

Supplemental Table S1 Nitrogen deficiency stress phenotype

Stage	Phenotype	Cultivars	N0	N1	Variation
SS	DMW per plant (g)	DN322	8.99	21.89	60.7%
		DN314	5.91	27.60	78.6%
TFS		DN322	17.59	32.03	45.1%
DN314		13.34	69.52	80.8%	
TFS	DMW of tuber (g)	DN322	17.59	32.03	45.1%
		DN314	13.37	69.52	80.8%
SS	Net photosynthetic rate ($\mu\text{m}/\text{m}^2\text{s}$)	DN322	5.20	8.68	40.1%
		DN314	9.72	16.11	39.7%
TFS		DN322	12.82	21.75	41.0%
		DN314	16.87	28.46	40.7%
SS	Root vatality($\mu\text{g}/\text{gh}$)	DN322	71.25	84.22	15.4%
		DN314	73.69	126.65	41.8%
TFS		DN322	80.93	106.44	24.0%
		DN314	84.08	146.23	42.5%

Note: SS represents seedling stage, TFS represents tuber formation stage, DMW represents dry matter weight.

Supplemental Table S2 RNA-seq quality of DN322

Samples	Clean reads	% \geq Q30
T1AN0a	22573267	0.9391
T1AN0b	21576255	0.9363
T1AN0c	22063493	0.9401
T1AN1a	21653028	0.937
T1AN1b	20600089	0.9392
T1AN1c	20457525	0.9367
T2AN0a	20907833	0.9432
T2AN0b	26384273	0.9341
T2AN0c	31881882	0.9336
T2AN1a	24618676	0.9403
T2AN1b	23050962	0.9346
T2AN1c	20712285	0.9125

Note: T1 represents seedling stage, T2 represents tuber formation stage, A represents DN322, a, b or c represents different biological replicates.

Supplemental Table S3 RNA-seq quality of DN314

Samples	Clean reads	% \geq Q30
T1BN0a	22,386,333	93.95%
T1BN0b	20,509,105	93.85%
T1BN0c	19,789,862	93.20%
T1BN1a	19,127,622	93.88%
T1BN1b	20,731,954	93.44%
T1BN1c	19,190,456	92.55%
T2BN0a	20,849,296	93.55%
T2BN0b	20,614,437	94.35%
T2BN0c	22,712,674	91.38%
T2BN1a	21,236,740	92.52%
T2BN1b	21,059,689	93.40%
T2BN1c	19,516,017	94.19%

Note: T1 represents seedling stage, T2 represents tuber formation stage, B represents DN322, a, b or c represents different biological replicates.