Unpublished dataset: Moore, B.D.1,2 and DeGabriel, J.L.1 (2019) “Leaf traits of the *Eucalyptus* series Siderophloiae”

1 School of Marine and Tropical Biology, James Cook University, Townsville, QLD, 4811

2 Hawkesbury Institute for the Environment, Western Sydney University, Locked Bag 1797, Penrith NSW 2751; email: [b.moore@westernsydney.edu.au](mailto:b.moore@westernsydney.edu.au)

Summary:

These traits were recorded in 2005 and 2005 as part of an unpublished study investigating the evolution of chemical defence traits in *Eucalyptus* series Siderophloiae (the red ironbarks). Foliage was collected from trees using pole pruners or by pulling branches with a bigshot throwline launcher. Nitrogen content was predicted from a near infrared spectroscopy (NIRS) calibration, based upon duplicate nitrogen determinations made using a semi-micro Kjeldahl technique. NIR spectra were collected between 400 and 2500 nm using an NIRSystems 6500 scanning spectrophotometer with spinning sample cup. Calibration procedures are described in DeGabriel, J.L., Moore, B.D., Foley, W.J. and Johnson, C.N. (2009) The effects of plant defensive chemistry on nutrient availability predict reproductive success in a mammal. *Ecology* 90(3):711-19. [**doi.org/10.1890/08-0940.1**](https://doi.org/10.1890/08-0940.1)

Methods:

Reported values of leaf area, dry mass and perimeter are means from 5 leaves from an individual plant. Reported values for thickness are means of values measured with a manual micrometer from 2 locations on the lamina of each of 5 leaves (i.e. 10 measurements in total) from an individual plant.

Leaf\_area

Leaf\_dry\_mass

Leaf\_thickness

Leaf\_n\_per\_area

Leaf\_n\_per\_dry\_mass

Soil analyses:

TOC Total organic carbon (% DM)

pH

conductivity (mS cm-1)

N (%DM) Soil Nitrogen

P (%DM) Soil Phosphorus

K (%DM) Soil Potassium

Sand (%)

Silt (%)

Clay (%)

At each site, the top 15cm of soil was sampled. Pits were dug at 20 locations, 10 under tree canopies and 10 in the open; soil from these pits was combined and mixed and resampled for analysis. Soil samples were analysed under the supervision of Dr Robert Congdon in the Tropical Vegetation Dynamics Research Group at James Cook University, Townsville.

We used the single digestion method of Anderson & Ingram (1989) for the determination of N, P and cations. Air-dry soil samples were ground to 0.2 mm, digested with sulphuric acid and hydrogen peroxide. Nitrogen is determined colorimetrically by the salicylate-hypochlorite method of Baethgen & Alley (1989), and phosphorus by an adaptation of Murphy and Riley's (1967) single solution method (Anderson & Ingram 1989). Aliquots of the digest can be analysed for cations (Na, K, Ca, Mg) using atomic absorption spectrophotometry. Some of the mineral forms of the cations are probably not present in the digest, so these do not strictly represent "total" concentrations, but are a useful index of what is potentially available for plants for comparative purposes. Subsamples of the air-dry soils are dried in an oven to determine moisture content, and nutrients are reported as % on an oven-dry basis.

Soil pH and electrical conductivity are determined using the standard method based on a 1:5 water extract (Rayment & Higginson 1992). Soil organic carbon is determined by the Heanes wet oxidation method - based on heating the sample with H2SO4 in the presence of dichromate (Rayment & Higginson 1992). External heating ensures complete oxidation, unlike the traditional Walkley & Black method. The carbon is determined from the concentration of chromic ions determined with a spectrophotometer.

Available P is determined by the modified Olsen method using an extracting solution of 0.5M NaHCO3, adjusted to pH 8.5, a soil/solution ratio of 1:100 and an extraction time of 16 hours (Rayment & Higginson 1992). Soil nitrate can be determined simply and accurately using second derivative spectroscopy (Sempere et al.. 1993). Soil texture as % sand, silt and clay is estimated from the changes in specific gravity of a soil suspension using a Bouyoucos soil hydrometer (Anderson & Ingram 1989), after removal of organic matter with hydrogen peroxide, and dispersion of the particles by shaking overnight with sodium hexametaphosphate.

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