Court soil – texture-contrast soil in strongly weathered sandstone

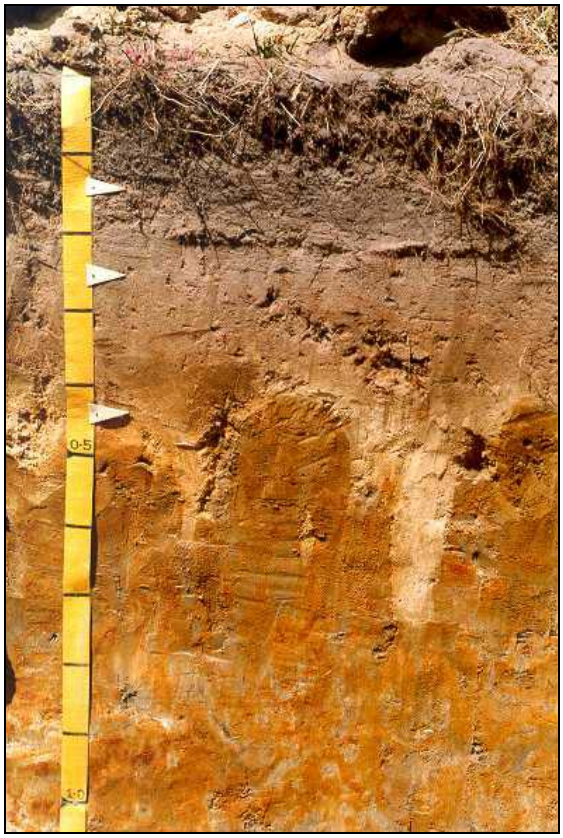
Site description

Occurrence: In eastern lowland Tasmania where mean annual rainfall is <800 mm
Parent Material: In-situ sandstone and some aeolian sand
Landform: Undulating valley floors
Drainage Class: Imperfectly drained
Vegetation: Mostly pasture with some *Eucalyptus nitens* plantations

Distinguishing Soil Properties

Profile Features:

- Texture-contrast profile
- Sandy texture in upper horizon
- Massive compact pan at about 50 cm depth



Chemical and physical features

- Low total C, total N and total P in topsoil (0-30 cm) in unfertilised soils
- Low K, Mg and Ca and SO_4-S in unfertilised soils
- Low ability to retain added P (very low P retention in all horizons) and other nutrients
- Permeability – slow, limited by compact and mottled BCg horizon (below 50 cm depth)

Similar soils

- Soil 14.1, Forest Soils of Tasmania (Buckland soil) is similar but has better structure in subsoils
- Catgut soil (Forest soil fact sheet no. 2) - sandy texture throughout
- Sandbrook soil (Forest soil fact sheet no. 3) - thicker sandy horizons, with an iron humus pan at depth

Soil Degradation Potential

FACTOR	RATING OF DEGRADATION POTENTIAL
Erodibility:	Very high
Compaction and puddling:	Moderate-high
Mixing:	Low
Nutrient depletion:	High
Landslides:	Slight
Flooding:	Negligible

Site Productivity

Low to very low productivity, limited by low reserves of moisture and nutrients; ex-pasture sites will have high plantation growth rates in the short term but the effect is unlikely to last.

Soil Management

Soils on hilly and steep slopes are prone to erosion. In native forest management, surface horizons should be left intact as far as possible. Excessive disturbance and burning may reduce productivity and promote erosion and should be avoided.

Native Forest Logging and Regeneration

LOGGING AND CLEARING:
Nutrient levels are low and concentrated in the surface horizon. The soils are prone to degradation by erosion (including wind erosion if large areas are cleared).
PREPARATION FOR REGENERATION:
Minimal seedbed preparation is required. Disturbance during logging should be sufficient. Burning should be minimised.
SILVICULTURAL CONSIDERATIONS:
Low nutrient status and droughtiness limits long-term productivity. Long-term management as a low wood-production forest using partial logging techniques is likely to be a viable option.

Suitability for Plantations

Marginally suitable to unsuitable for plantations due to low site productivity.
(Ex-pasture sites may show initially fast growth rates but these are unlikely to be maintained.)

CLEARING: Dozer clearing should be done using a rake blade.
CULTIVATION: Ripping to >50 cm depth is required so that roots can penetrate into the compact pan and utilise the full profile for nutrients and water. Spot cultivation should be used on slope 3-11^{o}. No cultivation should occur on slopes >11^{o}.
FERTILISER TREATMENT: Fertilising planted seedlings is required. Secondary fertilisation will be necessary.

Profile

Author: P.D. McIntosh
Date: 15 December 2000
Location: On Margaret Alomes farm, in pasture 5 m south of roadside belt of eucalypts
Map reference: Sheet 5628 (Orford) 56110 528250
Landform: Undulating valley floor, probably a dissected low terrrace of the Prosser River
Vegetation: Pasture; *Eucalyptus nitens* plantation nearby
Parent material: Strongly weathered sandstone and aeolian sand
Drainage: Imperfectly drained
Slope: 4°
Aspect: North
Altitude: 70 m
Photographs: PDM 12-00-16 (site); 12-00-13 (profile)
Australian Soil Classification: **Magnesic Mottled-Subnatric Yellow Sodosol**

A1	0-13 cm	Very dark grey (10YR3/1) (moist) sandy loam; loose strength; single grain structure; abundant fine roots; NaF 0/5.
A2e	13-26 cm	Brown (10YR5/2) (moist) sandy loam; very weak strength; single grain structure; many fine roots; NaF 0/5.
A22	26-44 cm	Yellowish brown (10YR5/4) (moist) loamy sand, becoming very pale brown (10YR7/4) with increasing depth; very weak strength; single grain structure; many fine roots; NaF 2/5.
BCg	44-110 cm	Brownish yellow (10YR6/8) (moist) silty clay loam; 8% red (2.5YR4/8) mottles 20-40 mm diameter; 20% grey (10YR5/1) veins 5-10 mm thick, mostly vertical; 10% light grey (10YR7/2) mottles around veins; firm strength; weak 200 mm prismatic structure breaking to very weak 50-100 mm angular blocky strucure; silt-organic cutans on ped faces and in pores; NaF 0/5.
	On	Jointed sandstone.

Laboratory Analyses

Horizon	Depth (cm)	pH (H_2O)	Total C (%)	Total N (%)	C/N	Colwell P (mg/kg)	Total P (mg/kg)	P retn. (%)	SO_4-S (mg/kg)	Water-stable aggreg. (%)
	0-30	*5.1*	*1.60*	*0.08*	*20*	*33*	*211*	*2*	*4*	*n.d.*
A1	0-13	5.4	1.45	0.08	18	28	176	5	2	33
A2e	13-26	5.4	0.55	0.02	26	12	90	5	0	8
A22	26-44	5.5	0.30	0.01	30	n.d.	56	6	2	5
BCg	44-110	5.7	0.29	0.01	24	n.d.	39	14	14	9

Horizon	Depth (cm)	Exch. Ca (cmol(+)/kg)	Exch. Mg (cmol(+)/kg)	Exch. K (cmol(+)/kg)	Exch. Na (cmol(+)/kg)	CEC (cmol(+)/kg)	BS (%)
	0-30	*1.76*	*0.32*	*0.08*	*0.09*	*4.0*	*57*
A1	0-13	1.89	0.37	0.09	0.10	4.0	62
A2e	13-26	0.62	0.13	0.03	0.07	1.7	51
A22	26-44	0.35	0.27	0.04	0.08	1.2	63
BCg	44-110	0.32	5.16	0.30	0.79	7.8	84

Analytical methods were those of Blakemore et al. (1987), Laffan et al. (1996) and Rayment and Higginson (1992), with variation of methods for C, N and SO_4-S (details available from P. D. McIntosh, Forest Practices Board).

References

Blakemore, L. C.; Searle, P. L. and Daly, B. K. 1987. Methods of chemical analysis of soils. *New Zealand Soil Bureau Scientific Report 80.*

Laffan, M. D.; Grant, J and Hill, R. 1996. A method for assessing the erodibility of Tasmanian forest soils. *Australian Journal of Soil and Water Conservation* 9: 16 – 22.

Rayment, G. E, and Higginson, F. R. 1992. Australian Laboratory Handbook of Soil and Water Chemical Methods. Incarta Press, Melbourne. 330p.

Acknowledgements

To Forestry Tasmania and Gunns Ltd, for funding soil analyses.

Citation

McIntosh, P.D.; Laffan, M.D.; Wong, L. and Miller, M. 2002. Court soil. *Tasmanian forest soil fact sheet no. 12.* Forest Practices Board, Hobart, Gunns Ltd, Launceston and Forestry Tasmania, Hobart. 4 p.

19 December 2002