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## Plant Traits and Production Rates from CO2 Starvation to Saturation

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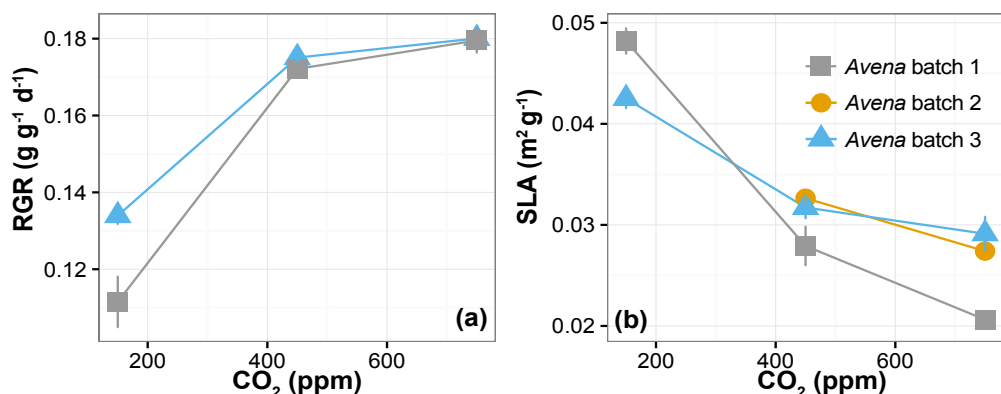
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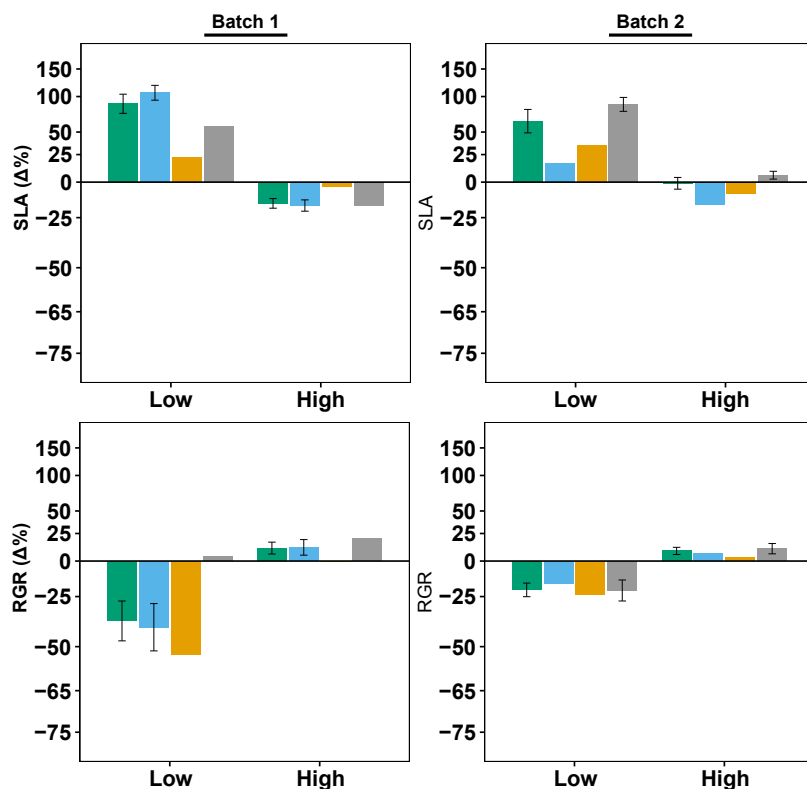
## **Appendix 2**

**Appendix table 2.1** Species grown for the experiment with their species name, family name and functional type. # replicates notes how much individuals of the species were harvested at final harvest for all three treatments.

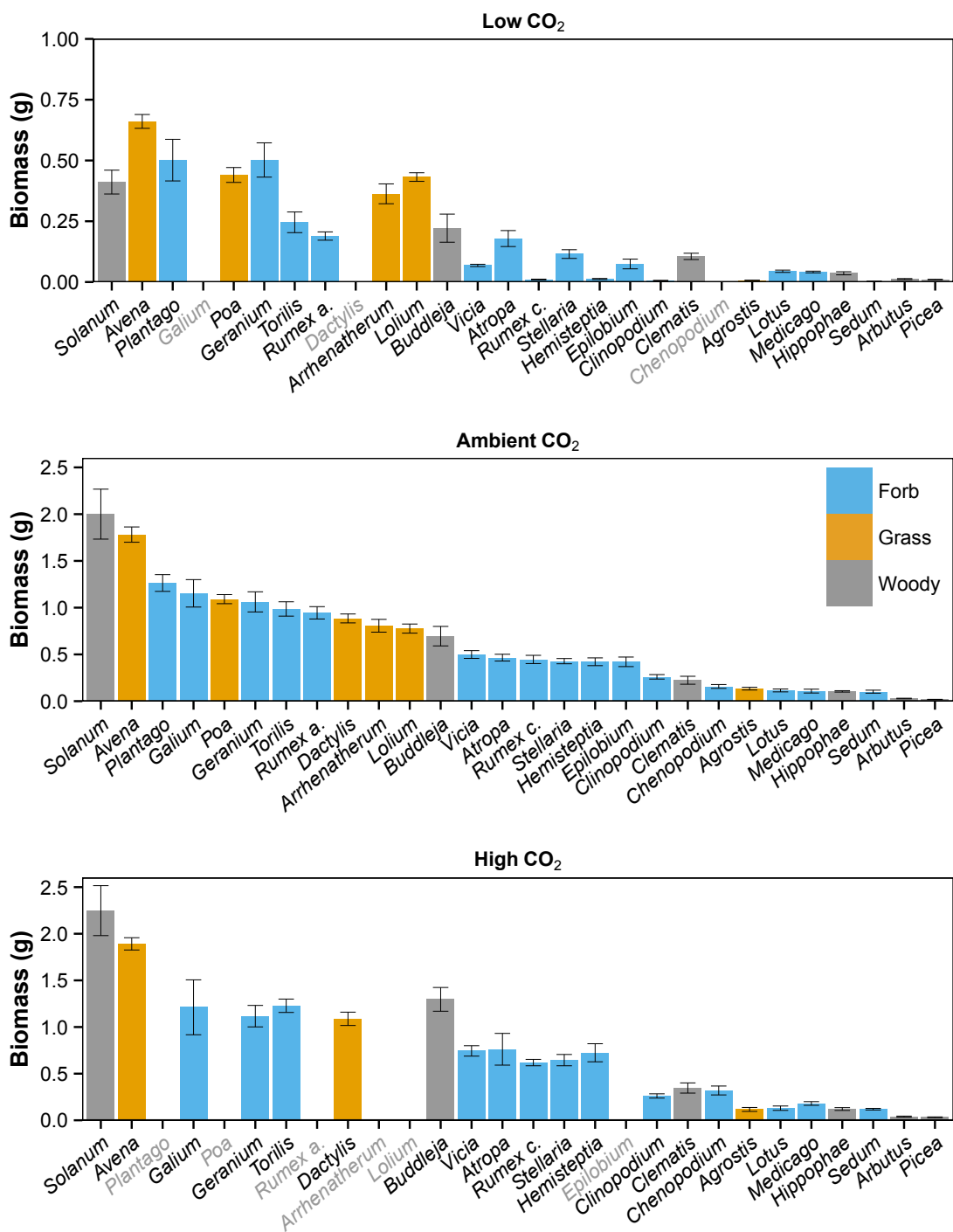
Species name	Family	Type	# replicates		
			low CO <sub>2</sub>	amb. CO <sub>2</sub>	high CO <sub>2</sub>
<i>Agrostis capillaris</i>	Poaceae	grass	5	6	7
<i>Arbutus unedo</i>	Ericaceae	woody, tree	5	7	6
<i>Arrhenatherum elatius</i>	Poaceae	grass	8	9	x
<i>Atropa belladonna</i>	Solanaceae	forb	7	6	6
<i>Avena sativa</i>	Poaceae	grass	10	10	9
<i>Buddleja davidii</i>	Scrophulariaceae	woody, shrub	6	6	7
<i>Chenopodium album</i>	Amaranthaceae	forb	x	10	10
<i>Clematis vitalba</i>	Ranunculaceae	woody, shrub	4	5	5
<i>Clinopodium chinense</i>	Lamiaceae	forb	8	8	7
<i>Dactylis glomerata</i>	Poaceae	grass	x	10	9
<i>Epilobium hirsutum</i>	Onagraceae	forb	4	8	x
<i>Galium aparine</i>	Rubiaceae	forb	x	5	5
<i>Geranium pratense</i>	Geraniaceae	forb	6	6	6
<i>Hemisteptia lyrata</i>	Asteraceae	forb	7	7	8
<i>Hippophae rhamnoides</i>	Elaeagnaceae	woody, shrub	6	7	6
<i>Lolium perenne</i>	Poaceae	grass	10	10	x
<i>Lotus corniculatus</i>	Fabaceae	forb	5	9	8
<i>Medicago lupulina</i>	Fabaceae	forb	6	6	6
<i>Picea sitchensis</i>	Pinaceae	woody, tree	8	8	6
<i>Plantago lanceolata</i>	Plantaginaceae	forb	7	10	x
<i>Poa annua</i>	Poaceae	grass	10	10	x
<i>Rumex acetosella</i>	Polygonaceae	forb	4	10	x
<i>Rumex chalepensis</i>	Polygonaceae	forb	7	7	7
<i>Sedum album</i>	Crassulaceae	forb	5	8	7
<i>Solanum dulcamara</i>	Solanaceae	woody, shrub	7	7	6
<i>Stellaria media</i>	Caryophyllaceae	forb	7	7	7
<i>Torilis scabra</i>	Apiaceae	forb	5	6	6
<i>Vicia sepium</i>	Fabaceae	forb	8	8	7



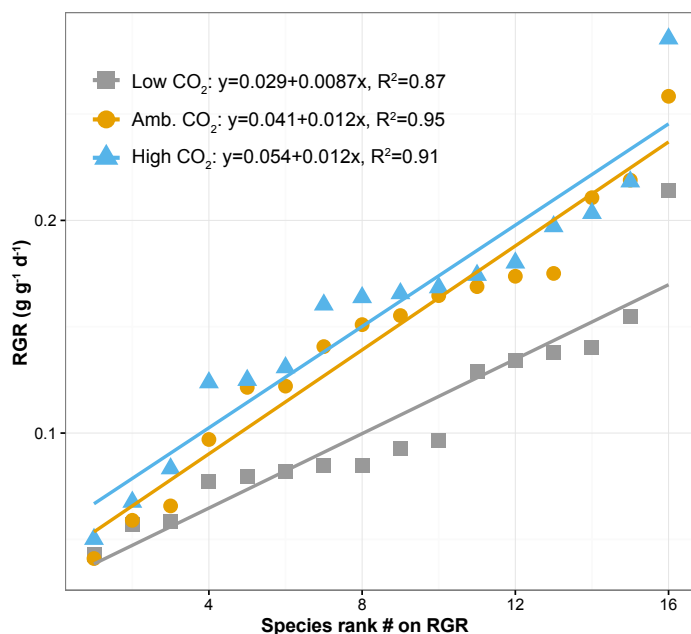
**Appendix 2.1** Response of multiple batches of *Avena sativa* to CO<sub>2</sub> grown at different times during the experiment. **(a)** Relative growth rate (RGR), **(b)** specific leaf area (SLA). Plants in batch 1 were for a pilot experiment, batch 2 had missing low CO<sub>2</sub> data, batch 3 was used for the main results.



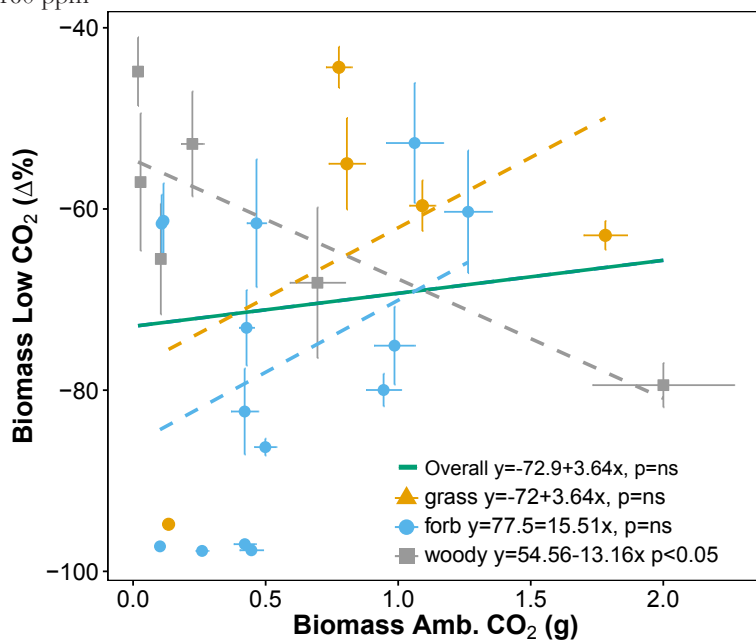
**Appendix 2.2** Comparison of RGR and SLA response to CO<sub>2</sub> of two batches of different species grown at different times. Relative shift in trait level at low or high CO<sub>2</sub> compared to ambient CO<sub>2</sub> for forb, grass and woody species. Bars indicate percentage shift in trait value at low CO<sub>2</sub> (160 ppm) and high (750 ppm) CO<sub>2</sub> compared to trait value at ambient (450 ppm) CO<sub>2</sub>. Axes are natural log transformed so that the size of the bars at a 50% decrease or a 100% increase is the same (reflecting a factor 2 adjustment). Green bars: all species, blue bars: forb species, orange bars: grass species, grey bars: woody species. Error bars give SE if there are multiple species per type.



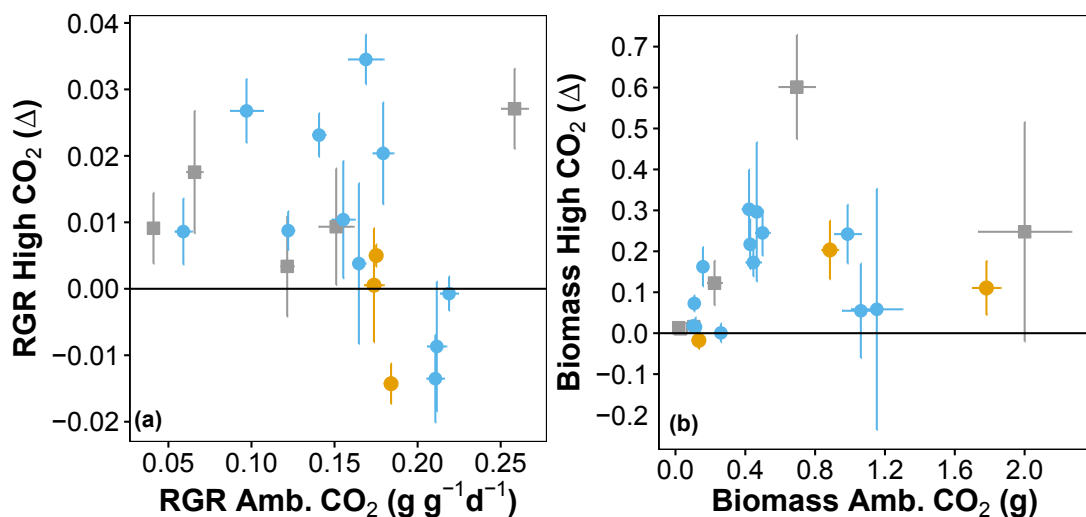
**Appendix 2.3** Plant species biomass (g) ranking at 160 ppm, 450 ppm and 750 ppm CO<sub>2</sub>. Species are ordered by RGR at 450 ppm CO<sub>2</sub>. Light grey species names indicate species is missing at this CO<sub>2</sub> treatment. Note the different axis scale at low CO<sub>2</sub>. Orange bars: grass species, blue bars: forb species, grey bars: woody species. Error bars denote SE.



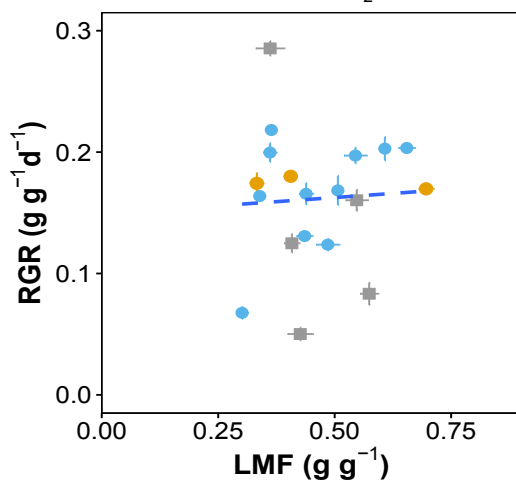
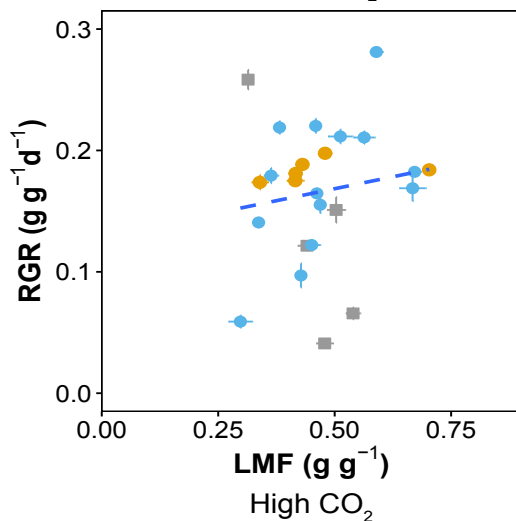
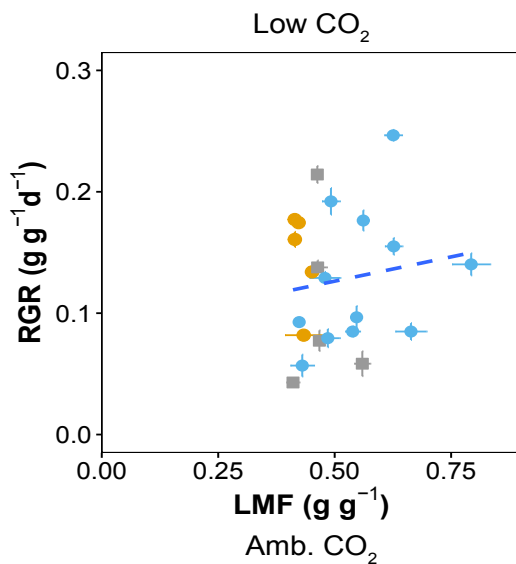
**Appendix 2.4** Plant relative growth rate rank vs Relative Growth Rate at 160 ppm, 450 ppm and 750 ppm CO<sub>2</sub>. Species are ordered by RGR from low to high at each CO<sub>2</sub> level. The slope between rank and RGR is significantly lower than the slopes at ambient and high CO<sub>2</sub> ( $p < 0.05$ ) which shows that the difference between the fastest and slowest grower is reduced. Orange: 450 ppm, Blue: 750 ppm, Grey: 160 ppm



**Appendix 2.5** Relative amount of biomass lost at low (160) CO<sub>2</sub> as compared to ambient CO<sub>2</sub>. Relative biomass difference (Δ%) at low CO<sub>2</sub> shows no relationship with biomass at ambient CO<sub>2</sub>. Blue circles: forb species, orange triangles: grass species, grey squares: woody species, Black line: overall regression. Error bars give SE



**Appendix 2.6** Difference in growth rate and plant biomass at future high (750 ppm) CO<sub>2</sub> compared to current ambient (450 ppm) CO<sub>2</sub>. **(a)** Relative Growth Rate difference at low CO<sub>2</sub> shows no relationship to growth rate at ambient CO<sub>2</sub>. **(b)** Biomass difference at low CO<sub>2</sub> shows no relationship with biomass at ambient CO<sub>2</sub>. Blue circles: forb species, orange circles: grass species, grey squares: woody species. Error bars give SE



**Appendix 2.7** Relationship between leaf mass fraction (LMF) and relative growth rate (RGR) at past low (160 ppm), current ambient (450 ppm) and future high (750 ppm) CO<sub>2</sub>. No significant relationship between LMF and RGR was found. Points indicate species mean RGR and LMF with SE; Blue circles: forb species, orange circles: grass species, grey squares: woody species.



