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Outstanding Oaks: Quercus Phenology at NEON Sites (Version 1.0)

By Jackie Matthes



[Image source](#)

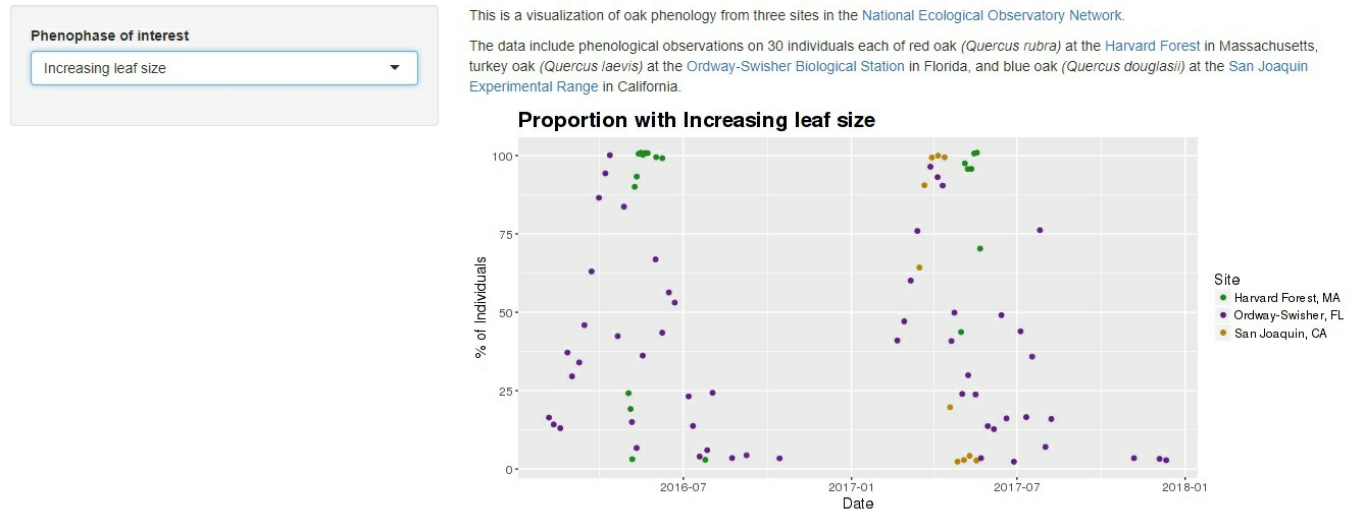
Module Description:

Oaks (trees within the genus *Quercus*) live within a broad range of ecosystems in the United States, including semi-arid savannas in California, temperate deciduous forests in the northeast, and coastal scrublands in the southeast. Within these diverse ecosystems, different species within *Quercus* have adapted traits that are suited for each environment. One example of these adaptations are differences in the phenological timing of *Quercus* events, including leaf formation and growth, flowering, and leaf-fall.

This exercise is designed to use an [app hosted on QUBES](#) to visualize repeated

phenology observations from the National Ecological Observatory Network (NEON) to examine similarities and differences among *Quercus* phenology at different sites. This exercise uses NEON site data from the San Joaquin Experimental Range (SJER) in California, the Ordway Swisher Biological Station (OSBS) in Florida, and the Harvard Forest (HARV) in Massachusetts.

Outstanding Oaks: *Quercus* phenology at NEON sites



View of the user interface for the Shiny app used by students in this exercise to visualize data from NEON observations of oak phenology at three different sites.

[Launch the Shiny app used in this exercise.](#)

You must be logged into your QUBES account to launch the app.

Teaching Setting:

This exercise was designed for students in Introductory Biology or Ecology courses.

QUBES Citation:

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Related Materials and Opportunities:

This resource was created by a participant in the [Spring 2018 NEON Data Education Fellows Faculty Mentoring Network \(FMN\)](#). The Fall 2018 NEON Data Education Fellows FMN is going on now. Another NEON FMN is planned for the Spring 2019 semester. Please contact Deborah Rook at deb.rook “at” bioquest.org if you are interested in participating. Learn more about NEON by visiting their [QUBES group](#) or [neonscience.org](#).

This resource is an example of how QUBES users can create their own customized activities and datasets which students can run using free software without having the need to purchase and install locally. QUBES hosts various software such as RStudio, NetLogo, and Jupyter notebooks that can be used in a browser without having to worry about installation on a local machine or maintaining a campus server. [Browse software hosted by QUBES](#). QUBES also has a server to host Shiny apps such as the one used in this resource. [Click here](#) for instructions on how to submit your Shiny app to QUBES and feel free to contact us at info@qubeshub.org for help!

If you adopt and adapt this module, you are highly encouraged to share your adaptation back with the QUBES community using the QUBES Resources System for sharing Open Education Resources.

QUBES on Social Media



QUBES is a community of math and biology educators who share resources and methods for preparing students to use quantitative approaches to tackle real, complex, biological problems.

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