
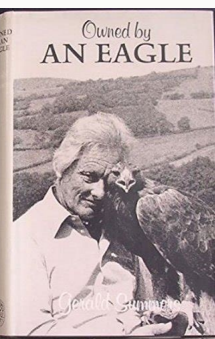
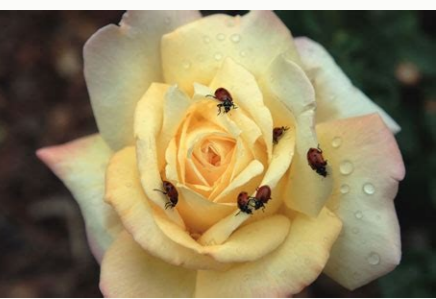
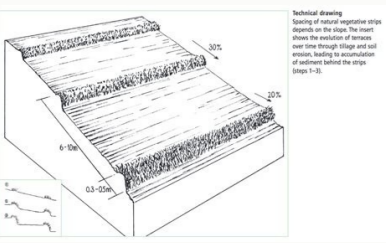


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Extension Bulletin E-2985 • New • May 2007

## Conserving Native Bees on Farmland

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This fact sheet has been developed to provide information for growers of insect-pollinated crops about farm practices that can support native bees. We provide background on the biology of these bees and give practical advice to guide growers who want to increase native bee abundance on their farms. This bulletin is based on our experience with Michigan fruit farms, but the information should be relevant to growers across the eastern United States interested in managing their farms to improve sustainable pollination of their crops.

### Introduction

**Bees are essential pollinators of many crops.** Pollination occurs when pollen is transferred from male to female parts of flowers, resulting in seed set and good crop development. Some plants have light-weight pollen that can be transferred by wind, but many crops have heavier pollen that must be transferred by animals. Insects, birds and bats can move pollen between flowers, but bees are most important for achieving pollination and maximum yields of many crop plants.

Crops that are highly dependent on pollinators to achieve economical yields include almond, apple, cherry, pear, cranberry, blueberry, blackberry, greenhouse tomatoes, asparagus, melon and squash. For most of these crops, bees provide most of the pollination activity as they move from flower to flower to collect food. Some crop plants with lighter pollen grains, such as strawberry, can show higher yields with the addition of honey bees because of improved pollination.

Without bees to move pollen, some crops would be far less productive, and many fruits and vegetables would not ripen as evenly or as quickly. Without complete pollination, plants produce deformed fruits and vegetables that are not marketable. Estimates suggest that a third of our food is from crops pollinated by bees, so it is important that growers consider strategies to pollinate their crops effectively.

**Why conserve native bees?** Since their introduction from Europe in 1622, honey bees have become the most economically important pollinator for fruit and vegetable production. Each spring, U.S. growers rent millions of hives to pollinate their crops. The high number of honey bees brought to crop fields helps ensure that yields will reach growers' expectations. Honey bees are becoming more difficult to manage, however, because of parasites and diseases. In addition, rental costs for honey bees are increasing. As a result, more attention has been given to conserving wild native pollinators, which are adapted to the local conditions and can help pollinate many food crops.

Diversifying the pollinators that are active on a farm makes good economic sense because it spreads risk across many bee species. This can reduce the chance that poor weather conditions will reduce pollination, as sometimes happens in colder springs. Another benefit of having more kinds of bees pollinating is that, for some crops, native bees are much more efficient at shaking the flower to release pollen. For example, a bumblebee is six times more efficient than a honey bee at pollinating blueberry flowers.

Most farms already have populations of native bees living in and around fields. Our recent survey of Michigan blueberry farms found that in addition to honey bees brought in to pollinate the crop, native bees such as halictid and andrenid bees were seen on flowers when blueberry was blooming. In this situation, growers get the benefits of large numbers of visited honey bees, but during cool weather, the native bees are better able to fly and pollinate the crop, helping to ensure an abundant harvest.

Most species of native bees are small and easily overlooked. Taking some simple steps to enhance the farm environment for these beneficial insects will increase their abundance over time and can lead to more consistent crop pollination from year to year.

**Bumble bee visiting a blackberry flower.**

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“These courses are oriented to the farming community and we try to incorporate crop advisors and the staff of the Natural Resource Conservation Service as they are the ones who work with farmers on the ground”, said Heidel-Baker. “I can’t ignore the animal aspect, both micro and macro, which often came out of plant farming,” he said. In 2013 alone, land-based farms supported its non-chemical methods of pest control, including conservation biocontrol, eliminated the use of 620,000 pounds of toxic pesticides. “We need to look at the farm as an organism.” “Thus you receive the management of the pests while benefiting pollinators and other wildlife. This also applies on a large scale. Because of this, biocontrolled conservation fits well with the national mandate of organic standards to improve the biodiversity of the farm.” This makes sense in terms of organic production goals because you’re improving biodiversity on your farm,” said Heidel-Baker. A 2016 study by Washington State University researchers found that many beneficial insects are highly attracted to milk species. The tiger beetle eats its body weight in parasite organisms and weed seeds daily. Photo courtesy of Xerces Company. These methods must be carefully incorporated into each unique farming system. Although he did not observe complications in his lettuce crops, he cites the need to investigate alternative and non-brassica insect plants to provide farmers with multiple planting options. “We are trying to get the word on conservation of biocontrolled conservation and provide resources to those who are implementing more sustainable management approaches.” These courses are from the book of Xerces 2014, agriculture with native positive insects, that Guides Planning and implementation of insect habitat in farmhouses. An example of beneficial insect habitat. Photo courtesy of the company Xerces Eric Brennan, a USDA research Recommends to create a “Buffet for all” for organic control in the company. A 2006 study estimates that insects provide 4.5 billion dollars annually to control crop parasites. In addition to the increase in biodiversity, McGreevy noted that “from the point of view of soil management, these practices have improved our soil inclination and even increased our populations of almost non-existent earthworms.” Despite being surrounded by conventionally cultivated land, he noted that he neighbors are recognizing the benefits of biological control and conservation. Jim McGreevy manages CloudView Ecofarms, a mixed farm of 20 acres at Royal City, WA, where he also manages his own organic seed company. “We have decided to expand and include predators and parasitoid insects, and to see how these beneficial insects can help improve parasitic management.” Quest year, the Xerces Society is launching a series of programs throughout the day. Short courses throughout the country, entitled “Agriculture with beneficial insects”, to educate the farmers interested in adopting these methods. Compatible organic sprays can also be harmful to beneficial insects. “This is why we must think of the future and strengthen biodiversity to help the natives to recover again.” Imagine entering an agricultural field on a July afternoon; The air is scented of land and full of insect sounds. The Xerces Society, a non-profit organization dedicated to the protection of invertebrates and their habitats, works for a long time on the storage of pollinators and has recently extended its attention to other benefits such as those ensuring biological control of conservation. Biological conservation control uses organisms already present. He estimates that the farm has up to 15 species of native bees, although it is surrounded by a monoculture landscape devoid of flowers. We need to identify locations on farms where it is most appropriate to include habitat. “Now we have models that show that this works on a large scale, he said, and pest insects never develop resistance to predators. “We were promoting the conservation of pollinators in the agricultural world and we recognized that many organisms besides pollinators benefit from the habitats we create”, said Thelma Heidel-Baker, the Xerces company specializing in biological control of conservation. Over the last nine years he has worked to improve the efficiency of organic control in lettuce systems. One such partner is Eric Brennan of USDA’s, who

conducts research at a USDA farm in Salinas, CA. To support greater biodiversity and a reduction in pesticides, it's important to be sure to encourage practices that work, he said. Eric Lee-Mader, co-director of the pollination program at Xerces Company, noted that many organic food brands have partnered with Xerces Company to create in-farm habitats for pollinators and benefits. These side benefits can be far-reaching. It's a long-term approach that provides pest management along the way, as well as many side benefits, said Heidel-Baker. This includes ensuring that the habitat is protected from pesticides. Over the past ten years, he said, we've been working more and more with large-scale manufacturers who are willing to change the pest containment programmes. In the BrennÄçÄs system, the sweet bug can attract the insect Bagrada, a parasite of the brassicas. 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Brad Ballie, Connell, WA Lenwood Farms, uses similar methods. Ä «You can enter the allyssum directly between the lettuce without a decrease in yield.» Currently he is working on creating a pellet of allysum seeds of the same sizes as a lettuce pellet, so that farmers who directly sow their crops can sow perfect annual insect habitat while planting their crops. Although the capacity of insects to control parasites has passed into the background compared to insecticides, many agricultural producers are encouraging these natural enemies to assume parasites. This reduction in the use of pesticides benefits both natural enemies and pollinator insects. These tiny Ä «natural enemies» play an important role in agriculture. Behind the soundtrack of cicadas, crickets and catheti is hidden a silent swarm of insects that under control parasites populations. As director of Lost Ladybug Project, he is concerned about the conservation of native coccinellides, a taxion of voracious insect aphidic predators in agricultural systems. The cockroaches prey aphids, while flies catch up trigid. Ä «We see wild bird populations never seen before, and predatory birds that control the rodent populations. We hope to be an oasis for them ".the practices, he said," they are hand in hand with biological philosophy. " Xerces Society at Cornell University, the Assistant Professor John Losey studies the intersection between parasites control and conservation biology. Wildlife receives a second advantage from conservative biocontrol: reduction of pesticides. This remains, from a philosophical point of view, the right thing to do. 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