Introduction to Phenology Data

Phenology Data Matching

Introduction

In Units 1-3, we learned about plant phenophases, PhenoCam, and Green Chromatic Coordinate (GCC) values. Now it's time to put it all together! Here are a few quick matching activities that will help you explore relationships between the different types of data available through PhenoCam. These activities can be completed individually, in groups or as a classroom.

Estimated Time:
One 30 minute class period

Suggested Grade Level:
Grades 5-9

Learning Outcomes

Students will be able to:
- Identify and compare different types of PhenoCam and phenology data
- Describe how changes in plant phenophases are reflected in PhenoCam images and GCC data

Background Information

PhenoCam Images
PhenoCams are cameras that are placed in fixed locations and programmed to take pictures of specific areas, every day. They record whether a plant is green or brown just like our eyes do, but a camera can take a picture of a whole lot of plants at one time, allowing us to estimate phenophase events across huge areas including entire sections of forests and grasslands. A camera records the amount of green or brown being reflected from those plants too - something our eyes can see but not assign a numeric value to.

Green Chromatic Coordinate (GCC)
The computer program used in the PhenoCam project analyzes the colors in the canopy in each picture. The green level is divided by the levels of red, blue, and green are added together. The resulting number is the Green Chromatic Coordinate or GCC value. This GCC value provides information about the amount of foliage present and its color. Just by looking at the GCC number you can tell when budburst happened and when the leaves turn color in the fall.

Phenophases
In plants, the appearance of life cycle events such as leafing, flowering, and fruiting are called phenophases. Plants use cues in the environment such as variation in day length, temperature, and precipitation to determine when to put out new leaves, open flowers, or ripen fruits. Because these phenophase events are sensitive to small variations in climate, scientists can use changes in phenophase timing, such as earlier fruiting and flowering, to identify trends and understand how climate may be impacting plants.

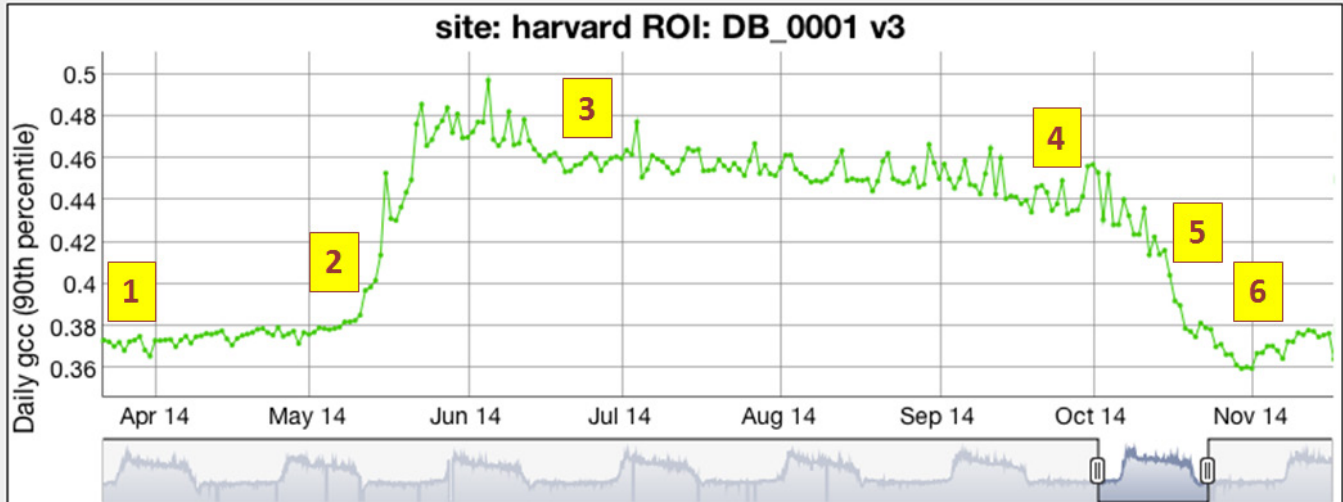**Looking for more information on PhenoCam data?**

Check out the guide:
Phenology 101 Unit 2: Monitoring Phenology

SEASON SPOTTER

Matching PhenoCam Data

GCC and PhenoCam Images

Match the image to the most likely date on the timeseries plot.

gcc (green chromatic coordinate) timeseries plot

site: harvard ROI: DB_0001 v3

PhenoCam Images and Dates

Instructions: match the image to the most likely date.

April 6	November 10	October 24
July 7	May 8	October 9

PhenoCam Images and Phenophases

Instructions: match the image to the name of the phenophase.

BudBurst	Leaf Drop	Full canopy development

Dormancy	Full Color	Beginning of color change