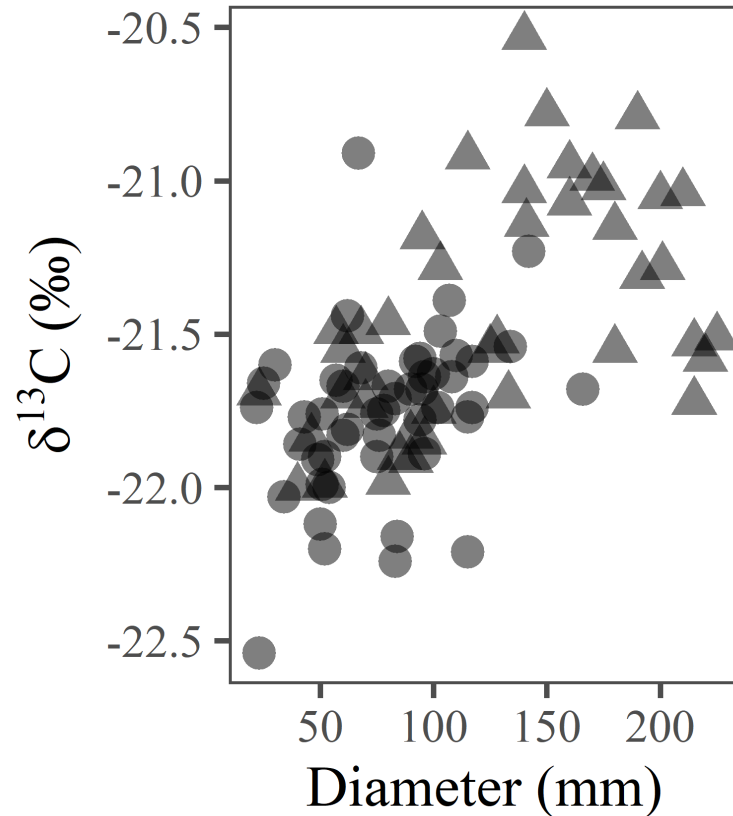
Aurelia labiata



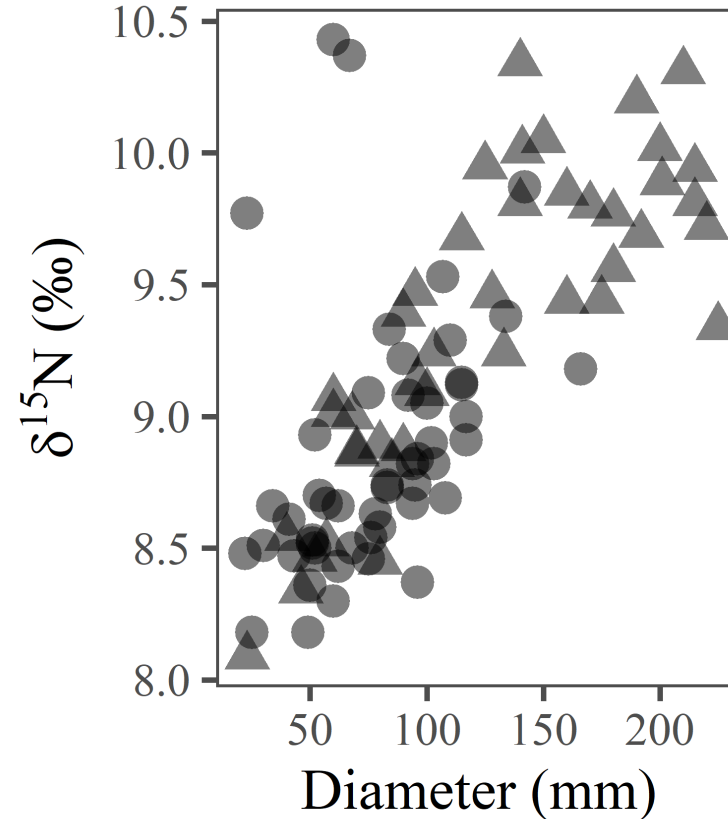
SAMPLE SIZE DISTRIBUTION OVERLAPPED BETWEEN MONTHS



INCREASE IN TL WITH SIZE, REGARDLESS OF SEASON



$\Delta\delta^{13}\text{C} = 1.43\text{‰}$
1 trophic level

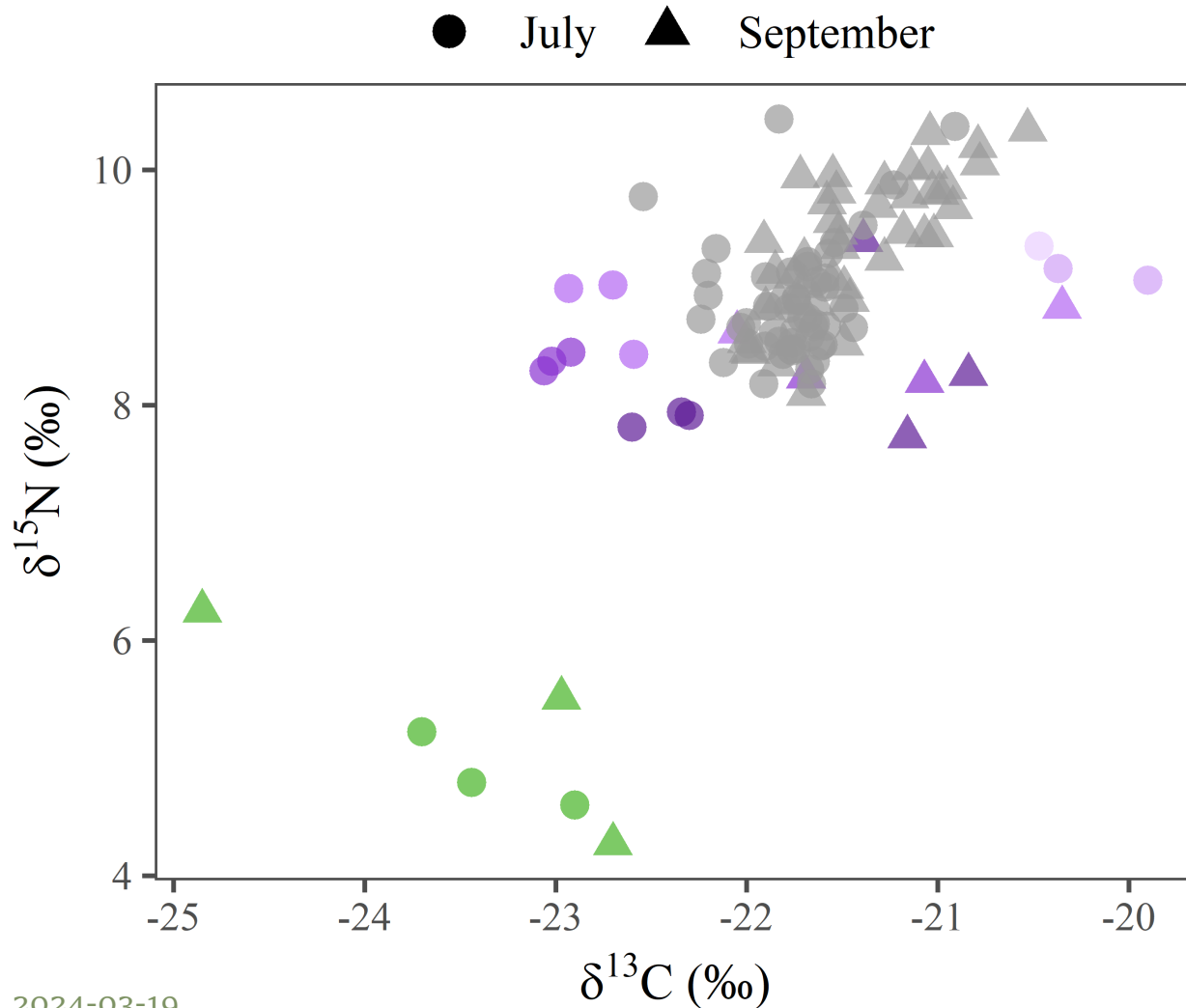


$\Delta\delta^{15}\text{N} = 2.05\text{‰}$
1 trophic level

- July
- ▲ September



MEASURED FOOD WEB STRUCTURE



MOON JELLYFISH

NET PLANKTON

Higher trophic level

FA markers for copepods

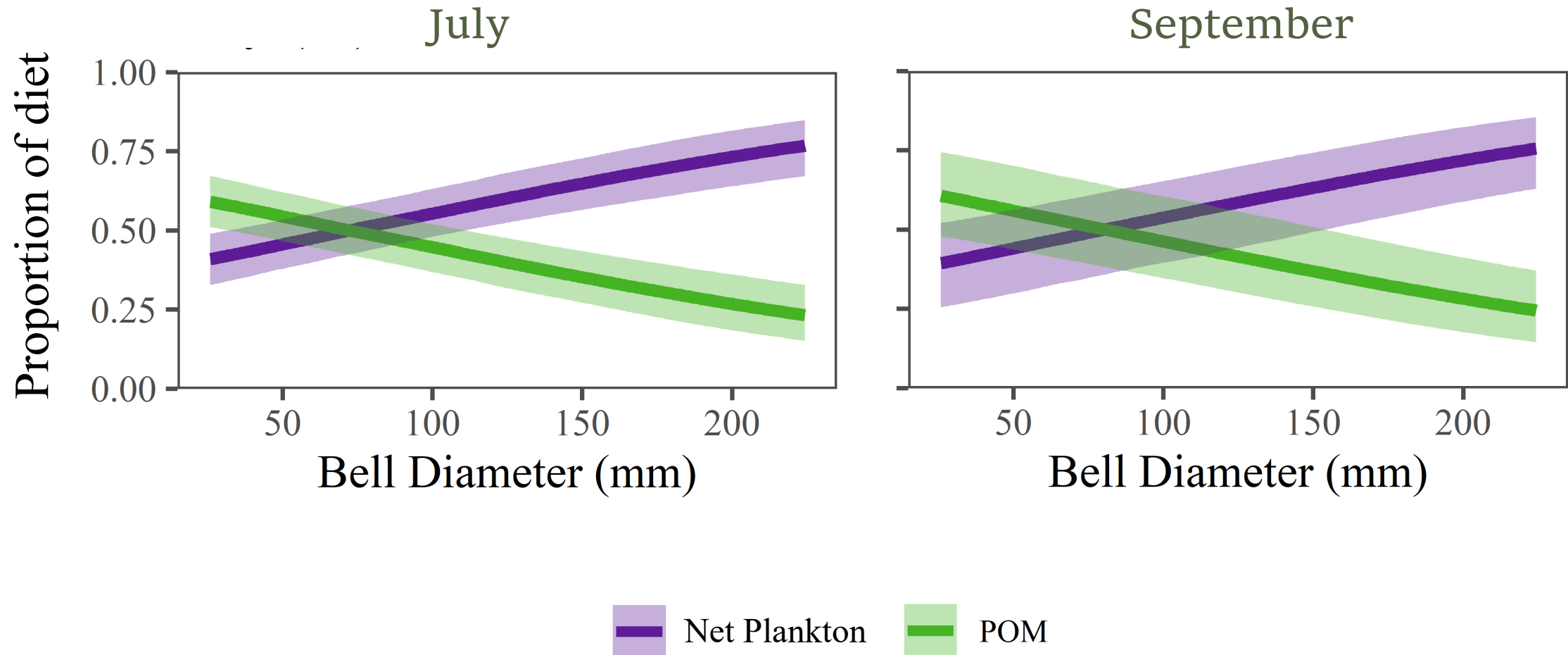
POM

Lower trophic level

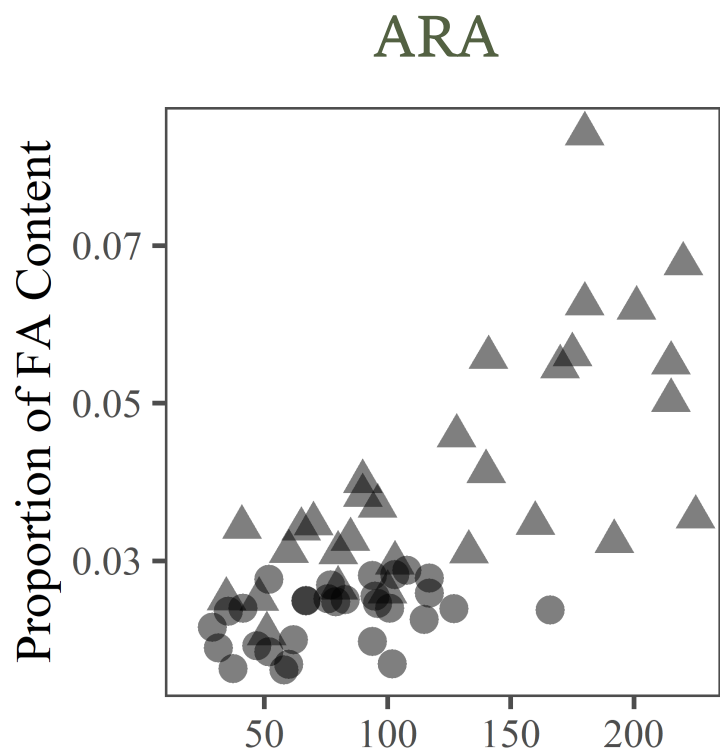
FA markers for bacteria, detritus,
phytoplankton, microzooplankton



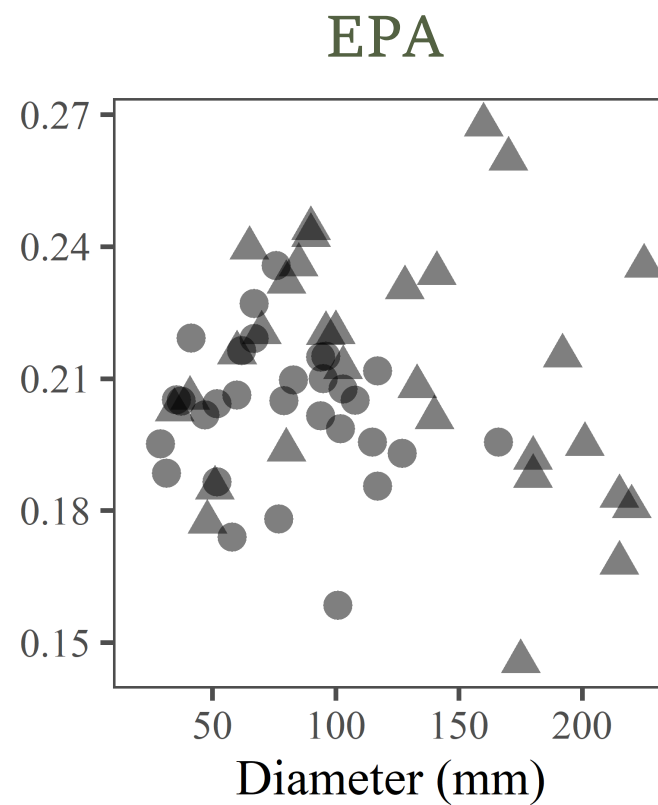
AURELIA DIET SHOWS TL SIZE STRUCTURE FOR BOTH SEASONS



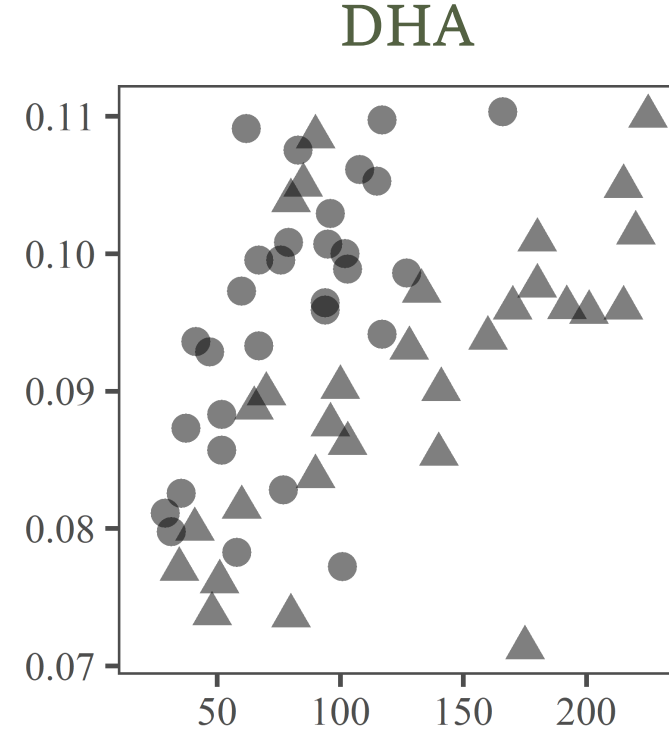
PATTERNS IN ESSENTIAL FATTY ACIDS CHANGE WITH SIZE



X Does not match trend in diet sources



X Does not match trend in diet sources



✓ Matches trend in diet sources

● July
▲ September



SUMMARY OF RESULTS

- Shift from small to large prey as jellyfish grow
 - 1 trophic level difference between 25 mm and 225 mm individuals
- *Aurelia* size was the major driver, as patterns were conserved between seasons
- Diet likely plays a role in jellyfish nutritional composition, but there are also other factors at play





THANK YOU!

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