

Korean research activities for ovary samples of Southern Bluefin Tuna collected by scientific observer program

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ABSTRACT

Maturity of southern bluefin tuna (SBT) was investigated based on the samples collected by scientific observer program of Korean tuna longline fisheries from 2015 to 2017. We analyzed maturity stage, gonadosomatic index (GSI) and fecundity of SBT. Annual reproductive cycles of SBT in this study could be divided into four successive stages in females; immature, maturing, mature and spent stage. The fecundity of SBT ranged 44,083,229 eggs (135 cm in FL) to 344,882,853 eggs (144 cm in FL), which was proportional to length.

1. Sampling activities of ovary and its process

A total of 365 ovaries of SBT have been collected by Korean scientific observer program (Fig. 1). The fork length and weight were measured onboard for each specimen by sex, and the histological analyses were conducted at laboratory. In addition, we analyzed the gonadosomatic index (GSI) and the fecundity of SBT.

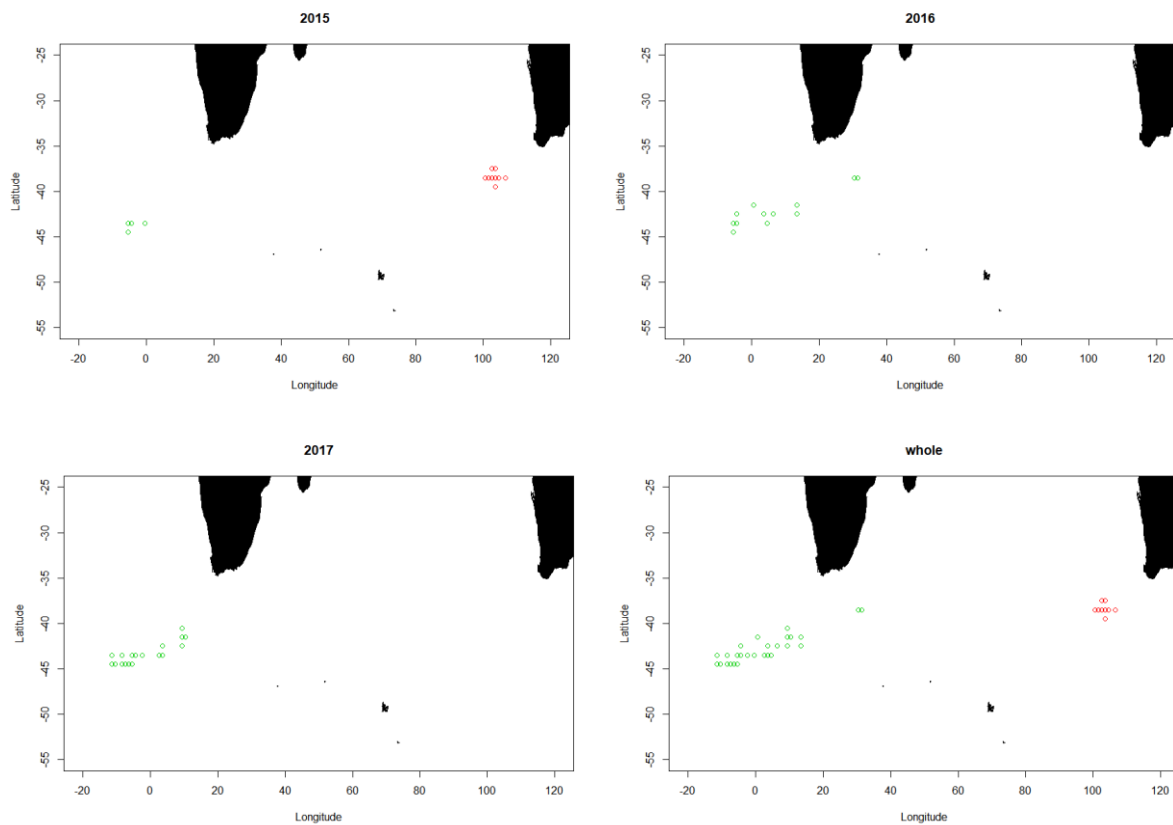


Fig. 1. Map showing the sampling areas of SBT ovaries collected by Korean scientific observer program during 2015-2017 (green : statistical area 9, red : statistical area 8).

2. Analysis of SBT maturity

The SBT ovary samples were collected from April to September during 2015-2017. The length distributions collected for analyzing maturity of SBT are shown in Table 1 and Fig. 2.

Fig. 3 represents the monthly changes of maturity stage of SBT by histological analysis. For female, immature and maturing stages appeared from April to September and mature and spent stages appeared in September.

As for the gonadosomatic index (GSI), both female and male showed the highest value in May but all the individuals were immature stage (Fig. 4).

The fecundity ranged from 44,083,229 eggs in FL 135 cm to 344,882,853 eggs in FL 144 cm (Table 3).

Table 1. Number of SBT ovary samples collected by Korean observer program, 2015-2017

(a) whole

Month	Statistical area 8		Statistical area 9		Total	
	F	M	F	M	F	M
Apr.			26	20	26	20
May			34	20	34	20
Jun.			60	46	60	46
Jul.			40	32	40	32
Aug.	19	33	3	3	22	36
Sep.	10	19			10	19
Total	29	52	163	121	192	173

(b) by year

Year	Month	Statistical area 8		Statistical area 9		Total	
		F	M	F	M	F	M
2015	4			2	2	2	2
	5			3	1	3	1
	6			16	20	16	20
	7			12	7	12	7
	8	19	33			19	33
	9	10	19			10	19
	Subtotal		29	52	33	30	62
2016	4			12	10	12	10
	5			2	2	2	2
	6			12	4	12	4
	7			18	16	18	16
	Subtotal		0	0	44	32	44
2017	4			12	8	12	8
	5			29	17	29	17
	6			32	22	32	22
	7			10	9	10	9
	8			3	3	3	3
	Subtotal		0	0	86	59	86
Total		29	52	163	121	192	173

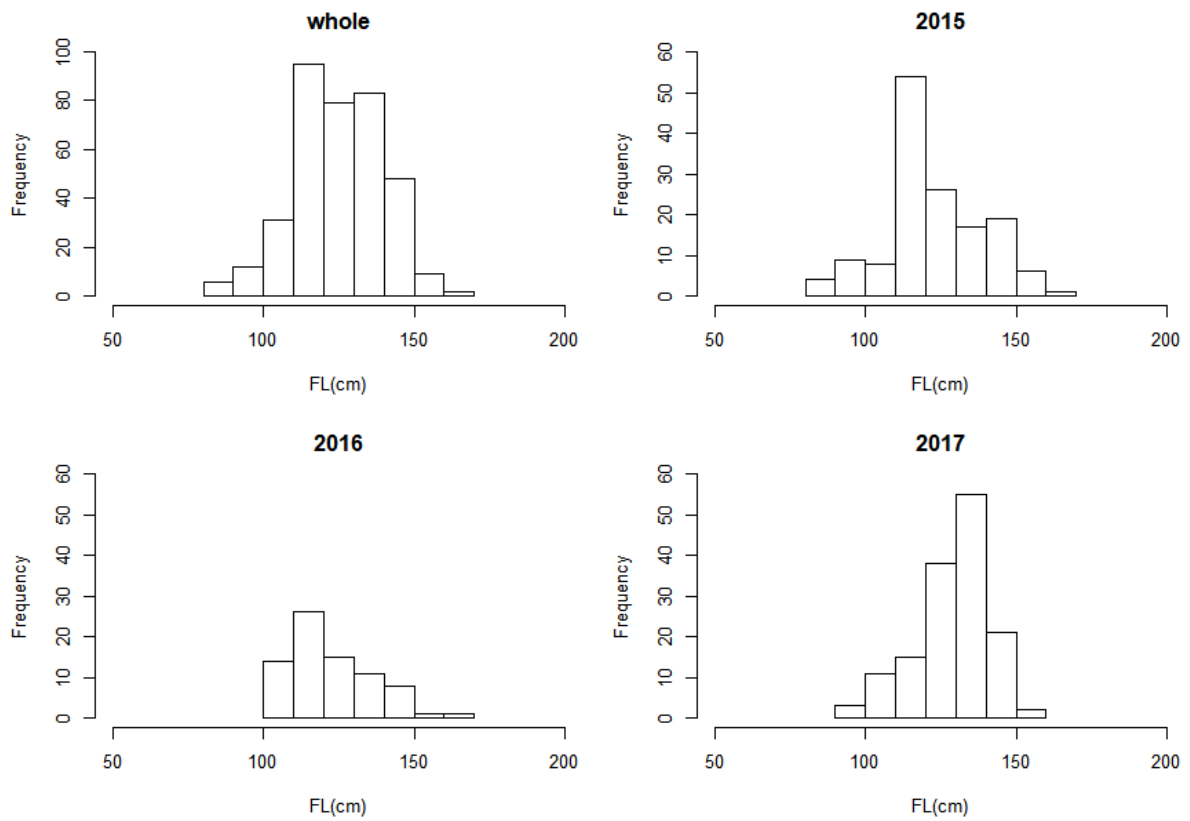


Fig. 2. Length frequency of SBT collected from 2015-2017.

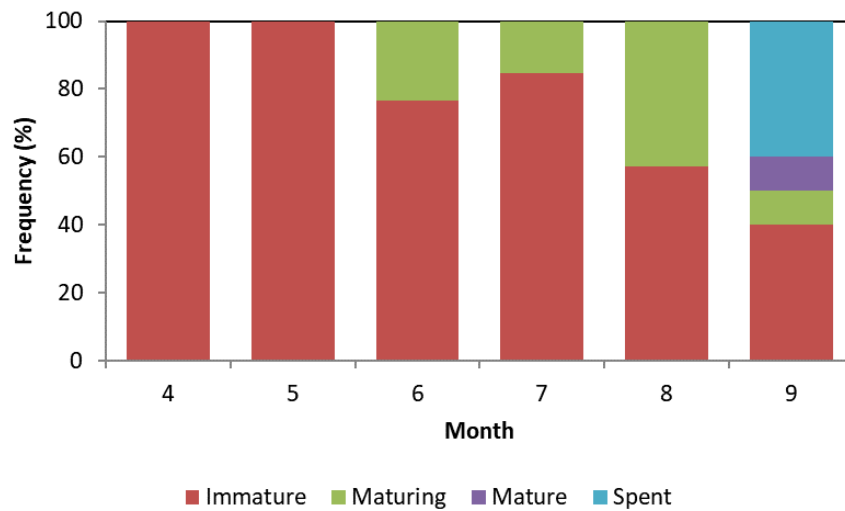


Fig. 3. Monthly changes of maturity stages of SBT from April to September, 2015.

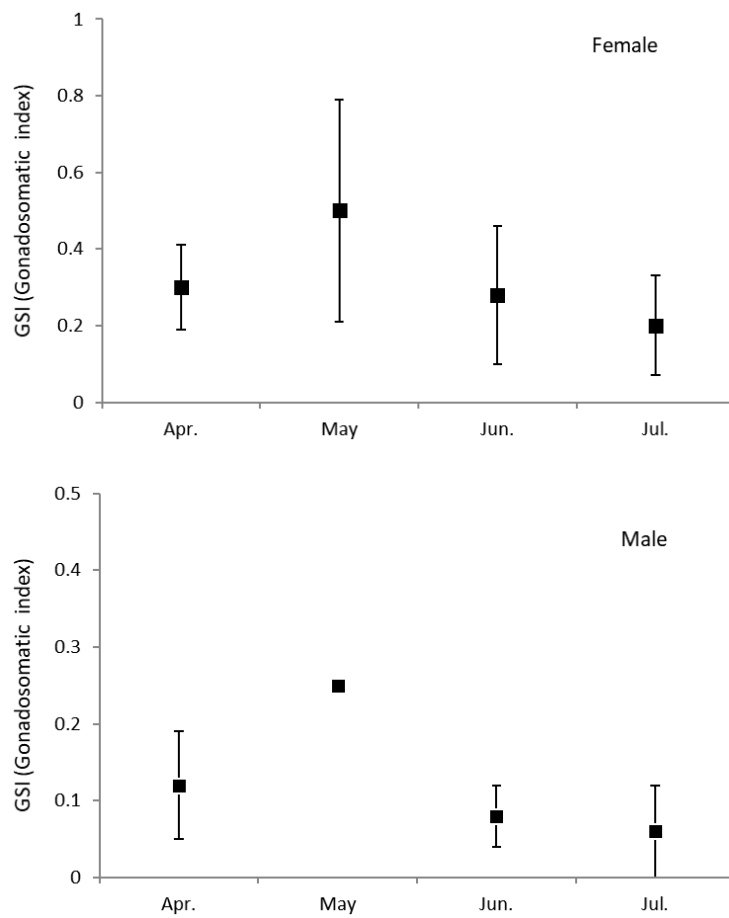


Fig. 4. Monthly changes of gonadosomatic indices (GSI) of SBT from April to July, 2016.

Table 2. Fecundities according to fork length of SBT

Range of FL (cm)		Fecundity		
		Minimum	Maximum	Mean
125	129	50,472,985	302,511,227	129,544,254
130	134	92,300,574	201,438,145	161,077,206
135	139	44,083,229	127,567,297	183,392,709
140	144	177,901,172	344,882,853	164,258,167
145	149	247,132,913	164,655,914	203,496,485
150	154	199,674,347	309,602,150	201,344,621