

 PARENT SESSION**Contributed Oral Session 142: Biodiversity and Nitrogen**

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Foliar isotopic changes in different successional stage on community and species level.

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ABSTRACT- It remains unclear of the relationship between changes in community compositions and foliar isotopic variations during succession. In this study, foliar samples were collected along successional gradients at the University of Virginia's Blandy Experimental Farm, Clark County, Virginia (78°00'W, 39°00'N). The region is an agro-ecosystem consisting of fields, shrublands, and woodlots. The woodlots are mature, second-growth, oak-hickory-elm forests, aged at more than 100 years. The shrublands have been free of agricultural activities for 14-20 years. The fields can be further divided into young fields and old fields. The old fields have been freed from any mowing and/or agricultural activities for 5-10 years, whereas the young fields for about 2 years. Foliar samples from each of five successional stages (2 year-old fields, 5 year-old fields, 14 year-old shrublands, 20 year-old shrublands, and 100 year-old woodlots) were collected between August and September in 2003 and 2004. We investigated stable carbon and nitrogen isotopic ratios (¹³C and ¹⁵N) of plants along successional stages on both community and species level. On the community level, 5-19 species in each successional stage are included in the analysis. Successional stage explains 31% and 15% of the total variance in foliar ¹³C and ¹⁵N, respectively (p < 0.0001 for both). As successional stage increases, both foliar ¹³C and ¹⁵N decrease. Six species that occur in at least 3 of the 5 successional stages were used to test for species-specific response to succession. Four of the 6 species showed a negative relationship between ¹³C and successional stage, and 5 of them showed a negative relationship between ¹⁵N and successional stage. The negative relationship between ¹³C and successional stage suggests a decline of water use efficiency during succession, whereas the negative relationship between ¹⁵N and successional stage suggests either a more closed nitrogen system during succession, or a heavier dependence of plants on mycorrhizae nitrogen foraging during succession.

Key words: Succession, Virginia, Blandy Farm, Isotope

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