

**FLORISTIC COMPOSITION, STRUCTURE AND
DISTRIBUTION PATTERNS OF COASTAL DUNE
VEGETATION: A CASE STUDY OF COASTAL DUNES
BETWEEN MALINDI AND MAMBRUI**

By

WINFRED MWONGELI MUSILA

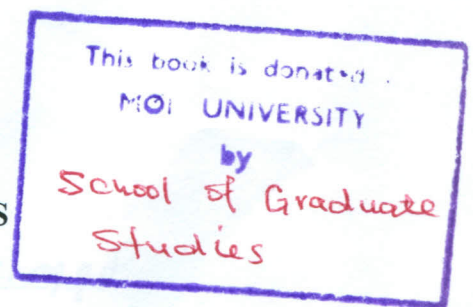
BSc. Hons. (Botany and Zoology) Egerton.

A Thesis Submitted to School of Graduate Studies in Partial Fulfilment of the
Requirement for the Degree of Master of Philosophy in Environmental Studies
(*Environmental Biological Sciences Division*)

SCHOOL OF ENVIRONMENTAL STUDIES

MOI UNIVERSITY

SEPTEMBER, 1998



ABSTRACT

The coastal sand dunes border the Indian ocean in Kilifi District between Malindi and Mamburui town. This study describes the composition, structure and distribution of the dune vegetation. Possible edaphic factors which may affect the distribution of the vegetation were also investigated. The area was studied by airphoto interpretation, field sampling and laboratory analysis. With the help of these techniques ten geomorphological units were distinguished namely; the beach face, beach berm, unridged dune platform, transgressive dunes 1,2 and 3, incipient foredune ridges, primary and secondary slacks, drowned valley, fossil foredune ridges, retention ridge and undulating dunes and dune ridges of the former Sabaki estuary.

A plant checklist was consisting of 156 plant species was compiled. Sixty families were recorded with Gramineae (17 species) and Papilionaceae (16 species) being the most represented. 15 plant communities were described in the different geomorphological units. A distinct zonal distribution of the plant communities was found.

A TWINSPAN analysis grouped geomorphological units of similar localities, mainly on the basis of their species composition. The *Halopyrum mucronatum* and *Ipomoea pes-caprae* communities were common in the beach berm, unridged dune platform, transgressive dunes 1 and 2. These geomorphological units occur near the sea where the sand is quite unstable. The *Cordia somaliensis* and *Pluchea discoridis* communities were common in the more stable geomorphological units including transgressive dune 3, incipient foredune ridges and fossil foredune ridges. Most of the plants in the more stable geomorphological units were shrubs and trees. Succulent herbs were identified in the slacks and the drowned valley which have moist and damp environments.

ANOVA analysis showed that there were significant variations in the soil parameters in different geomorphological units. Stepwise regression was used to investigate vegetation-soil relationships. Mean particle size of the sand was the most important factor influencing the vegetation composition, structure and distribution. Other important research studies are proposed to help in the proper management of these dunes. It is recommended that the dunes should be preserved for nature conservation and prosperity of this area.