

Malahide soil – texture-contrast or gradational soil with very thin sandy topsoil, under dry forest

Site description

Occurrence: In northern Tasmania on lowland sites where mean annual rainfall is <1000 mm

Parent Material: Weathered mudstone, siltstone and sandstone (Mathinna beds)

Landform: Hilly and steep land

Drainage Class: Well drained

Vegetation: Dry open sclerophyll forest dominated by *Eucalyptus sieberi*; occasional *E. viminalis* and *Casuarina* sp.; sparse understorey and ground cover

Distinguishing Soil Properties

Profile Features:

- Very thin sandy A1 horizons or mixed A1/A2 horizons; some profiles have strongly bleached subsurface layers
- Clayey subsoils with blocky or subangular blocky structure (peds)
- Subsoils are firm with few roots

Chemical and physical features

- Very low total P and N throughout profiles
- Medium high total C in upper horizons; C/N ratios indicates much of the C is charcoal
- Very low exchangeable Ca but medium to high exchangeable Mg throughout profile
- Permeability – moderate

Similar soils

- Lefroy soil (Grant et al. 1995: Forest Soils of Tasmania, Soil 9.1) – gradational soil under dry forest; formed in mudstone and siltstone on more stable sites
- Retreat soil (Grant et al. 1995: Forest Soils of Tasmania, Soil 10.1) – texture-contrast soil under dry forest, formed in sandstone

Previous descriptions

Grant et al. (1995a, b); Laffan et al. (1995)



Soil Degradation Potential

FACTOR	RATING OF DEGRADATION POTENTIAL
Erodibility:	Moderate
Compaction and puddling:	Moderate
Mixing:	Moderate
Nutrient depletion:	High
Landslides:	Moderate
Flooding:	Nil

Site Productivity

Low productivity because of low moisture and nutrient availability (P, N, Ca)

Soil Management

The thin A1 horizon has a high concentration of P, N and Ca compared to deeper horizons and should be left intact as far as possible. Excessive disturbance or intense burning will reduce productivity and should be avoided. Sandy surface horizons are prone to sheet erosion and/or gullyng.

Native Forest Logging and Regeneration

LOGGING AND CLEARING:

On hilly slopes the area used for snig tracks must be limited to avoid ground disturbance; disturbed areas may need matting and/or restoration to prevent erosion

PREPARATION FOR REGENERATION:

Minimal (low-intensity) burning is required to prepare a seedbed.

SILVICULTURAL CONSIDERATIONS:

Low nutrient status and drought limit long-term production. Long rotations are required.

Suitability for Plantations

Marginally suitable for softwood plantations; limited by low site productivity. Not suitable for hardwood plantations.

CLEARING: Dozer clearing must be done using a rake blade.

CULTIVATION: On slopes up to 19° contour cultivation and ripping may occur; on steeper slopes up to 26° spot cultivation should be used.

FERTILISER TREATMENT: Fertilising at planting is required; secondary fertilising will be needed to achieve reasonable growth rates of radiata pine.

Profile

Authors: M. D. Laffan and P.D. McIntosh

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Location: North of Malahide Road, Fingal

Map reference (AGD): Sheet 5640 (Mathinna) 579700 5401100

Landform: Lower midslope of hillside 200 m long

Vegetation: Dry sclerophyll forest with dominant *Eucalyptus sieberi*; *Casuarina* sp. and *Dodonea viscosa* in understorey

Parent material: Colluvium of siltstone, mudstone and slates, and minor sandstone from Mathinna beds.

Drainage: Well drained

Slope: 24°

Aspect: North

Altitude: 370 m

Photographs: PDM 11-03-8 (site); 11-03-13 (profile)

Australian Soil Classification: **Brown Dystrophic Haplic Kurosol**

A1/A2	0–8 cm	Brown (10YR5/3) (moist), very pale brown (10YR7/4) (dry), sandy loam; 20% angular sandstone gravels 5–10 cm diameter; very weak strength; strong granular peds <2 mm diameter; many fine roots; NaF 2/5.
B21	8–40 cm	Reddish yellow (7.5YR6/6) (moist) silty light clay; 5% reddish yellow (10YR7/8) mottles 5–10 mm diameter; light yellowish brown (10YR6/4) and light brown (7.5YR6/4) silt coatings on ped surfaces; 25% angular quartz gravels 2–4 cm diameter; firm strength; strong subangular blocky peds 20–50 mm diameter; common fine and few medium roots; NaF 2/5.
B22t	40–70 cm	Brownish yellow (10YR6/6) (moist) silty light medium clay; 40% reddish yellow (7.5YR6/6) mottles 5 mm diameter (very irregular); light brown (7.5YR6/4) clay skins on ped surfaces; 30% angular siltstone gravels 2–4 cm diameter; firm strength; strong subangular blocky peds 10–20 mm diameter; few fine roots; NaF 2/5.
B3t	70–90+ cm	Brownish yellow (10YR6/8) light clay; light yellowish brown (10YR6/4) clay skins on ped surfaces; 10% angular quartz gravels 2–4 cm diameter; firm strength; strong subangular peds 5–10 mm diameter; few fine roots; NaF 1/5.

Horizon	Depth (cm)	pH (H ₂ O)	Total C (%)	Total N (%)	C/N	Total P (mg/kg)	Colwell P (mg/kg)	P retn. (%)	SO ₄ -S (mg/kg)	Water-stable aggreg. (%)
	0–30	5.4	3.2	0.03	110	61	33	18	3	n.d.
A1/A2	0–8	5.1	6.0	0.07	86	66	3	16	4	47
B21	8–40	5.4	1.4	0.02	71	60	2	22	5	37
B22t	40–70	5.7	0.4	0.02	23	58	n.d.	19	14	42
B3t	70–90	5.6	0.3	0.02	13	59	n.d.	26	88	n.d.

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	0.25	1.25	0.38	0.30	13.6	16
A1/A2	0–8	0.68	1.06	0.38	0.25	14.7	16
B21	8–40	0.14	1.39	0.41	0.31	15.5	14
B22t	40–70	0.10	2.46	0.45	0.31	10.4	32
B3t	70–90	0.12	3.36	0.45	0.43	10.2	43

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 SO₄-S (details available from P. D. McIntosh, Forest Practices Board).

References

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