

Protecting Georgia's Pollinators



A state plan for promoting a large,
healthy and diverse pollinator workforce

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Peponapis pruinosa, the cucurbit bee, is common throughout the Southeast. Superficially resembling the honey bee, these solitary soil nesters are excellent pollinators of all commercially important cucurbits, including squash, cucumber, and melons.



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Pollination is the transfer of pollen from the male parts of a flower to the female parts of the same or a different flower. This is necessary for the production of seed and fruit in many crops. A 2014 economic impact study by the University of Georgia determined that the annual value of pollination to Georgia is over \$360 million. While many insects such as flies, beetles, moths, butterflies and wasps can be important pollinators, bees outperform them all because of their dietary need for pollen and nectar, their hairy bodies that carry pollen grains easily and their rapid flight from flower to flower. Species such as bumble bees and honey bees can be managed on a large scale suitable for the high-acreage pollination demands of modern agriculture. As important as managed bees are for pollination, the services provided for free by unmanaged, wild bees are at least equally valuable. Pollination is an ecosystem service, a gift from nature, with economic returns similar to rainfall or soil fertility; therefore, pollinators require proactive stewardship from all Georgia stakeholders, including beekeepers, farmers, foresters, land managers, homeowners, pest control operators and applicators.

Pollinator stewardship centers on maintaining healthy managed bee colonies, minimizing pesticide exposure and conserving and supplementing pollinator habitats. Many of the principles discussed here apply equally to urban or rural areas.



HONEY BEE DECLINE AND COLONY COLLAPSE DISORDER

Since 2006 U.S. beekeepers have been experiencing annual winter colony die-offs of around 30 percent, which is significantly higher than the self-reported “acceptable” loss rate of 18 percent. Although hive numbers can be quickly restored in spring by splitting surviving colonies, the extra labor and expense pose a threat to the long-term availability of colonies for spring pollination. Many factors have been implicated in bee decline, but scientists agree that the most important factors include:



- ✧ parasitic Varroa mites
- ✧ viruses spread by Varroa mites
- ✧ pesticide exposure
- ✧ habitat and forage degradation

While the media and general public may refer to bee decline as “Colony Collapse Disorder” (CCD), this term is better reserved for those cases where large numbers of adult bees disappear from a colony during active times of the year. Whether from winter die-off, CCD or other malady, the health of honey bees has suffered greatly in recent years.

THE ROLE OF BEEKEEPERS

Regardless of the number of hives maintained, the responsibility for the health and welfare of those bees rests ultimately with the beekeeper. This responsibility includes taking steps to ensure the bees’ health, practicing good neighbor skills and protecting bees from pesticide exposure.



Nancy Lee Adamson

Keeping Honey Bees Healthy

- Be sure that colonies are adequately provisioned with honey and pollen year-round. Feed bees a supplemental sugar syrup or protein supplement if natural supplies are low.
- Replace failing queens at the earliest opportunity.
- Make Varroa mite control the top priority. Reduce mite pressure on bees by using screen hive floors and genetically mite-resistant queen stock.
- Treat colonies for Varroa mites no later than the end of July. It’s especially important that the future winter cluster-forming bees are healthy.
- Consider an additional Varroa mite treatment in late winter/early spring to further safeguard bee health.
- Use only currently labeled miticides and prioritize use of miticides that have no known deadly interactions. These include Apivar (amitraz), ApiLife Var (thymol) and Apiguard (thymol).
- Do not use the miticides Apistan (tau-fluvalinate or fluvalinate) and CheckMite (coumaphos) together or in quick succession as bee-lethal synergies may result.
- Similarly, avoid treating bees with Apistan or CheckMite any time they might encounter the agricultural fungicides prochloraz or chlorothalonil in the field.
- Do not neglect brood diseases such as American foulbrood (AFB), European foulbrood (EFB) and chalkbrood. Preventative antibiotic treatments can reduce incidences of AFB and EFB; similarly, queens selected for hygienic behavior may help. Colonies expressing AFB symptoms should be burned to eliminate the source of the inoculum. Although EFB and chalkbrood are less virulent, burning contaminated combs of EFB and chalkbrood are good sanitation practices.

- Reduce infestations of small hive beetles (SHB) with any of the in-hive adult beetle traps available on the market. Inoculate soil in front of hives with commercial preparations of predatory nematodes to control SHB larvae.
- Do not stock yards with more colonies than local floral resources can support.

Being a Good Neighbor

- Place hives so that bee flight paths do not cross sidewalks, playgrounds or other places where bees could disturb pedestrians, livestock or pets.
- Provide adequate sources of water, especially in dry weather, so that bees do not visit your neighbor's swimming pool. Feed bees water with entrance feeders if necessary to minimize their motivation to forage for water.
- If you rent hives for pollination, remove hives in a timely manner after the contract is fulfilled.

Protecting Bees from Pesticides

- Establish apiaries in safe locations. Hives should be physically located as far away as possible from areas receiving pesticide applications. Bees have the potential to forage up to 4 miles from the hive.
- Obtain permission prior to placing hives on land owned by others. Be sure that the landowner and pesticide applicators know the location of your hives.
- Post your name and contact information in a highly visible place so that the landowner or applicators can contact you.
- Use the "Bee Aware" flag to clearly identify hive locations near agricultural fields and rights of way. The flag should be placed near the hives and in a location visible to individuals operating ground or aerial application equipment.



- Be knowledgeable of crop production practices in your area. Be prepared – even on short notice – to move hives during periods of heavy pesticide application.
- Urban beekeepers should locate hives as far away as possible from street frontage receiving mosquito fog applications. It may be advisable to loosely cover hives with tarps overnight, then remove tarps first thing in the morning.
- If it is not possible to move bees before an imminent pesticide application, temporarily net hives or screen entrances to restrict flight. However, this practice may not be advisable during extreme heat.
- Relocating hives may be the only practical response to pesticide kill from unknown point sources.

THE ROLE OF PESTICIDE USERS AND APPLICATORS

Communication, cooperation, education and common sense are the best ways to avoid unnecessary bee kills. Farmers, pesticide applicators and beekeepers can all mutually benefit by subscribing to these practices:

- Beekeepers, farmers and landowners should exchange names and contact information, hive locations, crops grown near the hives, potential pesticide applications and expected timing and notification procedures for applications.
- Use an integrated pest management (IPM) approach for managing crop pests. IPM uses all available tactics, including cultural controls, biological controls, host plant resistance and the judicious use of insecticides, so that economic losses and environmental side effects are minimized.
- Monitor insect pest populations to determine whether or not infestations require pesticide treatment. Economic treatment thresholds have been established for commonly occurring insect pests in crop production systems.

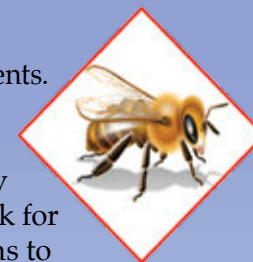


- If hives are being rented for pollination, the grower and beekeeper should enter into a mutually binding and protective contract that specifies dates in and out, fees, minimum colony strength, procedures for notification of pesticide applications and limits of liability.
- Use the “Bee Aware” flag, a unified flagging system that denotes hive locations near agricultural fields. The flag should be placed near hives in a location that is highly visible to pesticide applicators, whether ground-based or aerial.
- When possible, use selective pesticides that have minimal impact on non-target species. This practice protects pollinators and conserves natural enemies. If all recommended pesticides are equally hazardous to bees, use one with the shortest residual effect (see <http://1.usa.gov/1Ld92D9>).
- If possible, avoid simultaneous field applications of ergosterol-biosynthesis-inhibiting (EBI) fungicides and pyrethroid insecticides as bee-lethal synergies may result. The combined use of the fungicide propiconazole and insecticide lambda-cyhalothrin is especially hazardous to bees.
- Likewise, the agricultural fungicides prochloraz and chlorothalonil are especially risky to honey bees that have been treated with the miticides tau-fluvalinate, fluvalinate or coumaphos. Beekeepers most commonly apply these chemicals in late summer/early fall.
- The greatest risk of bee kill occurs any time pesticides are applied while a crop is blooming and attracting pollinators. If the crop system requires pesticide applications during bloom, it may be better to simply locate hives somewhere else.
- However, it may be possible to work around this problem with careful attention to timing and choice of chemical. Bee flower visitation rates are highest in early morning when flowers are full of nectar; therefore, a



pesticide application in late afternoon to early night with a rapidly degrading chemical may control the pest while allowing enough time for residue degradation before bees return the next morning. For more information on pesticide selectivity and degradation times, see <http://1.usa.gov/1Ld92D9>.

- Read and follow all pesticide label directions and precautionary statements. The U.S. Environmental Protection Agency (EPA) is now requiring a “Protection of Pollinators” advisory box on certain pesticide labels. Look for the bee hazard icon in the directions to learn restrictions and instructions that protect bees and other insect pollinators at each application site.
- Use caution when applying insecticides to production fields located next to blooming crops or weeds that may attract bees.
- Do not make pesticide applications when the wind is blowing toward bee hives or off-site pollinator habitats.



POLLINATOR CONSERVATION

Pollinator conservation is a mixture of passive conservation and active habitat enhancement. All bees require flowering plants, and most bee species are solitary and nest in tunnels in soil, solid wood or hollow reeds. Bee conservation involves paying attention to these basic needs and supplementing them if necessary. Studies show that maintaining connected “corridors” throughout intensive production areas is important to conserving bees and other beneficial species. Farmers, foresters and landowners are encouraged to think of bee conservation at a scale of the whole farm or even neighboring farms and properties. In practice, there are often suitable, non-cultivated spaces around a farm that can be set aside as bee sanctuaries. In certain cropping systems, the benefits of enhanced pollinator conservation can exceed the cost of land diverted from production into bee forage and nesting sites.

Conserving Bee Forage and Nesting Sites

- Leave significant areas of your property permanently undisturbed for soil-nesting bees. “Undisturbed” means no draining, plowing or compacting with heavy machinery. Sun-drenched patches of bare soil, roadsides, ditch banks and woodland edges are prime bee habitats.
- Provide nest-building materials, including mud and waxy-leaved plants.
- Leave field edges and rights of way permanently idle in mid-succession blooming plants, such as wildflowers, brambles and hedges. Heavily shaded climax forest is a comparatively poor bee habitat.
- At the scale of a small farm or home garden, it’s possible to increase bee nesting sites by providing solid wood, pre-drilled with $\frac{1}{4}$ to $\frac{1}{2}$ -inch holes that are at least 3 inches deep. It’s important that the tunnels terminate in dead ends and not penetrate all the way through the wood. Alternatively, cardboard cylinders of the appropriate diameter, bent in half to produce dead ends, bundled together and protected from the weather can be used. Bees will find these nesting sites and fill them with young. You will know if the holes are occupied because bees will plaster their entrances with mud or wood paste.

Providing Supplemental Bee Forage Plants

- Sow idle, sunny patches on your property with a mixture of annual and perennial flowering plants that provide bees with nectar and pollen.
- Bees need a season-long, unbroken succession of bloom. Since many plant species bloom in the spring, focus on those that bloom in mid to late summer, including Vitex, crape myrtle, Abelia, sage, clover and sunflower.

URBAN CONSIDERATIONS

Home gardens, ornamental landscape plantings, native plants and wildlife all benefit from pollinators. Bees of all species are valuable natural assets, and their pollinating activities are worth the effort to protect and preserve them. Here are some ways to help pollinators:



- The flight and nesting behavior of certain solitary bees happens in bursts of extreme activity. In spring or summer, you might see bees by the hundreds flying over a patch of your lawn. This activity is caused by the individual activity of many solitary bees, not a big nest of social insects. Close examination will show the ground pocked with scores or hundreds of tunnels. Solitary bees are gentle, and their sting risk is extremely low! Consider leaving them alone and enjoying the spectacle of nature in action. After a few days, the activity will die down for another 12 months; meanwhile, your tolerance is contributing to a healthy pollinator population.

- Know the beekeepers in your neighborhood. Attempt to work with them if you believe there are too many bees in your yard. Stay calm when bees (or bee-like insects) fly near you. Remember that your neighborhood beekeeper is not only a source of local honey, but free pollination for your garden.



- In spring a healthy honey bee colony will attempt to “swarm” or divide and form a new colony. In the first stage of this process, the bees cluster on a branch or other object. This is a temporary phase, and the bees will usually relocate to a permanent new site within a few hours. If immediate removal is necessary and if the swarm is safely accessible, it may be possible to hire a local beekeeper to remove it.

- Sometimes swarming bee colonies take up permanent residence inside a hollow structural wall. If these colonies are sufficiently remote from traffic by humans and pets, it may be possible to tolerate them indefinitely. However, many times it is necessary to remove them. This is a difficult procedure and involves physically opening the void, suctioning away the bees, cutting out the comb and reclosing the void. The job can usually be done without killing the colony. Consult your county Cooperative Extension agent for a referral list of local bee removal specialists. Any pesticide applications necessary to finish the job should be handled by a certified pest management professional.

- If you think insects are a problem in your garden or landscape, first identify the insects and determine if remedial action is necessary. If you decide to use an insecticide, it is important to read and follow the label; it may also include pollinator protection guidelines specific to that product.



- Pollinators are attracted to blooming plants, and flower visitation rates by bees are highest in early morning when flowers are full of nectar. When utilizing an insecticide, delay application until the plant is done blooming or make

the application in late afternoon to early night to minimize direct exposure to pollinators.

- Application of a systemic insecticide to the soil around trees and shrubs minimizes direct exposure of pollinators to the insecticide; however, some active ingredients can eventually be incorporated into nectar and may harm bees. If possible, avoid soil application of systemic insecticides during or just prior to bloom.



- When possible, use selective pesticides that have minimal impact on non-target species. For more information on pesticide selectivity and degradation times, see <http://1.usa.gov/1Ld92D9>.

- If applying insecticide for turf pests, mow your grass immediately before application. Mowing will help eliminate weed flowers that may attract bees.

- If you have questions about pollinator protection, please contact your county Extension office, the Georgia Department of Agriculture or a pest management professional to develop a practical and effective pest management action plan that considers pollinators.





“Protecting Georgia’s Pollinators”

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For a current list of supporters, please visit

ent.uga.edu/bees.



Queen bumble bees, *Bombus spp.*, emerge in spring early enough to be critically important pollinators of commercial blueberry.



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A succession of different solitary bee species will pollinate first and second summer plantings of squash.




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