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Proposed Otolith Marks for Brood Year 2009 Salmon in Russia

by

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Proposed Otolith Marks for Brood Year 2009 Salmon in Russia

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Abstract

The main goal of salmon marking at Russian hatcheries is the assessment of Pacific salmon returns. Besides, differentiation of wild and hatchery-reared salmon is used for studies according to the regional programs. For instance, in Magadan region the wild and hatchery-reared juvenile chum salmon survival in the early sea life period is evaluated based on the otolith marks differentiation. A complex population structure of pink salmon returns is noted for Sakhalin-Kuril region where they spawn in great numbers. In this connection, the important trend of studies is to determine timing of pink approaches and abundance of their different populations and groupings. The straying assessment of the hatchery-reared pink spawners to the neighbour rivers is of great interest for fish culturists.

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In recent years, salmon marking in the Far East has been performed in Magadan, Kamchatka, and Khabarovsk regions. Only a small number of otolith marks have been used and repeated from year to year.

The studies directed to apply otolith marking at Sakhalin hatcheries have been conducted since 2008. In this region, chum and pink salmon are the main hatchery-reared species. To achieve a goal, there is a need in much more marks because of the numerous hatcheries located there. To mark Sakhalin salmon of the 2008 brood, a total of 8 marks were required for 8 Sakhalin hatcheries: 4 for chum and 6 for pink salmon.

In 2009, the salmon-marking hatcheries will increase in number. A significant part of reared production will be marked at 8 hatcheries, and the experimental marking of small numbers of eggs and larvae will be conducted at individual hatcheries.

Marking at Sakhalin hatcheries is a complex process due to unstable temperature of water sources which supply nursery incubators and canals. Besides, at major hatcheries it is impossible to change water temperature for individual batches of eggs and juveniles, and sometimes for individual salmon species; this causes additional problems. At present, the otolith microstructure of salmon released from these hatcheries is studied as well as the temperature conditions during incubation and growing. Now it is difficult to choose hatcheries for experimental marking of the 2009 salmon brood; they will be distinguished during investigations.

Because of such situation, a three-year marking plan has been elaborated in Russia. In 2009, only part of marks will be used. The rest marks will be gradually used during the following period. We suggest the possibility of their operative exchange between hatcheries and yearly rotation. Besides, one and the same mark could be used at the embryonic stage and after hatching at some hatcheries.

The marking plan is presented in Table 1.

The thermal marking pattern is presented as the RBr notation (Munk and Geiger 1998; Hagen 1999) and Hatch code notation (Hagen et al. 2000).

References

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Munk, K. M., and H. J. Geiger. 1998. Thermal marking of otoliths: the "RBr" coding structure of thermal marks. (NPAFC Doc. 367) 19 p. CWT & Otolith Processing Lab., Alaska Department of Fish and Game, Juneau, Alaska, USA.

Table1.Plan marks from Russia for 2009 brood year stocks of salmon

Mark Type	BROOD YEAR	SPECIES	COUNTRY	STATE/ PROVINCE	FACILITY	HATCH CODE	RAPHIC IMAGE	
							PREHATCH	POSTHATCH
1	2	3	4	5	6	7	8	9
DM	2009	Chum	Russia	Sakhalin	Ado-Tymovsky Hatchery	1,3,1H	I I I I I	
TM	2009	Chum	Russia	Sakhalin	Ado-Tymovsky Hatchery	H1,3,1		I I I I I
DM	2009	Chum	Russia	Sakhalin	Pobedinsky Hatchery	1,2,2,1H	I I I I I	
TM	2009	Chum	Russia	Sakhalin	Pobedinsky Hatchery	H1,2,2,1		I I I I I
DM	2009	Chum	Russia	Sakhalin	Buyuklovsky Hatchery	1,2,4H	I I I I I I	
TM	2009	Chum	Russia	Sakhalin	Buyuklovsky Hatchery	H1,2,4		I I I I I I
DM	2009	Chum	Russia	Sakhalin	Sokolovsky Hatchery	5,2H	I I I I I I	
TM	2009	Chum	Russia	Sakhalin	Sokolovsky Hatchery	H5,2		I I I I I I
DM	2009	Chum	Russia	Sakhalin	Bereznyakovsky Hatchery	4,2H	I I I I I I	
TM	2009	Chum	Russia	Sakhalin	Bereznyakovsky Hatchery	H4,2		I I I I I I
DM	2009	Chum	Russia	Sakhalin	Anivsky Hatchery	3,2H	I I I I I	
DM	2009	Chum	Russia	Sakhalin	Taranaysky Hatchery	1,5H	I I I I I I	
TM	2009	Chum	Russia	Sakhalin	Taranaysky Hatchery	H1,5		I I I I I I
DM	2009	Chum	Russia	Sakhalin	Sokolnikovsky Hatchery	3n,1,2H	I I I I I	
TM	2009	Chum	Russia	Sakhalin	Sokolnikovsky Hatchery	H3n,1,2		I I I I I
DM	2009	Chum	Russia	Sakhalin	Yasnomorsky Hatchery	5,1H	I I I I I I	
TM	2009	Chum	Russia	Sakhalin	Yasnomorsky Hatchery	H5,1		I I I I I I
DM	2009	Chum	Russia	Sakhalin	Urozhayny Hatchery	3n,3H	I I I I I	
DM	2009	Chum	Russia	Sakhalin	Kalininsky Hatchery	3-3H	I I I I I I	
TM	2009	Chum	Russia	Sakhalin	Kalininsky Hatchery	H3-3		I I I I I I
DM	2009	Chum	Russia	Sakhalin	Lesnoy Hatchery	3,2n,2H	I I I I I I	
TM	2009	Chum	Russia	Sakhalin	Lesnoy Hatchery	H3,2n,2		I I I I I I
DM	2009	Chum	Russia	Sakhalin	Okhotsky Hatchery	3n,1,3H	I I I I I I	
TM	2009	Chum	Russia	Sakhalin	Okhotsky Hatchery	H3n,1,3		I I I I I I
DM	2009	Chum	Russia	Iturup	Kuril'sky Hatchery	3,2,2nH	I I I I I I	
TM	2009	Chum	Russia	Iturup	Reydovyy Hatchery	H1,2,2		I I I I I
DM	2009	Chum	Russia	Sakhalin	Hatchery on bay Olya	3,1,3nH	I I I I I I	
DM	2009	Chum	Russia	Sakhalin	Zalom Hatchery	1,2,1H	I I I I	
DM	2009	Chum	Russia	Sakhalin	Monetka Hatchery	3,4H	I I I I I I	
DM	2009	Chum	Russia	Sakhalin	Pilenga Hatchery	9H	I I I I I I I I	
DM	2009	Chum	Russia	Sakhalin	Phirsovka Hatchery	3,5H	I I I I I I I	
DM	2009	Chum	Russia	Sakhalin	Bakhura Hatchery	1,2,3,1H	I I I I I I	

Table1 (continued). Plan marks from Russia for 2009 brood year stocks of salmon.

Mark Type	BROOD YEAR	SPECIES	COUNTRY	STATE/ PROVINCE	FACILITY	HATCH CODE	RAPHIC IMAGE	
							PREHATCH	POSTHATCH
1	2	3	4	5	6	7	8	9
DM	2009	Chum	Russia	Sakhalin	Igrivaya Hatchery	4n,1,2H	III I I I	
DM	2009	Chum	Russia	Sakhalin	Skal'nyy Hatchery	1,2,1,2,1H	I I I I I I I	
DM	2009	Chum	Russia	Sakhalin	Ol'khovatka Hatchery	5,2nH	I I I I I I I	
DM	2009	Chum	Russia	Sakhalin	Krasnoyarka Hatchery	3,1,3H	III I I I I	
DM	2009	Chum	Russia	Sakhalin	Kuybyshevka Hatchery	4,1,2H	IIII I I I	
DM	2009	Chum	Russia	Sakhalin	Osenny Hatchery	4,2,1H	IIII I I I	
DM	2009	Chum	Russia	Sakhalin	Okeansky Hatchery	1,2,1-2H	I I I I I I	
DM	2009	Chum	Russia	Sakhalin	Dolinka Hatchery	4n,3H	III I I I	
DM	2009	Chum	Russia	Sakhalin	Lazovoy Hatchery	3,2n,2H	III I I I I	
TM	2009	Chum	Russia	Sakhalin	Lazovoy Hatchery	H3,2n,2		III I I I I
DM	2009	Chum	Russia	Sakhalin	Ozero Hatchery	1,4,2H	I I I I I I I	
DM	2009	Chum	Russia	Kamchatka	Ozerkovsky Hatchery	3,3H	III I I I I	
DM	2009	Chum	Russia	Kamchatka	Ketkinsky Hatchery	3,2,2H	III I I I I	
TM	2009	Chum	Russia	Kamchatka	Paratunsky Hatchery	H9		IIIIIIIIII
DM	2009	Chum	Russia	Magadanskaya	Armansky Hatchery	4,3H	IIII I I I I	
DM	2009	Chum	Russia	Magadanskaya	Olsky Hatchery	5H	IIII I I I	
DM	2009	Chum	Russia	Magadanskaya	Olsky Hatchery	1,6H	I I I I I I I	
DM	2009	Chum	Russia	Magadanskaya	Olsky Hatchery	4,3nH	III I I I I	
DM	2009	Chum	Russia	Magadanskaya	Tauysky Hatchery	3n-3nH	III I I I I	
DM	2009	Chum	Russia	Magadanskaya	Yansky Hatchery	7H	IIII I I I I	
TM	2009	Chum	Russia	Khabarovskaya	Kometa Hatchery	3n,4H	III I I I I	
DM	2009	Sockeye	Russia	Kamchatka	Ozerkovsky Hatchery	3,3H	III I I I I	
TM	2009	Sockeye	Russia	Kamchatka	Malkinsky Hatchery	3,1,2H	III I I I I	
DM	2009	Sockeye	Russia	Magadanskaya	Olsky Hatchery	7H	IIII I I I I	
DM	2009	Sockeye	Russia	Magadanskaya	Armansky Hatchery	3,4H	III I I I I	
TM	2009	Coho	Russia	Kamchatka	Paratunsky Hatchery	H9		IIIIIIIIII
DM	2009	Coho	Russia	Kamchatka	Viluysky Hatchery	3,5H	III I I I I I	
DM	2009	Coho	Russia	Magadanskaya	Armansky Hatchery	4,3H	IIII I I I I	
DM	2009	Coho	Russia	Magadanskaya	Olsky Hatchery	5H	IIII I I I I	
DM	2009	Coho	Russia	Magadanskaya	Tauysky Hatchery	7H	IIII I I I I	
DM	2009	Coho	Russia	Magadanskaya	Yansky Hatchery	3n,3nH	III I I I I	
DM	2009	Coho	Russia	Sakhalin	Ado-Tymovsky Hatchery	1,3,1H	I I I I I I	
DM	2009	Coho	Russia	Sakhalin	Buyuklovsky Hatchery	1,2,4H	I I I I I I I	

Table1 (continued). Plan marks from Russia for 2009 brood year stocks of salmon.

Mark Type	BROOD YEAR	SPECIES	COUNTRY	STATE/ PROVINCE	FACILITY	HATCH CODE	GRAPHIC IMAGE	
							PREHATCH	POSTHATCH
1	2	3	4	5	6	7	8	9
TM	2009	Coho	Russia	Sakhalin	Buyuklovsky Hatchery	H1,2,4		1,2,4
DM	2009	Pink	Russia	Sakhalin	Sokolovsky Hatchery	5,2H	I I I I I I I	
TM	2009	Pink	Russia	Sakhalin	Sokolovsky Hatchery	H5,2		I I I I I I I
DM	2009	Pink	Russia	Sakhalin	Anivsky Hatchery	3,2H	I I I I I	
TM	2009	Pink	Russia	Sakhalin	Taranaysky Hatchery	H1,5		I I I I I I I
DM	2009	Pink	Russia	Sakhalin	Taranaysky Hatchery	1,5H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Pugachyevsky Hatchery	3,3,1H	I I I I I I I	
TM	2009	Pink	Russia	Sakhalin	Pugachyevsky Hatchery	H 3,3,1		I I I I I I I
DM	2009	Pink	Russia	Sakhalin	Lesnoy Hatchery	4,2,1H	I I I I I I I	
TM	2009	Pink	Russia	Sakhalin	Lesnoy Hatchery	H4,2,1		I I I I I I I
DM	2009	Pink	Russia	Iturup	Kuril'sky Hatchery	3,2,2nH	I I I I I I I	
TM	2009	Pink	Russia	Iturup	Reydovyy Hatchery	H1,2,2		I I I I I I I
DM	2009	Pink	Russia	Sakhalin	Monetka Hatchery	3,4H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Phirsovka Hatchery	3,5H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Bakhura Hatchery	1,2,3,1H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Igrivaya Hatchery	4n,1,2H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Skal'nyy Hatchery	1,2,1,2,1H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Ol'khovatka Hatchery	5,2nH	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Tikhaya Hatchery	1,6H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Ay Hatchery	3,1H	I I I I I	
DM	2009	Pink	Russia	Sakhalin	Krasnoyarka Hatchery	3,1,3H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Kuybyshevka Hatchery	4,1,2H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Dolinka Hatchery	4n,3H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Manuy Hatchery	5,1H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Nituy Hatchery	6,1H	I I I I I I I	
DM	2009	Pink	Russia	Sakhalin	Urozhayny Hatchery	3n,3H	I I I I I I I	
DM	2009	Pink	Russia	Magadanskaya	Yansky Hatchery	4,3H	I I I I I I I	
DM	2009	Masu	Russia	Sakhalin	Sokolovsky Hatchery	5,2H	I I I I I I I	
DM	2009	Masu	Russia	Sakhalin	Anivsky Hatchery	3,2H	I I I I I I I	
DM	2009	Masu	Russia	Sakhalin	Urozhayny Hatchery	3n,2H	I I I I I I I	
TM	2009	Chinook	Russia	Kamchatka	Malkinsky Hatchery	H3,1,2		I I I I I I I