

ABSTRACT

A comparative study was made of the phytosociology of mangrove vegetation and physicochemistry of forty-three water-bodies selected along the coast from Palatupana in the southeastern arid-zone to Puttalam in the northwestern arid-zone of Sri Lanka with the major emphasis on the three lagoons at Rekawa, Kalametiya and Lunama. The floristic data were statistically analysed by Indicator Species Analysis (ISA) for classification and Reciprocal Averaging (RA) for ordination.

The coast covered all the climatic-zones and most of the major soil-types of the lowland of Sri Lanka. The multivariate analyses of the floristic data from the extensive survey of the forty-three mangrove communities revealed that most vegetational diversity is related to climate with differences in salinity and shallowness of the water-bodies being responsible partly for the heterogeneity between the major communities.

The three lagoons at Rekawa, Kalametiya and Lunama differed geomorphologically, hydrologically, hydrographically and physicochemically. At Rekawa both influx and efflux of seawater as well as freshwater occur through the same canal, while the Kalametiya lagoon is almost a running water-body because the inland irrigation waters flow continuously through it into the sea; the Lunama lagoon remains almost stagnant, has no connection

III

with the sea and receives water from the Kalametiya lagoon via a canal. The physiochemical parameters investigated were salinity, alkalinity, pH, dissolved oxygen content, reactive soluble phosphate and suspended matter, all of which exhibited marked seasonal variations in all the three lagoons; so was the diurnal variations in salinity, temperature and pH while their spatial heterogeneity was highest at Rekawa and lowest at Lunama.

The mangrove vegetation was most extensive and luxuriant with the highest species-richness and floristic zonation at Rekawa and least at Lunama while that at Kalametiya being somewhat interemediate. As evident from the multivariate results, the vegetational differences between the three mangrove complexes were associated with differences in salinity and the status of potassium and sodium; the floristic heterogeneity within each mangrove complex was also related to the differential influence of salinity which was further found to create edaphic, particularly cation, gradients so causing floristic zonation from the water's edge at the lagoon to the high-lying ground.

The floristic data from the monthly samples of phytoplanktons of the three lagoons were also analysed for ISA classification and RA ordination; this is probably the first such treatment of phytoplankton data. According to the results the maximum phytoplankton differences between the three lagoons are related to salinity and the monthly

fluctuations within individual lagoons are associated with variations in salinity, rainfall, total suspended matter and nutrients such as phosphate. Diatoms are predominant at Rekawa and blue green algae at Lunama with Kalametiya sharing both groups; the Importance Value Indices confirmed this observed predominance.

A brief study was also made of the phytoplankton productivity of the three lagoons. Both the overall productivity and that of the individual species exhibited considerable monthly fluctuations in association with variations in salinity, total suspended matter and rainfall.

The results are discussed with major emphasis on the edaphic, physicochemical and hydrological control of the variations of mangrove and phytoplankton flora of the three lagoons at Rekawa, Kalametiya and Lunama.