

Succession in a Sub-Alpine Forest

Karen E. Bedford and Ruth St. John

Okanagan University College
Penticton, British Columbia V2A 8E1

Succession — the replacement, with time, of one community by another — is usually demonstrated by observing two or more communities of different ages, usually in different locations. The disadvantages of this approach are (1) that it usually involves time-consuming travel, and (2) that it is hard to find two or more communities of different ages with similar physical environments.

Instead, we go to a single forest community, and compare the species composition between mature trees and juvenile trees (seedlings and young saplings). We assume that the forest is at its climax stage if the species composition of these groups is the same, and at a successional stage if the composition is different. The chi-square test is used to test whether the juveniles are the same as the matures.

Students choose a “random” plot of land, 5 meters by 5 meters, and count and record the numbers and species of mature trees and of juvenile trees. An arbitrary size is chosen to differentiate the two. We have found that eliminating trees in a middle range simplifies decisions.

For the chi-square test, the *observed* column is the actual counted number of individuals for each species of juvenile trees. The *expected* column is determined by multiplying the total number of juveniles by the proportion of each species found in the mature trees, and recording the number of individuals *predicted* for each species. For example, if one quarter of the mature trees were Douglas fir (*Pseudotsuga menziesii*), you would expect one quarter of the juvenile trees to be Douglas fir. Since the hypothesis is that the two communities are the same, a low chi-square value indicates that you are looking at a climax community, and a high value that you are observing a successional stage.

We suggest that this general method can be applied to other successional areas, such as field succession or different ages of hay infusions. It works well in sub-alpine forests where there are only a few species, but can be adapted to deciduous forests either by spending more time on identification, or by limiting the number of species counted to three or four.