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Characteristics of Egg Production of the Planktonic Copepod, *Calanus finmarchicus*, on Georges Bank: 1994-1999

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ABSTRACT

We present here a synthesis of observations of egg production rates (EP) of the planktonic copepod, *Calanus finmarchicus*, carried out during process cruises of the U.S. GLOBEC Northwest Atlantic/Georges Bank program between January and June of 1995, 1997 and 1999. Female *C. finmarchicus* produced eggs at relatively high rates in at least some regions of Georges Bank during all months between January and June. Median, monthly EP varied between 24 eggs female^{-1}d^{-1} in January to 50 eggs female^{-1}d^{-1} in April-June; the highest mean EP was 86 eggs female^{-1}d^{-1}. Mean egg diameter was negatively related to ambient mean water column temperature (0-100 m or bottom), decreasing from 149 to 142 μm between January and June. Direct measurement of body C or N or prosome length-mass relationships were used to determine mass-specific egg production rates. The relationships between estimates of chlorophyll a standing stock (mg chl. a m^{-2}) and both C- and N-specific rates (% d^{-1}) are reasonably well described by Ivlev curves (C-specific EP= -7.44 + 15.94 * (1- $e^{(-0.038*chla)}$); N-specific EP= -7.05 + 14.72 * (1- $e^{(-0.04*chla)}$); n=74). It is likely that chlorophyll standing stock serves as a proxy of both phytoplankton and microzooplankton food concentrations available to adult females. Chlorophyll standing stocks were below the critical concentration (at which EP is 95% of the calculated maximum) at approximately 55% of stations occupied over the study period, indicating frequent food limitation. There were periods (e.g. over at least 6 d in April, 1997 on the southern flank) during which food limitation was severe. There was no detectable influence of mean, water column temperature on mass-specific EP. Hatching success varied between 50-95% without any seasonal trend. Our qualitative observations suggest the possibility that a significant proportion of hatching nauplii incubations were non-viable, meriting further study.

Keywords: Zooplankton, copepod, Calanus, egg production, reproduction, Georges Bank