

**Otolith Thermal Mark for Brood Year 2018 and Proposed Thermal Marks
for Brood Year 2019 Chum Salmon in Korea**

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Abstract

Korea released 5.0 million and 2.7 million thermal marked chum salmon in March 2018 and 2019, respectively. The marks were 3,3nH (5.0million) for 2018 (2017BY) and 3,1,2H (2.5million) and 4n,2,3H (0.2million) for 2019 (2018BY). Korea will mark approximately 2.7 million chum salmon in BY 2019, which covers about 50–60% of release of BY 2018 chum salmon at Namdae-cheon and Wangpi-cheon (river). Chum salmon will be marked at two different hatcheries (Yangyang Hatchery and Uljin Hatchery) using two 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. Thanks 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 2018 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 2018 stock

Korea released 2.7 million thermal marked chum salmon in March 2019. The mark was a 3,1,2H (1:1.3,2.1,3.2) 2.5 million and 4n,2,3H (1:1.3,2.1,3.4n) 0.2 million.

Plan for 2019 BY stock

Based on success of thermal mark experiment for BY 2005–BY 2012 and BY 2013 stocks, Korea will continue this experiment for the BY 2018 salmon. Korea will mark approximately 2.7 million chum salmon at two different hatcheries with two patterns, which cover about 50–60% of release of BY 2019 chum salmon at Namdae-cheon and Wangpi-cheon (river) (Table 1). Proposed thermal mark schedule for BY 2018 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 2019 brood year stocks of chum salmon.

No	BROOD	YEAR OF	STATE/				FINAL RELEASE			
	YEAR	RELEASE	SPECIES	PROVINCE	REGION	AGENCY	FACILITY	STOCK	SITE	
K19-1	2019	2020	CHUM	GANGWON	EAST/JAPAN	yss	Yangyang	Namdae-	Namdae-river	
					SEA COAST		Hatchery	river		
K19-2	2019	2020	CHUM	GYEONGBUK	EAST/JAPAN	grcff	Uljin	Wangpi-	Wangpi-river	
					SEA COAST		Hatchery	river		

No	REARING	ESTIMATED			HATCH	GRAPHIC IMAGE			MARKING
	TREATMENT	STAGE	RELEASE	RBr CODE	CODE	PREHATCH	POSTHATCH	SYSTEM	
K19-1	Jan - Mar	fry	6,000,000	1:1.3,2.3,3.4	3,3,4H	III	III IIII	CHILLER	
K19-2	Jan - Mar	fry	500,000	1:1.4n,2.4,3.2	4n,4,2H	III	IIII II	CHILLER	

Table 2. Proposed thermal mark schedule for 2018 brood year stocks of Korean chum salmon.

No	OTOLITH MARK SCHEDULE	TEMP SHIFT DIRECTION	COMMENTS
K18-1	(2x)8C:12H,(1x)8C:24H,(3x)8C:8H	Down (12 to 8)	Spawning date: mid Oct.-late Nov.
K18-2	(3x)8C:8H,(1x)8C:24H,(1x)8C:12H, (1x)8C:24H, (3x)8C:8H,	Down (12 to 8)	Spawning date: mid Oct.-late Nov.