

Metabolic, Nutritional and Morphophysiological Behavior of Eucalypt Genotypes Differing in Dieback Resistance in Field When Submitted to PEG-Induced Water Deficit

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Electronic Supplementary Material

Supplementary Method

		Conversion	Reference
Step 1	Obtaining the cryoscope measures (<u>°H</u>)	°H values	
Step 2	Converting °H to <u>°C</u> (freezing point)	$= ((0.1915 * (-^{\circ}\text{H}) - (-0.0004785)) / 0.199)$	[34,35]
Step 3	Converting °C (freezing point) to <u>Osmol</u>	$= ((-^{\circ}\text{C}) / 1.86)$	[36]
Step 4	Converting Osmol to <u>MPa</u>	$= -\text{Osmol} * 2.479$	[37]
Step 5	Obtaining the MPa estimated measures	MPa converted values	

Table S1. ANOVA performed to indicate the effect of genotypes (SuzT - tolerant; SuzMT - moderately tolerant; SuzTP – in testing phase; SuzS - susceptible to dieback), treatments (Control; 100 PEG; 300 PEG) and their interaction on water potential, morphological, physiological and nutritional variables and on leaf metabolites.

Anova (F-test) - Osmotic potential and Morphological variables											
Factors	Osmotic potential	Diameter	No. of branches	No. of nodes	Plant height	Leaf area					
Genotype	0.43	21.93**	15.59**	14.39**	4.50**	14.56**					
Treatment	582.49**	10.40**	30.16**	43.23**	12.86**	12.70**					
Gen x Treat	0.49	1.54	1.19	1.15	1.39	1.41					
Anova (F-test) - Morphological variables											
Factors	LDM	SDM	RDM	TDM	F/TDM	S/TDM	R/TDM	Root/shoot			
Genotype	4.82**	5.52**	0.38	4.76**	3.25*	3.72*	3.19*	3.13*			
Treatment	0.44	5.40*	1.78	2.35	6.62*	2.25	0.55	0.51			
Gen x Treat	0.65	0.48	1.35	0.77	0.63	0.42	1.13	0.85			
Anova (F-test) - Physiological variables											
Factors	E	gs	A	WUE	WUEi	Ci/Ca					
Genotype	2.14	2.34	4.67**	1.85	2.54	3.50*					
Treatment	10.88**	2.46	5.43*	0.92	1.06	0.55					
Gen x Treat	0.72	1.05	0.94	0.34	0.72	0.74					
Anova (F-test) - Nutritional variables											
Factors	N	P	K	Ca	Mg	S	Zn	Fe	Mn	Cu	B
Genotype	11.26**	6.45**	10.51**	11.94**	21.35**	8.85**	22.56**	5.99	2.49	7.78**	16.10**
Treatment	1.39	1.92	2.3	1.2	3.44	1.6	1.99	0.04	1.17	5.43*	6.56*
Gen x Treat	2.27	0.34	1.05	1.54	1.15	2.68*	0.598	1.06	0.87	5.65**	1.49
Anova (F-test) - Leaf metabolites											
Factors	Amino acids	Proteins	Starch	Glucose	Fructose	Sucrose					
Genotype	10.85**	1.28	10.77**	1.61	2.66	1.54					
Treatment	2.86	5.68*	1.05	1.77	1.93	3.4					
Gen x Treat	6.07**	0.93	0.55	0.59	0.88	1.05					

* and ** indicate the statistical significance at $p < 0.05$ and $p < 0.01$ by F-test, respectively. The data are expressed as F-value.

Table S2. Statistical p-value performed to indicate the effect of genotypes (SuzT - tolerant; SuzMT - moderately tolerant; SuzTP – in testing phase; SuzS - susceptible to dieback), treatments (Control; 100 PEG; 300 PEG) and their interaction on water potential, morphological, physiological and nutritional variables and on leaf metabolites.

P-value - Osmotic potential and Morphological variables											
Factors	Osmotic potential	Diameter	No. of branches	No. of nodes	Plant height	Leaf area					
Genotype	1.00 ns	0.00**	0.00**	0.00**	0.009**	0.00**					
Treatment	0.00**	0.002**	0.00**	0.00**	0.001**	0.001**					
Gen x Treat	1.00 ns	0.19 ns	0.33 ns	0.35 ns	0.24 ns	0.24 ns					
P-value - Morphological variables											
Factors	LDM	SDM	RDM	TDM	L/TDM	S/TDM	R/TDM	Root/shoot			
Genotype	0.006**	0.003**	1.00 ns	0.007**	0.03*	0.02*	0.03*	0.03*			
Treatment	1.00 ns	0.021*	0.21 ns	0.14 ns	0.012*	0.15 ns	1.00 ns	1.00 ns			
Gen x Treat	1.00 ns	1.00 ns	0.26 ns	1.00 ns	1.00 ns	1.00 ns	0.36 ns	1.00 ns			
P-value - Physiological variables											
Factors	E	gs	A	WUE	WUEi	Ci/Ca					
Genotype	0.11 ns	0.09 ns	0.007**	0.15 ns	0.07 ns	0.02*					
Treatment	0.002**	0.12 ns	0.02*	1.00 ns	0.37 ns	1.00 ns					
Gen x Treat	1.00 ns	0.41 ns	1.00 ns	1.00 ns	1.00 ns	1.00 ns					
P-value - Nutritional variables											
Factors	N	P	K	Ca	Mg	S	Zn	Fe	Mn	Cu	B
Genotype	0.00**	0.0015**	0.00**	0.00**	0.00**	0.00**	0.00**	0.002**	0.07 ns	0.00**	0.00**
Treatment	0.28 ns	0.19 ns	0.14 ns	0.33 ns	0.06 ns	0.24 ns	0.18 ns	1.00 ns	0.34 ns	0.02*	0.01*
Gen x Treat	0.058 ns	1.00 ns	0.41 ns	0.19 ns	0.35 ns	0.03*	1.00 ns	0.40 ns	1.00 ns	0.00**	0.21 ns
P-value - Leaf metabolites											
Factors	Amino acids	Proteins	Starch	Glucose	Fructose	Sucrose					
Genotype	0.00**	0.29 ns	0.00**	0.20 ns	0.06 ns	0.22 ns					
Treatment	0.09 ns	0.018*	0.38 ns	0.21 ns	0.18 ns	0.06 ns					
Gen x Treat	0.00**	1.00 ns	1.00 ns	1.00 ns	1.00	0.41 ns					

* and ** indicate the statistical significance at $p < 0.05$ and $p < 0.01$. ns indicates a non-significant statistical difference at $p > 0.05$. The data are expressed as P-value.

Table S3. Sulfur (S) and copper (Cu) concentration in leaves of eucalyptus genotypes with different levels of dieback tolerance in response to water deficit.

S				
	SuzT	SuzMT	SuzTP	SuzS
Control	0.20 ± 0.01 Ba	0.24 ± 0.01 Ba	0.30 ± 0.01 Aa	0.21 ± 0.01 Ba
100 PEG	0.21 ± 0.01 Aa	0.25 ± 0.01 Aa	0.25 ± 0.03 Ab	0.23 ± 0.01 Aa
300 PEG	0.23 ± 0.01 Aa	0.20 ± 0.01 Aa	0.25 ± 0.02 Ab	0.20 ± 0.01 Aa
Cu				
	SuzT	SuzMT	SuzTP	SuzS
Control	1.14 ± 0.35 Ba	5.98 ± 0.09 Aa	2.78 ± 0.69 Ba	3.66 ± 0.66 ABa
100 PEG	2.08 ± 0.75 Aa	0.50 ± 0.50 Ab	3.02 ± 0.78 Aa	2.34 ± 0.59 Aa
300 PEG	0.96 ± 0.15 Ba	7.28 ± 1.87 Aa	3.70 ± 0.79 Ba	2.12 ± 0.82 Ba

* Means followed by the same capital letters on the horizontal and lower-case letters on vertical do not differ from each other by the Tukey test at 5% probability level. Values indicate mean ± standard error of 5 plants. Sulfur expressed in dag kg⁻¹, and copper in mg kg⁻¹. SuzT - tolerant; SuzMT - moderately tolerant; SuzTP – in testing phase; SuzS - susceptible to dieback. Control - plantlets managed according to the nursery standard procedures; 100 PEG – plantlets managed according to the standard procedures, with application of 100 mL of 100 g.L⁻¹ PEG solution every two days; 300 PEG - plantlets managed according to the standard procedures, with application of 100 mL of 300 g.L⁻¹ PEG solution every two days.

Table S4. Contribution morphological, physiological and nutritional variables of *Eucalyptus* genotypes for the variation of components 1 and 2 of PCA. Variables in bold presented the major contributions.

Variables	CP1	CP2
E	0.160	-0.256
gs	0.200	-0.229
A	0.141	-0.292
WUE	-0.095	-0.019
WUEi	-0.184	0.125
Ci/Ca	0.160	-0.004
Leaf DM	0.119	0.292
Stem DM	0.271	0.165
Root DM	0.203	-0.048
Total DM	0.242	0.178
S/TDM	0.242	0.138
L/TDM	-0.197	0.177
R/TDM	-0.062	-0.314
Root/Shoot	-0.064	-0.322
Diameter	0.198	0.246
No. of branches	0.248	-0.02
No. of nodes	0.207	-0.212
Plant height	0.214	-0.141
Leaf area	0.121	0.132
N	-0.140	-0.204
P	0.260	-0.130
K	0.058	-0.163
Ca	0.157	0.178
Mg	0.229	-0.014
S	0.231	0.019
Zn	0.255	0.016
Fe	0.206	0.086
Mn	0.068	0.127
Cu	-0.051	-0.083
B	0.122	-0.300