

Attracting Beneficial Insects with Native Flowering Plants

Anna Fiedler, Julianna Tuell, Rufus Isaacs, and Doug Landis
Department of Entomology, Michigan State University





Introduction

Conservation of natural enemies of insects (predators and parasitoids) and pollinators (bees) around the farm or garden can help suppress pests and increase crop yields. Many beneficial insects rely on plants for nectar and pollen or shelter. Plants commonly recommended to provide these resources are non-native annuals such as: buckwheat, sweet alyssum, faba bean, dill, and coriander. In a recent Michigan State University study, we wanted to learn whether native Midwestern perennial plants could provide similar resources.

We selected 46 native Michigan plants on the basis of their bloom periods and ability to survive in agricultural habitats. All of the species selected historically grew in prairie or oak savanna habitats. Once common in Michigan, prairies and oak savannas are now rare, as are many of the plants and animals that formerly utilized these habitats. By returning these plants to Michigan landscapes, we may be able to increase both pollination and pest control in agricultural crops while enhancing our native biodiversity.

Plant testing

Native species were established as rooted plug or 1-quart potted plants in the fall of 2003 and compared to the non-native annuals, which were planted as seed the following spring. During the 2004 and 2005 growing seasons, we determined dates of peak bloom for each species and collected insects at flowers during peak bloom. We then identified predator, parasitoid and pollinator insects collected at each plant species.

Our goal was to identify a group of native plants that can provide flowers throughout the growing season and are highly attractive to beneficial insects.

Cover photos: clockwise, top left: A. Fiedler; W. Cranshaw, Colorado State University; J. Tuell; A. Fiedler.

Chart photos: flower images 1 through 26: A. Fiedler.

MSU is an affirmative-action, equal-opportunity employer. Michigan State University Extension programs and materials are open to all without regard to race, color, national origin, gender, religion, age, disability, political beliefs, sexual orientation, marital status, or family status. • Issued in furtherance of Extension work in agriculture and home economics, acts of May 8 and June 30, 1914, in cooperation with the U.S. Department of Agriculture. Thomas G. Coon, Extension director, Michigan State University, E. Lansing, MI 48824. • This information is for educational purposes only. References to commercial products or trade names do not imply endorsement by MSU Extension or bias against those not mentioned. This bulletin becomes public property upon publication and may be printed verbatim with credit to MSU. Reprinting cannot be used to endorse or advertise a commercial product or company.

Establishing native plants

Local sources of native seed and potted plant material are available for Michigan and many other areas. Where possible, use local genotypes — i.e., plant material originally collected in your area and best adapted for your conditions.

Determine where you would like to establish native plants. If it is a large area (greater than 500 square feet), consider using seed to establish plants, which will flower in 3 to 5 years. If a smaller area, rooted seedlings sold in plugs or pots will flower in 1 to 2 years and will allow you to choose the position of each plant.

Consult a local native plant producer for seed mixes or plants most appropriate for your light, soil type, and moisture conditions, as well as for proper plant spacing.

Site preparation to minimize weeds is crucial to project success. Depending on the history of your site, plan on 3 months to 2 years for proper preparation. Professional plant and seeding installation services are available. If you are seeding an area yourself, you can hand broadcast seed with good results. Seed drills require a good deal of time and seed to calibrate correctly, so they are most effectively used on areas larger than an acre.

Please note: The information presented in this bulletin should be considered a guideline to be adapted for your local conditions. MSU makes no warranty about the use of the information presented here.

For more information on our research into native plants and beneficial insects, see

www.ipm.msu.edu/plants/home.htm

Acknowledgements

Project GREEN

MSU Extension and Michigan Agricultural Experiment Station
USDA NC-SARE

C.S. Mott Predoctoral Fellowship in Sustainable Agriculture
MSU Sustainable Agriculture: Production and Food Ecology
Systems Grant

Bill Schneider and Wildtype Design, Native Plants & Seed



Common name	Scientific name	Natural enemies	Bees	MAY	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
1. wild strawberry	<i>Fragaria virginiana</i>	★★	★						
2. golden Alexanders	<i>Zizia aurea</i>	★★★	★★						
3. Canada anemone	<i>Anemone canadensis</i>	★★★	★						
4. penstemon/hairy beardtongue	<i>Penstemon hispidus</i>	★★	★★						
5. angelica	<i>Angelica atropurpurea</i>	★★★	★						
6. cow parsnip	<i>Heraclium maximum</i>	★★★	★						
7. sand coreopsis/lanceleaf tickseed	<i>Coreopsis lanceolata</i>	★★★	★						
8. shrubby cinquefoil	<i>Potentilla fruticosa</i>	★★★	★						
9. Indian hemp	<i>Apocynum cannabinum</i>	★★★	★						
10. late figwort	<i>Scrophularia marilandica</i>	★★	★★						
11. swamp milkweed	<i>Asclepius incarnata</i>	★★	★★						
12. Culver's root	<i>Veronicastrum virginicum</i>	★★	★★						
13. yellow coneflower	<i>Ratibida pinnata</i>	★★★	★★						
14. nodding wild onion	<i>Allium cernuum</i>	★	★★						
15. meadowsweet	<i>Spiraea alba</i>	★★★	★★						
16. yellow giant hyssop	<i>Agastache nepetoides</i>	★★	★★★						
17. horsemint/spotted beebalm	<i>Monarda punctata</i>	★★★	★★						
18. Missouri ironweed	<i>Vernonia missurica</i>	★★	★★						
19. cup plant	<i>Stiphium perfoliatum</i>	★★★	★★★						
20. pale Indian plantain	<i>Caecilia atriplicifolia</i>	★★	★★						
21. boneset	<i>Eupatorium perfoliatum</i>	★★	★★						
22. blue lobelia	<i>Lobelia siphilitica</i>	★★★	★★★						
23. pale-leaved sunflower	<i>Helianthus strumosus</i>	★★★	★★						
24. Riddell's goldenrod	<i>Solidago riddellii</i>	★★★	★★						
25. New England aster	<i>Aster novae-angliae</i>	★★★	★★						
26. smooth aster	<i>Aster laevis</i>	★★★	★★						

Native Flowering Plants that Attract Beneficial Insects

The bloom periods shown for the native perennials are for 2-year-old plants growing in full sun in 2005 in Ingham County, Michigan. Bloom times will vary between years and locations. All plants are native to the north central United States; many are native to the eastern United States. Check with local resources to determine if they are native to your area.

Key:

- ★ good
- ★★ better
- ★★★ best

Entire bloom period.
Yellow area shows peak bloom.



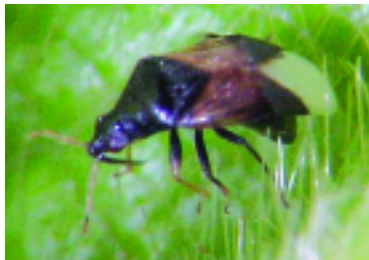


NATURAL ENEMIES

Some insects eat other insects and can provide natural pest control on farms and in gardens. These natural enemies can be divided into two groups — predators and parasitoids. Many predators and parasitoids are attracted to flowering plants, where they obtain pollen and nectar that help increase their life span and ability to lay eggs. The table in this bulletin can be used to select plants that provide flowers through the growing season.

Predators eat many prey in a lifetime, feeding both as young and as adults, and include some bugs, beetles, flies, lacewings and spiders. All shown here eat small, soft-bodied insects and help control aphid, whitefly, and mealybug populations, except for spiders, which will also eat larger insects.

Howard Russell



Minute pirate bug

D. Landis



Lady beetle

A. Fiedler



Syrphid fly

David Keith, University of Nebraska-Lincoln



Crab spider

Jim Kalisch & Tom Clark, University of Nebraska-Lincoln



Braconid wasp

Jim Kalisch & Tom Clark, University of Nebraska-Lincoln



Ichneumonid wasp

Gerald J. Lenhard



Chalcid wasp

Parasitoids seek other insects as hosts in which to lay their eggs. Each egg hatches within the host, and the young feed and develop within that single host, eventually killing it. Parasitoids are most commonly small wasps. Hosts can be from almost any insect group, including beetle larvae, caterpillars, flies, and other wasps.

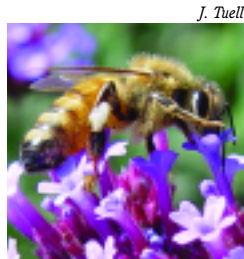
For more information on natural enemies, please see the *Other Resources* section on page 5.



POLLINATORS

Pollinating insects play a critical role in maintaining natural plant communities, and they also pollinate most crop plants grown for their fruits, vegetables, nuts, seeds, and fiber. Bees are excellent pollinators because they spend most of their adult lives collecting pollen to feed to their developing offspring. The plumed hairs on their bodies attract pollen grains, and “brushes” on their legs enable them to collect pollen and carry it back to the nest. Flowers provide energy in the form of nectar, and many bees have long tongues that allow them to reach into deep flowers that other insects cannot use.

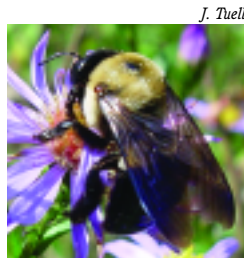
Five major bee families are found in the Midwest: **Apidae** (honey bees, bumble bees, carpenter bees, and a diverse group of solitary soil-nesting bees), **Andrenidae** (andrenid bees), **Halictidae** (sweat bees), **Megachilidae** (leafcutter and mason bees), and **Colletidae** (cellophane bees, not



Honey bee



Bumble bee



Carpenter bee



Andrenid bee



Sweat bee, brown



Sweat bee, green



Mason bee



Leafcutter bee

shown). Some of the more common species in these groups are pictured here.

Most bee species are solitary (each female produces offspring in her own nest), with only one generation of bees per year. However, some of the most abundant species, such as honeybees and bumblebees, are social, working together to provision a single nest in which a queen presides and produces multiple generations per year. Bees with multiple generations per year need food resources (pollen and nectar) across most of the growing season to build their colonies. Providing plants with overlapping bloom periods in a landscape will help these bees survive and prosper. The table in this bulletin can be used to select plants that will provide flowers through the growing season.

For more information on pollinators, please see the *Other Resources* section below.

Other Resources

Enhancing Beneficial Insects with Native Plants Web site: www.ipm.msu.edu/plants/home.htm

Flint, M.L., and S.H. Dreistadt. 1998. *Natural Enemies Handbook: the Illustrated Guide to Biological Pest Control*. Publication 3386. Berkely, CA: University of California Press, Division of Agriculture and Natural Resources.

Gardiner, M., C. DiFonzo, M. Brewer and T. Noma. 2006. *Identifying Natural Enemies in Crops and Landscapes*. Extension bulletin E-2949. East Lansing, Mich.: Michigan State University.

Shepherd, M., S.L. Buchmann, M. Vaughan and S.H. Black. 2003. *Pollinator Conservation Handbook*. Portland, Ore.: The Xerces Society.