FUNCTIONAL TRAIT ECOLOGY IN A SUCCESIONAL SYSTEM: A COMPARISON OF NATIVE AND EXOTIC SPECIES. Timothy A. Rye and Scott J. Meiners, Department of Biology, Eastern Illinois University, Charleston, IL 61920

A central problem in plant ecology is why nonnative invasive species are so successful in their introduced ranges. Possible explanations include invasive species possess unique combinations of traits, or that the invasive species are filling a space (i.e. niche) within the community that is poorly filled by native species. The purpose of this research was to compare the functional traits of native and introduced species within a long-term study of succession on abandoned agricultural fields. Although our previous research has shown no clear differences among native and exotic species in their population dynamics, there were clear differences in life forms, suggesting that native and exotic species may not significantly differ in terms of functional traits. We were particularly interested in whether exotic species would have traits that were distinct from native species. In addition, we were interested in determining if native and exotics were members of different functional groups, and would therefore have unique combinations of traits.

Traits were selected because of their potential impact on community dynamics, based on their strong impact on ecosystem processes and their effects on and response to environmental change. Leaf traits (e.g. specific leaf area (SLA), dry matter content (LDMC)) were collected from field samples, while other traits (e.g. height, seed mass, flowering period) were collected from literature sources. Overall, twenty traits were used to cluster 160 species into functional types. The distribution of values within four traits (plant height, SLA, LDMC, and seed mass) among native and exotic species was compared using a Kolmogorov-Smirnov (K-S) test. These four traits were used because they are thought be the best indicators of plant performance. A χ^2 test was used to determine if the occurrence of dispersal methods was independent of nativity.

Species tended to cluster in groups of similar life forms (e.g. trees, graminoids, and forbs). However, the clusters resolved clear differences among similar life forms. For example, dominant overstory trees (e.g. Oaks) clustered together, while sub canopy trees were in a separate cluster. Forbs clustered into eight groups (e.g. decumbent/procumbent growth form, plants with spines, legumes, ferns, forbs with rosettes). Shrubs formed their own cluster, as did lianas. Exotic and native species were almost equally represented in every cluster, although there were instances where clusters were exclusively native (e.g. ferns) or exotic (legumes). Of particular interest, large crabgrass, bald brome, Mary's Grass (*Microstegium vimineum*), and giant foxtail clustered together with other weedy species such as common ragweed and common lambs quarters. These species, with the exception of Mary's Grass, occurred in the early years of succession but not in later years, suggesting that Mary's Grass may be filling a space within the community that is poorly filled by other species.

Plant height, LDMC, and seed mass were significantly different between natives and exotics, while SLA was not. The occurrence of dispersal methods was not dependent of origin. These results suggest that while native and exotics may differ between single traits, they do not form groups defined based solely on nativity.