

---

## **Vegetation and environmental patterns on soils derived from Hawkesbury Sandstone and Narrabeen substrata in Ku-ring-gai Chase National Park, New South Wales.**

*Andrew F. Le Brocque & Rodney T. Buckney*

Department of Applied Biology, University of Technology, Sydney, P.O. Box 123, Broadway N.S.W. 2007

Correspondence to:- Dr A. F. Le Brocque Department of Biological & Physical Sciences, University of Southern Queensland, Toowoomba, QLD 4350, Australia

Tel: (07) 4631 1529; Fax: (07) 4631 1530; Email: [lebrocq@usq.edu.au](mailto:lebrocq@usq.edu.au)

### **Abstract**

The vegetation patterns in the Central Coast region of New South Wales have been extensively studied with respect to single environmental variables, particularly soil nutrients. However, few data are available on the effects of multiple environmental variables. This study examines the relationships between vegetation and multiple environmental variables in natural vegetation on two underlying rock types, Hawkesbury sandstone and Narrabeen group shales and sandstones, in Ku-ring-gai Chase National Park, Sydney. Floristic composition and 17 environmental factors were characterized using duplicate 500 m<sup>2</sup> quadrats from fifty sites representing a wide range of vegetation types. The patterns in vegetation and environmental factors were examined through multivariate analyses: indicator species analysis was used to provide an objective classification of plant community types, and the relationships between vegetation and environmental factors within the two soil types were examined through indirect and direct gradient analyses. Eleven plant communities were identified, which showed strong agreement with previous studies. The measured environmental factors showed strong correlations with vegetation patterns: within both soil types, the measured environmental variables explained approximately 32 - 35% of the variation in vegetation. No single measured environmental variable adequately described the observed gradients in vegetation; rather, vegetation gradients showed strong correlations with complex environmental gradients. These complex environmental gradients included nutrient, moisture and soil physical and site variables. These results suggest a simple 'nutrient' hypothesis regarding vegetation patterns in the Central Coast region is inadequate to explain variation in vegetation within soil types.

*Australian Journal of Ecology* **20**:229-238. 1995.