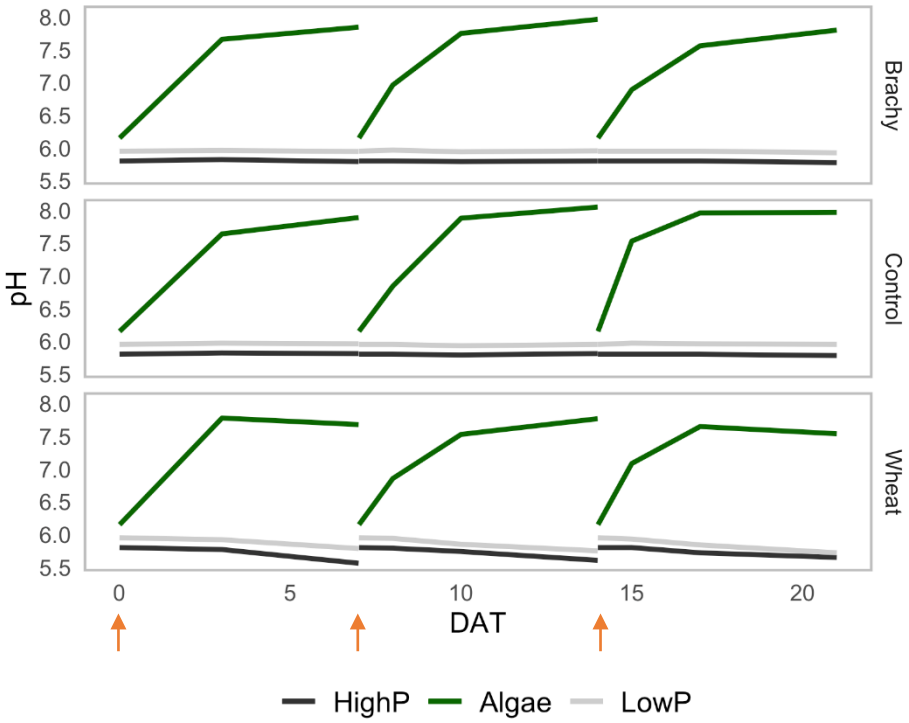
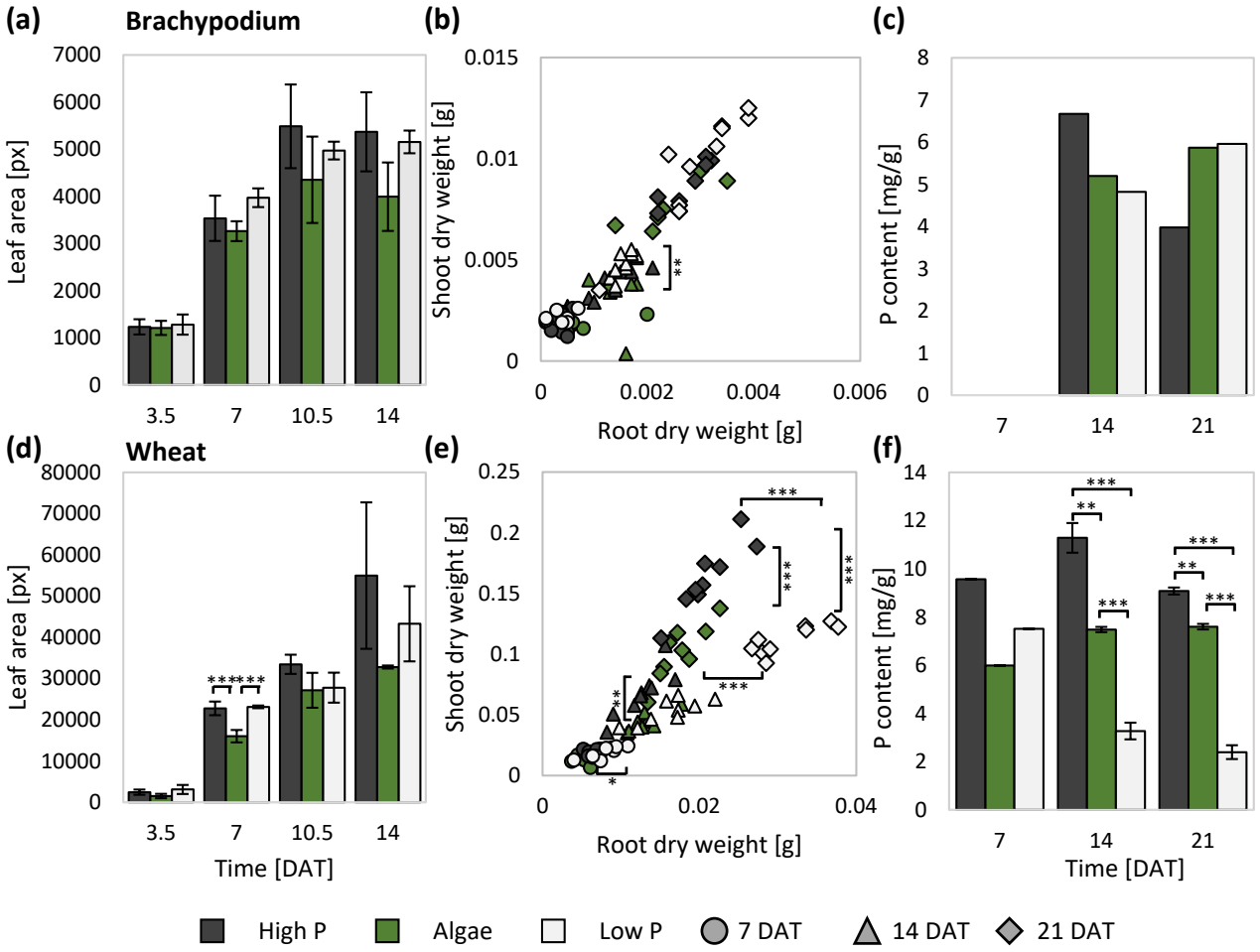
Supplemental Table S1. Composition of treatments based on 0.5x Hoagland. All concentrations in mM unless noted otherwise.

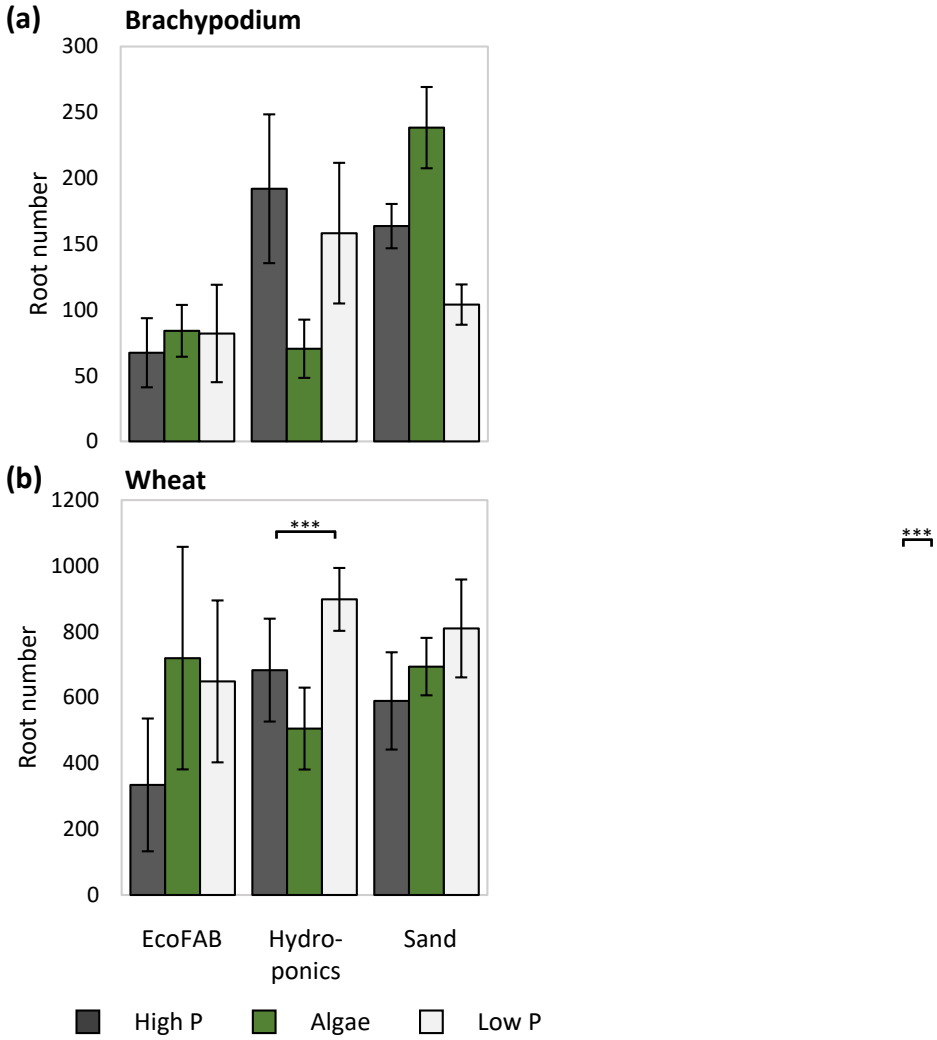
mM	**High P** (0.5x Hoagland full)	**Algae** (mineral addition to 0.5x Hoagland level)	**Low P** (0.5x Hoagland 10% P)
$NH_4H_2PO_4$	0.500	-	0.050
KNO_3	3.000	-	2.550
$Ca(NO_3)_2$	1.551	0.592	1.551
NH_4NO_3	0.449	-	0.899
K_2CO_3	-	1.221	0.225
$MgSO_4$	1.000	-	1.000
$Mg(CH_3COO)_2$	-	0.877	-
$FeSO_4$ Na_2-EDTA	0.045	0.008	0.045
$CaSO_4$	-	0.843	-
MES	6	6	6
Micronutrients	0.5 ml/l	0.5 ml/l	0.5 ml/l



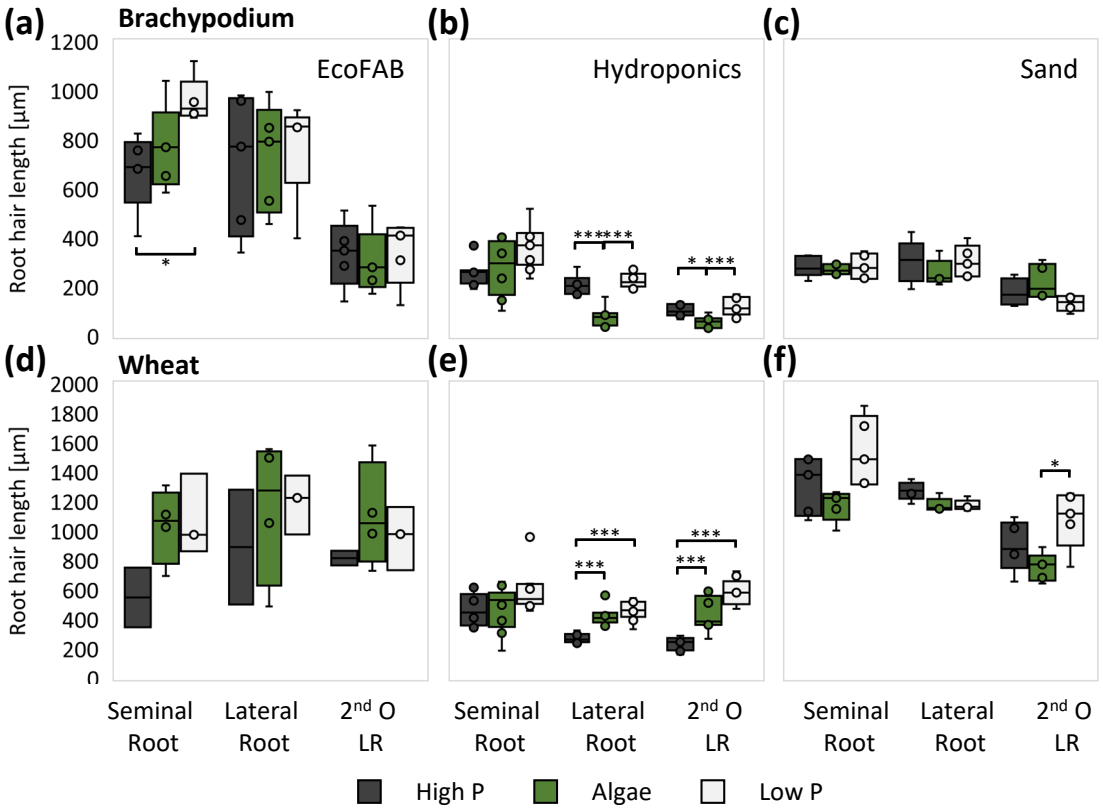
Supplemental Figure S1. pH changes over the experimental time frame in hydroponics. In hydroponics pH values were measured twice to three times per week for boxes containing brachypodium (top row) or wheat plants (bottom row). Control boxes (middle row) did contain nutrient solution, but no plants. Nutrient solution was replaced by freshly prepared nutrient solution every 7 days as indicated in Figure 1.



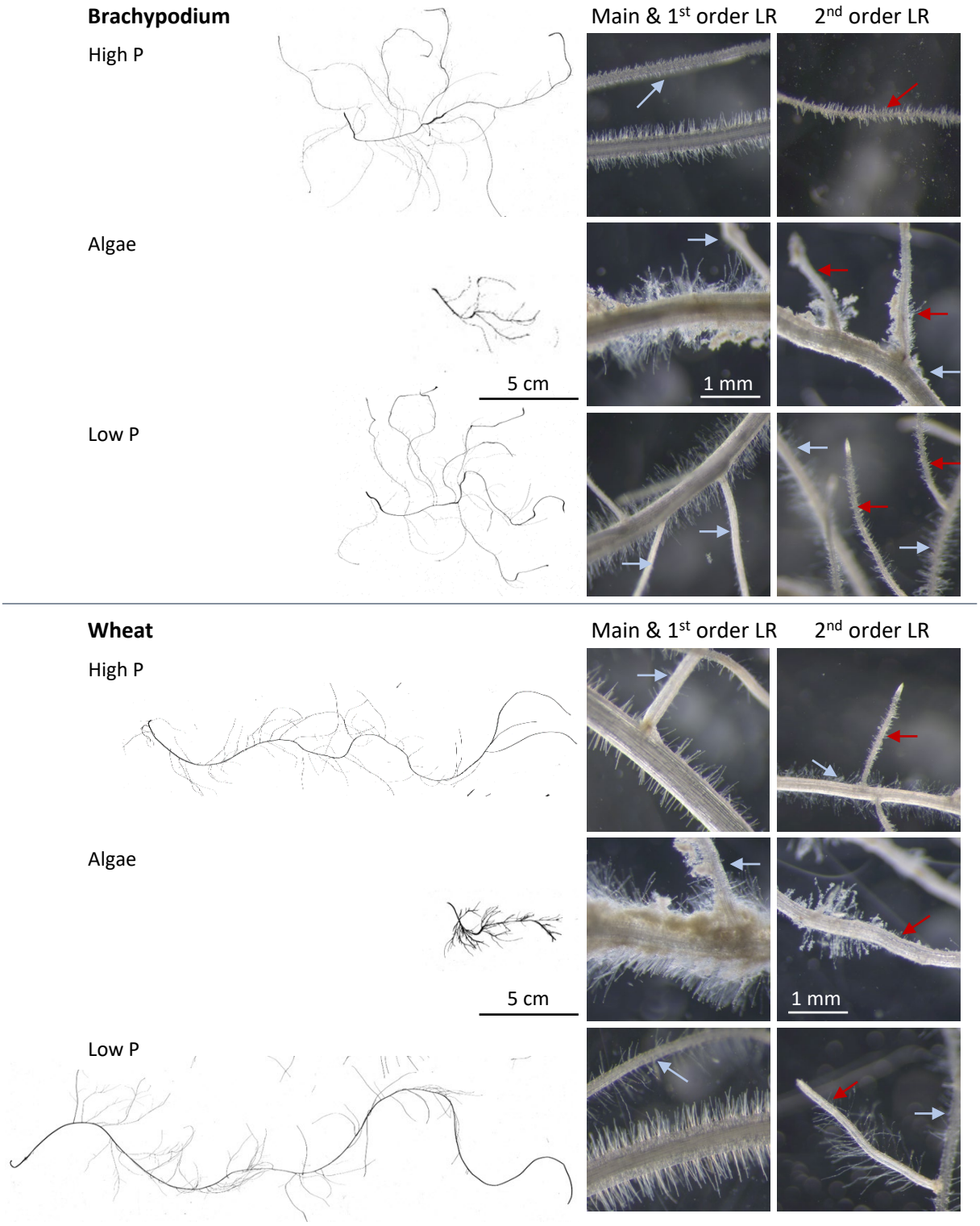
Supplementary Figure S2. Brachypodium and wheat plant development over time in hydroponics.
Brachypodium **(a-c)**, and wheat **(d-f)** projected leaf area determined until 14 DAT (a,d), root vs shoot mass of shoot and root dry weight measured (b,e), and P content measured by ICP-OES (c,f) at 7, 14, and 21 DAT. Mean +/- SE 9 independent plants are shown (a,d), while each data point represents one plant in (b,e); and pool-sampled measurements are depicted in (c,f). Significant differences tested by ANOVA with Tukey HSD per growth setup, refering to * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.



Supplementary Figure S3. Total root number of Brachypodium and wheat plants.
At 21 DAT, scanned root images were analysed using WinRhizo to extract root tip number of Brachypodium **(a)** and wheat **(b)** plants. Mean +/- standard deviation (n>3).



Supplementary Figure S4. Detailed root hair analysis for Brachypodium and wheat plants grown in all three experimental setups.
Root hair length of Brachypodium **(a-c)** and wheat **(d-f)** plants grown in either EcoFABs (a,d), hydroponics (b,e) or sand (c,f) setup for 21 DAT. Box plots from 5 (a,c,d,f) or 9 (b,e) independent plants are depicted. Significant differences tested by ANOVA with Tukey HSD per growth setup and root type, refering to * $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$.



Supplemental Figure S5. Brachypodium and wheat root phenotype in hydroponics. At final harvest, 21 DAT, brachypodium (top row) and wheat (bottom row) roots were cut, imaged stereomicroscopically and subsequently scanned with WinRhizo. Example scanned roots (left) and example stereomicroscope images (right) are depicted. Main (seminal) root, 1st order (blue), and 2nd order (red) lateral roots (LRs) are marked with arrows. Scale bar for all scans 5 cm, for all stereo microscope images 1mm.