Washington County Cooperative Extension Service

The Hoe Truth Newsletter

Helping You Grow

HORTICULTURE

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First Time Gardeners Should Start Small

As so many of us are spending much more time at home these days, this might be the perfect time to think about starting a vegetable garden! In addition to adding fresh produce to your diet, gardening can offer both physical and mental therapeutic benefits.

Anyone can develop a green thumb, as long as they're willing to invest a little time, patience and elbow grease.

Good planning is essential to successful gardening. Start your garden off right by selecting a location that receives at least six hours of direct sunlight daily, if possible.

Good drainage of excess water is critical. Observe the site during these rainy days to avoid areas where water tends to stand. Try to steer clear of trees and shrubs that would compete with your garden plants for water, light and nutrients. Walnut trees in particular produce a substance called juglone that is toxic to some garden plants.

Once you've selected your site, sketch your plans on paper. Decide how big the garden will be, what crops you want to grow and where to place them. Beginners tend to go overboard, not realizing how much work lies ahead. It's best to start out small and gradually add to your patch each year as needed. A 100-square-foot plot should be plenty for your first venture. Or consider making a small raised bed garden. Those without adequate space can consider gardening in containers.

Many different vegetables will produce well in Indiana. Most new gardeners start out by picking up a few seed packets at their local grocery. This is an acceptable way to get started, although there is no guarantee that the cultivars of vegetables being sold are best suited for Indiana conditions. Garden centers are more likely to have a wider choice available. More-experienced gardeners often order online to supplement what is available from local garden centers, taking time to pick out cultivars that have the particular characteristics they're interested in.

Before heading out to the garden to plant, you'll need to gather some tools and properly prepare the soil. A hoe, rake, spade, sprinkler, string and stakes are about the mini-

Fading lights: Comprehensive study unveils multiple threats to North America's firefly populations

A landmark study conducted by the University of Kentucky Martin-Gatton College of Agriculture, Food and Environment; Bucknell University; Penn State University; and the USDA has shed light onto the precarious situation facing firefly populations across North America. The study's results identified multiple factors impacting their numbers, offering a deep dive into how shifting environmental and human factors influence these iconic insects.

The study, published in *Science of the Total Environment*, "Illuminating Patterns of Firefly Abundance Using Citizen Science Data and Machine Learning Models," identified the factors likely responsible for troubling declines in firefly populations across North America.

To study these population changes, the research used a mix of field surveys from citizen scientists and advanced machine learning techniques to analyze over 24,000 surveys from the Firefly Watch citizen science initiative.

Key Findings

This research marks the first comprehensive attempt to apply a data-driven approach to understanding firefly population dynamics on a continental scale. Key findings from this new study indicate that fireflies, part of the beetle order, are sensitive to various environmental factors, from short-term weather conditions to longer climatic trends, including the number of growing-degree days related to temperature accumulations.

> *"Subtle changes in climate patterns, especially related to temperature, are significantly impacting firefly breeding cycles and habitat quality," said Darin McNeil, study principal investigator and assistant professor of wildlife ecology and management.*

Christina Grozinger, publius vergilius maro professor of entomology at Penn State University, said while scientists previously knew that urbanization, agricultural intensification and climate change can affect biodiversity, less was known about how these complex factors interact and what people can do in their own backyards, towns and cities to support biodiversity.

"In this study, we integrated large scale data sets on species abundance, land use, soil type, weather and climate using machine learning models to precisely model and predict firefly abundance patterns at the local scale across the eastern U.S.," Grozinger said. "We were very fortunate to have a multi-year citizen science data set that spanned more than 24,000 observations."

The study underscores fireflies' sensitivity to climatic variables such as temperature and precipitation. Fireflies thrive in temperate conditions, with wet and warm summers creating the ideal breeding environment and cold winters supporting the survival of immature stages like eggs, larvae and pupae.

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However, as global temperatures rise, these conditions become less predictable and, often, less hospitable. Changes in precipitation patterns, another critical factor for firefly survival, have led to either overly dry conditions that reduce larval survival or excessively wet conditions that can flood breeding grounds and disrupt life cycles.

"Artificial lights at night could disrupt firefly populations, possibly affecting both adult and larval stages," McNeil said. "Firefly larvae, which live in the soil, are particularly vulnerable to changes in light exposure and artificial light could alter their developmental cycles and survival rates. Firefly larvae, which are predatory, also require moist soil conditions because the humidity supports soft-bodied invertebrates like snails and slugs that firefly larvae use as prey."

Urban growth, such as establishing impervious surfaces such as sidewalks, buildings and roads, poses a significant threat to firefly populations by invading natural habitats and decreasing available breeding areas. Light pollution from streetlights and commercial signs is particularly disruptive, as it interferes with the fireflies' bioluminescent communication essential for mating. The study indicates that fireflies are markedly less common in areas with significant nighttime light pollution.

Agriculture impact on fireflies

Certain agricultural practices also seem to contribute to the decline of fireflies. The extensive use of pesticides and herbicides has been linked to decreased firefly numbers, likely due to reduced prey availability and direct toxicity.

This new study did not find a pesticide effect; in fact, certain agricultural areas supported some of the highest firefly densities, perhaps because some practices (e.g., livestock grazing) support meadow-like conditions that benefit fireflies. The study warns against increasing agricultural intensification, especially practices that reduce the organic debris and moist environments firefly larvae require to thrive.

The paper reveals that the decline in firefly populations is not uniform across all climates or regions. Some species adapted to dryer environments or those with specific breeding patterns may be less affected by certain changes, whereas others are more vulnerable. This highlights the complexity of natural ecosystems and the need for tailored conservation strategies.

The research team also made significant strides in identifying potential conservation measures to mitigate these impacts. These include reducing light pollution, preserving natural habitats and implementing wildlife-friendly agricultural practices that support fireflies.

Fireflies' importance in the environment

The decline of fireflies is more than the loss of a beloved natural spectacle; it signals broader ecological disruptions that could have cascading effects on other species and ecosystems. Fireflies play a role in the food web, serving as prey for some species and as predators for many invertebrates. Their disappearance could have unforeseen repercussions on local biodiversity.

"As the study concludes, further research is encouraged, particularly in exploring the long-term trends of firefly populations and the efficacy of various conservation strategies" McNeil said. "Moving forward, focused studies that survey particular firefly species, rather than the firefly community as a whole, will be important. This approach will be crucial in ensuring that future generations can also enjoy the natural wonder of fireflies lighting up the night sky."

Gardeners Wheelbarrow Series 2024

Fill This Registration Out and Return To The Extension Office, Circle if you will be attending the Morning or Evening Sessions If Applicable And Total At The Bottom

Attention!!! If An AM Or PM Session Doesn't Have At Least 5 To Register For That Session It Will Be Canceled Via One Call

~~Feb. 15th~~	~~AM~~	~~PM~~	~~Composting 101~~	~~Free!~~	
~~Feb. 22nd~~	~~AM~~	~~PM~~	~~Growing Root Vegetables In Kentucky~~	~~$5.00~~	
~~Feb. 29th~~	~~AM~~	~~PM~~	~~Terrific Tomatoes~~	~~$5.00~~	
~~Mar. 7th~~	~~AM~~	~~PM~~	~~Culinary Herbs From Seed~~	~~$5.00~~	
~~Mar. 14th~~	~~AM~~	~~PM~~	~~Abundant Asparagus~~	~~$10.00~~	
~~Mar. 21st~~	~~AM~~	~~PM~~	~~Opulent Onions, Lovely Leeks, Shallots~~	~~$10.00~~	
~~Mar. 28th~~	~~AM~~	~~PM~~	~~Bodacious Blackberries~~	~~$20.00~~	
~~Apr. 4th~~	~~AM~~	~~PM~~	~~Popular Perennials~~	~~$25.00~~	
~~Apr. 11th~~	~~AM~~	~~PM~~	~~Photogenic Phlox~~	~~$20.00~~	
~~Apr. 18th~~	~~AM~~	~~PM~~	~~Heavenly Heirlooms~~	~~$5.00~~	
~~Apr. 25th~~	~~AM~~	~~PM~~	~~Prizewinning Pineapple Lilies~~	~~$10.00~~	
~~May 2nd~~	~~AM~~	~~PM~~	~~Captivating Crinum Lilies~~	~~$15.00~~	
May 16th	AM	PM	Lavish Lilacs	Free!	
May 23rd	AM	PM	Dynamite Dahlias	$20.00	
May 30th	AM	PM	Classy Citrus	Free!	
June 6th	AM	NA	Horticulture How To: Living Wreaths	$10.00	**FULL**
June 13th	AM	PM	Glorious Gladiolas	$5.00	
June 20th	AM	NA	Horticulture How To: Draped Containers	$5.00	**FULL**
June 27th	AM	PM	Ticks and Tick Borne Diseases	Free!	
July 18th	AM	PM	Fall Vegetable Gardening	$5.00	
July 25th	AM	NA	Horticulture How To: Windchimes	$5.00	
Aug. 8th	AM	PM	Weed Identification and Control	Free!	
Aug. 22nd	AM	PM	Irresistible Iris	$10.00	
Sept. 5th	AM	PM	Colorful Conifers For Kentucky	Free!	
Sept. 26th	AM	PM	Glorified Garlic	$10.00	
Oct. 10th	AM	PM	Alternative Spring Flowering Bulbs	$10.00	
Oct. 24th	AM	PM	Dennis' Favorite Trees	Free!	
			Basic Registration For Any and All Classes	$5.00	$5.00
			Total From Above		
			Register And Pay For **ALL** Classes By February 15th 2024 And Save $20.00	-$20.00	
			TOTAL		

Fading lights: Comprehensive study unveils multiple threats to North America's firefly populations

"Each individual species has its own habitat requirement and things it needs to succeed," adds Bucknell University assistant professor of biology Sarah Lower, a noted firefly researcher. "With the citizen science data in this study, we're looking at fireflies in the aggregate, but we would like people in citizen science getting more training in species identification. If we can get species-level information, we can provide more specifics on species living in a particular area and how best to protect them."

To create similar data sets for other firefly species, the research team is also leveraging technology and AI to develop automated monitoring systems through an NSF funded INSECT NET graduate training program.

Individuals interested in learning more about the land use, weather and climate conditions in their locations can use Penn State's Beescape tool, which provides location-specific habitat quality scores for pollinators.

This work was funded by the Penn State Insect Biodiversity Center, Penn State's Huck Institutes of the Life Sciences and Penn State's College of Agricultural Sciences via the USDA's National Institute of Food and Agriculture and Hatch Appropriations.

First Time Gardeners Should Start Small

mum tool supply you'll need. It's a good idea to have your soil tested as early as possible to learn how much of what kind of fertilizer to apply.

Next, prepare a good planting bed, but make sure the soil has dried sufficiently before you work it. Working wet soil will damage the soil's structure. Squeeze a handful of soil, and if it crumbles away easily, it's ready. If it sticks together in a muddy ball, you'd better hold off. When it's ready, work the soil at least 6 inches deep. A rototiller makes this job pretty easy, but for small plots a spade and strong arms will do. Then rake the soil surface level.

Most seed packages will list planting directions such as depth and spacing. When setting out transplants, be sure to dig a hole larger than the soil ball of the plant to aid root establishment. Most transplants are sold in containers that must be removed before planting. The exception is those sold in peat pots (brown, fibrous pots) that can be planted but do need a little modification. Tear off the rim of peat pots to ensure that no part of the pot will stick out of the soil. And, if roots are not growing out of the bottom of the pot already, it's helpful to tear or poke holes through the bottom of the pot to allow for easier root penetration. Transplants dry out and wilt rapidly, so be sure to get those transplants watered thoroughly as soon as possible.

The job doesn't end with planting. There are always weeds, insects and diseases to battle. There are numerous cultural types of controls and preventive measures along with chemicals. No one chemical will control all problems on all crops, so you'll need to identify your problem correctly and then choose the proper control strategy. A pesticide is not necessarily the best method. Article by Rosie Lerner Purdue Extension

Save The Date!

Washington County Garden Club Day Trip
May 29th, 2024 (Location To Be Determined)
Depart 9:00 AM and Return By 4:00 PM

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Martin-Gatton
College of Agriculture,
Food and Environment

Cooperative
Extension Service

Recipe Of The Month

Melon Berry Smoothie

¼ cup skim milk

1 cup low fat vanilla Greek yogurt

2 cups chopped honey dew melon

1 cup frozen blueberries, strawberries or mixed berries

1 tablespoon honey, optional

Place all ingredients in blender.

Blend together until smooth using the pulse function, if available.

Pour into serving glasses and serve immediately.

Yield: 4, 8 ounce servings.

Nutritional Analysis: 130 calories, 1g fat, 0 g saturated fat, 5 mg cholesterol, 55 mg sodium, 28 g carbohydrate, 2 g fiber, 24 g sugars, 3 g protein.

Plate it up! Kentucky Proud

Buying Kentucky Proud is easy. Look for the label at your grocery store, farmers' market, or roadside stand.