

The Descent of Pink and Chum Salmon

down the Kola Peninsulā Rivers

by

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The non-return of adult specimens of pink and chum salmon released in 1957 and 1958 on the Kola Peninsula necessitated the studying of the reasons for the failure of the acclimatization work, particularly, to the necessity of studying the biology of pink and chum salmon smolts and their natural mortality. Regular observations on young, acclimatized salmon descending to the sea were started in 1959 by Azbelev V.V. and Bakshtansky E.L., scientific workers of the PINRO, who studied descending of smolts released by the Taibola and Ura-Guba hatcheries.

The Taibola hatchery is situated on the Kola River, 77 km from its mouth. In April/May 1957 and 1958, the hatchery released young pink salmon, at the larval stage, at the distance of 30 km from the mouth. Despite the very fast current, the descending of the young into the sea was observed until April. This delay of young pink salmon is supposed to have been conditioned by the peculiarities of the polar day.

The non-return of adult specimens of fish released in 1957 made the fishery biologists release more viable smolts in 1959. The cultivation of young pink and chum salmon having been started at the Taibola hatchery, smolts began to be released near the hatchery, at the distance of 77 km from the Kola River estuary. Some information on young pink salmon descending down the Kola River is given in Table 1.

It follows from the Table that the duration of the stay of young pink salmon in the river is inversely proportional to the size of smolts released. Young pink salmon move into the sea slowly, delaying their stay in shallows, where they feed intensively on small larvae of chironomidae and aerial insects. While descending to the sea, young pink salmon continue growing (see Tables 2 and 3).

The descending of young chum salmon released by the Taibola hatchery also varies from year to year. For example, in 1959 it was very prolonged and went on until July/August and even September. While descending, chum salmon reached 4-8 cm in size and 0.5-6.0 gr in weight. Mean length and weight of young chum salmon made up 5.6 cm and 2.2 gr respectively. In 1960, mass descending of smolts to the sea was observed on the 15th and 18th July. Mean length and weight of smolts was 3.8 cm and 1.611 gr respectively. In 1960, less deviations from the mean size were observed among young chum salmon descending to the Bay in comparison with 1959.

Young chum salmon released by the Taibola hatchery on 28th June 1961, left the river for the sea in a fortnight. Data illustrating young chum salmon descending to the sea in the Kola River for different years are shown in Table 4. Here the same fact is observed as with pink salmon moving into the sea; the larger the young released by the hatchery, the shorter the period of descending.

The Ura-Guba hatchery began operating in 1959. It is built on the stream at a distance of 2 km from the estuary. Young pink and chum salmon released by the Ura-Guba hatchery reach the Bay already on the day of release.

On the 10th June, 1959, the hatchery released 4,607 million specimens of young pink salmon, their mean weight being 220 mg. On the 1st of June 1960, 3,972 million specimens of pink salmon fry were released, their mean weight being 230 mg.

The peculiarities of the position of the Ura-Guba hatchery enables us to investigate the causes of young pink salmon natural mortality while passing over to the life under sea conditions.

Over a short distance of the stream the influence of predators (young salmon and trout) cannot be of great strength. The transition of young pink and chum salmon into the brackish waters of the inside part of the Ura-Guba Bay is accompanied by the increased effect of predators upon young salmon. Young cod, haddock and mainly saithe pursue schools of descending smolts, the abundance of which rapidly decreases under the influence of these predators. Avoiding the predators, salmon schools approach the coast where they perish after the low-tide.

It was noted that the areas of the inlet, densely inhabited by young Gadoid fish, were places of the biggest perishment of smolts. Thus, the drying of smolts is a result of the young Gadoid fish influence. We have examined 20 stomachs of young saithe (10-20 cm in length) and found from 1 to 6 specimens of salmon smolts. While descending, young pink salmon delay in the brackish waters for 3-4 days and young chum salmon no less than for 10 days. As a result, young chum salmon is more subject to the extermination by young Gadoid fish drying more than young pink salmon. Relatively large specimens of smolts survive more easily. To elucidate this question, we carried out in 1959 a sea-water experiment of cultivating the young pink and chum salmon in the inside part of the Ura-Guba Bay. Pink salmon fry was brought up to the weight of 925 mg. These specimens escaped the young Gadoid fish by not approaching the coast, thus their perishment due to drying up was not observed.

Chum salmon fry, brought up to the weight of 2 gr after liberation, remained in the coastal waters escaping the predators and after the first low-tide hundreds of dried chum salmon fry were found in the places of their release.

The first specimens of adult pink salmon were caught in the Kola Peninsula rivers in 1960. Unlike the previous years (1958, 1957) in 1959 these specimens of pink salmon did not leave the hatchery at the larval stage but as fry of a somewhat larger size. Observations on the descending of young salmon carried out in 1959 and 1960, enable us to state that the first positive results of the acclimatization of the Far East salmon in the Kola Peninsula, were not the consequence of any accidental reasons, but a consequence of the liberation of larger and more viable young fish by the hatchery. Nevertheless, different effectiveness of the hatcheries in those years convinces us of the impossibility of developing the achieved success and of forming the stock of Oncorhynchus in northern Europe without further study of numerous factors both of organic and inorganic environment influencing on the young salmon.

Table 1. Data on the descending of young pink salmon released
by the Taibola hatchery

Year	Time of release	Number of young fish released (mill.)	Mean length (cm)	Mean weight (gr)	Mass descent to Bay	End of descent	Time of descent in December	Mean size (cm)	Mean weight (gr)
1959	May 29 June 11	6.5	3.5 3.6	0.220 0.250	July 3-15	End of August	6	5.0	1.100
1960	May 29	6.7	3.6	0.364	June 20- July 10	End of July	5	4.8	0.730
1961	June 28			0.548		End of the second ten-day period of July	2	-	-

Table 2. Length of pink salmon smolts

Year	Length (cm)	3	4	5	6	7	8	Total
1959		1.9	59.6	30.9	3.4	4.2		100%
1960		-	66.0	33.5	0.5	-		100%

Table 3. Weight of pink salmon smolts

Year	1	2	3	4	Total
1959	74.9	18.0	3.7	3.4	100%
1960	86.8	13.2	-	-	100%

Table 4. Data on young chum salmon releasing and descending in the
Kola River

Year	Time of release	Number (millions of specimens)	Mean weight (gr)	Duration of descent
1959	Third ten-day period of June	1.9	0.370	Till September
1960	" "	4.25	0.460	Mass descent in the second ten- day period of July
1961	" "	11.00	0.655	The descent was over in the second ten-day period of July