

## Heterotrophic protists in the Central Arctic Ocean

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### Abstract

Distribution, general composition and activity of heterotrophic protists, as well as the distribution of bacteria, were assessed in the upper water column of the central Arctic Ocean during the Arctic Ocean Section, July-September 1994. Bacterial biomass varied from 5 to < 25 mg C l<sup>-1</sup>, with the highest values occurring in the Chukchi Sea. Protist biomass was highest (5-107 mg C l<sup>-1</sup>) in the upper 50 m of the water column. Higher integrated (0-50 m) protist biomass values (average 910±250 mg C m<sup>-2</sup>, range 580-1370 mg C m<sup>-2</sup>) were found in the Chukchi Sea, compared to the central Arctic Ocean (average 480 ± 320 mg C m<sup>-2</sup>, range 120-1120 mg C m<sup>-2</sup>). Heterotrophic dinoflagellates were more abundant than ciliates in the > 20 µm size class at all stations. In the central Arctic Ocean, the <20 µm size class was numerically composed of dinoflagellates (16%), choanoflagellates (4%) and other flagellates (80%). Choanoflagellates were slightly more abundant in the Chukchi Sea (9% of cell numbers), but were a large component of the flagellate assemblage (55% of cell numbers) at only one station, in the Nansen Basin. Bacterivory estimated via uptake of added fluorescently labeled bacteria ranged from 1.2 × 10<sup>3</sup> to 46 × 10<sup>3</sup> bacteria ml<sup>-1</sup> day<sup>-1</sup>; the highest rate was found at the station with a high choanoflagellate abundance. Observation of food vacuole contents showed that all size classes and taxonomic types of protists ingested phytoplankton. Choanoflagellates, and monads as small as 1.5 µm in size, ingested picoplanktonic eukaryotic phytoplankton, which were abundant (10<sup>3</sup>-10<sup>4</sup> cells ml<sup>-1</sup>) in the upper 50 m. Larger protists ingested cryptomonads and diatoms, as well as pico-autotrophs. Clearance rates of 10-100 µm sized ciliates and dinoflagellates, based on the uptake of 1-5 µm fluorescent microspheres, were similar to rates reported for herbivorous protists in temperate waters. In terms of ecosystem carbon flow, we infer that phagotrophic protists in the Arctic Ocean are important consumers of phytoplankton and bacteria, and may represent a significant food resource for zooplankton