



## Integrated Pest Management for Schools

IPM 70-2

July 2002

# Interior Pests: Cockroach Identification

by Donald R. Lewis, Extension Entomologist, Iowa State University

Cockroaches are probably the most undesirable of all insect pests. To many people, they are repulsive and objectionable simply by their presence. Cockroaches are capable of transmitting disease organisms, including the bacteria that cause food poisoning, and they are an important source of allergy in some people. In short, cockroaches are insects that we love to hate!

Most cockroaches are tropical. Worldwide, there are more than 3,500 species, but only 69 species have been found in the United States. Fortunately, only four species (German cockroach, brownbanded cockroach, American cockroach, and oriental cockroach) regularly cause problems indoors in the Midwest. Correct identification is an important first step in IPM of these pests.

Cockroaches are flat, oval, and light brown to black. They have spiny running legs, chewing mouthparts, four wings, and long, threadlike antennae. Adult cockroaches commonly found in midwestern schools can be categorized into two groups based on size. The German and brownbanded cockroaches are small (less than  $\frac{5}{8}$  inch in length). The American and oriental cockroaches are larger (usually 1 inch or longer).



*German cockroach.*



*Brownbanded cockroach.*

**German cockroach.** The German cockroach is probably the most common of all cockroach species. It is approximately  $\frac{5}{8}$  inch in length and tannish brown with two dark stripes running lengthwise on the shieldlike area (pronotum) behind the head. This species prefers warm, moist areas and is therefore usually found in kitchens and bathrooms. It seldom strays far from a source of water and is typically found close to the floor (as opposed to walls and ceilings). Both sexes are fully winged. The female carries her egg capsule with her until the nymphs hatch.

**Brownbanded cockroach.** The brownbanded cockroach is  $\frac{1}{2}$  to  $\frac{5}{8}$  inch in length. Females are shorter and wider than males. The common name comes from the presence of light-colored, crosswise bands located on the upper abdominal surface. These bands are hidden under the wings of adults. The pronotum is darker and lacks the two longitudinal bands of the German cockroach. The brownbanded cockroach is found throughout a building. It wanders on walls and ceilings, as well as floors, and it enters furniture, appliances, and books more often than the German cockroach. Unlike the German cockroach, the brownbanded female glues her egg capsule to hidden surfaces inside furniture and appliances, aiding in the insect's dispersal, and complicating management efforts.

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*American cockroach.*

**American cockroach.** Although native to Africa, the American cockroach has become one of the most commonly found insects in American food preparation establishments. It is large, measuring from 1½ to 2 inches in length and a uniform chestnut brown. Females are shorter and wider than the males. This species prefers warm, humid areas such as basements, sewers, heating ducts, boiler rooms, and first floors of buildings. Females deposit egg cases in sheltered areas on or near the floor, usually close to a food source.



*Oriental cockroach.*

**Oriental cockroach.** The oriental cockroach is approximately 1¼ inches in length and varies from dark brown to almost black. The sexes look different; the females have functionless, rudimentary wing pads, whereas the males have fully developed wings that cover about ⅔ of the abdomen. This species prefers cooler conditions than do the other midwestern species. It is often found in damp basements, drain pipes, sewers, and crawl spaces. Oriental cockroaches may find their way into other areas of buildings through drainpipes. They reproduce outdoors in trash piles and in unheated outbuildings. As cold weather approaches, these outdoor populations may cause problems by seeking shelter in nearby homes.

## Horticultural Tips: Perennial Maintenance

by Richard Jauron, Extension Horticulturist, Iowa State University

Perennials are attractive additions to school grounds. They also can cultivate an appreciation of plants in students and staff. Selection of perennials adapted to the site and good cultural practices should ensure a colorful display.

**Plant selection.** Low-maintenance, long-lived perennials that perform well in full sun to light shade include butterfly milkweed (*Asclepias*), false indigo (*Baptisia*), hardy geranium (*Geranium*), sunflower (*Heliopsis*), daylily (*Hemerocallis*), blazing star (*Liatris*), daffodil (*Narcissus*), peony (*Paeonia*), balloon flower (*Platycodon*), coneflower (*Rudbeckia*), stonecrop (*Sedum*), speedwell (*Veronica*), and most ornamental grasses. Goat's beard (*Aruncus*), bugbane (*Cimicifuga*), hosta (*Hosta*), Virginia bluebells (*Mertensia*), lungwort (*Pulmonaria*), Siberian squill (*Scilla*), and most ferns are excellent shade-tolerant perennials.

**Mulching.** Mulches are an excellent way to reduce maintenance activities in perennial plantings. Mulches conserve soil moisture, reducing the need to water. Mulches also help control weeds by preventing the germination of annual and perennial weed seeds. Additionally, mulches prevent the splattering of soil onto foliage and flowers, which keeps the plants cleaner and may reduce disease problems.

Excellent mulching materials for perennial beds and borders are shredded bark and wood chips. These materials are widely available, attractive, and long-lasting. Other possible mulches include ground corncobs, shredded leaves, dry grass clippings, and pine needles. Place 2 to 3 inches of mulch around the perennials, avoiding placement of the material directly over the plant crowns.

**Watering.** Many perennials perform best when they receive 1 to 1½ inches of water per week, either from rain or irrigation. When watering, soak the soil to a depth of 8 to 10 inches. Watering frequency is largely determined by soil characteristics, weather conditions, and plant species. Perennials, such as sedum and



*Coneflowers (Rudbeckia) bloom in summer.*

butterfly milkweed, have excellent drought tolerance. Once established, these drought-tolerant perennials require little or no watering.

**Deadheading.** Deadheading, or the removal of faded flowers during the growing season, prolongs the bloom period of some perennials. Deadheading also improves the appearance of many perennials because the spent flowers are often unattractive and it prevents fruit formation. Fruit development diverts resources away from other plant parts, which may weaken the plant and result in fewer flowers.

**Fertilizing.** For most perennials, an application of 1 to 2 pounds of an all-purpose garden fertilizer,

such as a 10-10-10, per 100 square feet of landscaped area would be adequate. Excess fertilization produces weak, leggy (tall and spindly) growth and inhibits flowering. Early spring (late March to mid-April) is the best time to fertilize perennials in Iowa.

**Cleanup.** Most perennials die back to the ground after the first hard frost. The dead plant debris should be cut off and removed in late fall or early spring of the following year. Removal of this material improves the appearance of the area and may reduce the severity of disease problems, because plant pathogens often persist in the dead debris.

### Update on School Lesson Plans

Carol Pilcher (Pest Management and Environment Program, Iowa State University) recently released the lesson plan “Environmental Awareness Surrounding Pesticide Use and the Impact of Conservation Organizations.”

Rachel Carson’s *Silent Spring* is the platform for this lesson plan, which is designed to help students understand the environmental concerns involved with pesticide use. The lesson provides teachers with the following:

- background information,
- worksheets, and
- resources that involve students in critical examination of pesticide use.

This resource can be used by teachers in 11th grade social studies classroom activities. It is available in at <http://school.ipm.iastate.edu> under “Lesson Plans.”

## Exterior Pests: Apple Scab

by Mark L. Gleason, Extension Plant Pathologist, Iowa State University

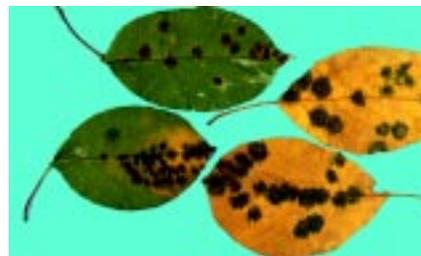
In many ways, crabapples (“crabs”) are the premier small tree for midwestern U.S. landscapes. Their toughness is highly prized, because they can survive almost any winter and adapt to almost any soil type. The springtime bloom of crabapples is eye-catching and sweet-smelling. Yet another great crabapple trait is its diversity; you can buy crabs in almost any desired combination of crown shape, tree size, bloom color, and fruit type and color, because the number of commercial crab cultivars now exceeds 500.



Olive-brown, smudgy spots on a crabapple leaf are caused by apple scab.

A downside to crabapples is their vulnerability to a fungal disease called apple scab. Scab is the reason that some crabapples drop their leaves during the summer. When this happens, the landscape value of the crabapple plummets. Crabs do not die from this disease, but who wants to look at a bare-branched tree all summer and fall! Scab is the main reason that crabs get little respect from many landscape managers.

The scab fungus, *Venturia inaequalis*, burrows into the leaf tissue in the summer and lurks inside fallen leaves during the winter. In the spring, during rainy weather, scab spores called ascospores are released from the decaying leaves and then drift up



Green leaves (left) show early stages of scab attack; at a later stage of the disease (right), leaves have turned yellow and will soon fall off.

into the air and onto other leaves. Infections by these spores produce smudgy-looking, olive-green leaf spots. These spots

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generate more spores, called conidia. More spores beget more infections, which beget more conidia, and the scab population snowballs. Severely infected leaves turn yellow and fall to the ground. If apple scab was severe in your region last year, a scab epidemic is more likely this year.

You can see why it is reasonable to expect moderately resistant crabs to perform increasingly poorly during a string of wet years. So blaming the weather is sometimes legitimate. However, all it takes is one relatively dry spring and summer to melt the scab-spore avalanche and improve the performance of these trees.

Apple scab can be managed with fungicide sprays, but few school systems have the time or money to go that route. Genetic resistance is a much simpler and easier way to beat scab. The good news is that there are many crabapple cultivars that are highly resistant to this disease. Thanks to years of painstaking breeding and selection, customers can find cultivars that combine high-level scab resistance with almost any combination of tree size, crown shape, bloom color, and fruit characteristics.

In Iowa, the following species and cultivars are highly resistant to scab and are recommended by Jeff Iles, chairman of the Department of Horticulture, Iowa State University, and a noted crab expert:

‘Adirondack’, *Malus floribunda*, Golden Raindrops<sup>®</sup>, Harvest Gold<sup>®</sup>, Lancelot<sup>®</sup>, ‘Louisa’, ‘Purple Prince’, Red Jewel<sup>®</sup>, Sugar Tyme<sup>®</sup>, and *Malus × zumi* ‘Calocarpa’. These examples are all small-fruited types, so you would not have smelly, fallen fruit that attract wasps.

Good cultural management also can help to suppress scab. Annual pruning of crabapples to thin out the inner branches, remove water sprouts (suckers), and open the canopy to better air movement speeds drying and thereby lowers scab risk. Proper pruning definitely promotes a better-looking tree.

Raking fallen leaves in late October is another management tool. Because most of next year’s scab spores come from this year’s old leaves, raking helps minimize spore survival for the next several years. It is advisable to burn, bury, or dispose of the scabby leaves.

The cultural approach—selecting highly resistant cultivars, annual pruning, and raking fallen leaves—is the best and most efficient way to keep your crabs in top shape. What if your school’s landscape includes crabs that defoliate in most years? A cost-effective, long-term answer might be to gradually take them out, replacing them with lower maintenance cultivars that are highly resistant to this common disease.

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