# Protecting Pollinators & Beneficials

Jennifer **Berry**

## UGA Is Reaching Out This Year

Last October, staff from the UGA bee lab traveled south to Moultrie, Georgia to participate in the Sunbelt Ag Expo Show, which, for 35 years, has showcased the newest innovations in agriculture. The annual Expo is housed on a 100-acre site and features over 1,200 exhibitors. One of those exhibitors was Rossman Apiaries. Fred and Ann Rossman have been attending the Sunbelt Expo for over a decade now. Fred explained that they had decided to exhibit because it was an excellent opportunity to educate the public about honey bees; plus, they only had to travel a few miles from their business location. Every year, they display beekeeping equipment and observation hives for the public to see. They also offer educational materials about the importance of honey bees and the role they play in agriculture – not only in Georgia, but world-wide.

While walking around Expo, it was amazing to see every kind of agricultural equipment imaginable: big tractors, small tractors, red tractors, blue tractors, bush hogs, sprayers, diggers, and harvesters. Everything you could possibly need in the agriculture business was on demonstration. Alongside all this machinery were research specialists from the College of Agriculture and Environmental Sciences (CAES) offering helpful, educational information to the public. The college's theme this year was "Pollinators and Peanuts," which provided the perfect opportunity to launch our "Protecting Pollinators and Beneficials" program.

Here at the UGA Bee Lab, one of our most important goals is to disseminate information about all aspects of beekeeping to the public. We accomplish this through direct consultations, our website (*http://www.ent.uga.edu/bees*), the Young Harris Beekeeping Institute (May 9-11), exhibits, publications, classes, workshops and lectures to local, state, national and international audiences. It is also our goal to educate the general public on the importance of honey bees, other pollinators (bumble bees, mason bees, sweat bees, digger bees, butterflies, moths, flies, bats, hummingbirds, and flying squirrels) and beneficials, along with how to protect and encourage their presence. By "the general public," I'm referring to non-beekeepers, since most beekeepers already have an understanding of the importance of honey bees. For instance, the average American usually doesn't realize that honey bees are responsible for the pollination of about 1/3 of the food that we consume. Most folks, and I was one of them years ago, have no clue where their food comes from or how it even becomes food to begin with. So, it is important that the public be informed not only about pollinators, but beneficial species as well.

We all know the definition of pollinators. When we speak of beneficials, we are talking about any organism that feeds upon or parasitizes unwanted pests in the farm, orchard, garden, landscape setting or turf grass. They benefit the growing process by reducing the extent of botanical injury by pests. These "good" insects, such as praying mantises, ladybugs, green & brown lacewings, dragonflies, tiger beetles and spiders (e.g., garden, jumping and wolf spiders), are some of the most common beneficials around. They eat agriculturally destructive insects such as whiteflies, aphids, plant bugs, and potato beetles, but, since they're not particularly discriminate eaters, they also sometimes eat each other. Notably, most parasitoid wasps are species-specific, only attacking one species of insect. For instance, the braconid wasp, *Aphidius ervi*, parasitizes exclusively the pea aphid. While parasitoids can act externally or internally, the ones most important to agriculture parasitize internally (endoparasitoid). Another parasitoid wasp, *Encarsia formosa* is used commercially for the control of the greenhouse whitefly, *Trialeurodes vaporariorum*, on greenhouse-grown vegetable crops and to a lesser extent ornamental crops. Some parasitoid wasps are tiny, measuring less than 0.6mm. Endoparasitoids pierce the integument of the host-insect of choice with their ovipositors and deposit their eggs. These eggs hatch into larvae and begin to feed on internal tissues; this eventually kills the host, which is a good thing, since now the destructive pest is no longer dining in your garden or yard.


*Rossman Apiaries set up at the Sunbelt Ag Expo.*

*Praying mantis eating grasshopper.*

*Parasitized caterpillar.* (photo by David Cappaert)

Unfortunately, homeowners are some of the worst abusers of pesticides. Panic-stricken after having seen a **bug** ("Oh, my!"), too many rush off to the nearest big box store and grab the bottle that promises instant, devastating and the longest-lasting results**.** Then they race home, haphazardly toss a "feels good" amount of the concentrate into a pump sprayer without reference to written instructions, and proceed to douse the garden or yard indiscriminately until saturated. Unfortunately, the "menacing intruder" that initially gave rise to this environmental tragedy was quite possibly not even a true pest. It may have just been an inconsequential passerby or, even worse, a pollinator or beneficial! The problem with using broad-spectrum pesticides is they eliminate all bugs in the system, the good along with the bad. This is why it is important to first know the beneficials from the pests. I'm not suggesting that everyone becomes an entomologist, but at least have some appreciation of the environment as a whole and be open to strategies to target specific pests. This year, our lab will be focusing on this very objective: to raise the public's awareness of the good verses the bad bugs.

The orders which include most of the bad bugs are Orthoptera (grasshoppers, crickets and katydids), Hemiptera (true bugs, which include, aphids, lacebugs, scales, spider mites, and spittlebugs), Coleoptera (beetles, Japanese beetles, and flea beetles), and Lepidoptera (butterflies and moths, with the caterpillars doing the damage).

Once identified as a pest, the next step is to determine if a bug is actually causing enough damage to be harmful to the plant as a whole. Direct injury is physically eating the leaves, sucking sap or burrowing into stems, fruit, or roots. This is usually apparent upon inspection of the plant; some examples are holes in leaves, necrotic spots on fruit or stippling on leaves and stems. Indirect injury is the secondary bacterial, viral, or fungal infection transmitted to a plant by a pest via direct injury. A few examples of this are chlorosis (change in leaf color), growth malformations, loss of vigor, and leaf wilt.

Now, most plants can tolerate some infestation and infection. Problems arise when that infection or infestation goes beyond the threshold of what the plant can handle. A few aphids or whiteflies on your tomatoes are usually not going to cause the plant to die or reduce yield. However, a few thousand is another story; this is when we may need to take incursive action if we want any tomatoes.

But, before reaching for that can with the skull and

crossbones, first try one of several less-toxic approaches such as physical controls. For example, soft-bodied insects, such as aphids, are no match against a strong, steady blast from a water hose. Or, better yet, a pair of fingers can work wonders, squashing, picking and flicking off these guys while inspecting stems and leaves. This is a regular practice of mine in my veggie and flower garden. "Hasta la vista, Baby!!!"

When there are no other physical control options and pesticides are necessary, there are still several simple "tricks" to reduce undesired side effects. Try the softer chemicals first. For instance, insecticidal soaps or oils are excellent alternatives to use in place of the harsher chemicals, and are sometimes much cheaper. Again, they work great against the smaller, soft-bodied arthropods such as aphids, mealybugs, psyllids and spider mites. Bt, *Bacillus thuringiensis*, another great alternative, is a soil dwelling bacterium used to control susceptible Lepidopteron larvae. Another biological pesticide is *Paenibacillus popilliae*, the bacterium responsible for causing a disease called milky spore, which helps to control Japanese beetle larvae in the ground.

When applying pesticides, two of the best usage suggestions are to apply at night and to avoid blooms. The first of these strategies helps since most pollinators are back home or out of the area after the sun has set. The second is important, obviously, because pollinators carry out their work by visiting the flowers, whereas most pests suck from stems or chew leaves. Another quick suggestion is to not apply any pesticide during windy conditions.

*UGA Lab technicians Nicholas Weaver and Ben Rouse.*

Pesticide contaminants can drift onto areas you want to avoid such as flowers, nesting sites, hives, waterways, and your body!

When choosing pesticides, you will have more control over environmental impact with those that break down (lose their effectiveness) rapidly. Also, avoid dusts, such as Sevin™ Dust, since the particulate size is similar to pollen and can be collected by bees and then fed to brood. Incorporating just these few measures will dramatically reduce the effects chemicals will have on the beneficials you want to keep around your yard and garden plus the impact on the environment as a whole.

Several years ago I took an IPM biological control class and just loved it. At one point during a lecture, the professor stated that it was unrealistic to assume that we could feed the population on this planet without the use of common, harsher pesticides. Our monocultured approach to agriculture was one of his reasons for this belief. He lamented that organic and sustainable agriculture were wonderful ideals, but they could only feed a small portion of the world. To this day, I question that statement. BC

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