

DISTRIBUTION OF PHYTOPLANKTON IN THE ARABIAN SEA BETWEEN CAPE COMORIN AND COCHIN

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ABSTRACT

The phytoplankton samples collected from the continental shelf and offshore waters of the region between Cape Comorin and Cochin during the cruises of *R. V. Varuna* in 1964-65 were studied by displacement volume and dryweight methods, and the values were represented by isolines to find out the relative abundance of the phytoplankton in the different regions in the different months. Phytoplankton was found to be abundant in the months of May and June in the areas between 8°—10° N and 75°—77° E in terms of displacement volume and dry weight. The estimated values for this region are higher than those values obtained for areas like the English Channel and Gulf of Maine at the height of bloom there.

Quantitative studies on the phytoplankton were made for a period of eight months during 1964-65 in the continental shelf and offshore waters of the region between Cape Comorin and Cochin (7°—10° N and 75°—78° E). The results are discussed here, with reference to the relative abundance of phytoplankton in different areas.

METHODS

Samples were collected during the cruises of *R. V. Varuna*, between Cape Comorin in the south and Cochin in the north. The location of the stations of sampling varied from month to month. The data relate to eight cruises covering 262 stations. For a regional comparison of biomass it was necessary to use estimated values obtained from contour diagrams. Samples were obtained by vertical hauls using a half-metre bolting silk net, from a maximum depth of 200 metres to surface. The methods employed for collection and analysis of the phytoplankton are same as those of Subrahmanyam (1959). The abundance of the phytoplankton was expressed in terms of displacement volume and dry weight per square metre area at each station.

The displacement volume was taken for the whole sample, whereas the dry weight was obtained for an aliquot sample of 50 ml and multiplied by five to get the value for the standard sample of 250 ml.

These values of the displacement volume and dry weight of the samples per m^2 were plotted on the charts (Figs 1-4) and isolines were drawn to illustrate the relative abundance of phytoplankton in different sections.

RESULTS

Monthly variation in the displacement volume (Figs. 1 and 2)

During September 1964 the values were found to be high in the shelf region between Quilon and Colachel. In October 1964, the values were high in the shelf

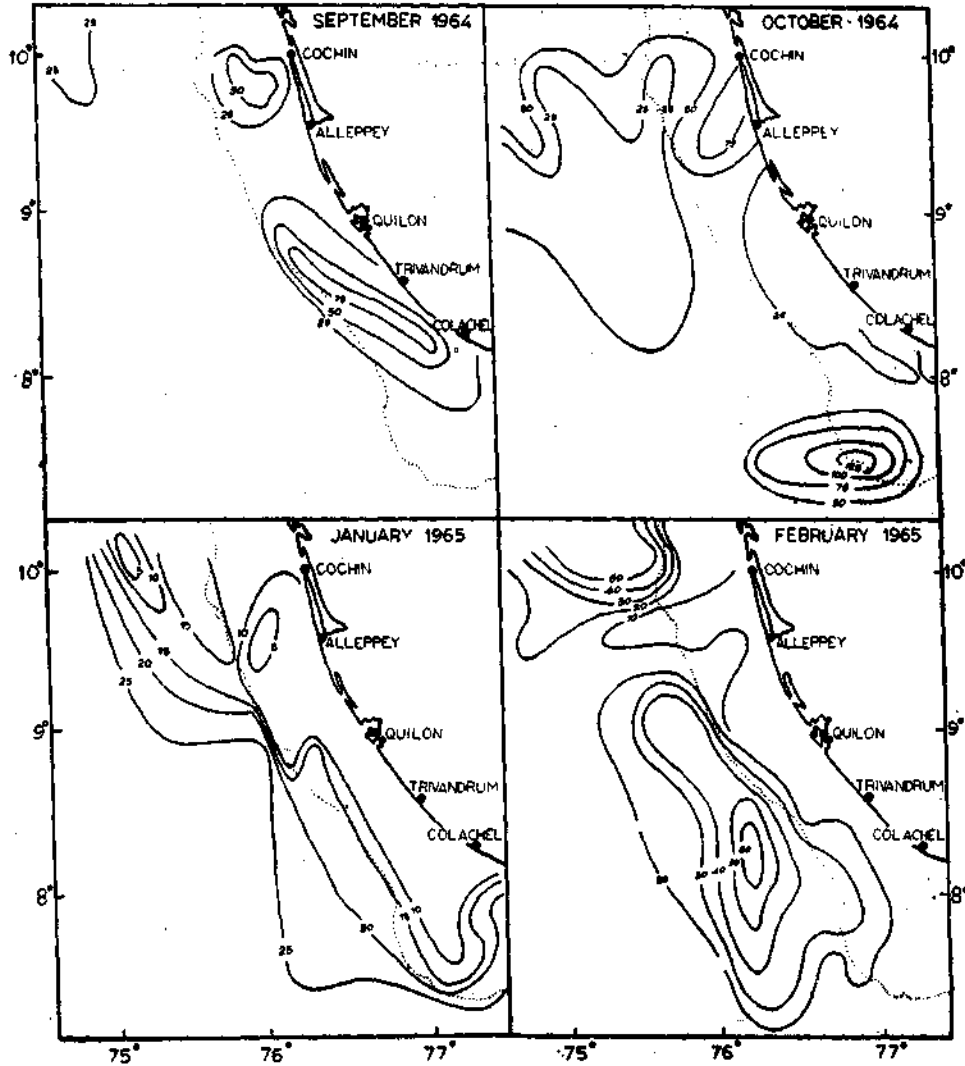


FIG. 1. Distribution of phytoplankton (displacement volume ml/m^2) for the months of September and October 1964, January and February 1965. (In Figs 1-4 the isoline interval is 5 for January 1965, 10 for February, March and October 1965 and 25 for the rest of the months).

region off Alleppey and on the edge of the continental shelf off Cape Comorin. In January 1965, high values were obtained in the offshore waters of all sections, whereas in February 1965 high values occurred just outside the shelf in the sections off Cochin and Colachel. In March 1965 also the displacement volume was high just outside the shelf region all along the coast.

During May 1965 high values were obtained in the offshore waters, between Quilon and Colachel, whereas in June 1965, the displacement volume was greater in the shelf region off Cape Comorin and along the shelf edge and offshore waters

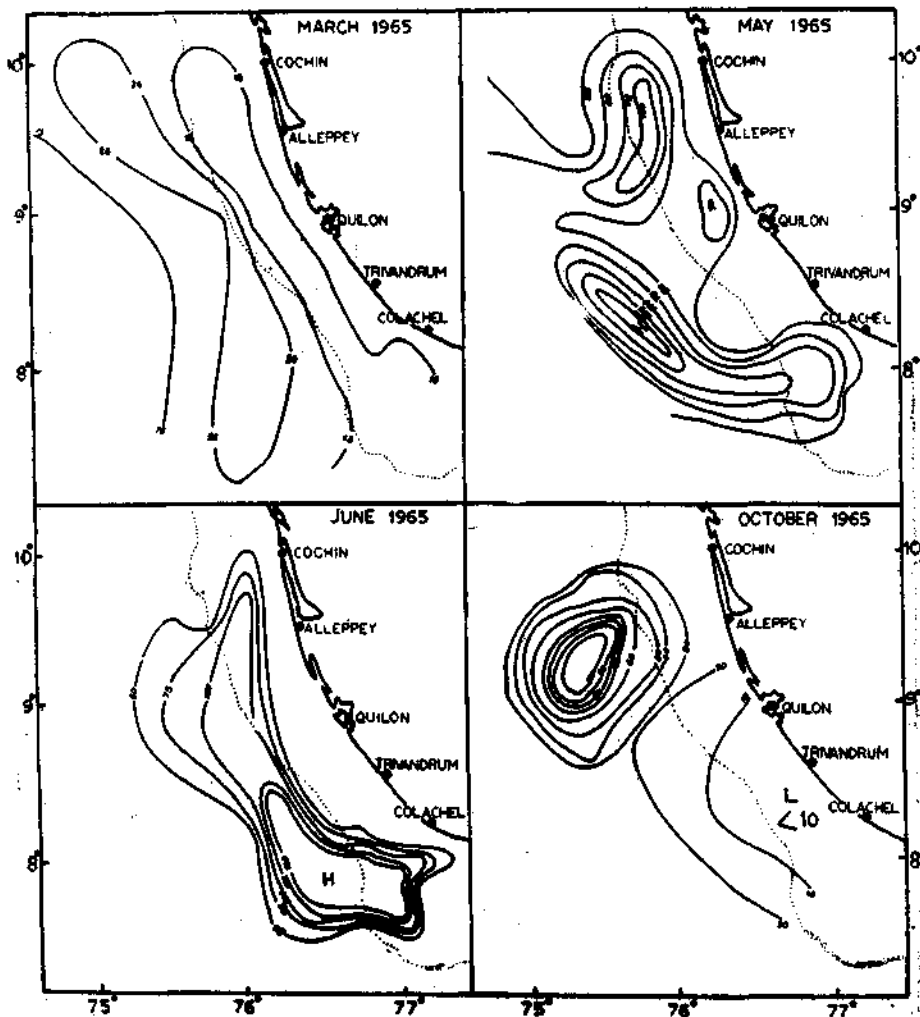


FIG. 2. Distribution of phytoplankton (displacement volume ml/m^2) for the months of March, May, June and October, 1965.

between Colachel and Cape Comorin. In October 1965 high values of displacement volume were noticed in the offshore waters between Alleppey and Quilon.

The values showed that phytoplankton was in abundance along the Colachel-Cape Comorin sections in almost all the months. Maximum values of phytoplankton were found in the monsoon months (May and June).

Monthly variation in the dry weight of the plankton (Figs. 3 and 4)

During September 1964 dry weight values for plankton were found to be higher on the continental shelf off Alleppey, Quilon and Colachel, and just outside the

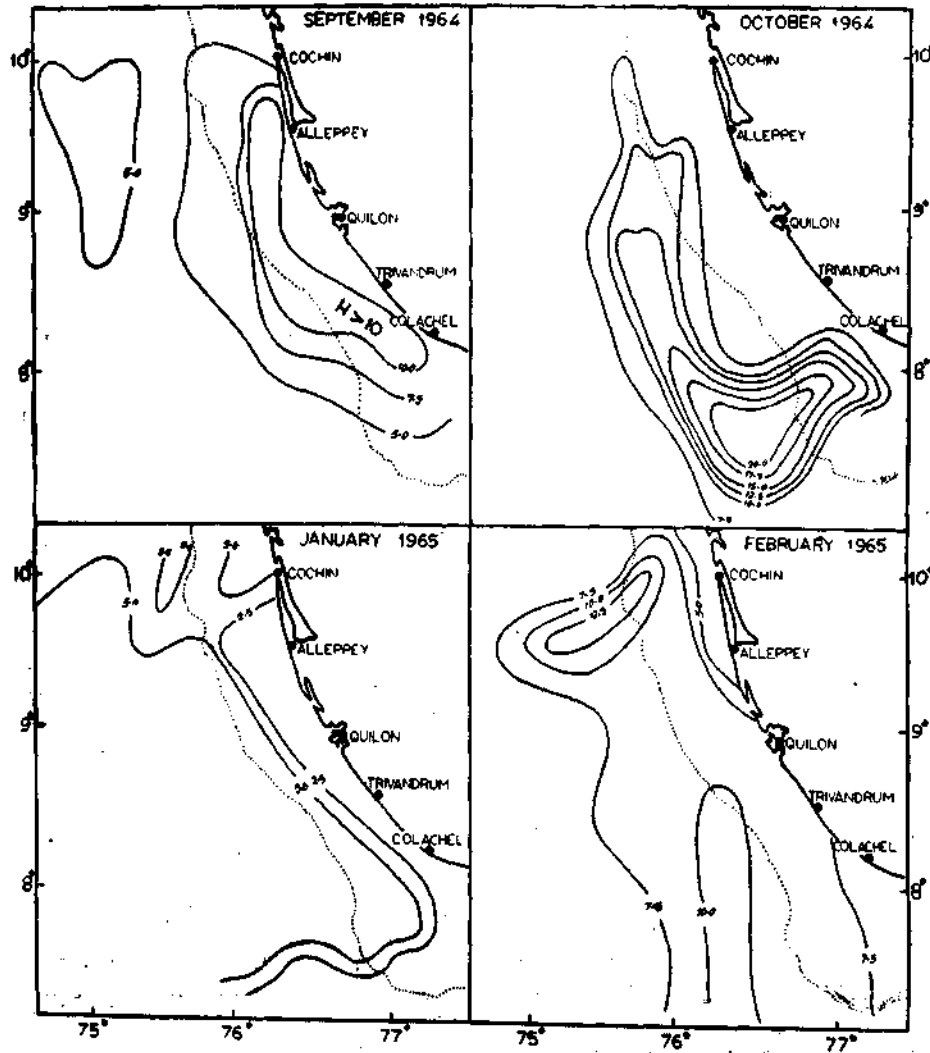


FIG. 3. Distribution of phytoplankton (dry weight g/m^2) for the months of September, and October 1964, January and February 1965.

shelf also, between Quilon and Colachel, than elsewhere; in October 1964 the high values were recorded on the edge of the continental shelf and in the offshore waters between Colachel and Cape Comorin.

In January 1965 higher values of dry weight were found in the shelf between Alleppey and Cape Comorin and in the offshore waters off Cochin and Cape Comorin than elsewhere. In February 1965 the high values were found along the Cochin section and extended into the offshore waters, between Cochin and Alleppey. In

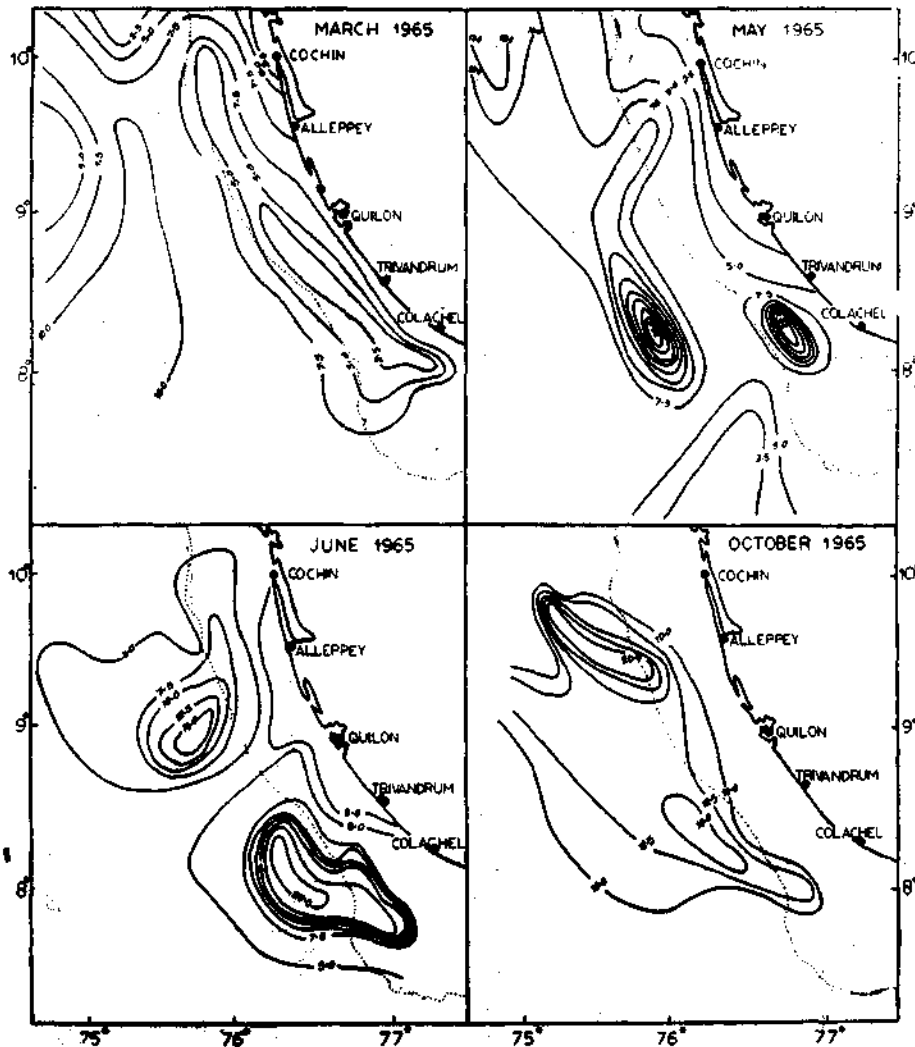


FIG. 4. Distribution of phytoplankton (dry weight g/m^2) for the months of March, May, June and October 1965.

March 1965 the high values were found in the offshore waters off Alleppey, Quilon and Colachel and in May and June 1965 also the high values of dry weight were recorded from the offshore waters, off Colachel and between Colachel and Cape Comorin respectively. In October 1965 the high values were noticed along the shelf, nearer to the shelf edge and also extended into the offshore waters off Alleppey.

Variations in the phytoplankton abundance during different months (Table 1)

As the collections were from almost the same region every month, it was possible to judge if there were any seasonal fluctuations in the phytoplankton abundance. For this purpose the stations between latitudes 7° and 8°, 8° and 9° and 9° and 10°N along longitude 76° E were selected and the maximum values noted for each month. It was observed that in May the values for displacement volume as well as for dry weight were high in the region between 8° and 9° latitudes and in other months the values showed slight fluctuations here and there with no regular pattern.

DISCUSSION

Earlier studies on the phytoplankton of the west and east coasts of India have been reviewed by Subrahmanyam (1959, 1960). Most of the accounts deal with the

TABLE 1. *Displacement volume in ml/m² and dry weight in g/m²*

Month and year	Longitude° E	Latitude° N	Displacement weight	Dry volume
September 1964	76	7- 8	—	—
		8- 9	—	5.0
		9-10	50.0	7.5
October 1964	76	7- 8	—	15.0
		8- 9	—	15.0
		9-10	75.0	10.0
January 1965	76	7- 8	—	5.0
		8- 9	25.0	—
		9-10	10.0	5.0
February 1965	76	7- 8	30.0	—
		8- 9	40.0	—
		9-10	10.0	—
March 1965	76	7- 8	25.0	—
		8- 9	—	7.5
		9-10	25.0	7.5
May 1965	76	7- 8	100.0	5.0
		8- 9	150.0	20.0
		9-10	50.0	7.5
June 1965	76	7- 8	—	5.0
		8- 9	100.0	5.0
		9-10	100.0	7.5
October 1965	76	7- 8	—	10.0
		8- 9	20.0	15.0
		9-10	30.0	12.5

nearshore waters and indicate that the peak of production of phytoplankton is during the south-west monsoon months because of the favourable conditions which prevail during these months.

For offshore and oceanic waters there were no data until the International Indian Ocean Expedition began. The results available for the two monsoons indicate that a higher production occurs during the south-west monsoon and the production is low during the north-east monsoon (Bogorov and Vinogradov, 1961; Kabanova, 1961, 1964; Sukhanova, 1962; Zernova, 1962 and Zernova and Ivanov, 1964).

In the present investigation the highest values recorded for displacement volume and dry weight for the months are listed below.

Month	Displacement volume ml/m ²	Dry weight g/m ²
September 1964	75.0	12.5
October	125.0	20.0
January 1965	30.0	12.5
February	140.0	20.0
March	28.5	10.0
May	150.0	26.5
June	165.0	21.2
October	103.5	22.5

As can be seen from the above values the highest volume obtained for this region is during May and June. The estimated values seem to be higher than those recorded by Harvey (1945) for the English Channel and Riley (1941) for the Gulf of Maine.

ACKNOWLEDGEMENTS

My sincere thanks are due to Dr. R. Subrahmanyam for his keen interest in these investigations. My thanks are also due to Mr. G.S. Sharma and Mr. J.J. Joel for their help.

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