

## Pollinator-Friendly Farming



Photos: Jack Rabin

Source: [ATTRA Alternative Pollinators: Native Bees](#)

In addition to conserving the food and nest sources of native bees, you can take an active role in protecting bees through the adoption of pollinator-safe farming practices. While insecticides are an obvious threat to bees, other farm operations or disturbances such as burning and tilling can also cause harm.

### Minimizing pesticide use

Insecticides not only kill pollinators (Johansen, 1977), but sub-lethal doses can affect their foraging and nesting behaviors, often preventing plant pollination and bee reproduction (Thompson, 2003; Decourtye et. al., 2004; and Desneaux et. al., 2007). Herbicides can kill plants that pollinators depend on when crops are not in bloom, thus reducing the amount of forage available (Kremen et. al., 2002 and Tscharrntke et. al., 2005). In general, while pesticide labels may list hazards to honey bees, potential dangers to native bees are often not listed. For example, many native bees are much smaller in size than honey bees and are affected by lower doses. Also, honey bee colonies may be covered or moved from a field, whereas wild native bees will continue to forage and nest in spray areas. If pesticides cannot be avoided, they should be applied directly on target plants to prevent drift. Broad-spectrum chemicals should be avoided if at all possible. In addition to active ingredients, consider the formulation of pesticides; generally dusts and fine powders that may become trapped in the pollen-collecting hairs of bees and consequently fed to developing larvae are more dangerous than liquid formulations (Vaughan et. al., 2007). Crops should not be sprayed while in bloom. Nighttime spraying, when bees are not foraging, is another way to reduce bee mortality. Periods of low temperatures may also be good for spraying because many bees are less active. However, the residual toxicity of many pesticides tends to last longer in cool temperatures. For example, dewy nights may cause an insecticide to remain wet on the foliage and be more toxic to bees the following morning, so exercise caution (Vaughan et. al., 2007 and Johansen and Mayer, 1990). Spray drift presents another threat to foraging native bees. Drift can occur either as spray droplets or vapors, as happens when a volatile liquid changes to a gas. Factors affecting drift include temperature (including temperature inversions), wind, application method, equipment settings and spray formulation (Ozkan, 2000). Spray application methods and equipment settings also strongly influence the potential for drift. Since small droplets are most likely to drift long distances, aerial applications and mist blowers should be avoided. Standard boom sprayers should be operated at the lowest effective pressure and with the nozzles

set as low as possible. For example, drop nozzles can be used to deliver insecticide within the crop canopy where it is less likely to be carried by wind currents. Regardless of the chemical or type of application equipment used, sprayers should be properly calibrated to ensure that excess amounts of pesticide are not applied (Ozkan, 2000). Alternatives to conventional insecticides include the use of selective products that target a narrow range of insects, such as *Bacillus thuringiensis* (Bt) for moth caterpillars, although even these products can be detrimental when they drift. Other alternatives for some pests include bug vacuums, pheromones for mating disruption and kaolin clay barriers for fruit crops. Several ATTRA publications are available to assist farmers with implementing non-chemical pest control alternatives. See the ATTRA Biorationals: Ecological Pest Management Database for information on specific product and pests. Finally, remember that many of the habitat features that support pollinators will also host beneficial insects that help control pests naturally, reducing the need for pesticides.

### **Minimizing the impact of mowing, haying, burning or grazing**

Grazing, haying, mowing and fire can have damaging effects on pollinators (Black et. al., 2008). Historically, there were sufficient areas of diverse vegetation to support populations of habitat specific pollinators. However, now that many of these areas exist only as fragments in larger agricultural landscapes, consideration of pollinators is needed to ensure healthy populations. Studies suggest that less than one-fifth of pollinator habitat should be burned, mowed or hayed at any one time in order to protect dormant pollinators, foraging adults and other wildlife. This will allow for re-colonization of the disturbed area from nearby undisturbed refugia (Hartley et. al., 2007). In order to maximize foraging and nesting opportunities, maintenance activities should be avoided while plants are in flower (Smallidge and Leopold, 1997). Ideally, mowing or haying should be done only in the fall or winter.