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SALMON RIVERS OF THE KOLA PENINSULA.
SOME DATA ON SALMON MIGRATIONS AND ESTIMATION
OF MARINE FISHERY INFLUENCE

by

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Introduction

The question of the Russian salmon migration routes and their feeding areas is of certain interest, and, therefore, it has been repeatedly discussed in literature (Berg, 1935, 1948; Danilchenko, 1938; Azbelev, Lagunov, 1956; Bakshtansky, 1970; Piefinch, 1972; Grinyuk, 1977; Bakshtansky et al., 1976, 1985, 1991; Antonova, Chuksina, 1987; Novikov, Kuzishev, 1990 et al.).

Basing on the data on tagging and some indirect data the authors of these papers conclude, that the Russian salmon, including the salmon, originating from the Kola Peninsula rivers, feed and migrate in the different areas of the Norwegian and Barents Seas. However, as for the Kola Peninsula, these areas can be exactly determined only for the Ponoy and Porya Rivers. It could be possible for the Ponoy River, due to the fishing of spawners, tagged in the area of the West Finmarken in 60s and in early 70s (Grinyuk, 1977), but the data on the sea migrations of the salmon from the Porya River were obtained basing on tagging of wild and farmed juvenile fish (Bakshtansky et al., 1976; Yakovenko, 1987). We may judge about the areas of distribution of salmon from the other rivers of the Kola Peninsula only by some separate fragmentary data, obtained on the basis of spawner tagging at the Norwegian coasts. The data show, that salmon from some rivers of the Kola Peninsula (Tuloma, Kola, Bolshaya Zapadnaya Litsa, Varzuga, Titovka, Ura and et cetera) occurred in the catches of the Norwegian fishermen, but there is no the more concrete information on that score.

The lack of the data on the areas of salmon migrations from the rivers of the Kola Peninsula is caused, first of all, by the insignificant volumes of juvenile tagging. However, the data on tagging return, obtained in the recent years, allow our picture of the area of salmon from the rivers of this region to be specified and significantly expanded. Moreover, our authors had the purpose to summarize, if possible, all the available data on the Kola salmon distribution, and, in connection with it, they express their sincere acknowledgement to L.P.Hansen (Norway, NINA) for the additional, having not been known before, information about salmon tagging in the Norwegian waters in 1962-1968 to be made available.

Results and discussion

The history of salmon juvenile tagging in the rivers of the Kola Peninsula has a very intricate character and the reliable information about tagging have been made available since 1959. In that year, as well as in 1960, 230 specimens of wild salmon and 1 495 spec. of the farmed Atlantic salmon juveniles were tagged by the Karlin's tags in the Luvenga River. Later, in 1968, 171 spec. of the farmed Atlantic salmon juveniles were tagged by the Karlin's tags in the Bolshaya Zapadnaya Litsa River. However, there are no data on the return of tags from the feeding areas for this period.

The first effective programme for tagging of salmon juveniles in the rivers of this region was performed in 1969-1974. In that period 7 271 spec. of farmed fish and 1 648 spec. of the wild Atlantic salmon juveniles were tagged (Table 1). According to Bakshtansky et al. (1976), 9 tags were returned from the different coastal areas of Norway (Fig.1), that amounted to 0.1% of the tagged fish.

Later on, up until 1980, juvenile tagging was not conducted. Since 1980, practically, the regular tagging of the Atlantic salmon juveniles have been carried out, although its volumes are, obviously insignificant for such region, as the Kola Peninsula (Table 1). In the period from 1980 to April 1995 42 833 spec. of farmed fish and 3 450 spec. of wild juveniles were tagged. The tagged salmon occurred in the catches of not only the Norwegian fishermen, but the Faroese ones (Fig.1). There was a case of tag returning from the West Greenland area. In all 19 tags or 0.05% were returned, without regard for the tagging in the latest two years.

Till early 70s one could judge about the distribution of salmon from the Kola Peninsula rivers by the data on the adult fish tagging, conducted by the Norwegian scientists in the Finmarken area. On the basis of those data, the boundaries of distribution of salmon from the largest river of the Kola Peninsula - the Ponoy River were rather clearly determined (Fig.1). Also, in 30s and 60s salmon were tagged in the area of Finmarken (Breivik) and then caught in the Puz River, the Bolshaya Zapadnaya Litsa River,

the Titovka River, the Ura River, the Tuloma River, the Kola River, the Teriberka River, the Voronya River, the Sidorovka River, the Olenka River, the Rynda River, the Kamenka River, the Vostochnaya Litsa River, the Jokanga River, the Strelna River, the Varzuga River, the Umba River, the Kovda River and others (Danilchenko, 1938; Novikov, 1953; Bakshtansky, Nesterov, 1973; data of L.P.Hansen). In this area, as Bakshtansky and Nesterov think (1973), the migrating salmon is fished off. This conclusion was made basing on the insignificant difference in time between the tagging of salmon and its second being caught in the rivers of the Kola Peninsula (mainly, from 9 to 53 days, in one case - 93 days) and borne out by the data, presented by L.P.Hansen.

As Novikov and Kuzischin conceive (1990), the main feeding area of the Atlantic salmon from the rivers of the European North of the USSR (Russia) is the area of the Faroes. For the rivers of the Kola Peninsula it is borne out by the data on tagging, despite the low percentage of tag return (Fig.1). In particular, the feeding areas of salmon from the Jokanga River, the Luvenga River, the Porya River, and, probably, from the other rivers of the Kola Peninsula are located in the area of the Faroes, between $64^{\circ}30'N-67^{\circ}40'N$ and $6^{\circ}20'-3^{\circ}20'W$. There is the information, that the salmon from the rivers of Kareliya (Bugaev, 1987) and the Arkhangelsk Region (verbal communication of L.P.Hansen) feed in these areas. Regarding all the data available, salmon from the rivers of the Kola Peninsula occur off the Norwegian coast, from Torshavn to North-East Finmarken. Nevertheless, in Grinyuk's mind (1977), only salmon from the Ponoy River feed in the Norwegian waters (at present there is no fishing in these areas). Salmon from the Pechora River feed approximately in the same areas (Antonova, Chuksina, 1987). Basically, in the home waters of Norway the salmon, migrating to the rivers of the Kola Peninsula and, accordingly, to the rivers of the other regions of North Russia, is fished off.

Thus, recently obtained data show, that the area of salmon from the rivers of the Kola Peninsula is significantly wider, than it has been imagined before. At the same time, the question of migration routes of postsmolts from the rivers of this region has remained to be not cleared up. Besides, the data available don't allow the populations of some rivers (separate stocks) in the feeding areas to be identified, and that, in its turn, don't allow the contribution of salmon from the rivers of the Kola Peninsula to the catches of the Faroes and Norway to be estimated.

Going into the matter of postsmolt migrations, Novikov and Kuzishev (1990) assume, that the salmon juveniles from the rivers of Murman (the Barents Sea rivers of the Kola Peninsula) from beginning may migrate in not western, but eastern and north-eastern direction, to the shores of the Novaya Zemlya, and further along the flows of the West Novozemelskoe Current. From now on, they may move along the border between cold and warm currents, along the shores of the Franz Josef Land, Spitsbergen, to the Greenland Sea, reaching the Faroese area. Basically, this is a rather attractive hypothesis, since the terms of juvenile

migration from the rivers of the Kola Peninsula coincide with the beginning of the hydrological spring in these areas, i.e. with development of food supply.

But in the Novaya Zemlya area a great number of saithe have been fished for a long time, however, there were no cases of postsmolt catch.

As for the contribution of the Kola salmon, as well as the Russian one, on the whole, to the catches of Norway and the Faroes, this point is reasonably moot. According to Rosseland (1969), 222 adult salmon were tagged in the area of Breivik (Finmarken), from which 58 (26%) were caught in the Norwegian waters. Presently we have the information, that in the rivers of the Kola Peninsula (regarding the data, presented by L.P.Hansen) in 1968 9 specimens, tagged in that area, were caught, i.e. approximately each the eighth salmon, caught in the area, originated from the rivers of the Kola Peninsula. In spite of this, it should be taken into account, that these data may be underestimated, i.e. according to the data by Bakshtansky and Nesterov (1973), in 1962-1968 132 Norwegian tags were recorded in salmon, having entered the rivers of the Kola Peninsula. We have the information (areas and terms of tagging) only about 37 tags.

Thus, there is no question, that until 80s salmon from the rivers of the Kola Peninsula was more intensively fished off in the area of Finmarken. The results of spawner tagging in the sea in 1935-1937 and 1962-1972 (Danilchenko, 1938; Novikov, 1953; Bakshtansky, Nesterov, 1973; Bakshtansky et al., 1991) and the data on the smolt tagging (Bakshtansky et al., 1991) indicate this. From the different estimations the percentage of the Russian salmon in catches in the area of Finmarken was from 35% to 67% (Bakshtansky, Nesterov, 1973; Bakshtansky et al., 1991). For this, we assume, that about half of the Russian salmon in catches, taking into account its stock status in the different regions of Russia, originated from the rivers of the Kola Peninsula. Nowadays, due to the prohibition of salmon fishing in the open areas of the Norwegian Sea and stopping the drift-net fishing off the Norwegian coast, the portion of the Russian salmon in catches in the area of Finmarken was reduced, that had the noticeable influence on the stock status of salmon in the Barents Sea rivers (Zubchenko et al., 1993). In the other areas of Norway, judging by the data of tagging in 1969-1974 (Bakshtansky et al., 1976) and tag return recently, the contribution of salmon from the rivers of the Kola Peninsula to the catches seems to be less, than in the area of Finmarken. However, it is hard enough to estimate this contribution on the basis of these data. According to the indirect data, including the fluctuations of catches in the Norwegian and Russian "home" waters, the percentage of the Russian salmon in the Norwegian catches was equal to about 10% (Zubchenko, Sharov, 1993).

It is also hard to appreciate the contribution of salmon from the rivers of the Kola Peninsula to the catches of the Faroes using the results of smolt tagging. Calculations showed, that, on the whole, the portion of the Russian salmon in the Faroese catches, in the period of intensive fishing was equal to 5-7% (Zubchenko,

Sharov, 1993). To all appearances, two thirds of salmon originated from the rivers of the Kola Peninsula, since their stocks in the most rivers of the north-western Russia were reduced, and the salmon from the Pechora River, according to Antonova and Chuksina (1987) feed in the eastern areas. To an extent, the estimation of the Russian salmon contribution to the Faroese catches is acknowledged by the results of tagging, conducted by the Norwegian and Faroese scientists in the seasons of 1992/1993 and 1993/1994 in the Faroese economic zone (Anon., 1995). 5 tags or 7.6% of 66 returned taggs were returned from Russia. Knowing about the great extent of illegal fishing in the most rivers of Russia, which presently amounts to or, even exceeds the commercial yeild, we may presume, that, at least, the similar number of taggs have not been returned by poachers. Nevertheless, we understand, that we have no right to apply the data to our judgement, and, thus, so far we should agree with the estimation obtained.

REFERENCES

- ANON., 1995. Report of the Working Group on North Atlantic Salmon. ICES C.M. 1995/Assess.
- ANTONOVA V.P., CHUKSINA N.A., 1987. The impact of foreign fisheries on spawning stocks of salmon in the Pechora River. Studies of salmonids in the European North, Petrozavodsk, p.20-26 (in Russian).
- AZBELEV V.V., LAGUNOV I.I., 1956. some data on sea migrations of Atlantic salmon. Voprosy ichtyologii, No. 6, p.113-120 (in Russian).
- BAKSHTANSKY E.L., 1970. The development of sea fishery for Atlantic salmon. Trudy PINRO, vol.74, p.156-176 (in Russian).
- BAKSHTANSKY E.L., NESTEROV V.D., 1973. Some data to evaluate the impact of foreign fisheries on Atlantic salmon stocks. Journal "Rybnoe khozjaistvo", No.7, p.18-21 (in Russian).
- BAKSHTANSKY E.L., YAKOVENKO M.Ya., ZAGURAEVA L.F., NESTEROV V.D. 1974 Results of the Atlantic salmon tagging in the Soviet Union. ICES C.M. 1974/M:17.
- BAKSHTANSKY E.L., ZAGURAEVA L.F., NESTEROV V.D. 1976. Results of Atlantic salmon juvenile tagging in 1969-1974. Trudy VNIRO, vol.CXIII, p.19-23.
- BAKSHTANSKY E.L., KLOVACH N.V., LEPSKAYA V.A., 1985. Migrations of salmon in the North Atlantic. Aspects of rational harvesting and conservation of natural resources of the White Sea. Summary of the presentation at the Regional Conference, p.206-208 (in Russian).
- BAKSHTANSKY E.L., KLOVACH N.V., LEPSKAYA V.A., 1991. Migrations of Atlantic salmon. Biological resources: status, perspectives and rational harvesting. Biological background of distribution of commercially valuable and prey sea species: selected scientific papers, Moscow, VNIRO, p.94-116 (in Russian).
- BERG L.S., 1935. Materials on the biology of Atlantic salmon. Izvestija Press/VNIORKH, vol.20, p.3-113 (in Russian).
- BERG L.S., 1948. Fishes of freshwaters in the USSR and neighbouring countries. Moscow, USSR Academy of Sciences Press., p.466 (in Russian).
- BUGAEV V.F., 1987. The impact from foreign fisheries on the salmon population in the river Keret. Studies of salmonids in the European North, Petrozavodsk, p.26-30 (in Russian).
- DANILCHENKO P.G., 1938. On sea migration of Atlantic salmon. Journal "Priroda", No.7-8, p.138-140 (in Russian).
- GRINYUK I.N., 1977. Fishery, production and forecasting of numbers of salmon spawning stock in the Ponoy River. Trudy PINRO, vol.32, p.156-182 (in Russian).
- NOVIKOV P.I., 1953. Atlantic salmon. Gosizdat Press of the Karelian-Finnish SSR, Petrozavodsk, p.134 (in Russian).
- NOVIKOV G.G., KUZISCHIN K.V., 1990. On sea migrations of the Atlantic salmon. Symposium on the Atlantic salmon.

- Thesises of reports, Syktyvkar, p.43. (in Russian).
- PYEFINCH K.A., 1972. Atlantic salmon in the sea. Proc. 2 Congr.Oceanogr. IIist., vol.73, ser.B, p.423-428.
- ROSSELAND L., 1969. Salmon tagging in Norway in 1968. ICES C.M. 1969/M:6, 1 p.
- YAKOVENKO M.Za., 1987. On migrations of Atlantic salmon marked in the Norwegian Sea and in the Porja river. Ecologic and physiological studies of commercially valuable fish species in the North basin, Leningrad, p.69-75 (in Russian).
- ZUBCHENKO A.V., SHAROV A.F., 1993. Salmon rivers in the Kola Peninsula. Status of Atlantic salmon stocks. ICES C.M. 1993/M:54, p.1-18.
- ZUBCHENKO A.V., LOENKO A.A., SHAROV A.F., 1993. Salmon rivers in the Kola Peninsula. Evaluation of the impact from the Norwegian drift net fishing on the status of Atlantic salmon stocks in some barents sea rivers. ICES C.M. 1993/M:53, p.1-20.

Table 1. Data on the Atlantic salmon juvenile tagging in the rivers of the Kola Peninsula

Year of tagging	Number of tagged fish		Place of juvenile release	Tag return	
	farmed	wild		Number	%
1969	600	-	The Kola River	1	0.17
1970	986	-	The Kandalakshsky Bay	-	
	-	100	The Porya River	1	0.1
1971	805	-	The Kola River	-	
	2930	-	The Luvenga R.	-	
	-	700	The Porya River	3	0.43
1972	-	600	The Porya River	3	0.5
1973	950	-	The Kola River	1	0.11
	-	148	The Porya River	1	0.68
1974	1000	-	The Luvenga R.	-	
	-	200	The Porya River	-	
1980	1000	-	The Luvenga R.	-	
1982	1820	-	The Luvenga R.	1	0.06
1983	1308	-	The Luvenga R.	-	
1984	2144	-	The Luvenga R.	1	0.47
1985	3710	-	The Luvenga R.	5	0.13
1986	2401	-	The Luvenga R.	6	0.25
1987	7600	-	The Luvenga R.	4	0.05
1988	5900	-	The Luvenga R.	1	0.017
1989	2800	-	The Luvenga R.	-	
	-	233	The Varzuga R.	-	

1990	2150	-	The Luvenga R. The Tuloma R. The Varzuga R.	- - -	
	-	617			
	-	2000			
1991	2000	-	The Luvenga R.	1	0.05
1992	2600	-	The Luvenga R.	-	
1994	4000	-	The Luvenga R. The Kola River	-	
	649	-	The	-	
	-	600	Strelna R.	-	
1995	2801	-	The Luvenga R.	-	

