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## STUDIES ON THE THREADFIN BREAM AND THE LIZARD FISH RESOURCES IN THE EXCLUSIVE ECONOMIC ZONE OF INDIA BASED ON THE DEMERSAL TRAWLING OPERATIONS OF FORV SAGAR SAMPADA

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### ABSTRACT

The present paper deals with the distribution and abundance of the threadfin bream and the lizardfish resources available for exploitation in the Exclusive Economic Zone of India based on the demersal trawling operations of FORV *Sagar Sampada* during her cruises 1-55. The area surveyed was divided into the northwest, southwest, northeast, southeast, Wadge Bank & Gulf of Mannar and the Andaman & Nicobar Islands and the stock abundance was computed for each latitude zone. Threadfin brems occurred at 39.0% and lizardfishes at 31.7% of the total 387 trawling stations covered during 1985-'88. Threadfin brems predominated in the trawling operations in the Wadge Bank and the southwest coast forming 34.6 and 44.3% of the total trawl catch respectively. Along the east coast the resource is poor compared to the west coast. The peak abundance of the resource was in 41-80 m depth in the southwest and in 61-80 m depth in the northwest forming significant percentage of the demersal resources. Along the east coast the relative abundance was higher in depths of 80-150 m. The threadfin bream resource was constituted mainly by *Nemipterus japonicus* and *N. mesoprion* along with small quantities of *N. bleekeri*. *N. metopias* occurred in the northeast and the Andaman & Nicobar region. Lizard fishes constituted 3.7 and 4.6% of the total demersal fish resource in the southwest and northwest region respectively. It was relatively more abundant in the northeast forming 0.6%, whereas in the southeast it formed only 0.4% of the total trawl catch. Along the west coast, the relative abundance of the resource was generally high in 41-60 m depth. The resource was composed mainly of *Saurida tumbil* and *S. undosquamis* along with small quantities of *S. longimana*. The paper also deals with biological characteristics like size distribution, gonadial condition etc. of the main constituent species.

### INTRODUCTION

The annual potential yield of marine fish resources of the Indian EEZ estimated from primary productivity studies, exploratory surveys etc., ranges from 2.3 to 8.5 million tonnes (Jones and Banerjee, 1973; Silas, 1969; George *et al.*, 1971; Joseph, 1987). Exploratory trawling has indicated that along the west coast, threadfin bream formed significant percentage beyond the limit of the conventional trawling grounds along 8° to 13°N and 14° to 23°N (Silas *et al.*, 1976; Joseph *et al.*, 1987; Sudarsan *et al.*, 1988). Lizard fishes also form significant percentage of the demersal resources in deeper waters along certain latitude zones. So in the present paper an attempt is made to bring together the knowledge gained so far from the trawling operations of FORV *Sagar Sampada* on the distribution and abundance of threadfin brems and lizard fishes in the Exclusive Economic Zone of India. The vessel made 387 hauls during the bottom fish coverage. Threadfin brems occurred at 39% and lizard fishes 31.7% of the total trawling stations covered.

### MATERIAL AND METHODS

For analysis of the data, the area surveyed was divided into the northwest, southwest, northeast, southeast, Wadge Bank & Gulf of Mannar and the Andaman & Nicobar islands. The area was further divided into 1° squares and the stock density was calculated. The stock size by depth was computed at 20 m depth interval upto 100 m depth and thereafter the depth ranges followed were 101-150 m, 151-200 m, 201-300 m, for each latitude zone. The depth-wise species composition and size distribution of the dominant species of threadfin brems and lizard fishes were determined for each latitude zone.

### RESULTS

#### Threadfin brems

##### *Area-wise abundance*

The area-wise abundance and distribution of threadfin brems along the coasts of India is given in Fig.1.

TABLE 1. *Depth-wise distribution of threadfin breams (kg/hr) at different latitudes along the coast of India*

Latitudes	Depth range (m)							Average
	21-40	41-60	61-80	81-100	101-150	151-200	201-300	
<b>Southwest coast</b>								
8-9°N	0	382.1 (66.6)	231.7 (49.4)	0	6.5 (3.3)	63.0 (22.5)	5.3 (8.6)	98.4 (26.9)
10-11°N	7.5 (0.9)	617.0 (57.6)	1254.3 (73.1)	200.0 (40.1)	9.0 (1.5)	1.0 (0.5)	0	298.4 (42.7)
12-13°N	6.2 (79.4)	0	59.5 (23.7)	113.2 (83.8)	8.1 (9.6)	0	0	26.7 (16.4)
14°N	0 (89.9)	1800.0 (43.9)	1100.0	0	0	0	0	488.3 (62.2)
Average	3.4 (1.2)	699.7 (71.5)	661.3 (53.6)	78.3 (41.7)	5.9 (24.8)	21.3 (12.6)	1.3 (0.6)	210.1 (44.3)
<b>Northwest coast</b>								
15-16°N	0	5.8 (19.1)	3.3 (1.5)	118.8 (21.1)	59.5 (76.7)	0	0	26.8 (13.4)
17-18°N	0.5 (0.1)	-	5.4 (0.9)	27.3 (19.7)	-	-	-	11.1 (2.6)
19-20°N	-	-	481.7 (40.2)	9.9	- (5.1)	-	-	245.8 (35.3)
21-22°N	0	51.5 (7.1)	691.0 (27.1)	-	0	-	-	185.6 (25.6)
23°N	-	-	16.0 (8.0)	-	-	-	-	16.0 (8.0)
Average	0.2 (0.1)	28.6 (11.4)	295.3 (31.1)	43.0 (14.4)	29.7 (50.6)	0	0	56.6 (17.3)
<b>Wadge Bank</b>								
7-8°N	0	199.7 (19.7)	1608.1 (61.3)	945.3 (55.9)	396.0 (66.0)	-	-	629.8 (34.6)
<b>Southeast coast</b>								
10-11°N	1.6 (1.2)	43.5 (11.5)	0	-	-	-	-	15.0 (8.2)
12-13°N	0	9.2 (9.0)	9 (5.8)	36.7 (68.4)	3	-	-	11.6 (11.9)
14°N	3 (5.3)	31.5 (7.0)	0	2.0 (3.0)	-	0	-	9.1 (4.9)
Average	1.5 (1.7)	28.1 (9.0)	4.5 (2.9)	19.4 (32.3)	3	0	-	11.3 (8.2)

Table 1. *Contd*

Latitudes	Depth range (m)							average
	21-40	41-60	61-80	81-100	101-150	151-200	201-300	
<b>Northeast coast</b>								
15-16°N	2.1 (0.2)	2.1 (1.5)	0	5 (0.5)	0	0.3 (0.6)	-	1.6 (0.4)
17-18°N	20.0 (13.6)	5.1 (5.3)	0.2 (0.1)	47.5 (15.5)	10.7 (8.7)	0	125 (7.4)	29.8 (8.2)
19-20°N	1.7 (0.7)	4.4 (1.5)	10.7 (0.4)	13.2 (7.1)	-	0	-	6.0 (1.0)
Average	7.9 (1.6)	3.9 (2.2)	3.6 (0.3)	21.9 (4.4)	5.4 (8.7)	0.1 (0.4)	125 (7.4)	23.9 (4.2)
<b>Andaman &amp; Nicobar</b>								
6-7°N	-	0	-	-	-	-	-	0
8-9°N	-	-	0	-	-	-	-	0
10-11°N	-	-	-	2.5 (7.5)	-	-	-	2.5 (7.5)
12-13°N	0	0	1.3 (0.3)	3.0 (0.5)	0.3 (0.6)	-	-	0.9 (0.3)
14°N	0	-	0	14.0 (42.4)	-	-	-	4.6 (12.6)
Average	0	0	0.4 (0.2)	6.5 (2.2)	0.3 (0.6)	-	-	1.4 (0.8)

yielded very high catch rates while in October-December the peak catch rates occurred in 61-80 m depth. In the Wadge Bank area high catch rates were obtained at 41-100 m depth during July-September. In the east coast no significant and marked seasonal variation in the abundance of the resource was noticed. However, the catch rates were found to be comparatively higher in 81-100 m depth during January-March and 41-60 m during July-September in the southeast and in 21-40 and 101-150 m during April-June in the northeast coast.

#### Species composition

The analysis of the species composition of threadfin breams in different depth ranges indicated that along the southwest coast the dominant species was *N. japonicus* upto a depth of 60 m, with

*N. mesoprion* predominating in 61-80, 81-100 and 101-150 m depths (Table 3). In the northwest, *N. japonicus* formed the main constituent in 41-60 and 81-100 m depths while *N. mesoprion* accounted for the major part of the catch in 21-40, 61-80 and 101-150 m depth zones. *N. bleekeri* formed 41.4% of the threadfin bream catch at 21-40 m depth zone along 17-18°N.

In the southeast and northeast coasts *N. japonicus* formed the dominant species in 21-40 and 41-60 m depth ranges. *N. mesoprion* dominated the catch in 61-80 m and deeper depth zones.

#### Size distribution of dominant species

##### *Nemipterus mesoprion*

The length-frequency distribution of *N. meso-*

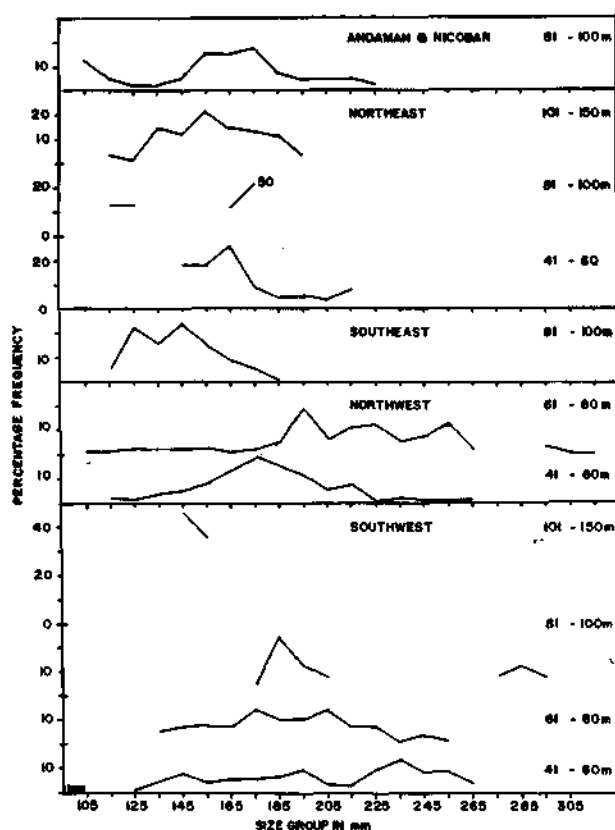


Fig. 3. Size frequency distribution of *N. japonicus* in percentage in different depth zones along the coasts of India.

along 15°-16°N and 19°-20°N, in 81-100 m depth range along 17°-18°N and in 41-60m depth range along 21°-22°N. The average catch rate for the area was the maximum in 61-80 m depth zone (41.7 kg/hr) followed by 41-60 m (38.2 kg/hr) and 81-100 m (25.8 kg/hr).

In the Wadge Bank area the highest catch rate was recorded from 101-150 m depth range (102.0 kg/hr) showing a decreasing trend with decrease in depth.

In the southeast coast, the lizard fish resource was poor along most of the latitudes, the highest catch rate recorded being only 3.3 kg/hr in the 81-100 m depth range along 12°-13°N. The highest average catch rate for the area was in the 81-100 m depth range (1.6 kg/hr) followed by 21-40 and 41-60 m depth ranges.

In the northeast coast the potential yield was found to be higher in 81-100 m depth range along 15°-16°N. Along 17°-18°N latitude zone, the catch rates were the highest at 21-40 m depth zone while

along 19°-20°N the maximum catch rate occurred at 61-80 m depth zone. The average catch rate for the area was the highest at the depth range of 21-40 m, showing a decreasing trend upto 61-80 m depth, after which it showed a slight increasing trend. In the Andaman-Nicobar area the most productive depth range for the lizard fishes was found to be 61-80 and 81-100 m depth ranges.

#### Seasonal variation

The depth wise seasonal distribution of lizard fishes showed that along the southwest coast the resource was the maximum in 41-60 and 61-80 m depth ranges during April-June closely followed by July-September. In October-December the peak abundance was observed at 101-150 m. In the northwest the abundance of the resource in the shallower waters was the highest during October-December. In the Wadge Bank area, the peak catch rates at shallower depths were during April-June and July-September. In the southeast in the inshore areas no seasonal fluctuations in the abundance of the resource could be observed, while in the northeast the catch rates were comparatively higher at 21-40 m depth in January-March and at 41-60 m depth in April-June and October-December.

#### Species composition

The analysis of the species composition of lizard fishes in different depth zones showed that in the southwest coast *Saurida tumbil* was the dominant species in 41-60 m depth range and above along all latitudes (Table 8). In the northwest coast and the Wadge Bank area also the same trend of dominance of *S. tumbil* was noticed except in 41-60 m depth, where *S. undosquamis* predominated. In the northeast *S. tumbil* predominated in 21-40 and 41-60 m depth ranges with *S. undosquamis* forming the major constituent in all higher depth ranges. *S. longimanus* occurred at 61-80 m depth zone along 19°-20°N. In the Andaman-Nicobar area along the northern latitudes, *S. tumbil* was the predominant species in all depth ranges.

#### Size distribution of dominant species

##### *Saurida tumbil*

The length- frequency distribution of *S. tumbil* in the different depth ranges along the coast is given in Fig. 5. In the southwest the modal values were at 265 mm in 21-40 m, at 355 mm in 41-60 m, at 265 and 295 mm in 61-80 m, at 285 mm in 81-100

TABLE 5. Depth-wise sex ratio and percentage of different maturity stages of females of *N. japonicus* along the coasts of India

	Depth range (m)							
	41 - 60		61 - 80		81 - 100		101 - 150	
	M	F	M	F	M	F	M	F
<i>Southwest coast</i>								
Sex ratio	45.1	54.9	30.0	70.0	48.1	51.9	50.0	50.0
Stages								
I	8.9		-		-		-	
II	25.0		14.2	-			66.6	-
III-IV	19.6		85.8		28.6		33.4	
V-VI	-		-		64.3		-	-
VII	46.5		-		7.1		-	
<i>Northwest coast</i>								
Sex ratio	65.9	34.1	52.7	47.3	50.0	50.0	-	-
Stages								
I	31.2		-		-		-	
II	56.3		6.9		-		-	
III-IV	12.5		93.1		100.0		-	
V-VI	-		-		-		-	
VII	-		-		-		-	
<i>Southeast coast</i>								
Sex ratio	5.8	94.2	-	-	50.6	49.4	-	-
Stages								
I	-		-		29.7		-	
II	43.7		-		29.7		-	
III-IV	56.3		-		35.1		-	
V-VI	-		-		5.5		-	
VII	-		-		-		-	
<i>Northeast coast</i>								
Sex ratio	48.3	51.7	-	-	-	-	-	-
Stages								
I	2.2		-		-		-	
II	8.8		-		-		-	
III-IV	75.7		-		-		-	
V-VI	13.3		-		-		-	
VII	6.6		-		-		-	

m and at 175 mm in 101-150 m. In the northwest in 81-100 m depth range the dominant modes were observed at 325 and 345 mm. In the Wadge Bank area, the dominant modes were at 225 and 245 mm in 41-60 m and at 135, 175 and 215 mm in 81-100 m depth zones. In the northeast, the modes were seen at 165 mm in 21-40 m and at 165 and 225 mm in 41-60 m. In the Andaman-Nicobar area the modal sizes were at 235 and 255 mm in the depth range 81-100 m.

The sex ratio and percentage of different maturity stages of the females of *S. tumbil* in various depth ranges along the coast is given in Table 9. In the southwest, specimens in all stages of maturity including spent ones occurred in 41-60 m depth, while preponderance of stage II fish was noticed in 81-100 m depth. In the northwest, stages III - IV and V-VI predominated in 41-60, 61-80 and 81-100 m depth zones. In the southeast, in 81-100 m depth

fish in stage III-IV of maturity formed 61.2%. In the northeast, fishes from stage II to VI occurred in 41-60 m, while stage II and III-IV fishes formed the major constituent in 61-80 m depth.

#### DISCUSSION

Tholasilingam *et al.* (1973) observed a dominance of *N. japonicus* in the catch from intermediate depths along the Kerala coast. The survey conducted by M.T. *Muraena* indicated that the fish is taken in reasonably good quantities in all depth ranges in the northwest coast of India (Bapat *et al.*, 1982). The studies by Sudarsan *et al.* (1988) indicated that nemipterids formed the highest percentage (21-25%) along 8° to 13°N and in 150-200 m and estimated the potential yield of nemipterids at 0.88 lakh tonnes in the west coast and 0.09 lakh tonnes in the Wadge Bank.

The present studies have shown that thread-

TABLE 6. Depth-wise distribution of lizardfishes (kg/hr) at different latitudes along the coasts of India

Latitudes	Depth range (m)							Average
	21-40	41-60	61-80	81-100	101-150	151-200	201-300	
<b>Southwest coast</b>								
8-9°N	0 (10.0)	57.5 (28.2)	132.5 (5.4)	3.3 (7.1)	14.1 (0.9)	2.5 (2.3)	14.3 (8.8)	32.0
10-11°N	0	77.5 (7.2)	24.1 (1.4)	35.0 (7.0)	6.3 (1.0)	0	0	20.4 (2.9)
12-13°N	0	0	9.2 (3.6)	1.8 (1.3)	0	0	0	1.6 (0.9)
14°N	0	100.0 (4.9)	0	10.0 (17.5)	0	-	0	18.3 (2.3)
Average	0	58.7 (6.0)	41.4 (3.4)	12.5 (6.7)	5.1 (2.1)	0.8 (0.5)	3.5 (1.5)	17.4 (3.7)
<b>Northwest coast</b>								
15-16°N	0	1.4 (4.6)	25.5 (11.7)	5.1 (1.0)	0	0	0	4.5 (2.3)
17-18°N	0	-	0	52.1 (37.5)	-	-	-	17.4 (4.1)
19-20°N	-	-	124.3 (10.4)	36.1 (18.7)	-	-	-	80.2 (11.5)
21-22°N	0	75.0 (10.3)	17.5 (0.7)	-	0	-	-	23.1 (3.2)
23°N	-	-	10.0 (5.0)	-	-	-	-	10.0 (5.0)
Average	0	38.2 (15.2)	41.7 (4.4)	25.8 (8.6)	0	0	0	15.1 (4.6)
<b>Wadge Bank</b>								
7-8°N	0	27.2 (2.7)	37.5 (1.4)	53.3 (3.2)	102.0 (17.0)	-	0	29.7 (1.6)
<b>Southeast coast</b>								
10-11°N	0	0	0	-	-	-	-	0
12-13°N	0	0.6 (0.6)	0	3.3 (6.2)	0	-	-	0.8 (0.8)
14°N	3.0 (5.2)	0	-	0	-	0	-	0.8 (0.4)
Average	1.0 (1.1)	0.2 (0.1)	0	1.6 (2.6)	0	0	-	0.5 (0.4)
<b>Northeast coast</b>								
15-16°N	0.5 (0.1)	3.0 (2.1)	0	5.0 (0.5)	0	0	-	1.4 (0.3)
17-18°N	18.3 (12.4)	5.0 (5.2)	1.3 (0.6)	9.5 (3.1)	10.1 (16.0)	0	0	6.35 (1.7)
19-20°N	2.6 (1.0)	5.4 (1.8)	7.3 (2.5)	1.6 (0.9)	-	0	-	3.4 (0.6)
Average	7.1 (1.5)	4.5 (2.5)	2.9 (0.6)	5.4 (8.8)	3.4 (12.8)	0	0	3.3 (0.6)
<b>Andaman &amp; Nicobar</b>								
6-7°N	- (1.9)	2.0	-	-	-	-	- (1.9)	2.0
8-9°N	-	-	0	-	-	-	-	0
10-11°N	-	-	-	1.0 (3.0)	-	-	-	1.0 (3.0)
12-13°N	0	0	5.0 (1.2)	2.3 (0.4)	0	-	-	1.5 (0.5)
14°N	0	-	0	26.0 (78.7)	-	-	-	8.6 (23.5)
Average	0	1.0 (0.5)	1.7 (1.0)	9.8 (3.3)	0	-	-	2.5 (1.6)

The figures in paranthesis indicate the percentage of lizardfishes in the total demersal catch.



THREADFIN BREAM AND LIZARD FISH RESOURCES IN THE EEZ OF INDIA

TABLE 7. Depth-wise seasonal distribution (kg/hr) of lizardfishes along the coasts of India

Seasons	Depth range (m)						
	21-40	41-60	61-80	81-100	101-150	151-200	201-300
<b>Southwest coast</b>							
Jan. - Mar.	0	0.5	16.1	0	3.6	0	8.9
Apr.-Jun.	0	105.8	204.1	20.2	9.0	-	0
Jul.-Sep.	0	56.8	16.6	11.5	0.7	0	0
Pct.-Dec.	-	0	0	0	34.0	5.0	0
<b>Northwest coast</b>							
Jan.-Mar.	-	0	1.0	6.2	-	-	0
Apr.-Jun.	-	0	0	-	-	-	-
Jul.-Sep.	0	1.2	8.5	57.1	10.0	0	-
Oct.-Dec.	0	41.5	62.9	12.2	0	-	-
<b>Wadge Bank</b>							
Jan.-Mar.	-	-	-	-	-	-	-
Apr.-Jun.	-	52.0	0	102.0	-	-	-
Jul.-Sep.	-	37.6	62.5	62.5	-	0	-
Oct.-Dec.	-	-	-	-	-	-	-
<b>Southeast coast</b>							
Jan.-Mar.	0	0	0	20.0	-	-	-
Apr.-Jun.	-	8.0	0	27.5	-	-	-
Jul.-Sep.	0	0	-	0	-	0	-
Oct.-Dec.	3.0	0	-	-	-	-	-
<b>Northeast coast</b>							
Jan.-Mar.	10.6	2.8	8.0	-	0	-	-
Apr.-Jun.	0	6.6	0.3	5.5	10.0	0	0
Jul.-Sep.	3.3	2.5	4.8	5.0	1.0	0	-
Oct.-Dec.	0.8	5.7	0.8	2.0	-	0	-
<b>Andaman &amp; Nicobar</b>							
Jan.-Mar.	-	-	2.0	-	0.5	-	-
Apr.-Jun.	0	0	2.3	4.3	-	-	-
Jul.-Sep.	-	-	-	0	-	-	-
Oct.-Dec.	-	-	-	0	-	-	-



THREADFIN BREEM AND LIZARD FISH RESOURCES IN THE EEZ OF INDIA

TABLE 8. Depth-wise species composition of lizard fishes (in percentage) along different latitude zones

Latitudes	Depth range (m)										
	21-40		41-60		61-80		81-100			101-150	
	St	Su	St	Su	St	Sl	Su	St	Su	St	Su
<b>Southwest coast</b>											
8-9°N	-	-	97.8	2.2	99.8	-	0.2	100.0	-	-	-
10-11°N	-	-	100.0	-	100.0	-	-	100.0	-	100.0	-
12-13°N	-	-	-	-	50.0	-	50.0	100.0	-	-	-
14°N	-	-	100.0	-	-	-	-	-	-	-	-
Average	-	-	99.3	0.7	88.4	-	11.6	100.0	-	100.0	-
<b>Northwest coast</b>											
15-16°N	-	-	50.0	50.0	-	-	-	100.0	-	-	-
17-18°N	90.0	10.0	-	-	-	-	100.0	100.0	-	-	-
19-20°N	-	-	-	100.0	70.0	-	30.0	100.0	-	-	-
21-22°N	-	-	-	-	100.0	-	-	100.0	-	-	-
23°N	-	-	-	-	-	-	-	-	-	-	-
Average	90.0	10.0	46.4	53.6	97.9	-	2.1	100.0	-	-	-
<b>Wadge Bank</b>											
7-8°N	-	-	76.5	23.5	-	-	-	100.0	-	100.0	-
<b>Southeast coast</b>											
10-11°N	-	-	-	-	-	-	-	-	-	-	-
12-13°N	-	-	-	-	-	-	-	-	-	-	-
14°N	0	100.0	-	-	-	-	-	-	-	-	-
Average	0	100.0	-	-	-	-	-	-	-	-	-
<b>Northeast coast</b>											
15-16°N	0	100.0	0	-	-	-	-	-	-	-	-
17-18°N	-	-	95.0	5.0	100.0	-	-	-	100.0	1.0	99.0
19-20°N	100.0	0	100.0	-	6.2	15.6	78.2	-	-	-	-
21-22°N	-	-	-	-	-	-	-	-	-	-	-
Average	64.5	35.5	99.6	0.4	8.2	15.5	76.3	-	100.0	1.0	99.0
<b>Andaman and Nicobar</b>											
6-7°N	-	-	-	-	-	-	-	-	-	-	-
8-9°N	-	-	-	-	-	-	-	-	-	-	-
10-11°N	-	-	-	-	-	-	-	-	-	-	-
12-13°N	-	-	-	-	100.0	-	0	91.5	8.5	100.0	-
14°N	-	-	-	-	-	-	-	-	-	-	-
Average	-	-	-	-	100.0	-	0	91.5	8.5	100.0	-

St = *S. tumbil*; Su = *S. undosquamis*; Sl = *S. longimana*.

TABLE 9. Depth-wise sex ratio and percentage of different maturity stages of females of *S. tumbil* along the coasts of India

		Depth range (m)					
		41 - 60		61- 80		81- 100	
		M	F	M	F	M	F
<b>Southwest coast</b>							
Sex ratio		36.9	63.1	-	-	50.0	50.0
Stages	I	7.3	-	-	-	-	-
	II	19.5	-	-	-	80.0	-
	III-IV	61.0	-	-	-	20.0	-
	V-VI	4.9	-	-	-	-	-
	VII	7.3	-	-	-	-	-
<b>Northwest coast</b>							
Sex ratio		66.6	33.4	57.6	42.4	37.5	62.5
Stages	I	-	-	-	-	38.3	-
	II	5.9	-	-	-	6.7	-
	III-IV	64.7	-	86.1	-	40.0	-
	V-VI	29.4	-	13.9	-	15.0	-
	VII	-	-	-	-	-	-
<b>Southeast coast</b>							
Sex ratio		-	-	-	-	28.0	72.0
Stages	I	-	-	-	-	16.6	-
	II	-	-	-	-	22.2	-
	III-IV	-	-	-	-	61.2	-
	V-VI	-	-	-	-	-	-
	VII	-	-	-	-	-	-
<b>Northeast coast</b>							
Sex ratio		33.4	66.6	57.1	42.9	-	-
Stages	I	-	-	33.3	-	-	-
	II	37.5	-	33.3	-	-	-
	III-IV	37.5	-	33.4	-	-	-
	V-VI	25.0	-	-	-	-	-
	VII	-	-	-	-	-	-

fin bream is the predominant demersal fish resource in the Wadge Bank and southwest coast forming 34.6 and 44.3% of the total trawl catch respectively. In the southeast, the peak abundance of the resource is observed in 41-60 and 61-80 m depth zones. In the northwest the catch rate is higher in 61-80 m depth range showing a decreasing trend with increasing depth. In the southwest coast the resource is contributed mainly by *N. japonicus* in shallow depth ranges and *N. mesoprion* in 61-80 m and above. In the northwest *N. japonicus* formed the main constituent along most of the depth ranges.

The survey conducted by EFP vessels in the Wadge Bank area and *M.T. Muraena* in the north-

west coast indicated an abundance of lizard fish resources in the deeper waters (E.F.P. Progress Report No.1, 1982; Bapat *et al.*, 1982). Sudarsan *et al.* (1988) estimated the potential yield of lizard fishes at 12,300 tonnes along the west coast.

The present studies have indicated the most productive area for lizardfishes to be the Wadge Bank followed by southwest and northwest zones. In the west coast the resource is comparatively more abundant in 41-60 m depth range showing a decreasing trend with increasing depth, whereas along the east coast the peak abundance is at 61-80 m depth. *Saurida tumbil* is the predominant species in depth ranges of 41-60 m and above.

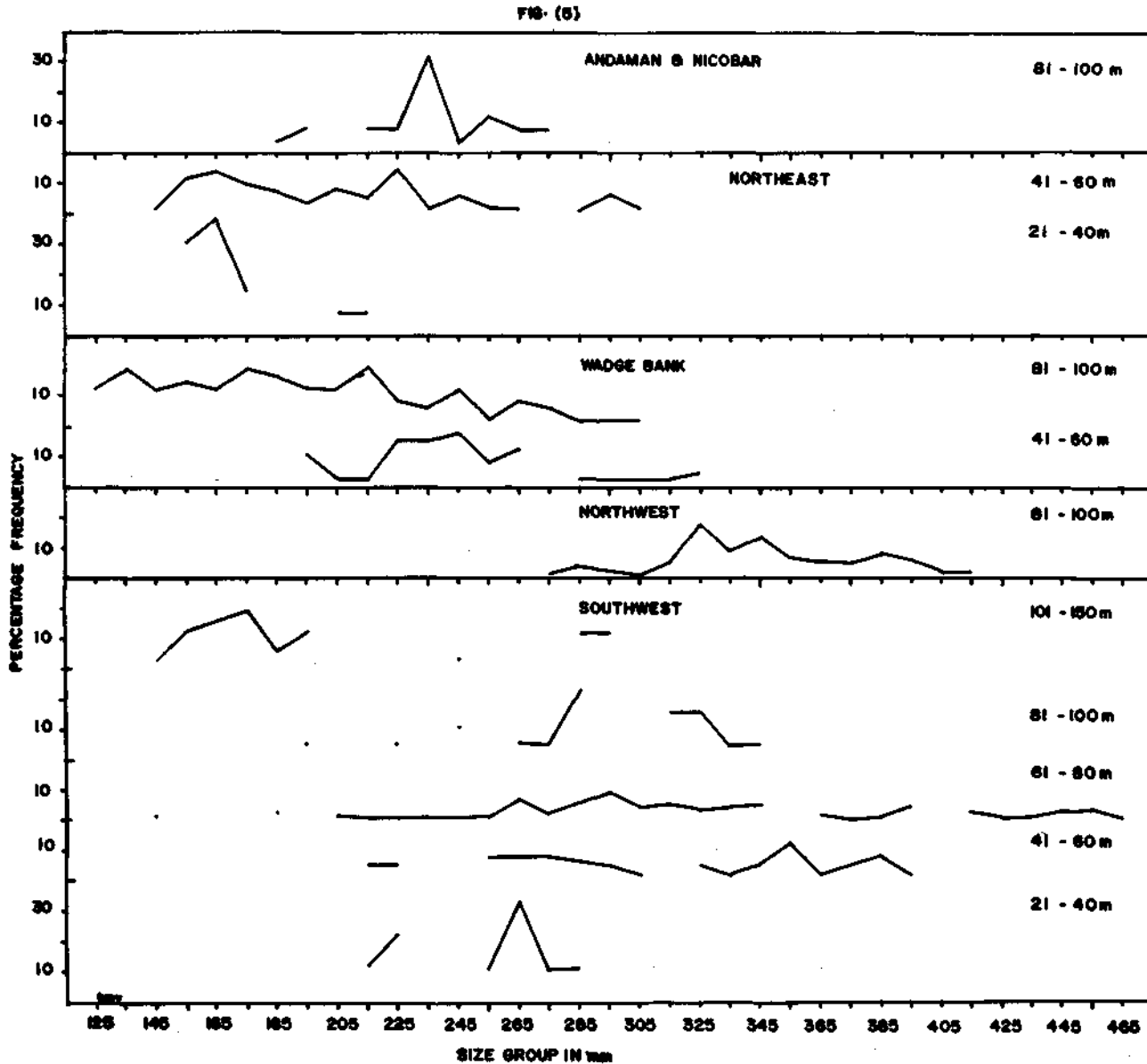


Fig. 5. Size frequency distribution of *S. tumbil* in percentage in different depth zones along the coasts of India.

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