## **Supporting Information**

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Fig. S1. Regression between standing plant nitrogen pool and standing plant carbon pool (P < 0.01,  $R^2 = 0.90$ ). For species abbreviations, please refer to Fig. 2.



**Fig. 52.** Seasonal average of *in situ* net N mineralization [mg (NH4 + NO3)/kg soil/day). Average was taken over three sampling periods (July, August, and September 2006). Net N mineralization *in situ* assays were carried out in 1-month intervals for each sampling period. Species differences in net N mineralization were examined using one-way ANOVA. No significant differences were found among species (*P* > 0.05).

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**Fig. S3.** Regression between plant nitrogen residence time and standing plant nitrogen pool (P < 0.01,  $R^2 = 0.49$ ). For species abbreviations, please refer to Fig. 2.



**Fig. S4.** Mean ( $\pm$  1 SE) above-ground standing biomass of a competition experiment of *Pinus strobus, Quercus ellipsoidalis, Schizachyrium scoparium*, and *Agropyron repens. Pinus strobus* and *Q. ellipsoidalis* were established in monoculture and in competition with either *A. repens* or *S. scoparium*. Biomass was sampled in 1996 after six growing seasons; pines were planted as 1-year-old seedlings; and all other species were seeded in October 1989 into six replicated 1.5 × 2.7 m plots for each treatment. Treatments are significantly different (data Ln transformed, one-way ANOVA, df = 7; *F* = 72.7, *P* < 0.001) and treatments with a different letter are *P* < 0.05 in a Tukey *post hoc* comparison.

## Table S1. Backwards elimination regression of plant carbon pool, with plant nitrogen pool and the carbon gain per unit nitrogen as predictors

Factor	Standardized $\beta$	F	Р
Plant nitrogen pool	0.896	11.9	0.000
Carbon gain per unit nitrogen	Eliminated		

Overall regression N = 38, F = 141,  $R^2 = 0.90 P = 0.000$ . Carbon gain per unit of nitrogen was not significant (P = 0.977) and was eliminated.

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## Table S2. Backwards elimination regression of plant nitrogen pool, with plant nitrogen pool and the carbon gain per unit nitrogen as predictors

Factor	Standardized $\beta$	F	Р
Ecosystem nitrogen losses		Eliminated	
Nitrogen fixation		Eliminated	
Gross nitrogen mineralization		Eliminated	
Nitrogen residence time	0.702	5.9	0.000

Overall regression N = 38, F = 34.9, R<sup>2</sup>=0.49 P = 0.000. The three eliminated variables all had P > 0.2.

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