



Native Bee Pollination of Hybrid Sunflowers

Prepared by the Xerces Society for Invertebrate Conservation

(This fact sheet is based on research conducted by Claire Kremen, Neal Williams, Sarah Greenleaf, and Robbin Thorp)

Bee pollination is critical for production of sunflower seeds. While the European honey bee is often used effectively to pollinate sunflowers (at 2 to 2.5 hives per acre), native bees are also important pollinators and significantly *enhance* pollination by honey bees. Recent research shows that the only fields estimated to achieve 100 percent pollination had abundant native bees. Here we describe the valuable role of native bees in sunflower pollination and how to increase both their populations and your bottom line.

INS AND OUTS OF SUNFLOWER POLLINATION

In sunflower hybrid seed production, pollen from a male row of sunflowers must be moved by bees to a female (male-sterile) row. Growers typically use honey bees to accomplish this task. However, most honey bee workers specialize as either nectar or pollen foragers. Nectar foragers tend primarily to visit female rows, while pollen foragers visit male rows. If few bees cross between rows, growers can experience poor seed-set.

In contrast, most native bees collect both pollen and nectar on each foraging trip. They therefore tend to cross between the rows, pollinating the female flowers in the process. These native bees also make honey bees up to ten times more efficient because the natives come in contact with honey bees and literally chase them between rows. These bullied honey bees transfer a lot more pollen from male to female rows, on average doubling the amount of seed set by honey bees. Because of these interactions, growers should strive to have both honey bees and native bees visiting their sunflower fields.

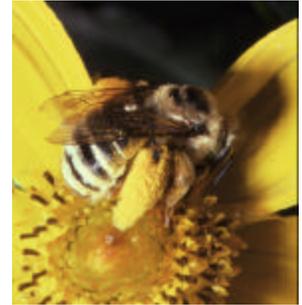
NATIVE BEE POLLINATORS

At least 29 native bee species visit sunflowers growing in Yolo County, CA. Of these, the most important visitors are species of long-horned and sunflower bees, followed by bumble bees and sweat bees.

Most of these native bees are ground-nesting solitary species. They sometimes nest together in large numbers, but each female works alone digging tunnels under ground in which she constructs cells to lay her brood. Many of these bees are found nesting on untilled road edges.

The most important native bees for pollinating hybrid sunflowers in Yolo County, CA	
Common name	Latin name
Long-horned bees	<i>Melissodes</i> sp.
“Sunflower” bees	<i>Diadasia</i> and <i>Svastra</i> sp.
Yellow-faced bumble bee	<i>Bombus vosnesenskii</i>
Sweat bees	<i>Halictus ligatus</i>

Bumble bees are social insects. They nest in small cavities, usually old rodent burrows. The queens start new colonies early each spring and by mid-summer may have more than 200 workers in a nest.



Long-horned bee
Photo by Ed Ross



“Sunflower” bee
Photo by Robert Parks



Yellow-faced bumble bee
Photo by Mace Vaughan



Sweat bee
Photo by Gary Braasch

NATIVE BEE HABITAT AND SUNFLOWER POLLINATION

Recent research explored the potential influences of nearby natural habitats -- such as grasslands and chaparral -- farm management, and pesticide use on pollination by native bees. These studies found that the abundance of native bees is six times higher on organic farms that are relatively close to natural habitat, and on fields where sunflowers have been planted within one mile every year for several years. When these native bees are abundant, their interactions with honey bees may double the value of a sunflower seed crop.

WANT MORE BEES?

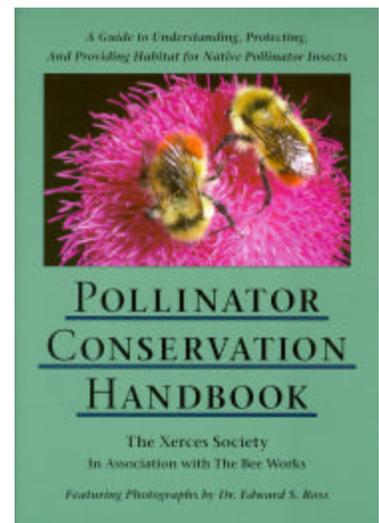
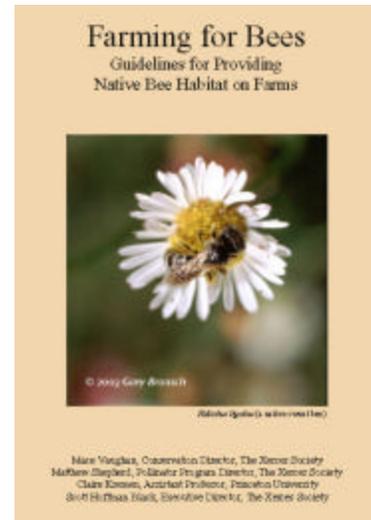
Learn to recognize and protect your native pollinator resources

The abundance of native bees is much less on farms far from natural areas because these farms lack nest sites or forage throughout the year. Supplying these habitat needs and reducing pesticide applications are the first steps to increasing crop pollination by native bees. Specifically:

- Support protection or restoration of natural areas closer to your farm.
- Provide an abundance of native flowering plants around your farm and ensure that sunflowers are planted in the same general area year after year.
- Protect borders of roads and fields from tillage to avoid disturbing potential ground-nesting sites for many species of solitary bees.
- Bumble bees depend upon old rodent burrows, so maximize your tolerance for rodents in the landscape and/or install bumble bee nest boxes around your farm.
- Eliminate the use of insecticides or, if they must be used, look for formulations that are least toxic to bees and apply them when *no* flowers are present in or close to your target fields.

Enhance pollinator habitat

Even on farms with few natural areas close at hand, growers can provide habitat for native bees and may, over time, increase populations of these insects. For more detailed information on the simple steps that may be taken to protect native pollinators already living on your farm, or on how to provide habitat for native bees, please see our *Pollinator Conservation Handbook* or our new booklet *Farming for Bees: Guidelines for Providing Native Bee Habitat on Farms* (may be downloaded from our website).



For more information about providing for the habitat needs of native bees on farms and elsewhere, please contact the Xerces Society for Invertebrate Conservation at 4828 SE Hawthorne Blvd., Portland, OR 97215 503-232-6639 www.xerces.org

This fact sheet was produced thanks to the generous financial support of the Richard & Rhoda Goldman Fund, the Wallace Genetic Foundation, the National Fish and Wildlife Foundation, and the Edward Gorey Charitable Trust.