Shaw Mountain Ice Storm Study 1998-2002

Tree Vitality Analysis

Only trees alive at the time of the ice storm are included.

vitality classes v1, v2, v3, v23, v4: 1=vigorous 2=moderately vigorous 3=weak 23=2 or 3, 4=dead.

pv11 = proportion of vigorous trees (vit 1) in the first year that remain vigorous (vit 1) in the second year.

In each chart, data are numbers of trees with a given vitality in year 1 and a given value in year 2.

To prepare chart, take subset of tree data including spcode, id, ice, vitality for one year, vitality for next year; sort by ice treatment, species, vitality in first year, vitality in second year. Count number of individuals in each combination of vitalities for two years.

Omit individuals dead before ice storm (m in 97 = 1).

RESULTS:

1. Mortality was greater in Iced plots: 15% of Iced trees died by 2002 (11 out of 72) compared to 1% of Control trees (1 out of 103).
2. Mortality did not occur in the first 6 months after the storm, and was spread rather evenly across the following 3 years (5, 3, and 3 died in 98/99, 99/00, and 00/01, respectively).
3. Mortality fell to zero in the year 2001/2002.
4. Sugar Maple and Hop-hornbeam make up all but 2 of the 12 trees that have died. Mortality of each of these species was about 14% in Iced plots, and 1 or 2 % in Control plots.
5. Two relatively rare components of the forest may be relatively susceptible to ice-related mortality: 50% of Ash (1 tree), and 25% of Birch (1 tree) died.
6. The 4 Betula trees in the study area sustained heavy storm damage. One died by 1999, and one was down-graded to "moderately vigorous" in 2001 and to "weak" in 2002.
7. However, 2 Betula trees damaged by the storm and only "moderately vigorous" in 1998 returned to "vigorous" in 1999 and remained so each year after (2000, 2001, and 2002).
8. The 5 Carya trees on the plots remained vigorous throughout the 3.5 years since the ice storm, with no mortality.
9. Trees rated vigorous in 1998 were all vigorous in 1999 except one Acer saccharum that died in a Control plot.
10. Vigor decreased in Control plots in 2000. Of vigorous trees in 1999, 29% Acer (n= 52), 100% Fraxinus (n=5), and 7% Ostrya (n=44) were moderately vigrous or weak in 2000.
11. Vigor did not decrease in Iced plots in 2000, in contrast to Control plots: 3 trees died in Iced plots, but no other trees weakened.
12. Tree vigor declined more in Iced plots than in Control plots between 2000 and 2001:
    14% of Acer saccharum vigorous in 2000 lost vigor or died by 2001 in Iced plots, compared to 3% in Control plots.
    19% of Ostrya virginiana vigorous in 2000 lost vigor or died by 2001 in Iced plots, compared to 6% in Control plots.
13. Tree vigor did not change much between 2001 and 2002, but similar to year 2000, Acer experienced more decline in Control plots (14%) than Iced plots (4%).
14. Control plots sustained some crown damage: 77 trees were moderately vigorous or weak in 1998, distributed in both Iced and Control plots.
15. Weak or moderately vigorous trees in 1998 usually became vigorous by 1999, but the proportion is smaller in iced plots (68%) than controls (95%).
16. By 1999 there were only 9 trees rated weak or moderately vigorous, 7 in Iced and 2 in Control plots. Most of these became vigorous in 2000.