

Appendix 6a. Summary statistics for growth and allocation responses (nitrogen, total biomass, carbon, root:shoot, C:N and water) to elevated CO2. For each response variable statistics are presented for both the main effect ("all" under heading "group") and individually for plant functional groups. E+ denotes effect size. Main effects highlighted in yellow are statistically significant (two-tailed tests) and pass Rosenthal's test (i.e. Fail safe ratio >1, see main text). Groups highlighted in green show significant variation between the levels of that group (QB test). For group members highlighted with red font, the individual effect size differs from zero (Z-test, two-tailed). Because many of these individual effects are expected to change in particular directions, we present the one-tailed probabilities as well although throughout the main text we use only the two-tailed probabilities.

Variable	Group	E+	df	Lower CI	Upper CI	QB	Prob (QB)	QW	Fail safe number	5n+10	Fail safe ratio	SE	Z	P (1-tailed)	P (2-tailed)
<b>Nitrogen</b>	<b>All</b>	<b>-0.157</b>	<b>501</b>	<b>-0.1741</b>	<b>-0.1405</b>				<b>55778.7</b>	<b>2520</b>	<b>22.1</b>	<b>0.0086</b>	<b>-18.352</b>	<b>0.000</b>	<b>0.000</b>
Nitrogen	Above-ground	-0.174	395	-0.1925	-0.1547	17.901	0.000	537.2672				0.0096	-18.003	0.000	0.000
Nitrogen	Below-ground	-0.071	83	-0.1153	-0.0269							0.0226	-3.153	0.001	0.002
Nitrogen	Whole plant	-0.155	21	-0.2311	-0.0787							0.0389	-3.984	0.000	0.000
Nitrogen	Nitrogen fixer	-0.101	53	-0.1463	-0.0566	7.240	0.007	675.7089				0.0229	-4.431	0.000	0.000
Nitrogen	Non-nitrogen fixer	-0.166	447	-0.1814	-0.1495							0.0081	-20.337	0.000	0.000
Nitrogen	C3	-0.163	364	-0.1827	-0.1436	14.301	0.000	430.288				0.0100	-16.362	0.000	0.000
Nitrogen	C4	-0.011	37	-0.0902	0.0675							0.0402	-0.281	0.389	0.779
Nitrogen	Fast	-0.165	300	-0.1861	-0.143	5.900	0.052	437.2143				0.0110	-14.971	0.000	0.000
Nitrogen	Slow	-0.141	49	-0.199	-0.0833							0.0295	-4.781	0.000	0.000
Nitrogen	Moderate	-0.090	51	-0.1488	-0.0309							0.0301	-2.989	0.001	0.003
Nitrogen	Angiosperm	-0.160	436	-0.1786	-0.142	0.690	0.406	554.2504				0.0093	-17.169	0.000	0.000
Nitrogen	Gymnosperm	-0.140	64	-0.1846	-0.0961							0.0226	-6.214	0.000	0.000
Nitrogen	Tree	-0.169	192	-0.1916	-0.1473	24.309	0.000	677.6456				0.0113	-14.990	0.000	0.000
Nitrogen	Grass	-0.137	167	-0.1646	-0.1087							0.0143	-9.579	0.000	0.000
Nitrogen	Shrub	-0.275	28	-0.3335	-0.2163							0.0299	-9.195	0.000	0.000
Nitrogen	Herb/Forbe	-0.123	111	-0.1564	-0.0902							0.0169	-7.301	0.000	0.000
<b>Total biomass</b>	<b>All</b>	<b>0.278</b>	<b>639</b>	<b>0.2537</b>	<b>0.3015</b>				<b>119158.8</b>	<b>3210</b>	<b>37.1</b>	<b>0.0122</b>	<b>22.766</b>	<b>0.000</b>	<b>0.000</b>
Total biomass	Non-nitrogen fixer	0.283	579	0.2579	0.309	0.280	0.597	539.6596				0.0130	21.740	0.000	0.000
Total biomass	Nitrogen fixer	0.260	47	0.1756	0.3447							0.0431	6.032	0.000	0.000
Total biomass	C3	0.284	567	0.2588	0.3095	8.502	0.004	504.7496				0.0129	21.966	0.000	0.000
Total biomass	C4	0.109	27	-0.0115	0.2294							0.0615	1.772	0.038	0.076
Total biomass	Fast	0.277	413	0.2473	0.3068	4.714	0.095	505.1345				0.0152	18.249	0.000	0.000
Total biomass	Moderate	0.351	85	0.2806	0.4215							0.0359	9.768	0.000	0.000
Total biomass	Slow	0.251	83	0.1811	0.3199							0.0354	7.075	0.000	0.000
Total biomass	Angiosperm	0.269	565	0.2437	0.2944	9.457	0.002	542.4947				0.0129	20.806	0.000	0.000
Total biomass	Gymnosperm	0.398	61	0.3181	0.4772							0.0406	9.799	0.000	0.000
Total biomass	Herb/Forbe	0.272	177	0.2282	0.3164	12.603	0.013	544.636				0.0225	12.102	0.000	0.000
Total biomass	Grass	0.222	173	0.176	0.2673							0.0233	9.519	0.000	0.000
Total biomass	Shrub	0.288	51	0.2012	0.3748							0.0443	6.503	0.000	0.000
Total biomass	Tree	0.328	227	0.2869	0.3688							0.0209	15.694	0.000	0.000
Total biomass	Sedge	0.167	7	-0.1284	0.4622							0.1507	1.108	0.134	0.268
Total biomass	Above-ground	0.267	365	0.2353	0.2986	2.340	0.310	543.7528				0.0161	16.528	0.000	0.000
Total biomass	Below-ground	0.305	209	0.2618	0.3481							0.0220	13.854	0.000	0.000
Total biomass	Whole plant	0.256	63	0.1794	0.3317							0.0389	6.576	0.000	0.000
<b>Carbon</b>	<b>All</b>	<b>0.002</b>	<b>59</b>	<b>0</b>	<b>0.0043</b>				<b>0</b>	<b>310</b>	<b>0.0</b>	<b>0.0011</b>	<b>2.006</b>	<b>0.022</b>	<b>0.045</b>
Carbon	Non-nitrogen fixer	0.001	55	-0.0023	0.0034	2.750	0.097	131.3328				0.0015	0.413	0.340	0.680
Carbon	Nitrogen fixer	0.004	3	-0.0009	0.0091							0.0026	1.607	0.054	0.108
Carbon	Fast	0.004	43	0.0021	0.0063	7.707	0.021	96.1092				0.0011	3.920	0.000	0.000
Carbon	Slow	0.015	7	-0.0098	0.04							0.0127	1.189	0.117	0.235
Carbon	Moderate	0.023	3	0.0002	0.0449							0.0114	1.982	0.024	0.047
Carbon	Angiosperm	0.005	49	0.0026	0.0068	32.326	0.000	107.1737				0.0011	4.387	0.000	0.000
Carbon	Gymnosperm	-0.010	9	-0.0153	-0.0046							0.0027	-3.627	0.000	0.000
Carbon	Grass	0.007	9	-0.0076	0.0219	14.386	0.001	121.7318				0.0075	0.943	0.173	0.345
Carbon	Herb/Forbe	0.005	17	0.0022	0.0077							0.0014	3.492	0.000	0.000
Carbon	Tree	-0.003	31	-0.0066	0.0005							0.0018	-1.712	0.043	0.087
<b>Root:shoot ratio</b>	<b>All</b>	<b>-0.016</b>	<b>86</b>	<b>-0.0506</b>	<b>0.0183</b>				<b>0</b>	<b>445</b>	<b>0.0</b>	<b>0.0176</b>	<b>-0.916</b>	<b>0.180</b>	<b>0.360</b>
Root:shoot ratio	Non-nitrogen fixer	-0.016	80	-0.051	0.0194	0.001	0.971	149.3547				0.0180	-0.880	0.189	0.379
Root:shoot ratio	Nitrogen fixer	-0.018	5	-0.1847	0.1481							0.0849	-0.216	0.415	0.829
Root:shoot ratio	Fast	-0.024	58	-0.0651	0.0176	0.786	0.675	145.3293				0.0211	-1.128	0.130	0.259
Root:shoot ratio	Slow	-0.014	13	-0.1117	0.0837							0.0498	-0.281	0.389	0.779
Root:shoot ratio	Moderate	0.021	11	-0.0807	0.1228							0.0519	0.406	0.342	0.684
Root:shoot ratio	Angiosperm	-0.017	84	-0.0522	0.0177	0.144	0.704	145.1283				0.0178	-0.965	0.167	0.335
Root:shoot ratio	Gymnosperm	0.024	1	-1.3304	1.378							0.6909	0.034	0.486	0.973
Root:shoot ratio	Grass	-0.008	15	-0.0975	0.0812	13.052	0.005	139.3865				0.0456	-0.180	0.429	0.857
Root:shoot ratio	Herb/Forbe	-0.135	15	-0.2145	-0.0545							0.0408	-3.295	0.000	0.001
Root:shoot ratio	Shrub	-0.012	3	-0.2626	0.2396							0.1281	-0.090	0.464	0.928
Root:shoot ratio	Tree	0.022	50	-0.0218	0.0665							0.0225	0.990	0.161	0.322
<b>Carbon:nitrogen ratio</b>	<b>All</b>	<b>0.188</b>	<b>151</b>	<b>0.1651</b>	<b>0.2107</b>				<b>14728.6</b>	<b>770</b>	<b>19.1</b>	<b>0.0116</b>	<b>16.153</b>	<b>0.000</b>	<b>0.000</b>
Carbon:nitrogen ratio	Non-nitrogen fixer	0.189	149	0.1674	0.2114	0.993	0.319	350.4806				0.0112	16.874	0.000	0.000
Carbon:nitrogen ratio	Nitrogen fixer	0.119	1	-0.7644	1.0029							0.4508	0.264	0.396	0.791
Carbon:nitrogen ratio	C3	0.182	141	0.1588	0.2058	2.431	0.119	302.9518				0.0120	15.205	0.000	0.000
Carbon:nitrogen ratio	C4	0.073	3	-0.1484	0.2934							0.1127	0.643	0.260	0.520
Carbon:nitrogen ratio	Moderate	0.276	11	0.1829	0.3692	7.579	0.023	276.3395				0.0475	5.810	0.000	0.000
Carbon:nitrogen ratio	Fast	0.176	97	0.1485	0.2035							0.0140	12.544	0.000	0.000
Carbon:nitrogen ratio	Slow	0.134	25	0.0738	0.195							0.0309	4.347	0.000	0.000
Carbon:nitrogen ratio	Angiosperm	0.189	143	0.1653	0.2124	0.110	0.740	325.0906				0.0120	15.722	0.000	0.000
Carbon:nitrogen ratio	Gymnosperm	0.173	7	0.0616	0.284							0.0567	3.046	0.001	0.002
Carbon:nitrogen ratio	Tree	0.215	55	0.1772	0.2531	8.152	0.043	343.7313				0.0194	11.114	0.000	0.000
Carbon:nitrogen ratio	Shrub	0.250	7	0.1529	0.346							0.0493	5.065	0.000	0.000
Carbon:nitrogen ratio	Grass	0.155	59	0.1211	0.1888							0.0173	8.969	0.000	0.000
Carbon:nitrogen ratio	Herb/Forbe	0.188	27	0.1327	0.2434							0.0282	6.657	0.000	0.000
<b>Water</b>	<b>All</b>	<b>-0.023</b>	<b>51</b>	<b>-0.0335</b>	<b>-0.0119</b>				<b>290.9</b>	<b>270</b>	<b>1.1</b>	<b>0.0055</b>	<b>-4.156</b>	<b>0.000</b>	<b>0.000</b>
Water	Non-nitrogen fixer	-0.029	43	-0.0416	-0.017	5.287	0.021	52.5835				0.0063	-4.669	0.000	0.000
Water	Nitrogen fixer	0.001	7	-0.0265	0.0276							0.0138	0.036	0.486	0.971
Water	C3	-0.023	47	-0.0349	-0.0118	2.140	0.144	51.342				0.0059	-3.971	0.000	0.000
Water	C4	0.012	1	-0.2887	0.3133							0.1536	0.080	0.468	0.936
Water	Slow	-0.026	9	-0.0539	0.001	1.246	0.536	57.9154							

Appendix 6b. Summary statistics for carbon-based primary metabolite responses to elevated CO<sub>2</sub>. For each response variable statistics are presented for both the main effect ("all" under heading "group") and individually for plant functional groups. E+ denotes effect size. Main effects highlighted in yellow are statistically significant (two-tailed tests) and pass Rosenthal's test (i.e. Fail safe ratio >1, see main text). Groups highlighted in green show significant variation between the levels of that group (QB test). For group members highlighted with red font, the individual effect size differs from zero (Z-test, two-tailed). Because many of these individual effects are expected to change in particular directions, we present the one-tailed probabilities as well although throughout the main test we use only the two-tailed probabilities. For soluble sugars, when divided into groups based on type of sugar, data from studies that did not specify the type of sugar measured are included in the group 'total soluble sugars'.

Variable	Group	E+	df	Lower CI	Upper CI	QB	Prob (QB)	QW	Fail safe number	5n+10	Fail safe ratio	SE	z	P (1-tailed)	P (2-tailed)
<b>Total carbohydrates</b>	<b>All</b>	<b>0.225</b>	<b>464</b>	<b>0.1818</b>	<b>0.2689</b>				<b>19025.1</b>	<b>2335</b>	<b>8.1</b>	<b>0.0222</b>	<b>10.140</b>	<b>0.000</b>	<b>0.000</b>
Total carbohydrates	Non-nitrogen fixer	0.196	335	0.1455	0.2455	4.7642	0.029	519.5202				0.0255	7.664	-0.000	-0.000
Total carbohydrates	Nitrogen fixer	0.302	128	0.2196	0.384							0.0419	7.196	-0.000	-0.000
Total carbohydrates	C3	0.234	424	0.1882	0.2801	4.9241	0.026	488.3533				0.0234	9.986	0.000	0.000
Total carbohydrates	C4	0.008	19	-0.1998	0.2156							0.1060	0.075	0.470	0.941
Total carbohydrates	Fast	0.250	310	0.1971	0.3033	3.8033	0.149	490.8722				0.0271	9.235	0.000	0.000
Total carbohydrates	Slow	0.160	43	0.0173	0.3034							0.0730	2.198	0.014	0.028
Total carbohydrates	Moderate	0.154	101	0.0566	0.2506							0.0495	3.104	0.001	0.002
Total carbohydrates	Gymnosperm	0.250	39	0.1006	0.3994	0.1212	0.728	500.4638				0.0762	3.280	0.001	0.001
Total carbohydrates	Angiosperm	0.223	424	0.1771	0.2689							0.0234	9.522	0.000	0.000
Total carbohydrates	Tree	0.168	219	0.1041	0.2311	14.8375	0.002	478.1103				0.0324	5.173	0.000	0.000
Total carbohydrates	Shrub	0.292	29	0.1101	0.4742							0.0929	3.145	0.001	0.002
Total carbohydrates	Grass	0.139	67	0.022	0.2558							0.0596	2.329	0.010	0.020
Total carbohydrates	Herb/Forbe	0.347	146	0.2662	0.427							0.0410	8.449	0.000	0.000
<b>Soluble sugars</b>	<b>All</b>	<b>0.075</b>	<b>242</b>	<b>0.0237</b>	<b>0.1264</b>				<b>703.9</b>	<b>1225</b>	<b>0.6</b>	<b>0.0262</b>	<b>2.867</b>	<b>0.002</b>	<b>0.004</b>
Soluble sugars	Non-nitrogen fixer	0.077	175	0.0163	0.1367	0.01	0.920	219.0627				0.0307	2.491	0.006	0.013
Soluble sugars	Nitrogen fixer	0.071	66	-0.0279	0.1693							0.0503	1.405	0.080	0.160
Soluble sugars	C3	0.080	218	0.0246	0.1349	1.7881	0.181	206.4268				0.0281	2.836	0.002	0.005
Soluble sugars	C4	-0.071	11	-0.3119	0.1695							0.1228	-0.580	0.281	0.562
Soluble sugars	Fast	0.091	164	0.027	0.1552	2.4497	0.294	204.723				0.0327	2.786	0.003	0.005
Soluble sugars	Moderate	0.078	59	-0.0309	0.1868							0.0555	1.403	0.080	0.161
Soluble sugars	Slow	-0.070	17	-0.2765	0.1362							0.1053	-0.667	0.252	0.505
Soluble sugars	Angiosperm	0.049	224	-0.0042	0.1022	13.7801	0.000	203.7783				0.0271	1.805	0.036	0.071
Soluble sugars	Gymnosperm	0.434	17	0.2228	0.6455							0.1078	4.027	0.000	0.000
Soluble sugars	Shrub	0.057	5	-0.3971	0.5113	4.6465	0.200	203.5481				0.2317	0.246	0.403	0.805
Soluble sugars	Tree	0.091	117	0.0153	0.1674							0.0388	2.356	0.009	0.018
Soluble sugars	Herb/Forbe	0.111	86	0.0214	0.1999							0.0455	2.429	0.008	0.015
Soluble sugars	Grass	-0.066	31	-0.2122	0.081							0.0748	-0.877	0.190	0.380
Soluble sugars	Total soluble sugars	0.117	82	0.0447	0.1897	9.8988	0.129	297.1643				0.0370	3.168	0.001	0.002
Soluble sugars	Sucrose	0.044	85	-0.0251	0.1131							0.0353	1.248	0.106	0.212
Soluble sugars	Fructose	0.145	25	0.005	0.2853							0.0715	2.029	0.021	0.042
Soluble sugars	Glucose	0.066	25	-0.0721	0.2042							0.0705	0.938	0.174	0.348
Soluble sugars	Hexose	-0.129	13	-0.3306	0.0731							0.1030	-1.251	0.106	0.211
Soluble sugars	Raffinose	-0.167	3	-0.7118	0.3788							0.2782	-0.598	0.275	0.550
Soluble sugars	Sorbitol	0.057	3	-0.4326	0.547							0.2499	0.229	0.409	0.819
<b>Starch</b>	<b>All</b>	<b>0.499</b>	<b>143</b>	<b>0.4073</b>	<b>0.5907</b>				<b>6065.5</b>	<b>730</b>	<b>8.3</b>	<b>0.0468</b>	<b>10.666</b>	<b>0.000</b>	<b>0.000</b>
Starch	Non-nitrogen fixer	0.443	87	0.3267	0.5602	2.2363	0.135	164.019				0.0596	7.444	-0.000	-0.000
Starch	Nitrogen fixer	0.584	55	0.437	0.7307							0.0749	7.793	-0.000	-0.000
Starch	C3	0.524	135	0.4297	0.6185	6.6283	0.010	156.5118				0.0482	10.882	0.000	0.000
Starch	C4	-0.133	3	-0.9307	0.6649							0.4070	-0.327	0.372	0.744
Starch	Fast	0.605	81	0.4872	0.7218	10.2023	0.006	157.9401				0.0598	10.101	0.000	0.000
Starch	Moderate	0.285	41	0.1065	0.4631							0.0910	3.131	0.001	0.002
Starch	Slow	0.355	15	0.0713	0.6386							0.1447	2.452	0.007	0.014
Starch	Angiosperm	0.577	123	0.479	0.6747	15.4439	0.000	155.4408				0.0499	11.556	0.000	0.000
Starch	Gymnosperm	0.100	19	-0.1318	0.332							0.1183	0.846	0.199	0.398
Starch	Shrub	0.523	5	-0.0621	1.1074	26.4265	0.000	164.9549				0.2983	1.752	0.040	0.080
Starch	Tree	0.334	75	0.2208	0.4462							0.0575	5.800	0.000	0.000
Starch	Herb/Forbe	0.818	46	0.6634	0.9728							0.0789	10.365	0.000	0.000
Starch	Grass	0.390	13	0.0923	0.6869							0.1517	2.569	0.005	0.010
<b>Total non-structural carbohydrates</b>	<b>All</b>	<b>0.394</b>	<b>41</b>	<b>0.315</b>	<b>0.472</b>				<b>1717.5</b>	<b>220</b>	<b>7.8</b>	<b>0.0401</b>	<b>9.825</b>	<b>0.000</b>	<b>0.000</b>
Total non-structural carbohydrates	Non-nitrogen fixer	0.381	35	0.2983	0.4632	1.0501	0.305	102.9691				0.0421	9.050	0.000	0.000
Total non-structural carbohydrates	Nitrogen fixer	0.519	5	0.1876	0.8512							0.1693	3.068	0.001	0.002
Total non-structural carbohydrates	C3	0.379	33	0.2914	0.4661	0.0024	0.961	100.2359				0.0446	8.497	0.000	0.000
Total non-structural carbohydrates	C4	0.385	3	0.0242	0.7452							0.1839	2.092	0.018	0.036
Total non-structural carbohydrates	Fast	0.434	33	0.3418	0.526	0.1537	0.695	91.5657				0.0470	9.234	0.000	0.000
Total non-structural carbohydrates	Slow	0.385	3	0.0159	0.7543							0.1884	2.044	0.020	0.041
Total non-structural carbohydrates	Gymnosperm	0.164	1	-1.776	2.1046	2.4242	0.119	99.8813				0.9899	0.166	0.434	0.868
Total non-structural carbohydrates	Angiosperm	0.410	39	0.3283	0.4922							0.0418	9.813	0.000	0.000
Total non-structural carbohydrates	Tree	0.217	15	0.0888	0.3459	24.0165	0.000	74.8384				0.0656	3.315	0.000	0.001
Total non-structural carbohydrates	Herb/Forbe	0.445	9	0.2468	0.6433							0.1011	4.400	0.000	0.000
Total non-structural carbohydrates	Grass	0.427	7	0.2068	0.6468							0.1122	3.802	0.000	0.000
Total non-structural carbohydrates	Shrub	0.775	7	0.5423	1.0081							0.1188	6.524	-0.000	-0.000
<b>Total structural carbohydrates</b>	<b>All</b>	<b>-0.126</b>	<b>21</b>	<b>-0.2431</b>	<b>-0.0078</b>				<b>20.8</b>	<b>120</b>	<b>0.2</b>	<b>0.0600</b>	<b>-2.091</b>	<b>0.018</b>	<b>0.037</b>
Total structural carbohydrates	Fast	-0.149	17	-0.3077	0.0099	0.1112	0.739	21.5017				0.0810	-1.838	0.033	0.066
Total structural carbohydrates	Slow	-0.075	1	-2.7068	2.5559							1.3425	-0.056	0.478	0.955
Total structural carbohydrates	Angiosperm	-0.139	19	-0.2692	-0.0085	0.3943	0.530	27.581				0.0665	-2.087	0.018	0.037
Total structural carbohydrates	Gymnosperm	-0.019	1	-2.304	2.2653							1.1656	-0.017	0.493	0.987
Total structural carbohydrates	Shrub	-0.206	3	-0.5749	0.164	12.3319	0.006	21.0692				0.1885	-1.090	0.138	0.276
Total structural carbohydrates	Tree	-0.218	13	-0.3672	-0.0692							0.0760	-2.870	0.002	0.004
Total structural carbohydrates	Herb/Forbe	0.256	1	-2.0726	2.5842							1.1880	0.215	0.415	0.830
Total structural carbohydrates	Grass	0.272	1	-1.8407	2.3853							1.0781	0.253	0.400	0.801

Appendix 6c. Summary statistics for nitrogen-based primary metabolite responses to elevated CO<sub>2</sub>. For each response variable statistics are presented for both the main effect ("all" under heading "group") and individually for plant functional groups. E+ denotes effect size. Main effects highlighted in yellow are statistically significant (two-tailed tests) and pass Rosenthal's test (i.e. Fail safe ratio >1, see main text). Groups highlighted in green show significant variation between the levels of that group (QB test). For group members highlighted with red font, the individual effect size differs from zero (Z-test, two-tailed). Because many of these individual effects are expected to change in particular directions, we present the one-tailed probabilities as well although throughout the main test we use only the two-tailed probabilities.

Variable	Group	E+	df	Lower CI	Upper CI	QB	Prob (QB)	QW	Fail safe number	5n+10	Fail safe ratio	SE	z	P (1-tailed)	P (2-tailed)
<b>Amino acids</b>	<b>All</b>	<b>-0.140</b>	<b>19</b>	<b>-0.2366</b>	<b>-0.0434</b>				<b>17.4</b>	<b>110</b>	<b>0.2</b>	<b>0.0493</b>	<b>-2.841</b>	<b>0.002</b>	<b>0.005</b>
<b>Protein</b>	<b>All</b>	<b>-0.099</b>	<b>75</b>	<b>-0.1477</b>	<b>-0.0504</b>				<b>428.3</b>	<b>390</b>	<b>1.1</b>	<b>0.0248</b>	<b>-3.988</b>	<b>0.000</b>	<b>0.000</b>
Protein	No	-0.079	57	-0.1306	-0.0268	2.330	0.127	37.512				0.0265	-2.972	0.002	0.003
Protein	Yes	-0.160	17	-0.2588	-0.0617							0.0503	-3.188	0.001	0.001
Protein	Fast	-0.069	41	-0.1333	-0.0045	6.317	0.042	39.509				-0.0329	2.097	0.018	0.036
Protein	Moderate	-0.543	1	-2.9089	1.8232							1.2072	-0.450	0.327	0.653
Protein	Slow	-0.068	5	-0.2894	0.1533							0.1129	-0.602	0.274	0.547
Protein	Herb/Forbe	-0.149	25	-0.2254	-0.0716	7.267	0.026	49.552				0.0392	-3.785	0.000	0.000
Protein	Tree	-0.040	11	-0.1628	0.0836							0.0629	-0.630	0.264	0.529
Protein	Grass	0.012	11	-0.0981	0.1225							0.0563	0.217	0.414	0.828

Appendix 6d. Summary statistics for secondary metabolite responses to elevated CO2. For each response variable statistics are presented for both the main effect ("all" under heading "group") and individually for plant functional groups. E+ denotes effect size. Main effects highlighted in yellow are statistically significant (two-tailed tests) and pass Rosenthal's test (i.e. Fail safe ratio >1, see main text). Groups highlighted in green show significant variation between the levels of that group (QB test). For group members highlighted with red font, the individual effect size differs from zero (Z-test, two-tailed). Because many of these individual effects are expected to change in particular directions, we present the one-tailed probabilities as well although throughout the main test we use only the two-tailed probabilities. For total phenolics, when divided into groups based on type of phenol, data from studies that did not specify the type of phenol measured are included in the group 'total phenolics'.

Variable	Group	E+	df	Lower CI	Upper CI	QB	Prob (QB)	QW	Fail safe number	5n+10	Fail safe ratio	SE	Z	P (1-tailed)	P (2-tailed)
<b>Total terpenes</b>	<b>All</b>	<b>-0.193</b>	<b>66</b>	<b>-0.2757</b>	<b>-0.1094</b>				<b>590.6</b>	<b>345</b>	<b>1.7</b>	<b>0.0424</b>	<b>-4.538</b>	<b>0.000</b>	<b>0.000</b>
Total terpenes	Moderate	0.092	19	-0.0373	0.2212	10.614	0.005	34.692				0.0659	1.394	0.082	0.163
Total terpenes	Slow	-0.170	21	-0.3084	-0.0315							0.0706	-2.407	0.008	0.016
Total terpenes	Fast	-0.505	3	-1.4952	0.4848							0.5051	-1.000	0.159	0.317
Total terpenes	Gymnosperm	-0.304	52	-0.3821	-0.2268	36.889	0.000	76.464				0.0396	-7.684	0.000	0.000
Total terpenes	Angiosperm	0.129	13	-0.0007	0.258							0.0660	1.949	0.026	0.051
Total terpenes	Tree	-0.307	56	-0.3829	-0.2311	41.909	0.000	73.623				0.0387	-7.928	0.000	0.000
Total terpenes	Shrub	0.153	9	0.0167	0.2883							0.0693	2.201	0.014	0.028
<b>Total terpene emission rate</b>	<b>All</b>	<b>-0.065</b>	<b>21</b>	<b>-0.3242</b>	<b>0.1933</b>				<b>0</b>	<b>120</b>	<b>0.0</b>	<b>0.1320</b>	<b>-0.495</b>	<b>0.310</b>	<b>0.620</b>
Total terpene emission rate	Moderate	0.092	17	-0.2428	0.427	2.538	0.111	24.514				0.1709	0.539	0.295	0.590
Total terpene emission rate	Fast	-0.284	3	-0.839	0.2716							0.2833	-1.001	0.158	0.317
Total terpene emission rate	Gymnosperm	0.013	11	-0.4411	0.4664	0.224	0.636	25.217				0.2315	0.055	0.478	0.956
Total terpene emission rate	Angiosperm	-0.110	9	-0.4638	0.2443							0.1806	-0.608	0.272	0.543
Total terpene emission rate	Tree	-0.153	15	-0.4393	0.133	1.697	0.193	24.840				0.1460	-1.049	0.147	0.294
Total terpene emission rate	Shrub	0.233	5	-0.4458	0.9111							0.3461	0.672	0.251	0.501
<b>Total phenolics</b>	<b>All</b>	<b>0.192</b>	<b>429</b>	<b>0.1537</b>	<b>0.2301</b>				<b>16493.7</b>	<b>2160</b>	<b>7.6</b>	<b>0.0195</b>	<b>9.846</b>	<b>0.000</b>	<b>0.000</b>
Total phenolics	Non-nitrogen fixer	0.163	391	0.1321	0.1933	18.660	0.000	523.131				0.0156	10.421	0.000	0.000
Total phenolics	Nitrogen fixer	0.355	37	0.2704	0.4392							0.0431	8.239	0.000	0.000
Total phenolics	Fast	0.203	283	0.1585	0.2483	1.575	0.455	351.193				0.0229	8.879	0.000	0.000
Total phenolics	Moderate	0.126	37	0.0081	0.2445							0.0603	2.094	0.018	0.036
Total phenolics	Slow	0.181	87	0.095	0.2677							0.0441	4.115	0.000	0.000
Total phenolics	Angiosperm	0.229	305	0.1879	0.27	11.761	0.001	395.699				0.0209	10.934	0.000	0.000
Total phenolics	Gymnosperm	0.099	123	0.037	0.1617							0.0318	3.125	0.001	0.002
Total phenolics	Grass	0.113	31	0.0282	0.1983	94.463	0.000	520.425				0.0434	2.609	0.005	0.009
Total phenolics	Shrub	0.091	37	-0.003	0.1847							0.0479	1.896	0.029	0.058
Total phenolics	Tree	0.147	313	0.1152	0.1791							0.0163	9.024	0.000	0.000
Total phenolics	Herb/Forbe	0.540	45	0.4612	0.6193							0.0403	13.394	0.000	0.000
Total phenolics	Total phenolics	0.037	147	-0.0103	0.0832	93.506	0.000	458.864				0.0239	1.530	0.063	0.126
Total phenolics	Condensed tannins	0.230	149	0.1821	0.2782							0.0245	9.386	0.000	0.000
Total phenolics	Total flavonoids	0.284	73	0.2187	0.3494							0.0333	8.518	0.000	0.000
Total phenolics	Phenylpropanoid acid intermediates	0.365	33	0.227	0.5034							0.0705	5.179	0.000	0.000
Total phenolics	Hydrolysable tannins	0.501	15	0.3283	0.6737							0.0881	5.686	0.000	0.000
Total phenolics	Coumarins	1.661	5	0.7888	2.5331							0.4450	3.733	0.000	0.000
Total phenolics	Non-condensed tannin phenolics	0.324	1	-2.6915	3.3398							1.5386	0.211	0.417	0.833
<b>Total flavonoids</b>	<b>All</b>	<b>0.271</b>	<b>73</b>	<b>0.1949</b>	<b>0.3474</b>				<b>1112.8</b>	<b>380</b>	<b>2.9</b>	<b>0.0389</b>	<b>6.969</b>	<b>0.000</b>	<b>0.000</b>
Total flavonoids	Non-nitrogen fixer	0.127	57	0.0488	0.205	49.437	0.000	82.717				0.0398	3.185	0.001	0.001
Total flavonoids	Nitrogen fixer	0.595	15	0.4801	0.7102							0.0587	10.140	0.000	0.000
Total flavonoids	Gymnosperm	0.239	3	-0.3504	0.829	0.031	0.860	95.348				0.3009	0.795	0.213	0.426
Total flavonoids	Angiosperm	0.273	69	0.1947	0.3506							0.0398	6.854	-0.000	-0.000
Total flavonoids	Tree	-0.020	25	-0.1743	0.134	56.407	0.000	76.222				0.0786	-0.257	0.399	0.797
Total flavonoids	Shrub	0.348	5	-0.0281	0.7249							0.1921	1.814	0.035	0.070
Total flavonoids	Grass	0.164	25	0.0648	0.2625							0.0504	3.246	0.001	0.001
Total flavonoids	Herb/Forbe	0.595	15	0.4805	0.7099							0.0585	10.171	0.000	0.000
<b>Nitrogen-based secondary metabolites</b>	<b>All</b>	<b>-0.157</b>	<b>21</b>	<b>-0.2752</b>	<b>-0.0393</b>				<b>9.3</b>	<b>120</b>	<b>0.1</b>	<b>0.0602</b>	<b>-2.612</b>	<b>0.004</b>	<b>0.009</b>
Nitrogen-based secondary metabolites	Shrub	-0.157	1	-2.0616	1.7483	4.021	0.259	15.616				0.9719	-0.161	0.436	0.872
Nitrogen-based secondary metabolites	Tree	-0.058	3	-0.5093	0.3944							0.2305	-0.249	0.402	0.803
Nitrogen-based secondary metabolites	Grass	0.324	3	-0.5713	1.219							0.4567	0.709	0.239	0.478
Nitrogen-based secondary metabolites	Herb/Forbe	-0.210	11	-0.3604	-0.06							0.0766	-2.743	0.003	0.006
<b>Condensed tannins</b>	<b>All</b>	<b>0.224</b>	<b>147</b>	<b>0.182</b>	<b>0.2656</b>				<b>6709.1</b>	<b>750</b>	<b>8.9</b>	<b>0.0213</b>	<b>10.494</b>	<b>0.000</b>	<b>0.000</b>
Condensed tannins	Non-nitrogen fixer	0.214	133	0.1715	0.2571	1.416	0.234	167.929				0.0218	9.814	0.000	0.000
Condensed tannins	Nitrogen fixer	0.298	13	0.1532	0.4433							0.0740	4.029	0.000	0.000
Condensed tannins	Fast	0.207	97	0.1567	0.2571	1.116	0.572	155.677				0.0256	8.078	0.000	0.000
Condensed tannins	Slow	0.254	21	0.1328	0.3749							0.0618	4.111	0.000	0.000
Condensed tannins	Moderate	0.260	19	0.1439	0.3751							0.0590	4.400	0.000	0.000
Condensed tannins	Angiosperm	0.270	113	0.2191	0.3215	9.879	0.002	151.813				0.0261	10.347	0.000	0.000
Condensed tannins	Gymnosperm	0.128	33	0.0525	0.2037							0.0386	3.321	0.000	0.001
Condensed tannins	Shrub	0.284	13	0.1327	0.436	6.792	0.079	168.033				0.0774	3.674	0.000	0.000
Condensed tannins	Tree	0.214	117	0.1693	0.2589							0.0229	9.367	0.000	0.000
Condensed tannins	Herb/forb	0.300	13	0.1579	0.4422							0.0725	4.138	0.000	0.000
Condensed tannins	Grass	-0.029	1	-1.5379	1.4794							0.7697	-0.038	0.485	0.970
<b>Total glycosides</b>	<b>All</b>	<b>-0.027</b>	<b>101</b>	<b>-0.0981</b>	<b>0.0439</b>				<b>0</b>	<b>520</b>	<b>0.0</b>	<b>0.0362</b>	<b>-0.748</b>	<b>0.227</b>	<b>0.454</b>
Total glycosides	Herb/Forbe	-0.171	35	-0.2773	-0.0637	16.117	0.000	94.769				0.0545	-3.129	0.001	0.002
Total glycosides	Tree	0.106	57	0.0113	0.2001							0.0482	2.195	0.014	0.028
Total glycosides	Shrub	-0.114	7	-0.3514	0.123							0.1210	-0.944	0.173	0.345
<b>Phenylpropanoid acid intermediates</b>	<b>All</b>	<b>0.340</b>	<b>23</b>	<b>0.0388</b>	<b>0.6402</b>				<b>25.4</b>	<b>130</b>	<b>0.2</b>	<b>0.1534</b>	<b>2.213</b>	<b>0.013</b>	<b>0.027</b>
Phenylpropanoid acid intermediates	Tree	-0.007	13	-0.3775	0.3628	9.007	0.003	29.088				0.1889	-0.039	0.484	0.969
Phenylpropanoid acid intermediates	Herb/Forbe	0.760	9	0.3307	1.1902							0.2193	3.468	0.000	0.001

Appendix 6e. Summary statistics for physical parameter responses to elevated CO2. For each response variable statistics are presented for both the main effect ("all" under heading "group") and individually for plant functional groups. E+ denotes effect size. Main effects highlighted in yellow are statistically significant (two-tailed tests) and pass Rosenthal's test (i.e. Fail safe ratio >1, see main text). Groups highlighted in green show significant variation between the levels of that group (QB test). For group members highlighted with red font, the individual effect size differs from zero (Z-test, two-tailed). Because many of these individual effects are expected to change in particular directions, we present the one-tailed probabilities as well although throughout the main test we use only the two-tailed probabilities.

Variable	Group	E+	df	Lower CI	Upper CI	QB	Prob (QB)	QW	Fail safe number	5n+10	Fail safe ratio	SE	Z	P (1-tailed)	P (2-tailed)
<b>Specific leaf area</b>	<b>All</b>	<b>-0.088</b>	<b>109</b>	<b>-0.2002</b>	<b>0.0245</b>				<b>0</b>	<b>560</b>	<b>0.0</b>	<b>0.0573</b>	<b>-1.532</b>	<b>0.063</b>	<b>0.126</b>
Specific leaf area	Non-nitrogen fixer	-0.095	99	-0.2135	0.0233	0.163	0.686	18.560				0.0604	-1.574	0.058	0.115
Specific leaf area	Nitrogen fixer	-0.015	9	-0.4417	0.4112							0.2176	-0.070	0.472	0.944
Specific leaf area	C3	-0.093	87	-0.2204	0.0354	0.111	0.740	17.942				0.0653	-1.418	0.078	0.156
Specific leaf area	C4	-0.041	17	-0.3387	0.2569							0.1519	-0.269	0.394	0.788
Specific leaf area	Fast	-0.122	41	-0.312	0.0687	0.284	0.867	17.106				0.0971	-1.252	0.105	0.211
Specific leaf area	Slow	-0.079	29	-0.3082	0.1498							0.1168	-0.678	0.249	0.498
Specific leaf area	Moderate	-0.045	29	-0.2726	0.1833							0.1163	-0.383	0.351	0.701
Specific leaf area	Angiosperm	-0.081	93	-0.203	0.0416	0.094	0.760	18.566				0.0624	-1.293	0.098	0.196
Specific leaf area	Gymnosperm	-0.130	15	-0.4509	0.1901							0.1635	-0.797	0.213	0.425
Specific leaf area	Grass	-0.004	37	-0.1788	0.1712	1.975	0.740	21.519				0.0893	-0.043	0.483	0.966
Specific leaf area	Tree	-0.170	41	-0.3365	-0.003							0.0851	-1.995	0.023	0.046
Specific leaf area	Herb/Forbe	-0.085	25	-0.301	0.1312							0.1103	-0.770	0.221	0.441
Specific leaf area	Shrub	-0.089	1	-4.8587	4.68							2.4333	-0.037	0.485	0.971
Specific leaf area	Sedge	-0.010	1	-4.7308	4.7108							2.4086	-0.004	0.498	0.997
<b>Toughness</b>	<b>All</b>	<b>0.106</b>	<b>17</b>	<b>0.0138</b>	<b>0.1981</b>				<b>23.3</b>	<b>100</b>	<b>0.2</b>	<b>0.0470</b>	<b>2.252</b>	<b>0.012</b>	<b>0.024</b>
Toughness	Fast	0.264	3	-0.0102	0.5388	6.302	0.043	12.298				0.1401	1.887	0.030	0.059
Toughness	Moderate	0.001	3	-0.2415	0.2438							0.1238	0.009	0.496	0.993
Toughness	Slow	-0.010	1	-1.3741	1.3547							0.6961	-0.014	0.494	0.989
Toughness	Tree	0.109	15	0.0064	0.2106	0.016	0.900	18.830				0.0521	2.083	0.019	0.037
Toughness	Shrub	0.092	1	-1.5194	1.7024							0.8219	0.111	0.456	0.911
<b>Specific leaf weight</b>	<b>All</b>	<b>0.181</b>	<b>51</b>	<b>0.109</b>	<b>0.2531</b>				<b>393.7</b>	<b>270</b>	<b>1.5</b>	<b>0.0368</b>	<b>4.927</b>	<b>0.000</b>	<b>0.000</b>
Specific leaf weight	Non-nitrogen fixer	0.200	43	0.1224	0.2783	2.147	0.143	41.342				0.0398	5.039	0.000	0.000
Specific leaf weight	Nitrogen fixer	0.035	7	-0.2146	0.2854							0.1276	0.278	0.391	0.781
Specific leaf weight	C3	0.203	31	0.1125	0.2933	2.845	0.092	32.753				0.0461	4.399	0.000	0.000
Specific leaf weight	C4	0.031	5	-0.2058	0.2672							0.1207	0.254	0.400	0.799
Specific leaf weight	Fast	0.168	37	0.0852	0.2515	4.229	0.121	34.288				0.0424	3.970	0.000	0.000
Specific leaf weight	Moderate	0.614	1	-2.1178	3.3455							1.3937	0.440	0.330	0.660
Specific leaf weight	Slow	0.136	1	-1.8898	2.1613							1.0334	0.131	0.448	0.896
Specific leaf weight	Shrub	0.331	5	0.1107	0.5521	4.324	0.229	42.263				0.1126	2.943	0.002	0.003
Specific leaf weight	Tree	0.181	9	0.0247	0.3375							0.0798	2.270	0.012	0.023
Specific leaf weight	Herb/Forbe	0.124	29	0.0188	0.2291							0.0536	2.311	0.010	0.021
Specific leaf weight	Grass	0.197	5	-0.0627	0.4564							0.1324	1.487	0.069	0.137
<b>General toughness</b>	<b>All</b>	<b>0.152</b>	<b>75</b>	<b>0.1094</b>	<b>0.1955</b>				<b>1231</b>	<b>390</b>	<b>3.2</b>	<b>0.0220</b>	<b>6.939</b>	<b>0.000</b>	<b>0.000</b>
General toughness	Non-nitrogen fixer	0.157	67	0.1129	0.2017	0.711	0.399	95.874				0.0227	6.944	0.000	0.000
General toughness	Nitrogen fixer	0.085	7	-0.1125	0.2816							0.1005	0.840	0.200	0.401
General toughness	C3	0.165	49	0.0961	0.2336	1.897	0.168	47.832				0.0351	4.698	0.000	0.000
General toughness	C4	0.031	5	-0.2035	0.265							0.1195	0.258	0.398	0.797
General toughness	Fast	0.179	41	0.1038	0.2547	1.120	0.571	51.112				0.0385	4.655	0.000	0.000
General toughness	Moderate	0.135	5	-0.1136	0.3836							0.1268	1.064	0.144	0.287
General toughness	Slow	0.063	3	-0.2808	0.4077							0.1756	0.361	0.359	0.718
General toughness	Angiosperm	0.156	73	0.1114	0.2003	0.584	0.445	93.114				0.0227	6.870	-0.000	-0.000
General toughness	Gymnosperm	0.070	1	-1.3385	1.4775							0.7184	0.097	0.461	0.923
General toughness	Shrub	0.237	9	0.1204	0.3542	3.816	0.282	86.368				0.0596	3.979	0.000	0.000
General toughness	Tree	0.132	27	0.0626	0.2009							0.0353	3.736	0.000	0.000
General toughness	Herb/Forbe	0.122	31	0.0383	0.2049							0.0425	2.861	0.002	0.004
General toughness	Grass	0.187	5	-0.0263	0.3995							0.1086	1.718	0.043	0.086