DIURNAL VARIATION IN THE CATCHES OF DEMERSAL FISHES IN THE NORTH WEST REGION OF BAY OF BENGAL DURING 1959-60

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ABSTRACT

During the period November 1959-October 1960, the Government of India trawler M. T. Ashok carried out exploratory trawling for demersal fishes, both during day and night, off the coasts of Andhra and Orissa between latitudes 17°-40' to 20°-10' N and in depths ranging from 5 to 64 metres. Six major groups of fishes viz., sharks and skates, rays, catfishes miscellaneous big and small fishes and prawns in the catches showed diurnal variations. The catches of sharks, skates, miscellaneous fish and catfish were heavier during the day than night, irrespective of the area of capture and depth. Prawns and rays, however, yielded better catches at night.

No definite trends could be seen in the seasonal variations of the above six groups in 17°-40' N and 18°-10' N latitude zones and also at two depth-ranges of 35-44 m and 45-54 m. Further, analysis was made of the seasonal variations of the six groups at two depth-ranges 35-44 m and 45-54 m, but no definite trends on their abundance could be discerned.

INTRODUCTION

The exploratory trawlers of the Government of India conducted extensive surveys for demersal fishery resources of the northern Andhra and Orissa coasts during 1959-60. Considerable seasonal and temporal variations in the quantitative and qualitative composition of the catch were observed in these surveys. Besides, variations were observed also in the day and night landings. This paper deals with the results of observations on the day and night variations in the catches of six important categories of fishes viz., sharks and skates, rays, catfish, 'miscellaneous-big' and 'miscellaneous-small' fishes and prawns. The abundance of these groups in terms of catch and catch per unit in different areas, depths and months is also presented.

MATERIALS AND METHODS

Apart from the observations made by C. M. F. R. Institute at Waltair on board the fishing trawlers M. T. Ashok, the trwal logs maintained by the skipper of the vessel were the chief source from which data required for the present investigations have been drawn. From the trawl-logs data, the

catches of six categories of fishes viz., sharks and skates, rays catfishes, prawns, 'miscellaneous-big and 'miscellaneous-small' fishes were available. Further, information on the area of operation, depth, duration of trawl (effort in hours) and other details were also obtained. The catch rate in kg per hour of trawling has been taken as the measure of abundance in the regions surveyed. All the catches obtained from 6 a.m. to 6 p.m. were treated as day catches and those obtained from 6 p.m. to 6 a.m. were treated as night catches. On occasions when fishing was continued beyond 6 in the evening or 6 in the morning, the catches of such hauls were suitably adjusted as to be well within the specified times.

RESULTS

Distribution and abundance of six categories of fishes in different latitude zones (Fig. 1)

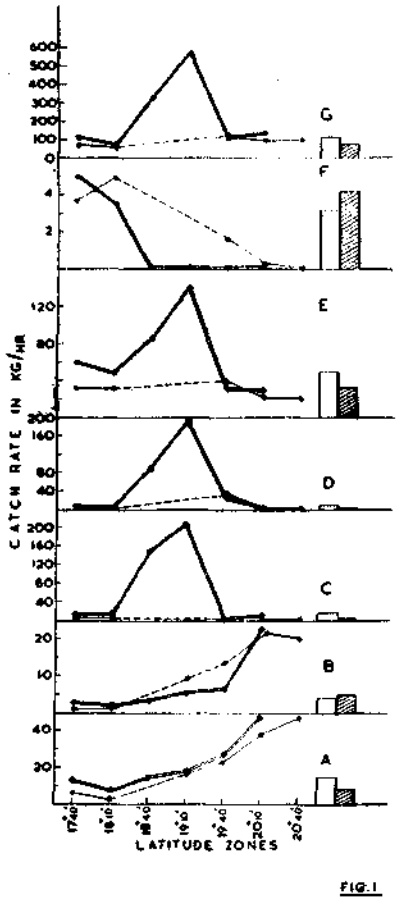

FIG. 1. Day (double line) and Night (single line) catch rates of the six groups of demersal fishes viz., Sharks and Skates (A) Rays (B) Cat fishes (C) Miscellaneous Big (D) Miscellaneous-Small (E) the Prawns (F) and 'All Fish' (G) in various latitude zones from 17°-40' to 20°-40'. Broken line indicates discontinuity in data.

Catches of sharks and skates increased from 18°-10' N to 20°-10' N zones during the day from 7.74 to 48.03 kg|h. Similar increasing trend could also be seen in the night catches from 19°-40' N to 20°-10' N zones as the values increased from 22.71 to 46.51 kg|h.

For the rays also, during the day there was an increasing trend, from 2.03 to 22.62, in catch-per-hour values from 17°-10' to 20°-10' zones. In the night catches also there was rise in the values from south to north from 1.04 to 22.43 kg|h.

Heavy catches of catfish were obtained from 18°-40' and 19°-10' zones (c.p.h. : 146.76 and 216.91 kg respectively) while in other areas, the values varied from 7.36 to 14.48 kg|h. Further it was noticed that there was a decrease in the catch rate from south to north.

Both miscellaneous big and small fishes showed a decreasing trend in the yield from 17°-40' N to 18°-10' N zones and in 18°-40' N and 19°-10' N zones high catch rates were noticed which was followed by abrupt fall in the values in subsequent zones.

For prawns it was observed that the yield during the night was better than the day and 17°-40' N, 18°-10' N were the productive zones. In other zones catches were very poor or nil.

Since fishing was done throughout the period from November, '59 to October, '60 only in 17°-40' N and 18°-10' N zones, studies on seasonal variations in the catch-per-hour values of different categories of fishes have been restricted to these two zones only.

Seasonal variation of different groups of fishes in 17°-40'N *zones* (Fig. 2)

For sharks and skates catch-per-hour values varied from 0.4 to 49.23 kg|h in respect of day, night or month.

For the rays, during the period July-October, the values for the day showed a increasing trend from 1.71 to 6.52 kg|h while in other months, the values fluctuated. Similar increasing trend from 1.28 to 6.52 kg|h was also observed on combining the day and night catches.

For the catfish the day as well as night catches fluctuated from month to month (2.36-63.73 kg|h) and it was observed that better catches were obtained during the day than in the night. March and April were the peak months for their abundance.

The catch per hour of miscellaneous-big and miscellaneous-small fishes varied from 1.1 to 29.3 kg|h and April and July were the peak months.

The catch per hour for miscellaneous-small fishes varied from 4.8 (March) to 132.6 kg (August) during day and 10.44 to 29.5 (December) during night. It was observed that day catches were better than the night catches.

No clear trend was noticed in the prawn catches.

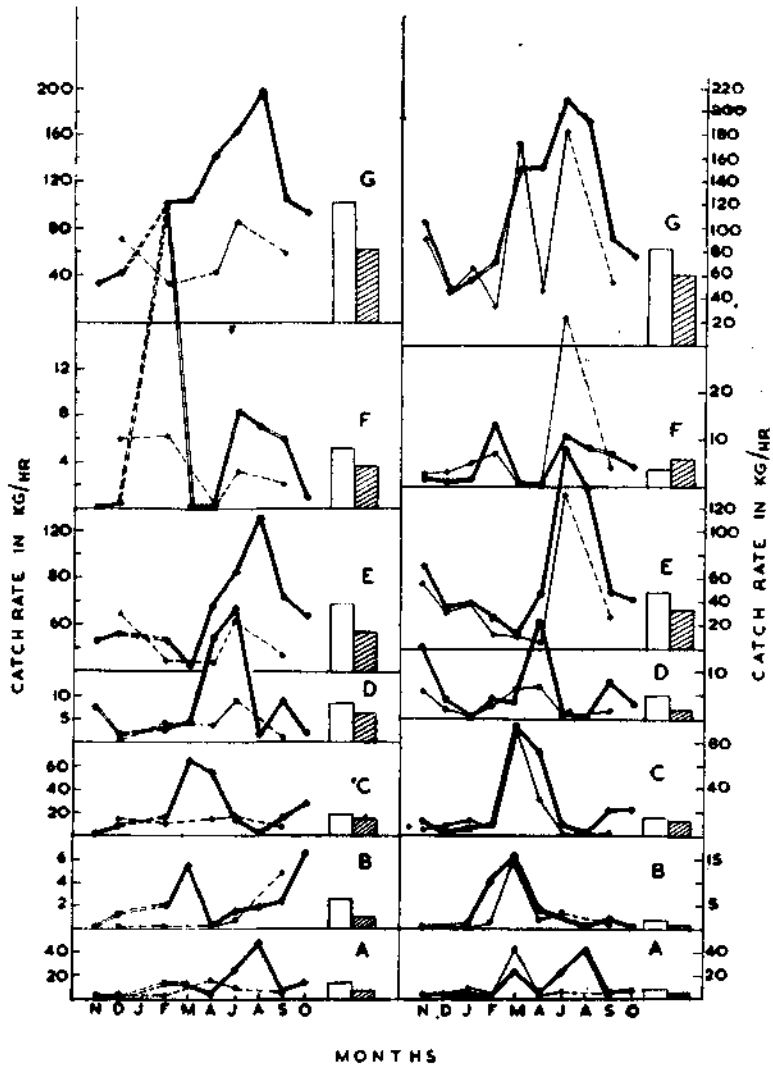

FIG. 2. Seasonal variations in the day (double line) and night (single line) catch rates of the six groups of fishes viz., Sharks & Skates (A) Rays (B) Cat fishes (C) Miscellaneous Big (D) Miscellaneous-Small (E) the Prawns (F) and 'All Fish' (G) during the different months in the latitude zones 17°-40' and 18°-10'. Broken line indicates dicontinuity in data.

Seasonal variation of different groups of fishes in 18°-10' *zone* (fig. 2)

For sharks and skates the catches varied during the day as well as in the night excepting in March, when the night catches were better than the day, for the remaining months better catches were obtained during the day and no seasonal trend could be seen. For rays, maximum catch per hour of 15.6 kg was obtained in March.

For catfishes maximum catches were noticed in March, better catches obtaining during the day than in the night.

April and July were the peak months for the abundance of miscellaneous-big and miscellaneous-small fishes. Further, day catches were better than the night catches and no seasonal trends could be observed.

Prawns were abundant during the day in February (13.69 kg|h) and for the night in July (35.9 kg|h) and it was observed that generally night catches were better than the day catches.

Distribution and abundance of different categories of fishes in various latitudes at different depths (Fig. 3-5)

Sharks and skates were abundant in 17°-40' and 18°-10' zones between 35-64 metres depth during the day and in the night maximum catches were obtained between 35-54 m depth (Fig. 3B). A comparison of diurnal variations in the catch values could not be made in 18°-40', 19°-10' and 19°-40' zones, since the fishing was done exclusively between 35-64 m depth either during the day or in the night. In 20°-10' zones, there was a decrease in the catch rate with increase in depth up to 44 metres, thereafter there was abrupt increase in the catch rate to 219.33 kg|h followed by another decrease.

For rays, fishing was done mainly between 35-64 m depth from 17°-40' zone and 18°-10' zone and day catches were better than night catches (Fig. 4B). Between 18°-10' N to 19°-40' N zones little or limited fishing was done. In 20°-10' zone, the catches of sharks, skates and rays varied in respect of depth, or the time of fishing. Similar observations were also made with reference to catfish, miscellaneous-big and miscellaneous-small fishes (Fig. 4A, 5A, 'B). For prawns it was observed that generally night fishing was better than the day fishing between 25-44 m depth (Fig. 5C).

Seasonal variation in the catch rates of different groups of fishes in 17°-40' N *and* 18°-10' N *zones at* 35-44 *and* 45-44 *m depth.*

It was seen that only in 35-44 and 45-44 m depth ranges, fishing was done in 17°-40' N and 18°-10' N zones throughout the year. Hence in order to know whether there were any seasonal trends in the catch rates of different groups of fishes further analysis was made.

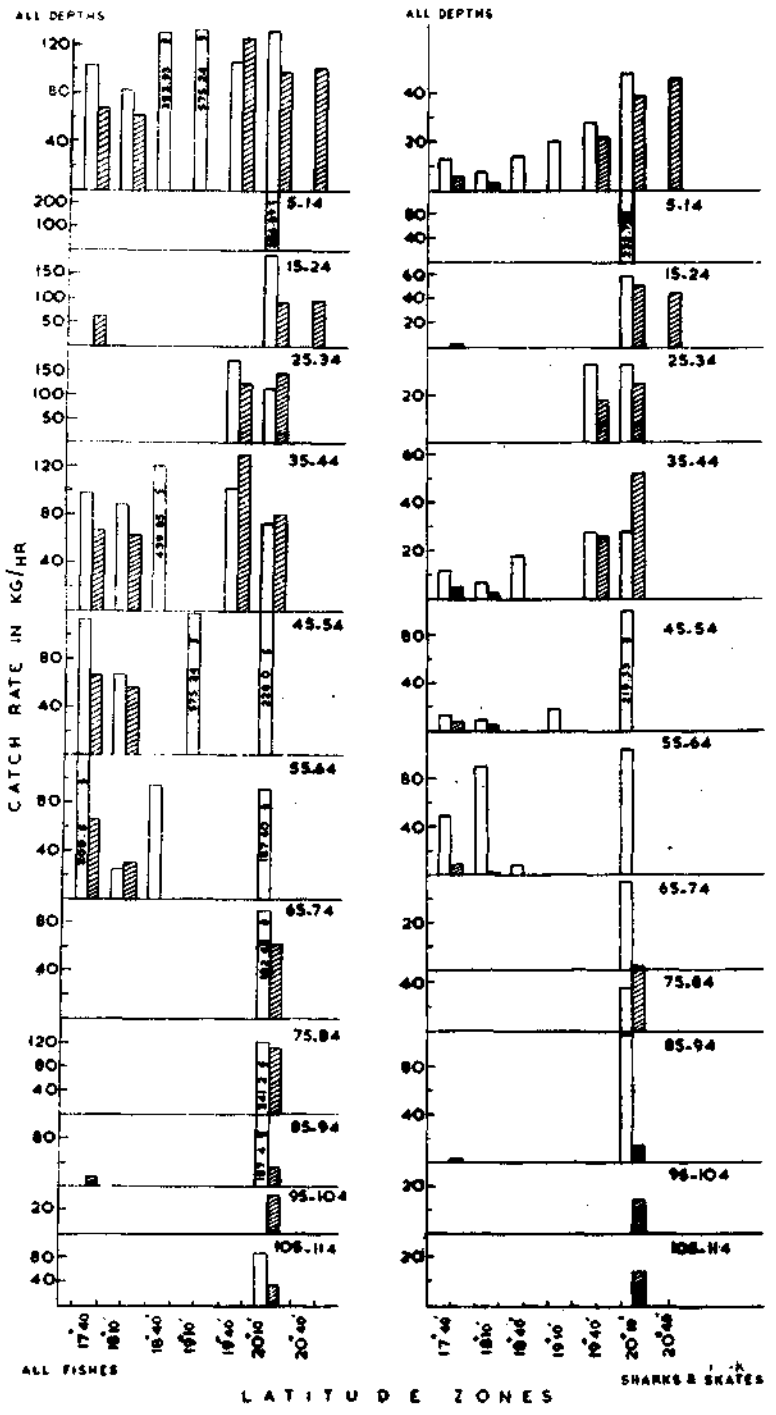

FIG. 3 Histogram to show day (unshaded) and night (shaded), catch rates of All Fish (A) Sharks and Skates (B) at various depths in different latitude zones.

Zone 17°-40' N

A. 35-44 *m depth* (*Fig.* 6)

At 35-44 metres depth range good catches of sharks and skates were obtained in August and for rays in March. For cat fishes and miscellaneous-big fishes, high catch rates were noticed in April. For miscellaneous-small fishes July-September was the peak period. Prawns were abundant in July both in day as well in night.

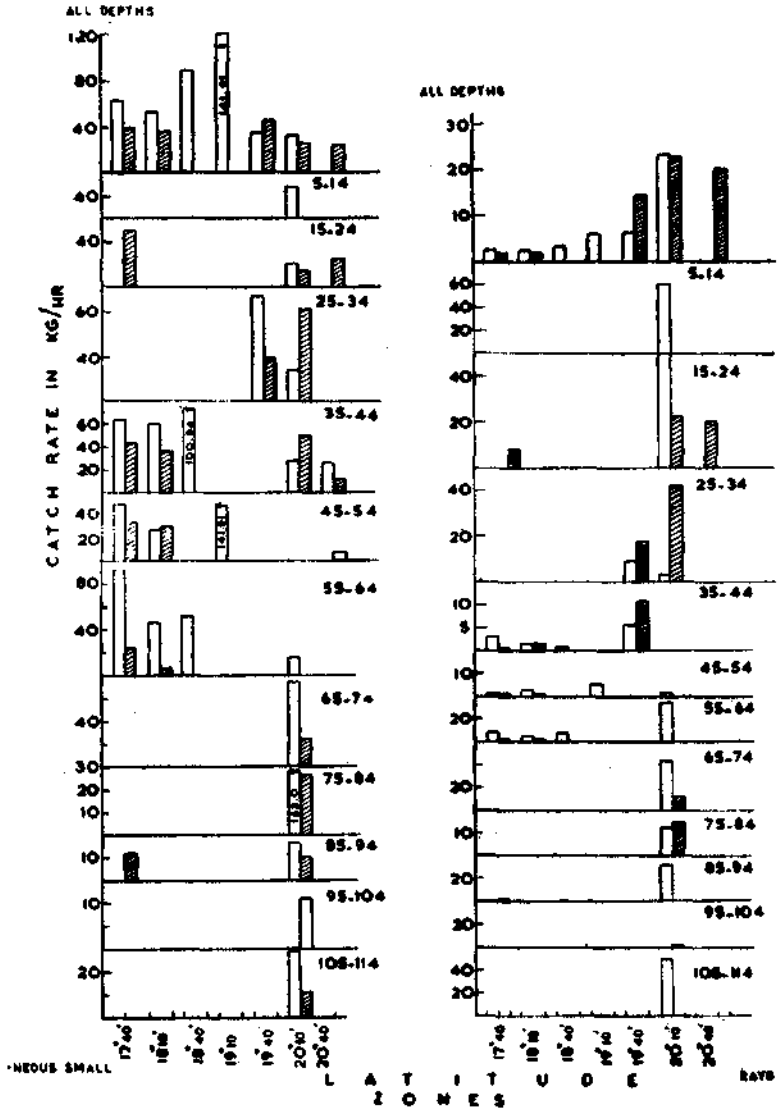

FIG. 4. Histogram to show Day (unshaded) and night (shaded) catch rates of Miscellaneous-Small (A) and Rays (B) at various depths in different latitude zones.

B. 45-54 *metres depth* (*Fig.* 7)

In this depth range catches were obtained during the period November-January. For sharks and skates peak catches were recorded in July and for rays in September-October. Maximum catches of catfish were recorded in July and

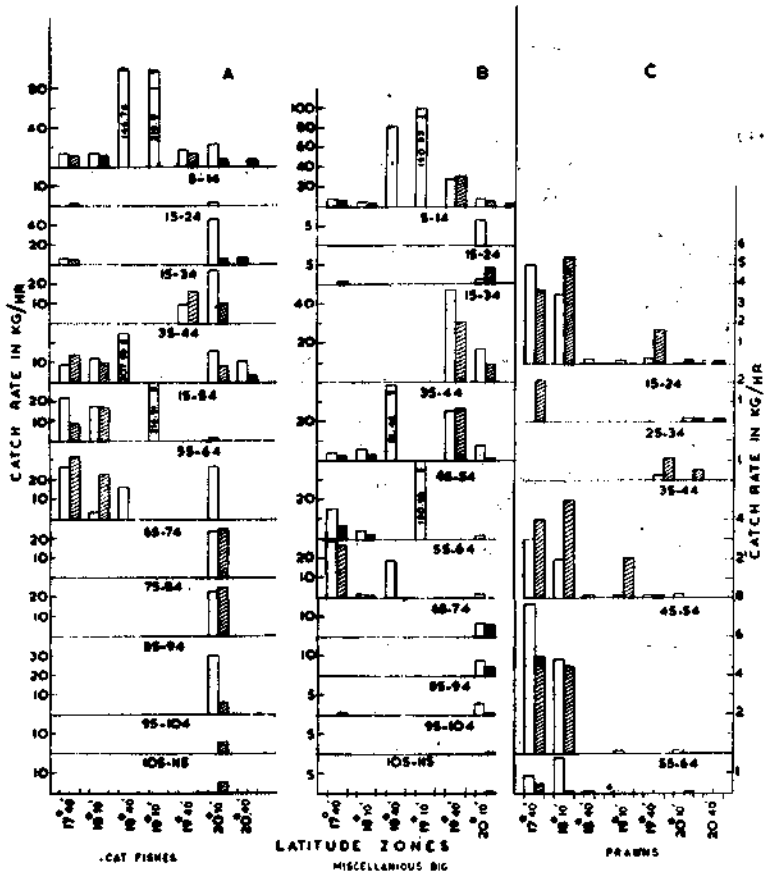

FIG. 5 Histogram to show Day (unshaded) and night (shaded) catch rates of Catfilhes (A) Miscellaneous Big (B) and prawns (C) at various depths in different latitude zones

October. For miscellaneous-big and miscellaneous-small fishes, peak season for abundance was July and August and for prawns, February was the peak month.

Zone 18°-10' N

A. 35-44 *metres depth* (*Fig.* 6)

At this depth range, for sharks and skates, rays and catfish March was the peak month. Miscellaneous-big fishes were abundant in April and miscellaneous-small in July. Good prawn catches were obtained during July-September and night catches were better than the day catches.

B. 45-54 *metres depth*: (*Fig.* 7)

For sharks and skates January and for rays February were the peak months of abundance. For the catfishes April and for miscellaneous-big fishes April and

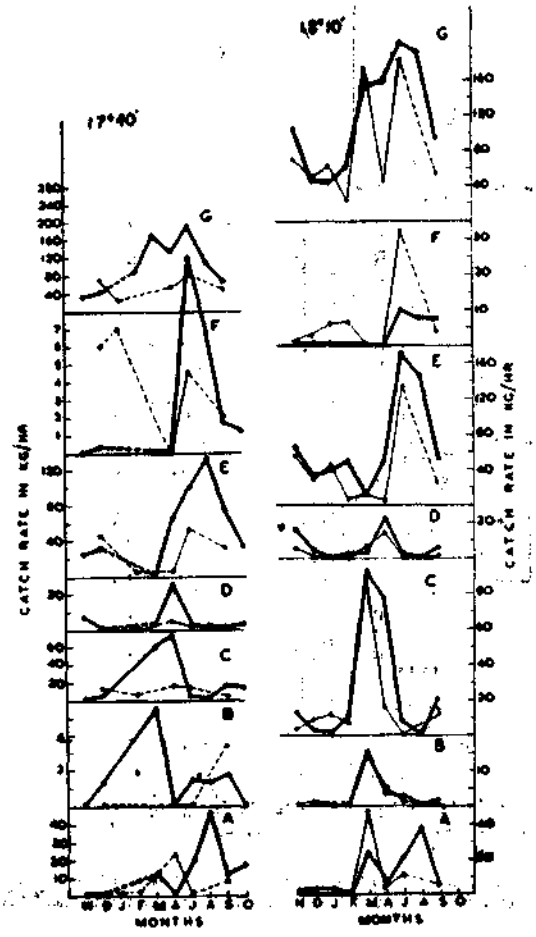

FIG. 6. Seasonal variations in the Day (double line) and Night (single line) catch rates of the six groups of fishes viz., Sharks & Skates (A) Rays (B) Catfishes (C) Miscellaneous Big (D) Miscellaneous-Small (E) Prawns (F) and 'All Fish' (G) during the different months at a depth of 35-44 metres in 17°-40' and 18°-10' latitude zones. Broken line indicates discontinuity in data.

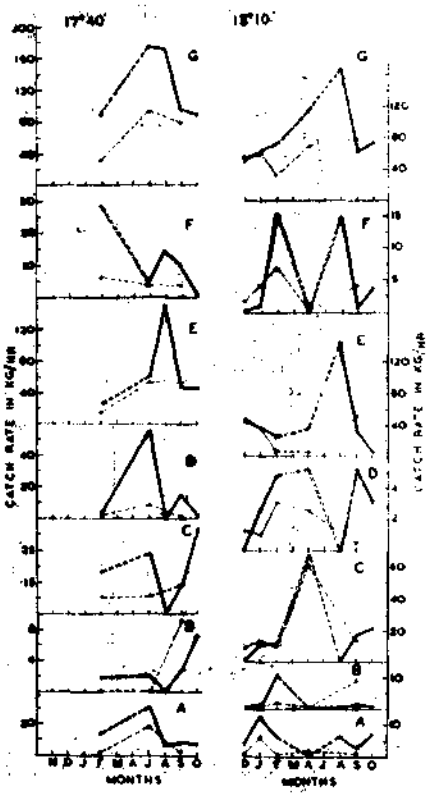

FIG. 7. Seasonal variations in the Day (double line) and Night (single line) catch rates of the six groups of fishes viz., Sharks and Skates (A) Rays (B) Catfishes (C) Miscellaneous Big (D) Miscellaneous-Small (E) the Prawns (F) and 'All Fish' (G) during the different months at a depth of 45-54 metres in 17°-40' and 18°-10' latitude zones. Broken line indicates discontinuity in data.

September were the months when maximum catches were obtained. For miscellaneous-small fishes good catches were realised during the period July-August. Maximum catches of prawns were realised in March or in July.

Conclusion

Sharks and skates showed a gradual increasing trend from south to north, the day catches were better than the night catches. The catches for rays too increased from south to north but with better night catches than the day catches. 20°-10' N zone yielded the highest catch rate for rays. Prawn landings were high in 18°-10' N, 19°-40' N and 20°-10' N zones with nil catches further north, and further, prawn landings were better during the night. Catfish catches were better during day, with high yields from 18°-40' N, 19°-10' N. The yield of miscellaneous fishes decreased from south to north.

No definite seasonal trends could be seen in the abundance of different categories of fishes since the peak catch rates varied from zone to zone and month to month.

The fishing, by and large, was concentrated in 35-54 m depth range. The optimum depth ranges for various groups varied from area to area and month to month and hence no clear trend could be discerned.

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