All animals, including insects, exist only in suitable habitats with places to shelter, eat, and reproduce. In a location that lacks one or more of these requirements, they fail to thrive or even survive.

Location is also important for a healthy garden whether planting ornamental, vegetable, flower, or even turf areas. Healthy plants have fewer pest problems than those stressed plants in unfavorable locations. Each plant has its own specific needs for sunlight, water, fertility, soil type, and temperature. When gardeners put plants in unsuitable areas, pest problems, such as insects, often appear.

Most insects, however, are not pests. The following is a guide to help distinguish some of the more common garden and household insects, their groups, and their purpose. Learn their role and discover what part of their cycle can potentially affect you and your garden. Gain an understanding of true pests, minor nuisances, benign residents, and beneficial "bugs."

Understanding Bugs

Did you know that of the 1.5 million identified animals on this planet, more than half are insects? And, most insects are beneficial to humans. For example, the ravious lady beetle, or ladybug, can eat as many as 2,400 aphids in its lifespan.

How do you determine if your garden is hosting pest insects or beneficial insects? This can be difficult because circumstances often determine the insect’s role. Honeybees can be both. If provoked, they deliver nasty, painful stings. However, bees also assist in pollinating many fruits and vegetables. Some insects eat other plant-damaging insects. Many insects are food for various animals and some are beneficial decomposers, and the small number of species that harm plants and animals are known as pests.

So what defines an insect?
All insects have the following:

• A hard, protective exoskeleton they must molt (shed) to grow larger
• Multiple life stages (e.g., egg, larvae, nymph, pupae, and adult)
• A body with bilateral symmetry
• Three body parts:
  - Head – with compound eyes, a mouth, and antennae
  - Thorax – the wings (if present) and legs are attached here
  - Abdomen – it is often the largest body part where the primary life functions occur
• Three pairs of jointed legs

Metamorphosis

Observing insect development helps us identify them, understand their purpose, and also understand the best time to apply specific control measures if necessary. Metamorphosis means a change in form, structure, or function as a result of development. This change requires molting the hard, protective exoskeleton and can be generally described as either incomplete or complete.

Insects having incomplete metamorphosis gradually change through three stages: egg, nymph, and adult. Hatching from an egg, the immature often looks like a smaller, wingless version of the adult, called a nymph. The adult stage results after numerous nymphal molts. Adults are the reproductive and final developmental stage. Stink bugs, cockroaches, aphids, and grasshoppers are examples of insects having incomplete metamorphosis.
Insects with complete metamorphosis have four stages: egg, larva, pupa, and adult. The larvae hatching from eggs look quite different from the adults, often use a different food source, and many times have different types of mouthparts. For example, the larval stage of a butterfly or moth has chewing mouthparts while the adult butterfly or moth has siphoning mouthparts. These larvae later become nonfeeding, stationary pupae inside a protective case. The larva inside each pupal case liquefies and reforms into an adult. Examples are moths and butterflies, flies, ants, and beetles.

Life cycle information helps determine what and when control options are most likely effective. In general, there is at least one stage in the insect’s cycle when it is most vulnerable to the selected control methods. Timing of controls is just as important as choice of control.

**Insect Groups**

It is also helpful to learn some common characteristics of the insect groups (scientific orders). This can help distinguish the good from the bad, or at least give you some understanding of their purpose.

<table>
<thead>
<tr>
<th>Scientific Order (name)</th>
<th>Common Name</th>
<th>Description</th>
<th>Activity or Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Araneae and Acarina</td>
<td>spiders, mites, and chiggers</td>
<td>not true insects, but still distant relatives; eight legs; two body parts – cephalothorax and abdomen; no antenna</td>
<td>spiders eat insects and other small animals; many mites are plant and animal pests; some mites are beneficial predators of insects and other mites</td>
</tr>
<tr>
<td>Coleoptera</td>
<td>beetles</td>
<td>hard wings cover the soft flight wings below</td>
<td>some are helpful to plants, some are damaging to plants</td>
</tr>
<tr>
<td>Dictyoptera</td>
<td>cockroaches and praying mantids</td>
<td>cockroaches are decomposers, eating any dead materials; mantids prey on other insects</td>
<td>front wings are completely leathery; hind wings are membranous; some fly, some don’t</td>
</tr>
<tr>
<td>Diptera</td>
<td>flies and mosquitoes</td>
<td>one pair of flight wings</td>
<td>some of the most notorious animal disease vectors (e.g., mosquitoes and tse-tse flies); some flies lay eggs in garden fruits, making the fruit unsightly or inedible; a few fly larvae are leaf and stem eaters</td>
</tr>
<tr>
<td>Hemiptera</td>
<td>true bugs (leafhoppers, stink bugs, lace bugs, pirate bugs, and assassin bugs)</td>
<td>forewings are half hardened, or leathery, and half membranous</td>
<td>some are helpful, some are damaging to plants; a few are human pests (e.g., bed bugs)</td>
</tr>
<tr>
<td>Homoptera</td>
<td>cicadas, leafhoppers, aphids, scale insects, whiteflies, and others</td>
<td>uniform wings; wedge-shaped head</td>
<td>all eat plant sap; some feed on only one type of plant; sometimes only the nymphs cause damage</td>
</tr>
<tr>
<td>Hymenoptera</td>
<td>ants, wasps, and bees</td>
<td>two pair of membranous wings; thin “waist” between abdomen and thorax; many are colonial</td>
<td>many are beneficial in the garden and nonstinging; some humans are highly allergic to those with a venomous sting</td>
</tr>
<tr>
<td>Isoptera</td>
<td>termites</td>
<td>both wing pairs are identical and equal in size</td>
<td>see ANR-1170, ANR-1035, ANR-1252, ANR-1022</td>
</tr>
<tr>
<td>Lepideptera</td>
<td>butterflies and moths</td>
<td>wings covered by scales, sometimes with colorful patterns</td>
<td>nectar feeding adults pollinate flowers; the larvae, or caterpillars, eat plant leaves and stems</td>
</tr>
<tr>
<td>Odonata</td>
<td>dragonflies and damselflies</td>
<td>toothed mouthparts; distinctive wing patches for each species</td>
<td>all are predators on other insects and, when nymphs, other aquatic creatures</td>
</tr>
</tbody>
</table>
Common Garden Sightings

Araneae and Acarina – spiders and mites

Spiders are not insects, but they are a specialized group of animals often producing silken webs for catching prey. Spiders without webs ambush prey. Some use underground burrows to hide while others change color for camouflage. In any case, spiders are often considered beneficial to the garden because their primary food is insects. Spiders have incomplete metamorphosis and a solitary lifestyle. In the United States, only the brown recluse, and black and brown widow spiders are dangerous to people.

Mites are also non-insects, and some are serious pests causing leaf galls, plant death, or irritation to animals. They all have needle-like mouthparts to puncture tissue and suck out liquids. Those that bite humans, such as chiggers and ticks, are irritating, and some ticks spread disease. Avoid wild areas with dense vegetation, especially tall grasses, to prevent bites. Insect repellents and long pants tucked into socks are recommended if you visit suspect areas.

When a few mites feed on leaves and flowers, affected tissues appear speckled (stippled) while webbing and dead tissue appear with larger mite populations. Prevention is relatively easy if you know spider mites thrive during hot, dry weather. A good spray of water disrupts reproduction and feeding. Spray the underside of leaves where they hide and repeat daily if plants are infested. Frequent monitoring during dry summer days is a must. Mites also tend to attack plants under stress, so keeping plants healthy is the first line of defense.

Coleoptera–beetles

Beetles comprise the largest and most diverse of all insect groups. In fact, they comprise 25 percent of all animals on Earth. Beetles have one pair of protective hard wings, called elytra, and sometimes a second pair of membranous flight wings underneath. Ground beetles and some weevils are examples of flightless beetles. All beetles undergo complete metamorphosis, and both larvae and adults have chewing mouthparts. Some feed on plants, some just on plant pollen. Some beetles feed on other insects, some on fungi, and others are decomposers, eating dead plants and animals.

Some of the more commonly known plant pest beetles are the elm leaf, Japanese, June, cucumber, potato, and Mexican bean beetles. Pest beetles can be trunk and stem borers, leaf miners, root feeders, leaf eaters, or whole plant eaters. Some predatory, beneficial beetles are lady, soldier, tiger, and ground beetles. The first key to control is identification. Preserve the beneficial beetles that snack on slugs, aphids, caterpillars, and other pests.

Dictyoptera–mantids and cockroaches

Praying mantids are one of the larger garden insects; some can be up to 4 inches long. They hide in the garden by camouflage and have heightened vision and hearing for sensing insect prey. Their front legs are spined to assist with catching prey. They are the only insects able to rotate their heads. Mantids have incomplete metamorphosis, laying 100 or more eggs in a spongy mass.

Labeling mantids as beneficial or pest insects is difficult. They do eat insects that harm your plants, but are just as willing to snack on a butterfly or lady beetle. All insects, even other mantids, are equally treated as just another meal. Mantids must be solitary for survival. You are most likely to see mantids in late summer or fall when adults are full-sized.

While cockroaches are certainly household pests, they also serve an important purpose: eating decaying organic matter. They belong to the clean-up crew outdoors. Garden soil benefits from the compost that cockroaches help provide. Roaches eat whatever plants shed throughout the year.

<table>
<thead>
<tr>
<th>Scientific Order (name)</th>
<th>Common Name</th>
<th>Description</th>
<th>Activity or Role</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orthoptera</td>
<td>grasshoppers, katydids, mole crickets, and crickets</td>
<td>straight, nonfolding wings; long hindlegs for jumping</td>
<td>all grasshoppers are plant eaters—some more damaging than others; crickets are decomposers, eating any dead materials; mole crickets eat only plant roots; katydids are also plant eaters</td>
</tr>
<tr>
<td>Siphonaptera</td>
<td>fleas</td>
<td>siphoning mouthparts; wingless, flattened body</td>
<td>pests of mammals</td>
</tr>
</tbody>
</table>

What's Buggin' You? 3
Diptera—flies and mosquitoes

Flies, along with mosquitoes, gnats, and midges, have two functional wings (di = two). The hind wings have evolved into tiny club-like structures and work like gyroscopes for navigation. Flies are among the few insects able to fly in a straight line.

The common house fly, a few biting flies, and the mosquito are familiar to most people. Some spread diseases. The larvae (maggots) of other pest flies, such as leafminer, gall, bulb, and fruit flies, destructively feed on various plant parts. However, some fly larvae help the soil by speeding up the decomposition of decaying plant and animal material.

Syrphid (hover flies) and tachinid fly larvae are beneficial to the garden as insect predators. The female adult fly lays her eggs in or near the preferred insect host so her larvae can feed until pupation time.

All flies have complete metamorphosis. Help preserve and attract beneficial flies to your garden by planting dill, parsley, sweet clover, or cultivated goldenrod.

Hemiptera—stink bugs, lace bugs, pirate bugs, assassin bugs, and others

Some people describe all insects, and sometimes spiders, as bugs. Entomologists, though, refer only to the true bugs in the order Hemiptera. Most adult bugs are winged, but a few are not, such as bed bugs. Those with wings have "half wings," forewings with a leathery half and a membranous half. Bugs also have a beak-like mouth for piercing the desired meal and sucking out its contents. All bugs have incomplete metamorphosis. Nymphs appear as small, wingless adults.

There are both beneficial and pest bugs in the garden. Common pest bugs include the azalea lace bug, chinch bug, harlequin bug, and many stink bugs. Some common beneficial bugs are the assassin bug, big-eyed bug, predaceous stink bug, and minute pirate bug. Assassin bugs are commonly found in gardens where few chemical pesticides are used. These voracious insect eaters prey on a variety of pests, including flies, beetles, and various larvae. Again, no two bugs are alike. Identification is necessary to separate the helpful from the destructive.

Homoptera—leafhoppers, aphids, scale insects, whiteflies, cicadas, and others

This group comprises a significant list of plant pests, both in the adult and nymphal stages. Adults may be winged or wingless. Homopterans pierce plant tissue and suck out sap. Feeding causes loss of plant vigor, stunted growth, discolored or deformed leaves, flowers, and buds, and can spread plant diseases. Infested plants may develop sooty mold, a black fungus that grows on the insects' honeydew secretion. Honeydew is excreted sugary plant sap and a primary food for several ants. The presence of ants on your plants is a sure sign of this pest group.

Leafhoppers feed on leaf undersides, causing loss of plant vigor and a stippled or mottled pattern. These missile-shaped insects hop more often than they fly, so control should start with spring's first nymphal generation. Wingless nymphs begin to appear with new plant growth in spring. There can be two to five leafhopper generations per year. Few of these are serious plant pests by themselves, but many spread plant diseases during their feeding.

Aphids are soft-bodied, pear-shaped insects and a favored treat for many predatory insects. They are often found on new, tender growth, but occasionally cover an entire plant. Aphids are unique in that they birth live nymphs more often than they produce eggs. Some trees, such as pecans, crape myrtle, river birch, and tulip poplar, seem to have aphids every year. Patient observation often proves little to no ill effect on tree health, but can reduce yields on fruit and nut trees. Know the plant first to determine the severity of the problem, and watch for beneficial insects. A strong blast of water or oil spray often works best on springtime aphids on flowering plants and shrubs.

One of the largest Homopteran subgroups is scale insects. There are three major groups of scale insects: armored scale, soft scale, and mealybugs. Armored scales live beneath an "armor" of wax and may live on almost any plant part (leaves, stems, trunks, roots).
Because only the first stage, crawlers, have legs, armored scales never move once they begin feeding. Common examples are euonymus scale, tea scale, and white peach scale. Their feeding directly damages plants. Armored scales are small and often go unnoticed until damaging numbers show plant injury. These scales do not produce honeydew.

Soft scales are larger and do not construct a separate wax cover. Their bodies are covered in a thin, invisible (except in wax scale) wax layer. Soft scale can be up to ½ inch, but are more often smaller (up to ¼ inch). Some are capable of moving, but most remain stationary at maturity. Soft scales produce honeydew, so watch for sooty mold and ants as a sign of their feeding. Common soft scales include wax scale, tulip poplar scale, pine tortoise scale, and brown soft scale.

Mealybugs are the third type of scale insects. Covered in soft, powdery wax, they appear grainy or mealy. Most mealybugs have legs, moving about as they feed and producing honeydew. The long-tailed mealybug, citrus mealybug and pink hibiscus mealybug are a few examples.

Scales are an important plant pest group because they are difficult to detect and control. Notice early signs such as yellowed leaves, ant trails, honeydew, or sooty mold. Dormant and summer oil or soap sprays are best because they penetrate the protective wax shell. Chemical sprays primarily affect the crawlers and application timing is tricky. Systemic insecticides applied to plant roots provide excellent, whole plant control of scale insects.

Whitefly adults resemble small, white moths with their powdery, white wings. They prefer feeding on leaf undersides and fly out in a cloud when affected plants are disturbed. This Homopteran lays eggs that emerge as feeding crawlers. Turn over a leaf to find crawlers, pupae, and adults. Several overlapping generations can develop each year. Infestations may be a sign that the natural enemies of whiteflies are absent. Whiteflies are not usually a serious problem for plant health.

Cicadas are the most benign members of this group. Their boisterous summer “singing” might be annoying and they cause minor damage to various forest trees when females puncture twigs and stems to insert their eggs. This causes dieback and can occasionally be fatal to young, small trees, but rarely causes serious damage to a mature tree. Nymphs feed on tree roots, but again, have little overall impact.

Hymenoptera–ants, bees, and wasps

Ants, bees, and wasps are familiar garden insects that often live in organized colonies. For colonial hymenopterans, the queen is the only member producing offspring. Workers tend the brood, make and tend the nest, and collect food. Sometimes adults have wings and sometimes they don’t. Hymenoptera feed on plant pollen and nectar, leaves and woody plant parts, and other insects and spiders. A few are destructive to plants in nesting. Some live underground, some bore into wood, and some build elaborate nests of paper, mud, wax, or other materials. There are also solitary Hymenoptera, such as velvet ants or parasitic wasps, that lay their eggs in other insects.

Hymenoptera are often beneficial to the garden. Various ant species feed on sweets, oily proteins, honeydew from other insects, seeds or grains, or other insects. Generally these are not serious pest activities; however, some ants cause damage when they build nests or when they protect the insects that produce honeydew. Many ants, though, are useful as scavengers and insect predators. Common pest ants are the black carpenter ant and the imported red fire ant. Argentine ants are also common, but mostly just a nuisance because they cannot sting. Braconid wasps are common beneficial insects that parasitize aphids, cabbageworms, flies, and several other insect larvae. Females inject their eggs into the host insect where the larvae hatch and feed. Other wasps, such as mud daubers, pack insect prey into the nest as food for their young.

Several members of this group can give a venomous sting. Keep in mind that this is a defensive response and usually only produces temporary discomfort. If you stay away from bee and wasp colonies and ant mounds, you are unlikely to be stung. It is important to note that some people are highly allergic to these stings. These sensitive people should be extra observant when outdoors.

Isoptera–termites

In Alabama, there are two main types of termites: the subterranean termite and the drywood, or powderpost, termite. Native subterranean termites live in the soil near dead trees or structures, or in wood near the soil. These termites make mud tubes to keep a moist environment. Formosan subterranean and eastern subterranean termites also attack wood in contact with soil, but additionally feed on living plants. Dry-wood termite species only live within wood, dead trees, or structures. They do not...
Many butterflies and moths are considered beneficial pollinators as adults. Though not always easy to separate, butterflies and moths do have several distinctions. Butterflies have knobbed, long antennae and moths have feathery antennae. Butterflies are often brightly colored, while moths are usually earthy, dull colors. Most moths are nocturnal. Moths wrap their pupae in silk or plant parts, making a cocoon. Butterflies leave the pupae bare, a chrysalis. Moth caterpillars are more commonly plant pests, compared to butterflies, simply because there are more moth species.

**Lepidoptera—moths and butterflies**

More than 11,000 Lepidoptera species live in North America and are the most popular for gardeners to study and observe. Most Lepidoptera are dependent on plants for one or more stages of their development: egg, larvae, pupae, or winged adult. Plant damage is only caused by the larvae or caterpillars.

**Caterpillars** are sometimes known by their adult names, such as the codling moth, gypsy moth, or monarch, while others are described by their plant-eating stage, such as fruitworm, cutworm, leafminer, and webworm. Caterpillars have worm-shaped, soft bodies, sometimes hairless, sometimes hairy, or covered with spiny protrusions. Some are camouflaged with their natural surroundings, but others are brightly colored. Some are covered with poisonous spines or hairs to ward off predators with a painful sting.

To separate them from true worms or other insect larvae, all caterpillars have three pair of jointed, hook-tipped legs near the head and usually have five pairs of prolegs, soft fleshy projections with sucker feet, near the rear.

Control any pest in this group with Bacillus thuringiensis, a bacterium fatal to all caterpillars but harmless to most other creatures, including other insects. Some butterflies and moths have distinctive wing markings: eye spots to trick predators, patterns creating camouflage, or warning coloration to caution would-be predators of a foul taste.

Control any ground contact or a moist environment. (See ANR-1170, ANR-1035, ANR-1252, ANR-1022, and ANR-1101 for more information.)

**Odonata—dragonflies and damselflies**

Dragonflies and damselflies live anywhere water is present. Each Odonata naiad, or aquatic nymph, prefers a specific type of aquatic habitat: stream, pond, lake, or other. Varying by species, naiads may live several months or even years before emerging from the water as adults. Both naiads and adults have strong, biting mouthparts and aggressively hunt their prey, which are mostly insects. Adults have four wings and large, compound eyes, with exceptional vision and a wide view at great distances. Each wing pair operates separately, allowing them to hover, fly backward, quickly turn midflight, or land suddenly. Damselflies differ from dragonflies because they are smaller, have weaker flight skills, and fold their wings in rest rather than leaving them spread out. Neither dragonflies nor damselflies can sting.

**Orthoptera—grasshoppers, katydids, mole crickets, and crickets**

All Orthoptera have greatly enlarged hind femurs for jumping. Several are nocturnal. If winged, the fore wings are toughened and straight while the hind wings are membranous and folded. Most males make characteristic songs in three types: one for calling females, one for courtship, and another warning other males to stay.
away. Both nymphs and adults have chewing mouthparts, but diet varies by species. Orthopterans do eat plants, but many are omnivorous, eating anything they find.

Most crickets are not considered serious garden pests, except for mole crickets. They have broad front legs for digging in the soil and they attack vegetable and grass roots. Katydid live and feed mostly in trees, but do not cause significant damage. Grasshoppers in large numbers can do significant plant damage and are extremely difficult to control once they mature. Fortunately, large populations are rare and seldom present a serious problem for home gardeners. A few parts of Alabama must deal with the eastern lubber grasshopper. Watch in spring for young nymphs, using the pick-and-stomp method of pest control.

**Siphonaptera—fleas**

Fleas are tiny insects with flattened bodies and are pests to mammal and birds. They have no wings or well-developed eyes, but sense motion from their warm-blooded hosts. Adults have siphoning mouthparts and remarkably strong legs for jumping. With these powerful legs, a human could jump 250 feet. Adult fleas can carry and transmit several diseases to mammals, such as typhus and plague, but even a noninfectious bite is irritating.

### Controlling Pests

The most effective control is prevention. If pests have no place to live, eat, or breed, they won’t become a problem. Place plants in the right location for their best health. Test for healthy soil, and mulch and water appropriately for each plant. Attract beneficial insects and learn to recognize them. Select plant varieties resistant to known pests in your garden. Monitor the garden for pests and understand their cycle to know when they are most vulnerable. Know the pest spectrum associated with the plants in your garden. Many plant-feeding insects have a narrow plant host range, which makes the prediction of their appearance easier. Knowing the pest helps you determine the best control options available. (See the resources below.)

All of these points describe Integrated Pest Management, IPM, a comprehensive, well-established approach to pest control involving a combination of strategies. IPM combines knowledge with compatible biological, cultural, physical, mechanical, and chemical tactics to solve pest problems. Chemicals are sometimes necessary, but choose the least toxic product and use it in combination with other methods as appropriate for optimum results. No single method is foolproof.

Learn about the important precautions and proper uses of any pesticide. Chemical treatment should be your last resort. Use all pesticides according to the product label. The label is one of the most important pieces of garden literature. Read and follow the directions for effective use and safety. See the Recommended Resources section for treatment recommendations.

**Beneficial Insects to Know**

- **Ladybugs** – Coleoptera – adults and larvae eat aphids, scale, mites, and larvae and eggs of various insect pests
- **Ground beetles** – Coleoptera – adults eat aphids, caterpillars and other insect larvae, and slugs
- **Rove beetles** – Coleoptera – adults eat aphids, flies, eggs, maggots (especially cabbage), mites, nematodes, and springtails
- **Praying mantids** – Dictyoptera – adults and nymphs eat any insect they find
- **Hover flies** – Diptera – larvae eat aphids and small caterpillars
- **Robber flies** – Diptera – adults eat flying insects; larvae eat soil insects, such as grubs
- **Tachinid flies** – Diptera – larvae eat squash bugs, caterpillars, and Japanese beetle larvae
- **Big-eyed bugs** – Hemiptera – adults eat aphids, caterpillars, mites, soil pests, thrips, and other small insects
- **Assassin bugs** – Hemiptera – adults and nymphs eat a variety of insects
- **Minute pirate bugs** – Hemiptera – adults and nymphs feed on thrips, spider mites, and several insects’ eggs
- **Spined soldier bugs (stink bugs)** – Hemiptera – larvae eat a variety of other insects’ larvae
Plant food-sources and provide shelter to attract beneficial insects to the garden and keep them around as helpers. A few plants they use for nectar include yarrow, dill, parsley, Queen Anne’s lace, buckwheat, thyme, cilantro, clovers, cosmos, asters, mint, and sedums. Most gardens provide shelter just by their existence, but remember to keep beds mulched as an added bonus for many larvae, and sometimes adults, of beneficial insects.

### Beneficial Insects to Know

- **Ichneumon wasps** - Hymenoptera - nonstinging adults and larvae eat several soft-bodied insects
- **Broconid wasps** - Hymenoptera - nonstinging adults and larvae eat several soft-bodied insects
- **Chalcid wasps** - Hymenoptera - nonstinging adults and larvae eat several soft-bodied insects
- **Lacewings** - Neuroptera - larvae eat aphids, scales, thrips, mites, and eggs of several pest insects

### Recommended Resources

  
  This book is an excellent reference that includes information on insects in general and the collection and preservation of insects. It is available from any bookstore.

  
  This reference has extensive photographs of both pest and beneficial insects grouped by their feeding and damaging habits. It is user-friendly.


  This field guide is available in most bookstores. It has wonderful photographs in the front.


  This small, popular book has wonderful and accurate illustrations, is easy to follow, and includes geographic ranges for various species.


  This book is easy to follow and has excellent illustrations. It is available from any bookstore.

- **The Plant Diagnostic Labs (ALFA Agricultural Services Bldg, 961 South Donahue Dr., Auburn University, AL 36849-5624; and at the C. Beaty Hanna Horticulture and Environmental Center, 2612 Park Rd., Birmingham, AL 35223) in Auburn and Birmingham are another resource to proper identification.** Remember to include collection date, plant or area where collected, damage if seen, and any other pertinent information that describes the surroundings where the insect was found.