Table 2 Correlation between the annual number of herring at age 1 and the biomass of some zooplankton forms.

Total Euphausiid		Small euphausiids		Large euphausiids		Predator biomass	
Spring	Fall	Spring	Fall	Spring	Fall	Spring	Fall
-0.63	-0.14	-0.72	-0.57	-0.25	-0.08	-0.87	-0.03

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Fish predation on krill and krill antipredator behaviour

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Krill constitute a key component in oceanic food webs. They have a diverse diet and are prominent prey for fish. The search strategies of fish foraging on krill differ among species, locations, and time of day and may involve visual search as well as ambush feeding based on hydrodynamic signals created by the swimming prey. This talk addresses the feeding behaviour of herring (*Clupea harengus*), whiting (*Merlangius merlangus*) and Norway pout (*Trisopterus esmarki*) foraging on krill (*Meganyctipahnes norvegica*), mainly based on research carried out in the Oslofjord, Norway.

Herring in the study area school above the krill at day, schools disperse at night and herring then forage on vertically migrating krill. Nocturnal predation is probably visual, and seems to be restricted to the upper 20-30 m. The non-schooling whiting lives deeper than herring, occupying the same depth range, and performing a similar diel migration pattern to that of krill. They forage on krill throughout the diel cycle. Prey search may be visual both day and night, and whiting appears to be able to forage at lower light intensities (i.e. deeper water) than herring. Norway pout is semi-demersal, largely remaining associated with the bottom at day, migrating into the water column at night. They forage on krill by day where the bottom intercepts the krill daytime habitat, otherwise predation is nocturnal by vertically migrating individuals ascending into the water column. Norway pout has large eyes, and may forage visually in relatively deep water at day. Their swimming behaviour, hanging motionless in the water column, does, however, suggest that they may be ambush feeders by night.

Krill antipredator behaviour includes a flexible DVM pattern, apparently responding to the presence of fish. They partly remain below visually foraging pelagic fish at day, but may avoid the near-bottom zone in presence of demersal fish. In waters devoid of nocturnally foraging planktivores, vertically migrating krill ascend all the way to the surface. while they modify their DVM pattern and largely avoids the upper 20-30 m at night in waters with abundance of nocturnally foraging fish. Antipredator behaviour also constitutes instantaneous escape responses upon encounters with fish. The talk also addresses how more subtle mechanisms like modification of feeding and swimming behaviour in response to mortality risks may be studied in the field. I argue that acoustic studies, comprising acoustic target tracking of individual plankters and fish, hold yet unexploited opportunities for studies of fish-krill interactions and for understanding of both krill and fish behaviour.

Euphausiids and western Bering Sea herring feeding

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The paper is based on long-term information (1939-1998) from weight method examination of 2997 stomach content from 117 coastal stations in Karaginsky Bay, Olyutorsky Bay, Olyutorsky-Navarin area, and 1486 stomach examinations at 9 daily stations. Rations were calculated in three ways: (1) using daily station data; (2) a physiological method using the well-known Vinberg equation; and (3) our identification of a strong dependence between daily ration, body weight, stomach fullness index, and water temperature.

Food composition and trophic activity by Korfo-Karaginsky herring are very labile among years, seasons, areas, age cohorts. The herring diet (excluding the larval stages) contains 70 species of marine animals from 13 classes. The dominant prey is copepods which make up more than a half (51.7%) of the annual ration. The portion of euphausiids in the diet fluctuates annually from 9.8% to 70.7% with average value 42.1%. In May – September the herring feed mainly on copepods – from 49.9% in September to 88.4% in July. During other months, euphausiids contribute 68-88% of the stomach contents.

The variability of the herring diet is related to age composition. Through summer and autumn, age