

Supplementary Table 1 Biomass and water use parameters of invasive and native plants under well-watered and drought stress treatment.

		Shoot	Root	Leaf water	Specific leaf	Net photosynthetic	Transpiration rate	Stomatal conductance	Water consumption
		biomass (g)	biomass (g)	potential (MPa)	area (cm ² / g)	rate (μmol / (m ² .s))	(mmol / (m ² .s))	(mmol / (m ² .s))	(ml)
Invasive	Well-watered	0.23 ±0.16 a	-0.82 ±0.068 a	-0.51 ±0.025 a	793.83 ±106.31 a	15.88 ±1.64 a	5.35 ±0.52 a	0.31 ±0.047 a	492.11 ±38.78 b
	Drought	0.021 ±0.16 b	-0.99 ±0.060 b	-0.66 ±0.025 b	838.91 ±75.83 a	15.43 ±1.48 a	4.66 ±0.52 a	0.28 ±0.048 a	300.05 ±35.90 c
Native	Well-watered	0.16 ±0.12 ab	-0.82 ±0.060 a	-0.54 ±0.031 a	519.58 ±72.75 b	13.17 ±1.22 b	5.58 ±0.70 a	0.29 ±0.046 a	586.11 ±46.13 a
	Drought	-0.18 ±0.12 c	-1.05 ±0.051 b	-0.87 ±0.064 c	669.92 ±97.43 ab	11.55 ±0.99 c	4.85 ±0.58 a	0.26 ±0.046 a	439.83 ±37.01 b

Note: Data with different lowercase letters represent a significant difference at $P < 0.05$.

Supplementary Table 2 Pearson's correlation coefficients between parameters.

[illegible]

RTD	-0.33**	1									-
L1	-0.35**	-0.48***	1								-
L2	0.19	-0.64***	0.62***	1							-
L3	0.47***	-0.54***	0.27*	0.78***	1						-
L4	0.67***	-0.48***	0.18	0.28*	0.41***	1					-
L5	0.51***	-0.31**	0.087	0.19	0.15	0.62***	1				-
WC	0.045	-0.39***	0.10	0.0011	-0.071	0.12	0.060	1			-
RWP	-0.48***	0.28*	-0.010	0.007	-0.17	-0.49***	-0.19	0.21	1		-
LWP	-0.50***	0.089	0.22	0.15	-0.086	-0.38***	-0.092	0.25*	0.89***	1	-

Notes: Biomass water use efficiency, WUEb; Root biomass, RB; Shoot biomass, SB; Ratio of roots to shoots, R/S; Specific leaf area, SLA; Net photosynthetic rate, Pn; Stomatal conductance, Cond; Transpiration rate, Tr; Instantaneous water use efficiency, WUEi; Root hydraulic conductivity, L_{pr} ; Specific root length, SRL; Root average diameter, AD; Root tissue density, RTD; Root lengths at diameters (D) of ≤ 0.5 mm, $0.5 < D \leq 1$ mm, $1 < D \leq 1.5$ mm, $1.5 < D \leq 2$ mm and $D > 2$ mm (L1 - L5, respectively); Water consumption, WC; Root water potential, RWP; Leaf water potential, LWP. * $P < 0.05$, ** $P < 0.01$ and *** $P < 0.001$

Supplementary Table 3 Conditional term effects of redundancy analysis.

Well-watered invasive plants				Drought-stressed invasive plants				Well-watered native plants				Drought-stressed native plants			
	Rate of				Rate of				Rate of				Rate of		
	explanation	pseudo-F	P		explanation	pseudo-F	P		explanation	pseudo-F	P		explanation	pseudo-F	P
	(%)				(%)				(%)				(%)		
RWP	43.4	13	0.002	RWP	54.9	21.9	0.002	L1	54.3	20.2	0.002	L2	67.9	33.8	0.002
AD	30	33.8	0.002	L4	7	4.8	0.044	SRL	12.5	7.8	0.018	L5	9.2	6	0.024
RTD	13.3	4.9	0.044	L3	6.8	3.5	0.068	R/S	10.3	10.5	0.014	L3	4.3	3.8	0.082
L2	1.6	1.8	0.16	Lpr	6.6	2.9	0.146	L5	9.1	4	0.07	Lpr	3.7	2.7	0.118
SRL	1.6	2	0.204	L5	3.3	1.8	0.226	L3	2.7	3.2	0.104	L1	3.5	3.9	0.098
L4	1.9	2.8	0.11	AD	2.6	1.2	0.296	RWP	0.6	0.7	0.394	SRL	1.3	1.1	0.302
L5	1.2	1.9	0.2	L2	1.4	1	0.336	AD	0.8	1	0.352	RTD	2.4	3.2	0.106
L1	1.7	3.3	0.112	SRL	1	0.7	0.438	L2	1	1.2	0.306	L4	1.4	2.1	0.192
L3	0.6	1.2	0.286	R/S	0.5	0.3	0.616	Lpr	0.3	0.3	0.616	R/S	0.6	0.9	0.36
R/S	0.2	0.4	0.556	L1	0.4	0.2	0.628	L4	0.2	0.2	0.686	AD	0.2	0.2	0.626
Lpr	0.3	0.5	0.512	RTD	<0.1	<0.1	0.974	L1	54.3	20.2	0.002	L2	67.9	33.8	0.002

Notes: Root hydraulic conductivity, *Lpr*; Root water potential, RWP; Ratio of roots to shoots, R/S; Specific root length, SRL; Root average diameter, AD; Root lengths (cm) at different root diameters ($D \leq 0.5$ mm, $0.5 < D \leq 1$ mm, $1 < D \leq 1.5$ mm, $1.5 < D \leq 2$ mm and $D > 2$ mm (L1 – L5, respectively); Root tissue density, RTD.

Supplementary Table 4 Subordinate function values of each parameter in the invasive and native plants.

Origin Index	Invasive	Native	Origin Index	Invasive	Native
Shoot biomass (g)	0.45	0.37	Leaf water potential (MPa)	0.74	0.54
Root biomass (g)	0.29	0.26	Root water potential (MPa)	0.74	0.57
Ratio of root to shoot	0.37	0.43	Root hydraulic conductance (cm / (MPa.S))	0.35	0.27
Specific leaf area (cm ² / g)	0.51	0.39	Specific root length (cm/g)	0.41	0.29
Net photosynthetic rate (μmol / (m ² .s))	0.52	0.34	Average diameter (mm)	0.64	0.26
Stomatal conductance (mmol / (m ² .s))	0.34	0.31	Root tissue density (g / cm ³)	0.35	0.14
Transpiration rate (mmol / (m ² .s))	0.60	0.58	Water use efficiency (μmol/mmol)	0.36	0.18
Water consumption (ml)	0.69	0.42	Water use efficiency (g / L)	0.49	0.35
Average	0.49 ±0.038	0.35 ±0.033			
One factor ANOVA	F=7.80	P=0.009<0.01 (**)			

Supplementary Figure 1

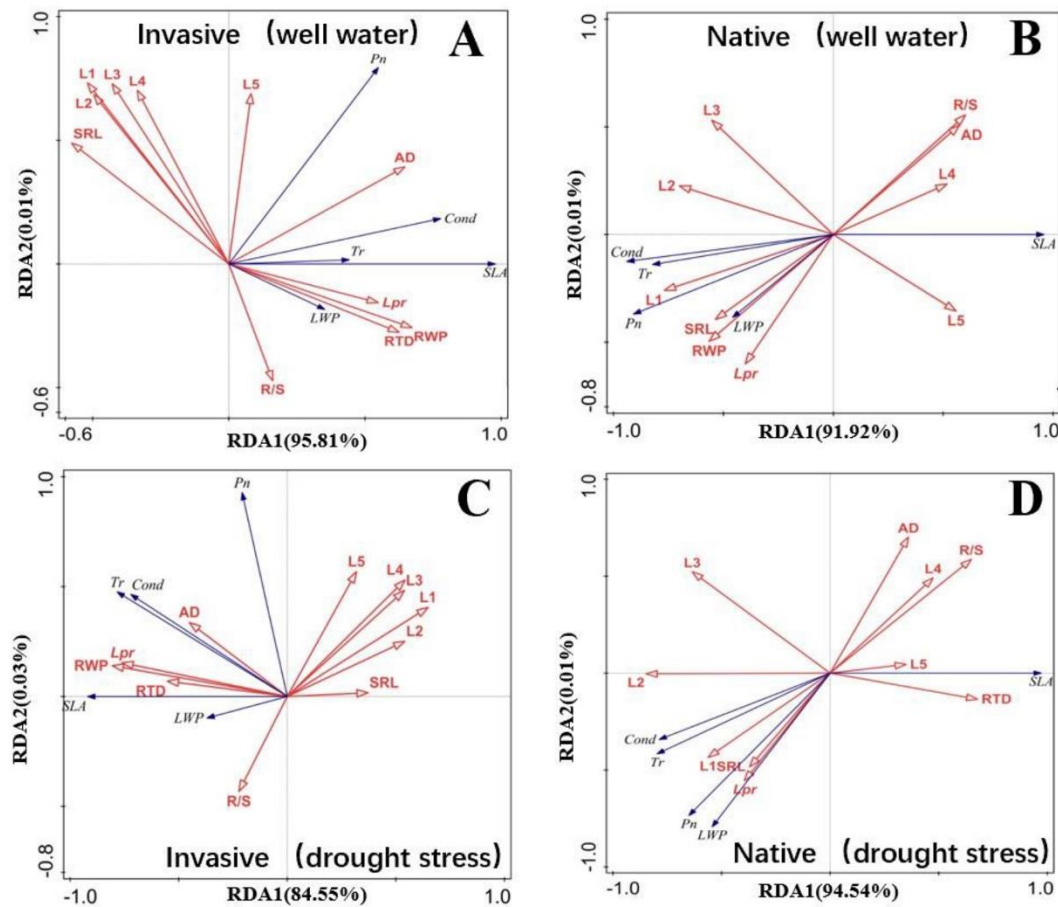


Figure S1. Relationships between the water use traits (transpiration rate, Tr ; stomatal conductance, $Cond$; net photosynthetic rate, P_n) and root morphological traits (ratio of root to shoot, R/S ; root average diameter, AD ; specific root length, SRL ; root length at a different root diameter (D): $0 < D \leq 0.5$ mm, $L1$; $0.5 < D \leq 1.0$ mm, $L2$; $1.0 < D \leq 1.5$ mm, $L3$; $1.5 < D \leq 2.0$ mm, $L4$; $D > 2.0$ mm, $L5$) and water use traits and physiological traits (root hydraulic conductivity, Lpr ; root water potential, RWP ; root tissue density, RTD) based on redundancy analysis (RDA) under well-watered (invasive (A) and native plants (B)) and drought stress conditions (invasive (C) and native plants (D)). Arrows indicate the lengths and angles between explanatory variables (root morphological and physiological traits) and response variables (water use traits). Blue arrows represent response variables and red arrows represent explanatory variables.