

Volunteers Scrutinize 'Ten Most Wanted' Plants for Clues to Climate Change

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The current distribution of lilacs is shown (in green); the trees' range may be changing. Credit: USDA

Students, gardeners, retirees, and other volunteers who are taking part in a nationwide initiative, Project BudBurst, are finding hints that certain plants are blooming unusually early, perhaps as a result of climate change. These citizen scientists are recording the timing of flowers and foliage, amassing thousands of observations from across the nation to give researchers a detailed picture of our changing climate.

The project, started as a pilot program in 2007, now features a list of the "Ten Most Wanted" species--flowers and trees such as the common lilac, red maple, and Virginia bluebell. These widely distributed plants can provide important early signs of the impact of warming temperatures on the environment, according to the scientists who designed the project.

"Project BudBurst empowers people living anywhere in the country to make a contribution that will lead to better understanding of our environment," says Project director Sandra Henderson of UCAR's Office of Education and Outreach. "This is needed data to help scientists who are studying the impacts of [climate change](#)."

Project BudBurst, operated by the University Corporation for Atmospheric Research (UCAR) and Chicago Botanic Garden, partners with the USA National Phenology Network and the National Ecological Observatory Network (NEON). Funding comes from the U.S. Fish and Wildlife Service, U.S. Geological Survey, U.S. Forest Service, NEON, NASA, and National Geographic Education Foundation. BudBurst is also supported by the National Science Foundation.

In Chicago, volunteers who have observed 15 kinds of plants since 2007 have found that 7 of them are flowering earlier now than at any time in more than 50 years of observations by [botanists](#). While these and other observations can reveal possible impacts of climate change on local yards and gardens, scientists need many more years of data to distinguish the effects of long-term trends in climate from natural year-to-year variations.

"We will need volunteers to make observations for a number of years before we can fill in an accurate picture about the impact of climate change on our landscape," Henderson says.

Volunteers say they enjoy making the observations.

"Where there are curious people, it doesn't take long to bring together a group to go scrutinizing particular plants and trees, discovering the earliest stages of cones or bud formation, for instance, then following the later development," says Sue Prindle, who lives in a retirement community in Silver Spring, Maryland. "It has been rewarding and fun."

Overall, participants across the country have made more than 10,000 observations since 2007, establishing a baseline for the timing of key plant events.

"These findings are important as scientists analyze the impacts of global warming on our natural world," says Kayri Havens, a senior scientist with the Chicago Botanic Garden and co-manager of Project BudBurst.

How to participate

Each participant in Project BudBurst selects one or more plants to observe. The project website, www.budburst.org, encourages volunteers to focus on the 10 most wanted species, but it also welcomes observations of other plants.

Volunteers begin checking their plants at least a week prior to the average date of budburst--the point when the buds have opened and leaves are visible. After budburst, participants continue to observe the tree or flower for later events, such as seed dispersal and autumn leaf drop. Participants submit their records of these phenophases online. Anyone can view the results as maps of the phenophases across the United States.

The science of phenology, or tracking cyclic behavior in plants and animals, has a distinguished history. For centuries farmers, naturalists, geographers, and other scientists have kept careful records of the phenology patterns of plants and animals. Farmers have long used their phenological knowledge to predict the best time for planting and harvesting crops, when to start expecting problems with insect pests, and other seasonal events.

A warming trend

The effects of climate change on numerous plant and animal species throughout the world have been observed and reported in the scientific literature. Some [plants](#) respond to warmer temperatures by extending their growing seasons. Others shift their ranges toward the poles or to higher elevations.

At the same time, many insects breed and disperse based on regular cycles of sunlight rather than temperature. This can cause a mismatch between the behavior of pollinating insects, such as bees, and flowers that bloom earlier than the insects expect. Such asynchronous behavior has already been noted across many parts of the world.

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