International Council for the
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Salmon and Trout Committee
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Study of the Seaward Migration of the Pacific Salmons and the Perspectives of their Acclimatization in the Waters of the White Sea and the Barents Sea

by

A.A.Azbelev, E.L.Bakshtansky, I.N.Grinjuk,
E.I.Surkova, S.S. Surkov.

The process of acclimatization of different species of animals passes in a different manner. In some cases a species easily adapts itself to the new conditions and quickly reaches commercial abundance. In other cases the adaptation of a species to the new conditions is retarded and the acclimatization itself may be carried out only with the help of man. The work on the acclimatization of the Pacific salmons (pink salmon and chum salmon) carried out since 1956 in the waters of the Barents Sea and the White Sea illustrates this phenomenon.

Due to the absence of a return migration of the males and females in 1958 and 1959 it was necessary to clear up the reasons of this phenomenon. Thus, since 1959 the study of the seaward migration of fry of these species released by the hatcheries began and the role which the natural reproduction plays in the process of the formation of the commercial stock of pink salmon was also estimated. The investigations conducted, especially the materials of 1962 allow us to obtain a clearer understanding of the perspectives of the further acclimatization.

Observations carried out by E.L. Bakshtansky showed that a considerable percentage of pink salmon smolts and mainly chum salmon smolts is exterminated by cod fry. Chum salmon are fed on more intensively as their period of life spent near the shores is longer compared with that of the pink salmon.

The observations on the seaward migration of fry released by the Umba hatchery were carried out in the summer of 1962. This hatchery is situated 4 kilometres from the mouth of the Umba River. The strong current favours the quick seaward migration. In some hours a small number of fry enter the mouth of the River. The small shoals of fry remain in the mouth close to the shores. They are hunted by sea trout, salmon migrants and even by stickleback.

In the daytime a small number of fry of pink and chum salmon migrate downwards, by the evening the seaward migration increases and the maximum is reached at about midnight. In summer there is sufficiently light in the north, and it can be seen that pink and chum salmon in small shoals (amounting to several hundred specimens) migrate into the sea along the shores. Sometimes the shoals are so large that they become one, forming a dark band of 0.5 - 1.0 m in width.

As the observations and experiments showed, fry of pink and chum salmon can perish (during the migration into the sea) owing to different reasons, i.e. they can perish because of the influence of low temperatures or they are fed on by predators etc.

At night, on the 25th of June 1962, during the maximum of the seaward migration of smolts of pink and chum salmon, a shoal of herring entered the mouth of the Umba River and migrated 300 - 400 m upwards the river. In the daytime the herring kept 2 kilometres from the shores. Judging by the behaviour of sea-gulls following the herring the shoal was small.

In the river the herring often jumped out of the water, "played", hunting for smolts of pink and chum salmon. Sometimes, a young fish jumped out of the water together with the herring; at a distance of 2 metres we observed that a herring, 12 - 13 cm long, reached and seized the same young fish several times, it escaped but the herring seized it again.

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In the Lebjazhja River (tributary of the Ponoi River) the seaward migration of fry started on the 13th of June at a water temperature of 7.5°C and finished during a ten-days' period, the temperature being 7.5°C. During the period of the 15th to the 25th of June, 11 to 25 smolts were caught every day with a sampler, and 2 to 7 smolts were taken during the rest of the days. A total of 118 specimens were studied in the laboratory. The average length and weight of smolts in this sample were 26 mm and 2o7 mg, i.e. they were similar to those of the smolts of the Far East by these indices. During the seaward migration in the Lebjazhja River some increase in length and weight of young pink salmon was observed; however, the increase was not so significant as in the Sidorovka River. The retarded growth in the Lebjazhja River can be explained either by the fact that immediately after escape from a redd, the pink salmon are carried into the Ponoi River or the retarded growth is due to worse feeding conditions.

The seaward migration of young pink salmon was also observed in the Muchka River.

The investigations carried out by the Polar Institute (PINRO) show that the time of formation of the stock of pink salmon at the Murman Coast depends on the two following factors:- the frequency of occurrence of the early-ripening year-classes and the thermal conditions when the eggs are at their first stages of development.

The early-ripening generations in the north can be cultivated as a result of transport of the eggs of males and females entering the Kamchatka rivers and other northern areas of pink salmon distribution.

As far as the thermal conditions are concerned, the investigations show that the eggs of pink salmon at the early stages of development (up to the eyed-stage) cannot bear the incubation in water temperatures close to the zero. The combination of the unfavourable conditions of the thermal regime affect especially the development of the eggs deposited by the lately-ripening males and females.

No figures have been received for this contribution. ICES' Secretariate.