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Distribution and life history of *Euphausia pacifica* off northeastern Japan

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東北沖合域における *Euphausia pacifica* の分布と生活史

Euphausia pacifica is the dominant euphausiid in the north Pacific Ocean. In Japanese waters of the Pacific Ocean, it occurs as far south as Suruga Bay, and extends northward as far as the southwestern area of the Okhotsk Sea. *E. pacifica* as one of the key species in the northwestern Pacific have been studied intensively their distribution and life history. However, population dynamics studies of *E. pacifica* in the northwestern Pacific have been conducted at a few fixed station or based on catches by commercial fishing boats. This study investigated the abundance, spawning, growth patterns and life span of *E. pacifica* off northeastern Japan using discrete samples collected over a 10 yr period.

A total of 3073 discrete samples was collected during 206 cruises in the northeastern Pacific between the years 1992 and 2001. The sampling area was between 35°30' and 48°00'N and west of 158°E, however about 70% of the Norpac net samples were carried out between 36° and 48°00'N and west of 145°E. Nets (45cm, 335 μ m; no closing) were lowered to 150m depth and hauled vertically to the surface at 1m s⁻¹. Samples were preserved in 5% buffered formalin seawater immediately after collection. *E. pacifica* were sorted in to its developmental stages except for the nauplius and metanauplius stages. The length was measured from the tip of the rostrum to the distal end of the telson. Adults were sexed according to the presence of a thelycum in females or petasmas in males. Water masses were classified on the basis of the temperature at 100m depth as the Oyashio area (OW; $\leq 5^{\circ}\text{C}$), cold waters of the transitional area (CW; $5 < \text{CW} \leq 10^{\circ}\text{C}$), warm waters of the transitional area (WW; $10 < \text{WW} \leq 15^{\circ}\text{C}$) and Kuroshio area (KW; $> 15^{\circ}\text{C}$).

Adults were distributed in the Oyashio area and the transitional area throughout the year, but the occurrence of large adults was limited to OW ($\leq 5^{\circ}\text{C}$) and the cold waters of the transitional area ($5 < \text{CW} \leq 10^{\circ}\text{C}$). Spawning occurred in OW and transitional area throughout the year, especially in CW in spring but rarely in winter. Two modal cohorts of adults were consistently recognized in OW and CW. Cohorts of small males and females (10-11mm), which newly appeared in spring, grew remarkably to about 17mm from the following spring to early summer, followed by a long period of little growth during spring-winter. Then, both male and female cohorts grew slowly and steadily after summer to a maximum of 18-19mm by the following spring. The cohort of males disappeared after spring, but the females (about 20mm) were still being observed up until late summer. If the cohort of small adults is assumed to develop mainly from the spring hatching, the life span of male and female *E. pacifica* can be estimated to be 24 and 28 month, respectively, off northeastern Japan.

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