



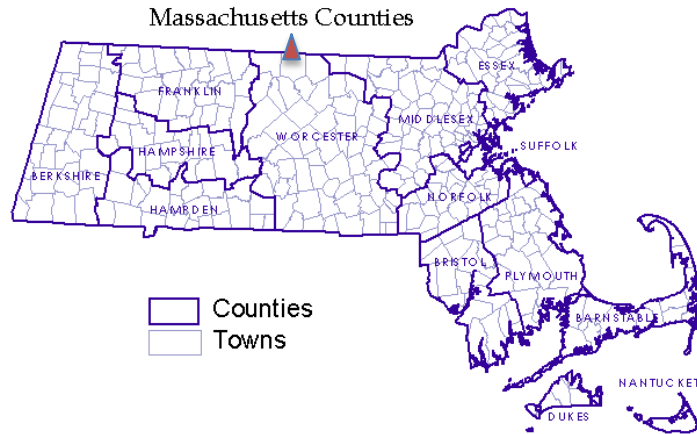
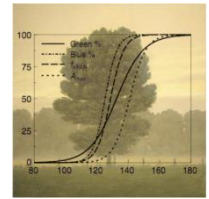
Harvard LTER Schoolyard Program

Teacher Developed Lessons and Documents that integrate
Harvard Forest Schoolyard Ecology Themes into curriculum.

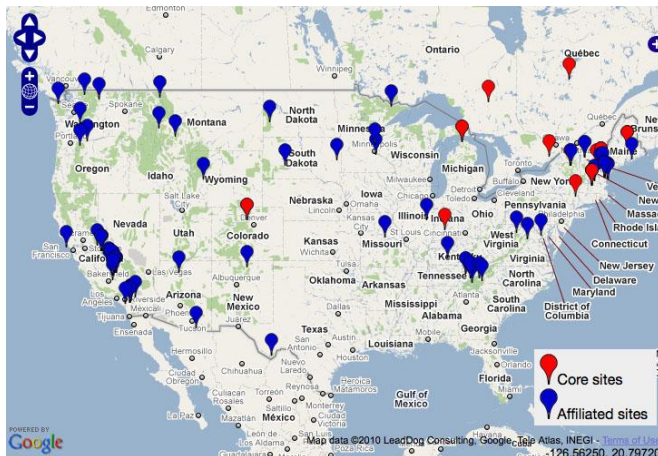
- Lesson Title: *Phenology and Student Scientists Part II*
- Teacher/Author: Katherine Bennett
- School: J.R. Briggs Elementary School, Ashburnham
- Level: Grade 5
- Date: August, 2011



Joining the Phenocam Network
















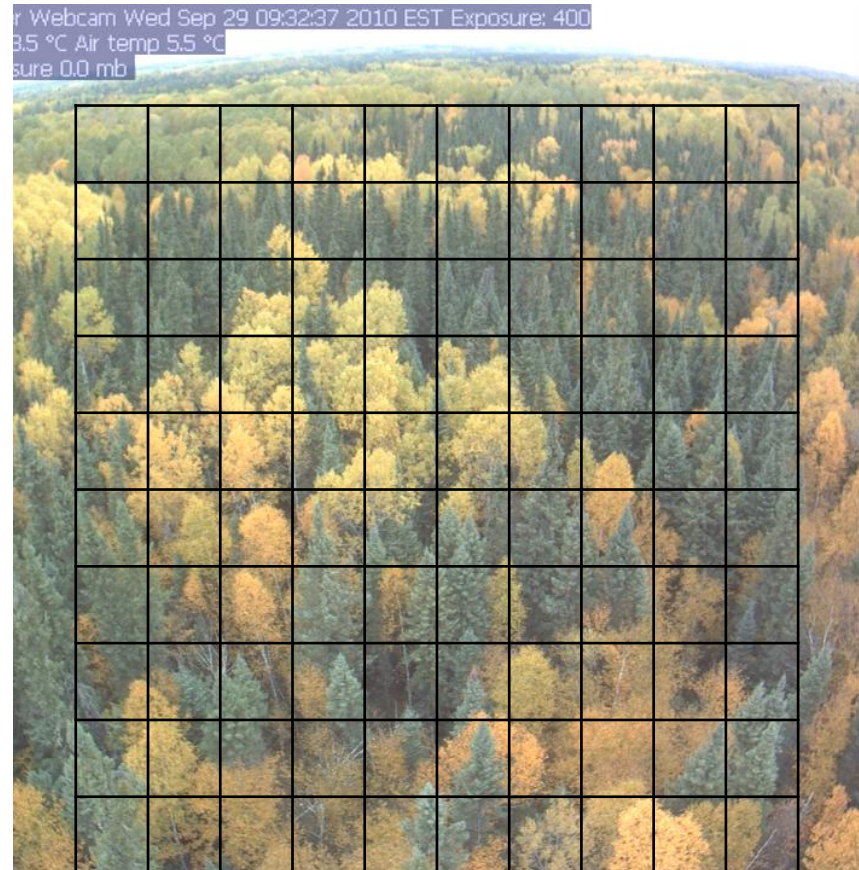
Overlook Middle School



Compare ground data to the canopy



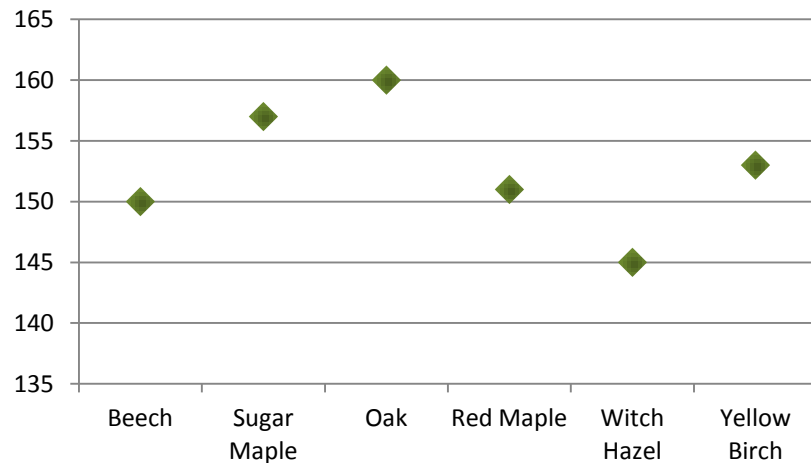
 <div style="border: 1px solid black; padding: 2px; display: inline-block;"> Harvard Forest Schoolyard Ecology Buds, Leaves, and Global Warming </div>																																																					
Autumn Student Data Sheet December 2007																																																					
Name: _____ Date: _____ Teacher: _____ School: _____																																																					
Tree Number: _____ Branch letter: _____ Tree Species: _____	Please measure leaves only once at beginning of season.																																																				
<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <th></th> <th>Leaf 1</th> <th>Leaf 2</th> <th>Leaf 3</th> <th>Leaf 4</th> <th>Leaf 5</th> <th>Leaf 6</th> </tr> <tr> <td>Leaf Length (cm.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Leaf Width (cm.)</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </table>		Leaf 1	Leaf 2	Leaf 3	Leaf 4	Leaf 5	Leaf 6	Leaf Length (cm.)							Leaf Width (cm.)																																						
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Put a check mark in the correct column below to show Leaf Color and Leaf Drop																																																					
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Leaf #</th> <th colspan="4">Fraction/ Percent of Leaf Color (not green)</th> <th rowspan="2">Leaf Drop 0-not fallen 1- fallen</th> </tr> <tr> <th>0 - 25%</th> <th>26 - 50%</th> <th>51 - 75%</th> <th>76 - 100%</th> </tr> </thead> <tbody> <tr> <td>1</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr><td>2</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>3</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>4</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>5</td><td></td><td></td><td></td><td></td><td></td></tr> <tr><td>6</td><td></td><td></td><td></td><td></td><td></td></tr> <tr> <td>Whole Tree</td> <td></td> <td></td> <td></td> <td></td> <td>N/A</td> </tr> </tbody> </table>	Leaf #	Fraction/ Percent of Leaf Color (not green)				Leaf Drop 0-not fallen 1- fallen	0 - 25%	26 - 50%	51 - 75%	76 - 100%	1						2						3						4						5						6						Whole Tree					N/A	
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Total number of study leaves observed per branch (fallen and not fallen) _____																																																					
Total number of leaves fallen _____																																																					
Teacher note: Remember that the branch total above must be added with branch totals from all branches on the same tree to get the total number of leaves dropped per tree to submit to Harvard Forest to post online.																																																					
Optional Field Notes: Weather Notes: _____ Animal/ Plant notes: _____																																																					



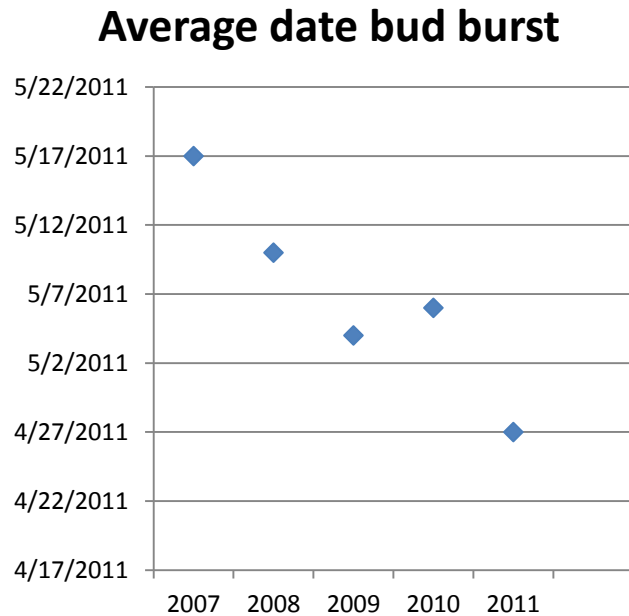
Do the dates of the pheno events vary among species?

Can we use those differences to determine the dominant tree species?

Budburst Julian day



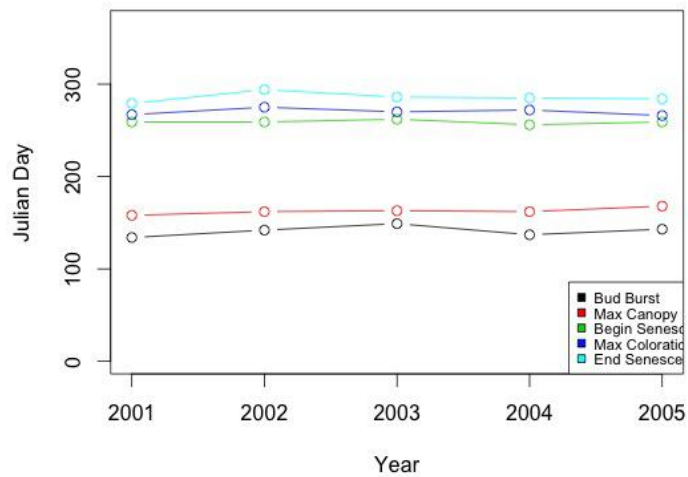
Are the dates of the pheno events different each year?



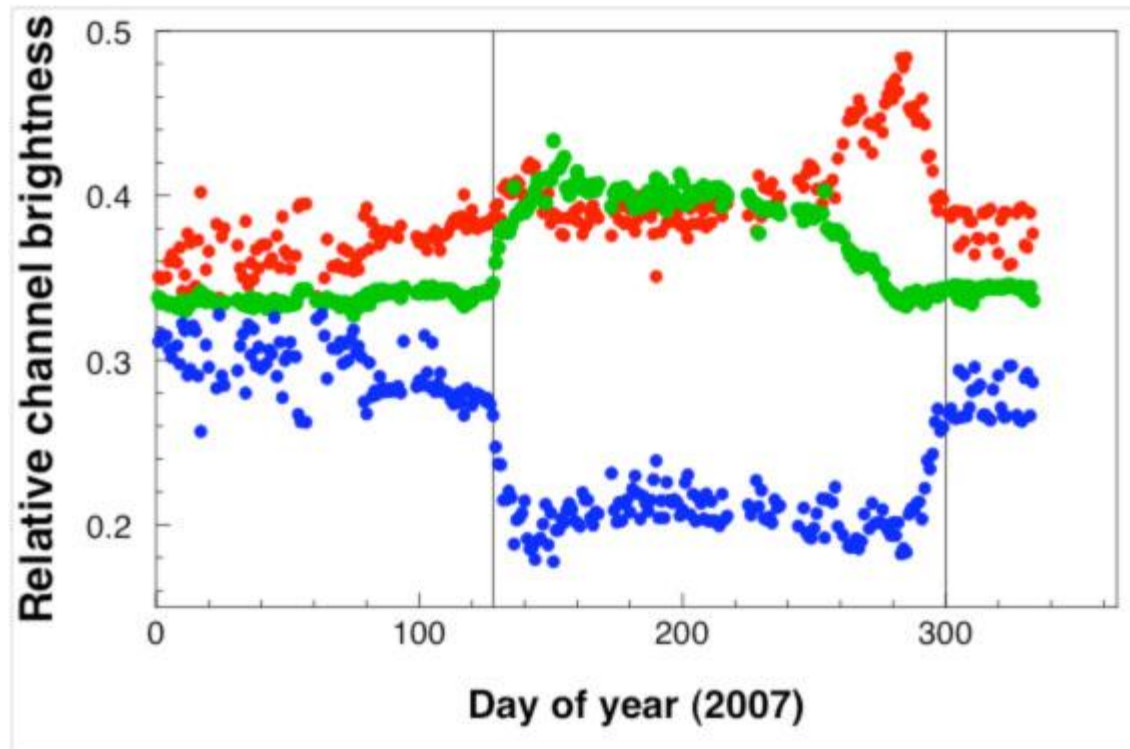
Comparing sites near and far away



mountzirkel



Will this be next?



Dr. Andrew Richardson

Project BudBurst

Timing is everything!

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Fifth Grade Pheno Events

September 1



March 1



April 20



May 15



Massachusetts Comprehensive Assessment System



HARVARD FOREST

Established 1907 Long Term Ecological Research Site since 1988

HARVARD UNIVERSITY



Harvard LTER Schoolyard Program

Pam Snow

Dave Orwig

Emery Boose

John O' Keefe

Betsy Colburn

Mentors

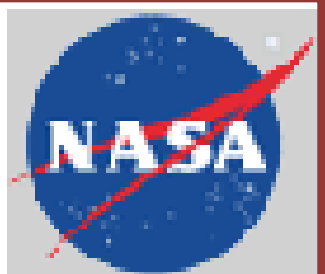
Andrew Richardson

Mark Friedl

Koen Hufkens

Oliver Sonnentag

Trevor Keenan



REU

KeKe Mitchell

Rachel Norman

Isaac Lavine