Decoupling plant economics traits and biomass carbon composition in wetland litter

Supplemental Material

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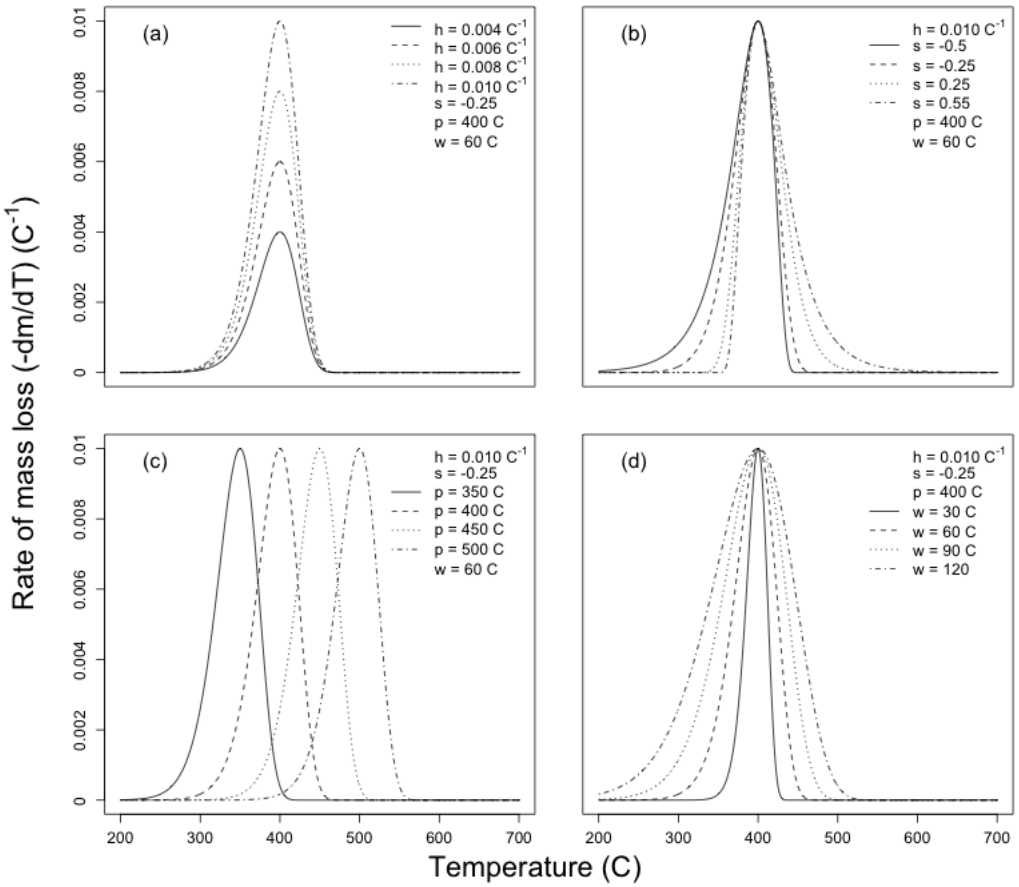


Fig. 1. Parametric study of the Fraser-Suzuki function for deconvolution of derivative thermogravimetric biomass curves: (a) Effect of modifying height; (b) skew; (c) position; and (d) width.

Table 1. GenBank Accession codes.

Species	rbcl	matK
Acacia dealbata	NC_034985.1	NC_034985.1
Alternanthera pungens	AY514795.1	AY270054.1
Baumea articulata		AM999787.1
Baumea rubiginosa		AY725940.1
Carex nigra	FN668463.1	GQ469838.1
Crassula falcata	AF115594.1	
Crassula helmsii		KM360736.1
Cycnogeton procerum	KF632824.1	U80713.1
Cyperus eragrostis	KX369451.1	HM849936.1
Eleocharis acuta		AM999820.1
Eleocharis marginulata	KC123404.1	
Eucalyptus camaldulensis	NC_022398	NC_022398.1
Gahnia aspera		AB369962.1
Juncus maritimus	JN894909.1	AY216629.1
Lycopus rubellus	KJ772924.1	KJ773662.1
Marsilea crenata	KC536646	
Marsilea drummondii		DQ643299.1
Melaleuca leucadendra		KX527090.1
Melaleuca viridiflora	AF184708.1	
Muehlenbeckia australis		FM883618.1
Myriophyllum exalbescens		L11195.2
Myriophyllum sibiricum	EF178980.1	
Nymphaea alba	AJ627251	AJ627251
Paspalum distichum	FN908063.1	FN870399.1
Persicaria decipiens	KR734365.1	FM883624.1
Phragmites australis	MF035995	MF035995
Restio tetraphyllus	AF164379.1	AF206816.1
Rumex crispus	EU840458.1	JX848510.1
Sphagnum australe	KU725452	KU725452.1
Typha domingensis	HM850522.1	KJ773961.1

Table 2. Mantel test for the correlation between branch length distance and functional trait distances between the seven traits.

Trait	Mantel Test observation	*P*-value
Litter area per mass	**0.42**	**0.01**
Litter dry matter content	0.06	0.27
Litter nitrogen	-0.1	0.72
Litter carbon	-0.13	0.86
Litter hemicelluloses	-0.07	0.58
Litter cellulose	-0.02	0.47
Litter lignin	-0.13	0.83

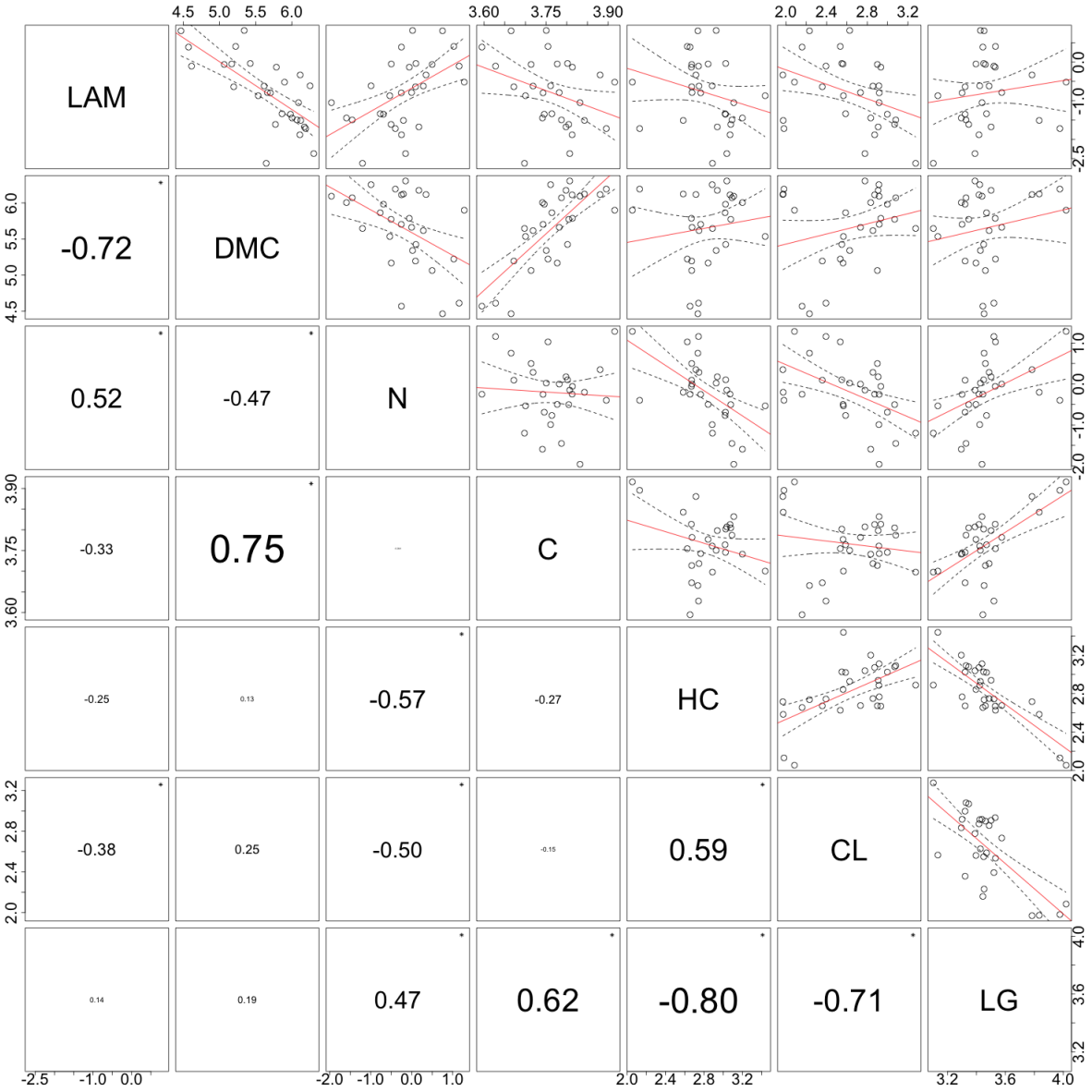
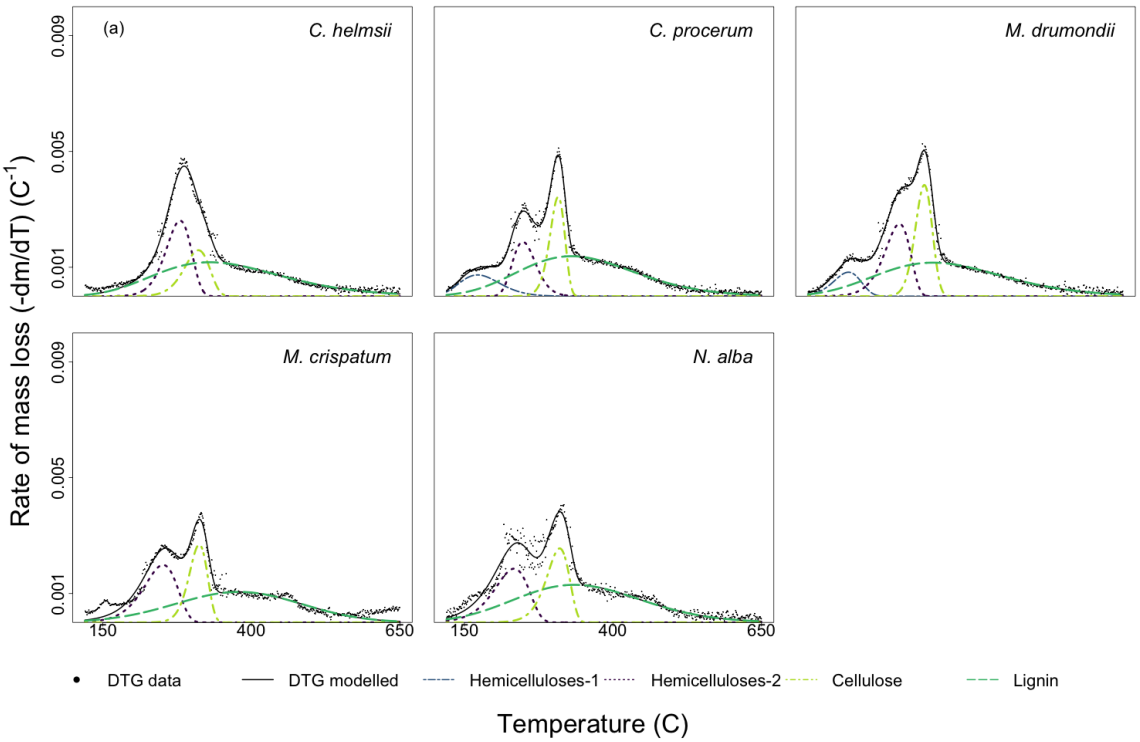


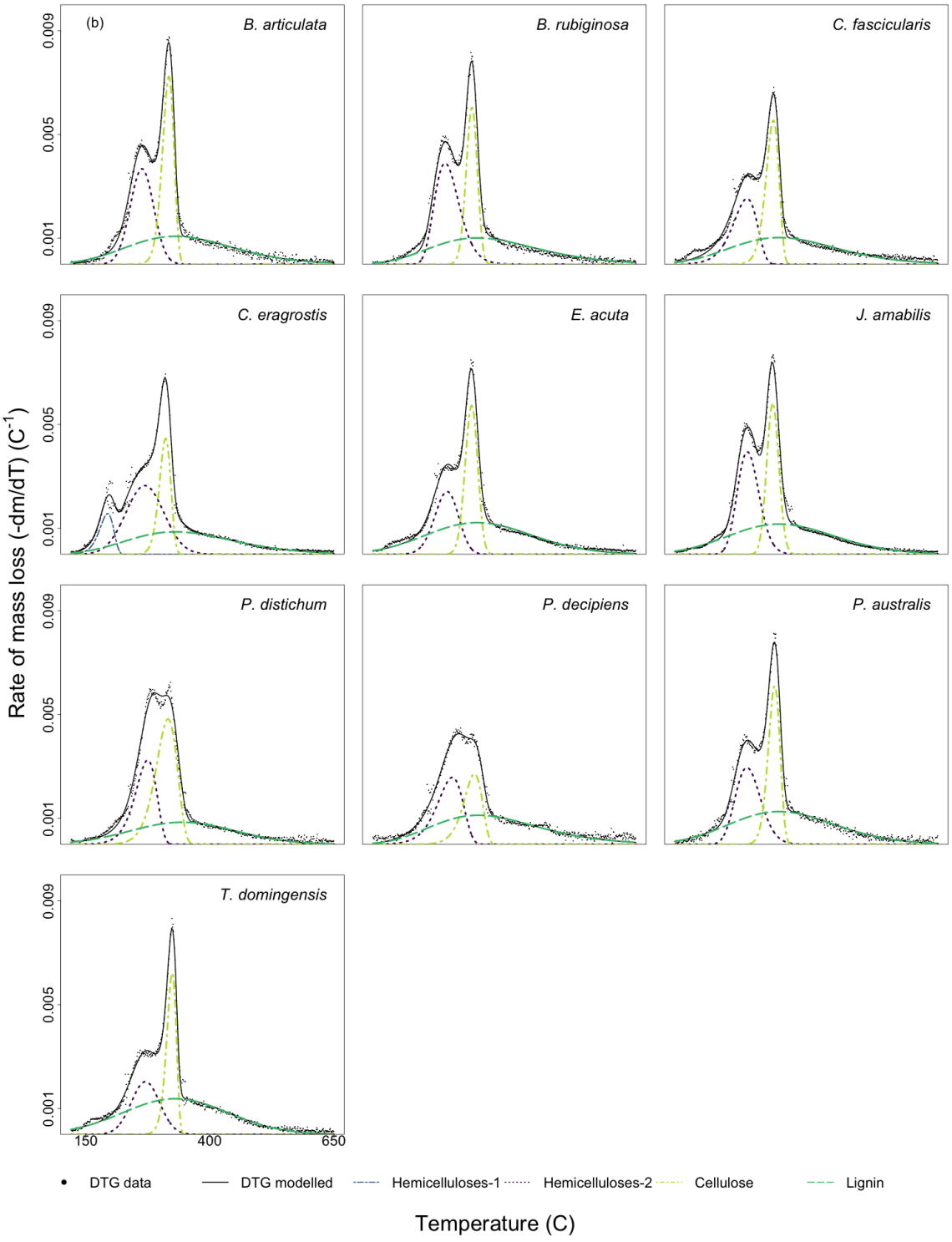
Fig. 2. Correlations between traits. Size of R^2 listed on bottom panel proportional to weight of relationship, with star to indicate significance at P <0.05.

Table 3. Principal Component Analysis axis loadings.

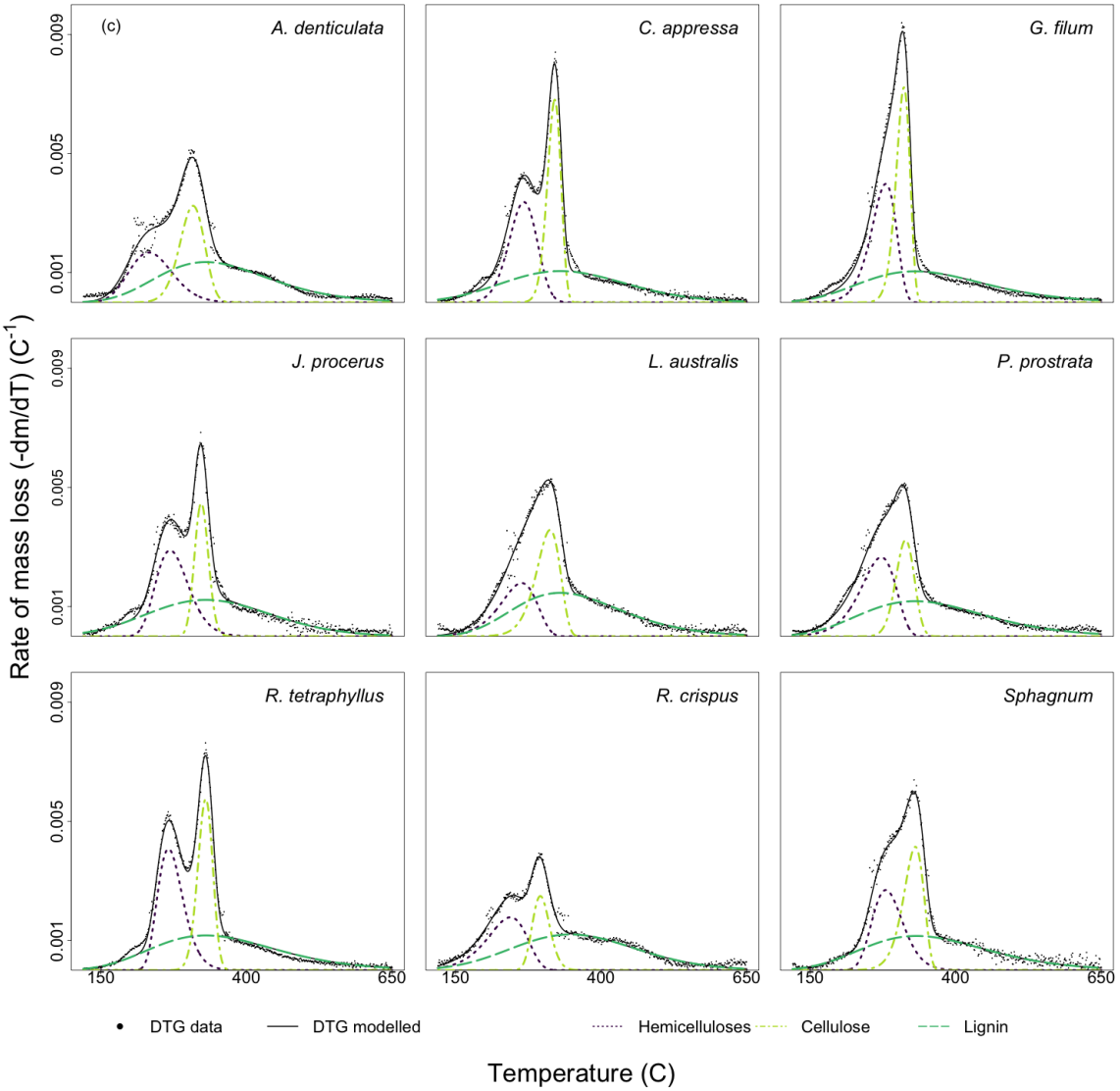
Trait	Axis 1	Axis 2
Litter area per mass	0.34	0.38
Litter dry matter content	-0.23	-0.56
Litter nitrogen	0.45	0.14
Litter carbon	0.07	-0.59
Litter hemicelluloses	-0.47	0.17
Litter cellulose	-0.46	0.07
Litter lignin	0.44	-0.37



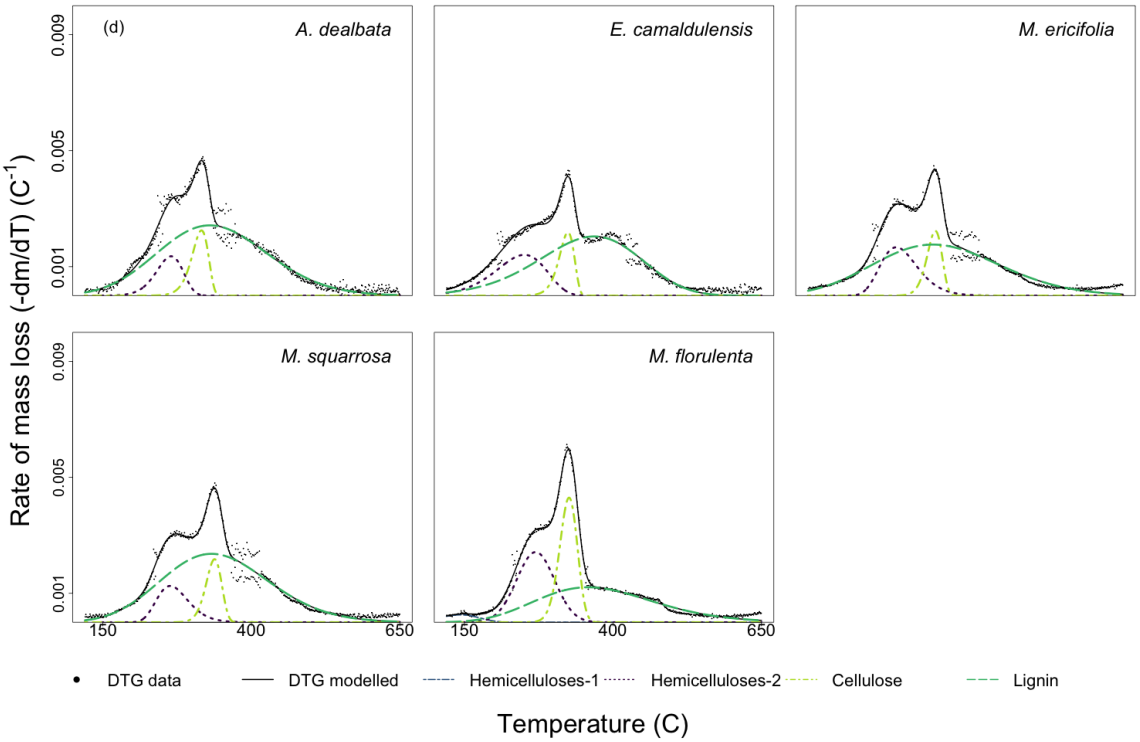
(a) DTG deconvolution for amphibious fluctuation-responders (n = 5).



(b) DTG deconvolution for amphibious fluctuation-tolerators (n = 11).



(c) DTG deconvolution for terrestrial damp species (n = 8).



(d) DTG deconvolution for terrestrial dry species (n = 5).

Fig. 3. All species first derivative thermogravimetric (DTG) deconvolutions: (a) amphibious fluctuation-responders; (b) amphibious fluctuation-tolerators; (c) terrestrial damp species; and (d) terrestrial dry species.

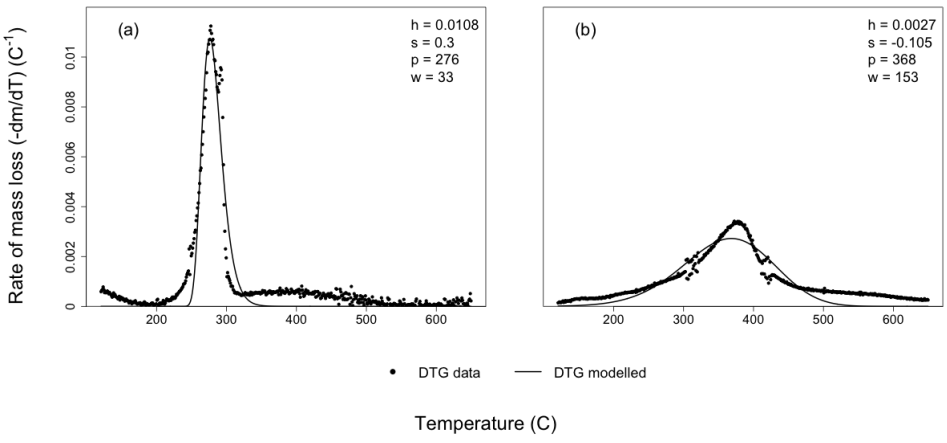


Fig. 4. Predicted negative derivative thermogravimetric for raw biomass samples: (a) carboxy-methyl cellulose; (b) alkali lignin.

Table 4. Fraser-Suzuki mixture model parameter estimates for each species.

	Height				Position				Skew				Width			
Species	HC-1	HC-2	CL	LG	HC-1	HC-2	CL	LG	HC-1	HC-2	CL	LG	HC-1	HC-2	CL	LG
Acacia dealbata		0.0014	0.0023	0.0024		265	316	330		-0.216	-0.330	0.085		53	32	217
Alternanthera denticulata		0.0017	0.0032	0.0014		233	308	330		0.134	-0.138	0.250		87	50	224
Baumea articulata		0.0037	0.0072	0.0011		263	317	330		-0.015	-0.226	0.172		55	27	250
Baumea rubiginosa		0.0039	0.0060	0.0010		266	320	330		0.250	-0.071	0.250		58	26	250
Carex appressa		0.0034	0.0068	0.0011		268	321	330		-0.115	-0.169	0.112		57	27	250
Carex fascicularis		0.0025	0.0055	0.0010		265	319	330		-0.330	-0.270	0.176		57	31	250
Crassula helmsii		0.0026	0.0016	0.0012		280	311	330		-0.249	-0.255	0.250		50	50	250
Cycnogeton procerum	0.0007	0.0019	0.0034	0.0014	172	248	308	330	0.200	0.200	-0.228	0.177	80	46	29	229
Cyperus eragrostis	0.0016	0.0026	0.0045	0.0009	194	269	311	330	-0.323	0.002	-0.202	0.200	33	90	27	250
Eleocharis acuta		0.0024	0.0057	0.0012		270	319	330		-0.079	-0.061	0.072		56	30	250
Eucalyptus camaldulensis		0.0014	0.0022	0.0020		251	324	369		-0.275	-0.330	-0.165		100	30	203
Gahnia filum		0.0040	0.0072	0.0010		280	311	330		-0.303	-0.238	0.250		50	28	250
Juncus amabilis		0.0039	0.0058	0.0012		266	317	330		0.125	0.014	0.094		51	29	250
Juncus procerus		0.0029	0.0045	0.0012		269	322	330		0.219	0.054	0.100		66	28	250
Lycopus australis		0.0018	0.0036	0.0015		264	312	330		-0.330	-0.304	0.250		73	48	217
Marsilea drummondii	0.0008	0.0025	0.0038	0.0012	188	274	316	330	-0.201	-0.330	-0.141	0.200	54	50	34	250
Melaleuca ericifolia		0.0017	0.0022	0.0018		268	334	330		0.250	-0.227	0.101		73	30	250
Melaleuca squarrosa		0.0013	0.0022	0.0024		264	338	333		0.250	-0.195	0.109		62	31	212
Meuhlenbeckia florulenta	0.0003	0.0024	0.0043	0.0012	143	270	326	358	-0.162	-0.007	-0.122	0.200	80	75	35	230
Myriophyllum crispatum		0.0020	0.0027	0.0011		251	312	379		-0.330	-0.234	-0.017		66	36	250
Nymphaea alba		0.0019	0.0026	0.0013		234	310	335		-0.330	-0.330	0.104		68	45	250
Paspalum distichum		0.0032	0.0048	0.0008		275	316	344		-0.330	-0.287	0.029		50	50	250
Persicaria decipiens		0.0026	0.0027	0.0011		280	325	332		-0.330	-0.330	0.250		60	43	250
Persicaria prostrata		0.0027	0.0032	0.0012		272	314	330		-0.330	-0.107	0.250		70	37	250
Phragmites australis		0.0030	0.0061	0.0013		265	321	330		0.143	-0.183	0.112		59	28	250
Restio tetraphyllus		0.0041	0.0058	0.0012		266	330	330		0.250	-0.103	0.250		51	30	250
Rumex crispus		0.0018	0.0025	0.0012		244	296	347		-0.330	0.128	0.102		79	35	250
Sphagnum sp		0.0027	0.0041	0.0011		280	331	333		0.203	-0.312	0.250		62	40	250
Typha domingensis		0.0020	0.0062	0.0014		270	324	330		-0.006	-0.285	0.008		67	23	250

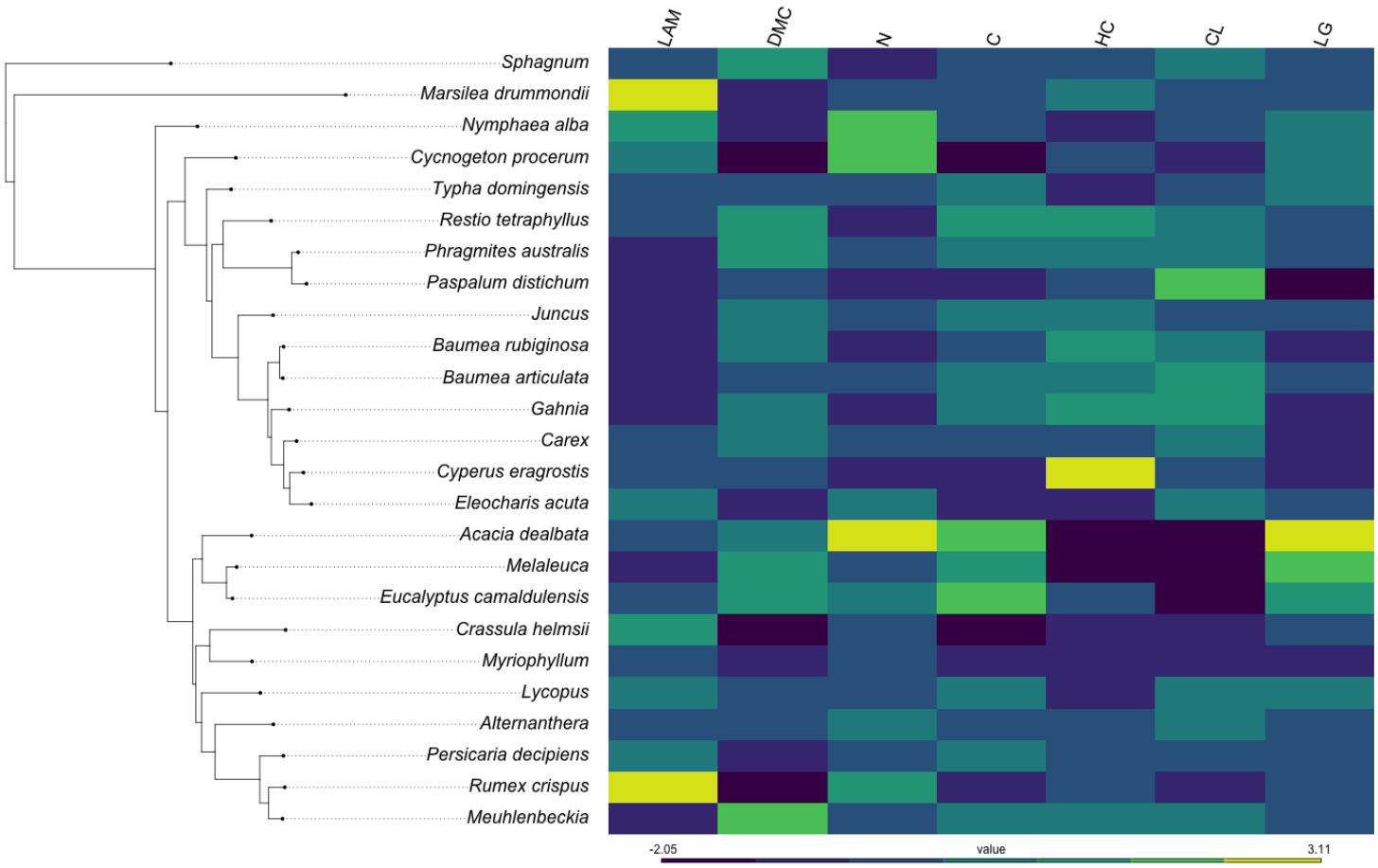


Fig. 5. Phylogenetic tree of species with traits. Tree at genus level where species level sequences for rcbL gene unavailable. If the branch represents more than one species, the trait value was averaged among species in that genus.

Table 5. Hierarchical classification scheme of wetland plant species by habit and response to water. Devised by Brock and Casanova (1997).

Abbreviation	Primary category	Secondary category	Description
AR	Amphibious	Fluctuation-responders	Species which germinate in flooded conditions, grow in both flooded and damp conditions, and reproduce above the surface of the water.
AT	Amphibious	Fluctuation-tolerators	Species which germinate in damp or flooded conditions and tolerate variation in water level.
Tda	Terrestrial	Damp species	Species which germinate, grow, and reproduce on saturated soil.
Tdr	Terrestrial	Dry species	Species which germinate, grow, and reproduce where there is no surface water and water table is below the soil surface.