

Supplementary Materials

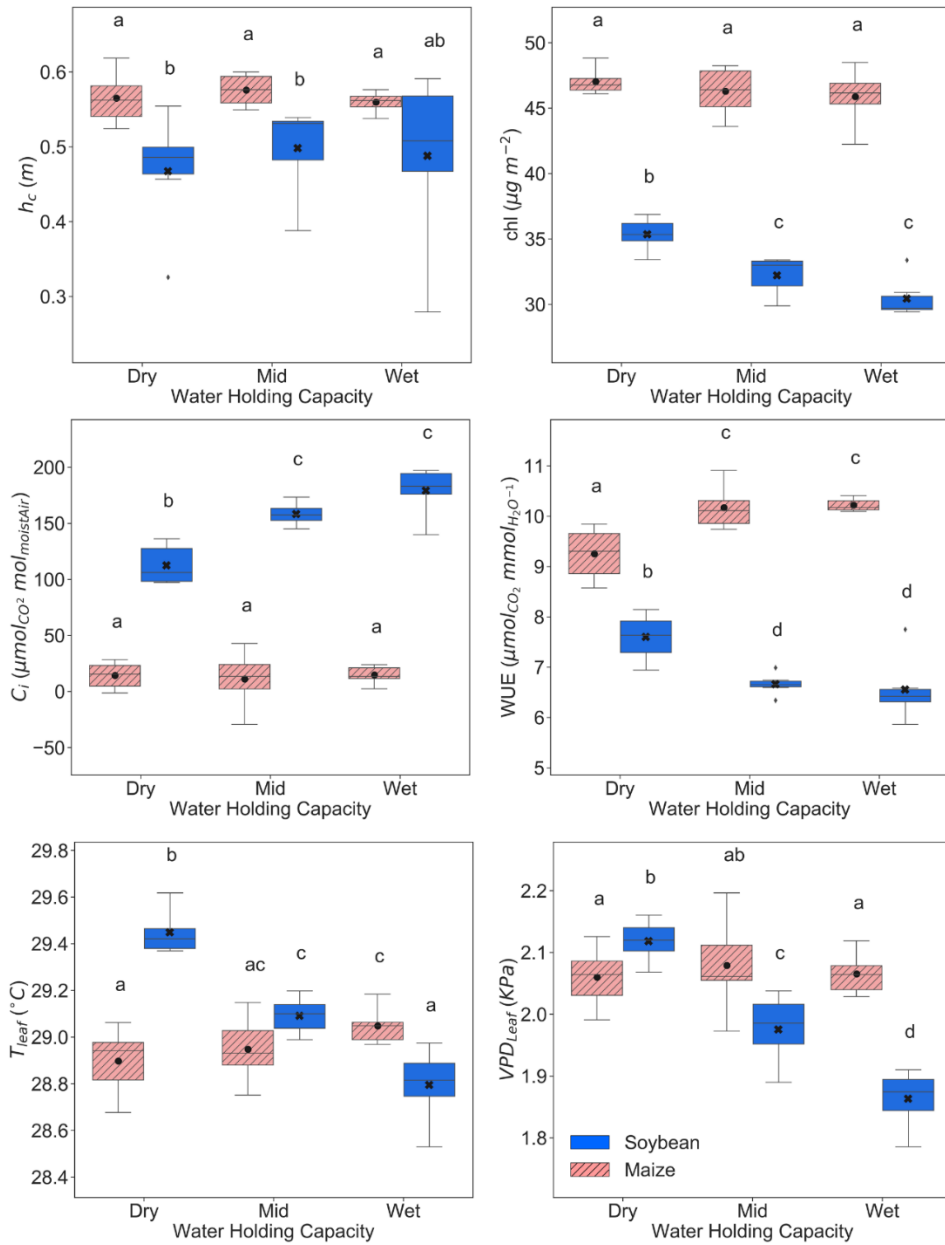
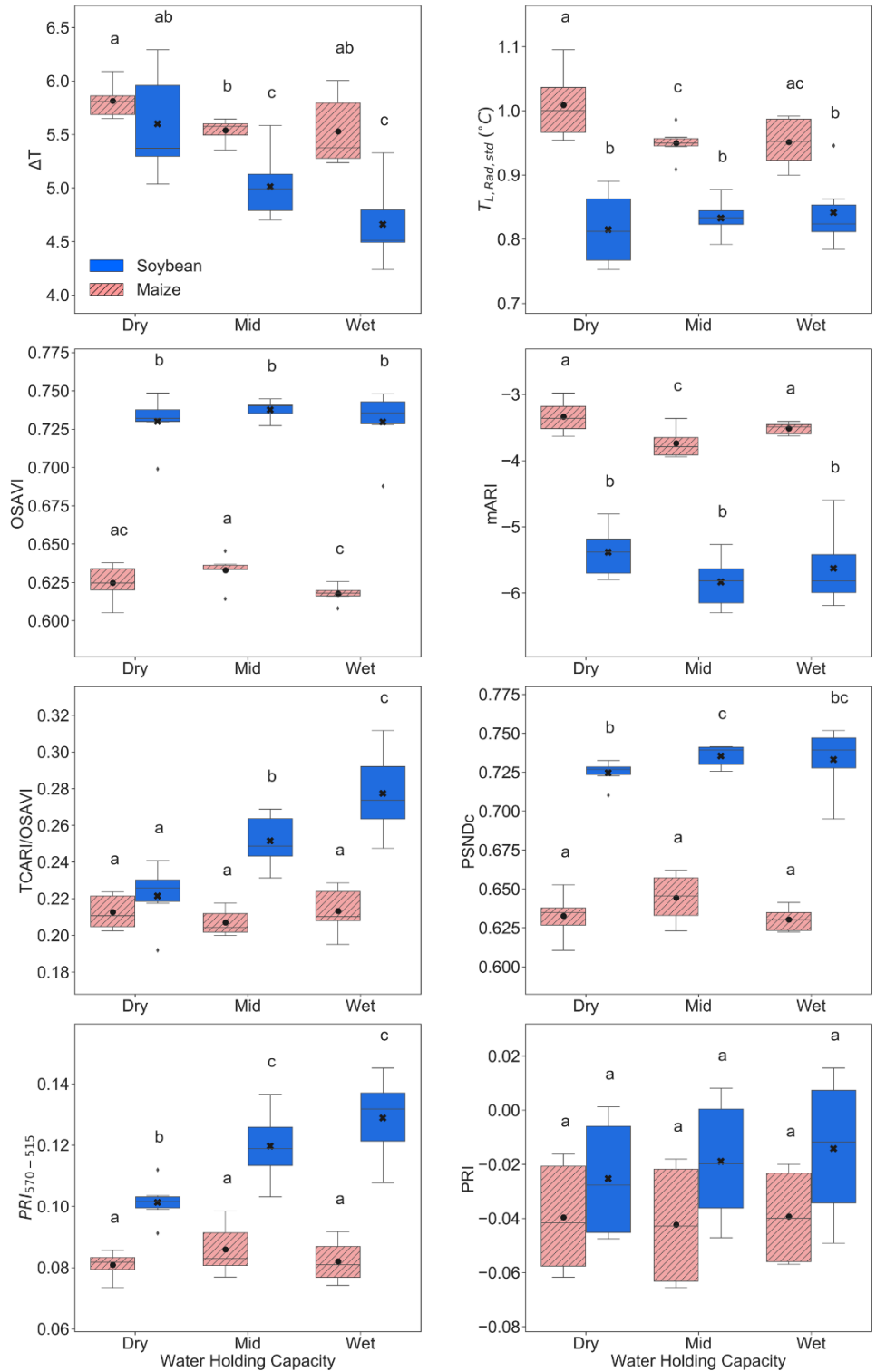


Figure S1. Cont.



**Figure S1.** Comparison between soil water levels: Wet/control (100% WHC), Mid (70% WHC) and Dry(40% WHC) for each crop: soybean (blue boxes) and maize (dashed reddish boxes)  $h_c$ ,  $chl$ ,  $C_i$ , WUE, leaf temperature from LI-6400 ( $T_{leaf}$ ),  $VPD_{Leaf}$ ,  $\Delta T$ , radiometric leaf standard deviation temperature ( $T_{L,Rad, std}$ ), OSAVI, mARI, TCARI/OSAVI, PSNDc,  $PRI_{(570-515)}$  and PRI. Dots in maize and crosses in soybean represent

the seasonal average of the 6 replicates for each crop. Boxplots contain 6 replicates. Boxes show the 25<sup>th</sup> and 75<sup>th</sup> percentiles of the interquartile range (IQR), horizontal line represents the median of the data and whiskers extend from the edges of box to show 1.96 IQR. Points outside this range are outliers. Different letters indicate that differences are significant at  $p$ -value  $< 0.05$  level.

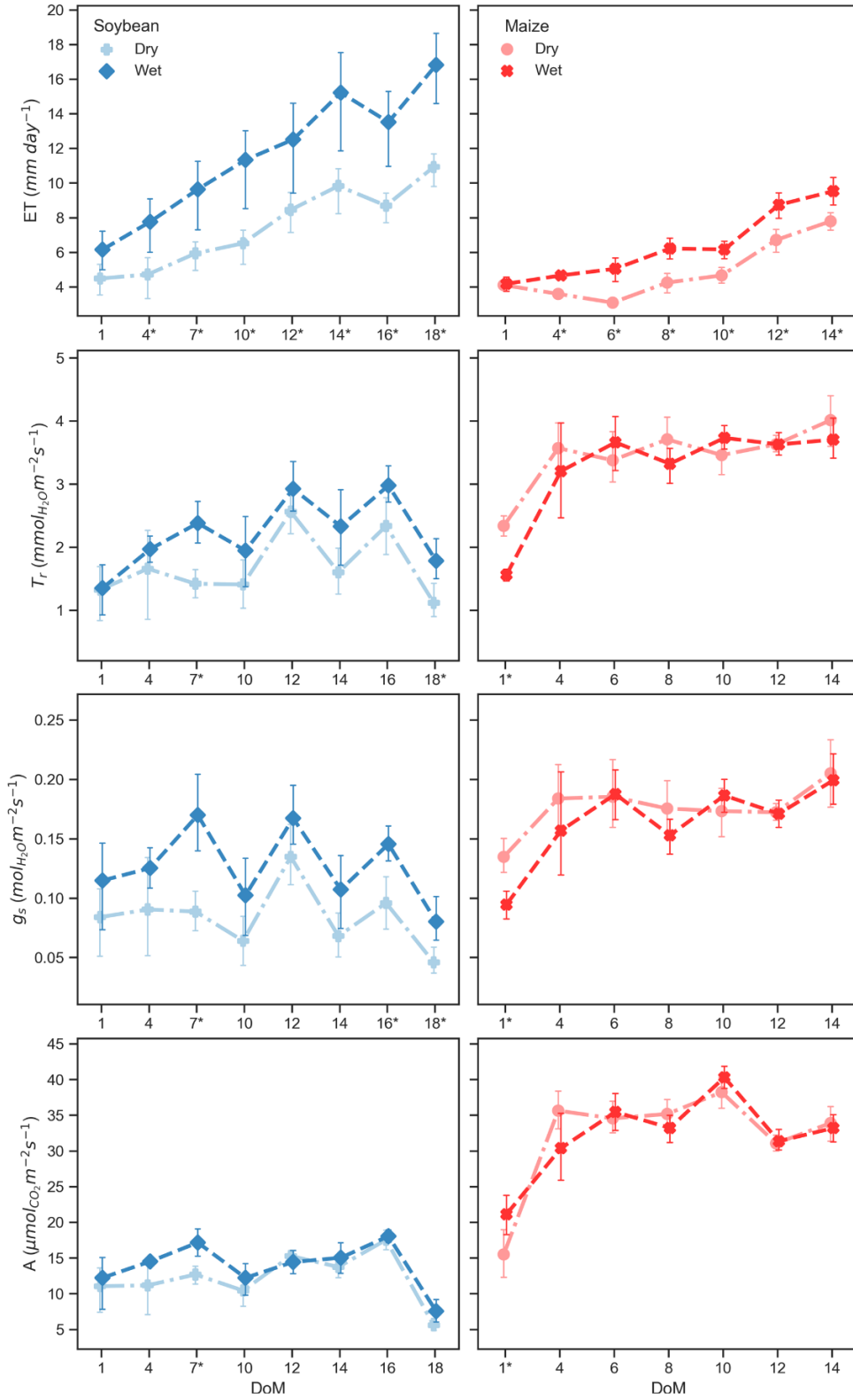
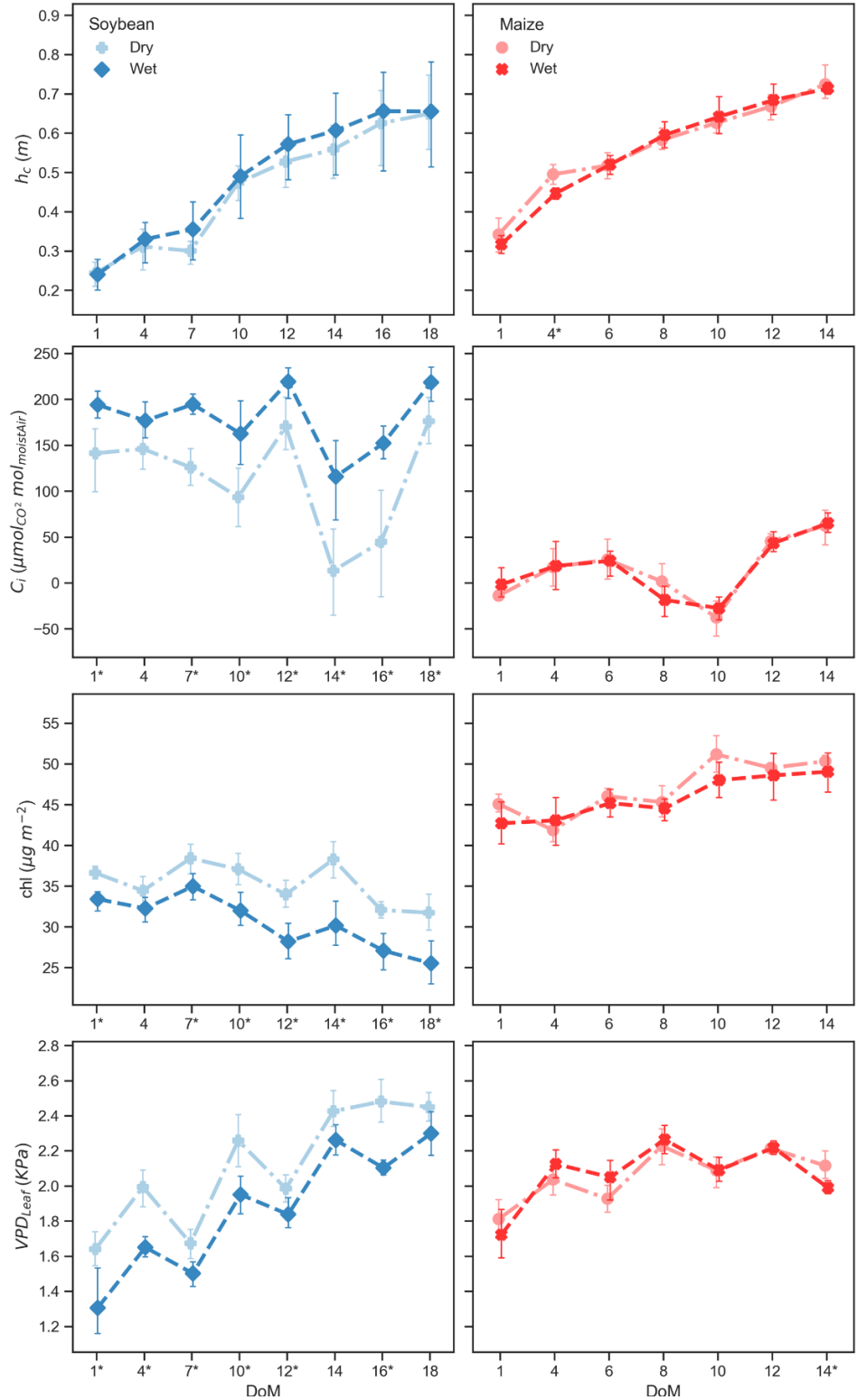
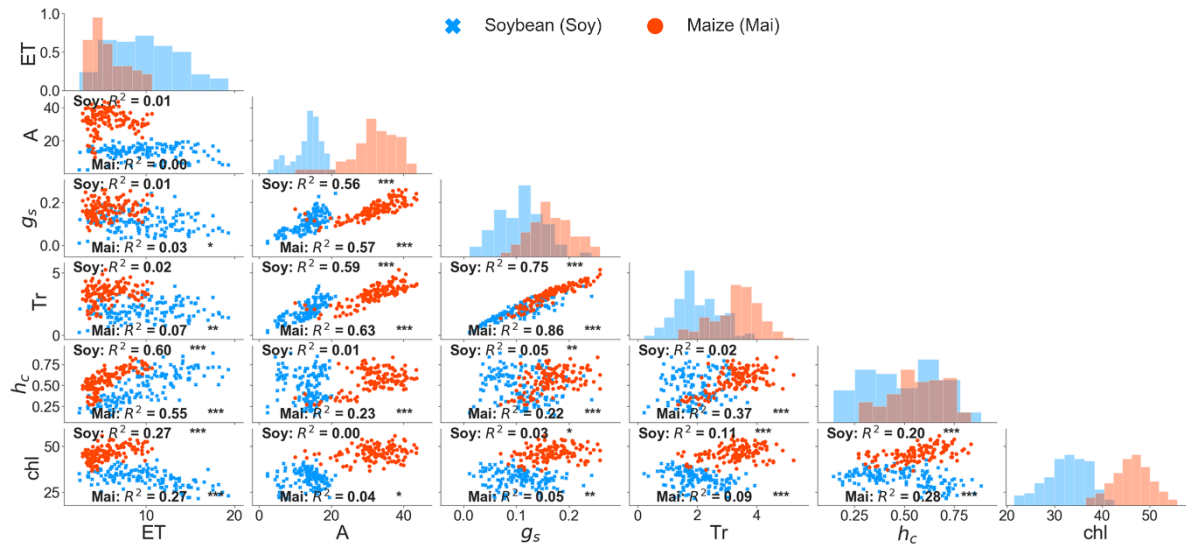


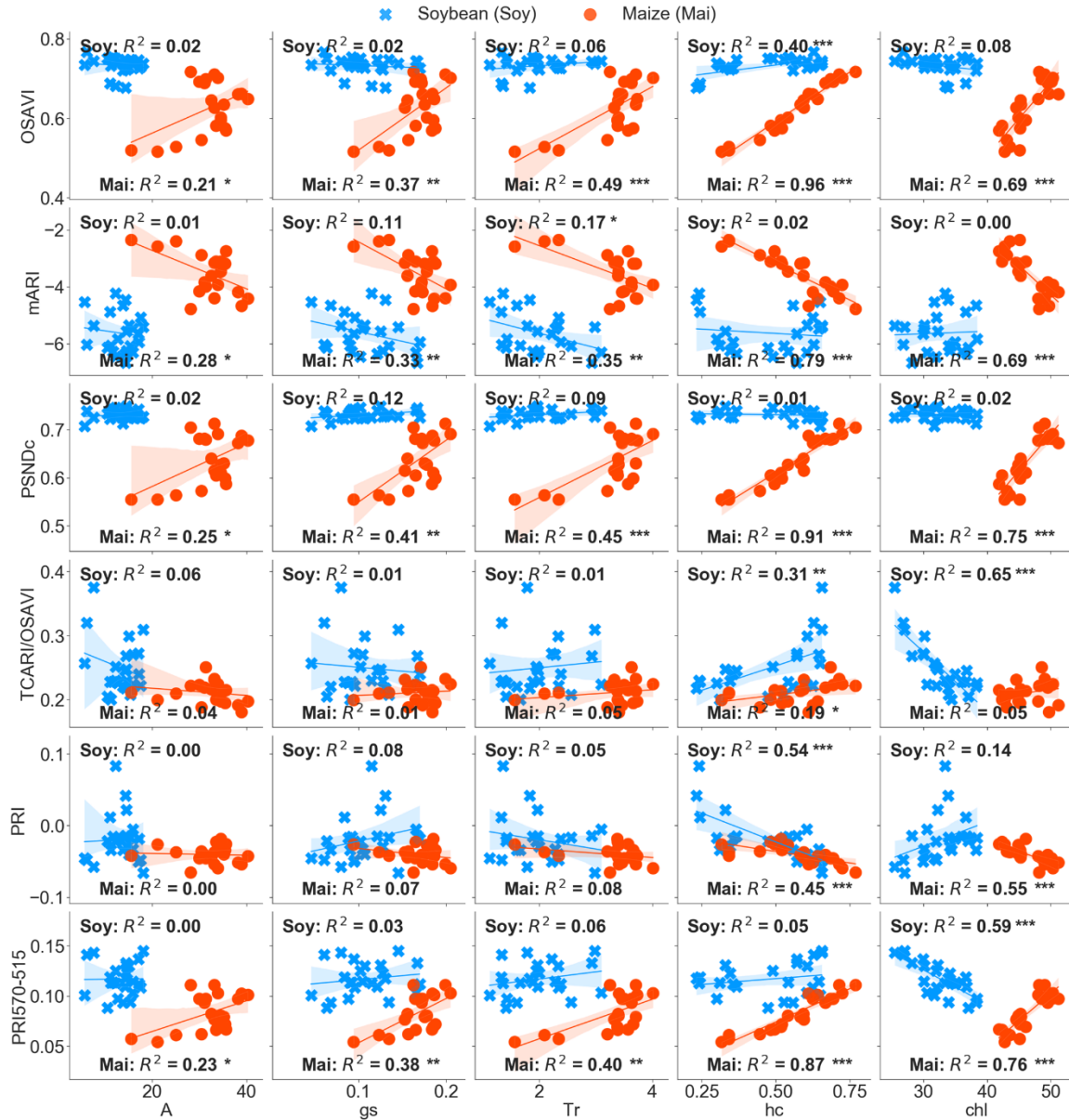
Figure S2. Cont.



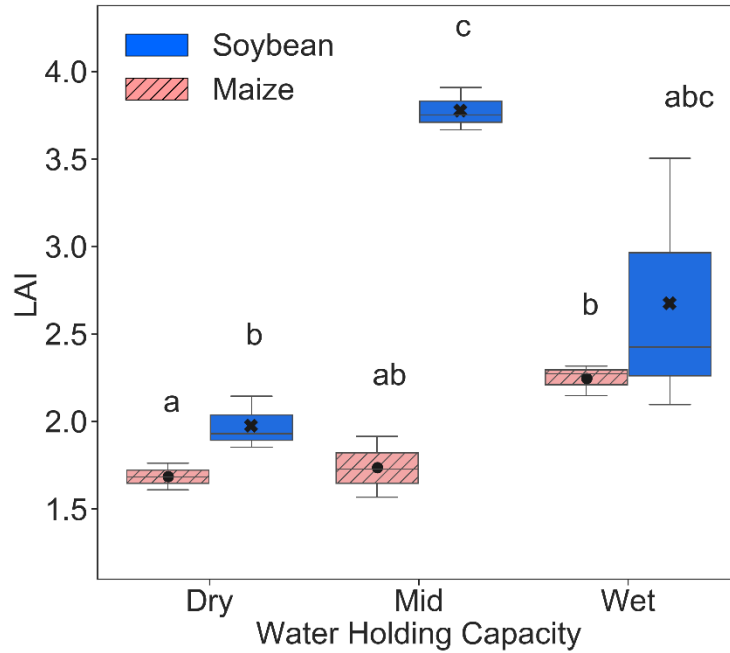
**Figure S2.** Time series plot per day of measurement (DoM) of wet (100% WHC) and dry (40% WHC) soybean (bluish lines in left figures) and maize (reddish lines in right figures) ET, Tr, gs A, hc, Ci, chl and VPDleaf. Asterisks (\*) indicate significant differences between wet (control) and dry plants at 5% significance level.



**Figure S3.** Scatter plots between different variables including physiology (canopy evapotranspiration = ET in mm day<sup>-1</sup>, leaf photosynthesis = A in μmol CO<sub>2</sub> m<sup>-2</sup> s<sup>-1</sup>, leaf stomatal conductance = g<sub>s</sub> in mol H<sub>2</sub>O m<sup>-2</sup> s<sup>-1</sup> and leaf transpiration = T<sub>r</sub> in mmol H<sub>2</sub>O m<sup>-2</sup> s<sup>-1</sup>), biochemistry at leaf level (chlorophyll content = chl in μg m<sup>-2</sup>) and morphology (canopy height = h<sub>c</sub> in m). Soybean (blue crosses) and maize (orange dots) are separated with their respective coefficient of determination (R<sup>2</sup>) and p-value indicated with stars (\* p-value < 0.05, \*\* p-value < 0.01, \*\*\* p-value < 0.001). The diagonal shows the distribution of each parameter for both crops.



**Figure S4.** Linear correlation between vegetation indices (VIs) (Error! Reference source not found.) vs A ( $\mu\text{mol CO}_2 \text{ m}^{-2} \text{ s}^{-1}$ ),  $g_s$  ( $\text{mol H}_2\text{O m}^{-2} \text{ s}^{-1}$ ),  $T_r$  ( $\text{mmol H}_2\text{O m}^{-2} \text{ s}^{-1}$ ) and chl ( $\mu\text{g m}^{-2}$ ) at leaf level and  $hc$  (m) for soybean (blue crosses) and maize (red dots). Points represent the average of 6 replicas. Coefficient of determination ( $R^2$ ) is shown and  $p$ -value is represented with stars (\*  $p$ -value < 0.05; \*\*  $p$ -value < 0.01; \*\*\*  $p$ -value < 0.001).



**Figure S5.** Comparison between soil water levels: Wet/control (100% WHC), Mid (70% WHC) and Dry(40% WHC) for each crop: soybean (blue boxes) and maize (dashed reddish boxes) leaf area index (LAI). Dots in maize and crosses in soybean represent the average of the 3 replicates for each crop measured the last day of the experiment. Boxes show the 25<sup>th</sup> and 75<sup>th</sup> percentiles of the interquartile range (IQR), horizontal line represents the median of the data and whiskers extend from the edges of box to show 1.96 IQR. Points outside this range are outliers. Different letters indicate that differences are significant at  $p$ -value < 0.05 level.