SUPPORT PLANT COMMUNITIES AND POLLINATORS

Insects are essential to the reproduction of most flowering plants, so supporting a variety of pollinating insects throughout the growing season is beneficial for the success of your garden and surrounding natural landscapes.

Climate change may cause some plants to shift when they produce flowers, and other plants to grow poorly. To ensure that your garden provides nectar throughout the pollinator season, follow these tips*:

Support pollinators throughout the growing season
Choose a planting palette that blooms throughout the growing seasons, from spring to summer to fall.

Provide "depth in the bench" in your garden
Choose multiple species of plants that perform the same roles at once. By planting multiple species of flowering plants that bloom at the same time, if one plant species in your garden succumbs to environmental impacts or disease, others will still be present to provide nectar and pollen for pollinators in that same flowering window.

Keep your garden flexible
While there are projections for climate change in the future, there are many unknowns. One way to be prepared is to include a mix of flowering plants that have a diverse range of responses to environmental conditions.

Participate in the Garden Community

- Join garden organizations that stay on top of current topics and help you contribute to citizen science.
- Participate in Project Budburst (budburst.org) a network of citizens across the country monitoring plants with the changing climate.
- Sign up for the "Million Pollinator Garden." Your garden can be one of the million public or private gardens that pledge to support pollinators. Learn more on the Xerces society website xerces.org.

For nectar resource plant and garden ideas, take a look at the pollinator garden that is planted near the entrance to the Pounder Garden.

*content adapted from: Hunter, M. (2011). Using Ecological Theory to Guide Urban Planting Design: An adaptation strategy for climate change. Landscape Journal.

LEARN MORE

About the garden:
Changes occur in the Climate Change Garden everyday. Read about them on our climate change garden blog at **cornellbotanicgardens.org**

Climate projections:
In New York http://www.nyserda.ny.gov. Search "Climate Change in New York State"

Intergovernmental Panel on Climate Change:
Ipcc.ch Here you can download "AR5" –a clear and up-to-date summary of the current scientific knowledge relevant to climate change.

Resources for climate conscious gardening:
Books
"The New American Landscape: Leading Voices on the Future of Sustainable Gardening," Edited by Thomas Christopher

"The Climate Conscious Gardener," by Janet Marinelli. Brooklyn Botanic Garden Guides for a Greener Planet.

ccetompkins
ccetompkins.org/environment/climate-change: This page provides links to climate change and gardening resources.

Climate change at Cornell
climatechange.cornell.edu/research A one-stop guide to climate change research, extension and outreach, and other programs at Cornell University.

climateinstitute.CALS.cornell.edu Website for the Cornell Institute for Climate Change and Agriculture, which serves as a focal point to facilitate research, education, and outreach to help farmers become more resilient to extreme weather and climate variability and reduce their impact on climate change.

CORNELL BOTANIC GARDENS

How you and your garden can be part of the climate solution.

Thank you for visiting the Climate Change Demonstration Garden where we are trying to understand and share the effects of projected changes in temperature and precipitation associated with climate change on plants. As gardeners, you can make a difference!

Advice to Gardeners from a Climate Change Expert
David Wolfe is a Cornell professor of horticulture and a leading authority on the effects of climate change on plants, soils, and ecosystems. The tips below are taken from his chapter, "Gardening Sustainably in a Changing Climate," in The New American Landscape.

PREPARE YOUR GARDEN FOR CLIMATE CHANGE

Experiment with new species
If your favorite plants become less able to thrive in new climate conditions, experiment with new species and varieties as plant hardiness zones shift.

Move up planting and harvesting dates
Longer periods of high heat accompanied by low precipitation may require gardeners to shift to slower-growing, drought tolerant plant varieties. Take advantage of an earlier spring and a longer growing season by setting an earlier planting date. This can reduce plants' exposure to high heat later in the summer.

Manage water
Rain is predicted to fall in more intense events, which can cause plants to have "wet feet" and root disease. Identify where water pools in low spots and reconfigure for better drainage. Use soil amendments to improve drainage during wet periods or to improve water-holding capacity during dry periods.

Protect plants against frost
If higher temperatures come earlier than usual, trees and shrubs may leaf out earlier, making them vulnerable to spring frost. Use mulch or reusable fabrics to cover these plants in the case of frost. Avoid planting on north-facing slopes and low-lying shaded areas that are more subject to frosts.

Be aware of new invasive threats
Higher temperatures are predicted to bring increased weed, insect, and disease pressure. Keep up with the latest information provided by local public gardens & Cooperative Extension experts on new threats.

MAKE YOUR GARDEN PART OF THE CLIMATE SOLUTION

Reduce or replace synthetic nitrogen fertilizer
Synthetic nitrogen fertilizers such as urea and ammonium nitrate require a lot of energy to manufacture and transport (for every ton of fertilizer produced, 4 – 6 tons of CO^2 is emitted). As a replacement, plant legumes, such as beans and peas in your garden and integrate clover into your lawns. When they die, incorporate them into the soil. Or, replace synthetic fertilizers with natural sources such as manure or compost.

Traditional lawns are highly dependent on nitrogen fertilizer. Here's how you can be more efficient with less fertilizer:

- Set your mower higher than three inches to promote better root growth and exploration for more soil for nitrogen.
- Leave lawn clippings in place, since they hold nitrogen and other nutrients, which are recycled back to the lawn.
- Use organic nitrogen sources, such as manure and compost.
- Avoid applying nitrogen in very early spring.
- For healthy, mature lawns in shaded areas, try using only two applications of supplemental nitrogen per year, in early summer and late fall, and apply only one or two pounds of nitrogen per 1,000 square feet.
- If you must use synthetic fertilizer, choose urea over ammonium sulfate or ammonium nitrate, as the production of urea produces less greenhouse gas emissions.

Rethink lawns
Cut down the need for gas-powered mowers and fossil-fuel based fertilizers by replacing high-maintenance turf with no-mow grass varieties. Visit the low-mow demonstration garden on the southeast end of Cornell Botanic Gardens' Mundy Wildflower Garden, which displays a variety of grasses ideal for low-mow lawns.

Make Your Garden a Carbon Sink
Till your garden less, and instead let plants decompose and become part of the soil's organic matter naturally. This prevents carbon from being released into the atmosphere, and improves soil health.

Plant strategically
Choose native plants or other suitable plants, which are adapted to local climate, soils, pests and diseases and require less protection, water and fertilizer. Try your best to place plants in a location that provides the right amount of light, moisture and drainage needed for the plant to thrive without unnecessary inputs.

Avoid buying potting mixes
Most pre-made potting mixes contain synthetic fertilizer, and use energy-intensive ingredients transported from around the globe. Instead, make your own by mixing 1/3 compost, 1/3 garden topsoil and 1/3 builder's sand.

Plant more trees
Trees on your property can take up CO^2 from the atmosphere. Place them in locations to block winter winds and create summer shade to reduce the amount of energy required to heat and cool your home.

Vary Your Vegetables
Adding a diversity of vegetables by interplanting perennial vegetables and herbs with annual crops requires less fertilizer and maintenance than monoculture beds of annual plants.

Power Down and Recycle
As an alternative to leaf blowers and weed whackers, mulch well to keep weeds down. Rake every so often, to compost leaves in small bursts rather than in one big cleanup.

Reuse existing and salvaged materials for garden construction, like bricks and stone, to eliminate the need for manufacturing and transporting new products, which require fossil fuels. Use recycled products whenever you need planter boxes, compost bins, garden hoses, fencing and pots.