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MATURATION CYCLE OF ANTARCTIC KRILL: DO LIGHT AND FOOD MATTER?

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Introduction

Antarctic krill is the keystone species of the Antarctic marine ecosystem, being the major food source of most of the Antarctic predators. Study into krill reproduction biology is important since reproductive output is one of the key determinants of its future population size. Seasonal cycle of the field environments (food, light and temperature) are generally thought to be responsible for regulating seasonal maturation cycle of organisms. However, there are only two major studies to date dealing with krill maturity/reproduction under controlled laboratory environment. One of the studies suggested that their maturation is primarily controlled by their internal rhythm, and the other study demonstrated importance of photoperiod in inducing their maturation. The aim of our study is to re-visit these earlier studies and clarify the effects of photoperiod and feeding conditions on maturity cycle of female krill.

Experimental setup

Krill were kept over 10 months from March 2005 under the following three different treatment groups. A) Fed under complete darkness, B) fed under Antarctic light regime, C) starved under Antarctic light regime. Approximately 250 krill were kept in each group, and temperature was kept at 0.5^{o}C throughout. External sexual maturation was monitored by examining development of their thelycums (Bargmann,1945).

Results and Discussion

Regression and re-maturation of external sexual characteristics occurred synchronously among the three groups. Further ovary maturation, mating, and spawning were observed only in the two fed groups (both dark and light tanks), but not for the starved group. Spawning events extended longer for krill in dark compared to krill in Antarctic light regime. Our result demonstrates that the maturation cycle of their external sexual characteristics progress regardless of food and light conditions, however the ovary maturation seemed to be affected by both food and light conditions. These results will further be discussed in relation to seasonal maturation cycle of those in the field environment.