OSU Phenology Garden Network
Perennial Phenology

The OSU Phenology Garden Network consists of 36 gardens located throughout Ohio, each containing identical plant material consisting of 17 common trees and shrubs, the blooming sequence of which spans the growing season. The Network is a collaborative research and education effort directed by Denise Ellsworth and Dan Herms that involves numerous OSU Master Gardener programs, local parks, schools, arboreta, and other partners. At each site, volunteers engage in the age-old practice of tracking plant bloom and linking these phenological events with insect and other pest activities, as well as using the gardens as demonstration and teaching tools for gardeners and professional horticulturists.

Phenology is the study of recurring biological phenomena and their relationship to weather. Bird migration, hunting and gathering seasons, blooming of wildflowers and trees, and the seasonal appearance of insects are examples of phenological events that have been recorded for centuries. Because the development of both plants and insects is temperature dependent, plants can accurately track the environmental factors that determine when insects are active. For this reason, plant phenology can be used to predict insect activity. Plant phenology can also be used to track long-term climactic changes, such as global warming.

The OSU Phenology Garden Network was initiated in 2004, when garden locations were selected and plant donations were solicited from Ohio nurseries, who contributed nursery stock valued in excess of $15,000. Trees and shrubs were distributed in May of 2004 at a training session in Wooster, and gardens were soon established at OSU Master Gardener demonstration gardens, 8 arboreta, 6 school sites, 5 parks, and 2 OARDC research stations, where all are accessible to the public. Over 100 volunteers (who also maintain the gardens) began collecting data in 2005, which is submitted online each week via the phenology network website, where it is linked to degree-day data. The study will continue through at least 2009.

These data are being used to test the hypothesis that phenological events occur in the same order throughout the state, and that the comprehensive Biological Calendar (consisting of 76 plants and 45 pests) that was developed in Wooster is relevant state-wide (the Biological Calendar and real-time degree-day data for any location in Ohio can be found at the following website: http://www.oardc.ohio-state.edu/gdd/). This Biological Calendar is being cross-calibrated with the Network with data collected at the Secrest Arboretum garden site. Data are also used to quantify the substantial phenological variation that occurs across Ohio from south to north (4-6 weeks), which will facilitate site-specific timing recommendations. Many volunteers and staff at the phenology garden sites use the collected data in a variety of public outreach efforts, including public programs, newsletters and newspaper columns.

In 2006, Phase II of the OSU Phenology Garden Network began. Each garden received 15 herbaceous perennial species, all of which are common in home gardens (many are

past “Perennial Plant of the Year” selections). The majority of these perennial plants are native to North America. Three replicates of each species were added to each garden in the spring of 2006. First and full bloom data will be recorded for each of these perennial plants beginning in 2007, in addition to the 17 woody species in each garden. Data will be submitted online throughout the season via the website (phenology.osu.edu).

OSU Phenology Garden Network perennials:

- *Anemone x hybrida* ‘Honorine Jobert,’ Japanese Anemone
- *Asclepias tuberosa*, butterfly weed
- *Baptisia australis*, false indigo
- *Dianthus gratianopolitanus* ‘Tiny Rubies’
- *Doronicum orientale* ‘Magnificum,’ Leopardbane
- *Echinacea purpurea* ‘Magnus,’ Purple coneflower
- *Geranium* ‘Nimbus,’ Perennial geranium
- *Helleborus* x *hybrida*, Lenten rose
- *Hemerocallis* ‘Raspberry Pixie,’ Daylily
- *Iris sibirica* ‘Anniversary,’ Siberian iris
- *Monarda didyma* ‘Raspberry Wine,’ Bee balm
- *Penstemon digitalis* ‘Husker Red,’ Beardtongue
- *Phlox paniculata* ‘David,’ Garden phlox
- *Salvia* x *sylvestris* ‘May Night,’ Hybrid sage
- *Sedum* ‘Autumn Joy’

The addition of herbaceous perennial plants to the gardens will increase the project’s usefulness to home gardeners, as these species are more common in residential landscapes than are many of the woody species. Data generated from this study will be used to incorporate herbaceous perennials into the Biological Calendar, which will greatly increase its relevance for hobbyists and professional horticulturists. Furthermore, cooperators and interested observers can add indicator plants in their own landscapes, gardens or nurseries; it will be much easier and cheaper to add perennials. Incorporating perennials will make tracking phenology a practical and inexpensive undertaking for in home gardens, at community gardens and in other public sites.

Although the flowering sequence of woody plants has proven to an excellent predictor of phenology of insects that have overwintering stages exposed to ambient air (e.g. gypsy moth eggs and scales), predicting emergence of insects that overwinter in the soil (e.g. white pine weevil and birch leafminer) has been more variable, perhaps because of effects of insulating snow cover or soil moisture. This project will test the hypothesis that the phenology of soil-borne insects is more accurately predicted by herbaceous perennials, which also survive the winter below ground.

Visit the OSU Phenology Garden Network website at http://phenology.osu.edu/ for Ohio's garden locations, a complete list of plants being studied, and phenology data.