

# Supplementary information:

Table S1 Seasonal ammonia volatilization in soil during maize and wheat seasons from 2013 to 2016

Year	Treatment	Maize season volatilization (kg N hm <sup>-2</sup> )			Wheat season volatilization (kg N hm <sup>-2</sup> )			annual volatilization (kg N hm <sup>-2</sup> )
		Basic fertilization	topdrssing	Sum	Basic fertilization	Topdrssing	Sum	
2013-2014	CK	7.27 c	2.06 c	9.32 c	6.95 b	5.21 b	12.15 b	21.48 c
	CN	9.65 a	14.51 a	24.16 a	11.99 a	6.40 ab	18.38 a	42.55 a
	AC-FE	9.03 ab	12.19 b	21.22 b	11.65 a	6.85 a	18.50 a	39.72 ab
	2,4D-DI	7.94 bc	11.97 b	19.91 b	12.30 a	5.77 ab	18.07 a	37.97 b
2014-2015	CK	6.80 c	4.56 b	11.36 c	6.85 b	2.78 a	9.63 b	20.99 b
	CN	8.90 a	6.08 a	14.98 a	7.79 a	3.31 a	11.10 a	26.08 a
	AC-FE	8.15 b	6.01 a	14.17 ab	7.75 a	3.00 a	10.75 ab	24.92 a
	2,4D-DI	7.55 b	6.26 a	13.81 b	7.45 ab	3.11 a	10.56 ab	24.37 a
2015-2016	CK	2.67 c	7.21 b	9.88 b	9.09 b	5.21 b	14.30 b	24.18 b
	CN	3.92 a	11.24 a	15.16 a	11.98 a	5.94 a	17.92 a	33.08 a
	AC-FE	3.63 ab	11.10 a	14.73 a	11.34 a	5.51 ab	16.85 a	31.57 a
	2,4D-DI	3.35 b	10.83 a	14.18 a	11.76 a	6.07 a	17.83 a	32.01 a

Data are mean values  $\pm$  standard deviation. Different lowercase letters in the same line indicate significant differences between different N loss at  $p < 0.05$ .

Table S2 Seasonal denitrification in soil during maize and wheat seasons from 2013 to 2016

Year	Treatment	Maize season denitrification (kg N hm <sup>-2</sup> )			Wheat season denitrification (kg N hm <sup>-2</sup> )			annual denitrification (kg N hm <sup>-2</sup> )
		Basic fertilization	topdrssing	Sum	Basic fertilization	Topdrssing	Sum	
2013-2014	CK	3.79 b	0.87 c	4.66 c	0.18 b	0.15 c	0.34 c	4.99 b
	CN	6.95 a	4.24 a	11.19 a	0.29 ab	0.29 ab	0.58 ab	11.77 a
	AC-FE	4.16 b	2.41 b	6.57 bc	0.31 a	0.36 a	0.67 a	7.24 b
	2,4D-DI	5.86 ab	2.02 b	7.88 b	0.19 ab	0.22 bc	0.41 bc	8.29 b
2014-2015	CK	0.55 b	0.63 b	1.18 c	0.23 b	0.48 b	0.71 b	1.90 c
	CN	1.56 a	2.27 a	3.83 a	0.25 ab	1.68 a	1.93 a	5.76 a
	AC-FE	0.88 b	1.91 a	2.78 b	0.28 ab	1.75 a	2.03 a	4.81 ab
	2,4D-DI	0.60 b	1.74 a	2.33 b	0.30 a	1.43 ab	1.73 a	4.07 b
2015-2016	CK	0.57 c	0.30 b	0.88 b	0.20 a	0.10 a	0.31 a	1.18 b
	CN	1.55 a	0.95 a	2.50 a	0.26 a	0.12 a	0.38 a	2.88 a
	AC-FE	1.31 ab	0.88 a	2.19 a	0.21 a	0.17 a	0.38 a	2.57 a
	2,4D-DI	0.91 bc	0.98 a	1.89 a	0.23 a	0.11 a	0.34 a	2.23 a

Data are mean values  $\pm$  standard deviation. Different lowercase letters in the same line indicate significant differences between different N loss at  $p < 0.05$ .