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Tracing leaf litter-derived 15N to mineral soil organic matter in forests of different ages

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Forest soils are important for retaining nitrogen (N), especially in areas where anthropogenic activities have led to historically high inputs of N. As forests age and their N demands for biomass accumulation decline, the capacity for N retention of soils may change as well, although little work has been done to further our understanding of this process. We conducted a mineral soil reciprocal transplant study in three northern hardwood forests of different ages (young, recently mature, and old growth) in New Hampshire, USA to determine how the retention of isotopically labeled nitrogen from leaf litter would differ depending on characteristics of the incubated soil's origin and destination. After 18 months of incubating the soil bags below the ^{15}N-labeled litter, we did not find retention of litter-derived N to be related to the age of the incubation site forest, but rather that it differed based on the origin of the incubated soil. We found that the soil C content was the strongest predictor of how much of the tracer was recovered in the transplanted soil bags. Furthermore, the C content of soils changed during incubation and tended to change in the direction of equilibrating with the soil C concentration of the incubation site. This finding suggests that site characteristics are important in determining soil C concentrations and consequently N retention capacities.