

Interannual Variation in Prey Resources During the Early Ocean Life of Juvenile Chum Salmon in Four Coastal Areas Around Hokkaido, Northern Japan

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The early ocean life of juvenile chum salmon is a critical phase in their life history. It is thought that high mortality occurs in this initial phase, which may be an important determinant of subsequent salmon population size. Previous studies suggested the survival of juvenile chum salmon is affected by both physical factors (e.g., temperature) and biological factors (e.g., prey environment; Irie 1990; Asami et al. 2005). The state of the prey environment, such as zooplankton abundance and species composition, is important for the growth and survival of juvenile chum salmon during their early ocean life.

In order to evaluate the prey environment during the early ocean life of juvenile chum salmon, we conducted a long-term monitoring study of zooplankton from March to July 1998-2010 in four different coastal environments around Hokkaido: Atsuta along the Japan Sea coast, Shiraoi along the western Pacific coast, Konbumori along the eastern Pacific coast, and Shari along the Okhotsk Sea coast. Zooplankton samples were collected with vertical tows (0 - 20 m) by a NORPAC net (0.45 m opening diameter, 0.33 mm mesh) during daytime. If water depth was less than 20 m, the net was towed from 3 m above sea bottom.

Common zooplankton types observed in all areas were hydrozoans, cladocerans, copepods, euphausiids, chaetognaths and appendicularians. Zooplankton types observed occasionally included meroplanktonic larvae, such as gastropods, polychaetes, decapods and echinoderms. Trends of interannual variation of zooplankton abundance and species composition were different among the four areas. Dominant zooplankton were small-size copepods less than 2 mm in body length, such as *Pseudocalanus newmani* collected in the Japan Sea and Okhotsk Sea coast samples, and *Acartia longiremis* in the Pacific coast samples. However, juvenile chum salmon fed on zooplankton larger than 2 mm in body length, and zooplankton species found in chum salmon stomach samples were different among areas (unpublished data). Our results suggest that variation in large-size zooplankton abundance may affect the growth and survival of juvenile chum salmon.

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