Copepods (mostly calanoids) were the predominant component of mesozooplankton biomass in the ECS.

Objectives
- Measure mesozooplankton grazing rates on phytoplankton and microzooplankton communities based on bottle experiments.
- Clarify trophic sources and pathways to mesozooplankton community.
- Evaluate importance of mesozooplankton for trophodynamics to higher trophic levels.

Background
- ECS–Kuroshio is major spawning grounds of various forage fishes.
- Mesozooplankton is prey to support survival of these fish larvae and known to demonstrate high standing stocks and productivity even under oligotrophic conditions in the ECS–Kuroshio.
- There is less knowledge on trophic source and pathways in plankton food web to support mesozooplankton community.

Study site

Results: Community structure
- Copepods (mostly calanoids) were the predominant component of mesozooplankton biomass in the ECS–Kuroshio.
- Pico- (i.e., Prochlorococcus) to nano-fractions (i.e., haptophytes and chrysophytes) dominated phytoplankton biomass.
- Naked ciliates and heterotrophic dinoflagellates contributed to microzooplankton biomass.

Results: Mesozooplankton ingestion
- Mesozooplankton ingestion rates on size-fractionated chlorophyll a (left), phytoplankton groups classified with CHEMTAX analysis (middle) and microzooplankton groups (right). + or -1: significantly positive or negative from zero at p<0.05 (one sample t-test).

Results: Mesozooplankton feeding to ambient chlorophyll
- Mesozooplankton ingestion rates to the ambient chlorophyll a exhibited a positive correlation for phytoplankton prey but no correlation for microzooplankton prey.

Results:
- Ingestion rate (μgCHL mgC day⁻¹)
- Ingestion rate (μgCHL mgC day⁻¹)
- Ingestion rate (μgCHL mgC day⁻¹)

Fig. 1. Stations conducted mesozooplankton feeding experiments.
Fig. 2. Mesozooplankton biomass (MeZB) and their taxonomic composition in the incubations.
Fig. 3. Mesozooplankton potential prey (Chlorophyll: CHLₚ, Microzooplankton: MiZB) biomass and its composition at the beginning of the incubations.

Fig. 4. Mesozooplankton ingestion rates on size-fractionated chlorophyll a (left), phytoplankton and microzooplankton communities based on bottle experiments.

Fig. 5. Mesozooplankton ingestion rates on chlorophyll a concentrations (CHL) and microzooplankton prey (MiZ) to the chlorophyll a at the beginning of the bottle incubations (CHLₚ).

Conclusions
- Calanoid copepods are major consumer of phytoplankton and microzooplankton communities.
- A major trophic pathway to calanoid copepods is nano-autotrophs like haptophytes and chrysophytes and supplemented by ubiquitous naked ciliates.
- Calanoid copepods and nano-autotrophs are important linkages transferring microbial production to higher trophic levels in the ECS–Kuroshio.

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