

Appendix A Precipitation, sunshine hours, and temperature during the rice growing season in 2017 and 2018 in the experiment site.

Meteorological factors / Year	Month						
	May	June	July	August	September	October	November
Precipitation (mm)							
2017	34.7	12.6	43.8	85.2	65.7	51.2	54.3
2018	63.2	49.1	182	274	66.2	36.0	60.4
Sunshine (h)							
2017	222	194	246	187	122	110	158
2018	151	208	211	211	152	210	123
Temperature (°C)							
2017	24.1	26.3	31.7	28.7	23.9	17.8	16.2
2018	21.8	26.0	29.5	29.2	24.2	16.8	16.5

Appendix B Detailed information of the experimental varieties in present study¹⁾

Varieties	Varietal types ²⁾	Growth period ³⁾ (d)	Plant height ⁴⁾ (cm)	Rel eased year	Parental information	
7	Lianjing- V	NE	154	101 0	201 0	Zhendao 88/zhongjing 8415 × Zhongjingchuan 2/wuyujing 3
5	Huaidao V	NE	155	106	200	7208 × Wuyunjing 3
13	Huaidao- V	NE	155	109	200	Siyang 83486/Zhongguo 91 × Lianjing 1
1	Ningjing- NIV	NIV	155	98.5	200	Wuyunjing 8 × W3668
5	Ningjing- NIV	NIV	154	103	201	Wuxiangjing 14 × Zhendao
-4038	Yangjing NIV	NIV	157	109	200	Zhenxiang 24 × Wuyunjing
				8	8	

1) Detailed information is available from the China Rice Data Center (<http://www.ricedata.cn>)

2) NEV, N-efficient variety; NIV, N-inefficient variety.

3) The growth period of all the varieties is the situation of normal N condition.

4) Plant height of all the varieties is the situation of normal N condition at heading time.

Appendix C Grain yield and nitrogen use efficiency of two types of varieties under two N treatments in 2017

N treatment ¹⁾	Varieties	Grain yield (t ha ⁻¹)	AE _N ²⁾ (Kg Kg ⁻¹)	PFP _N (Kg Kg ⁻¹)	IE _N (Kg Kg ⁻¹)
0N	Huaidao 5	6.20±0.12c	-	-	64.0±0.2a
	Huaidao-13	6.36±0.14c	-	-	65.4±2.2a
	Lianjing-7	6.10±0.09cd	-	-	63.8±2.6ab
	Ningjing-5	5.78±0.14de	-	-	62.0±2.0bc

	Ningjing-1	5.50±0.20e	-	-	59.9±0.5c
	Yangjing-4038	5.70±0.16e	-	-	61.6±1.4c
NN	Huaidao 5	9.40±0.75a	16.0±0.8a	47.0±0.4a	53.7±2.0d
	Huaidao-13	9.49±0.51a	15.7±0.8a	47.5±1.2a	55.2±2.4d
	Lianjing-7	9.25±0.24a	15.8±0.5a	46.3±0.3a	54.1±0.5d
	Ningjing-5	8.42±0.23b	13.2±0.8b	42.1±1.2b	50.7±1.0e
	Ningjing-1	8.16±0.36b	13.3±1.1b	40.8±1.8b	49.8±1.4e
	Yangjing-4038	8.32±0.16b	13.1±0.3b	41.6±0.8b	51.4±0.6e
Analysis of Variance					
	Nitrogen (N)	**	-	-	**
	Varital group (V)	**	**	**	**
	N×V	*	-	-	NS

1) 0 N, nitrogen omission treatment (0 Kg N ha⁻¹); NN, normal N treatment (200 Kg N ha⁻¹).

2) AE_N, Agronomic N use efficiency: [grain yield in N application plots – grain yield in N omission plots (Kg)]/N rate (Kg); PFP_N, partial factor productivity of applied N: grain yield in N application plots (Kg)/N rate (Kg); IE_N, Internal N use efficiency: grain yield (Kg)/Total N uptake of plants (Kg).

No common letter above the column indicates statistical significance at the $P = 0.05$ level. *, ** Significant at the 0.05 and 0.01 probability levels, respectively. NS, not significant at the $P = 0.05$ level.

Appendix D Grain yield and nitrogen use efficiency of two types of varieties under two N treatments in 2018

N treatment ¹⁾	Varieties	Grain yield (t ha ⁻¹)	AE _N ²⁾ (Kg Kg ⁻¹)	PFP _N (Kg Kg ⁻¹)	IE _N (Kg Kg ⁻¹)
0N	Huaidao-5	6.00±0.27c	-	-	62.1±2.6a
	Huaidao-13	6.13±0.08c	-	-	62.3±1.1a
	Lianjing-7	6.02±0.14c	-	-	62.5±2.7a
	Ningjing-5	5.46±0.15d	-	-	59.3±1.4b
	Nnijing-1	5.41±0.94d	-	-	59.1±1.2b
	Yangjing-4038	5.38±0.28d	-	-	58.4±1.8b
NN	Huaidao-5	9.14±0.22a	17.4±0.5a	50.8±0.3a	54.9±1.0c
	Huaidao-13	9.18±0.36a	16.9±0.5a	51.0±0.3a	55.3±0.5c
	Lianjing-7	9.16±0.31a	17.4±0.2a	50.9±1.5a	55.7±1.8c
	Ningjing-5	8.17±0.12b	15.1±0.5b	45.4±0.4b	51.5±1.7d
	Ningjing-1	8.13±0.13b	15.1±0.8b	45.1±0.7b	51.7±2.0d
	Yangjing-4038	8.18±0.21b	15.6±0.8b	45.4±1.0b	52.0±0.9d
Analysis of Variance					
	Nitrogen (N)	**	-	-	**
	Variety (V)	**	**	**	**
	N×V	*	-	-	NS

1) 0 N, nitrogen omission treatment (0 Kg N ha⁻¹); NN, normal N treatment (180 Kg N ha⁻¹).

2) AE_N, Agronomic N use efficiency: [grain yield in N application plots – grain yield in N omission plots (Kg)]/N rate (Kg); PFP_N, partial factor productivity of applied N: grain yield in N

application plots (Kg)/N rate (Kg); IE_N , Internal N use efficiency: grain yield (Kg)/Total N uptake of plants (Kg).

No common letter above the column indicates statistical significance at the $P=0.05$ level. *, ** Significant at the 0.05 and 0.01 probability levels, respectively. NS, not significant at the $P = 0.05$.