10.1071/BT12195_AC
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Supplementary Material

Methods

Multivariate analyses

No transformation (or weighting) of the species abundance measures was undertaken as the intention was to preserve as much of the information in the full floristic samples as possible. The environmental variables used for ordination analyses were derived from the field-collected environmental data. The relative values and allocated rankings of the environmental variables are described in Table S1, and in Rossetto and Kooyman (2005) and Royer et al. (2009). Descriptions of the volcanic stratigraphy and rhyolite soil formations are provided in Crook and McGarity (1956), Turner and Kelly (1981), and Smith and Houston (1995). Transformation of variables included replacement of all measured environmental variables by ranks for PCA, and the use of the Spearman Rank coefficient for tests of results (Global Tests) and multivariate regression tree analyses (Clarke and Gorley 2006). Principal component analysis (PCA; Euclidean distance) was also used to examine the position of group members in component space relative to the influence of environmental variables (not presented).

Trait compilations

The trait data for leaf area (LA), wood density (WD) and seed size (SS) were extracted from published floras, herbaria specimens, and sources including Bootle (1983); Floyd (1989); Ilic et al. (2000); Harden (1990-2002, volumes 1-4 with revisions); Stanley and Ross (1983-9); and were checked during compilation with collected specimens (RMK) and online resources such as http://www.environment.gov.au/biodiversity/abrs/online-resources/flora/about.html. Leaf size was for the whole area of simple leaves or phyllodes and for the leaflets of compound leaves. Juvenile leaf sizes were excluded from consideration. Leaf size (cm^2) was estimated as maximum length x maximum width x 0.70. This formula has been shown to correlate well with photographic area estimates of rain forest tree leaves (e.g. Kraft et al. 2008). Seed size was estimated using maximum dimensions of endocarp (length + width / 2, in millimetres; average diameter). Wood density estimates (as dry weight in kg m^{-3}) were taken from published sources.

Results

Additional tests of multivariate patterns

Additional analyses and tests undertaken included ANOSIM permutation tests (for the *R* statistic), the Global BEST match test, and a modified MRT (multivariate regression tree) analysis (De'ath 2002) referred to as the Linkage Tree procedure, in PRIMER v6 (Clarke and Gorley 2006). The outputs from these analyses provided a range of opportunities to interrogate and test the pattern of relationships of the available environmental (abiotic) variables to assemblage patterns (floristic variation) in the data, and confirmed the results presented.

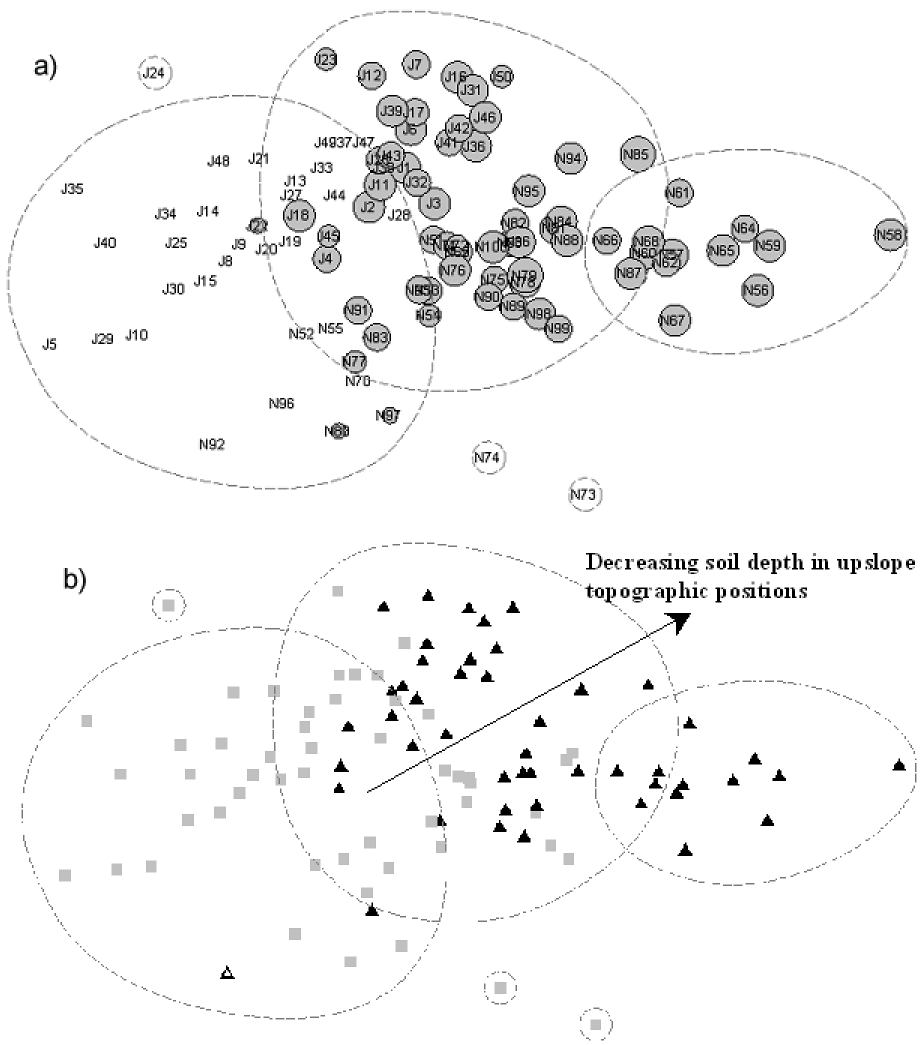

Figure S1.1 (a-b) Constrained 2-dimensional nMDS ordinations of 100 sites representing 50 / 20 x 20 m plots from each area, Nightcap and Mt Jerusalem. The top figure a) shows an example of the distribution of one species relative to floristic variation and the underlying abiotic gradients. In this case the grey-scale bubbles indicate sites with *Uromyrtus australis* present, and the species relative cover abundance (by bubble size). Sites at Nightcap NP are labelled with the prefix ‘N’, Mt Jerusalem the prefix ‘J’. Note the split between the two geographic areas and the much larger population at Nightcap. Figure b) shows the influence of the mostly correlated gradients of decreasing soil depth, and upslope topographic positions. Solid black triangles - skeletal / rocky soils; solid grey squares - shallow soils; open triangle – medium depth soils. The broken grey line(s) represent the 60-percent resemblance level derived from the clustering routine (and subsequent dendrogram) using the Bray-Curtis distance measure. Overall stress in the 2-D ordination(s) (0.16).

Uromyrtus australis distribution in sample

Uromyrtus australis was detected on 68 of the 100 quadrats, with 24 locations from Mt. Jerusalem and 44 from Nightcap. The geographical pattern of the species distribution and the abundance data show that the core areas of the species range in Nightcap NP have the highest population density (Fig. S1.1a). Kruskal-Wallis tests of the relationship of number of stems and basal area of *U. australis* to topographic position and soil depth showed a significant relationship for both (number of stems H = 44.265, 2 d.f., $p < 0.0001$; and basal area H = 47.95, 2 d.f., $p < 0.0001$) (Kooyman 2005).

Table S1.1 Environmental variables and rankings used in data collection and subsequent analyses. Fire frequency and disturbance were ranked using floristic and visual indicators and known disturbance and fire history.

Topographic Position	Fire Freq. (yrs)	Disturbance	Soil Depth	Soil Type	Altitude	Slope	(1)Aspect
1. crest	*1.* 0-100	*1.* none	*1.* skeletal	*1.* clay/loam	*Actual*	*Actual*	*Actual*
2. upperslope	*2.* 100-250	*2.* light	*2.* shallow	*2.* peaty/clay			
3. mid-slope	*3.* 250-500	*3.* moderate	*3.* medium	*3.* alluvium			
4. lowerslope	*4.* >500	*4.* heavy	*4.* deep				
5. creek/gully	*5.* no fire						

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