Bug-Wise

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Non-Insecticide Management for Insect Pests in the Home Landscape: Insecticides are not the only tools we have for managing insects. There are many things gardeners can do to reduce the potential for having damaging insect problems that do not involve spraying. These usually cost little or nothing, and take less time and effort than spraying. In most cases insecticides should be used as the 'treatment of last resort' to control an insect population that has gotten out of hand. Wise gardeners use non-insecticidal insect management tools to help reduce their reliance on insecticides. Some of the most helpful are discussed in the following sections.

Plant Selection and Cultural Practices

What you grow and how you grow it can have a huge influence on potential insect problems. Here are some things that you can do to reduce your chances of having insect and/or mite problems.

1} Grow *plant species that tend not to have insect problems.* You can greatly reduce your potential for having insect problems by choosing species that are relatively pest free. Some plants have a lot of insect pests, or one or two serious pests, and you have to be willing to control them if you are going to grow these bug-prone plants. Large-flowered hibiscus are almost certain to be attacked by hibiscus sawfly, and azaleas will sometimes be damaged by azalea lace bug, but loropetalum has few insect pests. Fruit trees provide an even better example. If you don't want to have to spray at all, stick with pears. If you don't mind applying a few sprays each season, plant apples. If you enjoy spraying, grow peaches.

2} *Plant resistant varieties.* Within a given species of plant, some varieties are more pest prone than others. Knock Out roses are less susceptible to most insect pests than are most of the tea roses. Some varieties of Encore azaleas are resistant to lace bugs. It is often difficult to find specific lists showing which varieties are most susceptible or resistant to various pests, but this often gets resolved in the market place. Popular varieties are usually popular because they perform well under a variety of conditions, including insect pressure.

3} *Buy pest-free plants.* Avoid paying for pest problems. Inspect plants at the nursery before you buy them and buy only pest-free plants. No matter how low the price, a plant that's heavily infested with scale is no bargain.

4} *Plant the plant in a suitable site.* Plants growing in sites to which they are not adapted are stressed plants, and stressed plants are more susceptible to insect problems. Azaleas growing in full sun are more likely to suffer injury from azalea lace bugs than azaleas growing in filtered shade.

5} *Grow healthy vigorous plants.* Fertilize, mulch, prune, water, and maintain plants properly. Healthy plants are better able to defend themselves against insect attack and better able to tolerate low levels of insect damage. For example, drought stressed pines are much more susceptible to attack by pine beetles. Potassium deficiency predisposes many plants to spider mite injury.

6} *Avoid over fertilizing, especially with nitrogen.* Excessive nitrogen can make plants more susceptible to insect pests, especially aphids and spider mites.

7} *Use cultural practices that help control specific insect pests.* Cutting and disposing canna foliage during the winter helps prevent canna leaf rollers from overwintering. Misting plant foliage with water can help control spider mites. Building populations of aphids can often be washed from plants with a forceful water spray.

Know the Pests

1} *Learn which insects to expect on which plants.* Certain plants are prone to certain insect pests. St. Augustine lawns are more likely to be damaged by chinch bugs, centipede lawns are more likely to get spittlebug infestations, and bermudagrass lawns are more likely to have armyworms. By knowing which insects are most likely to occur on the particular plants in your landscape you can be better prepared to deal with pest problems when they do develop.

2} *Know the biology of the pests you are trying to prevent or control and when they are likely to occur.* Do they have chewing or sucking mouth parts? Which life stage(s) causes damage? How many generations are there each year? What environmental conditions favor outbreaks? When do heavy infestations most often occur? Hot dry conditions favor chinch bug outbreaks. Spittlebugs are more likely to be a problem following wet, rainy periods. See state Extension publications and field guides for information on pest biology.

3} *Know the kind of damage the insect causes.* Will it only cause short-term aesthetic damage, or can it potentially kill the plant? Young oak saplings that have been defoliated by caterpillars will usually recover quickly, but an infestation of flatheaded appletree borers or granulate ambrosia beetles can be fatal. Hibiscus sawflies won't kill ornamental hibiscus, but they can sure make them look bad.

4} Know *how to scout for insects and scout at the appropriate times.* It's a lot quicker and easier to look for insect pests than to spray for insect pests that aren't there. Detect pests in the early stages of a population build-up and you can avoid damaging infestations by timely treatment. It's also important to check to be sure that the insects that caused the damage are still there before you spray. Often aphid, mite, or caterpillar infestations have already 'crashed', due to natural biological control, before the damage is noticed. Spraying won't help if the critters you are spraying for are already gone.

Rely on Naturally Occurring Beneficials

Pest insect populations are normally kept in check by naturally-occurring populations of the three Ps: predators, parasites, and pathogens. For any given insect pest, there are usually many different species of predators that feed on that pest, several species of parasitic wasps and/or flies that attack it, and many fungi, bacteria, and viruses that cause fatal infections. Collectively, these naturally-occurring beneficial organisms are our most important defense against pest insects. Still, it is normal for there to be more pests than predators and parasites—there are usually more rabbits than foxes. When severe pest outbreaks occur, it is because the population development of the pest population has gotten ahead of the beneficials. Usually, the beneficials will eventually catch up and bring the pest population under control, but this does not always happen in time to prevent excessive plant damage.

- *Predators* are animals that eat other insects. Praying mantids are large, general predators. They look impressive but provide little real benefit in controlling pest species. This is also true for spiders and most vertebrate predators, such as birds, lizards, and frogs. It's the smaller, less conspicuous, more host specific predators that provide the greatest pest control benefits. For example, there are hundreds of species of lady beetles; most feed preferentially on soft bodied insects, like aphids and whiteflies. Insects such as damsel bugs, big-eyed bugs, and minute pirate bugs provide even more benefit, but these small predators go largely un-noticed by most gardeners.

- *Parasites* are insects that complete part of their life cycle inside the body of another insect, ultimately causing the death of their insect host. There are thousands of different species of insect parasites. Most are either flies or tiny wasps. Some attack the larval stage of their hosts, while others attack the eggs, pupae, or adults. Most insect parasites are so small and inconspicuous that they are rarely noticed by the average homeowner. Most insect parasites attack only a narrow range of hosts, but most pest insects are attacked by several different species of parasites, and parasitism can have a dramatic effect on pest insect populations. For example, one common parasitic wasp often causes over 80% mortality in aphid populations.

- *Pathogens* are diseases. In this case we are talking about diseases of insects. Bugs get sick too. There are many different types of insect diseases, including different species of fungi, nematodes, bacteria, protozoa, and viruses. Most insect pathogens are quite host specific. Many of these diseases are acutely fatal to affected insects and often cause wide-spread epizootics in susceptible insect populations. Disease outbreaks are more likely to occur in pest populations that have developed to high numbers. One such fungal disease often causes dramatic population reductions of aphid populations; similar fungal outbreaks also occur in spider mites.

Naturally-occurring biological control is cost free, and it happens in every garden. Savvy gardeners can increase the benefits of this free insect control in three key ways.

1} *Avoid unnecessary insecticide use.* Insecticides kill more than just the target pests. They can also kill predators and parasites that help control insect pests. Unnecessary insecticide use often triggers subsequent pest outbreaks because the pests thrive when their parasites and predators are eliminated. This phenomenon is often referred to as 'flaring' a pest outbreak. "I flared spider mites on my Leyland cypress when I sprayed them with Sevin."

2} *Choose insecticides that minimize impact on beneficials.* Sometimes you have to spray to control an insect population that has gotten out of hand. When possible, try to choose an insecticide that will control the target pest(s), but have minimal impact on beneficial insects. Some insecticides are much more target specific than others. Use a broad spectrum insecticide like permethrin, acephate, or carbaryl (Sevin) to control bagworms on an ornamental conifer and you may flare spider mites—because these insecticides kill predatory mites that help keep the pest mites in check. Choose a more target-specific insecticide like spinosad instead. Spinosad works great on caterpillars but is less likely to flare spider mites.

3} *Grow a diverse array of plants to encourage parasites and predators.* Adult parasitic wasps and flies often rely on pollen and nectar for much of their food, and many predatory insects also supplement their diet with nectar. Maintaining a diverse garden with many different species of blooming plants can help encourage naturally-occurring parasites and predators. Most gardeners especially like this approach; it's an excuse to buy more plants!

"So where can I order some of these beneficial insects to release in my garden?" Buying and releasing beneficial insects is usually not a very effective insect management tool for home gardens. Artificial releases of laboratory reared parasites and predators can work quite well in enclosed greenhouse situations where the environment is carefully controlled, but such releases are rarely helpful in outdoor home landscapes. The released insects either fly away, die because they are not adapted to the environment, or fail to find suitable hosts because the timing is wrong.

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