

Translation
of

SAKHNIRO

Information Report

at stage 2 of contract # 04-40/2013-NIR

on the work of research work topic:

«The identification of tagged salmon returning to the hatcheries “Kurilskiy”,
“Reidovoy” and “Olga Bay” in 2012»

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«Идентификация маркированных лососей в возврате к ЛРЗ «Курильский»,
«Рейдовый» и «Бухта Оля» в 2012 г.»

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Information report

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on the work of research work topic:

«The identification of tagged salmon returning to the “Kurilskiy”, “Reidovoy” and
“Olga Bay” hatcheries in 2012»

The identification results of chum salmon returning to the hatcheries

“Kurilskiy”, “Reidovoy” and “Olga Bay”

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Yuzhno-Sakhalinsk, 2013.

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Introduction

The first of tagged juveniles were released from the Kurilskiy and Reidovoy hatcheries on Iturup Island in 2009.

In 2012, the 3+ age group returned in numbers which allow the identification of marked fish in the return, and to get the initial data for estimating the number of hatchery chum salmon running to Iturup Island.

Materials and Methods

Material presented to evaluate the origin of chum salmon spawners was collected mainly in the Prostor Bay and to a small extent in the roe collection site of the hatchery. In addition, the single samples were collected in the Kurilskiy Bay from the catches of the trap nets in the Slavnaya River area, as well as from the Rybatskaya River and in lakes Sopochnoye and Lebedinoye. About 3 thousand pair of otoliths from chum salmon were carried to the otolithometrics area for the analysis of the microstructure.

Thermoplastic cement was used for the preparation of otoliths (Buehler, USA). The installation of the otoliths on glass was accomplished using low magnification from the stereomicroscope Olympus SZ51 and MBS-10. The preparation of the otoliths for the analysis of the microstructure was carried out in accordance with conventional techniques for otoliths (D.H. Secoretal., 1991).

The otoliths were polished by the MetaServ-250 grinding and polishing machine. Grinding of the otoliths was carried out on abrasive disks with aluminum-oxide and silicon-carbide-coated grit 30-40 microns. For the polishing of saw cuts, the grinding disk FibrMet and diamond grinding paper ultra-prep from 0.1 to 9 microns were used. The microstructure of the otoliths was determined using microscope Olympus BX51.

Analysis Results of the Otolith Microstructure of Chum Salmon, in the Return of 2012.

The release of marked chum salmon juveniles from CJSC “Gidrostroy” hatcheries in 2009 was 26.2 million, of which 2.3 million were released by Kurilskiy hatchery and 23.9 million by Reidovoy Hatchery (Table.1).

Table 1

The number of the marked chum salmon juveniles released from the hatcheries of Iturup Island, 2009.

Name of hatchery	Total release, million	Marked juveniles, million	Marked juveniles,% of total release
«Reidovoy»	23.89	23.89	100
«Kurilskiy»	18.7	2.3	12.3
Total	42.59	26.19	61.5

The number of juveniles marked in the Reidovoy Hatchery in 2009 was 10 times higher than the number of juveniles marked in the Kurilskiy Hatchery. 100% of juveniles released from Reidovoy Hatchery were marked. This allows the identity of all spawners aged 3+ from this hatchery collected for analysis. Fish without tags on the otoliths can be wild or released from the Kurilskiy Hatchery.

Tags from both hatcheries are well identified in the microstructure of both juvenile (Fig. 1) and spawners of chum salmon (Fig. 2 and 3). Therefore the determination of origin of fish is not a problem.

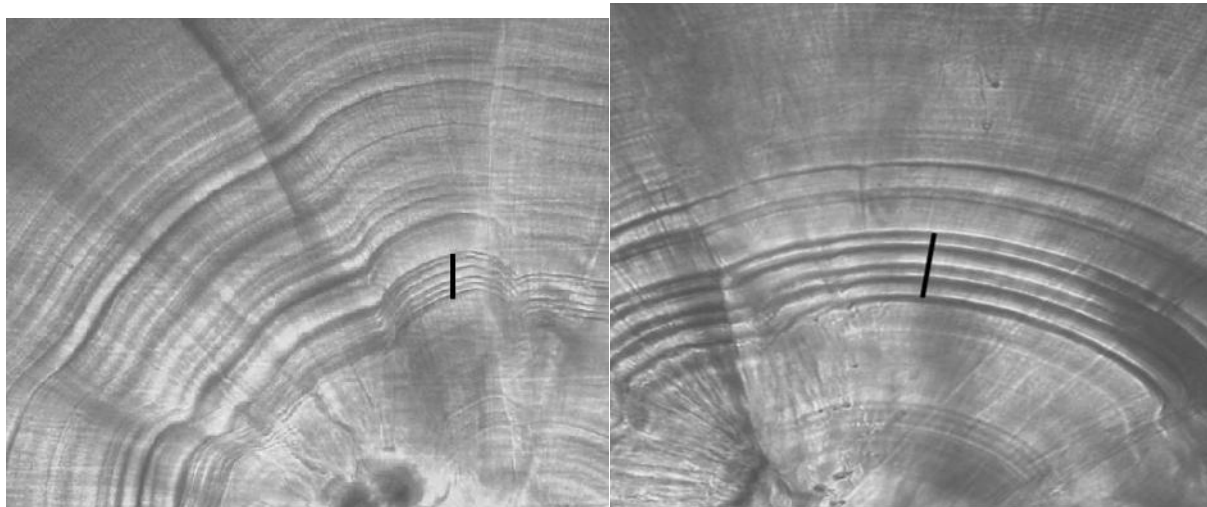


Figure 1. These are the tags on the otoliths of juvenile chum salmon from Kurilskiy (left) and Reidovoy (right) hatcheries released in 2009.

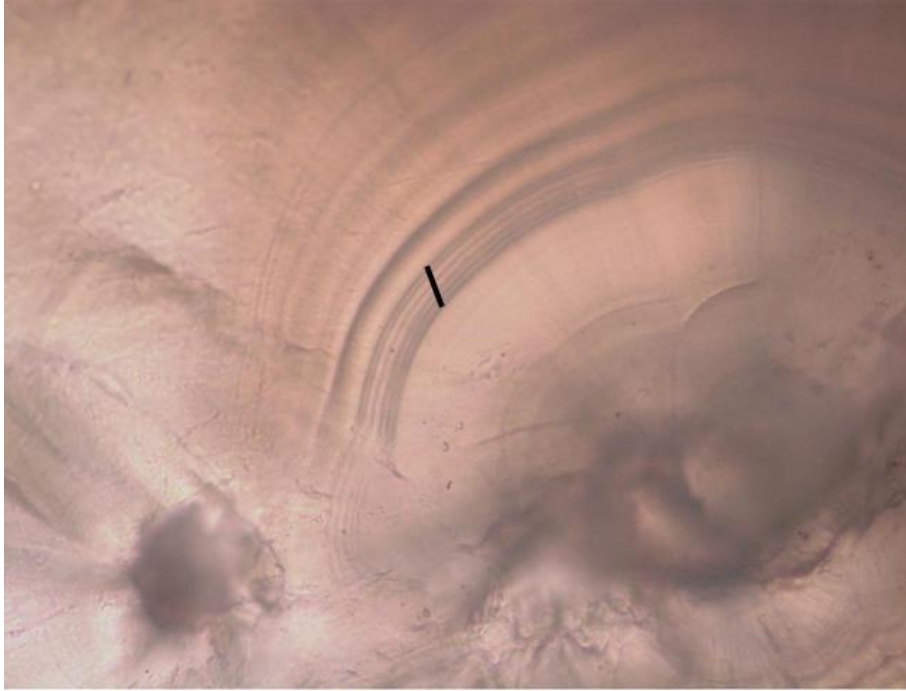


Figure 2. This is the otolith tag on chum salmon released from Kurilskiy Hatchery in 2009, and returning in 2012.

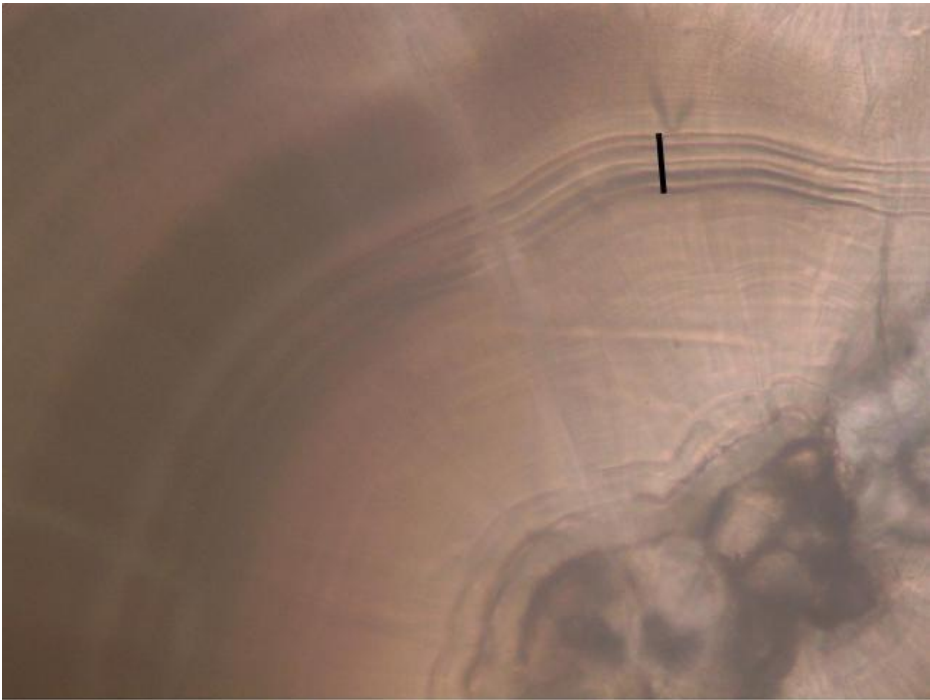


Figure 3. This is the otolith tag on chum salmon released from Reidovoy Hatchery in 2009, and returning in 2012.

The analysis of the otolith microstructure of 2,893 chum salmon individuals identified 526 fish with otolith tags. (Table.2).

Table 2

The results of the identification of chum salmon in the spawning return of 2012 to the area of Kurilskiy and Prostor Bays, Iturup Island

The place of the collection	Date	Without tag	Reidovoy	Kurilskiy	Japanese	N
"Reidovoy" Hatchery, roe collection site #1	07.10	59	38	0	0	97
"Reidovoy" Hatchery roe collection site #1	08.10	51	36	0	0	87
"Reidovoy " Hatchery, roe collection site #1	22.10	122	65	0	0	187
"Reidovoy" Hatchery, roe collection site #1	30.10	28	21	0	0	49
The mouth of the Reidovoya River, roe collection site #2	29.09	63	30	0	0	93
"Reidovoy" Hatchery, roe collection site #2	09.10	54	30	0	0	84
"Reidovoy" Hatchery, roe collection site #2	21.10	50	34	0	0	84
The Prostor Bay, зал. Простор, Chernye Kamen	11.09	47	2	0	0	49
The Prostor Bay	17.09	132	18	0	0	150
The Prostor Bay	18.09	79	15	1	0	95
The Prostor Bay	19.09	80	12	0	2	94
The Prostor Bay	20.09	35	11	0	0	46
The Prostor Bay	21.09	35	9	0	0	44
The Prostor Bay	22.09	38	12	0	0	50
The Prostor Bay	23.09	37	10	0	0	47
The Prostor Bay	27.09	70	27	0	0	97
The Prostor Bay	30.09	44	5	0	0	49
The Prostor Bay	01.10	130	14	1	1	146
The Prostor Bay	02.10	81	13	0	0	94
The Prostor Bay	03.10	37	12	0	0	49
The Prostor Bay	05.10	43	7	0	0	50
The Prostor Bay, the trap net Kisly	06.10	91	8	0	0	99
The Prostor Bay	19.10	47	43	0	0	90
The mouth of Kurilka River	03.10	86	0	7	0	93
The mouth of Kurilka River	10.10	43	0	4	0	47
"Kurilskiy" Hatchery	16.10	39	0	9	0	48

The mouth of Kurilka River	17.10	40	0	9	0	49
“Kurilskiy” Hatchery, roe collection site	26.10	37	0	7	0	44
“Kurilskiy” Hatchery, roe collection site	03.11	48	0	1	0	49
The Kurilskiy Bay	14.09	15	0	0	0	15
The Kurilskiy Bay	13.10	87	0	6	0	93
“Olya Bay” Hatchery	04.10	95	0	0	0	95
“Olya Bay” Hatchery	15.10	99	1	0	0	100
“Olya Bay” Hatchery	24.09	50	0	0	0	50
Slavnaya River	28.09	75	3	2	0	80
Sopochnoye Lake	25.10	99	0	0	0	99
Rybatskaya River	12.11	47	0	0	0	47
Lebedinoye Lake	16.11	54	0	0	0	54
Total		2367	476	47	3	2893

The proportion of total hatchery fish analyzed was 18%, among which, chum salmon marked at the Reidovoy Hatchery dominated (Fig. 4).

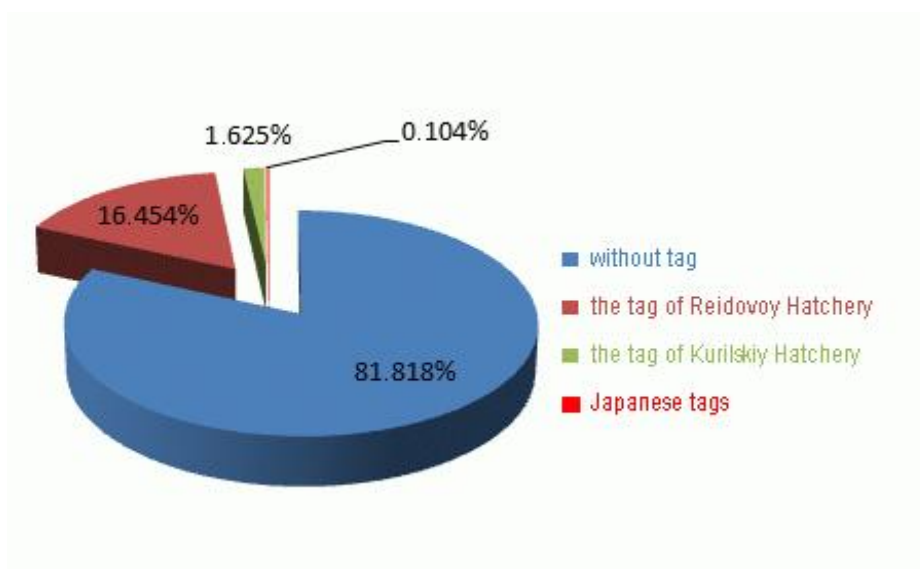


Figure 4. The proportion of chum salmon from different origins in the total amount of spawners collected for analysis.

The small number of samples from the hatchery roe collection sites does not allow the making of a decision about the dynamics of hatchery fish in the run. The maximum amount of

hatchery fish were at the roe collection sites of the hatchery, where its variation was as low as 35-43% during the spawning run (Fig.5).

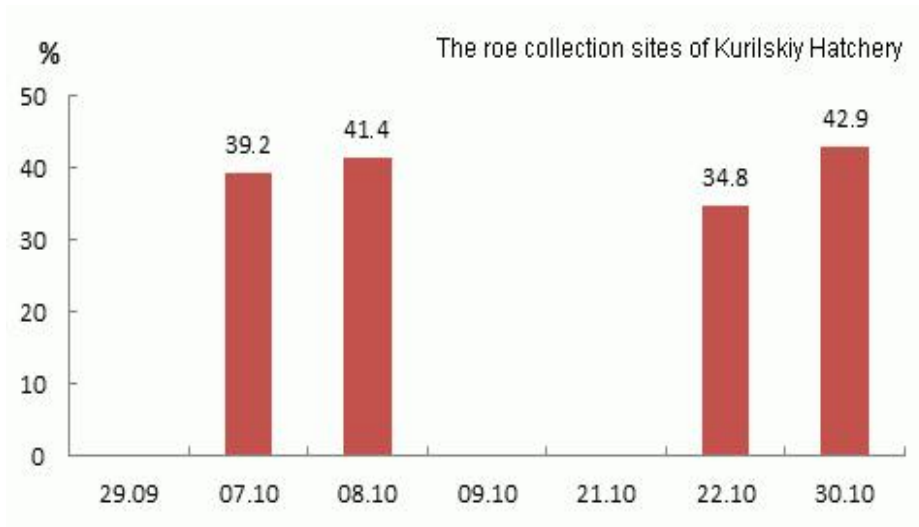


Figure 5. The proportion of chum salmon from Reidovoy Hatchery at the roe collection site.

The concentration of hatchery chum salmon in the mouth of the base river increased slightly during October, changing approximately within the same range. (Fig. 6).

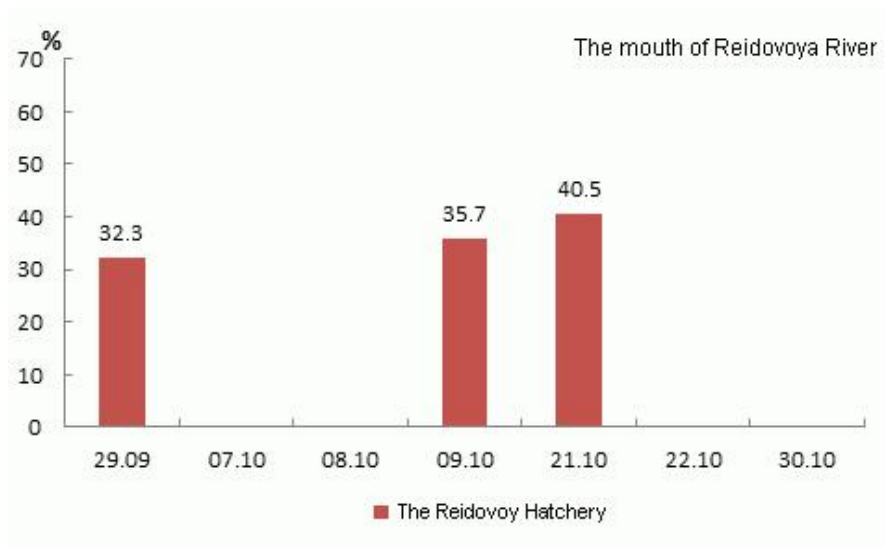


Figure 6. The change of the hatchery chum salmon proportion in the samples from the mouth of the base river of Reidovoy Hatchery.

The proportion of chum salmon from the Reidovoy Hatchery in the samples from the catches of the trap net located in the Prostor Bay ranged from 4.1 to 47.8%, averaging 18 %. Determining trends on the dynamics and distribution of fish in the waters of the bay is not possible, since the collection of the otoliths was carried out from the total catches of the trap net. A low proportion of hatchery fish was noted in the samples from trap net catches located at a considerable distance on either sides of the mouth of the Reidovoya River (the trap net Kisly and the trap net in the area of Chernye Rocks). At the same time, their proportion in the final sample at Prostor Bay was unexpectedly high and is comparable to the proportion observed in the base river (Fig. 7).

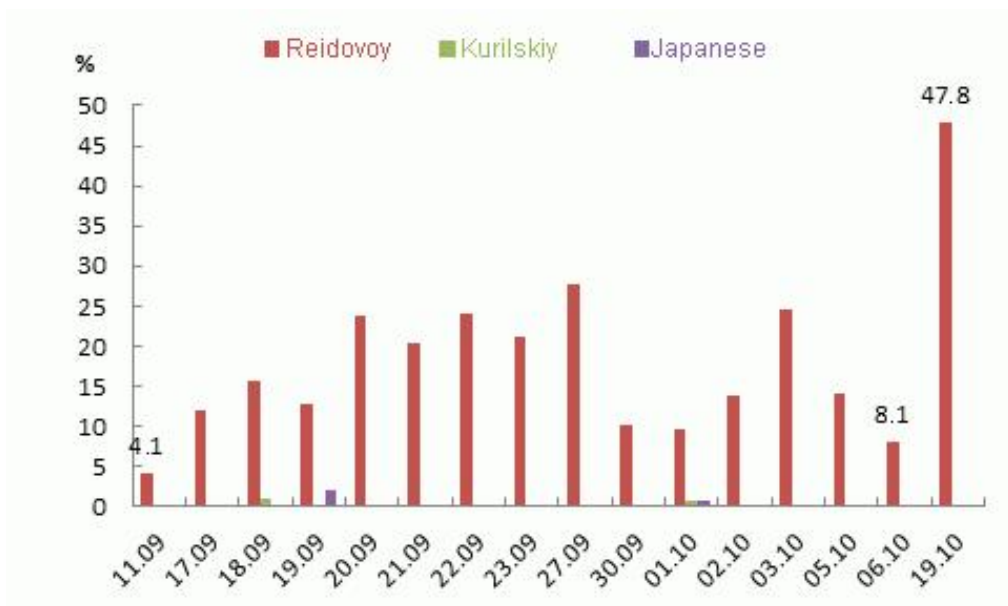


Figure 7. Change in the proportion of hatchery chum salmon in the catch samples from the trap nets in Prostor Bay.

Chum salmon with tags from the Kurilskiy Hatchery were observed less during the whole spawning run, which corresponds to the ratio of the amount of marked juveniles observed in 2009. This hatchery's chum salmon were observed not only in the return at the Kurilskiy Hatchery but, singularly, in samples from the catches in Prostor Bay. As far as can be judged from the three samples, the concentration of marked fish in the mouth of the base river gradually increased (Fig. 8). Their maximum proportion at the roe collection sites of the hatchery was 18.8% (Fig. 9).

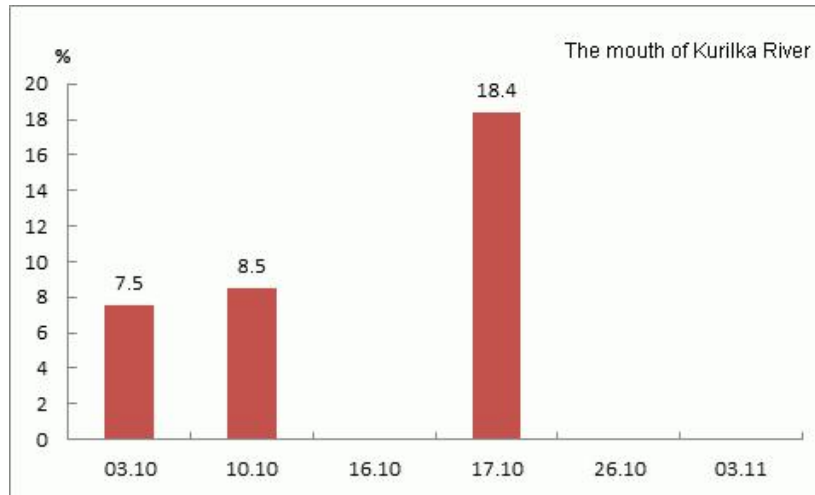


Figure 8. The proportion of chum salmon with Kurilskiy Hatchery tags found in the mouth of the Kurilka River.

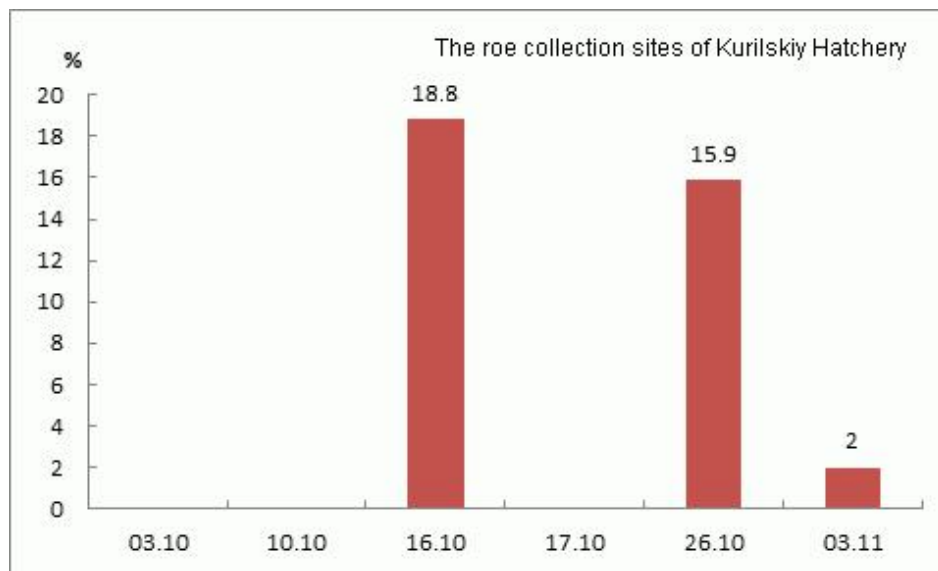
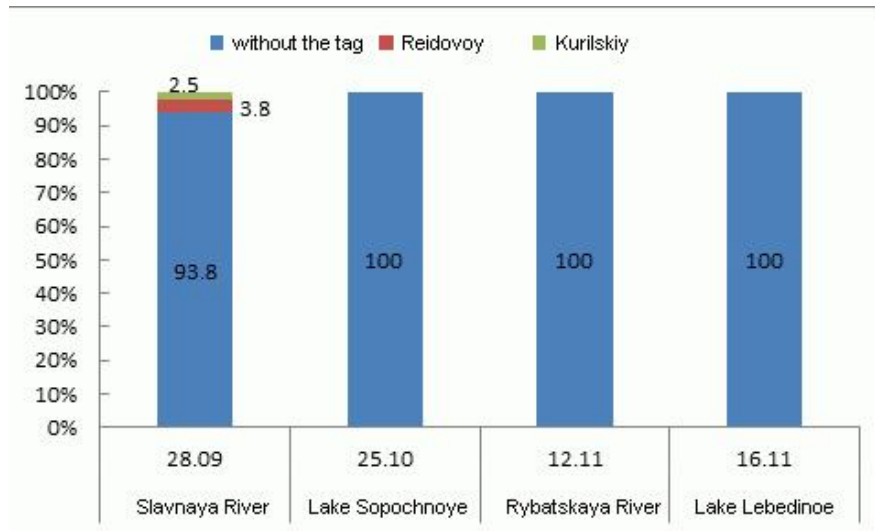


Figure 9. The proportion of chum salmon with Kurilskiy hatchery tags found at the hatchery's roe collection site.

Because the proportion of marked juveniles was only 12.3% of the chum salmon released from Kurilskiy Hatchery in 2009, it can be assumed that the return of chum salmon of this hatchery will not be lower than the return of chum salmon from the Reidovoy Hatchery.

Juvenile Chum salmon released from Reidovoy and Kurilskiy hatcheries were identified in samples from the trap net catches in the area of Slavnaya River, the proportion of which was 3.8 and 2.5 % respectively.

In other waters, where single samples were collected (Sopochnoye and Lebedinoe lakes; Rybatskaya River), marked fish were not found.



Among the marked spawners in the samples from the trap nets of Prostor Bay, 3 fish were found with tags from the Japanese hatchery on Hokkaido. Judging from previous years, marked Japanese chum salmon are found sporadically in the trap net catches located on the migration route to Japanese shores and are absent in the run to the base rivers.

Conclusion

The analysis of all materials showed the presence of a large number of marked chum salmon returning to the base rivers of hatcheries, and in the catches of marine trap nets in Prostor Bay.

Identification of individual chum salmon with tags from Kurilskiy Hatchery, marked in small quantities, may indicate that its number of return is at the same level as the chum salmon from the Reidovoy Hatchery.

The absence of marked fish in the samples from lakes suggests the absence or minimal impact of hatchery chum salmon on the lake populations.

However, the presented material does not allow for considering the particular qualities of the overall geographic area and timeframe for the distribution of hatchery fish during the

spawning run, knowledge of which is necessary for the correct evaluation of the number of return.

Further research is necessary by collecting samples at certain points and ensuring that the samples are not mixed. The samples must be collected from the catches of the trap nets, located at considerable distance from the mouth of the base rivers of the hatchery, in estuarine trap nets, and in the roe collection sites of hatcheries taken at regular intervals of time (at least 5 days). In the spawning ground of the base rivers, samples must be collected not less than 3 times during the spawning run (early, middle and end it). In addition, the study of the effect of hatchery fish on the lake populations and the populations in rivers not affiliated with the base rivers, is of great importance for the certification of a chum salmon fishery. The collection of the samples on such sites should be given more attention.

When assessing the quantity of hatchery chum salmon runs, it is absolutely necessary to correctly determine the ratio of age groups. In our view, it is necessary to conduct a biological analysis by also collecting scales together with otoliths. This is because the determination of age based on otoliths alone is not always possible due to the domination of fish with aberrant otoliths.