# Floristic Quality Assessment of an Old Field Succession Chronosequence


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## Introduction

Floristic Quality Assessment (FQA) is a standardized tool for evaluating or monitoring vegetation quality. It is fairly rapid, objective, repeatable, and is adaptable to different needs where standard comparisons are needed. Even though FQA has many different theoretical uses, these uses have not all been examined or validated. One of these applications is to use FQA as a means to investigate its use at a site that is recovering from disturbance.

Secondary succession describes the recovery of natural communities after disturbance, e.g., old fields after release from agriculture. When a field is first fallowed there are many annual weed species, especially adventives. As the field ages, perennials, shrubs, and eventually trees begin to take up residence. Over time the sun-loving herbaceous plants succumb to the shrubs and trees that grow and increase the amount of shaded area.

This study examines a chronosequence of old fields to show that FQA can be applied to sites as they recover from disturbance.

**Fig. 1.** Michelle Misurac and Ann O'Neill in the Northwest field of Taylor University Arboretum.

## Materials and methods

Three old fields were sampled: two located in the Taylor University Arboretum and a third located 3 miles south of campus. In addition, available data were assembled from experimental plots representing one through five year old field communities.

In the three old fields, at least one transect of 100m was taken in each field. Quarter meter quadrats spaced 5m apart were sampled, allowing for 20 quadrats in each transect. The percent coverage data was collected for each quadrat.

Once the data was collected it was entered into *Floristic Quality Assessment Computer Programs*, Version 1.0 (Wilhelm & Masters 1999). This software was used for transect and quadrat level assessment and generating site statistics including mean C, floristic quality index, and the number of native and adventive species observed.

**Fig. 2.** Determining percent coverage of a quarter meter quadrat. The quadrat is marked by a metal square (indicated by the arrow).

## Results

*Floristic Quality Assessment Computer Programs* was utilized in obtaining species richness and mean C values. Since these values are the most helpful in determining the floristic quality of the fields, data analysis focused on these data.

Species richness is simply the number of species that are found in a transect or quadrat. The graph below (Fig. 3) depicts the age of the field versus the total number of species that were found within the transects. Of particular interest are the transects from the 26 year old fields. The richness varies greatly from one location to the next. A closer look at the data reveals that the fields varied in post fallow treatment. The data points with the lowest species richness represent a field that was planted with Kentucky Blue Grass after it was released. The other fields were released with no special treatment. Additional variation in species richness may be due to proximity to seed source.

Coefficient of conservativeness (C values) can best be explained as estimating the faithfulness of a species to a natural community type. C values range from 0-10. Plant species with a C value of 0 are the least faithful to a natural community type, and are typically referred to as adventive and ruderal species. Plant species with a C value of 10, however, are thought to be very faithful to a natural community type and are typically associated with undisturbed remnant natural communities.

In our study the C values for the plants within a quadrat are averaged to generate the mean C. We expect that the mean C will be close to 0 in one-year old fields and over time will increase to approximately 3.5 as seen in local woodlands.

Our results show that a newly released field does have a mean C that is close to 0, and that as fields increase in age the C values rise. This rise occurs slowly, however, as depicted by the regression lines plotted in Fig. 4. The first year plot had a quadrat mean C of about 0. This increased to about 2 in the course of approximately 50 years. At this rate, a newly released field would require about 180 years to reach a quality associated with a low-end quality natural woodland community.

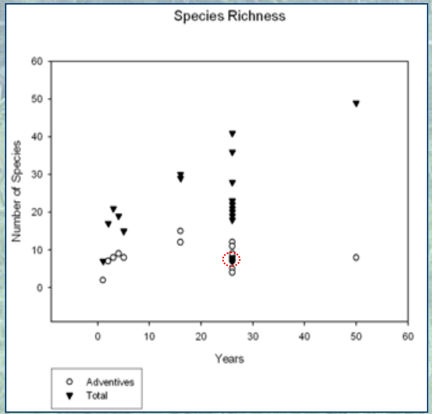


**Fig. 3.** Species richness, as shown here, is calculated by the number of species found within each transect. There are multiple data groups for fields with data for more than one transect. The red dashed circle indicates a field that was planted with Kentucky Bluegrass when released from cultivation.

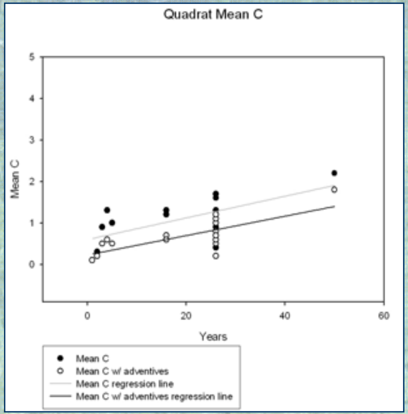


**Fig. 4.** Quadrat Mean C is an average of the of coefficients of conservatism (C value) found at a site. As expected mean C values were initially near zero. They slowly increased with time but did not attain the level (mean C of 3.5) associated with a local natural woodland.

## Conclusions

After examining the different fields and analyzing the data, several conclusion can be made:

1. As the age of a field increases, the total number of species increases.
2. As the age of a field increases, the number of native species increases, while the number of adventive species remains relatively unchanged.
3. The overall floristic quality (as measured by mean C) of an old field will increase slowly over time.

Just as succession does not take place in a short amount of time, the floristic quality of an old field requires many years to improve. Several factors come into play as the succession of an old field is studied. Some of these factors include seeding the site, proximity to seed source, as well as the relative age of the site.

**Fig. 5.** Poison Ivy, a common species found in the old fields.

## Pertinent Literature


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