

SOME STUDIES ON THE ECOLOGY AND PRODUCTIVITY OF
DRY PATNAS OF THE UVA BASIN, SRI LANKA

By

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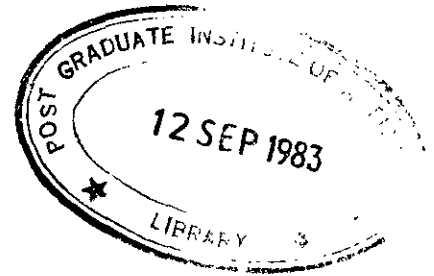
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ABSTRACT

A major vegetation survey of the Uva-basin has been carried out using multivariate methods. The normal and inverse classification of the dry patanas by association analysis of the percentage shoot frequency data collected from fifty stands distributed on seventeen hills identified five major community level groups. The stands in each group showed a similar geographical aspect, but stands on the same hill did not necessarily fall into the same category. These results were confirmed by the ordination by reciprocal averaging. The projection of environmental factors on stand ordination indicated the major groups to be associated with the moist eastern and dry western aspects as well as other factors connected with soil moisture retention. Soil chemical properties did not vary significantly between stands to influence the grouping. The four major species groups suggested various degrees of adaptation to the prevailing climate.

Similar studies in a representative community suggested that inter-stand variability was mainly influenced by various degrees of human interference such as building and road construction, occasional fires and any factors affecting the soil moisture status.

The analysis of pattern using the standardized variance and the detection of association using covariance and correlation coefficient analyses were carried out in eight sites located around

Bandarawela, *Arundinella villosa*, *Chrysopogon zeylanicus*, *Fimbristylis nigrobrunnea* and *Ischaemum indicum* showed two to three scales of pattern. Generally, the primary scale of pattern was related to the morphology of the species, and subsequent scales were due to complex environmental factors such as the microtopography and degrees of biotic and andropogenic interference. At small scales of pattern, all species were mutually exclusive, but they were positively associated at larger scales indicating different true optima but similar habitat preferences.

Dry patana productivity was found to vary with fluctuations in macro-climatic factors. Floristic composition and individual species productivity were higher in the wet north-east monsoonal period and lowest in the south-west monsoonal season when the majority of ephemerals died out. Productivity which was low by world standards, also varied with degree, frequency and time of vegetation removal either by clipping or firing. Higher rates resulted in a prostrate physiognomy of the plants. Results suggested that productivity was influenced by factors affecting tiller formation of main species. The exemplary cyclic vegetational changes in the clump-maturation of *Chrysopogon zeylanicus* indicated a climax stage of development. Full insolation was found to result in lower over-all canopy cover and productivity, but side effects such as an increase in the evapotranspiration of fully exposed plants were responsible for the low levels of production.

Pot experiments on interference amongst species growing in close proximity indicated a clear advantage of rapidly tillering species such as *Arundinella villosa*. Though the maximum number of tillers per pot appeared to be regulated by inherent mechanisms, there were indications that the rate of tiller formation could be controlled by extrinsic factors such as the initial planting density. In all cases, however, *Arundinella villosa* and *Chrysopogon zeylanicus* were more aggressive than *Eulalia phaeothrix* and the degree of aggression between *Arundinella villosa* and *Chrysopogon zeylanicus* varied with age and density. Individual response to superior aggression varied from plasticity to mortality.

Controlled management practices involving timed clipping and fires are advocated for enhanced productivity.

