Ground-dwelling spiders as bioindicators of forest disturbance and mangement

Lead by: David Shorthouse

Theme: Arthropod Diversity

Status: Continuing

Start: 1999

Participants

- David Shorthouse
- John Spence

Background

Spiders are upper trophic level arthropods that provide significant functional linkages between smaller arthropods and larger animals, like birds, generally valued by the public. A major shift in the structure of their assemblage undoubtedly shifts the activity patterns of their prey and those that prey upon them. Because spiders are agile and short-lived, they respond quickly to disturbances. On the other hand, most understory plant species are perennial. Their distribution patterns do not reflect short-term changes in habitat quality, nor can they be good early predictors of habitat change. Consequently, litter spider composition may be more useful than plants as a bioassay of forest floor habitat quality.

Objectives

1) What species or groups of species show measurable population responses to disturbance and what species or groups of species are the best indicators of disturbance and recovery? 2) What habitat characteristics of harvested and burned stands are most tightly linked to the structure of spider assemblages?

Key Results

In summer 1999, 18 705 adult spiders among 134 species were trapped. The following summer, 24 585 adults in 140 species were trapped. Spiders were more abundant in harvested stands, largely because of one opportunistic species. There was little difference in catch rates between harvest treatments between

summers (Figure 1). However, control and high residual treatments were richer in spider species (figure not shown). Unfortunately, these differences may be spatially-dependent. Spatial variability can be removed using Partial Mantel tests. These tests reveal strong spider to harvest treatment and cover type correlations as well as weak, yet significant correlations between spider assemblages and overstory and understory vegetation (Figure 2).