

Tables

Table S1. Summary of the linear mixed models of ψ_{pd} over time for both species. The response variable was the log of $|\psi_{pd}|$.

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	353	1.46459	0.2270
	Date	13	353	162.33675	<.0001
	Heating	1	9	0.00348	0.9542
	Drought	1	19	0.98511	0.3334
	Date:heating	13	353	3.89529	<.0001
	Date:drought	13	353	8.31225	<.0001
	Heating:drought	1	9	0.05862	0.8141
	Date:heating:drought	13	353	2.11037	0.0131
<i>P. edulis</i>	Intercept	1	351	0.88431	0.3477
	Date	13	351	74.79700	<.0001
	Heating	1	12	0.23055	0.6398
	Drought	1	14	0.37138	0.5520
	Date:heating	13	351	3.26616	0.0001
	Date:drought	13	351	5.86383	<.0001
	Heating:drought	1	12	4.76966	0.0495
	Date:heating:drought	-	-	-	-

Note: Full model: $\text{lme}(\log(\text{abs}(\psi_{pd})) \sim \text{date}*\text{heating}*\text{drought}, \text{random}=\sim 1|\text{chamber/tree}, \text{na.action}=\text{na.omit}, \text{method}=\text{"ML"})$

Table S2. Summary of the linear mixed models of ψ_{sf} over time for both species. The response variable was ψ_{sf} .

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	368	1977.0741	<.0001
	Date	13	368	105.4403	<.0001
	Heating	1	10	0.0269	0.8731
	Drought	1	19	0.1682	0.6863
	Date:heating	13	368	2.6542	0.0014
	Date:drought	13	368	4.7575	<.0001
	Heating:drought	-	-	-	-
	Date:heating:drought	-	-	-	-
<i>P. edulis</i>	Intercept	1	350	65.27089	<.0001
	Date	13	350	13.55676	<.0001
	Heating	1	13	0.08783	0.7716
	Drought	1	14	0.09656	0.7606
	Date:heating	13	350	1.67341	0.0648
	Date:drought	13	350	2.67611	0.0013
	Heating:drought	-	-	-	-
	Date:heating:drought	-	-	-	-

Note: Full model: $\text{lme}(\psi_{sf} \sim \text{date}*\text{heating}*\text{drought}, \text{random}=\sim 1|\text{chamber/tree}, \text{na.action}=\text{na.omit}, \text{method}=\text{"ML"})$

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Table S3. Summary of the linear mixed models of PLC over time for both species. The response variables were the log of PLC or the sqrt of PLC for *J. monosperma* and *P. edulis*, respectively.

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	368	682.0664	<.0001
	Date	13	367	143.2692	<.0001
	Heating	1	10	0.0881	0.7727
	Drought	1	19	0.4568	0.5073
	Date:heating	13	368	2.4711	0.0031
	Date:drought	13	368	5.3880	<.0001
	Heating:drought	-	-	-	-
	Date:heating:drought	-	-	-	-
<i>P. edulis</i>	Intercept	1	350	421.0890	<.0001
	Date	13	350	12.0993	<.0001
	Heating	1	13	0.1008	0.7559
	Drought	1	14	0.1030	0.7530
	Date:heating	13	350	1.6102	0.0802
	Date:drought	13	350	2.8866	0.0006
	Heating:drought	-	-	-	-
	Date:heating:drought	-	-	-	-

Note: Full model: lme(log or sqrt(PLC) ~ date*heating*drought, random=~1|chamber/tree, na.action=na.omit, method="ML")

Table S4. Summary of the linear mixed models of A_N over time for both species. The response variable was the sqrt of A_N .

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	356	829.6153	<.0001
	Date	13	356	65.7613	<.0001
	Heating	1	9	0.3929	0.5464
	Drought	1	19	0.0001	0.9916
	Date:heating	13	356	3.7593	0.0001
	Date:drought	13	356	4.1367	0.0001
	Heating:drought	1	9	0.0102	0.9217
	Date:heating:drought	13	356	1.8336	0.0368
<i>P. edulis</i>	Intercept	1	356	706.0698	<.0001
	Date	13	356	66.4499	<.0001
	Heating	1	12	2.7330	0.1242
	Drought	1	15	1.0984	0.3112
	Date:heating	13	356	2.6384	0.0016
	Date:drought	13	356	3.0209	0.0003
	Heating:drought	1	12	10.7268	0.0066
	Date:heating:drought	-	-	-	-

Note: Full model: lme(sqrt(A_N) ~ date*heating*drought, random=~1|chamber/tree, na.action=na.omit, method="ML")

Table S5. Summary of the linear mixed models of g_s over time for both species. The response variable was the sqrt of g_s .

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	356	586.2840	<.0001
	Date	13	356	77.5507	<.0001
	Heating	1	9	1.4353	0.2615
	Drought	1	19	0.0009	0.9765
	Date:heating	13	356	4.3530	<.0001
	Date:drought	13	356	5.5101	<.0001
	Heating:drought	1	9	0.0620	0.8090
	Date:heating:drought	13	356	2.1376	0.0118
<i>P. edulis</i>	Intercept	1	355	445.1740	<.0001
	Date	13	355	72.2485	<.0001
	Heating	1	12	0.1248	0.7301
	Drought	1	15	3.2669	0.0908
	Date:heating	13	355	2.8292	0.0007
	Date:drought	13	355	3.0909	0.0002
	Heating:drought	1	12	8.6828	0.0122
	Date:heating:drought	-	-	-	-

Note: Full model: $\text{lme}(\text{sqrt}(g_s) \sim \text{date}*\text{heating}*\text{drought}, \text{random}=\sim 1|\text{chamber/tree}, \text{na.action}=\text{na.omit}, \text{method}=\text{"ML"})$

Table S6. Summary of the linear mixed models of the relationship between ψ_{pd} and SWC (average from 0 to 40 cm depth) for both species. The response variable was the log of $|\psi_{pd}|$.

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	272	79.68936	<.0001
	Log(swc)	1	272	164.77779	<.0001
	Heating	-	-	-	-
	Drought	-	-	-	-
	Log (swc):heating	-	-	-	-
	Log (swc):drought	-	-	-	-
	Heating:drought	-	-	-	-
	Log(swc):heating:drought	-	-	-	-
<i>P. edulis</i>	Intercept	1	237	55.39814	<.0001
	Log (swc)	1	237	104.50441	<.0001
	Heating	1	7	11.07428	0.0126
	Drought	1	13	0.23607	0.6351
	Log (swc):heating	1	237	13.46695	0.0003
	Log (swc):drought	1	237	0.72907	0.3940
	Heating:drought	1	7	2.41565	0.1641
	Log(swc):heating:drought	1	237	2.85393	0.0925

Note: Full model: $\text{lme}(\log(\text{abs}(\psi_{pd})) \sim \log(\text{swc})*\text{heating}*\text{drought}, \text{random}=\sim 1|\text{chamber/tree}, \text{na.action}=\text{na.omit}, \text{method}=\text{"ML"})$

Table S7. Summary of the linear mixed models of the relationship between ψ_{sf} and SWC (average from 0 to 40 cm depth) for both species. Non transformed ψ_{sf} was used as the response variable in the model.

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	273	451.5937	<.0001
	Log(swc)	1	273	163.3432	<.0001
	Heating	-	-	-	-
	Drought	-	-	-	-
	Log(swc):heating	-	-	-	-
	Log(swc):drought	-	-	-	-
	Heating:drought	-	-	-	-
	Log(swc):heating:drought	-	-	-	-
<i>P. edulis</i>	Intercept	1	238	0.120667	0.7286
	Log(swc)	1	238	13.311933	0.0003
	Heating	1	8	3.135220	0.1146
	Drought	1	13	2.181454	0.1635
	Log(swc):heating	1	238	3.740975	0.0543
	Log(swc):drought	1	238	2.970122	0.0861
	Heating:drought	-	-	-	-
	Log(swc):heating:drought	-	-	-	-
Note: Full model: lme($\psi_{sf} \sim \log(\text{swc}) * \text{heating} * \text{drought}$, random= $\sim 1 \text{chamber/tree}$, na.action=na.omit, method="ML")					

Table S8. Summary of the linear mixed models of the relationship between PLC and SWC (average from 0 to 40 cm depth) for both species. The response variables were the log of PLC or the sqrt of PLC for *J. monosperma* and *P. edulis*, respectively.

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	273	307.8331	<.0001
	Log(swc)	1	273	230.2635	<.0001
	Heating	1	-	-	-
	Drought	-	-	-	-
	Log(swc):heating	1	-	-	-
	Log(swc):drought	-	-	-	-
	Heating:drought	-	-	-	-
	Log(swc):heating:drought	-	-	-	-
<i>P. edulis</i>	Intercept	1	239	22.1020509	<.0001
	Log(swc)	1	239	19.424345	<.0001
	Heating	1	8	2.250007	0.1720
	Drought	1	13	1.577912	0.2312
	Log(swc):heating	1	239	2.713893	0.1008
	Log(swc):drought	1	-	-	-
	Heating:drought	-	-	-	-
	Log(swc):heating:drought	-	-	-	-
Note: Full model: lme(log or sqrt (PLC) $\sim \log(\text{swc}) * \text{heating} * \text{drought}$, random= $\sim 1 \text{chamber/tree}$, na.action=na.omit, method="ML")					

Table S9. Summary of the linear mixed models of the relationship between A_N and SWC (average from 0 to 40 cm depth) for both species. The response variable was the A_N .

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	273	161.39836	<.0001
	Log(swc)	1	273	113.01770	<.0001
	Heating	1	9	1.92003	0.1992
	Drought	-	-	-	-
	Log(swc):heating	1	273	3.94073	0.0481
	Log(swc):drought	-	-	-	-
	Heating:drought	-	-	-	-
	Log(swc):heating:drought	-	-	-	-
<i>P. edulis</i>	Intercept	1	239	172.65921	<.0001
	Log(swc)	1	239	109.59460	<.0001
	Heating	1	8	5.19799	0.0521
	Drought	-	-	-	-
	Log(swc):heating	1	239	5.84481	0.0164
	Log(swc):drought	-	-	-	-
	Heating:drought	-	-	-	-
	Log(swc):heating:drought	-	-	-	-
Note: Full model: lme($A_N \sim \log(\text{swc}) * \text{heating} * \text{drought}$, random= $\sim 1 \text{chamber/tree}$, na.action=na.omit, method="ML")					

Table S10. Summary of the linear mixed models of the relationship between g_s and SWC (average from 0 to 40 cm depth) for both species. The response variable was the g_s .

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	272	193.59916	<.0001
	Log(swc)	1	272	182.2739	<.0001
	Heating	1	9	7.94834	0.0201
	Drought	1	16	0.08854	0.7699
	Log(swc):heating	1	272	13.03811	0.0004
	Log(swc):drought	-	-	-	-
	Heating:drought	-	-	-	-
	Log(swc):heating:drought	-	-	-	-
<i>P. edulis</i>	Intercept	1	235	196.07939	<.0001
	Log(swc)	1	235	141.76349	<.0001
	Heating	1	8	12.27870	0.0080
	Drought	1	13	3.16680	0.0985
	Log(swc):heating	1	235	13.38750	0.0003
	Log(swc):drought	1	235	3.42296	0.0656
	Heating:drought	-	-	-	-
	Log(swc):heating:drought	1	235	0.05622	0.8128
Note: Full model: lme($g_s \sim \log(\text{swc}) * \text{heating} * \text{drought}$, random= $\sim 1 \text{chamber/tree}$, na.action=na.omit, method="ML")					

Table S11. Summary of the linear mixed models of the relationship between $\Delta\psi$ and ψ_{pd} for both species. Non transformed $\Delta\psi$ and log of $|\psi_{pd}|$ were used as response and explanatory variables in the model, respectively.

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	402	761.6926	<.0001
	Log($ \psi_{pd} $)	1	402	207.8590	<.0001
	Heating	-	-	-	-
	Drought	1	19	2.9963	0.0997
	Log($ \psi_{pd} $):heating	-	-	-	-
	Log($ \psi_{pd} $):drought	-	-	-	-
	Heating:drought	-	-	-	-
	Log($ \psi_{pd} $):heating:drought	-	-	-	-
<i>P. edulis</i>	Intercept	1	388	1925.6429	<.0001
	Log($ \psi_{pd} $)	1	388	765.1678	<.0001
	Heating	-	-	-	-
	Drought	-	-	-	-
	Log($ \psi_{pd} $):heating	-	-	-	-
	Log($ \psi_{pd} $):drought	-	-	-	-
	Heating:drought	-	-	-	-
	Log($ \psi_{pd} $):heating:drought	-	-	-	-

Note: Full model: lme($\Delta\psi \sim \log(\text{abs}(\psi_{pd})) * \text{heating} * \text{drought}$, random= $\sim 1 | \text{chamber/tree}$, na.action=na.omit, method="ML")

Table S12. Summary of the linear mixed models of the relationship between g_s and ψ_{sf} for both species. Sqrt of g_s and non transformed ψ_{sf} were used as response and explanatory variables in the model, respectively.

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	245	9.45556	0.0023
	ψ_{sf}	1	245	286.28375	<.0001
	Heating	1	9	0.09344	0.7668
	Drought	1	19	0.38791	0.5408
	ψ_{sf} :heating	1	245	0.30199	0.5831
	ψ_{sf} :drought	1	245	0.98972	0.0851
	Heating:drought	1	9	1.44457	0.2601
	ψ_{sf} :heating:drought	1	-	-	-
<i>P. edulis</i>	Intercept	1	238	332.9162	<.0001
	ψ_{sf}	1	238	14.5400	0.0002
	Heating	-	-	-	-
	Drought	1	14	8.6822	0.0106
	ψ_{sf} :heating	-	-	-	-
	ψ_{sf} :drought	-	-	-	-
	Heating:drought	-	-	-	-
	ψ_{sf} :heating:drought	-	-	-	-

Note: Full model: lme(($\text{Sqrt}(g_s) \sim \psi_{sf} * \text{heating} * \text{drought}$), random= $\sim 1 | \text{chamber/tree}$, na.action=na.omit, method="ML")

Table S13. Summary of the linear mixed models of the relationship between g_s and PLC for both species. Log of PLC and sqrt of PLC were used as explanatory variables in the model for *J. monosperma* and *P. edulis* respectively, and sqrt of g_s was used as response variable.

Species	Fixed Effects	numDF	denDF	F-value	p-value
<i>J. monosperma</i>	Intercept	1	246	326.2233	<.0001
	PLC	1	246	541.2242	<.0001
	Heating	1	10	0.0324	0.8608
	Drought	1	19	1.9436	0.1794
	PLC:heating	1	246	3.3349	0.0690
	PLC :drought	-	-	-	-
	Heating:drought	1	-	-	-
	PLC:heating:drought	-	-	-	-
<i>P. edulis</i>	Intercept	1	238	103.89731	<.0001
	PLC	1	238	14.5763	0.0002
	Heating	-	-	-	-
	Drought	1	13	8.52856	0.0119
	PLC:heating	-	-	-	-
	PLC :drought	-	-	-	-
	Heating:drought	-	-	-	-
	PLC:heating:drought	-	-	-	-
Note: Full model: lme((sqrt (g_s) ~ log or sqrt (PLC) *heating*drought, random=~1 chamber/tree, na.action=na.omit, method="ML")					

Figures

Figure S1. Vulnerability curves to cavitation for *P. edulis* and *J. monosperma* at the Los Alamos Survival/Mortality Experiment. Data points represent individual branches and lines are the adjusted curves for 12 trees per species. Shaded regions indicate PLC variation between the species air-entry point (ψ_e) and the non-conductive point (ψ_{max}).

Figure S2. Difference (delta) in daily average VPD between Control (C) and all other treatments: Control Chamber (CC), drought (D), heat (H) and heat and drought (HD).

Figure S3. Relationship between pre-dawn water potential (ψ_{pd} , a), hydraulic safety margin (ψ_{sf} , b), percentage loss of hydraulic conductivity (PLC, c), net assimilation rate (A_N , d), and stomatal conductance (g_s , e) with soil water content (SWC) in *P. edulis* and *J. monosperma* (different panels in each plot). Different colors indicate different treatments. Data correspond to average values by date, species and treatment carried out through the experiment (N=303 and 265 for *J. monosperma* and *P. edulis*, respectively). Treatment effects are summarized in Tables S6-S10.

Figure S4. Relationship between net assimilation rate (A_N) in leaves of *J. monosperma* and *P. edulis* through the experimental period. Means and standard errors for different combinations of campaign and treatment are shown. N varies from five to 13 depending on treatment and species. The dotted line shows the 1:1 relationship, and the solid line shows the regression between the A_N of both species.

Figure S5. Relationship between stomatal conductance (g_s) in leaves of *J. monosperma* and *P. edulis* through the experimental period. Means and standard errors for different combinations of campaign and treatment are shown. N varies from five to 13 depending on treatment and species. The dotted line shows the 1:1 relationship, and the solid line shows the regression between the g_s of both species.

Figure S6. Relationship between stomatal conductance (g_s) and hydraulic safety margin (ψ_{sf} ; a) and between g_s and percentage loss of hydraulic conductivity (PLC; b) in *P. edulis* and *J. monosperma* (solid triangles and circles respectively). Different colors indicate different treatments. In Fig. S6a, the red dashed line indicate the point at which the Ψ_{md} reaches the air-entry point, Ψ_e . Data correspond to values measured in all trees during the different campaigns carried out through the experiment (N=280 and 269 for *J. monosperma* and *P. edulis*, respectively).

Figure S1.

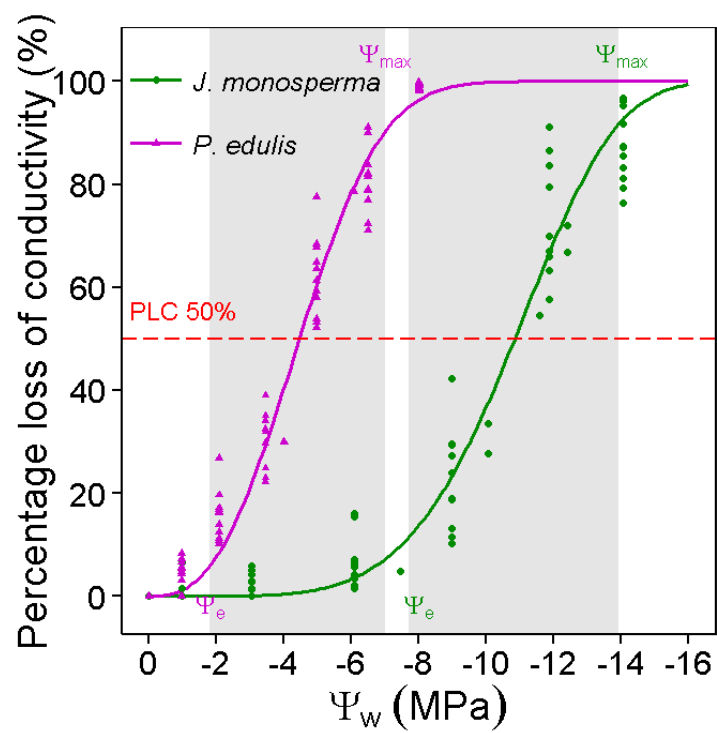


Figure S2.

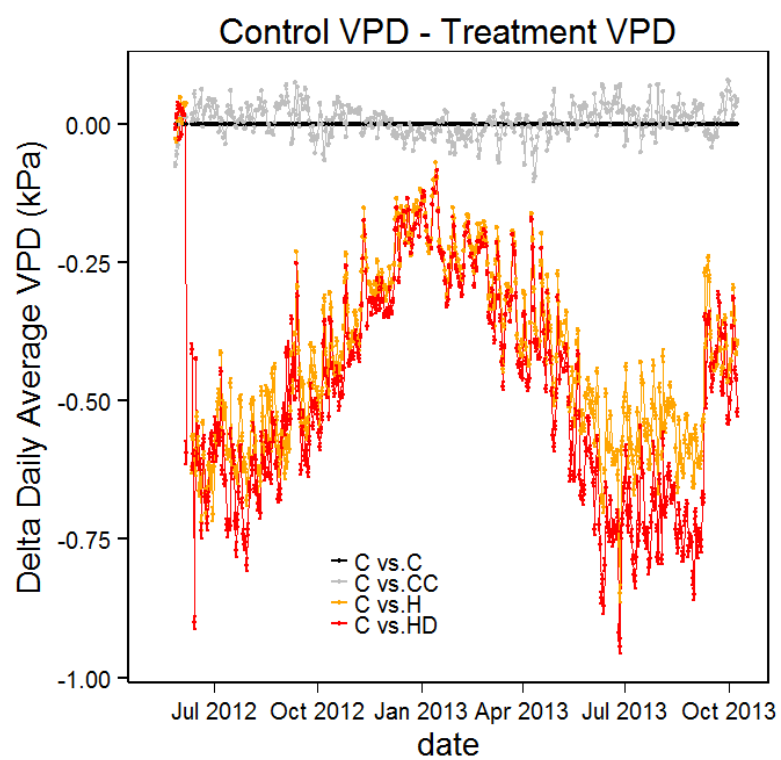


Figure S3.

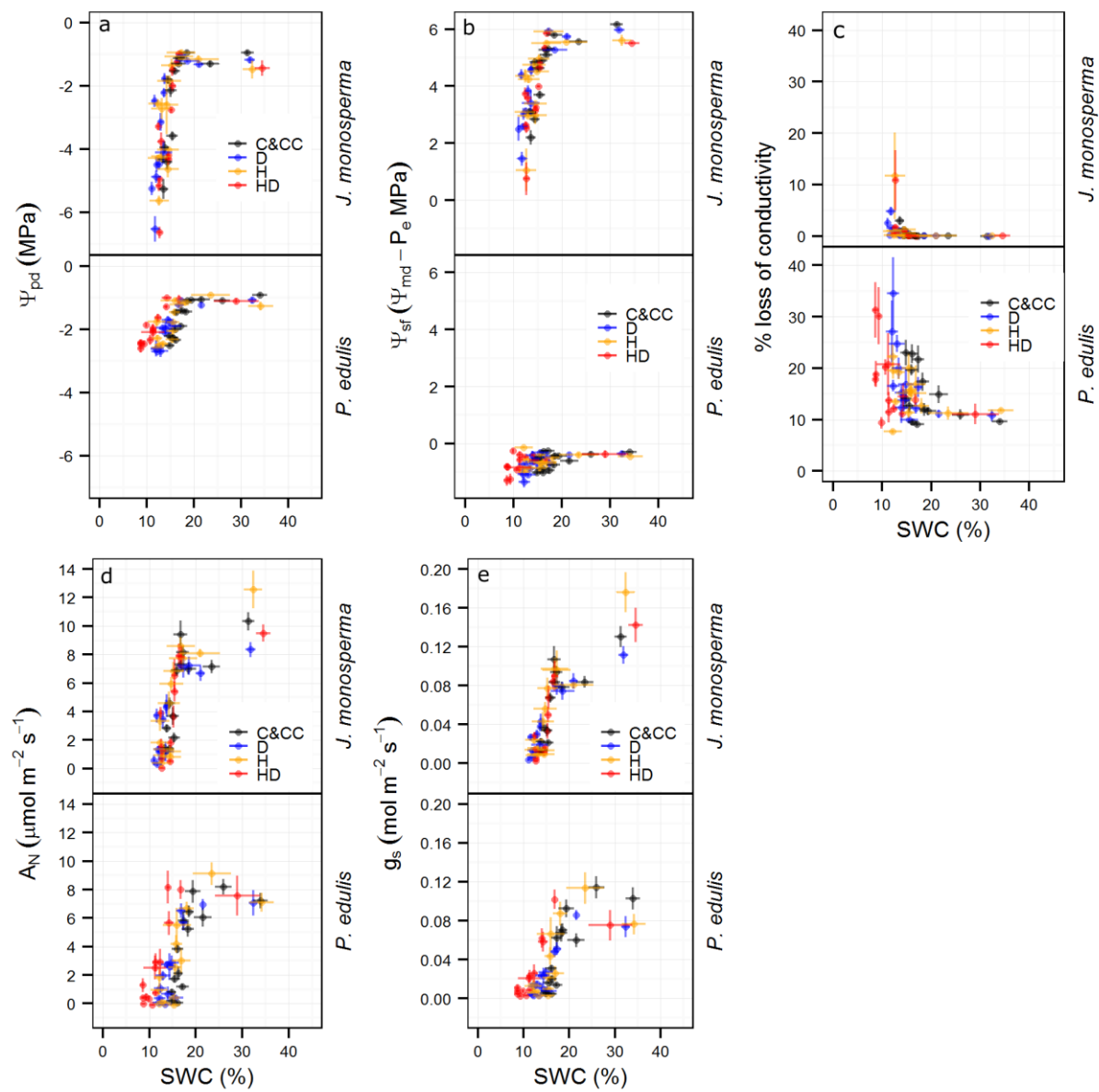


Figure S4.

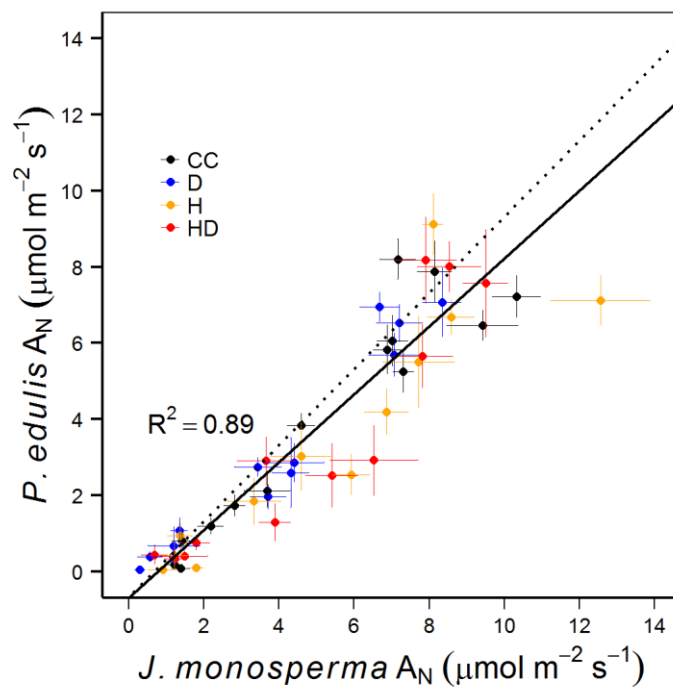


Figure S5.

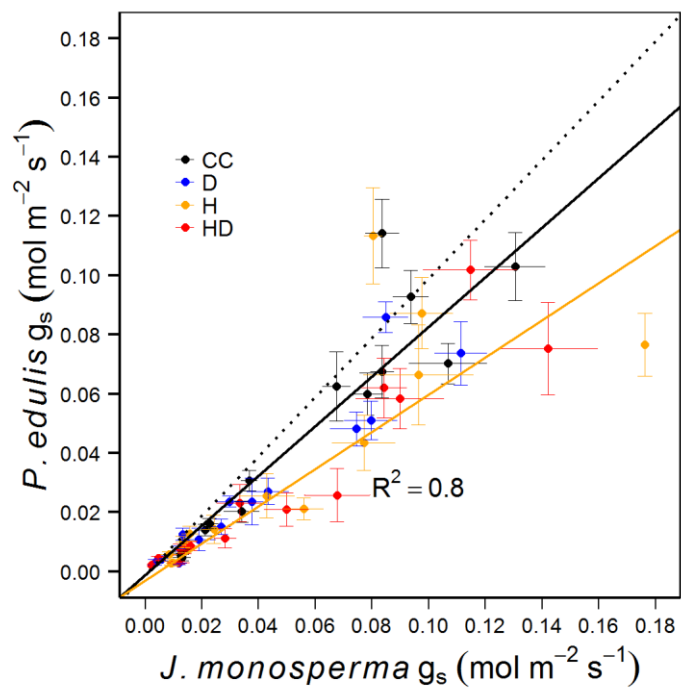


Figure S6.

