

Supplementary information

Table S1 Effect of different fertilizer treatments on rice root morphology at heading stage in 2016

Fertilizer Application Method	Fertilizer type	Length ($\times 10^2$ cm/hill)	Projected area ($\times 10^2$ cm ² / hill)	Surface area ($\times 10^2$ cm ² / hill)	Average diameter (mm)	Root volume (cm ³ / hill)	Tips ($\times 10^4$ / hill)	Dry matter accumulation (t ha ⁻¹)
Broadcast	CK	211.6 \pm 14.1	11.2 \pm 0.2	35.2 \pm 0.5	0.52 \pm 0.03	47.1 \pm 2.2	11.6 \pm 1.2	1.27 \pm 0.02
	SCU	172.7 \pm 14.3	9.2 \pm 0.3	28.8 \pm 1.0	0.46 \pm 0.02	38.6 \pm 0.4	9.2 \pm 1.6	1.00 \pm 0.01
	PCU	147.3 \pm 15.8	7.9 \pm 0.8	25.5 \pm 2.4	0.47 \pm 0.01	29.4 \pm 2.8	8.2 \pm 1.0	0.88 \pm 0.10
	BBF	183.1 \pm 9.1	9.8 \pm 0.3	30.6 \pm 0.9	0.53 \pm 0.01	41.0 \pm 0.5	11.1 \pm 1.1	1.15 \pm 0.23
Deep placement	SCU	223.2 \pm 15.2	10.5 \pm 1.0	32.9 \pm 3.0	0.48 \pm 0.01	39.9 \pm 4.4	15.1 \pm 0.3	1.31 \pm 0.08
	PCU	164.7 \pm 36.5	8.3 \pm 1.9	26.0 \pm 6.1	0.51 \pm 0.01	32.8 \pm 8.2	9.4 \pm 2.3	0.97 \pm 0.17
	BBF	192.4 \pm 4.3	10.5 \pm 0.4	33.1 \pm 1.2	0.55 \pm 0.01	46.0 \pm 2.4	11.7 \pm 0.2	1.28 \pm 0.03
	LSD _{0.05}	20.68	1.16	3.96	0.05	6.21	1.20	0.15
Fertilizer placement (P)		**	*	*	ns	*	**	**
Fertilizer type (T)		**	**	**	**	**	**	**
P \times T		*	ns	ns	ns	ns	**	ns

Notes. CK, high-yield split fertilization of urea; PCU, a polymer-coated urea (4% (w/w) coating, 43% N); SCU, a sulfur-coated urea (37% N); BBF, a bulk blending fertilizer (40% N). ns: not significant ($P > 0.05$), *: significant at $P \leq 0.05$, **: significant at $P \leq 0.01$.

Table S2 Effect of different fertilizer treatments on rice plant N content in 2015 and 2016.

Year	Fertilizer Application Method	Fertilizer type	Plant N content (%)			
			Tillering	Panicle initiation	Heading	Maturity
2015	Broadcast	CK	3.19±0.02	2.32±0.03	1.83±0.01	1.13±0.01
		SCU	3.23±0.01	2.42±0.04	1.62±0.02	0.95±0.01
		PCU	3.11±0.05	2.65±0.05	1.72±0.01	1.00±0.01
		BBF	3.08±0.03	2.54±0.02	1.78±0.03	1.06±0.01
	Deep placement	SCU	3.13±0.1	2.52±0.03	1.79±0.02	1.10±0.02
		PCU	3.69±0.05	2.69±0.10	2.02±0.03	1.16±0.01
		BBF	3.14±0.01	2.60±0.04	1.82±0.01	1.12±0.03
		LSD _{0.05}	0.27	0.20	0.12	0.06
2016	Broadcast	CK	3.19±0.02	1.88±0.04	1.56±0.01	1.20±0.01
		SCU	3.23±0.01	2.04±0.01	1.21±0.02	1.03±0.02
		PCU	2.90±0.08	2.70±0.03	1.81±0.07	1.17±0.02
		BBF	3.03±0.03	2.39±0.06	1.60±0.01	1.21±0.01
	Deep placement	SCU	3.21±0.08	2.12±0.02	1.27±0.03	1.10±0.01
		PCU	3.18±0.06	2.56±0.03	2.02±0.03	1.27±0.01
		BBF	3.08±0.05	2.36±0.03	1.62±0.07	1.24±0.01
		LSD _{0.05}	0.27	0.13	0.16	0.05
P-value	Year (Y)		**	**	**	**
	Fertilizer placement (P)		**	ns	**	**
	Fertilizer type (T)		*	**	**	**
	Y×P		ns	ns	ns	*
	Y×T		**	**	**	**
	P×T		**	ns	**	*
	Y×P×T		ns	ns	ns	ns

Notes. CK, high-yield split fertilization of urea; PCU, a polymer-coated urea (4% (w/w) coating, 43% N); SCU, a sulfur-coated urea (37% N); BBF, a bulk blending fertilizer (40% N). ns: not significant (P>0.05), *: significant at P≤0.05, **: significant at P≤ 0.01.