

ICES/PICES 6ZPS/ 2016/S8

Reconciling differing perspectives of copepod feeding selectivity: the utility of flowCAM to analyse feeding experiments

Angus Atkinson, Elaine Fileman, Nicolas Djeghri, Louise Cornwell

Plymouth Marine Laboratory

Contrasting perspectives of zooplankton feeding have evolved over the years. These include models based on predator-prey size ratios, categorisations of feeding mode for trait-based modelling (e.g. feeding current, ambush or cruise feeders), or predictions on selectivity based on optimal foraging theory or stoichiometry. Because zooplankton diets are diverse, including small, soft-bodied and variably digested items without unique chemical signatures, traditional bottle experiments using natural prey assemblages still have a role. Improving technology (e.g. photographic resolution and image classification using new flowCAMs) has eased the analysis of these experiments, allowing the clearance on each prey item to be compared. We conducted 11 experiments on 5 copepod species through the season at Plymouth E1, our open shelf monitoring site. These were alongside dilution experiments to provide insights into prey growth dynamics. Enumeration of this matrix of grazer/food combinations was using flow cytometry, flowCAM and microscope counts of the largest preys (nauplii and the longest diatom chains). We defined the width and shape of the ingestible size spectrum as well as optimum prey size for species with contrasting feeding modes. The counting methods also allowed testing of predictions based on feeding mode; for instance that ambush-feeding *Oithona similis* are ineffective at catching diatoms and feeding current feeders retain diatoms more effectively than motile cells of similar size. The high clearance rates we found on nauplii are discussed in the context of intraguild predation impact and the size-based patterns are discussed in relation to the seasonal biomass spectra of the prey field.

Keywords: feeding selectivity, predator-prey size ratios, clearance rates, flowCAM

Contact author: Angus Atkinson, Plymouth Marine Laboratory aat@pml.ac.uk