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Summary of Japan-Russia Cooperative Juvenile Salmon Research aboard the Research Vessel Wakashio-maru in 1995

by

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Summary of Japan-Russia Cooperative Juvenile Salmon Research aboard the Research Vessel Wakashio-maru 9n 1995

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Abstract

To make clear the distribution and migration routes of juvenile salmon originating in Japan, we conducted the drift net survey in the southern and central parts of the Sea of Okhotsk using the research vessel *Wakashio-maru.* in the July and August of 1995. Fifteen drift net operations were conducted from July 13 from August 5. Thirty nine chum salmon juveniles, 20 pink juveniles, and 1 masu salmon juvenile were collected. Juvenile chum salmon were widely distributed over the southern and central Okhotsk Sea except for coastal waters near the northern Kuril Islands. Fork length of juvenile chum were ranged from 107 mm to 218 mm, juvenile pink from 111 mm to 147 mm.

Introduction

In accordance with 1995 Japan-Russia Science and Technology Cooperative plan for Fisheries, the present research was conducted in the Sea of Okhotsk. The purpose of the research was to describe the distribution and migration of juvenile salmon originating in Far East Asia, especially juvenile chum salmon (*Oncorhynchus keta*) originating rivers in Japan.

Japanese origin chum juveniles were believed to migrate northwards within coastal waters and reach coastal waters off the southeastern Hokkaido by early summer (Irie, 1990). However, it is not clear where the juvenile chum salmon migrate after leaving coastal waters of northern Japan. The 1993 *Wakashio-maru* and *Kaiyo-maru* juvenile salmon researches showed that juvenile pink and chum salmon were widely and abundantly distributed in the Okhotsk Sea in September and October, while few juvenile were distributed in Pacific coast waters off the Kuril Islands in October (Ueno and Shimizu 1994a and Ueno et al., 1994) . The 1994 *Wakashio-maru* research also revealed that no juvenile salmon were distributed in the Pacific coasts of the Kuril Islands in mid summer (mid-July to early August). These indicate that the most of juvenile chum salmon migrate to the Okhotsk Sea after leaving coastal waters in early summer.

Assuming that juvenile chum salomon migrate from coastal waters off northern

Japan to the Okhotsk Sea after early summer, we conducted the drift net survey for juvenile salmon in the southern and central Okhotsk Sea from mid-July to early August.

Methods and materilas

We surveyed 15 sampling stations in the southern and central Okhotsk Sea using the research vessel *Wakashio-maru* (199.51 gross tons) from July 13 to August 5 (Fig. 1). Drift nets for collecting juvenile salmon, CTD for oceanographic observation , and plankton nets were used at all stations. Drift nets were composed of sixteen tans of small mesh sized nets (22, 26, 30, 35, 42, 48, 55, 63 mm) and six tans of large mesh sized nets (157 mm), which were used for stretching the small mesh sized nets.

We set the drift nets at 9 p.m. and lifted them at 4 a.m. at each stations in principle. After juvenile salmon were collected and identified into species, fork length (FL) and body weight (BW) of them were measured and recorded. Some scales were also taken for stock identification and estimating the ocean age from the juvenile salmon. All of juvenile salmon collected were wrapped using sheets of plastic wrap and frozen for examination in the laboratory.

Results

Juvenile salmon: Numbers of main fishes collected in this survey are shown in Table 1. A total of 39 chum salmon juveniles were collected. Juvenile chum salmon were widely distributed over the southern and central waters of the Okhotsk Sea (Fig. 1) . Fork length of juvenile chum salmon were ranged from 107 mm to 218 mm with a mean of 154mm (Fig. 2). Juvenile pink salmon (*O. gorbuscha*) were mainly distributed in the western part of the survey area (Fig. 1). Fork length of juvenile pink salmon ranged from 111 mm to 147 mm with a mean of 130 mm (Fig. 2). A masu salmon juvenile were collected the central part of survey area. Juvenile chum salmon mainly occurred at surface water temperature ranging from 9.0 to 14.0 ℃ and juvenile pink salmon from 11 to 14.6 ℃.

By-catch: Except for juvenile salmon, 14 sockeye salmon (*O. nerka*), 46 chum salmon, 116 pink salmon, 8 coho salmon (*O. kisutch*) and 1 chinook salmon (*O. tschawytscha*) were collected (Table 2) and the most of them were mature. Japanese anchovy (*Engraulis japonicus*) mainly occurred in the southern part of survey area. A lot of Pacific herring (*Clupea pallasii*) were collected in the coastal waters off the northern part of the Kuril Islands. Arabesque greenling (*Pleurogrammus azonus*) were widely distributed over the survey area.

Stock identification and other studies: Stock identification using electrophoresis analysis, scale pattern analysis, and counts of pyloric caeca were now under way.

Discussion

Fork Length of chum salmon juvenile: The fork length range of the most of juvenile chum salmon collected in coastal waters off Hokkaido and the southern Kuril Islands in early summer were 70 to 140mm in fork length (Irie, 1991; Ueno and Ishida, 1992) . On the other hands, the fork length of chum salmon juvenile collected in the present survey ranged from 107 to 218mm. Considering the difference and overlap in their fork lengths, we can suggest that there are some possibilities that juvenile chum salmon collected in this survey came from coastal waters off northern Japan.

Efficiency of the small mesh sized drift net: Although we got juvenile chum salmon at the most stations in survey areas, the total number of juvenile chum salmon collected were not numerous (39 individuals/ 15 stations). We often observed that small fish dropped from small mesh sized drift nets (especially 30, 26, 22 mm). Efficiency of small mesh sized drift nets to small juvenile salmon may be seriously lower than those of large mesh sized drift nets to large juvenile salmon. In the near future, when sampling for small juvenile salmon are conducted in the offshore waters, we recommend to use the surface trawl composed from some pieces of small mesh sized nets instead of the drift nets.

Reference

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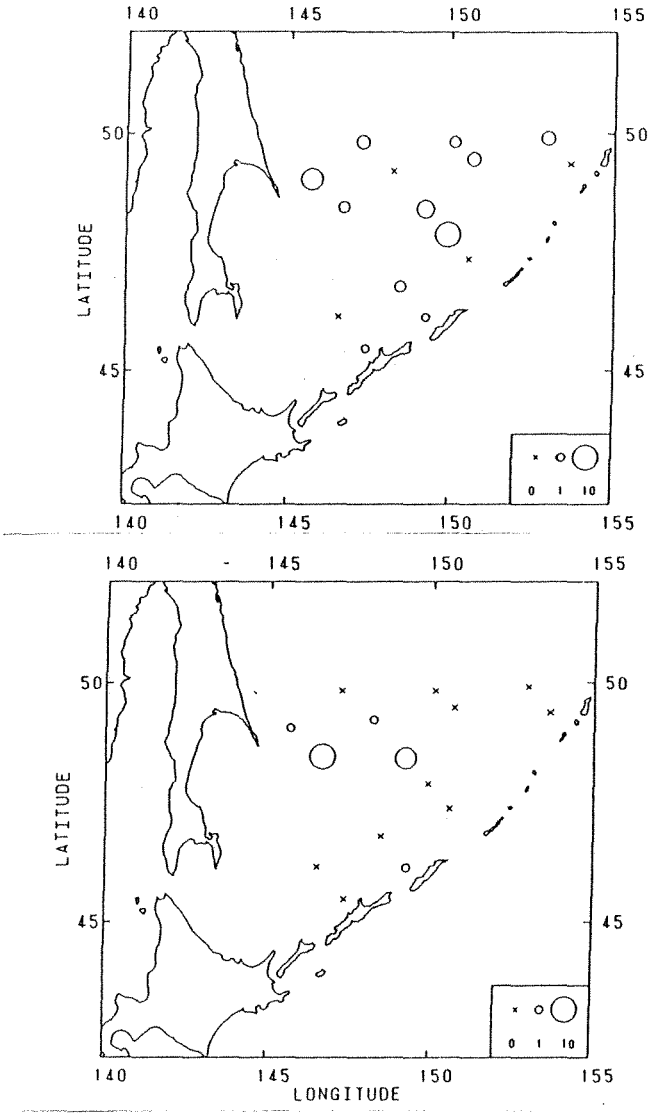

Fig.1 Distribution of juvenile chum (upper) and pink (lower) salmons caught in the 1995 *Wakashio-maru* cruise.

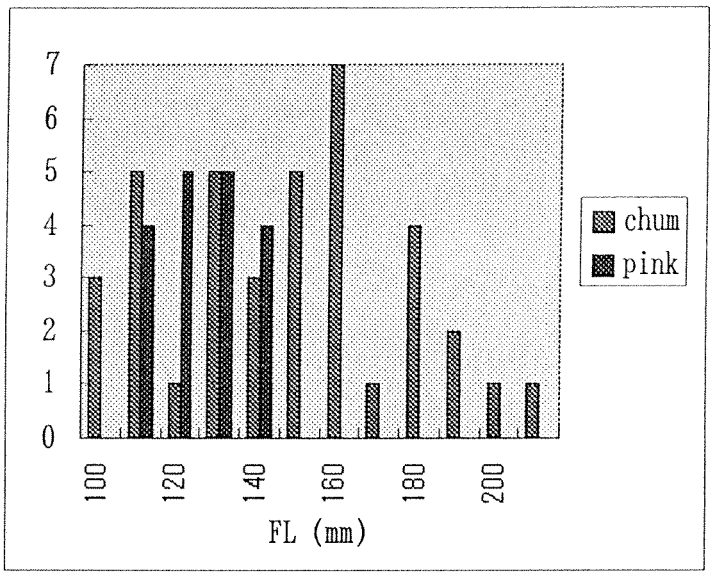

Fig. 2 Fork length frequency distribution of juvenile chum and pink salmon

Table 1. Number of juvenile salmons and other main by-catch fishes at each station.

ST.	Date	Location	SST	No. Tans	J. chum	J. pink	J. masu	J. Dolly	Green ling	Anchovy	Herring
5-1	95.07.14	45-29N, 147-22E	12.0	22	1				193	11	
5-2	95.07.15	46-11N, 146-30E	13.0	22	*				37	1762	
1-1	95.07.18	49-24N, 153-40E	6.4	22					3		
1-2	95.07.19	49-55N, 153-00E	7.7	22	3			1	3		25
2-4	95.07.20	49-50N, 150-07E	9.8	22	2				24		905
2-3	95.07.21	49-30N, 150-42E	9.8	22	3				11		3201
4-2	95.07.27	46-50N, 148-27E	14.0	22	2				137	9	
4-1	95.07.28	46-10N, 149-15E	11.5	22	1	1			46	1	
3-1	95.07.29	47-25N, 150-35E	8.4	22					13		
3-2	95.07.29	47-56N, 149-54E	13.2	22	10				68	1	
3-3	95.08.01	48-28N, 149-13E	11.7	22	5	7			56		
3-4	95.08.02	49-15N, 148-13E	11.6	22		1	1		50		
3-5	95.08.03	49-50N, 147-15E	12.5	22	3				178	17	
4-5	95.08.04	49-05N, 145-39E	11.1	22	7	1			10	2	
4-4	95.08.05	48-30N, 146-39E	14.6	22	2	10			63	2	
Total				330	39	20	1	1	892	1805	4131

Table 2. Number of mature and immature salmon at each station

ST.	Date	Location	SST	N. tans	Socjeye salmon	Chum salmon	Pink salmon	Coho salmon	Chinook salmon
5-1	95.07.14	45-29N, 147-22E	12.0	22	1		6		
5-2	95.07.15	46-11N, 146-30E	13.0	22			17		
1-1	95.07.18	49-24N, 153-40E	6.4	22	8	16	1	1	1
1-2	95.07.19	49-55N, 153-00E	7.7	22	5	9	4	1	
2-4	95.07.20	49-50N, 150-07E	9.8	22		4	2		
2-3	95.07.21	49-30N, 150-42E	9.8	22		4	5		
4-2	95.07.27	46-50N, 148-27E	14.0	22			7	1	
4-1	95.07.28	46-10N, 149-15E	11.5	22		2	9	1	
3-1	95.07.29	47-25N, 150-35E	8.4	22			11	2	
3-2	95.07.29	47-56N, 149-54E	13.2	22		2	6		
3-3	95.08.01	48-28N, 149-13E	11.7	22		4	19		
3-4	95.08.02	49-15N, 148-13E	11.6	22			2		
3-5	95.08.03	49-50N, 147-15E	12.5	22		2	17	1	
4-5	95.08.04	49-05N, 145-39E	11.1	22		2	6	1	
4-4	95.08.05	48-30N, 146-39E	14.6	22			4		
Total				330	14	45	116	8	1