

NATURAL ENEMIES

POLLINATORS

Attracting Beneficial Insects with Native Flowering Plants

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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 for these insects 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. Spiders will also eat larger insects.



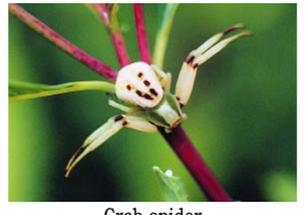
Minute pirate bug



Lady beetle



Syrphid fly



Crab spider



Braconid wasp



Ichneumonid wasp



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.

Pollinating insects play a critical role in maintaining productive 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



Honey bee



Carpenter bee



Sweat bee, brown



Mason bee



Bumble bee



Andrenid bee



Sweat bee, green



Leafcutter bee

Colletidae (cellophane bees, not 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 honey bees and bumble bees, 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.nativeplants.msu.edu
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.





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 found that native Midwestern perennial plants could provide similar, and in some cases, more attractive 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 while enhancing 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.

The table in this bulletin shows 26 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.

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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, beneficial insects and pollinators, see www.nativeplants.msu.edu

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

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.



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