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Korean Research Plan for Salmon in 2019

by

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Korean Research Plan for Salmon in 2019

Salmon are very important resources in biological, social, economic, and political aspect with characteristics of transboundary distribution and economic importance. The interest in chum salmon biology in Korea has been much increased since the establishment of the Inland Living Resources Center (formerly Yangyang Salmon Station) of Korea Fisheries Resources Agency in 1980s. The enhancement program for chum salmon has been expanded thereafter, so that chum salmon were transplanted 18 streams in the coast of the Korean Peninsula. More than 10 million fry salmon have been released every year since the 2000s. On the other hand, the ecological research on salmon species was very limited until recently due to the lack of research program. Although the North Pacific Anadromous Fisheries Commission (NPAFC) emphasizes the need for salmon research, the conspicuous increase in research funding was not achieved. Oceanic environments have been rapidly altered by climate change during the last a few decades and ocean ecosystems including salmon populations will be changed under the global warming situation. Especially, Korea is located at the southern limit of chum salmon distribution, and special attention and support for salmon ecology research is needed.

1. To reveal the mechanisms of mass mortality of chum salmon during their early life in rivers and coastal areas in conjunction with the fluctuation of return rates, we will carry out the research as follows:

- (1) Identification of prey and predator species for juvenile salmon in the rivers and coastal areas;
- (2) Stage-by-stage estimation of survival rate after releasing in the rivers and coastal areas;
- (3) Tracking movement with water quality and ecology research in the river and coastal areas;
- (4) Examination of growth rate during the early life history using size, otolith and DNA, and compare the growth rate between released juvenile salmon and wild juvenile salmon.

2. Climate change effects on salmon distribution, migration route, and abundance will be investigated. This research includes the following:

- (1) Continuous monitoring activities on environmental conditions in the Korean waters;
- (2) Climate change effects on the biological characteristics of chum salmon returned to the Korean waters;
- (3) Migration of young salmon (smolt) and adult salmon in the coastal water and off-shore

with tagging experiment;

(4) Chum salmon life cycle with Change in regression rate of younger chum salmon.

3. Otolith thermal marking on Korean chum salmon will be carried out to provide information about growth, survival during the early ocean life stage, and hatchery origins from 2017 release (2016 brood).

4. For the stock identification, Korea will develop new multiplex PCR set using microsatellite loci of chum salmon to investigate genetic variation and population structure of Korean populations.

5. Genetic structure of non-anadromous and anadromous cherry salmon populations will be investigated using mitochondrial DNA to collect baseline data for the strategy of conservation and management.

6. Parasites as biological tags for stock discrimination of the chum salmon in Republic of Korea. Parasites can be good biological tags because they are applied by nature at no cost. Parasites can be infected with susceptible host fishes when they enter into certain areas. Then if they move to the outside and are caught, researchers can infer that the fish had been in the endemic area for a period of time during their life. Hence, the host fish can be considered as naturally 'tagged' by parasites. However, if they do not pass the parasites endemic area, they will harbor no parasites. Therefore, researchers can discriminate each fish stocks and trace their migration routes with these biological tags:

- (1) Monitoring of fish parasites in chum salmon migrating to Korea;
- (2) Korea and other countries returning salmon were compared by parasite infection status;
- (3) Development of biological tag for stock analysis.