

## More Information About Beneficial Insects

The Xerces Society is a nonprofit organization that protects biological diversity through conservation of invertebrates and their habitat. We work with farmers and scientists across the country to protect habitat for beneficial insects that pollinate crops and prey upon crop pests. More information about predatory and parasitoid insects is available on our website at [www.xerces.org/conservationbiocontrol/](http://www.xerces.org/conservationbiocontrol/).



**The Xerces Society for Invertebrate Conservation**  
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The Integrated Plant Protection Center at Oregon State University houses the statewide Integrated Pest Management program. The Center also runs the Farmscaping for Beneficials program, which undertakes participatory research and education programs with farmers. More information about the Center can be found at <http://ipmnet.org>.



## Financial and Technical Assistance

The USDA's Natural Resources Conservation Service (NRCS) provides financial and technical assistance to support conservation efforts for pollinators and other beneficial insects on farms. For information on NRCS conservation programs, contact your local NRCS or conservation district office. The office nearest you can be located at [www.nrcs.usda.gov](http://www.nrcs.usda.gov).



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## Habitat for Predators and Parasites

Many insects and spiders, as well as bats and birds, eat crop pests and weeds. Providing food and shelter for these useful animals can help suppress unwelcome pest species.

This brochure illustrates how farmers can attract and retain helpful predators and parasites by providing some of the key resources that they require. Many of these practices benefit pollinators and other wildlife as well, and are eligible for support by Farm Bill programs.

Inside, you will find more information and a guide to help you manage your farmland for a wide variety of the beneficial insects that are the natural enemies of crop pests and weeds.

## Principles of Farmscaping for Natural Enemies

**1. Determine which species are most likely to be helpful.** Find out which predators and parasites feed upon the pests that attack your crops, the time of year they are active, and the habitat resources (food and shelter) that they need.

**2. Know and map farm habitats.** Identify fields and margins—and the times of year—where habitat resources for these beneficial species are lacking.

**3. Manage your farm to attract and retain natural enemies.** Use the illustration in this brochure as a guide to protect and enhance valuable habitat and to add appropriate plants and other features.

*Striking a balance between beneficial organisms and pests is the key to biological pest management on our farm. We don't want to kill off all the bad bugs. We want just enough out there to feed our good ones.*

—John Eveland  
Gathering Together Farm  
Philomath, Oregon

## Requirements of Predators and Parasites

**Food.** Many natural enemies of pests and weeds rely on plants for growth, development, and reproduction. They may feed on pollen, nectar, seeds, sap, or plant parts, or consume the honeydew produced by other insects. Some eat additional, non-pest prey living on plants in and around the farm.

**Shelter.** Many natural enemies—both vertebrates and invertebrates—require specific plant habitats for nesting or overwintering, or to provide favorable microclimates such as lower temperature or higher humidity in the summer. If critical requirements are missing at key stages in the life cycle of insects, birds, or bats, they will not stay on your farm.

**Protection from pesticides and disturbance.** Insecticides may be toxic to predatory and parasitic species; herbicides may remove critical plant resources; and intensive cultivation may reduce population densities of these beneficial organisms.

*I establish beneficial insect habitat because it makes me money. For example, increased predator activity has allowed me to eliminate sprays for black cherry aphid.*

—Mike Omeg  
Omeg Family Orchards  
The Dalles, Oregon

## Getting Started

Here are two things you can do to improve the situation for natural enemies of pests and weeds:

**Start small by experimenting with a single tactic.** Establish an insectary flower border or block, as illustrated in this brochure, in a readily accessible location. Observe this habitat regularly to determine whether beneficial species are present when they would be most helpful on your farm.

**Avoid a harmful practice.** Choose an alternative pesticide that is not toxic to beneficial species, or experiment with reducing intensive cultivation in an area of your farm. Watch to see whether predators and parasites are more active in these areas.

## Going Further

The practices listed in this brochure will generally increase beneficial insects and reduce pest species. Many pests, however, also have specialized predators and parasites that are highly efficient; these may require specific practices to attract and retain them. Consult with biological control experts such as extension workers or other growers to determine what you might do for these species on your farm.

## What to Expect

Many predator and parasite species have limited dispersal capacity and reproduction rates, and populations may therefore be slow to increase. Don't be surprised if it takes more than one growing season for your habitat improvements to yield results.

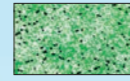
Invertebrate natural enemies include hoverflies, lady beetles, parasitic wasps, spiders, lacewings, predaceous mites, and pirate bugs.





**Native Trees**  
*Food and Shelter*

Alone or in windbreaks, trees such as conifers, willows, or maples provide resources, travel routes, and safe haven for predators, parasites, and insect-feeding birds year-round.



**Cover Crops**  
*Food and Shelter*

Including cover crops such as buckwheat and clover in planting rotations helps to build soil and add nutrients while providing patches of flowers to support predator and parasite populations.



**Sunflowers**  
*Food and Shelter*

Sunflowers support alternative prey and provide nectar and pollen for predators and parasites. They also offer escape cover for insect-feeding birds.



**Insectary Blocks**  
*Food and Shelter*

Blocks planted with a variety of annuals and perennials such as rose, elderberry, or yarrow can provide resources throughout the year.



**Perennial Shrubs**  
*Food and Shelter*

Native shrubs such as oceanspray, elderberry, or rose provide pollen, nectar, and homes for non-pest prey—as well as undisturbed habitat—for predators and parasites.

**Harmful Practices**

Cultivation, field burning, and broad-spectrum pesticides disturb or kill natural enemies and their non-pest prey. Reducing disturbance and using selective pesticides and non-chemical controls will help minimize impacts.



**Bat and Bird Nest Boxes**  
*Shelter*

Bats forage in the air above crops, where they feed upon the flying stages of insects, including pest species. Birds may eat insects and rodents. Providing nest boxes for these animals gives them a home on your farm.



**Insectary Field Borders and Strips**  
*Food and Shelter*

A variety of strip plantings—blocks of calendula, alyssum, yarrow, or phacelia, for example—interspersed in and around crops are easily managed to provide resources for beneficial insects at the times and places where they are most valuable.



**Beetle Banks**  
*Food and Shelter*

Creating permanent raised banks near fields, and densely planting them with bunch grasses, will provide overwintering habitat for predatory beetles and spiders.



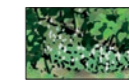
**Bolting Crops**  
*Food and Shelter*

Retaining bolting or flowering crops for a while after harvest may provide beneficial insects with an important nectar source when and where pests are active.



**Wildflower Patches**  
*Food and Shelter*

Patches of volunteer annuals or innocuous weeds allowed to flower along field edges help provide an unbroken sequence of nectar and pollen during the growing season.



**Conservation Cover**  
*Food and Shelter*

Sowing crop alleys or field roads with clover or other flowering plants can add soil nutrients and provide resources for predators and parasites through the year.