Coastal Feeding Patterns Based on Spatial Distribution of Released Korean Chum Salmon, *Oncorhynchus keta,* Fingerings

Ju Kyoung Kim[1], O-Nam Kwon[2], and **Kwan Eui Hong[1]**

[1]*Yangyang Salmon Station, Korea Fisheries Resources Agency, Yangyang –gun, Gangwon-do 215-821, Republic of Korea*
[2]*Gangneung-Wonju National University, East Coastal Life Science Institute, Gangneung 210-702, Republic of Korea*

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In this study, we conducted a survey to examine the ecological feeding strategy of Korean chum salmon, *Oncorhynchus keta,* juveniles released in March from the Namdaechun Stream and caught in coastal waters during April to May in 2010 and 2011 (Fig. 1). We investigated the feeding patterns of salmon juveniles moving northwards along and away from the coast. The fork lengths and body weights of the salmon releases were not significantly different from one another and ranged 5.2-7.8 cm and 1.5-5.1 g, respectively. In zooplankton samples, the dominant taxonomic group was copepods. The stomach contents of juvenile chum salmon differed by sampling station, but most of the salmon were consuming amphipods. Dipteran terrestrial insects were commonly observed in chum salmon stomach samples, and the occurrence of insects was not related to the distance of the survey site from land. Results showed the most suitable prey items of juvenile chum salmon were dipterans and amphipods in the coastal survey area of the East Sea of Korea. Therefore, we suggest these results become part of the basic data by which to identify the migration pathway of juvenile chum salmon moving away from the release area.

In 2010, zooplankton samples were collected at 16 sites 1 km away from the juvenile chum salmon release site. Samples indicated copepods were the dominant group and accounted for more than 50% of the zooplankters counted, except for survey transect (ST) 3. At ST 3, amphipods accounted for 50.3% (11.7 individuals/ton) and copepods were 47.7% (11.1 individuals/ton) of the items in the samples. Amphipod abundance ranged from 3.0% to 50.3% (0.5 to 11.7 individuals/ton) at the sites 1 km away from the coastal sites, except for five locations. However, the location of macroplankton abundances, including chaetognaths and arthropods, did not show a clear trend.

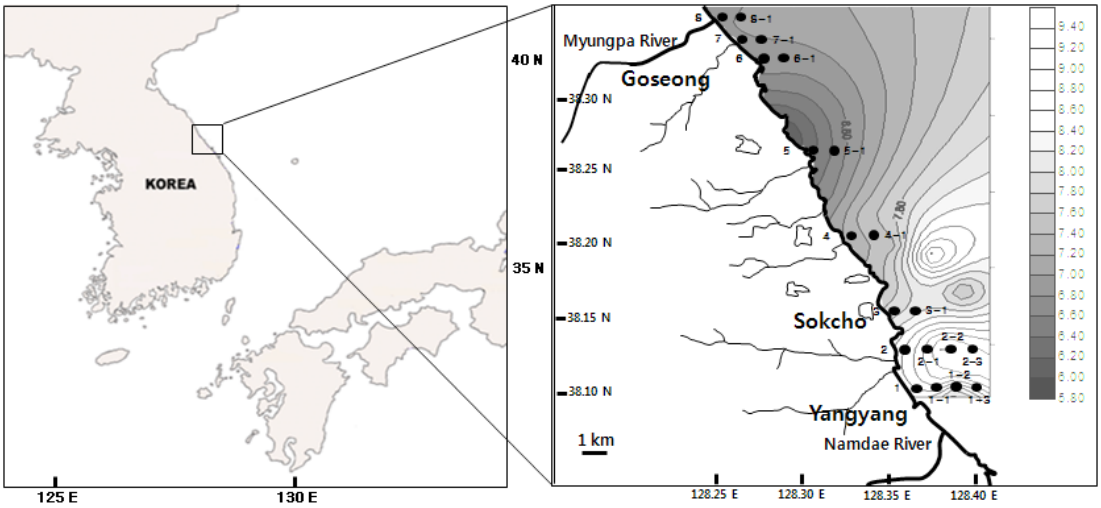

Fig. 1. Location of survey stations in the East Sea off the coast of the Republic of Korea sampled in April-May, 2010-2011.

Analysis of juvenile chum salmon stomach contents collected at the same sites are shown in Fig. 2. Considering coastal sites 1 km away from the juvenile chum salmon release location, copepods were dominant in the stomach samples collected at ST 2-1 and amphipods were dominant at most of the other sampling sites. In addition, diptera were dominant in stomach contents collected at ST 1 and ST 8-1.

All correspondence should be addressed to J.K. Kim.
e-mail: loginkjk@fira.or.kr

In 2011 zooplankton samples collected at ST 1 and ST 2, copepods were the dominant group and accounted for 75% to 100% (5.8 to 892.7 individuals/ton) of the items in the samples, except for those collected at ST 2-2. Amphipods were usually a subdominant group and were present at six of eight transects, but this group accounted for 54.8% (46.6 individuals/ton) of the items in zooplanton samples only at ST 2-2.

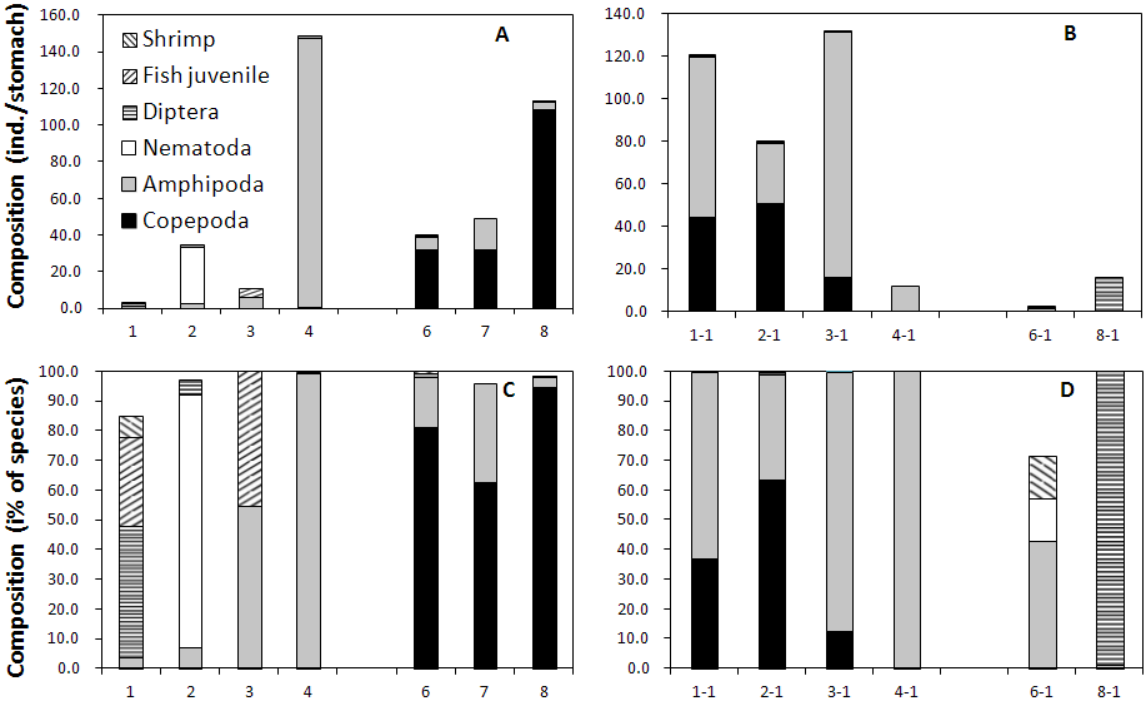

Fig. 2. Juvenile chum salmon stomach contents (count of prey individuals/stomach) collected in spring (April to June) 2010. Other minor categories include decapods, euphausiids, pteropods, fish egg, crab larvae and hydrolysate.

Stomach contents of the juvenile chum salmon varied by site according to the distance the sample was collected from the coast (Fig. 3). Copepods accounted for 81.2% (32.3 individuals/stomach) and 62.7% (108.8 individuals/stomach) of stomach contents at ST 1-3 and ST 2, respectively. Amphipods accounted for 54.5% (6 individuals/stomach), 61.7% (75.5 individuals/stomach) and 62.6% (75.5 individuals/stomach) of stomach contents at ST 1-2, ST 2-1 and ST 2-2, respectively. Nematodes accounted for 84.8% (30.6 individuals/stomach) and 44.5% (1.5 individuals/stomach) of stomach contents at ST 1-1, and ST 1, respectively. Fish prey were consumed only at ST 1, ST 1-2, and ST 1-3, and shrimp were observed in stomach samples collected at ST 1 and ST 2-1. Diptera were observed in stomach contents of juvenile chum salmon caught at most sampling sites, regardless of the distance from the coast.

Terrestrial insects, diptera, observed in juvenile Korean chum salmon stomach samples were generally consumed in the river. The tendency to consume a high proportion of insects was also observed in juvenile Chinook salmon (Rondorf et al. 1990). In coastal waters, amphipods were easy to capture because, among the arthropods, they are relatively slow moving. Diptera and amphipods are excellent sources of nutrients, such as DHA and EPA (docosahexaenoic acid and eicosapentaenoic acid, both omega-3 fatty acids). Consequently, the best food for juvenile Korean chum salmon entering the marine waters of the coastal region is amphipods.

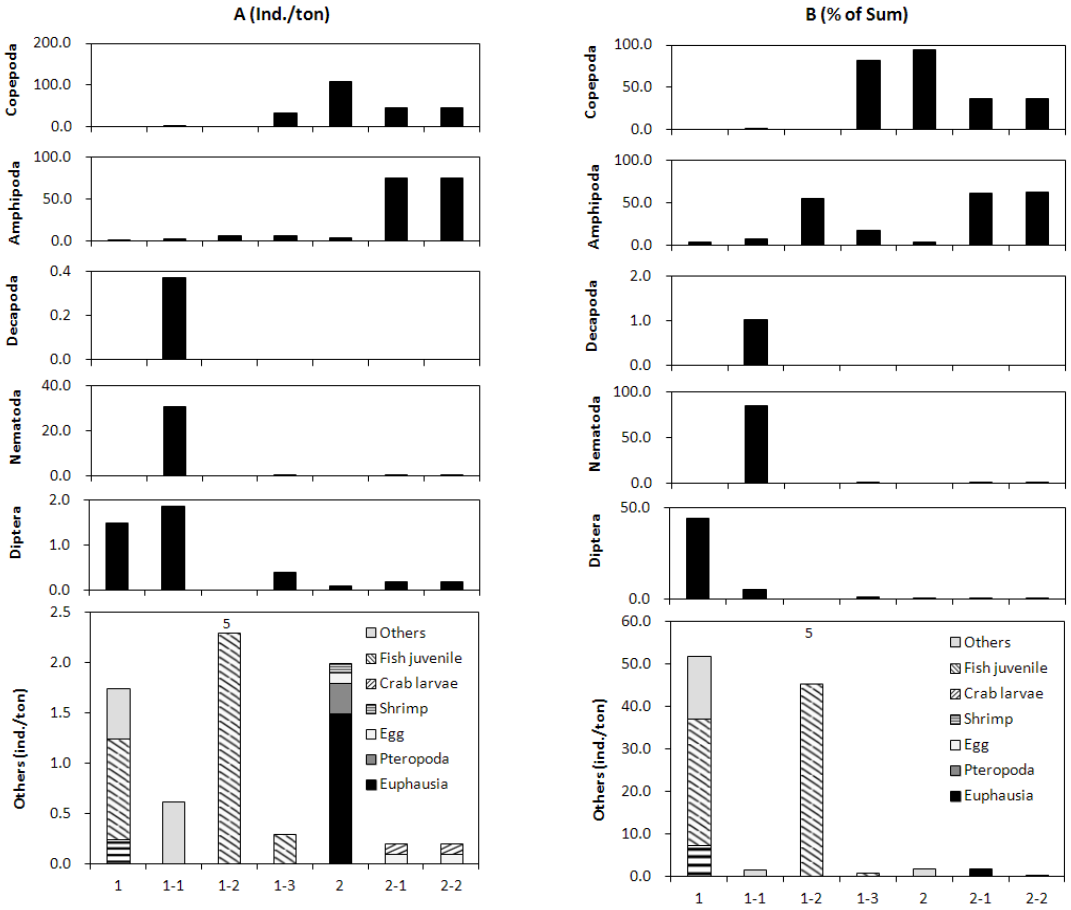

Fig. 3. Stomach contents (individuals/stomach) of juvenile chum salmon collected in spring (April to June) 2011.

REFERENCES

Rondorf, D.W., G.A. Gray, and R.B. Fairley. 1990. Feeding ecology of subyearling Chinook salmon in riverine and reservoir habitats of the Columbia River. Trans. Am. Fish. Soc. 119: 16-24.