RELATIVE ABUNDANCE OF SCIAENIDS ALONG ANDHRA-ORISSA COAST

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ABSTRACT

The distribution and relative abundance of sciaenids, a major constituent of the trawl fisheries of Andhra-Orissa coast, in space and time, are indicated.

INTRODUCTION

A variety of species of sciaenids are known to occur along the east and west coasts of India (Lal Mohan 1969) where these form one of the commonest of groups in the fish catches. From the west coast, Hefford (1949), Jayaraman *et al* (1959) and Rao (1965) have dealt with the distribution, relative abundance and catch trends of 'ghol' (*Pseudosciaena diacanthus*). Along the east coast, knowledge regarding the distribution and abundance of sciaenids is lacking. They contribute 10-15% of the total catches in the Government of India trawlers operated from Visakhapatnam. Studies on the distribution of sciaenids, occurring along the Andhra and Orissa coasts were taken up by the author and the present paper reports the results of investigations carried out on the basis of the data of M.T. Ashok during the period from 1964 to 1970 and of M.V. Champa during 1964-1971.

MATERIAL AND METHODS

The logs maintained by the skippers of the two trawlers, M.T. Ashok and M.V. Champa, were the main source from which the data required for the present investigations were drawn. The procedure of analysis was in all essentials similar to that followed by Krishnamoorti (1973). During the period 1964-70, M.T. Ashok made trawling operations over a vast area along the Andhra and Orissa coasts extending from Kakinada (16°40' N-84°40'E) in the south to False Point (20°20'N-86°40'E) in the north, while M.V. Champa fished in 17°40' and 18°10' latitude zones only. It may be mentioned here that M.T. Ashok did not operate during 1971 as it was decommissioned by then.

SPECIES COMPOSITION AND SIZE RANGE

The species occurring in the trawl catches are *Pseudosciaena aneus* Bloch, *Johnius carutta* (Bloch), *Pseudosciaena bleekeri* (Day), *Pseudosciaena axillaris*

TABLE 1. *The percentage composition of important species of sciaenids in total catches of 'all fishes' in different latitude zones of* M.T. Ashok *during the period* 1964-70 (*Figures in the brackets refer to the length range*).

	P. aneus J. carutta		Other sciaenids	*P. aneus J. carutta*		Other sciaenids	*P. aneus J. carutta*		Other sciaenids	*P. aneus J. carutta*		other sciaenids
	16°40'			17°10'			17°40'					
1964	—	—	—	0.1	0.001	—	9.6	1.2	1.3			
1965	17.6	—	0.6	6.2	5.5	10.8	5.1	0.06	0.5			
1966	8.8	—	0.7	10.9	—	1.3	5.7 (10.5-23.7)	1.2 (14.9-23.0)	2.5			
1967	—	—	—	—	—	—	5.9 (15.3-32.0)	3.2 (17.5-22.4)	3.0			
1968	—	—	—	—	—	—	8.6 (7.1-23.3)	2.7 (8.0-17.3)	3.1			
1969	—	—	—	—	—	—	8.3 (16.0-23.5)	7.4 (14.9-20.5)	9.3			
1970	—	—	—	—	—	—	4.9 (10.2-31.0)	2.2 (12.8-21.4)	3.7			
	18°10'			18°40'			19°10'					
1964	10.6	0.5	0.9	16.3	1.9	1.8	27.2	0.8	1.7			
1965	7.4	0.05	0.03	17.0	0.1	2.2	1.8	1.0	1.9			
1966	13.7	—	11.20	—	—	—	—	—	—			
1967	0.9	—	—	—	—	—	—	—	—			
1968	8.1	9.1	4.00	—	—	—	—	—	—			
1969	—	—	—	—	—	—	—	—	—			
1970	0.8	0.4	0.10	—	—	—	—	—	—			
	19°40'			20°10'			20°40'			21°10'		
1964	15.5	2.7	1.0	39.8	—	17.9	16.9	—	2.2	—	—	—
1965	0.9	0.2	0.2	0.9	4.1	2.4	2.6	—	2.7	3.1	—	6.8
1966	—	—	—	—	—	—	—	—	—	—	—	—
1967	—	—	—	—	—	—	—	—	—	—	—	—
1968	—	—	—	—	—	—	—	—	—	—	—	—
1969	—	—	—	—	—	—	—	—	—	—	—	—
1970	—	—	—	—	—	—	—	—	—	—	—	—

(Cuvier), *Pseudosciaena sina* (Cuvier), *Pseudosciaena diacanthus* (Lacepede), *Johnius maculata* Bloch and Schneider, *Sciaena dussumieri* (Valenciennes), and *Atrobucca nibe* (Jordon and Thompson). Out of these, *Pseudosciaena aneus* and *Johnius carutta* are the most important species in the trawl catches. The remaining species are included under 'other species' as they occur in lesser quantities. The percentage of important species in different zones are shown in Tables 1 and 2.

Specimens of *P. aneus* range in total length from 7.1 to 32.0 cm; *J. carutta* from 8.0 to 23.3 cm; *P. bleekeri*, 8.0 to 23.0 cm; *P. axillaris*, 7.1 to 16.0 cm; *O. ruber*, 10.0 to 22.0 cm; *O. argenteus*, 9.0 to 24.0 cm; *P. sina*, 15.2 to 85.0 cm; *P. diacanthus*, 11.2 to 120.0 cm; *J. maculatus*, 7.0 to 16.8 cm; *S. dussumieri*, 9.0 to 23.0 cm.

TABLE 2. *The percentage composition of important species of sciaenids in total catches of 'all fishes' in different latitude zones of* M.V. Champa *during the period* 1964-70.

	17°40'			18°10'			21°10'		
1964	10.3	1.7	2.6	5.7	1.8	2.4	—	—	—
1965	11.5	3.3	4.9	10.3	7.7	5.6	7.5	—	—
1966	6.4 (12.5-23.2)	1.7 (15.0-23.3)	2.4	6.1	0.002	0.0001	—	—	—
1967	5.2 (11.1-24.5)	2.4 (16.5-22.3)	3.4	—	—	—	—	—	—
1968	5.8 (11.0-25.0)	2.6 (9.7-11.8)	2.8	—	—	—	—	—	—
1969	6.5 (17.2-24.8)	2.1 (8.9-20.9)	3.3	8.1	16.2	—	—	—	—
1970	7.4 (11.7-22.5)	4.7 (16.7-20.5)	7.0	9.4	—	—	—	—	—

RELATIVE ABUNDANCE OF SCIAENIDS

M.T. Ashok (Table 3)

During the period 1964-70, annual total catches of sciaenids ranged from 3,320 kg (1965) to 27,282 kg (1964). In terms of catch rates, however, the year 1964 was most productive (37.53 kg|h). The lowest catch rate (8.15 kg|h) was realised in 1970. There was a steady increase in the catch rates from 9.02 kg|h (1965) to 33.54 kg|h (1969). During the year 1964, the catch rates varied from 1.04 (17°10') to 107.58 kg|h (19°10'). In 1965, a high catch rate of 85.33 kg|h was obtained from 16°40' latitude zone. In 1966, the catch

TABLE 3. *Total catches (y) and Catch per unit effort (y|g) of sciaenids during the period* 1964-70 *in the trawling operations of* M.T. Ashok.

Year	y	y|g
1964	27,282.8	37.53
1965	3,320.2	9.02
1966	8,860.3	10.39
1967	10,641.8	22.96
1968	9,125.8	23.56
1969	10,420.5	33.54
1970	4,953.8	8.15

rates ranged from 7.95 (17°40') to 18.67 kg|h (18°10'). In 1967, sciaenids were caught only from 17°40' zone because only this zone was fished during the year and the catch rate was found to be 22.96 kg|h. During the period 1968-70, the catch rate in 17°40' zone fluctuated from 8.25 to 33.74 kg|h and in the adjacent 18°10' zone, the values decreased from 37.50 kg|h to 7.17 kg|h.

TABLE 4. *Total catches (y) and catch per unit effort of sciaenids during the period* 1964-71 *in the trawling operations of* M.V. Champa.

Year	y	y|g
1964	6.471.08	14.91
1965	10,701.68	12.58
1966	6,642.51	8.44
1967	5,858.40	9.41
1968	7,397.19	11.39
1969	8,031.90	13.43
1970	3,923.20	10.44
1971	683.40	2.32

M.V. Champa

Though exploratory fishing was done by this vessel for a period from 1964 to 1971, the total sciaenid catches amounted to 49709.27 kg (Table 4). This might be due to fishing in limited zones, i.e., 17°40' and 18°10' only. The annual total catches ranged from 683 kg (1971) to 10,701 kg (1965). In terms of catch rates during the period 1964-66, there was decrease in the values from 14.91 to 8.44 kg|h and from 1967 to 1969, there was slight increase in catch rates from 9.41 to 13.43 kg|h. From 1970 to 1971 there was a fall in the catch rate from 10.44 to 2.31 kg|h. In 17°40' zone, during the period 1964-71, the catch-per-hour values fluctuated from 2.32 to 14.20 kg|h (1964). In 18°10' zone, the values ranged from 0.14 kg|h to 18.55 kg|h.

SEASONAL FLUCTUATIONS

M.T. Ashok: For the period 1964-70, the average monthly catch rates in different latitude zones are shown in Table 5. As suggested by Sekharan *et al* (1973), those latitude zones, where fishing was done more than six months in a year, are taken up for describing the seasonal trends of the catches. Thus in the year 1964, the 17°40' zone was characterised by two peaks of abundance during July (25.46 kg|h) and September (25.81 kg|h). In 1966 there were two peaks one in May (13.24 kg|h) and another in October (10.37 kg|h). During the years 1967 and 1968 peak catch rates were observed in July 1967 (72.82 kg|h) and August 1968 (66.25 kg|h) respectively. During 1969 and 1970 peak catch rates being noticed in May 1969 (90.88 kg|h) and July 1970 (16.39 kg|h).

In the 18°10' latitude zone, fishing was done only in 1964 for more than six months, and a peak catch rate was observed in February (50.04 kg|h). In the adjacent 18°40' latitude zone a peak catch rate was observed only in March (18.81 kg|h). In the 19°10' latitude zone good catches were realised during June-July, September and December and the peak catch rate was observed in September (249.4 kg|h). Thus it was generally observed that during the period of investigation usually sciaenids were abundant only during the period February-April; June-July and September-October.

M.V. Champa: M.V. Champa fished in 17°40' zone for more than six months in each year during the period 1964-1971 (Table 6) and in 18°10' zone only during the years 1964 and 1965. During the year 1964, in 17°40' zone a peak catch rate of 36.38 kg|h was realised in August. In 1965, a maximum catch rate of 25.15 kg|h was observed in July. During the year 1966, there were two peaks of abundance — a major peak in May (13.23 kg|h), a minor peak in October (12.20 kg|h) and in August 1968 highest catch rate of 21.91 kg|h was recorded; while in 1969 and 1970, the yield of sciaenids were generally good; a peak catch rate of 29.78 kg|h was realised in July 1969 and during 1970, a peak catch rate of 23.36 kg|h was observed in September. However, in 1971, the sciaenid catches showed a decrease and a peak catch rate was observed in August (5.92 kg|h). Thus it was generally observed that in 17°40' zone, sciaenids were usually abundant during the period July-September.

During 1964, in 18°10' latitude zone, a very high catch rate of 104.15 kg|h was obtained in October and the subsequent year, a peak rate of 47.37 kg|h was observed in November. In general it was noticed that good catches of sciaenids were obtained during the period April-June and October-November.

From the above results, it was seen that the average catch rates of sciaenids varied from zone to zone and also from year to year. In order to

TABLE 5. *Seasonal variations of catch-per-hour values of sciaenids in the catches of various latitude zones of M.T. Ashok during the years 1964-1970 (NF = No fishing).*

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average
16°40'													
1964				..... No fishing									
1965	—	—	—	18.10	—	—	—	—	—	—	—	—	18.10
1966	—	—	23.08	85.33	—	—	—	—	—	—	—	—	35.37
1967 to 1970				..... No fishing									
17°10'													
1964	NF	NF	1.70	NF	NF	—	NF	NF	NF	NF	NF	NF	1.04
1965	—	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	—
1966	NF	NF	17.31	25.56	NF	NF	7.94	NF	NF	NF	NF	NF	14.41
1967 to 1970				..... No fishing									
17°40'													
1964	NF	—	2.04	2.86	10.15	24.49	25.46	2.63	25.81	18.38	3.38	2.45	12.33
1965	1.25	31.25	NF	NF	2.27	NF	NF	NF	NF	NF	NF	0.15	5.45
1966	1.43	0.84	—	7.21	13.24	7.44	NF	NF	7.04	10.37	9.03	NF	7.95
1967	4.43	27.40	8.29	63.09	13.16	36.46	72.82	NF	NF	NF	NF	NF	22.96
1968	NF	NF	6.79	32.22	13.96	34.17	29.46	66.25	—	11.48	27.32	8.9	23.33
1969	—	—	6.00	—	90.48	88.88	2.08	22.38	18.82	9.84	—	—	33.74
1970	NF	13.70	3.69	0.33	8.13	15.17	16.39	10.92	14.67	7.94	9.12	1.70	8.25
18°10'													
1964	NF	—	16.58	5.48	24.90	12.38	NF	0.33	32.80	83.20	7.50	6.70	17.22
1965	—	50.04	4.06	NF	0.11	NF	NF	NF	NF	NF	NF	NF	9.98
1966	NF	—	14.02	52.26	NF	NF	NF	NF	NF	NF	NF	NF	18.67
1967				..... No fishing									
1968	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	65.8	37.50
1969	18.7	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	18.73
1970	NF	9.03	7.38	0.05	10.13	29.25	NF	NF	NF	NF	NF	NF	7.17

18°40'													
1964	NF	1.52	NF	NF	13.09	12.65	9.90	NF	67.39	56.49	2.00	NF	28.61
1965	NF	2.50	18.81	NF	1.50	NF	NF	NF	NF	NF	NF	NF	14.33
1966 to 1970	..... No fishing												
19°10'													
1964	NF	33.96	—	—	51.40	135.81	141.44	NF	249.4	44 10	34.17	177.8	107.58
1965	17.5	NF	6.05	NF	NF	NF	NF	NF	NF	NF	NF	NF	7.72
1966 to 1970	..... No fishing												
19°40'													
1964	—	2.91	NF	NF	NF	55.09	NF	NF	99.44	77.90	NF	11.96	58.42
1965	2.20	NF	1.68	NF	NF	NF	NF	NF	NF	NF	NF	NF	1.77
1966 to 1970	..... No fishing												
20°10'													
1964	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	192.85	192.85
1965	6.37	25.21	0.25	NF	NF	NF	NF	NF	NF	NF	NF	NF	6.86
1966 to 1970	..... No fishing												
20°40'													
1964	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	11.40	11.40
1965	2.61	1.00	9.17	NF	NF	NF	NF	NF	NF	NF	NF	—	4.20
1966 to 1970	..... No fishing												
21°10'													
1965	NF	94.75	10.49	NF	NF	NF	NF	NF	NF	NF	NF	NF	35.64

TABLE 6. *Seasonal variations of catch rates of sciaenids in the various latitude zones of* M.V. Champa *during the year* 1964-71.

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual average
17°40'													
1964	—	6.00	0.63	10.08	12.28	NF	18.49	36.38	14.41	12.59	NF	1.62	14.20
1965	NF	—	9.98	16.20	24.65	21.32	25.15	4.67	6.86	4.98	4.98	—	11.82
1966	2.73	2.87	NF	NF	13.23	11.60	7.94	11.54	7.01	12.20	4.59	8.32	8.46
1967	1.02	8.87	NF	7.97	7.15	19.48	19.94	9.26	6.77	12.89	9.62	NF	9.41
1968	NF	NF	6.03	10.39	3.86	14.35	19.28	21.91	6.14	8.90	4.61	14.25	11.39
1969	19.84	19.53	21.90	21.98	NF	NF	29.78	7.91	4.48	2.56	10.22	1.32	13.46
1970	1.96	13.15	12.56	NF	7.91	—	17.04	11.06	23.36	NF	NF	NF	10.57
1971	NF	—	—	—	3.84	2.53	2.76	5.92	0.57	2.90	—	0.28	2.32
18°10'													
1964	—	0.12	7.28	23.07	NF	NF	14.00	17.85	NF	104.15	NF	—	18.55
1965	NF	NF	2.58	17.56	37.80	24.08	NF	16.08	NF	9.76	47.37	0.32	17.71
1966	1.0	0.07	NF	NF	NF	NF	NF	16.54	NF	13.11	NF	0.66	7.95
1967	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	—
1968	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	—
1969	—	NF	NF	13.84	NF	NF	NF	NF	NF	NF	NF	NF	11.25
1970	0.35	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	NF	0.35
1971	No fishing.....												

evaluate the most productive latitude zone, the monthly catch rates obtained in each square of that latitude zone were classified into 7 groups at intervals of 5 kg|h. The results of such a study are shown in Tables 7 and 8. It was seen that during the year 1964, the number of squares that yielded more than 30 kg|h were obtained mainly from the 17°40', 18°10', 19°10', 19°40' latitude zones. Also it was evident that the percentage of squares which yielded more than 30 kg|h increased from south to north. In 1965, few squares in 21°10', 19°40' and 18°40' zones yielded good catch rates but in the year 1966, 16°40' and 17°10' zones yielded catch rate more than 25 kg|h. During the period 1967-70, fishing was done mainly in 17°10' and 17°40' zones and better catches, i.e., more than 30 kg|h was realised from the 17°40' zone.

Most fishing by M.V. Champa was confined to the 17°40' and 18°10' latitude zones and few squares have yielded catch rates more than 25 kg|h in both these latitude zones. It may however be concluded that most of the productive areas are located not far away from the shore though the sciaenids are known to occupy mid- and bottomwater habitats. Also, the most productive squares are located either along the northern latitude zones of 18°40', 19°10' and 19°40' or southern latitude zones of 17°10' and 17°40'. Champa also showed that comparatively better catches are realised from the 18°10' zone than from the 17°40' zone.

Discussion and Conclusion

From the results of the present investigations it is evident that the sciaenids are distributed all along the Andhra and Orissa coasts extending from Kakinada in the south to False Point in the north. Dealing with the abundance and distribution of the 'miscellaneous small groups of fishes', of which sciaenids contributed a major share, Sekharan *et al* (1973) have stated that comparatively better grounds are towards the north. From the studies on the magnitude of abundance based on the catch rates of M.T. Ashok and M.V. Champa, it appears that southern zones, mainly 17°40' and zones north of 19°40' are also good grounds for sciaenids.

During all the years of study, the catch rates for both the vessels were generally good during 1964-65, high during 1967-69 and poorest in 1970. The poorest catches during 1970 might be due to fishing in limited zones and poor fishing effort. Furthermore, peak months of abundance of sciaenids were generally between February-April; June-July and September-October. Rao (1965) stated that high yields of 'ghol' were associated with low and moderate bottom temperatures characteristic of Cutch, Dwaraka, Porbundar and Veraval regions. During the period of study as there were no data on bottom temperatures such a relationship could not be deduced.

TABLE 7. *Zone-wise distribution of number of squares that yielded various grades of catch rates of sciaenids by* M.T. Ashok.

Latitude zone	Number of squares with catch rates (kg/h) 0-5	6-10	10-15	16-20	20-25	26-30	Above 30	Total
1964								
17°10'	8	1	—	—	—	—	—	9
17°40'	7	7	4	—	—	—	9	27
18°10'	7	8	3	—	—	—	7	25
18°40'	4	2	1	1	1	4	13	26
19°10'	1	1	—	—	2	—	16	20
19°40'	1	1	2	—	—	—	13	17
20°10'	—	—	—	—	—	—	—	—
Total	28	20	11	1	3	4	58	125
1965								
17°40'	7	1	1	1	1	—	1	12
18°10'	5	2	1	1	—	—	2	11
18°40'	3	—	—	—	—	—	1	4
19°10'	2	—	2	1	—	—	—	5
19°40'	3	1	—	—	—	—	—	4
20°10'	—	2	1	—	—	—	1	4
20°40'	5	1	1	—	—	1	2	10
21°10'	2	2	—	1	—	—	—	5
Total	27	9	6	4	1	1	7	55
1966								
16°40'	—	—	—	—	—	—	1	1
17°10'	3	3	1	—	1	—	2	10
17°40'	9	11	1	1	1	—	1	24
18°10'	4	—	—	1	2	2	1	10
Total	16	14	2	2	4	2	5	45
1967								
17°40'	3	2	4	2	1	—	7	19
Total	3	2	4	2	1	—	7	19
1968								
17°40'	1	2	2	1	3	2	3	14
18°10'	—	—	—	—	—	—	2	2
Total	1	2	2	1	3	2	5	16
1969								
17°40'	2	4	1	3	11	1	2	24
Total	2	4	1	3	11	1	2	24
1970								
17°40'	8	12	4	4	3	3	—	34
18°10'	1	1	—	—	—	—	—	2
Total	9	13	4	4	3	3	—	36

TABLE 8. *Zone-wise distribution of number of squares that yielded various grades of catch rates of sciaenids by* M.V. Champa.

Latitude zone	Number of squares with catch rates (kg/h) 0-5	6-10	11-15	16-20	21-25	26-30	Above 30	Total
1964								
17°40'	14	6	10	5	5	2	4	46
18°10'	5	—	—	1	—	—	2	8
Total	19	6	10	6	5	2	6	54
1965								
17°40'	11	9	4	8	3	2	7	44
18°10'	3	—	1	2	—	—	2	8
Total	14	9	5	10	3	2	9	52
1966								
17°40'	11	13	7	1	—	—	1	33
18°10'	3	—	1	—	1	—	—	5
Total	14	13	8	1	1	—	1	38
1967								
17°40'	5	7	5	4	—	1	—	22
Total	5	7	5	4	—	1	—	22
1968								
17°40'	8	5	4	2	4	—	—	23
18°10'	7	3	5	3	1	3	2	24
Total	15	8	9	5	5	3	2	47
1969								
17°40'	7	3	5	3	1	3	2	24
18°10'	—	—	—	1	—	—	—	1
Total	7	3	5	4	1	3	2	25
1970								
17°40'	4	1	5	2	2	—	—	14
18°10'	2	—	—	—	—	—	—	2
Total	6	1	5	2	2	—	—	16
1971								
17°40'	10	1	—	—	—	—	—	11
Total	10	1	—	—	—	—	—	11

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