Effects of Abiotic Factors on Insect Populations in Riparian Restoration

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Importance of plant water and nitrogen

1) Insects obtain most of their water from their food

2) Plant-feeding insects are nitrogen-limited
   - plants are 1.5-5.0% N by dry weight
   - insects are 7-14% N by dry weight

3) Insect development and survival are affected by plant water and nitrogen concentrations
N application

Mean branch % water

65
64
63
62
61
N application

Mean leaf % N

- 3.0
- 2.5
- 2.0
- 1.5
- 1.0
Leaf % nitrogen vs. Branch % water for different dates:
- Aug 16
- Aug 24
- Sep 20
The graph shows the arthropod wet mass over time.

- Orange bars represent Spiders.
- Blue bars represent Plant-eating insects.
- Green bars represent Other insects.

The y-axis represents arthropod wet mass in milligrams (mg), ranging from 0 to 250.

The x-axis represents dates:
- Aug 16
- Aug 24 (Date)
- Sep 20

The highest arthropod wet mass is observed on Aug 24.
Summary

1) leaf nitrogen content influences spider and insect mass on branches when populations are high
   - leaf nitrogen concentration may need to be monitored
   - what is the optimum concentration for arthropods?

2) effects of plant water content on arthropod abundance and mass not determined