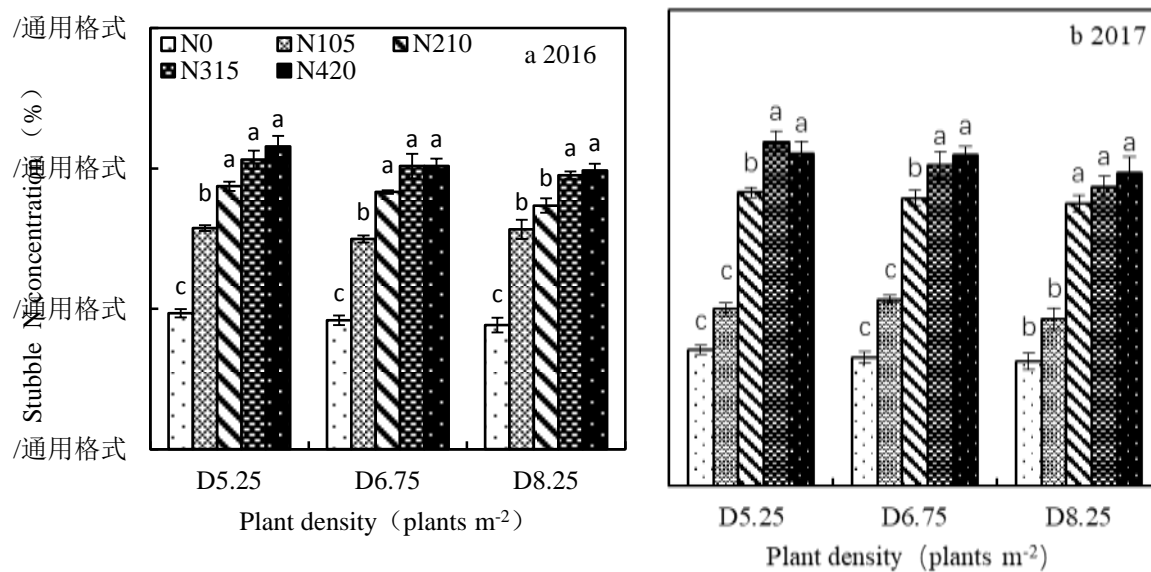


Supplementary Table S1 N apparent balance of soil at three plant densities (5.25, 6.75 and 8.25 plants m⁻²) and five N rates (0, 105, 210, 315 and 420 kg ha⁻¹) in 2016 and 2017.

Plant density (plants m ⁻²)	N rate (kg ha ⁻¹)	Initial N		N applied		N uptake		Residual N		Soil apparent N surplus	
		(kg ha ⁻¹)		(kg ha ⁻¹)		(kg ha ⁻¹)		(kg ha ⁻¹)		(kg ha ⁻¹)	
		2016	2017	2016	2017	2016	2017	2016	2017	2016	2017
5.25	0	169.5	100.1 e	0	0	180.0 f	169.1 f	50.4 d	48.3 e	-60.9 e	-117.3 e
	105	169.5	126.2 d	105	105	208.9 e	203.3 e	59.0 d	53.6 de	6.6 d	-25.7 d
	210	169.5	159.8 c	210	210	225.9 d	227.9 c	84.5 c	82.4 c	69.1 c	59.5 c
	315	169.5	185.1 bc	315	315	240.9 c	234.9 c	115.5 ab	120.9 b	128.0 b	144.3 b
	420	169.5	228.1 a	420	420	239.8 c	228.2 c	141.0 a	157.6 a	208.7 a	262.3 a
6.75	0	169.5	110.4 e	0	0	185.6 f	175.1 f	44.8 e	40.7 e	-60.8 e	-105.5 e
	105	169.5	125.7 d	105	105	224.4 d	215.8 d	46.1 e	46.2 e	4.1 d	-31.4 d
	210	169.5	162.0 c	210	210	243.8 c	247.1 b	79.2 c	81.6 c	56.5 c	43.3 c
	315	169.5	202.1 b	315	315	260.1 ab	249.8 b	100.6 b	107.9 b	123.8 b	159.4 b
	420	169.5	248.1 a	420	420	251.1 bc	255.4 b	139.2 a	153.7 a	199.2 a	259.0 a
8.25	0	169.5	110.5 e	0	0	184.4 f	172.1 f	40.3 e	36.1 e	-55.2 e	-97.7 e
	105	169.5	138.2 d	105	105	223.7 d	212.1 de	47.4 e	42.6 e	3.4 d	-21.5 d
	210	169.5	154.1 c	210	210	245.2 c	233.6 c	78.7 c	73.2 c	45.6 c	44.3 c
	315	169.5	216.2 b	315	315	258.9 ab	249.8 b	103.9 b	110.3 b	121.7 b	171.2 b
	420	169.5	239.7 a	420	420	269.8 a	268.5 a	134.8 a	149.8 a	184.9 a	241.4 a

Small letters indicate differences among five N rates and three plant densities in the same year at $\alpha=0.05$. Significance levels (** $P<0.01$, * $P<0.05$, and ^{ns} $P\geq 0.05$) are given.



Supplementary Fig. 1 Effects of plant densities (5.25, 6.75 and 8.25 plants m⁻²) and N rates (0, 105, 210, 315 and 420 kg ha⁻¹) on N concentration of stubble after harvesting in 2016 (a) and 2017 (b). Small letters indicate significant differences in N rates ($p < 0.05$).