



CCSBT-ESC/2008/Info 02  
(ESC Agenda item 4.1)

## **UPDATE ON SBT MONITORING PROGRAM IN BENOA PORT, BALI , INDONESIA 2019**

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## **Summary**

This paper will provide update information about the SBT monitoring program in Bena port, Bali Indonesia 2019 presented in the CCSBT-ESC 2019 (CCSBT-ESC/1909/Info 03). The sampling coverage was decreasing from 53.69% in 2018 to 44.63% in 2019. The SBT number observed were also falling in 2019 with only 1,662 individuals compare to 2018 (1,733 individuals). The SBT size also decreased from 121-210 to 108-200 cm.

## **Indonesian tuna monitoring program**

SBT monitoring program commenced since 1993 through the series collaboration between Indonesia's marine fisheries research institutes within the Ministry of Marine Affairs and Fisheries (MMAF) and Commonwealth Scientific and Industrial Research Organisation (CSIRO) (Farley et al. 2017). The development of this program occurred in mid-2002, a monitoring program in three major Ports of Indonesia Bena (Bali), Muara Baru (Jakarta), and Cilacap (south cost Central Java) was established (Farley *et al.* 2014). The monitoring program aims to monitor the catch of all landing species and record the number of tuna longline vessel landings. Since 2011, the monitoring activities have been submitted to the Research Institute for Tuna Fisheries (RITF) as an institution that specializes in research on tuna resources in the Indian Ocean.

## **Sampling methods**

### *Sampling*

The SBT data collection conducted in 2019 (January-December) by enumerators from RITF at tuna fish processing company in Bena port. In this period, there are ten companies that routinely organize tuna fish processing. The enumeration unit applied is the number of tuna longline vessels that perform SBT catch landings in Bena port. The data collected, including the number of catches, fish weight, fish length, fish destination (export/reject/ bycatch), vessel name and company name.

The most important thing to verify is that every individual fish that represents all the fish caught from the tuna longline vessels must be recorded. If the weight per individual of tuna cannot be recorded, it is not allowed to make an estimate of the data itself. Registration of individual weights for all tuna longline vessel catches, will ensure that there is no bias in terms of sorting data by weight or by species (Jatmiko *et al.* 2017). Length measurements are conducted using callipers that have a precision of up to 0.5 cm. Length sizes are shown in order of priority

according to international measurement standards. If not possible to measure the length of all fish catches, then measuring the length of the rejected fish can already be recorded as a random sampled (Jatmiko *et al.* 2017).

### *Statistical analysis*

Estimation of total production can be calculated using formula modification from IOTC (2012):

$$CM = LM * AVM$$

Where:

CM : Estimation of total production per month (ton)

LM : Number of landed vessels per month which landed SBT (unit)

AVM : Production from sampled vessels per month which landed SBT (ton)/number of total vessels per month per processing plant which landed SBT (unit)

The relationship between fish length and weight was obtained using a multiplicative regression model ( $y = ax^b$ ) (King 2013).

### **Registered vessels**

The total number of longline vessels landed in Bena port, sampled by RITF enumerator were 183 units in 2019. These vessels landed in 10 processing plants in Bena port. In average, the number of longline vessels landed were about 34 ships per month with the total sampling coverage in 2019 is 43.41% (Appendix 1). This percentage resulted from the calculation on how many total vessels landed either one or more divide by the number of vessels that sampled.

### **Bycatch composition**

A total 24 species of bycatch recorded in the longline vessels monitoring program at Bena port in 2019. The catch composition is dominated by *Prionace glauca* (BSH) with 43.53%, followed by *Lampris guttatus* (LAG) 23.42%. Whereas, the bycatch composition which was less than 0.1% consist of 7 species, including *Coryphaena hippurus* (DOL), *Katsuwonus pelamis* (SKJ), *Bramidae* (BRZ), *Lophotus capellei* (LOP), *Trachipterus arcticus* (TPA), *Carcharhinus longimanus* (OCS), and *Taractes rubescens* (TCR) (Appendix 2). The bycatch composition of tuna longline vessels based on fish number sampled provided in Appendix 3.

### **SBT length frequency and length-weight relationship**

The length frequency of southern blue fin tuna (SBT) landed in Bena port, Bali in 2019 is presented in Appendix 4. A total 1,662 SBT were measured in fork length (FL), ranged from 108-200 cm with the domination length is between 151 and 155 cm. While the relationship between SBT length and weight, showed the strong correlation, with the high R value, 0.9756 (Appendix 5).

### **References**

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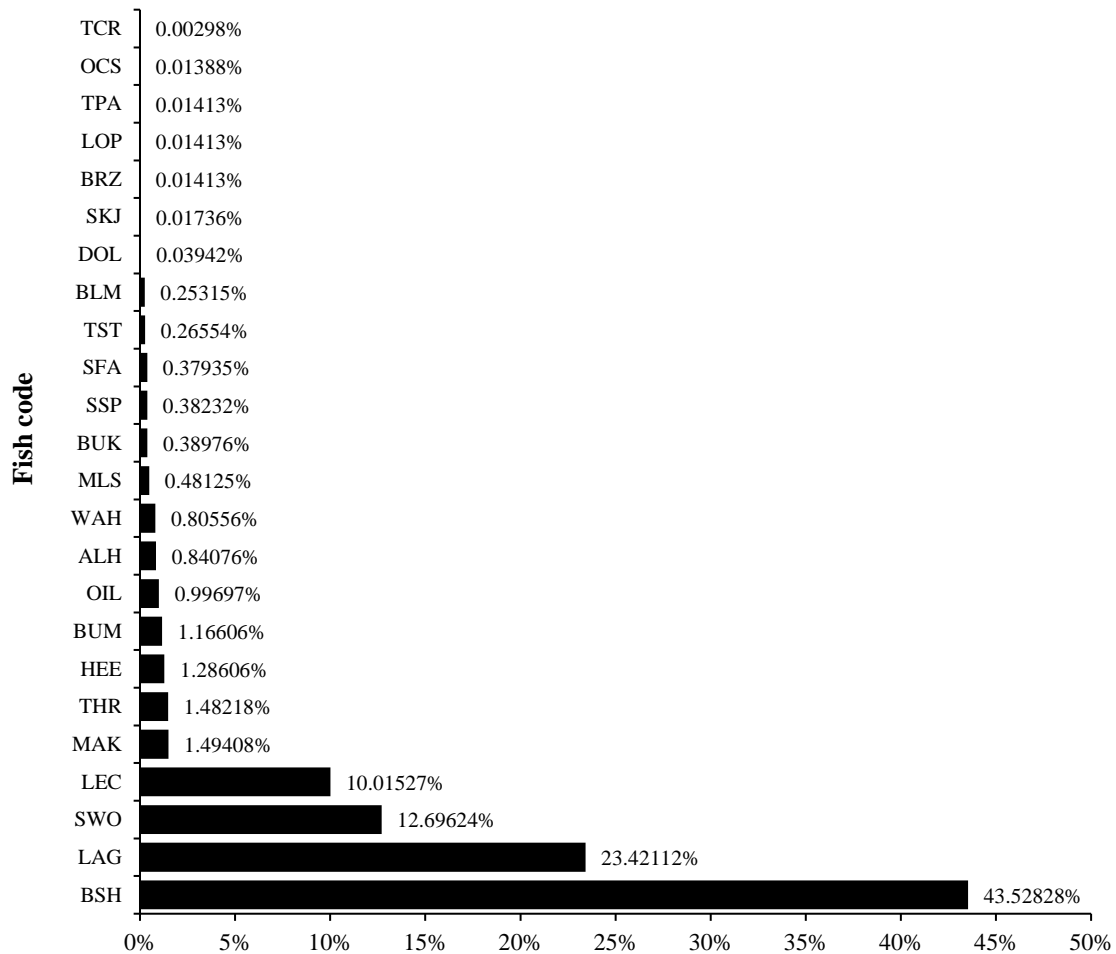
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**Appendix 1.** Number of sampled and landed vessels and its proportion at Benoa Port in 2019

Month	Landed	Sampled	%
January	43	27	62.79%
February	19	7	36.84%
March	32	11	34.38%
April	27	12	44.44%
May	38	16	42.11%
June	21	5	23.81%
July	25	13	52.00%
August	37	16	43.24%
September	38	16	42.11%
October	41	24	58.54%
November	42	16	38.10%
December	47	20	42.55%

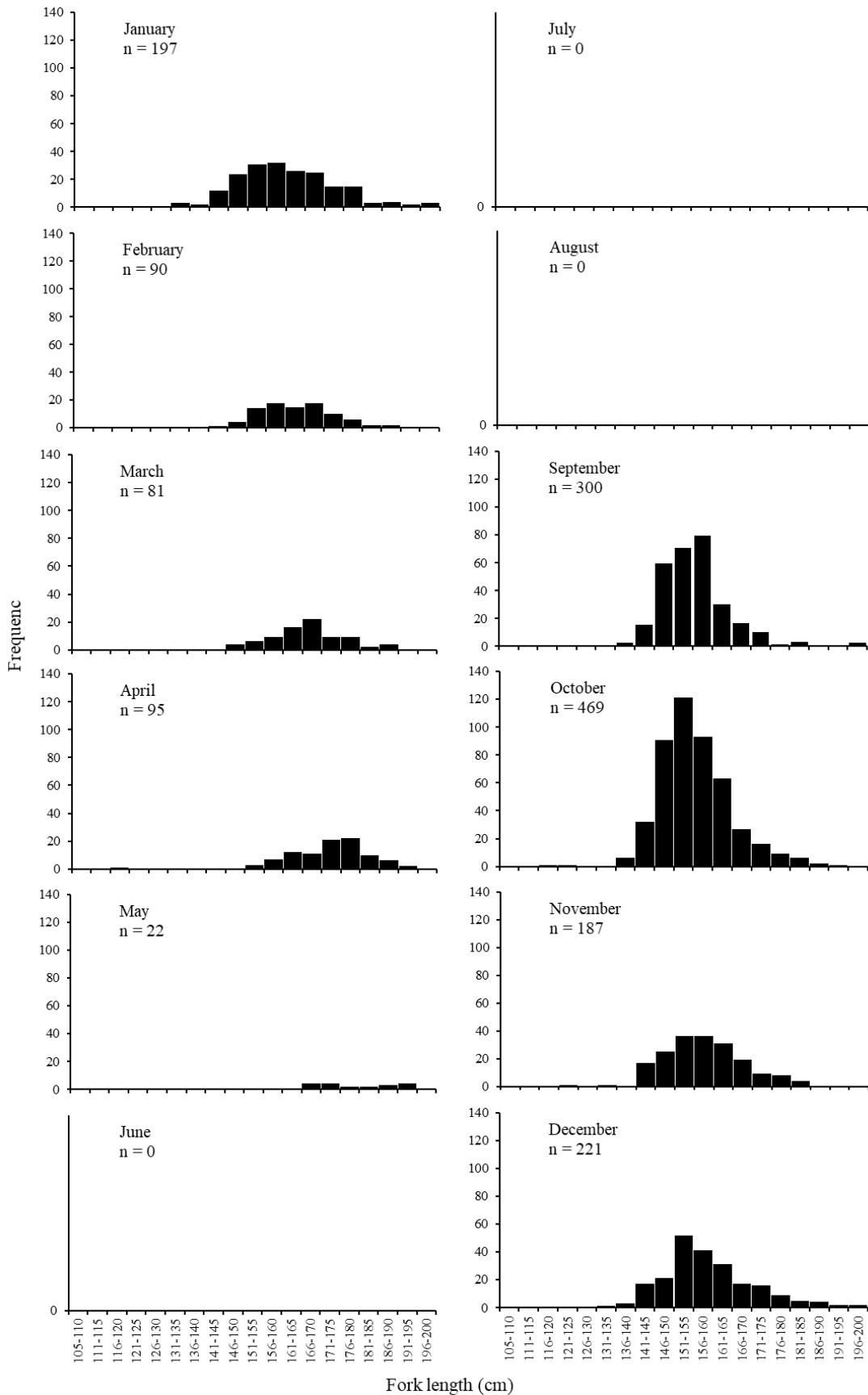
**Appendix 2.** Bycatch composition (%) based on fish weight percentage landed in Benoa port, Bali in 2019



### Appendix 3. Bycatch composition of tuna longline vessels based on fish number sampled at Bena port, Bali in 2019

Code	Common name	Scientific name	Jan	Feb	Mar	Apr	Mau	Jun	Jul	Aug	Sep	Oct	Nov	Des	Total
ALH	Slickhead	<i>Alepocephalidae</i> sp	1			2			90	99	111	38	82	19	442
BLM	Black Marlin	<i>Makaira indica</i>	1		2	1			3	2	2	9			20
BRZ	Pomfret, ocean breams nei	Bramidae							2		2				4
BSH	Blue shark	<i>Prionace glauca</i>	3,152		2,390	262			616	947	1,570	568	668	310	#####
BUK	Butterfly kingfish	<i>Gasterochisma melampus</i>			1				28	2	20	2	4		57
BUM	Blue marlin	<i>Makaira mazara</i>	2			26	13		3	1	3	9		3	60
DOL	Common dolphin fish	<i>Coryphaena hippurus</i>			8				22			1	13		44
HEE	Snaggletooth shark	<i>Hemipristis elongata</i>	6		3	1			6	17	101	84	73	124	415
LAG	Opah	<i>Lampris guttatus</i>	61		68	23			939	333	1,214	478	476	105	3,697
LEC	Escolar	<i>Lepidocybium</i> sp	37		557	82			878	136	1,124	1,053	488	298	4,653
LOP	Crestfish	<i>Lophotus capellei</i>										3	5		8
MAK	Mako shark	<i>Isurus</i> spp	18		10	3			18	61	29	5	4	6	154
MLS	Striped marlin	<i>Tetrapturus audax</i>	1		7	2			2	1	1	39		1	54
OCS	Oceanic whitetip shark	<i>Carcharhinus longimanus</i>									1				1
OIL	Oilfish	<i>Ruvettus pretiosus</i>	29		2	1			22	14	132	29	86	34	349
SFA	Sailfish	<i>Istiophorus platypterus</i>	3			6			36	14	25	16	7	1	108
SKJ	Skipjack tuna	<i>Katsuwonus pelamis</i>			1				1	1		6	1		10
SSP	Shortbill Spearfish	<i>Tetrapturus angustirostris</i>	2		23	1			51			12	9		98
SWO	Swordfish	<i>Xiphias gladius</i>	23	4	73	29	20	27	150	40	174	196	174	110	1,020
TCR	Knifetail pomfret	<i>Taractes rubescens</i>								1			1		2
THR	Thresher shark	<i>Alopias</i> spp	12		2	1			7	3	5	1	6	7	44
TPA	Tapertail ribbonfish	<i>Trachipterus arcticus</i>											2		2
TST	Sickle pomfret	<i>Taractichthys steindachneri</i>	2						5	6	46	6	23	8	96
WAH	Wahoo	<i>Acanthocybium solandri</i>			12	3			149	4	16	37	1	7	229

**Appendix 4.** Length frequency of southern blue fin tuna (SBT) landed in Benoa port, Bali in 2019



**Appendix 5.** Length-weight relationship of southern blue fin tuna (SBT) landed in Bena port, Bali in 2019

