Table S1. 30 year normal and 2018 average temperature and monthly rainfall for growing season in Rosemount, MN

		May	June	July	Aug	Sept	Oct
	precipitation (cm)	10.3	12.0	11.4	12.0	9.2	7.3
30 year mean	avg temperature (^{0}C)	14.3	19.6	21.9	20.7	16.0	8.9
2017 season	precipitation (cm)	10.9	15.4	11.1	9.9	15.7	9.1
	avg temperature (^{0}C)	18.6	21.4	22.0	21.1	17.4	6.2

Table S2. ANOVA results for NUE in detail.

Factor	PNUE Total	PNUE Root	PNUE Shoot	PNUE Grain	NIE Total	NIE Root	NIE Shoot	NIE Grain
	PNUE				**NIE**			
1 year old stand								
Treatment	0.1267	**0.0007**	**0.001**	0.289	0.1515	0.8123	0.1423	0.3783
Sampling time	**<.0001**	**<.0001**	**<.0001**	--	0.4393	0.8727	0.0655	--
Treatment X sampling time	0.081	**0.0193**	0.3027	--	0.7486	0.446	0.9454	--
2 year old stand								
Treatment	0.0572	**0.0016**	0.5069	**0.007**	0.9246	0.1639	0.6658	0.7418
Sampling time	**0.0343**	**0.0027**	**<.0001**	--	**0.0019**	**0.0067**	**0.0032**	--
Treatment X sampling time	0.4381	0.5174	0.0545	--	0.5366	0.9751	0.7259	--

Statistics were performed based on a complete randomized block design. For each tissue type, statistics were performed on dates for which the nitrogen use efficiency was calculated for each tissue type, respectively (Total PNUE and NIE were calculated for the maturity and fall regrowth dates only, were root, shoot, and grain PNUE and NIE were also calculated).

Table S3. Results of analysis of variance to test for significant nitrogen addition treatment, sampling time, and interaction effects on soil NO_3^--N (0-15), soil NH_4^+-N (0-15), soil mineralized NO_3^--N (0-15 cm), and soil mineralized NH_4^+-N (0-15 cm) in 1 year old and 2 year old intermediate wheatgrass stands

Factor	Mineral N (mg kg^{-1})			Mineralized N (mg kg^{-1})			Mineralization rate (mg kg^{-1} day^{-1})			Soil N (%)
	NO$_3$-	NH$_4$	Total	NO$_3$-	NH$_4$	Total	nitrification	ammonification	total Nmin	
1 year old stand										
Treatment	**0.0011**	**0.0122**	**0.0005**	0.0658	**0.0302**	**0.0088**	0.2039	**0.0378**	0.0169	0.3426
Sampling time	**<.0001**	**0.0002**	**<.0001**	**<.0001**	**0.0016**	**<.0001**	**<.0001**	**0.0007**	**<.0001**	**0.0013**
Treatment X sampling time	**0.0016**	**0.0402**	**0.0029**	**0.0412**	0.1138	0.1126	0.0866	0.0671	0.0804	7267
2 year old stand										
Treatment	0.0824	0.1966	0.1451	0.8115	0.1822	0.2031	0.7663	0.2301	0.258	0.3317
Sampling time	**0.0009**	**0.0185**	**0.015**	**0.0011**	0.0583	**0.049**	**0.0054**	**0.0177**	0.0562	0.0594
Treatment X sampling time	**0.0328**	0.0747	0.0533	0.0955	0.1008	**0.0461**	0.1387	0.135	0.0574	**0.039**

* = $P < 0.05$; ** = $P < 0.01$; *** = $P < 0.001$; NS= not significant, -- = data not available for this test