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**Otolith Thermal Mark for Brood Year 2016 and Proposed Thermal Marks
for Brood Year 2017 Chum Salmon in Korea**

by

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Abstract

Korea released 8.0 million and 7.6 million thermal marked chum salmon in March 2016 and 2017, respectively. The marks were 3,1,2H(7.0million), 4n,2,3H(1.0 million) for 2016(2015BY) and 3,2,1H(7.0million), 3,4,2H(0.6 million) for 2017(2016BY). We will mark approximately 8.0 million chum salmon in BY 2017, which covers about 50% ~60% of release of BY 2017 chum salmon at Namdae-cheon and Wangpi-cheon (river). Chum salmon will be marked at 2 different hatcheries(Yangyang Hatchery and Uljin Hatchery) using 2 thermal mark.

Keywords: Korea, thermal mark, chum salmon

Introduction

Tagging is an old tool in biology, and is economically valuable for aquaculture, stock assessment and fisheries management. Traditionally, tagging experiments consisting of clipping, punching of fins, attaching plastic cards, inserting coded wire tags and micro data loggers have been used to distinguish fish stocks, to determine the optimum period of release of juveniles, and to check growth condition of fishes. However, labor-intensive tagging experiment requires high costs. Furthermore, in many cases, researchers experienced difficulties in getting enough specimens of recovery to find the alternative methods.

Otolith thermal marking is one of the alternatives, which makes distinct and recognizable patterns in the otolith structures by exposing the fish to different temperature regimes. Due to advantages of mass-marking and good mark retention, all NPAFC countries have been released juvenile salmon with otolith marking. Korea released 2.2 million thermal marked chum salmon in March 2006 and 5.0 million in March 2007 and 5.0 million in March 2008. The marks were Gangwon province is 3,3nH for 2005 Brood Year(BY), 3,1,2H for 2006 BY, and 3,2,1H for 2007 BY And Gyeongbuk province is 3,4,2H for 2013 BY, 3,1,4nH for 2014 BY, and 4n,2,3H for 2015 BY. We will continue the otolith thermal marking on 2017 BY chum salmon to get the growth conditions and survival during the early ocean life stage, and to distinguish hatchery origins to classify the two different provinces.

Thermal mark for BY 2016 stock

Korea released 7.6 million thermal marked chum salmon in March 2017. The mark was a 3,2,1H (1:1.3,2.2,3.1) 7.0 million and 3,4,2H(1:1.3,2.4,3.2) 0.6 million.

Plan for 2017 BY stock

Based on success of thermal mark experiment for BY 2005 - BY 2012 and BY 2013 stocks, we will continue this experiment for the BY 2016 salmon. We will mark approximately 8.0 million chum salmon at 2 different hatcheries with 2 pattern, which covers about 50%~60% of release of BY 2017 chum salmon at Namdae-cheon and Wangpi-cheon (river) (Table 1). Proposed thermal mark schedule for BY 2016 stock of Korean chum salmon is shown in Table 2. Thermal mark pattern is presented in both the RBr notation (Munk and Geiger 1998), with the modification by Hagen (1999).

References

- Hagen, P. 1999. A modeling approach to address the underlying structure and constraints of thermal mark codes and code notation. (NPAFC Doc. 395). 12 p. Alaska Dept. Fish and Game, Juneau Alaska.
- Munk, K.M. and Geiger, H.J. 1998. Thermal marking of otoliths: the “RBr” coding structure of thermal marks. (NPAFC Doc. 367). 19 p. Alaska Dept. of Fish and Game, Juneau Alaska.

Table 1. Proposed thermal mark releases from Korea for 2017 brood year stocks of chum salmon.

No	BROOD YEAR	YEAR OF RELEASE	SPECIES	STATE/		AGENCY	FACILITY	STOCK	FINAL
				PROVINCE	REGION				RELEASE
K17-1	2017	2018	CHUM	GANGWON	EAST/JAPAN SEA COAST	yss	Yangyang Hatchery	Namdae- river	Namdae- river
K17-2	2017	2018	CHUM	GYEONGBUK	EAST/JAPAN SEA COAST	grcff	Uljin Hatchery	Wangpi- river	Wangpi- river

No	REARING		ESTIMATED		HATCH	GRAPHIC IMAGE		MARKING
	TREATMENT	STAGE	RELEASE	RBr CODE	CODE	PREHATCH	POSTHATCH	SYSTEM
K17-1	Jan - Mar	fry	7,000,000	1:1.3,2.3n	3,3nH	III	III	CHILLER
K17-2	Jan - Mar	fry	1,000,000	1:1.3,2.1,3.4n	3,1,4nH	I I I	I III	CHILLER

Table 2. Proposed thermal mark schedule for 2016 brood year stocks of Korean chum salmon.

No	OTOLITH MARK SCHEDULE	TEMP SHIFT DIRECTION	COMMENTS
K16-1	(2x)8C:12H,(1x)8C:24H,(1x)8C:24H, (2x)8C:12H	Down (12 to 8)	Spawning date: mid Oct.-late Nov.
K16-2	(2x)8C:12H,(1x)8C:24H,(3x)8C:12H, (1x)8C:24H, (2x)8C:12H,	Down (12 to 8)	Spawning date: mid Oct.-late Nov.