

Plant Wise

IOWA STATE UNIVERSITY
Extension and Outreach

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November 2013

Best Practices to Promote Pollinator Habitat

By Matt O'Neal and
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The European Union's restriction on the use of neonicotinoid insecticides and the joint U.S. Department of Agriculture/Environmental Protection Agency (USDA/EPA) report of a continued decline in honey bees reminds us of the on-going issues with pollinator health (<http://www.usda.gov/documents/ReportHoneyBeeHealth.pdf>). Specifically, the decline of honey bee populations is reaching a breaking point for pollinated crops in the United States. In an article published in *Wired* magazine (Keim 2013), entomologist Dennis vanEngelstorp from the University of Maryland noted, "We're getting closer and closer to the point where we don't have enough bees in this country to meet pollination demands."

Although the factors thought to be causing this decline are many, there are some simple things we can do to help conserve bees. All bees share some basic needs: something to eat and someplace to live. As noted in the USDA/EPA report, the habitat that is available to bees in the United States is shrinking in size and declining in quality. To reverse this trend, several universities, including Iowa State University, are investigating how to get more high-quality habitat in our landscape.

Providing bees food

Midwest researchers have focused on native plants as a food source for bees and other beneficial insects. These plants include flowering perennials commonly found in prairies. At Michigan State University (MSU), Doug Landis is leading a team to study which of these plants

and plant mixtures is most attractive to beneficial insects and least attractive to pest insects. Their research is summarized on an MSU website that rates plant attractiveness and gives recommendations for growing them (<http://nativeplants.msu.edu/>). Also, a chart showing when these plants bloom is included. They recommend selecting a combination of plants that provide flowers from spring to fall so that bees have a constant source of nectar and pollen.

At Iowa State University, we investigated if the MSU recommendation would be more attractive to beneficial insects than other plants commonly found in the Iowa. We created a mix of plants from the list provided by MSU that were rated the most attractive to beneficial insects. The mix was constructed of 12 plants that provided a habitat that flowered throughout the growing season. With funding from the Leopold Center for Sustainable Agriculture, we observed during a two-year study (<http://www.leopold.iastate.edu/pubs-and-papers/2013-01-conserving-beneficial-insects-native-plants>) that the 'best-bet mix' attracted more bees than single plant species (e.g., corn, switch grass, alfalfa or willow) and a mix of prairie plants currently recommend for reconstructing prairie. Furthermore, if the plant mixture was reduced to just two species, such as cup plant (Photo 1) and golden alexanders, it still outperformed most of the single plant treatments.

Photo 1. Cup plant (*Siphium perfoliatum*) is a perennial plant that bees find very attractive, like this bumble bee.



These plants grow 4 to 10 feet tall and produce several flowers during July and August in Iowa. Photo by Adam Varenhorst.

Photo 2. The 'MSU best bet mix' is comprised of 12 species of plants commonly found in prairies. This picture was taken in August when cup plant, pinnate coneflower

(*Ratibida pinnata*) and swamp milkweed (*Asclepias incarnate*) are flowering. The best bet had the most bees of the nine different treatment options tested. Photo by Adam Varenhorst.



Providing bees a place to live

Bees also need a place to live. For honey bees, this is usually a hive box provided by a beekeeper. But honey bees are only one of the nearly thousands of bees found in North America. Most of these bees are not social and build nests alone. Depending upon the species, these nests can be found in the ground or in living or dead plants. Creating nesting habitat for bees can include providing undisturbed soil to building 'bee hotels' that offer material like stems, drinking straws and wood blocks with holes.

The Xerces Society (http://www.xerces.org/wp-content/uploads/2008/11/nests_for_native_bees_fact_sheet_xerces_society.pdf) is a non-governmental organization that is focused on pollinator conservation. The Xerces Society has several fact sheets (<http://www.xerces.org/fact-sheets/>) for how best to provide nesting habitat for ground nesting and stem nesting bees. Included in these recommendations are guides for building artificial nests.

Reducing harm from insecticides

After providing food and nesting habitat, beekeepers can take an extra step to reduce the impact of insecticides. The Iowa Department of Agriculture and Land Stewardship has an apiculturist (honey beekeeping expert), Andrew Joseph, who maintains a registry of honey bee hives in Iowa. This registry is available for insecticide applicators so that they can contact beekeepers (http://www.iowaagriculture.gov/Horticulture_and_FarmersMarkets/sensitiveCropDirectory.asp). By registering hives, beekeepers can make adjustments to limit exposure. At the same time, applicators are required to adjust their application time to early evening, when honey bees are less likely to forage.

References

Keim, B. One-third of U.S. honey bee colonies died last winter, threatening food supply. 2013.

Wired. <http://www.wired.com/wiredscience/2013/05/winter-honeybee-losses/>

Other Resources:

MSU Webinar: The Buzz About Pollinators
<https://connect.msu.edu/p7igtptsguba/?launcher=false&fcsContent=true&pbMode=normal>

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Dealing with Fallen Leaves

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At this time of year homeowners clearly understand why another term for "autumn" is "fall." With the slightest breeze, shade and ornamental trees send a shower of leaves to carpet the lawn, drive and sidewalk. Horticulturists with Iowa State University Extension and Outreach answer homeowners' questions as they decide how to deal with fallen leaves. To have additional questions answered, contact Hortline at hortline@iastate.edu or call 515-294-3801.

Do I need to remove the leaves on my lawn?

Turfgrass plants use sunlight, water and nutrients to manufacture food. In fall, lawn areas beneath large trees are often completely covered with leaves. The leaf debris prevents the turfgrass plants from manufacturing and storing food prior to winter. A thick layer of leaves (little or no grass is visible) will need to be raked up and removed. It's possible to deal with a thin layer of leaves (areas of grass are clearly visible) by chopping them up with a mulching mower. Small quantities of shredded leaves will filter down into the grass canopy rather than rest on the grass surface.

How can I accelerate the decomposition of leaves in my compost pile?

Leaves contain high levels of carbon and small amounts of nitrogen. The microbes that decompose leaves and other types of organic matter require nitrogen for their own metabolism and growth. A compost pile composed mainly of leaves decomposes slowly because the leaves don't contain adequate levels of nitrogen for the microbes.

To promote decomposition, mix leaves with grass clippings or other materials high in nitrogen. If possible, shred the leaves prior to composting. The smaller the size of the material, the faster it will decompose.

Construct the compost pile in layers. Each 6- to 8-inch-layer of plant material should be topped with 1 inch of soil or compost. A small amount of an all-purpose garden fertilizer, such as 10-10-10, can also be added to supply nitrogen to the microbes. Continue to build the compost pile in layers until it is 3 to 5 feet high. Finally, water the pile regularly and turn it about once every two weeks.



Compost Bin

Can leaves be used as a mulch?

Shredded or composted leaves are excellent mulch for vegetable gardens, raspberry plantings, perennial flower beds and around trees and shrubs. While the leaves of some trees, such as oak, are acidic, they can be safely used in the yard and garden. An oak leaf mulch has little effect on soil pH.

Leaves are a poor winter mulch for strawberries and herbaceous perennials. Plants covered by leaves over the winter months may be damaged due to excess moisture trapped under the leaves. Clean, weed-free wheat, oat or soybean straw is excellent winter mulch for strawberries and perennials.

Trees and Shrubs with Colorful Fruit

By Richard Jauron
Dept. of Horticulture
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The predominate colors of the winter landscape in Iowa are white and various shades of gray and brown. An excellent way to awaken the dead of winter is to plant trees and shrubs that possess colorful fruit.



Winter King Hawthorn Tree

While **crabapples** (*Malus*) are usually planted for their flowers, many varieties also possess attractive, persistent fruit. Crabapple varieties with red fruit include 'Donald Wyman,' 'Sugar Tyme,' 'Red Jewel,' 'David,' 'White Angel,' and 'Jewelberry.' 'Winter Gold' and 'Harvest Gold' have striking yellow fruit.

Hawthorns are another group of small, flowering trees that possess attractive fruit. Hawthorns produce white flowers in spring. In fall, the fruit turn red and persist into winter. Two hawthorns noted for their excellent fruit

display are the Washington hawthorn (*Crataegus phaenopyrum*) and Winter King hawthorn (*Crataegus viridis* 'Winter King').

The American cranberrybush viburnum (*Viburnum trilobum*) is an excellent shrub for screens and hedges. The shrub grows 8 to 12 feet tall and produces white, flat-topped clusters of flowers in spring. The fruit turn a bright red in fall.

A plant often associated with the Christmas season is holly. The glossy, green-leaved and red-fruited sprigs of holly are often used in wreaths, centerpieces, and other decorations. Unfortunately, most hollies are not reliably hardy in Iowa. A native, deciduous holly and several hybrid broadleaf

evergreen hollies can be successfully grown in Iowa.

Winterberry (*Ilex verticillata*) is a deciduous holly. It is native to northeast Iowa and grows 6 to 10 feet tall. Hollies are dioecious. There are



Winterberry

separate male and female plants. The fruit on female plants turn a bright red in fall and persist into winter. Two female varieties noted for their excellent fruit display are 'Sparkleberry' and 'Winter Red.' A male variety must also be planted for pollination and fruit set. Winterberry prefers moist, acid (pH 4.5 to 6.5) soils and will grow in sun or partial shade. Several hybrid broadleaf evergreen hollies introduced by Mrs. F. Leighton Meserve, collectively known as the **Meserve hybrid hollies** (*Ilex x meserveae*), can also be grown in some areas of Iowa. 'Blue Prince,' 'Blue Princess,' 'China Boy,' and 'China Girl' are hardy to -10 to -20 F (USDA Hardiness Zone 5). Meserve hollies are susceptible to winter (desiccation) injury from bright sun and dry, cold winds. They should be planted in protected areas, such as the east side of a house.

The **Japanese barberry** (*Berberis thunbergii*) is a small (4 to 6 feet tall), thorny shrub. Its green leaves change to orange or reddish purple in the fall. The Japanese barberry produces small, oval-shaped fruit which turn bright red in the fall and persist into winter. Many varieties are available. Most possess reddish-purple foliage.

Red chokeberry (*Aronia arbutifolia*) is an upright, spreading shrub. It produces small, white flowers in spring, followed by red berries in fall. The common name chokeberry is derived from the astringent taste of the fruit. Red chokeberry grows 6 to 10 feet tall. An excellent fruiting variety is 'Brilliantissima.' 'Brilliantissima' is hardy in USDA Hardiness Zones 5 to 8.

The brightly colored fruit of many of the aforementioned trees and shrubs do not remain throughout the winter. Extreme cold in mid-winter will cause many of the fruit to turn brownish or black. Hungry birds and squirrels will also dine on the fruit. However, the display in late fall and early winter can be spectacular.

Mulching Strawberry Plants

By Richard Jauron
Department of Horticulture
Iowa State University

To insure a bountiful strawberry crop next year, home gardeners should mulch their strawberry plantings this fall.

Cold winter temperatures and repeated freezing and thawing of the soil through the winter months are the main threats to strawberry plants. Temperatures below +20 degrees Fahrenheit may kill flower buds and damage the roots and crowns of unmulched plants. Repeated freezing and thawing of the soil can heave unmulched plants out of the ground, severely damaging or destroying the plants.

Allow the strawberry plants to harden or acclimate to cool fall temperatures before mulching the planting. Applying mulch before the strawberry plants have properly hardened may make the plants more susceptible to winter injury. In northern Iowa, strawberries are normally mulched in early November. Gardeners in central and southern Iowa should mulch their strawberry plantings in mid-November and late November, respectively.

Excellent mulching materials include clean, weed-free oat, wheat, or soybean straw. Chopped cornstalks are another possibility. Apply approximately 3 to 5 inches of material. After settling, the mulch layer should be 2 to 4 inches thick.

In windy, exposed areas, straw mulches can be kept in place by placing wire or plastic fencing over the area. The fencing can be held in place with bricks or other heavy objects.

Leaves are not a good winter mulch for strawberries. Leaves can mat together in layers, trapping air and creating space for ice to form. The leaf, air, and ice layers do not provide adequate protection. A leaf mulch may actually damage plants due to excess moisture trapped under the matted leaves.



Plant Wise Newsletter is Going Paperless Sign up Today!

The Plant Wise newsletter will be transitioning to electronic distribution in February of 2014. We currently mail 175 paper copies of the newsletter and would like to convert most of these subscriptions to electronic delivery via email. Paper subscriptions will still be available at a cost of \$10.00 per year. There will be no cost to receive the Plant Wise newsletter electronically. Please contact Nancy Crews at ISU Mills County Extension and Outreach office to sign up for electronic delivery or paper subscription by December 15, 2013, 712-624-8616 or ncrews@iastate.edu.

Glenwood's Giving Garden – 2013 Success!

By Nancy Crews
Horticulture Program
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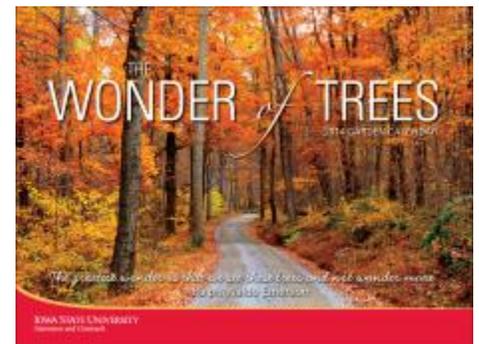


The 2013 harvest numbers are in, and it was a very successful season at Glenwood's Giving Garden! Over 6,772 pounds of fresh vegetables were grown and distributed to people in need throughout the community with the help of Mills County Public Health and numerous volunteers. The Giving Garden has received generous support from the community with a 2013 grant from the Mills County Community Foundation, and donations from the Mills County Supervisors, Knights of Columbus, Mills County Master Gardeners, and numerous other business and individual donations. Funding received this year has been used to improve distribution of the considerable amount of produce coming out of the garden including an enclosed garden shed, refrigerators to keep produce fresh, shelves for storage and an electrical line. The garden would not be possible without the generosity and hard work of landowners June Focken and Carol McCormick and Mills County Master Gardeners, Mike and Lisa Dytrych. Congratulations to all on a successful year!

2014 Garden Calendar Available

Trees improve the landscape of Iowa, whether it's with sheltering foliage, beautiful blooms, nourishing fruit, vivid color, or gnarly bark.

This year's calendar celebrates the wonderful gifts that trees provide for other living things. In addition to striking photos, find monthly garden tips, tree-planting instructions, Iowa's state forests, vignettes of historical trees, and quotes



that trees inspired. Makes a great gift and a handy garden journal too! Calendars are available for \$6.00 each - online at www.store.extension.iastate.edu/ or through the Mills County extension office.

Upcoming Horticulture Events of Interest

SW Iowa Forestry Field Day Tractor Tree Planting Operations

Date: Tuesday, November 12

Time: 9:00 – 3:00 PM

Place: 1680 US Highway 71, Villisca, Iowa

Cost: Free

The field day will include discussion of site preparation, species selection and planting methods. Two tractors will be actively planting. Instructors: Dr. Jesse Randall, ISU Extension Forester; Lindsey Barney, DNR District Forester; Brent Olson, Loess Hills State Forest Area Forester. Lunch catered courtesy of American Tree Farm System. RSVP by November 11 to Lindsey Barney, District Forester, 712-482-6245 or Lindsey.barney@dnr.iowa.gov.

Cover Crop Field Day

Date: Thursday, November 14

Time: 12:00 – 3:00 PM

Place: Stanton Fire Station, 205 Broad Ave., Stanton, IA

Cost: Free

Hosted by ISU/Iowa Learning Farms and Practical Farmers. Learn about cover crop management including cover crops and soil health, strategies to reduce nutrient loss, and livestock grazing. Complimentary lunch provided. RSVP and more information 515-232-5661

Ask the ISU Extension Gardening Expert

How can I increase the likelihood of my garden mums surviving the winter?

Several things can be done to increase the likelihood of garden mums surviving the winter in Iowa. Select early flowering cultivars that are known to possess excellent cold hardiness. For example, many of the University of Minnesota introductions perform well in Iowa. Plant mums in spring. Fall planted mums usually don't survive the winter. Stop fertilizing plants in July to discourage late season growth. Finally, cover plants with a protective winter mulch in late fall.

When should I cut back my asparagus?

The asparagus foliage can be cut back to the ground after it has been destroyed by a hard freeze in fall. However, it is generally recommended that the dead foliage be allowed to stand over winter. The dead debris will catch and hold snow. Snow cover helps protect the asparagus crowns from extreme cold. Asparagus foliage allowed to remain in the garden over winter should be removed in late March or early April before the spears begin to emerge.

When can I cut back my rhubarb plants?

Don't cut back the rhubarb until the foliage and stalks have been destroyed by a hard freeze. To produce a good crop next spring, the rhubarb plants must manufacture and store adequate levels of food in their roots. The foliage continues to manufacture food as long as it's healthy. Once destroyed, the foliage and stalks can be removed.

What are neonicotinoids?

Neonicotinoids are a class of synthetic insecticides that are chemically similar to nicotine, the naturally-occurring toxin that is found in plants of the nightshade family. Neonicotinoid insecticides are designed to be less harmful to humans than pure nicotine, but this chemistry is poisonous to all animals. Neonicotinoids include several different chemicals, but the one most widely available to homeowners is **imidacloprid**. Others are acetamiprid, clothianidin, dinotefuran, thiacloprid and thiamethoxam.

Why are neonicotinoids a particular concern?

Neonicotinoids are being examined for a couple of reasons: 1) they are a relatively new type of insecticide that has quickly been widely adapted world-wide; 2) they are systemic, meaning that they move throughout the plant and are present in all the plant tissues for a period of time, so pollinators can be exposed even if the chemical is applied before the plant is blooming; and 3) they can be present in the ecosystem for a long time. For instance, **imidacloprid** can remain present in soil for up over 5 years.

The neonicotinoids are also a concern because they are highly toxic to bees and much more so than some other commonly used insecticides. To measure this we use something called the LD50 rate, which refers to the amount of chemical it takes to kill 50% of a test population. When you look at an LD50, the smaller the number the more poisonous a compound is because it takes less to kill 50% of the population.

For a honey bee, the amount of **imidacloprid** that must be ingested to kill 50% of the test population is 0.0037 micrograms. Compare this to carbaryl (brand name Sevin) which requires 0.14 micrograms to kill 50% and bifenthrin that takes 0.1 micrograms. This means that

imidacloprid is 27 to 38 times more poisonous to bees than these other commonly used insecticides.

What can I do as a homeowner to help beneficial insects?

Before you use any insecticide, including neonicotinoids, evaluate if it is necessary. Is the damage already done, will treating improve the health of the plant, is the damage cosmetic? Are there other things you could do to reduce damage by the insect pests? Follow Integrated Pest Management practices to reduce insecticide use.

If you have determined that an insecticide is necessary, you should consider using the least toxic option first like soap or oil based insecticides. Then consider if the plant is a flowering plant and if the blooms are attractive to bees. If it is, we do not recommend using **imidacloprid**. You can use spray insecticides that cover the outside of the plant after bloom or if you decide to use a neonicotinoid insecticide, use after bloom.

NOVEMBER GARDENING TO DO LIST



- Water recently planted evergreens thoroughly before the ground freezes to prevent winter dessication.
- Continue to water newly established trees, shrubs, and perennials.
- Plant spring-flowering bulbs. You can continue to plant most bulbs up until the ground freezes. Ideally though, they will have a couple of weeks to settle in before the ground is frozen.
- Mulch strawberries with 3 – 5 inches of straw.
- Refer to the owner's manual for winter storage care of power equipment.
- Carefully blow or rake tree and shrub leaves off your perennial gardens. Large leaves get wet, mat down, and provide poor insulation for your plants. Shred fallen leaves and use them as a soil mulch or amendment for new plantings..
- Plant a windowsill herb garden to enjoy the fresh flavors all winter long.
- Soil preparation can be done until the ground freezes. Spread a 2-3 inch layer of organic

matter on the soil of your perennial beds. Work it in to the top few inches.

- Leave stems, flower heads, and seedpods standing for winter interest.
- Prevent frost cracking or sunscald by wrapping young, thin-barked trees (such as maples and many fruit trees) with commercial tree wrap.
- Clean, sharpen, and store your garden tools so they will be ready and in good working order next spring.
- Cover perennials susceptible to winter damage, such as chrysanthemums, with pine needles, straw, or pine boughs.
- Pick up a copy of the 2014 Garden Calendar at your Extension office. Pick up an extra copy or two for easy gift-giving!
- Enjoy your garden bounty with family and friends. Happy Thanksgiving!

Resources for Horticulture information

ISU's Hortline at (515) 294-3108
(Monday-Friday, 10 a.m.-noon, 1-4:30 p.m)

ISU/Mills County Extension: 712-624-8616
www.extension.iastate.edu/mills/yardgarden.htm

Iowa State University Publications

- PM 2079 Flowering Plants for the Late Summer Garden
- RG 316 Poinsettia Care
- RG 308 Growing Holiday Cacti
- RG 328 Growing Amaryllis
- PM 683 Composting Yard Waste
- PM 713 Indoor Plants
- RG 402 Lighting and Houseplants
- PM 731 Harvesting and Storing Vegetables
- RG 312 Suggested Daffodil Cultivars for Iowa
- RG 320 Growing and Over-wintering Garden Geraniums
- RG 304 Late Season Perennial Flowers

Horticulture Publications on-line
<https://www.extension.iastate.edu/store/ListCategories>

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