

## Supplementary Materials

### **Seedling-Stage Deficit Irrigation with Nitrogen Application in Three-Year Field Study Provides Guidance for Improving Maize Yield, Water and Nitrogen Use Efficiencies**

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**Table S1 Summary of ANOVA for the effects of seedling-stage soil water level, N fertilization and experimental year on shoot and root dry biomass (DM) and their ratio at different growth stages, grain yield and yield components of maize plants**

Source of variation	Shoot DM				Root DM			Root: shoot ratio			Grain yield	Ear number	Grain number per ear	100-grain weight
	BDI	ADI	R1	R6	BDI	ADI	R1	BDI	ADI	R1				
Water (W)	—	***	ns	ns	—	***	ns	—	ns	ns	ns	***	ns	ns
Nitrogen (N)	***	***	***	***	***	***	***	***	***	ns	***	***	***	***
Year (Y)	***	***	***	***	***	***	***	***	ns	**	***	***	***	***
W × N	—	ns	ns	ns	—	ns	ns	—	ns	ns	ns	*	ns	ns
W × Y	—	ns	**	**	—	**	**	—	*	ns	**	ns	**	**
N × Y	***	ns	ns	ns	***	ns	ns	ns	ns	ns	ns	*	ns	ns
W × N × Y	—	ns	ns	ns	—	ns	ns	—	ns	ns	ns	ns	ns	ns

DI, deficit irrigation; BDI, Before seedling-stage DI; ADI, After seedling-stage DI; R1, silking stage; R6, Maturity stage.

\*, \*\* and \*\*\* indicate significance at  $P < 0.05$ ,  $P < 0.01$  and  $P < 0.001$ , respectively, and ns indicates non-significance ( $P > 0.05$ ).

**Table S2 Summary of ANOVA for the effects of seedling-stage soil water level, N fertilization and experimental year on N uptake, N use efficiency (NUE), actual evapotranspiration (ETa) and water use efficiency (WUE) for shoot dry biomass (WUE<sub>dm</sub>) and grain yield (WUE<sub>gy</sub>) of maize plants at different growth stages**

Source of variation	Plant N uptake				NUE		ETa				WUE <sub>dm</sub> / WUE <sub>gy</sub>							
	BDI	ADI	R1	R6	BDI	ADI	R1	R6	S-BDI	BDI-ADI	ADI-R1	R1-R6	S-R6	S-BDI	BDI-ADI	ADI-R1	R1-R6	S-R6
Water (W)	—	***	ns	ns	—	ns	ns	ns	—	***	*	ns	***	—	***	ns	ns	*
Nitrogen (N)	***	***	***	***	—	—	—	—	ns	ns	ns	ns	ns	***	***	***	***	***
Year (Y)	***	***	***	***	***	***	***	***	***	***	***	***	***	*	ns	***	***	*
W × N	—	ns	ns	ns	—	—	—	—	—	ns	ns	ns	ns	—	ns	ns	ns	ns
W × Y	—	ns	*	***	—	**	**	***	—	**	ns	ns	ns	—	**	ns	ns	*
N × Y	***	ns	*	**	—	—	—	—	ns	ns	ns	ns	ns	ns	ns	ns	ns	ns
W × N × Y	—	ns	*	*	—	—	—	—	—	ns	ns	ns	ns	—	ns	ns	ns	ns

S, sowing; DI, deficit irrigation; BDI, Before seedling-stage DI; ADI, After seedling-stage DI; R1, silking stage; R6, Maturity stage.

\*, \*\* and \*\*\* indicate significance at  $P < 0.05$ ,  $P < 0.01$  and  $P < 0.001$ , respectively, and ns indicates non-significance ( $P > 0.05$ ).

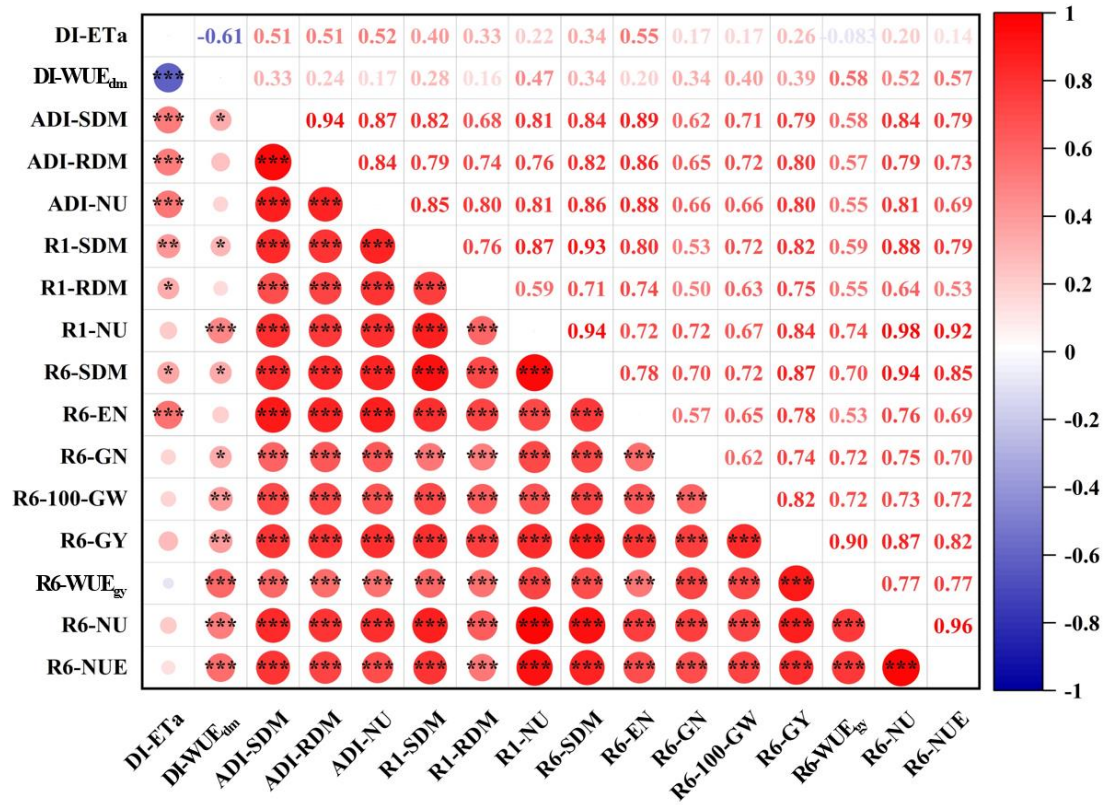


Figure S1 Correlations coefficients (upper triangular) and significant marks (lower triangular) among maize growth, water and N use parameters at different periods, respectively.

DI, deficit irrigation period; ADI, after seedling-stage DI; R1, silking stage; R6, maturity stage; ETa, actual evapotranspiration; SDM, shoot dry matter; RDM, root dry matter; NU, plant N uptake; NUE, N use efficiency; GY, grain yield; EN, ear number; GN, grain number per ear; 100-GW, 100-grain weight; WUE<sub>dm</sub> and WUE<sub>gy</sub>, water use efficiency for SDM and GY, respectively.

Significant mark \*, \*\* and \*\*\* indicate significance level at  $P < 0.05$ ,  $P < 0.01$  and  $P < 0.001$ , respectively.