

**OBSERVATIONS ON THE SPAWNING SEASON AND
THE FISHERIES OF THE SPOTTED SEER,
SCOMBEROMORUS GUTTATUS
(BLOCH & SCHNEIDER)**

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INTRODUCTION

THE spotted seer or *Scomberomorus guttatus*, is an important and much esteemed table fish, standing next in importance to *Leiognathus splendens* in the fishery of Rameswaram Island, where approximately 320 tons of this fish, fetching a market price of about Rs. 250,000, are landed every year (Krishnamoorthi, 1958). It is well known in the fishery of all coastal areas of India. Nevertheless the available literature furnishes little exact information about its biology except for some remarks on taxonomy and geographical distribution by Day (1889) and Weber and Beaufort (1951), a description of the egg by Delsman (1931) and notes on life-history and feeding habits by Vijayaraghavan (1955). Accordingly, the present study was initiated to gather some knowledge of the biology of this important commercial species.

I am gratefully indebted to Dr. N. K. Panikkar, the then Chief Research Officer, Central Marine Fisheries Research Station, Mandapam Camp, for suggesting the problem and for his guidance and criticism throughout the course of this investigation.

MATERIAL AND METHODS

Of the many fishing villages in the Rameswaram Island, Thangachimadam and Dhanushkodi in the north and Kundugal Point in the south are the only major fish-landing places where *Scomberomorus guttatus* (along with, sometimes, *Scomberomorus commersonii*), is landed in large quantities by the gill-nets. The fishing season commences after the close of the north-east or the south-west monsoon as the case may be. In the former two places it begins early in March and terminates in October; while in the latter centre it is comparatively short being from November to February only. During the fishing seasons these centres were visited at regular weekly intervals and random samples of the catches were obtained. All fish were measured in the fresh condition. Gonads from both mature and maturing forms were also collected and preserved in 5% formaldehyde for later examination at

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the laboratory. Ova teased out of the ovaries were measured with the help of an ocular micrometer keeping the magnification constant.

SPAWNING SEASON

With a view to determine the spawning season a series of measurements of ova diameters was taken as done by other workers (Clark, 1936; Hickling and Rutenberg, 1936; De Jong, 1939; Arora, 1951; Sekharan, 1955; Prabhu, 1956). For this purpose not less than a thousand ova were collected from the gonads of eight specimens ranging from 44 to 52 cm. in length since all maturing fish belong to this group (see below). Mature specimens of this species with ovaries in ripe condition were collected from gill-nets in the months of April, May and June suggesting that the species probably spawns during these months. From Fig. 1 it is evident that there are only two modes,

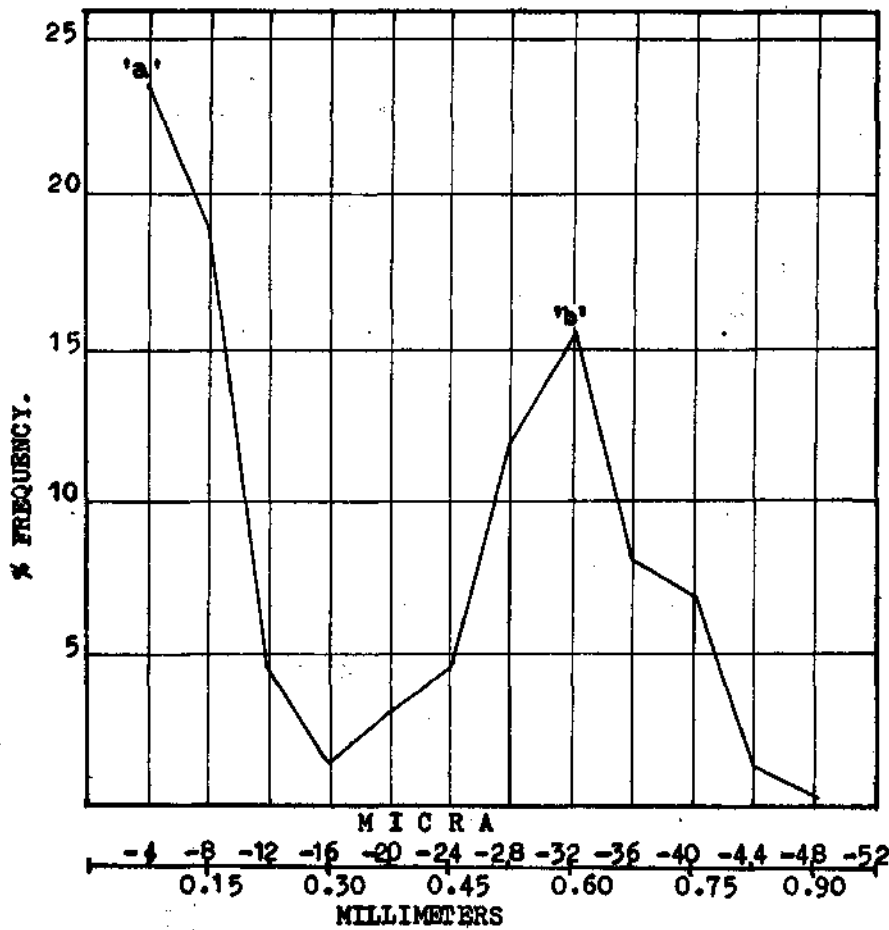


FIG. 1. Percentage frequency of ova in the ovaries of *Scomberomorus guttatus*.

TABLE I

Monthly size progression of ova of *Scomberomorus guttatus* during the different months of 1952.
Majority of the females carried the eggs of the sizes indicated by the range of the solid circles

Maturity	Diameter groups in micra	Jan.	Feb.	March	April	May	June	July	August	Sept.	Oct.	Nov.	Dec.	
Immature ..	0.0-4.0	●	●	●	●	●	●	Data unavailable	●	●	●	●	●	
	4.0-8.0	●	●	●	○				●	○	●	●	●	●
	8.0-12.0	○		●	○				○	○	○	○	○	●
	12.0-16.0	○	○	○	○				○	●	○	○	○	○
	16.0-20.0	○	●	○	○				○	●	○	○	○	
Maturing ..	20.0-24.0		●											
	24.0-28.0		●		○									
	28.0-32.0			●	○	○				●				
	32.0-36.0			●	●	○				●				
	36.0-40.0			●	●	○				●				
	40.0-44.0			●	●	●								
	44.0-48.0			●	●	●	○							
Ripe ..	48.0-52.0					●	○							
	52.0-56.0					●	●							
	56.0-60.0					●	●							
	60.0-64.0						●							
	64.0-68.0						●							
	Mean diameter in micra	6.7	12.2	14.1	35.2	51.7	57.5		8.1	6.9	6.5	6.5	7.6	

viz., one at 'a' and the other at 'b'. The eggs with a modal length of 'a' are immature, while at 'b' they are mature. The absence of a mode representing the intermediate group of eggs perhaps suggests that the species has a very short and restricted spawning period.

Further, the course of the growth of the maturing eggs was followed through the year and Table I shows the results. The majority of the females carried eggs of the sizes indicated by the range of the solid circles. It is evident that during June the eggs reached the maximum (mean) size of 57.5 micrometer divisions; the largest eggs, measuring 64 micrometer divisions or 1.2 mm., were ripe, transparent and possessed a single oil-globule measuring 0.16 mm. In the light of these observations it is permissible to conclude that May to July forms the spawning season for *Scomberomorus guttatus*, with the peak in July. In order to verify this conclusion further, data on the percentage occurrence of the mature fish, month by month all through the year, were also collected. On an average, 120 fish were examined every month and the results tabulated (Table II). It is evident from Fig. 2 that

TABLE II

Percentage of immature and maturing fish in random samples during the different months of 1952

Months	No. of fish examined	Percentage of fish	
		Immature	Maturing
January ..	150	68	32
February ..	100	63	37
March ..	100	48	52
April ..	120	30	70
May ..	100	21	79
June ..	120	12	88
July ..	150	6	94
August ..	120	10	90
September ..	150	18	82
October ..	140	31	69
November ..	150	51	41
December ..	150	57	33

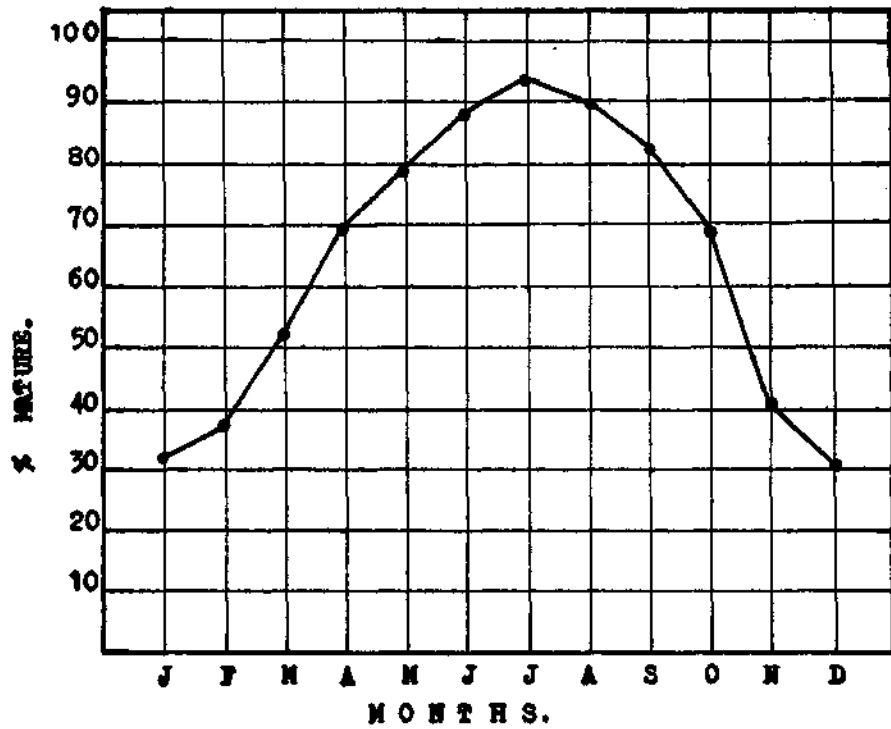


FIG. 2. Percentage of mature females of *Scomberomorus guttatus* during each month of the year 1952.

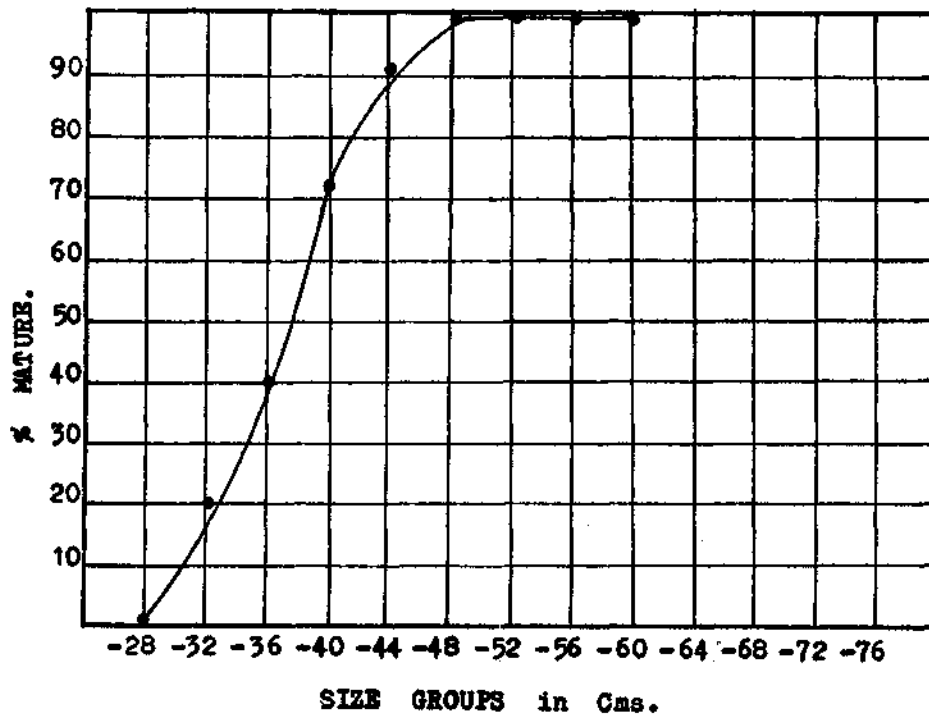


FIG. 3. Size at first maturity of *Scomberomorus guttatus*.

the percentage of mature fish was high during the months of May to August with the peak in July, supporting the conclusion that there is only one spawning season in a year.

MINIMUM SIZE AT FIRST MATURITY

Fish collected from April to June were taken into account for this study. A total of 480 specimens was examined. The data are plotted in Fig. 3. It is evident from this figure that only 20% of fish were mature in 24-28 cm. group, 40% in 32-36 cm. group, 73.7% in 36-40 cm. group, 90.2% in 44-48 cm. group and 100% in and above 48-52 cm. group. This last group suggests the minimum size at first maturity.

RELATIONSHIP OF THE STANDARD TO TOTAL LENGTH

An analysis of the relationship between the total length and the standard length of the spotted seer was made to determine the degree of association of these two characters and to establish an equation for the conversion of one measurement into the other. The standard and total lengths of 441 specimens were measured and in order to establish an equation for the

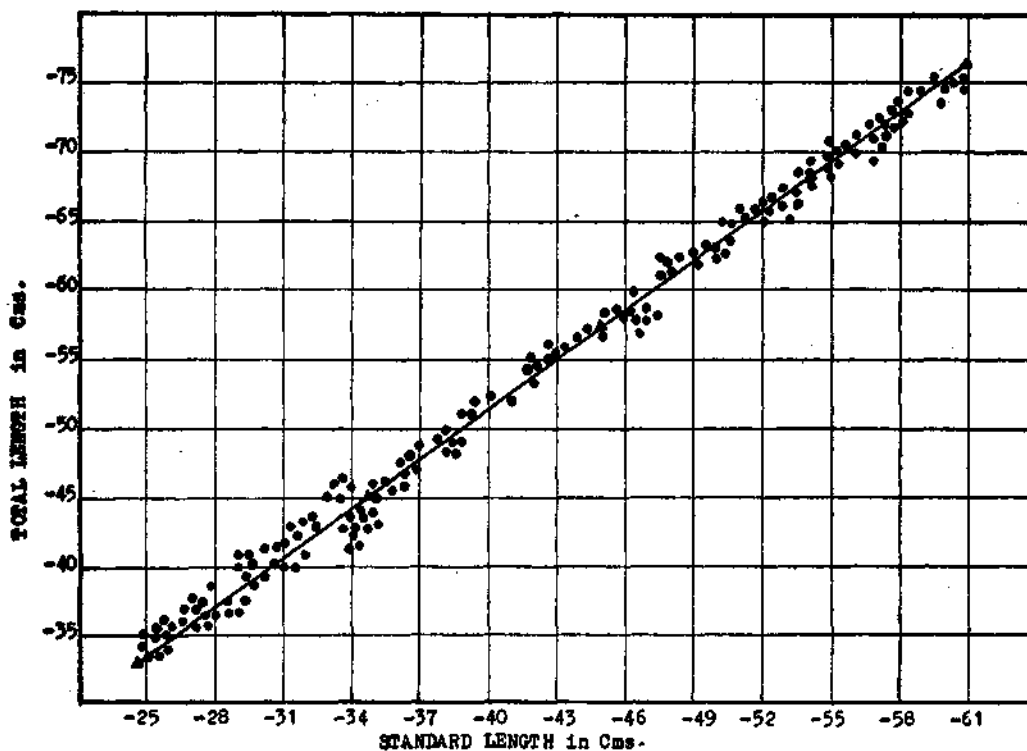


FIG. 4. Relationship of the standard length to the total length in *Scomberomorus guttatus*.

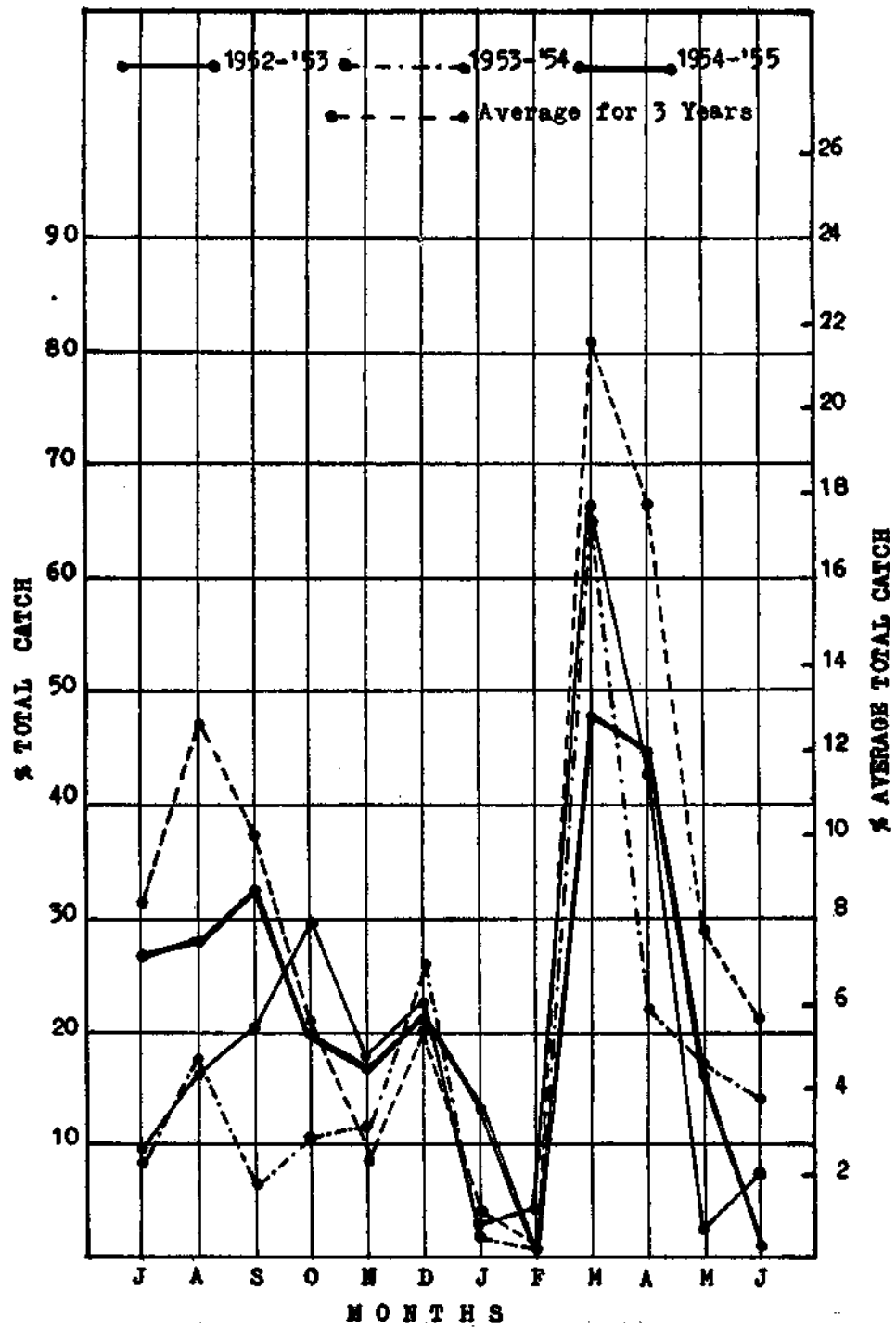


FIG. 5. Trend of catches during each month of 1952-53, 1953-54 and 1954-55 for *Scomberomorus guttatus*.

conversion they were set to the allometric curve of Huxley, viz., $y = cx^{\infty}$ (where 'y' represents the total length, 'x' the standard length and 'c' and ' ∞ ' constants) and it was found to be:

$$y = 0.8580 x^{.9771}$$

or

$$\log y = -0.0665 + .9771 \log x.$$

The equation for the regression line being: $Y = bX + A$, where 'Y' & 'X' are the total and standard lengths (i.e., the two variables) and 'b' and 'A' the two constants, 'b' also being the regression coefficient, the formula for the regression line was found to be: $Y = 0.56X + 8.58$. Figure 4 shows the results of this study indicating an excellent correlation between the observed length and the calculated length and the regression line of best fit.

TREND OF THE SEER FISHERY

The weights of seer-fish landed by gill-nets and by shore-seines operating in all the fishing villages of Rameswaram Island were systematically recorded. Based on the data so collected it was possible to estimate the total landings for each month during the three years, 1952 to 1955. From Table III and Fig. 5 it is obvious that the fishery extends all through the year. The summer months (March to September) show high landings in all the three years, with the peak of the season occurring in March. The catches during the winter months (October to February) fall comparatively low, reaching the lowest during February. Excepting for a sharp, but not appreciably high, rise in the catches during December, the landings in the winter months are quite low. Since fishing during winter months is in the Gulf of Mannar, the Palk Bay appears to be a comparatively richer fishing ground for this species. In Fig. 5 the percentages of average landings during each month are also indicated to facilitate comparison.

The majority of the fish that entered the fishery measured 38.5 cm. As is evident from the length-frequency polygon (Fig. 6), the peak was reached at 38.5 cm. size-group during both the years. There is circumstantial evidence that this may be the third year-class. The seer-fishery in the Rameswaram Island, therefore, is probably composed of the third year-class only.

TABLE III

Weight of seer-fish landed during each month in the years 1952-53, 1953-54, and 1954-55

(Figures within brackets indicate percentage of seer in total fish landings)

Months	Amount of fish landed during							
	1952-1953		1953-1954		1954-1955		Total	
	lb.	Tons	lb.	Tons	lb.	Tons	lb.	Tons
July ..	43,734.04 (9.44)	19.52	39,783.18 (8.67)	17.76	1,01,515.67 (26.95)	45.32	1,85,032.89 (8.60)	82.60
August ..	63,008.67 (17.86)	28.13	80,662.17 (16.53)	36.01	1,32,377.00 (27.77)	59.10	2,76,047.84 (12.83)	123.24
September ..	64,808.15 (20.64)	28.93	23,110.96 (6.90)	10.32	1,27,015.32 (32.49)	56.70	2,14,934.43 (10.00)	95.95
October ..	33,411.58 (29.72)	14.92	30,576.16 (10.66)	13.65	59,564.19 (20.04)	26.59	1,23,551.93 (5.74)	55.16
November ..	16,150.71 (18.20)	7.21	21,034.67 (11.15)	9.39	15,353.01 (17.85)	6.85	52,538.39 (2.44)	23.45
December ..	55,272.00 (23.13)	24.68	32,028.01 (26.11)	14.30	32,598.42 (21.47)	14.55	1,19,389.43 (5.57)	53.53

January	..	1,581·35 (3·37)	0·70	5,277·36 (2·10)	2·35	18,597·37 (15·88)	8·30	25,456·08 (1·18)	11·35
February	..	6,270·78 (4·76)	2·80	690·39 (1·09)	0·31	3,288·31 (1·42)	1·47	10,249·48 (0·48)	4·58
March	..	1,14,611·13 (65·66)	51·17	1,36,976·52 (65·80)	61·15	2,18,432·79 (47·99)	97·51	4,70,020·44 (21·83)	209·83
April	..	1,95,322·24 (43·28)	87·20	51,849·33 (22·10)	23·15	1,35,959·67 (45·25)	60·70	3,83,131·24 (17·80)	171·05
May	..	15,215·80 (2·75)	6·79	71,286·00 (17·10)	31·82	79,220·23 (17·61)	35·37	1,65,722·03 (7·70)	73·98
June	..	40,458·42 (7·55)	18·06	80,834·78 (14·26)	36·09	4,063·11 (1·14)	1·82	1,25,356·31 (5·83)	55·97
TOTAL	..	6,49,844·87	290·11	5,74,109·53	256·30	9,27,985·09	414·28	21,51,939·49	960·69
AVERAGE	..	54,153·74	24·18	47,802·46	21·36	77,332·09	34·52	59,776·09	26·69

Fisheries of the Spotted Seer, *Scomberomorus guttatus*

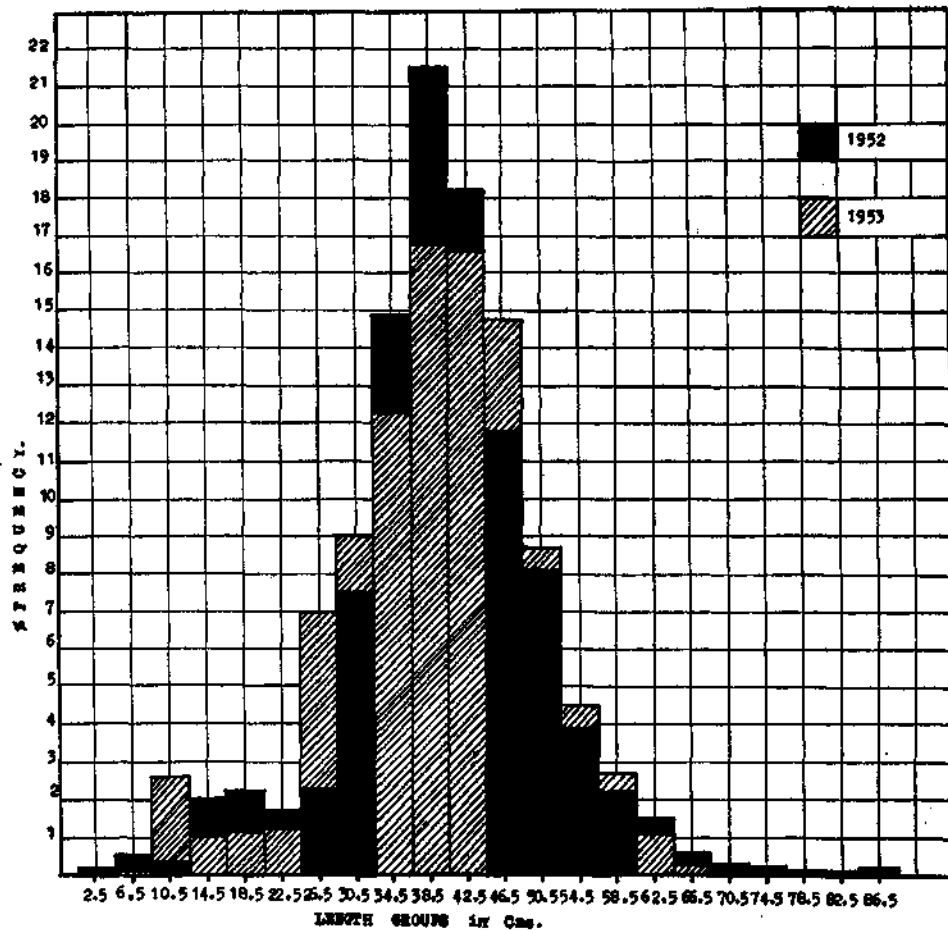


FIG. 6. Length-frequency distribution of *Scomberomorus guttatus* during the years 1952 and 1953.

SUMMARY

1. Observations on the spawning season and the fisheries of *Scomberomorus guttatus* in the Rameswaram Island are reported in this paper.
2. From ova diameter measurements, it was concluded that the spawning season of *Scomberomorus guttatus* is short, restricted, and probably within April to July.
3. Eggs at maximum size were observed in July when they were ripe, transparent and possessed a single oil-globule measuring 0.16 mm. The fully ripe egg measured 1.2 mm. in diameter. The months of May to July, with the peak in July, appear to be the spawning season for this species. Percentage occurrence of mature fish was the highest during May to August with the peak in July.

4. The percentage of mature fish in different size-groups was determined and 100% of mature fish were found only in and above the 48-52 cm. group. This suggests the minimum size at first maturity.

5. The formula to represent the relationship between the total and standard lengths was found to be $y = 0.8580 x^{.9771}$ or $\log y = -0.0665 + .9771 \log x$ where 'y' is the total length and 'x' the standard length. The equation for the regression line was found to be $Y = 0.56 X + 8.58$.

6. *Scomberomorus guttatus* occurs all through the year in the landings on Rameswaram Island. The summer months (March to September) witness high landings with the peak of the season in March. The catches are poor during the winter months (October to February), reaching the lowest in February. The fishery seems to consist mostly of the third year-class.

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