

EucFACE Parameter list

Last modified: 6/8/2013

General site description

Site elevation: 22 m a.s.l.

Site N deposition: 0.3 g N m⁻² yr⁻¹ (estimated at half that of Duke; Oren et al. 2001 Nature)

Atmospheric CO₂ concentration (unenriched, background): 390 µmol mol⁻¹

There are six plots at EucFACE, centred at:

One = -33.616402°, 150.738033°; Two = -33.617018°, 150.738492°; Three = -33.619023°, 150.738214°; Four = -33.618137°, 150.738569°; Five = -33.618268°, 150.737592°; Six = -33.617503°, 150.737745

These plots are hexadecagons that are 25m in diameter, with 32 vertical stand pipes for CO₂ release.

Table 1. Biometrical description for plots/ trees:

Plot	N stems ¹	Tree density	Dom/Codom tree stems	Basal area	Quad. Diam ²	Diam mean	Est Biomass ³	Ht-max
No.	No.	No./ha	No.	m ² /ha	cm	cm	Mg/ha	m
1	30	611	20	25.2	23.1	21.8	385	24.1
2	41	835	13	24.3	20.1	18.0	348	23.7
3	39	795	19	25.9	20.5	19.3	187	20.5
4	55	896	22	20.9	17.2	16.6	187	18.8
5	54	1019	19	38.0	22.0	20.7	189	22.2
6	44	815	10	29.0	22.5	20.0	228	22.7

¹ Total number of stems includes trees and shrubs > 2m tall (shrubs counted as one stem). The dominant species is *Eucalyptus tereticornis* Sm. accounting for >95% of all tree stems.

² At breast height of 1.3m. All trees > 6 cm dbh.

³ This estimate uses allometry of trees from Williams et al. (2006) that is off-site, from different species and different soils than the actual research site.

Note : All estimates below are for the stand at EucFACE or for measurements of dominant/codom. *Eucalyptus tereticornis* trees from this stand unless otherwise indicated

Soil extractable water and texture

Total plant extractable soil water = 300mm

Rooting depth = 2m

Effective field capacity = 530mm (=0.265 m³ m⁻³)

Effective wilting point = 230mm (=0.115 m³ m⁻³)

Notes: 'effective' because it averages over the different soil layers (taking into account differences in texture, bulk density, wilting points estimated from release curves).

Field capacity was estimated from actual total storage estimates based on neutron probe measurements. This is fairly high because the soil drains poorly/slowly, so more water is actually available to the plant.

Surface soil texture (upper 45 cm) for Clarendon sand: 80 ± 8% sand, 9 ± 5% silt, 11 ± 3% clay

Source: Teresa Gimeno, Burhan Amiji & D. Ellsworth

Soil chemical and physical properties for the EucFACE site

Table 2. Texture class and bulk density (mean ± SD *n* = 3) at each specific soil depth.

Depth (cm)	Class	Bulk density (g cm ⁻³)
0-15	Loamy sand	1.47 ± 0.18
15-30	Loamy sand	1.57 ± 0.01
30-45	Loamy sand	1.70 ± 0.05
45-60	Sandy clay loam	1.77 ± 0.05
100-140	Sandy clay loam	1.82 ± 0.09
135-180	Sandy clay loam	1.69 ± 0.15
200-215	Sandy clay loam	1.82 ± 0.04
250-270	Sandy clay loam	1.76 ± 0.05
300-315	Sandy clay loam	1.74 ± 0.03
350-400	Clay	1.62 ± 0.15
400-415	Clay	1.70 ± 0.05
450-465	Clay	1.58 ± 0.02

Table 3. Soil nutrient concentration (mean ± SD, *n* = 6) at different soil depths, from samples collected in autumn 2012 (pre-treatment)

Depth (cm)	Total N ¹ (mg/kg)	Total P ² (mg/kg)	Extractable P ³ (mg/kg)	OM ⁴ (%)	Organic C ⁴ (%)
0-15	670±282	58.8±23.9	3.5±1.4	1.77±0.8	1.02±0.45
15-45	185±123.7	22.2±17.7	2.8±1.7	<0.5	<0.5
100-115	80±54.8	37.8±14.3	<1.0	<0.5	<0.5

Source : Teresa E. Gimeno, Burhan Amiji, David S. Ellsworth

Specific leaf area (SLA)

SLA at the top of the canopy: $43.7 \pm 1.5 \text{ cm}^2 \text{ g}^{-1}$ dry mass (age>6 months), 56.8 ± 1.6 (age ~2 months, fully-expanded and mature).

Source: K. Crous, Teresa Gimeno & D. Ellsworth

Leaf N concentration

Leaf N concentration, top of the canopy,: $18.5 \pm 0.4 \text{ mg g}^{-1}$ dry mass (age>6 months), 15.9 mg g^{-1} dry mass (age ~2 months, fully-expanded).

Leaf P concentration, top of the canopy,: $0.85 \pm 0.02 \text{ mg g}^{-1}$ dry mass (age>6 months).

Source: K. Crous & D. Ellsworth

Leaf C:N ratio

Green leaf C:N: $28.7 \pm 0.6 \text{ g g}^{-1}$ dry mass; dead leaf C:N: 66.3 g g^{-1} dry mass

Source: K. Crous & D. Ellsworth

Leaf width

267mm (SE = 14)

Source : Ben Moore

V_cmax and J_{max}

$V_{\text{cmax}}/N = 15.6 \text{ } \mu\text{mol s}^{-1} [\text{g N}]^{-1}$ (at 22°C)

$J_{\text{max}}/N = 31.5 \text{ } \mu\text{mol s}^{-1} [\text{g N}]^{-1}$ (at 22°C)

Source: K. Crous, Teresa Gimeno & D. Ellsworth

Leaf lignin

Leaf lignin: 13-16% dry mass in *Eucalyptus punctata*

Source: *Eucalyptus punctata* in Cork et al. (1983) J. Comparative Physiol. 153: 181-190

Leaf turnover

Leaf lifespan: 18 months (estimate)

Source: D. Ellsworth, P. Reich & K. Crous

Root turnover

Root lifespan: 18 months (first-order estimate, consistent with leaf lifespan)

Source: Pinus in Matamala et al. (2003) *Science*, 302, 1385–1387; and Pritchard et al. (2008) *Global Change Biology* 14: 588-602

Wood density

Mean wood density (basic density; mean \pm SD): $0.766 \pm 0.06 \text{ g cm}^{-3}$ (n = 34)

Source: Teresa Gimeno

Stomatal conductance parameters

g_1 parameter from stomatal model (Medlyn et al. 2011): 2.78 ± 0.12 (unitless; mean \pm SE, df = 106)

g_0 parameter from stomatal model (Medlyn et al. 2011): $-0.059 \text{ mol m}^{-2} \text{ s}^{-1} \pm 0.016$

Source: Teresa Gimeno, K. Crous, & D. Ellsworth

Biomass partitioning

Partitioning of NPP: 31% leaf production, 37% fine root production, 32% wood production (prefer using one-third each as estimates aren't this precise)

Source: Eucalyptus pauciflora stand, Keith et al. *Plant and Soil* 196: 81–99, 1997

From Keith et al. fractions of wood in standing biomass of *E. pauciflora* is:

Twigs	2%
Branches	24%
Bark	7%
Stem	67%

Leaf area index

LAI site is ~1.5

Source: Remko Duursma

Microbial biomass

Table 4. Size of bacteria, fungi and nematode communities in number of DNA copies (16S DNA gene copies for Bacteria, 18S DNA gene copies for Fungi and Nematodes).

Depth (cm)	Bacteria.mean	Fungi.mean	Nematodes.mean
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0-15	205450308.666667	150937197.333333	755.591666666667
15-30	54465422500	341693310673.333	8980.88333333333
30-45	448280816.666667	3344054.16666667	315.383333333333
45-60	488508477.333333	13915527.45	322.716666666667
100-115	485441818.181818	299611.109090909	127.236363636364
100-116	1.31e+09	30800	10
150-165	77969854583.3333	103070755.183333	9205162.64166667
200-215	1001726370	761613758.333333	152.863333333333
250-265	282252666.666667	30532753.4166667	23.315
300-315	1224795950	6729069.58849167	10700345.4641667
350-365	1556834500	1034881690	852.325
400-415	2910108481.81818	418451850	1625.7
400-425	5.47e+08	3.46e+09	253

Source : Barbara Drigo