

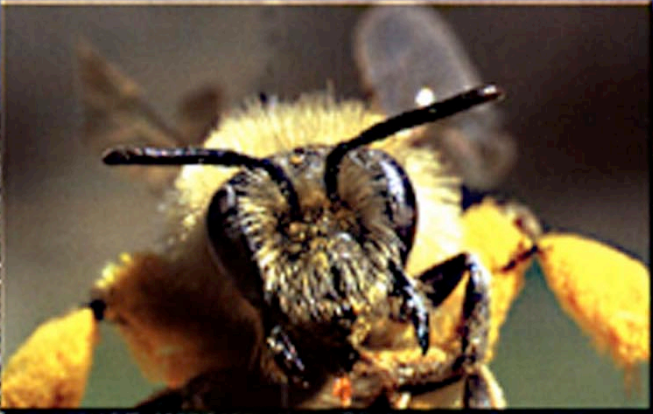
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A MEISTER PUBLICATION

Enhancing Alternative Pollinators

Native bees and other insects can be a successful option to honey bee pollination.

By David M. Gordon

HONEY bee mortality caused by parasitic mites and the newly troublesome small hive beetles has stimulated great interest in “alternative pollinators”. What are alternative pollinators? Wasps, butterflies, flies, and beetles drink nectar or eat pollen from flowers. Bees collect pollen to feed their young. In the process of foraging in the flower these insects get covered with pollen which, when rubbed off on the appropriate portion of the flower’s anatomy, accomplishes pollination.

There are approximately 20,000 species of bees. Some are specialists that only visit a few kinds of flowers, while others are generalists and will visit a wide variety. Bees are very effective pollinators because many because many individuals regularly visit many flowers of the same species to collect pollen. The flight season of many bee species is synchronized with the floral resources upon which they depend. Therefore, different are active at different times during the spring, summer, and fall.

Interestingly, however, the commonly used honey

bee is not necessarily the most effective pollinator of some crops. As a result, the blue orchard bee has been developed for pollinating some fruit trees, and researches have been working on developing other bees for pollination.

Abandon Honey Bees?

So should you purchase alternative pollinators from a commercial source and abandon honey bees next year? In most cases, probably not. Honey bees are easy to manage and provide a source of income through honey production and other hive products. Furthermore, pollination guidelines are usually based on honey bee use. As a general rule, replacing a single pollinator species with another species which may not have pollination guidelines is probably asking for trouble. Since other species of bees have been successfully developed for pollinating certain crops, you might start by purchasing some of these pollinators to supplement your honey bees while you learn to work with them.

Consider developing a diversity of pollinators by taking advantage of the bees available in your area. This requires understanding of bee biology,

what’s available locally, and cultural practices that will help build these populations. This is essentially new territory, so be prepared to experiment on your own for several years. Here’s what you will need to know to get started.

Enhancing Local Pollinators.

Just as you must keep an eye out for pests in your crops, you should be looking for beneficial insects, including pollinators. Examine flowers to learn which insects are visiting and which ones appear to be important pollinators by seeing which are transferring pollen to the stigma. If bees are present, you can augment their numbers by encouraging them to be happy and proliferate. The smaller the size of your operation, the more likely such a strategy is to be successful, and in a shorter time.

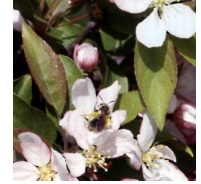
Keep in mind that the nesting habitat and resources available will influence the abundance and diversity of your local bee population. In order to build adequate numbers you will want to be sure that all these needs are met. In addition, you will need to think about how your cultural practices affect these critical elements.



Skipper butterfly and sweat bee



Small carpenter bee



Digger bee



Cellophane bee



Bumble bee nest in abandoned rodent nest



Small carpenter bee nest in goldenrod stem



Artificial nests can attract different species



A miner bee's nest entrance

POLLINATION

Alternatives



Sunflower bee

A good example of this is Rocky Meadow Orchard and Nursery in New Salisbury, IN, where more than 20 species of native bees are providing the pollination services. Owner Ed Fackler has encouraged flowers to grow in the orchard, has been careful about pesticide applications, and has minimized disturbance of the soil where the bees nest. Over the years these practices probably allowed native bees to build up to such levels that no longer has to rely on honey bees for pollination (see sidebar)

Provide Forage. In order to build a good crop of bees, it is important that food is available thorough their nesting season: before and after your crop blooms.

Orchard blooms are typically short. If no other foraging recourses are available before, during, or after the bloom, and you saturate the orchard with honey bees, the local bees will have little food available to build up strong populations.

Encourage Nesting Habitat.

Nesting habitat includes soil, sand, holes in wood or dead trees, artificial nest holes, and rodent nests. Some species such as the alfalfa leafcutter and the blue orchard bee nest in pre-existing cavities such as nail or worm holes in wood. Paper straws and directions for their use are available from supplies of blue orchard bees. Other species excavate holes in solid or rotting wood or in stems of plants such as goldenrod.

The nests of ground –nesting bees are often hidden in the vegetation and only appear as a pile of “mine tailings” on the surface and it is difficult to tell if the hole was made by a bee or another insect.

Nesting materials. Nesting materials include leaves, mud, and rodent nests. Leafcutter bees tend to favor certain species of plants for nest construction materials and some species use flower petals. Mason bees, including the blue orchard bee, use mud for nest construction and will require access to source of mud. These sources should be relatively close to nesting sites. Bumble bees generally use old rodent nests. While you may be reluctant to increase rodent nest habitat in your orchard, it could be worth a few since commercial bumble bee nests cost about \$200 each.

Cultural Practices.

Cultural practices can impact foraging resources, nesting habitat, and nesting materials. Take care not to till up nesting sites or destroy adults and developing brood with pesticides or flooding. Modify your weed control activities to provide abundant foraging resources. Use native plants in your “bee garden,” linking your pollinator enhancement activities to native plant conservation programs that can refer you to sources for native plants.

Potential Problems.

Most people are concerned about bee stings. Some bumble bee species are rather pugnacious if their nest is disturbed and some sweat bees are prone to bite or sting (or both) when they land on people to drink salty perspiration. In general, however, most native bees are very docile. During 20 years of handling these bees I have been stung only twice.

Carpenter bees can cause structural damage to beams and rafters but most native bees do not cause problems.

Diversify Pollinators

You may want to begin introducing some of the commercially available alternative pollinators while you assess and enhance your local pollinators. Bumble bees and blue orchard bees are probably the most common alternatives. Be sure that the bees you purchase will visit your crops, because some are specialists.

Commercial sources and information regarding these bees are available through the Logan bee Lab Web site (www.LoganBeeLab.usu.edu). Additional information sources include the American Association of Professional Apiculturists (AAPA) Web site (www.ent.agri.umn.edu/AAPA/aapapubs.htm), and a new pollination book by Delaplane and Mayer that will be available in July, 2000.

Introducing bees will provide a source of alternative pollinators, but enhancing populations of local species adapted to your environment will help reduce the need to purchase more each year. •

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POLLINATION

Alternative Pollination At Rocky Meadow

By Ed Fackler, Rocky Meadow orchard and Nursery, New Salisbury, IN

ROCKY Meadow Orchard and Nursery has been producing fruit and nursery stock for 25 years. Since 1991, when our last six honey bee hives were destroyed by mites, we have had excellent pollination of apple, pear, plum, peach, and blueberry by a wide range of other insect species. In springs prior to 1991 I noticed many unusual insects in the earlier blooming stuff like peach, apricot, and Japanese plum. The ones I was familiar with included mud-dauber wasps, fireflies, sweat bees, and miner bees, as well as a host of common flies. These insects would work flowers at a much lower temperature (35 to 45 degrees F) than honeybees, which generally do not become active here until the temperature is in the upper 50s.



Now, please understand I am not implying in any stretch of the imagination that honey bees are unimportant. In solid blocks of apple and pear, especially on larger scale, I am certain that honey bees are not only practical, but also necessary. Peach, nectarine, and perhaps tart-cherry, which are largely self-fertile, would possibly be not as dependent on imported pollinators.

In 1996 I met Tom Webster, an entomologist with Kentucky State University. Before knowing that Tom was a honey bee specialist, I made a somewhat goofy statement to the effect, "honeybees were very overrated for fruit crop pollination as they required too high of a temperature for flower activity." Tom became very curious and the following spring he asked David Gordon, a fellow entomologist that specializes in native bees, to come out and take a look. Dave has been back every year since and has found almost 20 species of native bees.

Why are they here? In reality, I do not know for certain. However, I believe some contributing factors include the culture I have used which has promoted high populations of certain flowering "weeds". In the early '80s, I began using post-emergent herbicides in the tree rows, deliberately eliminating the grass competition to enhance dandelion growth. Hence, dandelion populations have grown to such an extent that from mid-March to mid-April every year, we have 38 rows of intense yellow dandelion bloom. This, along with the hen-bit, some other weeds, and various nearby pollen producing deciduous trees, is supplying an early-season food supply for a very wide range of insects. Later, in midsummer, a various other weeds like milkweed, Spanish nettle, blackberry and sumac supply for food for these insects. In the months of September and October, there is a nearby field with about 6 acres of goldenrod and aster. Also, back in the early 70s I planted a few rows of autumn Olive to create a habitat for ginseng, resulting in a four- to six- week food supply for many insects during May and early June.

In addition, I have deliberately left small "island" plots untouched since 1975, which probably provides enhanced habitat. The practice of sub-soiling and incorporating compost in the sub-soiled trenches may be a contribution as well, as this practice enhances soil texture and/or relieves compaction.

Since 1982, we have used pesticides in what may be termed need-driven IPM. I have always been conservative with my applications and sprayed at night when a vast majority of these insects are inactive. I also want to strongly emphasize that proper pesticide usage appears NOT to be a factor regarding these insect populations. The exception would be the use of post-emergent herbicides to eliminate the grass competition, which allowed dandelion to flourish and become densely established.