

Measuring Old Field Recovery from Disturbance Using Floristic Quality Analysis

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Introduction

Complete removal of natural vegetation is an obvious consequence of agricultural development. But what happens when these fields are abandoned? Will they eventually return to their former state or are they forever damaged?

An abandoned field will undergo ecological succession, which is a fancy term for aging. From the bare earth, annual and later perennial plants will grow. A few years later, shrubs will grow among the herbaceous plants. Given another fifteen years, tree seedlings will slowly rise above the shrubs and eventually shade out some species. This is the succession of plant communities.

Floristic change over time can be measured using Floristic Quality Assessment (FQA), an analytical protocol developed for Indiana in 2004. FQA is an objective, easy to use system designed to quantify the quality of plant communities. It uses C values assigned to each species which indicate that species' faithfulness to pre-European settlement communities.

The objective of this study was to validate FQA in an old field setting. It is our hypothesis that two FQA metrics – species richness and mean C – will increase during old field succession as native plants seed in and establish a diverse community. As a stronger native presence is established, adventives will diminish as they are “weeded out.”

Materials and methods



Last summer, Michelle Misurac gathered data from fields aged 1-27 years. This summer we extended the study with new data from fields as old as 51 years. Data was gathered by sampling along a 100 meter transect in each of five old fields. Sampling was performed using a 0.25 m² quadrat every five meters. Both species and their aerial cover were recorded.

This data was inputted into the FQA computer application, which calculates the species richness and quadrat mean C, among other values.

Results

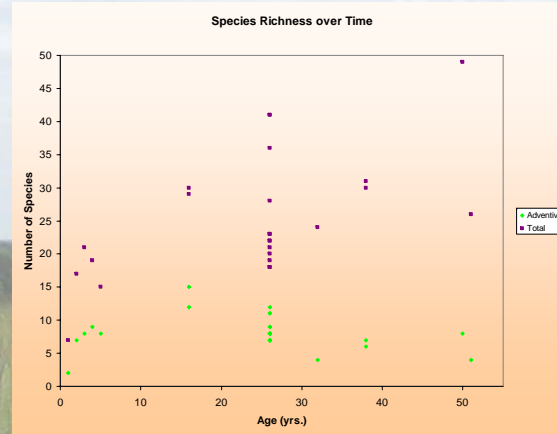


Figure 2. Total species richness increased over time, rising from an average of about 17 in the youngest fields to ~35 in the older fields.

At first adventive (i.e., non-native) species richness was rising along with the total, but it reached a peak around fifteen years. Natives began to replace adventives, and by fifty years very few adventives remained.

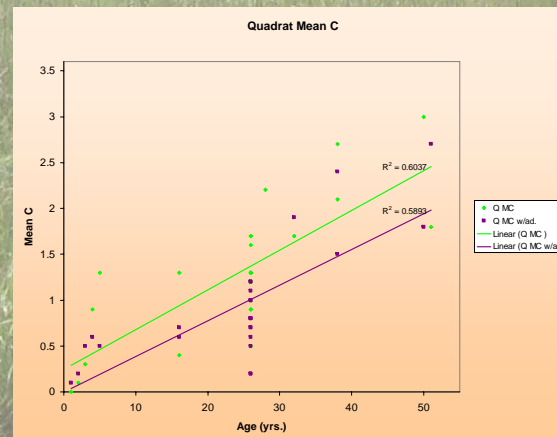


Figure 3. As with species richness, mean C also increased with time, indicating that the gap between a strongly disturbed field and a pre-European settlement plant community was being closed.

Other studies suggest that a community possessing remnant natural quality would have a MC = 3.5 or higher. By plugging 3.5 in the y value in the approximate equation for the Q MC trend line, it is estimated that after about 75 years the old field would approximate the quality of a natural community.

Conclusions

The data supported the hypothesis – floristic quality of the older fields was indeed higher than that of younger fields.

Because old fields improve in quality over time, there is value in farmland that is abandoned due to loss of productivity or land use changes.

FQA can be used to track improvement in these abandoned fields, and to measure effectiveness of specific management practices.



Figure 4. Jason Haupt ducks under a young tree in a forty year old field.

Literature cited

Wilhelm, Gerould, and Linda Masters. 1999. *Floristic Quality Assessment and Computer Applications*. Conservation Design Forum, Elmhurst.

Misurac, Michelle and Paul Rothrock. 2006. *Floristic Quality Assessment of an Old Field Chronosequence*. Taylor University, Upland.

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For further information

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