SOME BIOLOGICAL STUDY OF YELLOWFIN TUNA (THUNNUS ALBACARES) AND BIGEYE TUNA (THUNNUS OBESUS) IN THE EASTERN INDIAN OCEAN.

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INTRODUCTION

Some biological study of tunas and catches data were collected from tuna resources survey in the Eastern Indian Ocean by research vessel "MAI-IIDOL" (Department of flsheries). Catches and biological data were taken by purse seine. The objective of this report is to determine some biological data such as length frequency distribution, length — weight relationship, age and growth parameters of yellowfin tuna (Th,,nnu.s alhacares) and bigeye tuna (Thunnrts ohesz,s) caught by research vessel "MAHIDOL" and Japanese purse seine. The biological study and growth parameters are basic knowledge of tuna resources management for the Tropical tunas in the Indian Ocean effectively.

MATERIALS AND METHODS

Tuna purse seining operations by R/V "MAHIDOL" were conducted during October, 1995 - September, 1996 in the Eastern Indian Ocean, Data collection from Japanese purse seine was collected during landing at Phuket fishing port Thailand. in 1994- 1Q95. The biological darns of tuna collection in catches, size frequency. individual length and weight, sex ratio for analysis of tuna length frequency distribution, length- weight relationship and for the growth parameters, L8, K. and t0 were used to estimate growth equation from Likelihood Methods for the von Bertalanffy Growth Curve (Kimura. 1980)

RESULTS

Length-frequency distribution

The length frequency distribution was taken by R/V "MAHIDOL" in 1995 — 1996. Range of size distribution of yellowfin tuna was from 28 — 84 cm FL and bigeye tuna ranging from 30 — 82 cm FL. The length frequency distribution was taken by Japanese purse seine In 1994— 1995. Range of size distribution of yellowfin tuna was from 30-114cm FL and bigeye tuna ranging from 35 — 86 cm FL. The mean length of yellowfin tuna and bigeye tuna were collected data from R/V "MAHIDOL" and Japanese purse seine as shown in Fig. 1 —4

Length- weight relationship

The length-weight relationship of yellowfin tuna and bigeye tuna were seperated by male, female and pooled or each species. The following equation $W = aL^b$ were used as follows

Length- Weight relationship

YelIowfin tuna (Thunnus albacares)

Male	$W = 0.000041\ L^{2.793}$	, r = 0.97, n = 174
female	$W = 0.000054\ L^{2.723}$	, r = 0.97, n = 194
pooled	$W = 0.000031\ L^{2.858}$	, r = O.97, n = 368

Bigeye tuna (Thunnus obesus)

male	$W = 0.000013\ L^{3.071}$	, r = 0.98, n = 114female
	$W = 0.000301\ L^{2.327}$	, r = 0.88, n = 138pooled
	$W = 0.000082L^{2.648}$	, r = 0.99, n = 252

where W is weight in kg and L is fork length in cm

Growth parameters

Using the Bhattacharya s method was to split a composite distribution into the mo dal distributions and estimate the growth equation from Likelihood Methods for the von Bertalanffy Growth Curve.

The growth equation of yellowfin tuna were as follows

R/V "MAHIDOL" $L_t = 182.864\ (1-e^{-0.365\ (t-(-0.00I3))})$

Japanese purse seine $L_t = 185.684\ (1-e^{-0.345\ (t-(-0.003))})$

The growth equation of bigeye tuna were as fellows

R/V "MAHIDOL" $L_t = 182.528\ (1-e^{-0.308\ (t-(0.07))})$

Japanese purse seine $L_t = 180.89\ (1-e^{-0.298\ (t-(-0.09))})$

CONCLUSION

Biological observation on yellowfin tuna and bigeye tuna taken by purse seine in the Eastern Indian Ocean was made by data collective data from research vessel "MAHIDOL". The growth increments for age 1-8 years were calculated by growth parameter. The growth increment from one year to two years was 38.8 cm (55.98 to 94.78 cm) or 3.23 cm per month of yellowfin tuna. As suggested by Anderson (1988) the growth rate of 2.9 + 4 cm per month would be nearest to the true rate. The growth increment of bigeye tuna from one year to two years was 34.8cm or 2.9cm per month. From Japanese purse seine the growth increment of yellowfin tuna from one year to two years was 38.34cm (54.31 to 92.65) or 3.19cm per month and bigeye tuna the growth increment from one year to two years was 33.69 cm or 2.81 cm per month. (Table 1)

REFERENCES

Anderson, R.C. 1988. Growth and Migration of juvenile yellowtin tuna *(Thunnus alhacares)* in the Central Indian Ocean. IPTP. Coil. Vol. Work. Doe. 3:TWS/88/21:2819.

Kimura. Daniel K. 980. Likelihood Methods for the von Bertalanffy Growth Curve. Washington Department of Fisheries, Olympia. WA 98504, Fishery Bulletin: Vol. 77 No. 4. 765-776.

Table I: Age - Length - Weight key of tunas in the Indian Ocean P/V "MAHIDOL"

	Yellowfin tuna		Bigeye tuna	
Age	**L(cm)**	**W(kg)**	**L(cm)**	**W(kg)**
0.5	30.58	0.55	29.39	0.63
1.0	55.98	3.07	51.25	2.76
.5	77,15	7.68	69.98	6,30
2.0	94.78	3.83	86.05	10.89
2.5	09.48	20.88	99.82	16.13
3.0	121.72	28.27	111.62	21.69
3.5	131.92	35.58	121.74	27.29
4.0	140.42	42.53	130.42	32.75
4.5	147,50	48.95	137.86	37,93
5.0	153,40	54.76	.14423	42.76
5.5	158.31	59.92	149.70	47,18
6.0	162,41	64.46	154.38	51,20
6.5	165.82	68.40	158.40	54.80
7.0	168.66	71.81	161.84	58.01
7.5	171.03	74.73	164.80	60.85
8.0	173.01	77.22	167.33	63.36

Japanese purse seine				
	Yellowfin tuna		**Bigeye tuna**	
Age	L(cm)	W(Kg)	L(cm)	W(kg)
0.5	29.58	0.50	29.17	0.62
1.0	54,31	2.82	50.17	2.61
1.5	75.13	7.12	68.26	5.90
2.0	92.65	12.96	83.86	10.17
2.5	107.39	19.76	97.29	15.07
3.0	119.79	27.01	08.86	20.30
3.5	130.23	34,29	118.83	25.60
4.0	139.02	41.33	127.42	30.80
4.5	146.41	47.93	34.82	35.76
5.0	152.63	53.98	141.20	40.42
5.5	57.87	59.44	146.70	44.72
6.0	62.28	64.31	151 .43	48.64
6.5	165.99	68.60	155,51	52.19
7.0	169.11	72,35	159.02	55.37
7.5	171.73	75.61	162.05	58.20
8.0	173.94	78.42	164.66	60.72

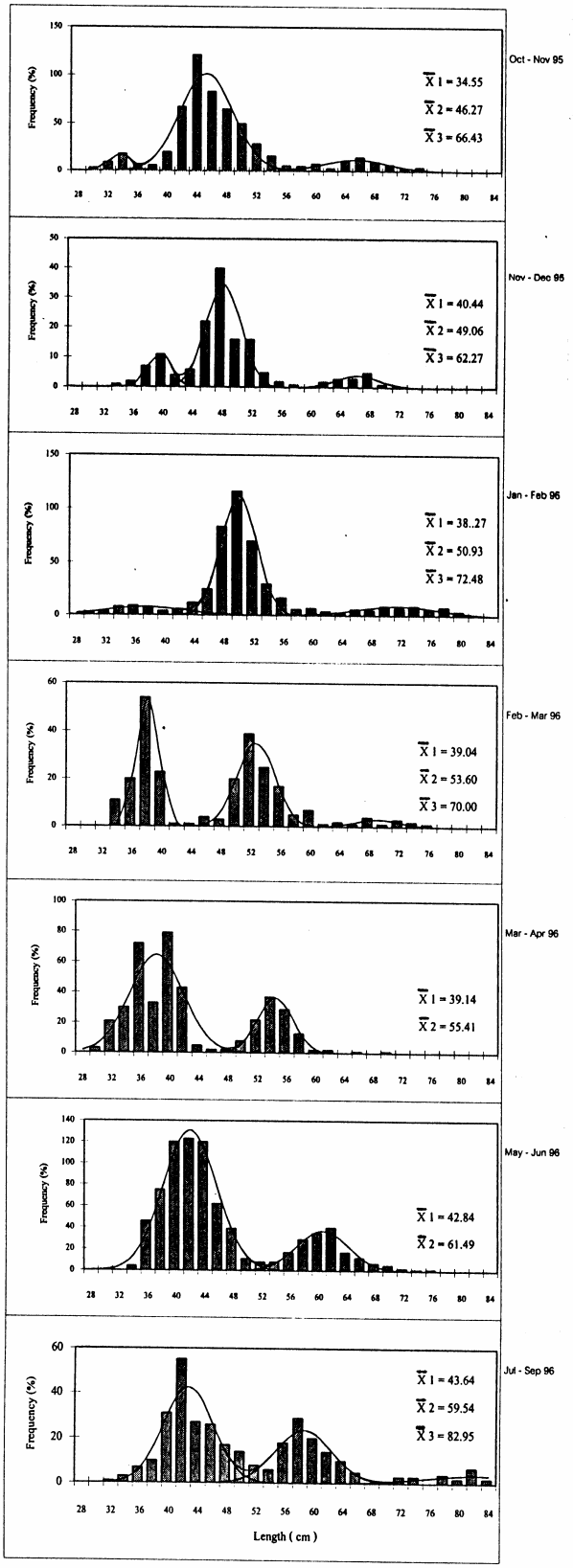


Fig. 1 Length distribution of yellowfin tuna caught by R/V "MAHIDOL" in the Indian ocean.

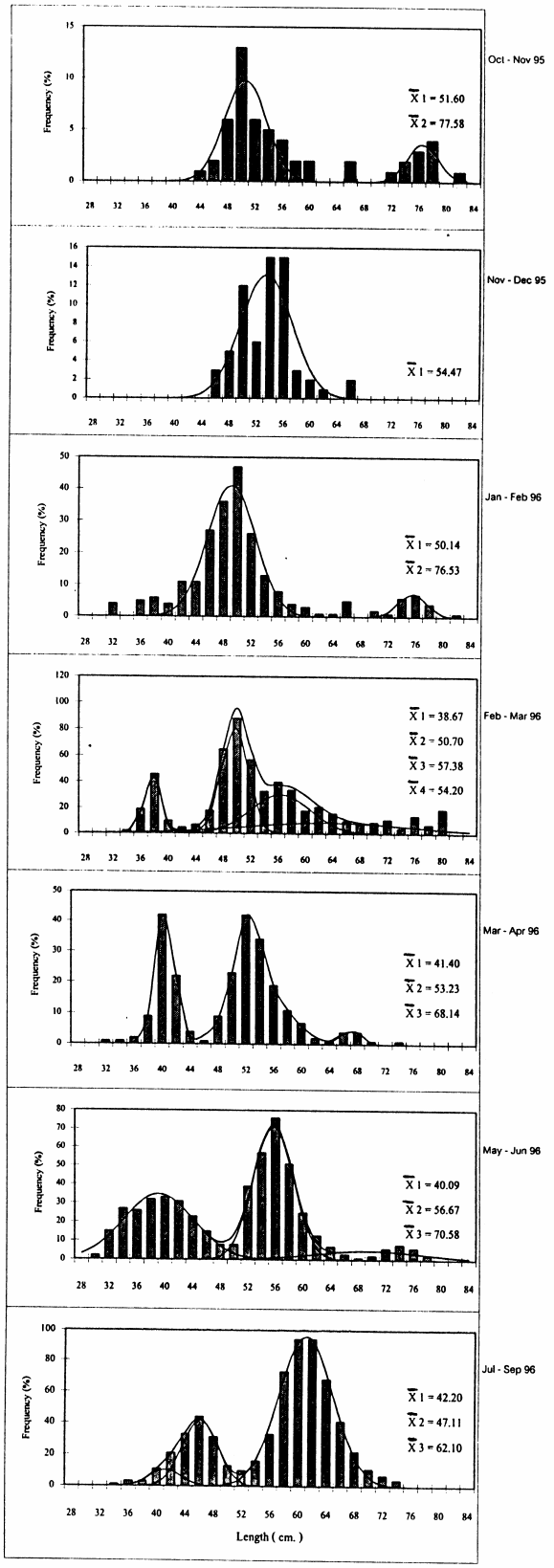


Fig. 3 Length dietribution of bigeye tuna caught by R/V "MAHIDOL" in the Indian Ocean.

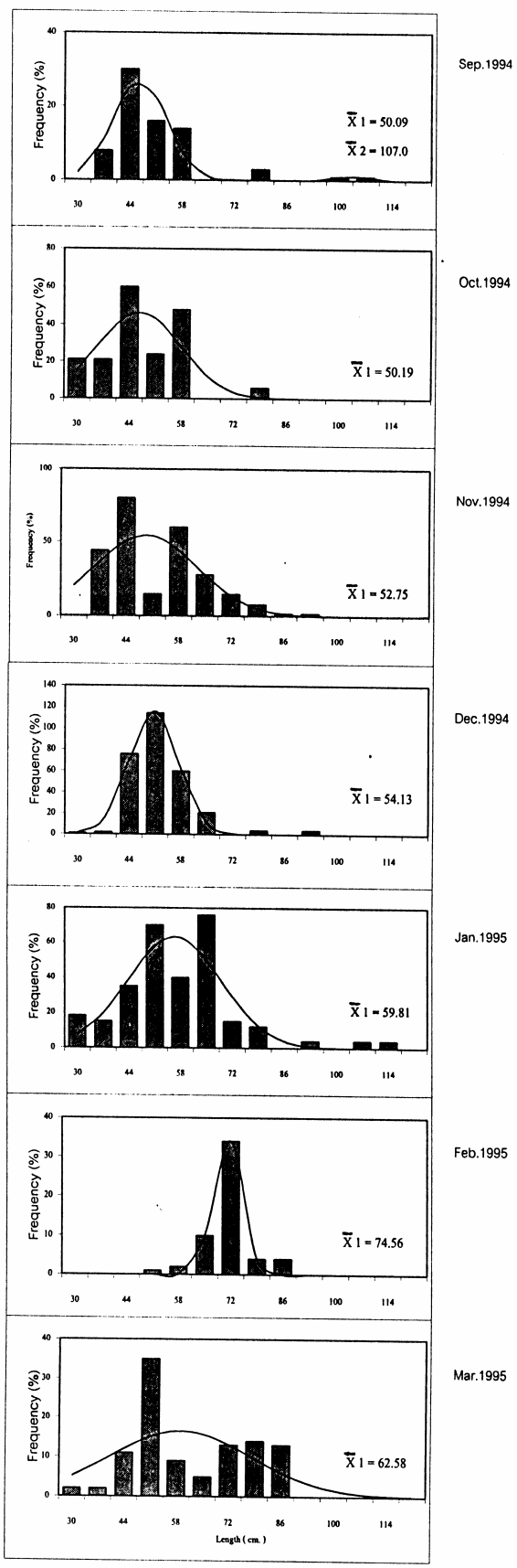


Fig. 2 Length distribution of yellowfin tuna caugth by Japanese purse seine in the Indian ocean.

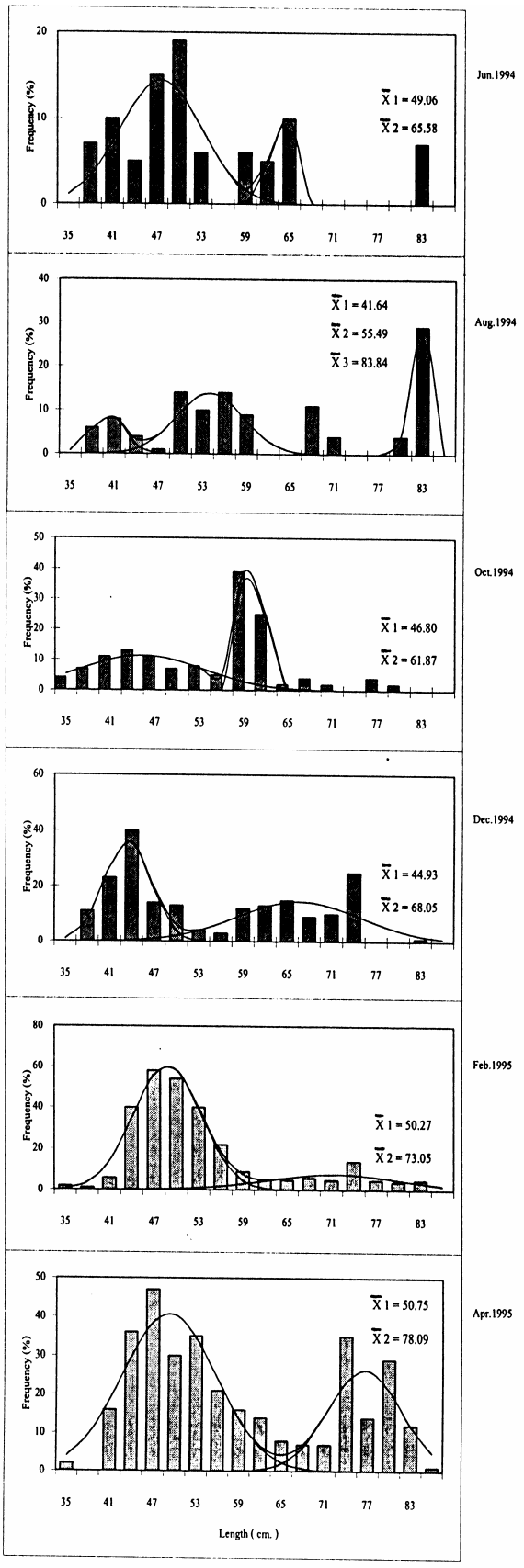
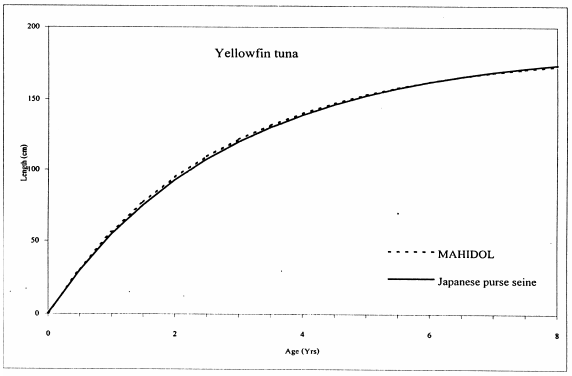


Fig. 4 Length distribution of bigeye tuna caught by Japanese purse seine in the Indian ocean.



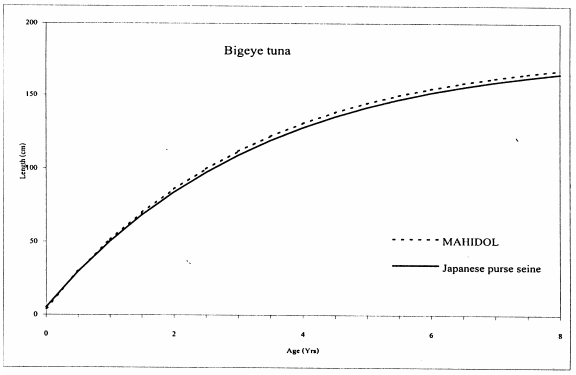
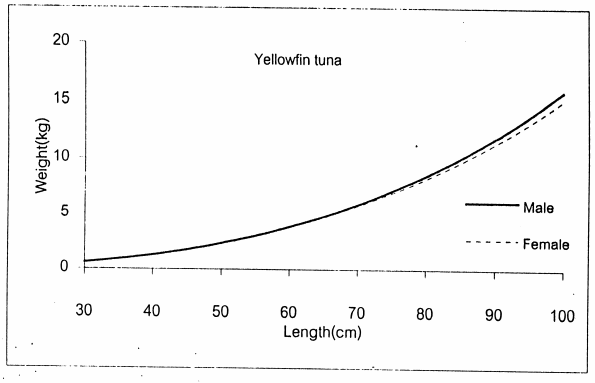


Fig. 6 Growth curve of yellowfin tuna and bigeye tuna estimated data from R/V "MAHIDOL" and Japanese purse seine



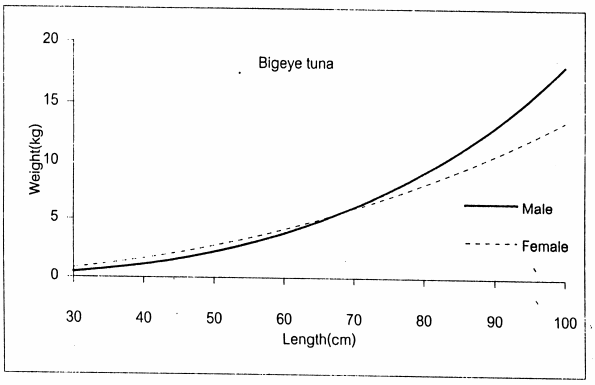


Fig. 5 Length weight relationship of yellowfin tuna and bigeye tuna compare with male female.