

Analysis of Live Food and Food Intake of Chum Salmon Released in Korea Taehwa River

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Abstract

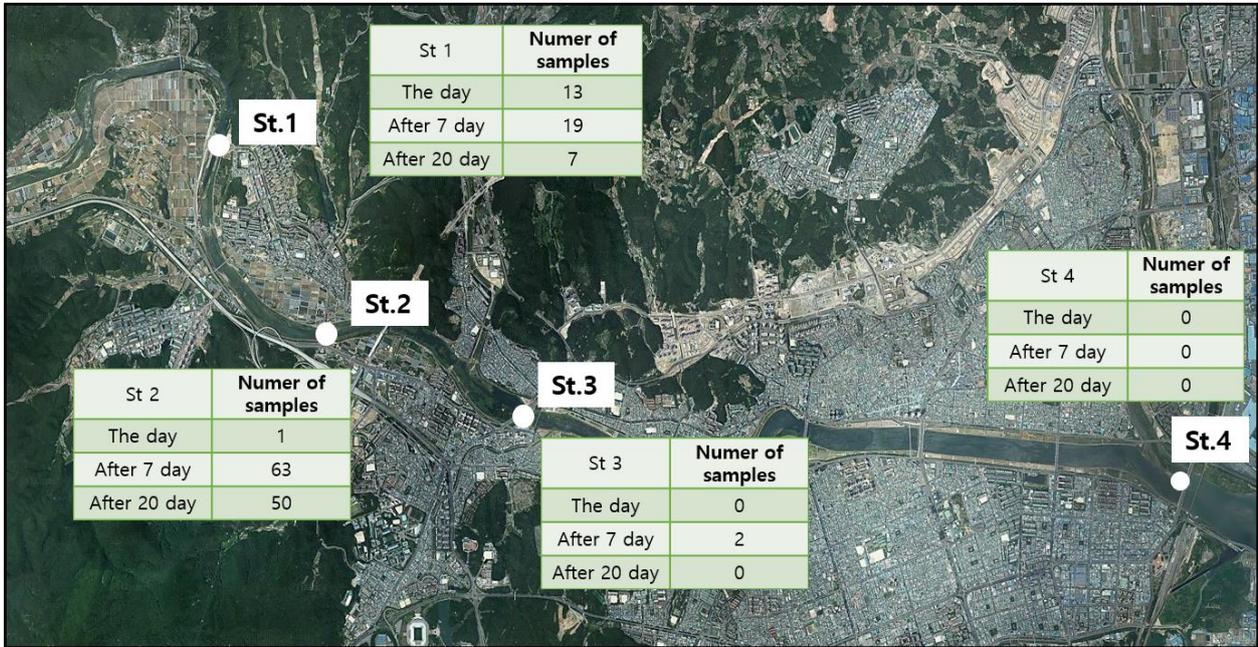
In the Taehwa river of South Korea's Ulsan Metropolitan City, live food and chum salmon were recaptured and analyzed in 4 spots after chum salmon are released in the year 2016 and 2017. Live food was investigated 3 times after 7 days, 20 days of release. Salmon caught after 20 days of release grew to have lengths of $4.5\pm 0.6\text{cm}$ to $6.3\pm 0.8\text{cm}$, and weights of $0.5\pm 0.2\text{g}$ to $1.8\pm 0.7\text{g}$. The chironomidae family turned out to be the dominant component of chum salmon gut contents. The chum salmon gathering area had species of 3 divisions, 3 classes, and 6 orders. The insecta class had the highest ratio of 69%, and from it the order ephemeroptera varied most with 15% proportion. The order ephemeroptera was dominant for total population as well, excluding St. 4. The chum salmon fed mostly on the chironomidae family and tubifex, and they inhabited areas where the chironomidae family and tubifex were predominant.

Introduction

Taehwa river is a river that flows in the center of South Korea's representative industrial city of Ulsan Metropolitan City. As industrialization progressed, the BOD level reached 11.3 ppm due to environmental pollution in 1996, and many fish, including salmon, died en masse or disappeared. Because of this, Ulsan Metropolitan City has started an environmental improvement business for chum salmon release in 2000. It led to the return of 5 salmon in 2003, and the highest record of 1827 salmon after release in 2014. However, in 2015 the numbers decreased to 578 which was 31% in comparison to 2014. In 2016 the return rate has dramatically decreased to 123. Reports have shown that the understanding of the release environment and adaptation pattern could increase the survival rate of chum fish. Food intake and the adaptation process should be studied further as the early release environment and the food intake are especially important in deciding their physical nutritive conditions. Therefore, the increased of the early survival rate of the chum salmon released and recaptured in Taehwa river are studied for use as fundamental research.

Chum salmon released and recaptured

It can be observed that a chum salmon intakes chironomid and tubificid mostly and it grows and survives within the region where lots of chironomid and tubificid can be found as live foods. According to the findings of this research on the live food, it showed that chironomid and tubificid were the dominant and subdominant members of the food group and the biomass of chironomid plays the most important role in a chum salmon's ingestion of the live food in the Taehwa River.



Life food and food intake

On March 15, Seventy-seven thousand chum salmons were released from St.1 and Five hundred thousand from St.2 while the preliminary research was conducted from March 14 to March 15 at St.1, St.2, St.3, and St.4 prior to the release. Chum salmons appeared until the primary research (Seven days after the release) and the second research (20 days after the release). The chum salmons collected prior to the release were naturally spawned salmon raised in the Taehwa River and fourteen of them appeared. After seven and twenty days after the release, 84 and 54 chum salmons were captured, respectively. In terms of the location where they appeared, 114, 39 and 2 of them appeared at St.2, St.1. and St.3, respectively. It was assumed that they also passed through St.4, but it was not possible to collect them due to a fluctuating water stream caused by the deep water level and the tidal differences.

By looking at it based on the seasonality, it was observed that chum salmons appeared seven and twenty days after the release (water temperature 10.2 ~ 16.3 Celsius) and it was assumed that they travelled to the coast afterward since they did not appear subsequently after April during the period when the water temperature was increasing.

species	St 1	St 2	St 3	St 4	%
Platyhelminthes	0	1	0	0	0.14
Mollusca	4	3	2	3	1.71
Annelida	12	3	0	82	13.82
Malacostraca	1	0	4	47	7.41

Crustacea	0	0	0	105	14.96
Insecta	0	0	0	2	0.28
Ephemeroptera	185	53	7	0	34.90
Odonatan	1	0	0	0	0.14
Megaloptera	1	0	0	0	0.14
Coleoptera	1	6	2	0	1.28
Diptera	40	39	9	0	12.54
Trichoptera	45	12	2	0	8.40
Total	301	114	24	263	

After the release, chum salmon which were naturally spawned and raised were mixed with ones that were released and it was not possible to differentiate between two types with the naked eye because their size and weight were similar. The length of a naturally raised chum salmon that was captured was 4.5 ± 0.6 cm while the length, width, and the weight of the one captured seven days after the release appeared to be 5.5 ± 0.7 cm, 1.1 ± 0.16 cm, and 1.8 ± 0.7 g, respectively. For the ones which were captured after 20 days, the length and weight increased by 1.8cm and 1.3g, respectively.

