

INSTRUCTIONS

on the artificial propagation of local salmon populations

Detailed research into the Pacific salmon has shown that as they head for their spawning grounds in the various rivers along the coast of the Far East, including Sakhalin and the Kurile Islands, the local runs remain almost completely isolated from each other. At the same time, the individual runs are not biologically homogeneous, but are made up of smaller stocks (distinct population segments) which also differ genetically but are not fully isolated from each other.

The run and the populations that form it are qualitatively different in genetic make-up: the run has a high degree of generational stability, while the individual distinct population segments are more varied.

Thus, when any school is targeted by the fishing industry (including for the purposes of aquaculture), its particular internal structure must be considered in order to avoid disrupting its biological stability.

The method of hatchery rearing for chums and pinks implemented here makes it possible to increase the effectiveness of artificial propagation by preserving populational genotypic variety in the local salmon runs of each hatchery river by choosing spawners from each of the distinct population segments in proportion to its frequency and sexual structure.

The salmon roe must be collected regularly throughout the spawning period in the following proportions: 25% taken from the first fish to arrive (at the beginning of the spawning run); 50% from the middle of the migration (mid-way through the run); and 25% from the rear guard (at the end of the run). [*penciled in*: "according to Aptukhov"].

Description of Operations:

As the fish approach the hatchery's egg-collection weir, they are sampled (100-150 fish) to determine their sex ratio. If males predominate in the sample, this indicates that the initial wave of the run has arrived at the weir. Mature spawners are then sorted out and the immature fish are released to spawn naturally or to be harvested in a commercial fishery (if there are no natural spawning grounds).

From the front wave of the run, as many fish as are needed are used to make up the 25% of the total volume of roe required by to the plan. Simultaneously with the collection of roe, a sex ratio test is performed two to three times a day; as this indicator approaches equality (males to females = 50:50), it indicates the arrival of the middle (and largest) portion of the run at the weir. Enough spawners are used from this portion to provide 50% of the quantity of roe that is planned to be collected for artificial fertilization, and the remaining fish are released to spawn naturally or to be harvested in a commercial fishery.

When the rear (final) section of the run arrives consisting predominantly of females, enough spawners are selected to provide for the collection of approximately 25% of the total volume of roe being set aside for incubation; the remaining fish are released to spawn naturally or to be harvested in a commercial fishery.

Roe to be transferred from one hatchery to another must also necessarily be collected in accordance with the process described above, i. e., utilizing salmon spawners from the beginning, middle, and end of the run, so as to ensure that roe is being incubated from the maximum number of distinct population segments making up the salmon run in the river from which the roe is taken.

Studies have shown that the mass transfers of fertilized roe that were undertaken in the past did not have the desired effect; the return coefficient turned out to be negligibly small: 0.05-0.1%, since the transfers ignored the genetic structure of the salmon run in each separate case.

At the end of the salmon season, each salmon hatchery compiles a report in triplicate indicating the amount of roe incubated, using the form below. 2 copies shall be submitted to the Department within 3 days of compilation. The report must be notarized by the Fish Conservation Inspectorate and the Agricultural Council.

In addition, the spawners must undergo biological analyses at the beginning, middle, and end of the season to identify the size/weight characteristics and fecundity of the females, in addition to the sex ratio.

The results of the analyses shall be presented in tables that must be attached to the roe incubation report as indicated above. At least 100-150 individual fish are to be used for each analysis.

Such analyses must be performed for each body of water where roe is collected.

CUMULATIVE TABLE
 Spawner Biological Analysis
 [translator's note: handwritten entries are in italics]

Kurilsk Salmon Hatchery, pink salmon from creek ...

Observations	Species of salmon, name of water body	Results of observations		
		Beginning of run	Middle (largest part) of run	End of run
1. Date of analysis		<i>Aug. 31</i>	<i>Oct. 3</i>	<i>Oct. 18</i>
2. Number of fish in sample		<i>100 indiv.</i>	<i>100 indiv.</i>	<i>100 indiv.</i>
3. Sex ratio	<i>Female: Male</i>	<i>1:2</i>	<i>1:1</i>	<i>2:1</i>
Analysis of females:				
Average weight, <i>gr</i>		<i>1019</i>	<i>1022</i>	<i>989</i>
Average length, <i>cm</i>		<i>45.8/42.9</i>	<i>48.6/45.3</i>	<i>46.5/43.5</i>
AC/AD				
Average fertility		<i>1126 ea.</i>	<i>1258 ea</i>	<i>1357</i>
Analysis of males:				
Average weight, <i>gr</i>		<i>982</i>	<i>987</i>	<i>842</i>
Average length		<i>45/42.4</i>	<i>45.5/43</i>	<i>42.5/41.6</i>
AC/AD				

REPORT

Kurilsk hatchery

_____ 1976

During the 1976 salmon season at the *Kurilsk* Salmon Hatchery, salmon roe was incubated in accordance with the method for artificial propagation of local salmon stocks.

A total of ~~120560000~~ million eggs were collected, including:
pink salmon: 120560000 million, chum: _____ million.

The pink salmon roe was collected in the *Ketovaya creek* during the period from *September 21* through *October 16*, 1976.

No.	Data from pink salmon roe collection on the river	Start of run	Middle of run (largest part of run)	End of run	Total
1.	Collection dates	<i>Nov. (sic) 21- Oct. 1</i>	<i>Oct. 2-Oct. 11</i>	<i>Oct. 12-Oct. 18</i>	
2.	Roe collected (mln.) % of total quantity	<i>30040000 24.9</i>	<i>60840000 50.5</i>	<i>29680000 24.6</i>	<i>120560 m. 100%</i>
3.	Sex ratio Fem.:male	<i>1:2</i>	<i>1:1</i>	<i>2:1</i>	
4.	Total No. of spawners used including:				
	females	<i>47874</i>	<i>83440</i>	<i>36509</i>	<i>167823</i>
	males	<i>24854</i>	<i>50640</i>	<i>24809</i>	<i>100303</i>
5.	Spawners released for natural spawning	<i>23020</i>	<i>32800</i>	<i>11700</i>	<i>67520</i>
6.	Extra spawners harvested	---	---	---	---

Note: (this table is compiled individually for each river where pink salmon roe is being collected.)

Chum salmon roe was collected on the _____ rivers during the period from _____ to _____, 1976.

No.	Data from chum salmon roe collection on the river _____	Start of run	Middle of run	End of run	Total
1.	Collection dates				
2.	Roe collected (mln.) % of total quantity				100%
3.	Sex ratio				
4.	Total No. of spawners used including: females males				
5.	Spawners released for natural spawning				
6.	Extra spawners harvested				

Note: (this table is compiled individually for each river where pink salmon roe is being collected.)

Signatures: Director of the salmon hatchery:
 Senior Hatchery Manager
 Hatchery Manager
 Shift Supervisor
 Representative from the Fish Conservation Service
 Representative from the Agricultural Council

Seal