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Smart flower borders to attract beneficial insects

Home gardeners can plant a diverse mix of flowers to attract beneficial insects to their yard and gardens.

Rebecca Krans, Michigan State University Extension

Smart gardeners use sustainable practices that are earth friendly and save them time, effort and money. One smart practice is to incorporate a variety of perennial flowering plants that bloom throughout the growing season in your yard and garden. Not only do flowering plants provide food for a variety of bees which aid in pollination, they also provide food and shelter for a myriad of other beneficial insects that eat and parasitize destructive bugs.

What are beneficial insects?

Beneficials are the "good" bugs. For example, pollinators such as bees are needed for pollination of cherries, blueberries, cucumbers and many other crops to produce fruit. There are over 20,000 species of bees worldwide with over 400 native bee species recorded in Michigan. According to Rufus Isaacs, Michigan State University Department of Entomology, bees are necessary for the pollination of 80 percent of flowering plant species and many of our major crop plants. If pollination is limited, fewer flowers turn into fruit, the fruit is smaller, and won't be as juicy.

Other beneficials include predators, like lady beetles, lacewings or predatory flies, that eat the pests that can destroy many garden plants. One such group of pests, the aphids, can damage plant tissues and transmit plant diseases when they eat. Lacewing larvae are voracious feeders of aphids and they will eat hundreds to thousands of aphids during their lifecycle.

Other beneficials include the parasitoids; they will parasitize or feed off the pest insects. Examples include parasitic wasps that lay their eggs within the caterpillar or larval stage of pests; one such pest that is affected is the tomato or tobacco hornworm. If you see this big green caterpillar with many white protrusions on it, you are observing this natural process. A parasitic wasp has laid her eggs inside and they are developing on the paralyzed tomato hornworm, feeding off of it and eventually killing it. The offspring of the parasitic wasp will emerge from these white protrusions to begin the cycle over.

Adult lady beetle (left) and its larval stage (right) eating aphids on a button bush plant.

Which plants are "smart" for beneficial insects?

Flowers that have multiple blooms are best attractants for beneficial insects. Annuals such as marigolds, verbena, alyssum and salvia will be preferred by bees, yet most annuals are going to be enjoyed by beneficials. Perennials can also be combined to provide flowers for the entire growing season

providing food and shelter the entire time. Choose perennials such as salvia, mints, coneflowers and daisies. Hardy mums and asters will provide food and shelter after the first fall frost.

Selecting native plants is also a smart plant choice in that natives are often well-adapted to site conditions, therefore requiring less time and inputs from the gardener. MSU has a helpful resource titled "Attracting Beneficial Insects with Native Flowering Plants" that can be purchased from the MSU Extension Bookstore or available for free to download at www.nativeplants.msu.edu, a website full of information on this topic.

Smart gardeners can also plant flowers and herbs, such as cilantro and dill, amongst vegetables. These provide a nearby shelter and food source for pollinators, predators and parasitoids near your vegetable crops. Visit the MSU Horticultural Demonstration Garden for ideas on how to lay out a perennial plant bed. Gardeners can also check out the Michigan Native Plant Producers Association at www.MNPPA.org that has locations around the state for purchase of native perennials.

Smart gardeners are conscious of beneficials' importance

Many fruits and vegetables require pollination and as Isaacs points out, pollination of these crops results in millions of dollars of economic benefit for the state of Michigan. Smart gardeners realize that bees are mainly interested in getting to the next flower for food. He notes that the majority of native bee species make their nest in the soil, so homeowners need to be conscious of this. Bumble bees are dependent on flowers through the summer, and if you provide food for these bees they will reward you with improve pollination of your fruits and vegetables.

Smart gardeners can provide a diverse habitat that will attract beneficial insects into their yard and gardens. Help educate others about beneficial insects' importance to food production and sustainability, and show what everyone can do to attract them to their gardens.

Gardening to protect bees

Watch a webinar on smart gardening for bees from MSU entomologist Rufus Isaacs.

Read an article on how to protect bees in your yard and garden from MSU entomologist Dave Smitley.

Rebecca Finneran

Soils for gardeners: Unlocking the secrets to the living component of a healthy soil

A close look at soil biology helps gardeners understand how routine garden practices may tip the balance of a healthy soil.

Rebecca Finneran, Michigan State University Extension

Understanding soil biology is quickly becoming the "next frontier" for science exploration. Michigan State University professor of nematology George Bird reminds us that "Like the oxygen we breathe, no life can exist without soil." Similarly, soil cannot function without life.

While soil scientists have long understood the physical and chemical properties of the ground we garden in, new research is unlocking secrets of the "living component" of soils that make them able to regenerate and function as a living ecosystem. So, what does this mean? Do we need a bunch of earthworms sliding around to make our soils healthy?

According to Bird, a large percentage of the living component is microscopic, not visible to the naked eye. Like magic, organisms such as bacteria, fungi, nematodes, flagellates and actinomycetes work in harmony with one another to release, or mineralize, nutrients and make them available to plant roots. Often these very organisms become the "gatekeeper" of essential elements to enter plant roots. What Bird describes as "gardener's friends," these diminutive creatures work in tandem with plant roots and each other, allowing the soil to respond to management practices in a predictable manner and preventing soil degradation.

A closer look

Naturally occurring fungi known as mycorrhiza, or root fungi, thrive in the soil just outside the plant's root hairs or "rhizosphere," the area of soil directly impacted by the root. Water and nutrients must travel through the mycorrhiza to enter the plant's vascular system. Acting as a "gatekeeper", the mycorrhiza also protects roots from some disease-causing organisms. Likewise, beneficial bacterial also lend a hand by protecting plant roots from harmful invaders. A symbiotic relationship allows both organisms to benefit from living in the shadow of the root as it "leaks" a sugar exudate (food) into their watery world.

Bird groups a smart gardeners' friends into three categories:

1. Shredders: earthworms and arthropods
2. Decomposers: bacteria, fungi and actinomycetes
3. Mineralizers: flagellates, ciliates and nematodes

Playing roles in the transformation of dead or decomposing plant matter into usable nutrients, these creatures may have big names, but they are larger than life when it comes to helping a garden be sustainable.

The big screen backlot

The very gardening practices you implement will encourage this "life below ground" or discourage it. Excessive tillage, over-fertilization, over-watering, over-use of pesticides and compaction are factors that destroy the dynamic equilibrium that one hopes to achieve in a sustainable or "smart garden."

We have long understood that the rototiller may not be a gardener's best friend. The action of excessive tillage breaks chemical bonds that soil needs to help it "clump," providing pores for air, water and roots to penetrate. At the same time, adding abundant oxygen to the soil causes organic matter to decompose rapidly which may lead to an imbalance in the living component of your soil.

Farmers have been exploring no-till technology for many years to reclaim the soil's natural, living component. While this may take many years, Michigan State University Extension believes a gardener can capitalize on the same techniques to encourage life below ground to bloom as it does above. In addition to this, research is proving out that organic mulches also will benefit the good guys by keeping soils more insulated, evenly moist during dry periods and providing nutrients that they thrive on.

Rebecca Finneran

Organic mulches benefit soils by allowing the gardener to reduce or stop tilling.

Maintaining warm soils during a cold summer

Consider these smart ways to keeping soils warm and warm-season vegetables healthy during a colder-than-normal summer.

Gretchen Voyle, Michigan State University Extension

The weather experts are talking about summer 2014 being a slightly cooler summer than usual for Michigan. This is because of the amount of ice that formed on the Great Lakes and the depth to which it froze. Westerly winds blowing over ice or cold water could make Michigan cooler. This may be great for the air conditioner bill, but it could make some warm-season vegetables in the garden not as productive.

First in line as a warm-season diva is the tomato. With its ancestors hailing from Central America and Mexico, tomatoes have always been somewhat disappointed with Michigan's weather. However, a cool summer season could slow plant growth and fruit production. Other warm-season vegetables that could be similarly affected are peppers, eggplant, tomatillo, okra, melons, squash, beans sweet corn, cucumbers and pumpkins.

The question becomes what can the home gardener do to keep and maintain a warmer soil? This is a challenge for smart gardeners rather than a problem.

The very first thing Michigan State University Extension recommends is to make sure these heat-loving vegetables receive eight or more hours of full, uninterrupted sun. The more direct sun, the more soil warming will take place. Making fruit requires a great deal of energy and the sun enables those warm-season vegetables to produce a bountiful crop.

Another possibility would be not using organic mulch like straw on some or all of your warm-season vegetables. Mulch is invaluable for keeping soil temperatures down because of its insulating ability. Bare soil that has been loosened will absorb the sun's rays. This is when a technique called "dust mulching" can work. The soil is lightly tilled or hoed to a depth of 2-3 inches. The loosened soil dries out and heats up. The compacted soil below the tilled area holds in moisture. This also prevents weed seeds from germinating because there is no moisture at the top where seeds would germinate. The drawback is that you have to continue to dust mulch if you are walking on the soil or overhead watering, or if it rains.

Leon Roberts, Wikimedia Commons

If bare soil works for your garden, you could distribute compost on the soil surface. Because it is dark in color, it absorbs the sun's rays even better than many soils that are various shades of tan. Adding 2 or 3 inches on the soil surface gives the garden a double treat. The soil is warmer and at the end of the season, the compost is tilled into the soil to work its magic on plant roots in coming years.

Another technique is to cover the bare soil with black or clear plastic. This will allow heat to penetrate and the plastic will hold it in more successfully than just bare soil. It is important to anchor the plastic so windy days do not cause your plastic to run away from home. Rocks, bricks or scrap pieces of lumber could be used. You could bury the edges in the soil, but as the plastic traps heat, it also blocks rain and overhead irrigation. Watering with a hose placed close to the base of the plant will get the water under the plastic or by laying a soaker hose under the plastic. Moisture can be directed to the root zone by only hooking up one end with the other closed off.

If using plastic, buy the thickest plastic that you can find. Thin plastic does not hold up well when walked on and picking dozens of little pieces of torn plastic embedded in the soil could cause most gardeners to invent new and colorful expressions.

Watch the weather and temperatures as the growing season continues. Be ready to employ any of these heat-saver techniques if this will help your garden.

Benefits of using lawn fertilizers containing slow release nitrogen

Slow release fertilizers can help to reduce mowing frequency and improve lawn quality.

Diane Brown, Michigan State University Extension

It can be confusing to sort out what kind of fertilizer to choose for a lawn; there are so many choices available. The nutrients needed in the largest quantities by turfgrass are nitrogen (N), phosphorus (P) and potassium (K). Michigan State University Extension recommends to start by taking a soil test to determine the nutrient s needed by your lawn. The P and K requirements can vary considerably due to soil type and texture. Nitrogen is not routinely tested because it is very mobile in the soil. Instead, N needs for turfgrass are estimated based on the lawn use and maintenance level. Low maintenance lawns need 1-2 pounds of N per year, medium maintenance lawns need 3 pounds of N per year, and high maintenance lawns such as golf courses or athletic fields with sprinkler irrigation need 4-6 pounds of N per year. Regardless, no more than 1 pound of N per 1,000 square feet of lawn should be applied at one time.

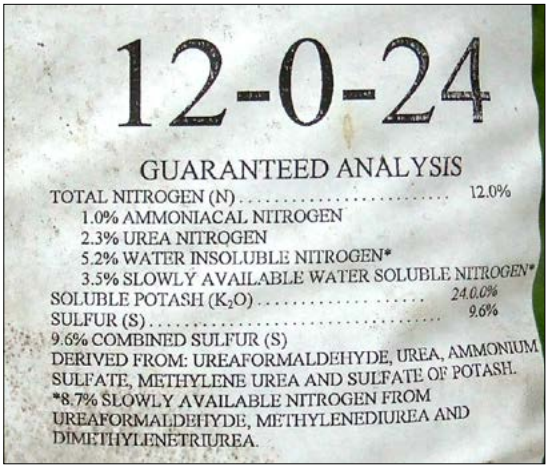
A bag of a complete fertilizer contains N, P and K – listed in that order – as percentages by weight of the total bag contents (guaranteed analysis). For example, a 50-pound bag of 10-10-10 fertilizer is 10 percent N, 10 percent P and 10 percent K. Those percentages equate to 5 pounds actual N, 5 pounds actual P, and 5 pounds actual K. The remaining 35 pounds are carriers and fillers – additives to make the product easier to spread and apply evenly. In January 2012, a Michigan law restricting phosphorus use on turfgrass was enacted. For home lawns, fertilizer containing phosphorus may only be applied:

1. For new sodded or seeded lawns.
2. When a soil test indicates that phosphorus is needed.
3. When it is part of an organic manure, compost or sewage sludge product (i.e., Milorganite).

A soil test will tell you whether or not phosphorus is needed for your lawn.

As mentioned, nitrogen is mobile in the soil. It can also be volatile. Although fertilizers with slow-release nitrogen are more expensive than quick-release synthetic fertilizers, the benefits include low risk of burning the turf; more even, sustained grass growth (less mowing); and less leaching into ground and surface water. IBDU, methylene urea, sulfur-coated urea and polymer-coated urea are all forms of slowly soluble nitrogen. IBDU has low water solubility and is not affected by the activity of soil microbes, making it ideal for use on cool-season turfgrass. Sulfur-coated urea breaks down as water enters pores in the sulfur coating, causing the urea to slowly dissolve. Polymer-coated fertilizers release nitrogen as the plastic coating slowly dissolves. Urea-form fertilizers depend on long chain polymers to slow the release of nitrogen. You are more likely to find these types of slow-release fertilizers in products listed for professional use than in typical home lawn fertilizers.

Peletized or slow release forms of fertilizer can be used easily and have a high level of protection from over-application.

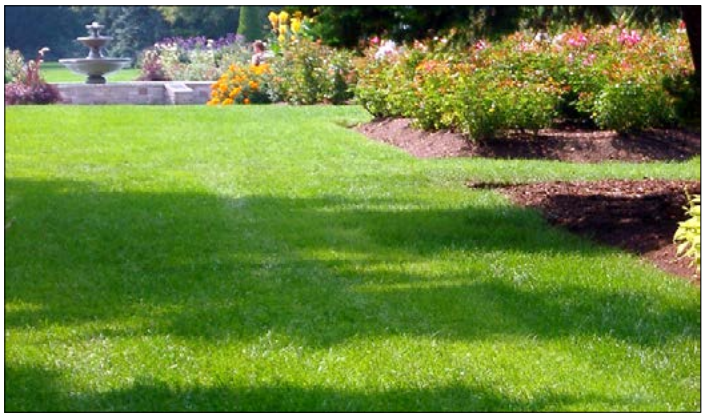


A wide variety of granular fertilizers have the nutrient analysis clearly printed on the label. Many are for specialty crops such as a lawn.

All photos in article Rebecca Finneran

Methylene urea and natural organic products such as activated sewage sludge (Milorganite) and processed turkey manure (Sustane) are dependent on soil temperature and biological activity for conversion to usable forms of nitrogen. Other organic products include composts, seed meals and poultry and other manures. These products release nitrogen slowly to very slowly. They tend to have a low guaranteed analysis (Milorganite is 6-2-0, Sustane is 4-6-4) and are expensive per unit of nitrogen. However, they do offer low burn and leaching potential. The natural organic products such as Milorganite and Sustane are readily available. They do contain phosphorus, which your lawn may not need; check your soil test results to determine whether or not these are appropriate choices.

Look for turf fertilizers that have at least a portion, 25 percent or more, of their nitrogen in the form of slow



release N. Your lawn will benefit from lower risk of fertilizer burn, and the growth will be more even. The environment will benefit from lower risk of fertilizer moving into ground and surface water, and you will benefit from having a beautiful lawn that needs to be mowed and fertilized less often.

Looking for more?

For more information on a wide variety of **smart gardening** topics, or to find out about smart gardening classes and events, visit www.migarden.msu.edu.

Don't forget to visit us at the **Master Gardening College** June 20-21 on the campus of Michigan State University Registration is currently open.

Stay up-to-date with resources and news for home gardeners by signing up at http://bit.ly/MSUEDigestSignup to receive MSUE Home Gardening Production Digests via email.

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