

Supplementary data

Table S1 Midday leaf water potential (mean $\pm$ standard error of the mean of three replicated plants) of rice and wheat cultivars under different water treatments.

Species	Cultivar	Leaf water potential (vegetative stage)			Leaf water potential (flowering stage)		
		CT	MD	SD	CT	MD	SD
<i>O. sativa</i>	IR64	-1.37 $\pm$ 0.05	-1.86 $\pm$ 0.07	-1.91 $\pm$ 0.03	-1.21 $\pm$ 0.02	-1.34 $\pm$ 0.02	-1.89 $\pm$ 0.03
	Apo	-1.37 $\pm$ 0.02	-2.00 $\pm$ 0.03	-2.06 $\pm$ 0.03	-1.54 $\pm$ 0.07	-1.63 $\pm$ 0.05	-1.90 $\pm$ 0.02
	UPL7	-1.29 $\pm$ 0.06	-1.45 $\pm$ 0.06	-1.59 $\pm$ 0.12	-1.26 $\pm$ 0.07	-1.58 $\pm$ 0.07	-1.69 $\pm$ 0.03
<i>T. aestivum</i>	S82	-0.43 $\pm$ 0.01	-0.44 $\pm$ 0.01	-0.52 $\pm$ 0.02	-0.40 $\pm$ 0.01	-0.44 $\pm$ 0.01	-0.53 $\pm$ 0.02
	We4	-0.31 $\pm$ 0.01	-0.37 $\pm$ 0.01	-0.44 $\pm$ 0.02	-0.32 $\pm$ 0.01	-0.34 $\pm$ 0.01	-0.39 $\pm$ 0.01

Table S2 Analysis of variance results for nodal root anatomical traits in rice and wheat.

Species		RCA	SA	SA:RCA	CWT	EXA	EXN	MXA	MXN	ENS	ENL
Rice	Cultivar (C)	***	***	***	***	***	***	***	***	***	***
	Treatment (T)	***	***	***	***	***	***	***	***	***	***
	Position (P)	***	***	***	***	***	***	***	***	***	***
	Stage (S)	***	***	**	***	***	***	***	***	***	***
	Cultivar × Treatment	***	ns	***	***	**	ns	**	**	***	***
	Cultivar × Position	***	**	*	***	***	**	***	ns	**	***
	Treatment × Position	***	***	***	**	***	**	***	*	***	**
	Cultivar × Stage	***	***	***	ns	**	ns	***	ns	**	*
	Treatment × Stage	***	**	ns	***	ns	ns	ns	*	ns	ns
	Position × Stage	ns	ns	*	**	ns	**	**	***	ns	*
	C × T × P	*	ns	ns	*	ns	*	*	*	ns	ns
	C × T × S	ns	*	***	ns	***	***	ns	ns	*	ns
	C × P × S	ns	ns	**	ns	ns	ns	*	*	ns	ns
	T × P × S	ns	ns	ns	ns	ns	ns	ns	ns	***	**
	C × T × P × S	***	*	***	ns	ns	**	**	*	ns	ns
Wheat	Cultivar (C)	ns	ns	***	***	**	***	ns	*	***	***
	Treatment (T)	***	***	***	ns	***	***	***	***	**	**
	Position (P)	***	***	***	***	***	***	***	***	***	***
	Stage (S)	***	*	***	***	*	*	ns	***	***	***
	Cultivar × Treatment	**	ns	*	ns	ns	ns	**	ns	**	ns
	Cultivar × Position	ns	ns	***	***	***	***	***	***	ns	*
	Treatment × Position	***	***	***	*	ns	***	***	***	*	**
	Cultivar × Stage	***	***	***	***	***	***	***	***	*	***
	Treatment × Stage	ns	ns	*	ns	ns	ns	ns	***	ns	**
	Position × Stage	ns	ns	ns	ns	ns	ns	***	**	**	*
	C × T × P	**	***	ns	ns	ns	ns	***	***	ns	ns
	C × T × S	ns	ns	ns	***	ns	ns	ns	ns	***	***
	C × P × S	*	ns	***	*	**	*	**	*	ns	ns
	T × P × S	*	ns	ns	ns	ns	ns	ns	***	*	ns
	C × T × P × S	**	**	ns	**	***	***	*	ns	ns	ns
Rice + Wheat	Species	***	***	***	***	***	***	***	***	***	***
	Treatment (T)	***	***	***	***	***	***	***	***	***	***
	Position (P)	***	***	***	***	***	***	***	***	***	***
	Stage (S)	***	ns	ns	***	ns	ns	***	***	***	***
	Species × Treatment	***	***	***	***	***	*	***	***	***	***
	Species × Position	***	***	***	***	***	***	***	***	***	***
	Treatment × Position	**	***	**	ns	ns	**	***	*	*	ns
	Species × Stage	***	***	ns	*	**	**	***	***	ns	*
	Treatment × Stage	*	ns	ns	ns	ns	ns	ns	**	ns	ns
	Position × Stage	ns	ns	**	ns	ns	ns	ns	***	ns	ns
	Species × T × P	ns	**	ns	ns	ns	ns	***	***	***	**
	Species × T × S	*	ns	ns	ns	ns	ns	ns	ns	ns	ns
	Species × P × S	ns	ns	ns	ns	ns	ns	***	*	*	ns
	T × P × S	ns	ns	ns	ns	ns	ns	ns	ns	**	ns
	Species × T × P × S	ns	ns	ns	ns	ns	ns	ns	**	ns	ns

RCA = root cross section area, SA = stele area, SA:RCA = stele area in proportion to root cross section area, CWT = thickness of the inner wall of endodermis, EXA = total early metaxylem area, EXN = early metaxylem number, MXA = total late metaxylem area, MXN = late metaxylem number, ENS = suberization rating on endodermis, ENL = lignification rating on endodermis. The significance of each factor or interaction was shown as: ns, not significant; *, P< 0.05; **, P< 0.01; ***, P<0.001.

Table S3 Analysis of variance to assess the significance of the effects of cultivar, water treatment, stage and of their interactions on measured and calculated morphological features of rice and wheat.

Species		RB	RL	FRL:TRL
Rice	Cultivar	***	***	ns
	Treatment (T)	***	***	***
	Stage	***	***	*
	Cultivar × Treatment	*	**	ns
	Cultivar × Stage	ns	ns	**
	Treatment × Stage	ns	ns	***
	Cultivar × T × Stage	ns	ns	ns
Wheat	Cultivar	***	***	**
	Treatment (T)	***	ns	ns
	Stage	***	***	ns
	Cultivar × Treatment	ns	*	ns
	Cultivar × Stage	ns	***	***
	Treatment × Stage	**	*	ns
	Cultivar × T × Stage	***	***	ns
Rice + Wheat	Species	***	***	***
	Treatment (T)	***	***	***
	Stage	***	***	*
	Species × Treatment	***	***	***
	Species × Stage	**	***	ns
	Treatment × Stage	ns	ns	**
	Species × T × Stage	ns	ns	**

RB = root biomass (g plant⁻¹), RL = root length (km plant⁻¹), FRL:TRL = fine root length to thick root length ratio. The significance of each factor or interaction was shown as: ns, not significant; *, P< 0.05; **, P< 0.01; ***, P<0.001.

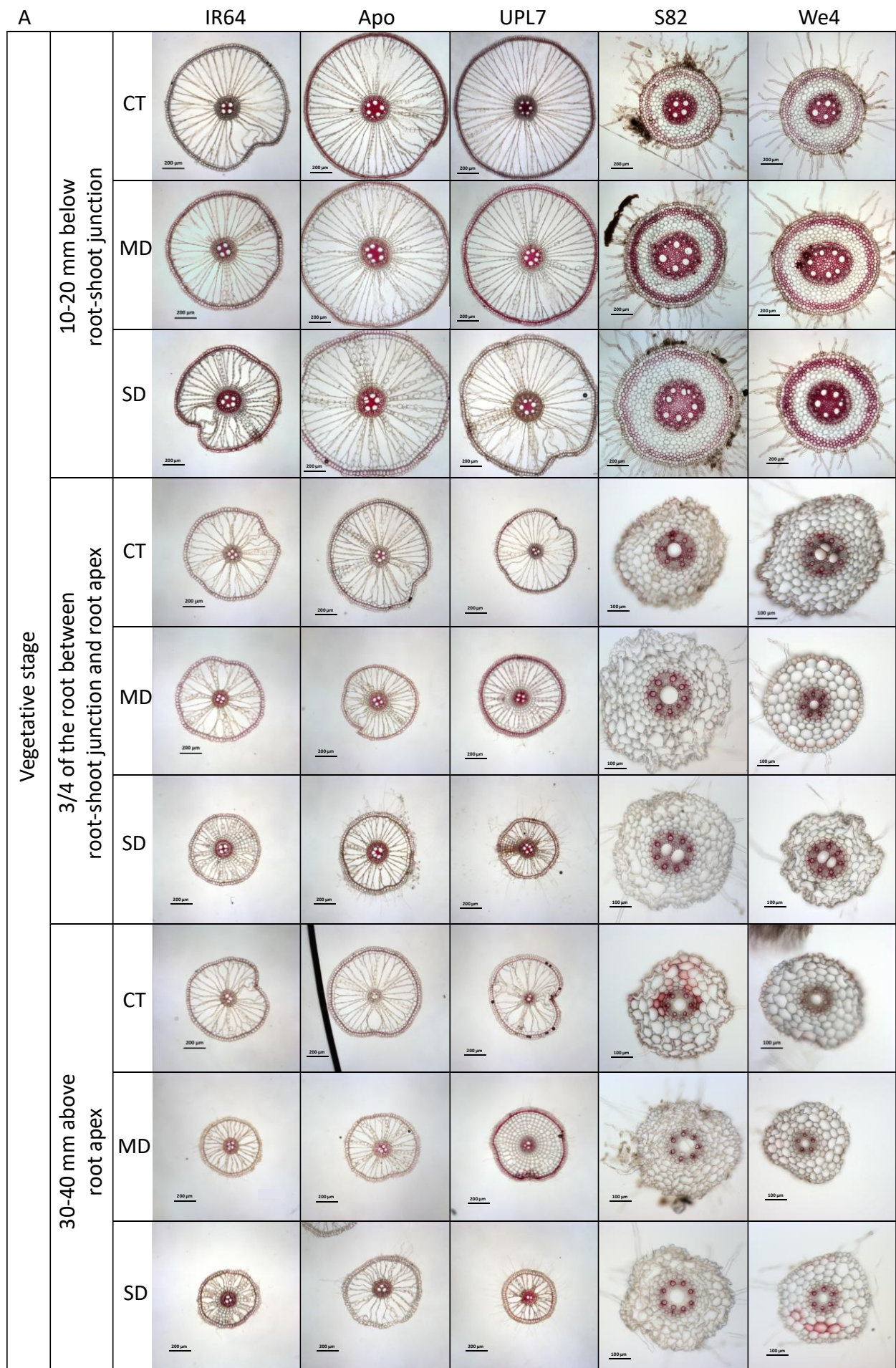


Fig. S1 Cross-sections of rice and wheat nodal roots grown under control (CT), mild drought (MD), and more severe drought (SD) conditions. Root segments were sampled at 10 to 20 mm below root-shoot junction, 3/4 of the root between root-shoot junction and root apex, and 30 to 40 mm above root apex, at (A) vegetative and (B) flowering stages. Sectioning positions are displayed on the left side of the figures. Sections stained with phloroglucinol-HCl and viewed under white light. Each scale bar represents 100 μ m for wheat cross-section images at 3/4 of the root between root-shoot junction and root apex and 30 to 40 mm above root apex, and 200 μ m for other cross-section images.

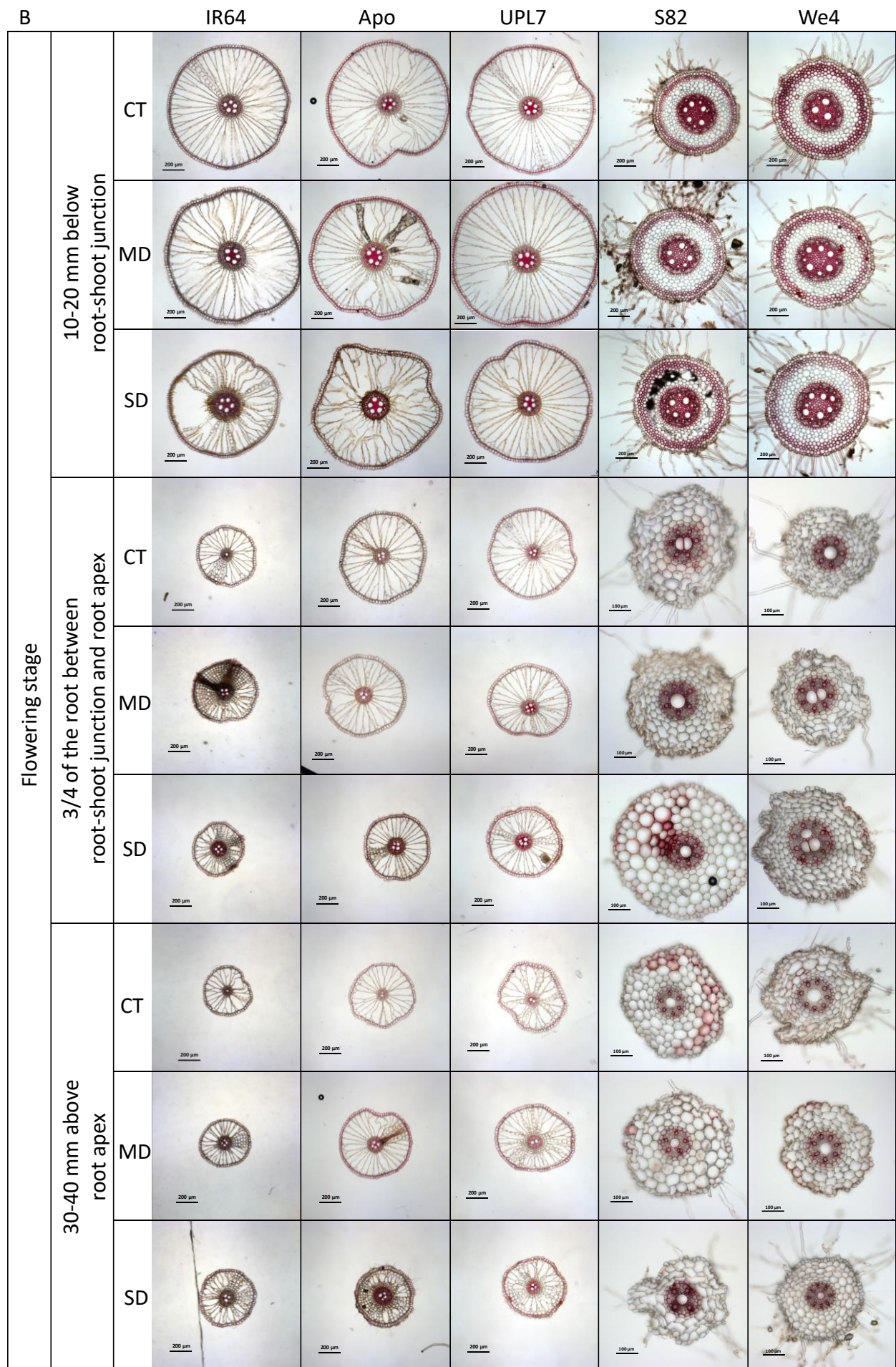


Fig. S1 Continued

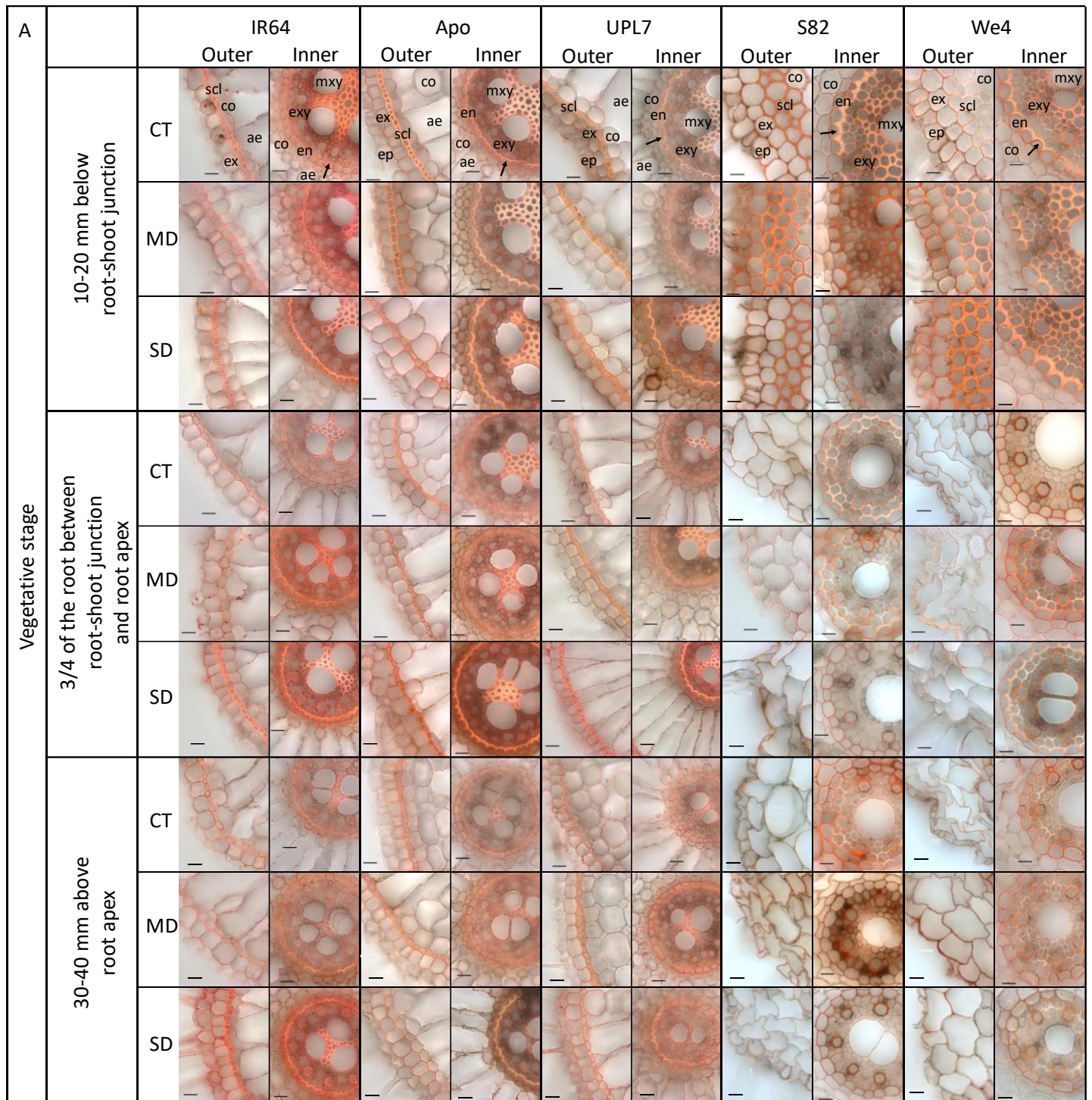


Fig. S2 Comparison of suberin deposition in the outer parts and inner parts of rice and wheat nodal roots grown under control (CT), mild drought (MD), and more severe drought (SD) conditions. Root segments sampled at 10 to 20 mm below root-shoot junction, 3/4 of the root between root-shoot junction and root apex, and 30 to 40 mm above root apex, at vegetative (A) and flowering (B) stages. Sectioning positions are displayed on the left side of the figures. Suberin in cell walls was detected by an orange color staining with Sudan III. ae, aerenchyma; co, cortical cells; ep, epidermis; ex, exodermis; en, endodermis; scl, sclerenchyma cells; mxy, late metaxylem; exy, early metaxylem. Arrows indicate the inner walls of endodermis. Each scale bar represents 20 μ m.

B		IR64		Apo		UPL7		S82		We4		
		Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner	Outer	Inner	
Flowering stage	10-20 mm below root-shoot junction	CT										
		MD										
		SD										
	3/4 of the root between root-shoot junction and root apex	CT										
		MD										
		SD										
	30-40 mm above root apex	CT										
		MD										
		SD										

Fig. S2 Continued

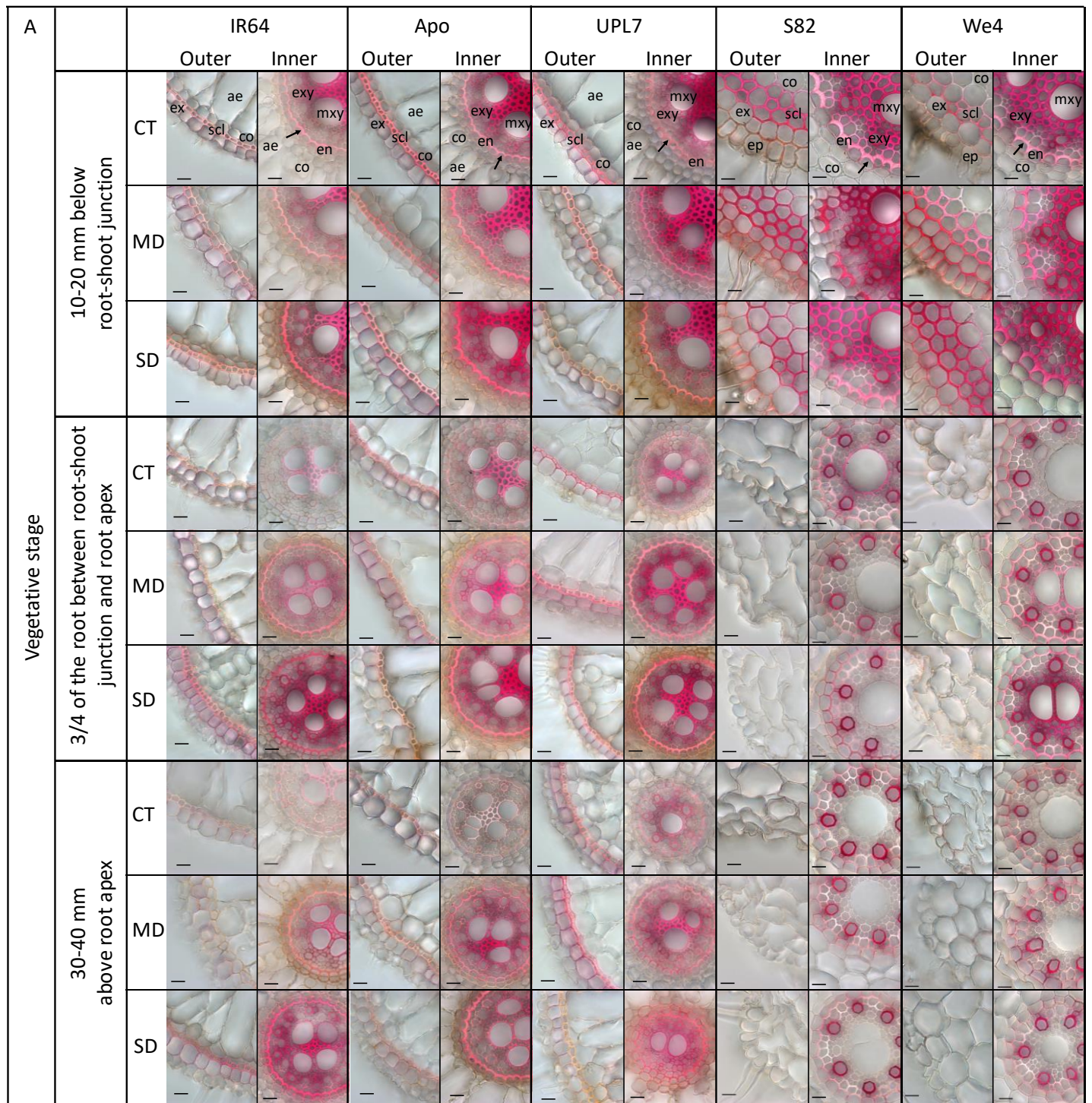


Fig. S3 Comparison of lignin deposition in the outer parts and inner parts of rice and wheat nodal roots grown under control (CT), mild drought (MD), and more severe drought (SD) conditions. Root segments sampled at 10 to 20 mm below root-shoot junction, 3/4 of the root between root-shoot junction and root apex, and 30 to 40 mm above root apex, at vegetative (A) and flowering (B) stages. Sectioning positions are displayed on the left side of the figures. Lignin in cell walls was detected by a red pink staining with phloroglucinol-HCl. ae, aerenchyma; co, cortical cells; ep, epidermis; ex, exodermis; en, endodermis; scl, sclerenchyma cells; mxy, late metaxylem; exy, early metaxylem. Arrows indicate the inner walls of endodermis. Each scale bar represents 20 μ m.

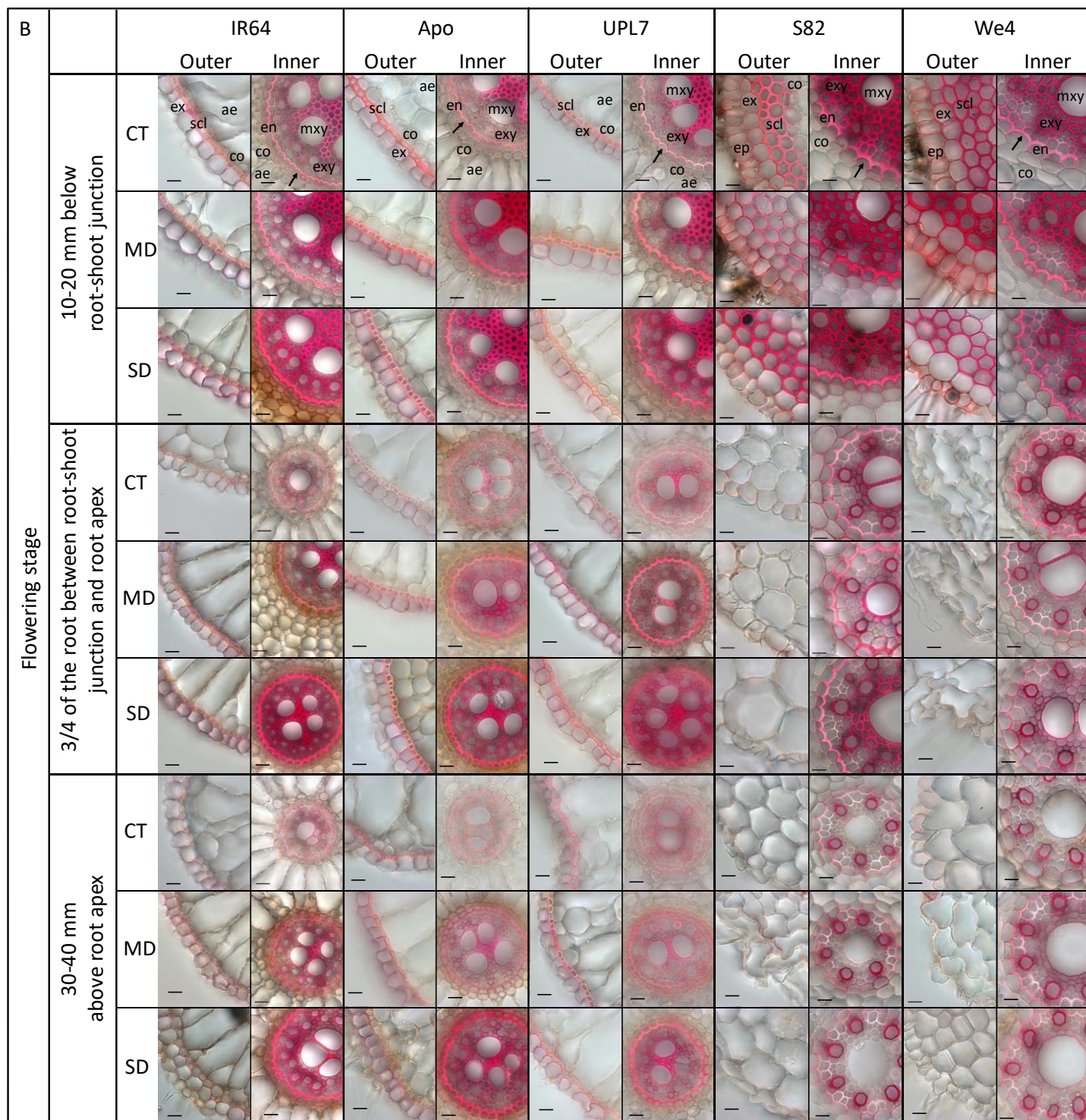


Fig. S3 Continued

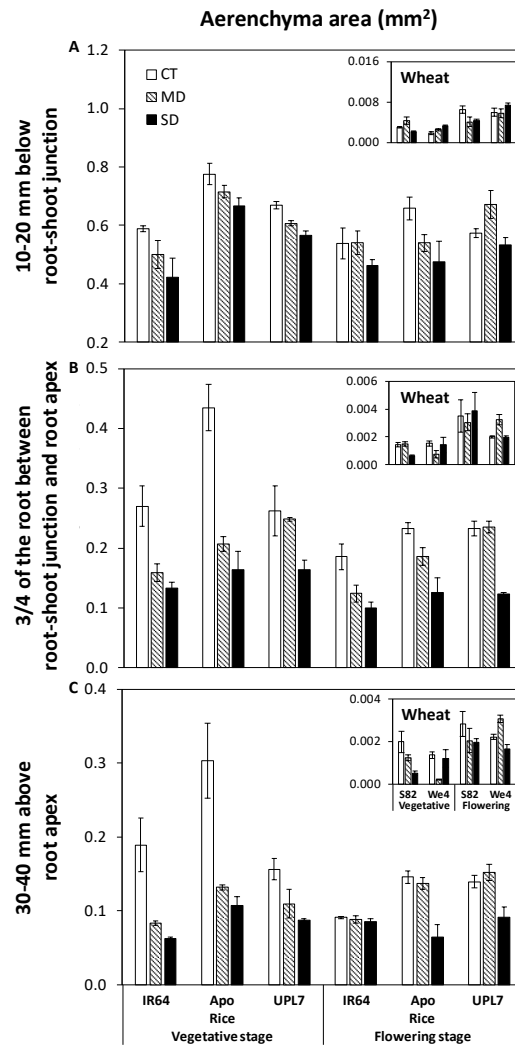


Fig. S4 Response of aerenchyma area along nodal roots of rice and wheat to water treatments: control (CT), mild drought (MD), and more severe drought (SD). Root cross-sections were taken at (A) 10 to 20 mm below root-shoot junction, (B) 3/4 of the root between root-shoot junction and root apex, (C) 30 to 40 mm above root apex, at vegetative and flowering stages. Bars represent standard errors of the mean for three replicates. Due to the large differences of the aerenchyma area and in proportion to the root cortex area between rice and wheat cultivars, data for wheat are shown in insets.

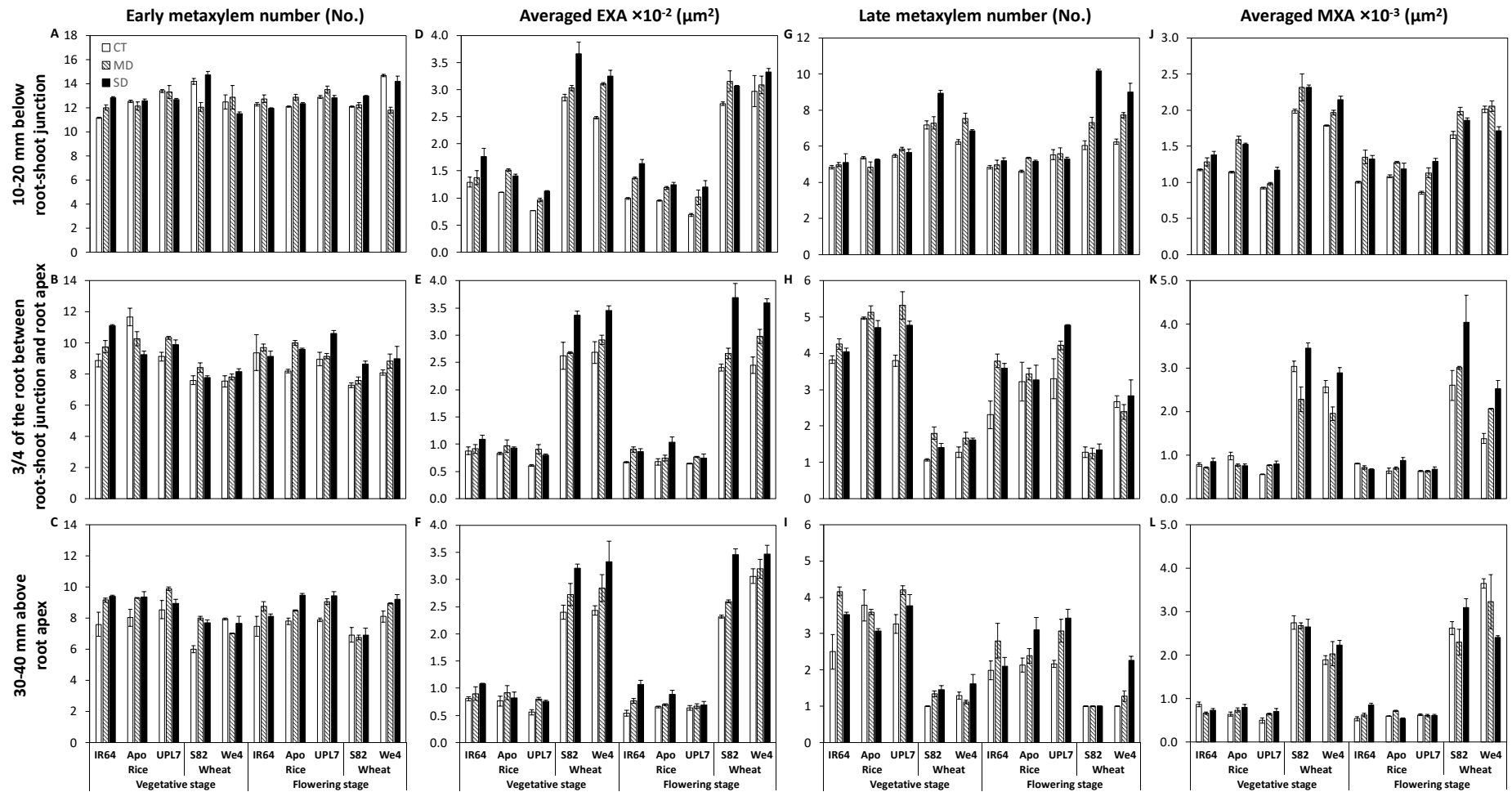


Fig. S5 Response of (A-C) early metaxylem number, (D-F) averaged area per early metaxylem, (G-I) late metaxylem number, and (J-L) averaged area per late metaxylem along nodal roots of rice and wheat to water treatments: control (CT), mild drought (MD), and more severe drought (SD). Root cross sections were taken at (A, D, G, J) 10 to 20 mm below root-shoot junction, (B, E, H, K) 3/4 of the root between root-shoot junction and root apex, and (C, F, I, L) 30 to 40 mm above root apex, at vegetative and flowering stages. Bars represent standard errors of the mean for three replicates.

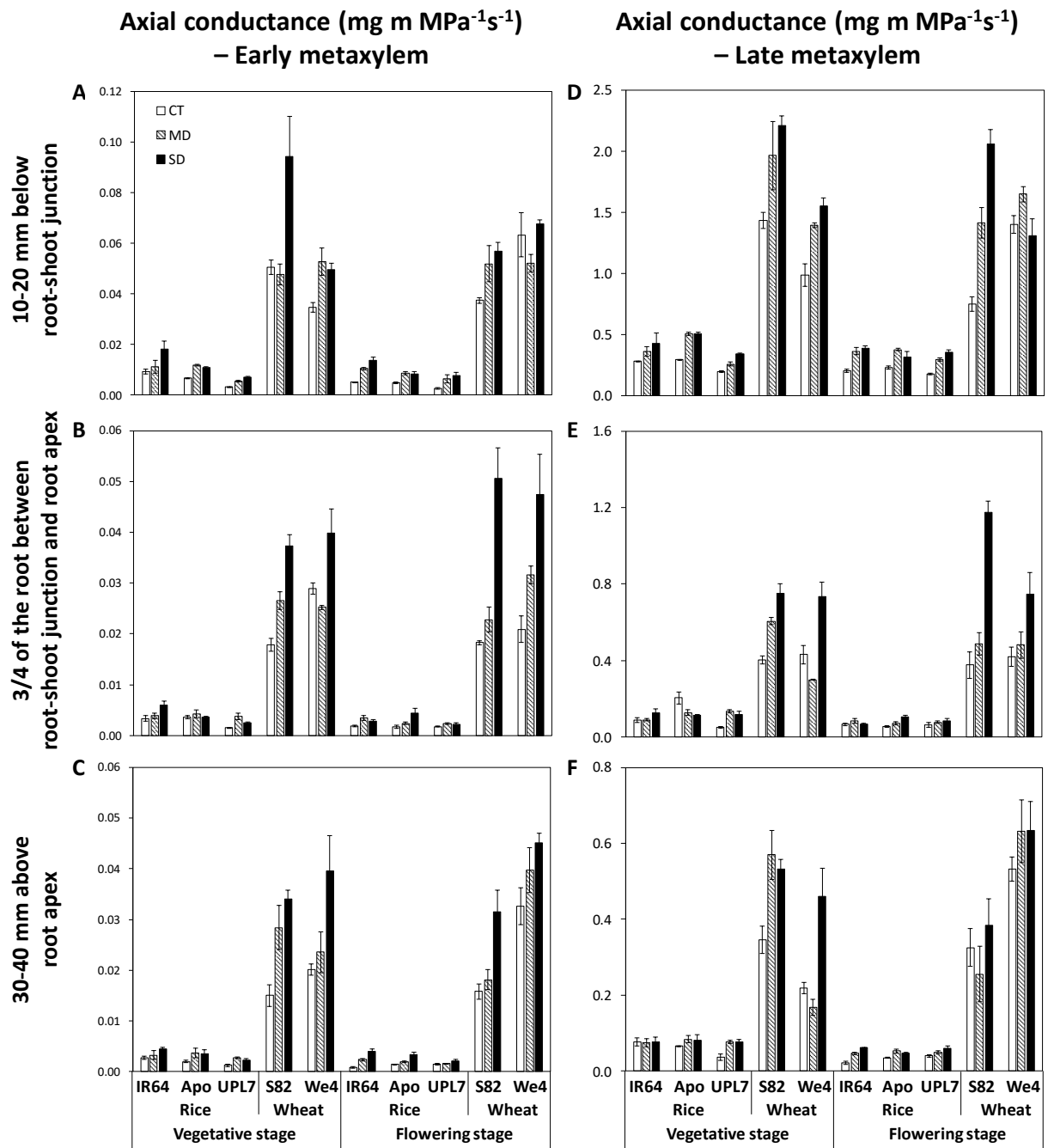


Fig. S6 Response of theoretically calculated axial hydraulic conductance of (A-C) early and (D-F) late metaxylem along nodal root of rice and wheat to water treatments: control (CT), mild drought (MD), and more severe drought (SD). Root cross-sections were taken at (A, D) 10 to 20 mm below root-shoot junction, (B, E) 3/4 of the root between root-shoot junction and root apex, and (C, F) 30 to 40 mm above root apex, at vegetative and flowering stages. Bars represent standard errors of the mean for three replicates.