Integrated Pest Management for Schools

IPM 70-4 October 2002

Horticultural Tips: Houseplant Care

by Cindy Haynes, ISU Consumer Horticulture Extension

Adding houseplants to a school classroom is an easy and attractive way to make the classroom more pleasant and conducive to learning. Many of our most common houseplants are native to tropical areas and therefore are adapted to lower light levels and consistently warm temperatures. But keeping them *thriving* instead of just *surviving* indoors can be a challenge. For success with houseplants, it's all about the proper environmental conditions. Below are a few environmental guidelines to successfully grow houseplants indoors.

Light. Most houseplants prefer bright light; thus, indoor houseplants should be placed next to a window or under commercially manufactured grow lights. There are a few plants that can survive in the darker corners of your classroom, yet they do not thrive and are often short-lived.

A dozen "no fail" houseplants

Spider/airplane plant
Snake plant/sansaveria
Pothos/devil's ivy
Philodendron
Peace lily
Weeping fig/ficus tree
Chinese evergreen
Moth orchid
African violet
Holiday cactus
Jade
Inch plant

Temperature. Houseplants typically prefer temperatures between 60 and 80°F. Temperatures above 85°F or below 55°F can injure some plants. Keep plants away from drafty windows and doors, especially in the winter. It is also a good practice to avoid getting cold water on the foliage of sensitive plants such as African violets.

Water. Check each plant regularly to determine its water needs. If the top inch of the potting soil is dry to the touch, water the soil thoroughly. Apply enough water until it flows out the bottom of the container and into a saucer. Discard excess water in the saucer as soon as possible. Do not let plants sit in water for long periods because submerged roots often die. Plants need to be watered more frequently during peak growing seasons such as summer but less in winter.

Fertilizer. Unless the plant is blooming, avoid fertilization in the winter. Because most plants are not actively growing in the winter, they do not require large amounts of nutrients. When plants are actively growing (spring and summer), fertilize regularly with

Moth orchid.

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a dilute fertilizer solution; one-half of the recommended rate listed on the fertilizer container for houseplants is sufficient.

Other suggestions. Plants growing indoors inevitably require regular maintenance such as repotting, division, or cutting back. It is best to wait until spring to do this type of maintenance to permit quick plant recovery and establishment. Always purchase plants that seem healthy and free of insects or diseases. When moving plants into your classroom from their summer place on your patio, check for whiteflies or other insect pests. If present, treat the plants with insecticidal soap or another product registered for use on houseplants before moving the plants indoors.

African violet.

Exterior Pests: Brown Evergreen Needles

by Paula Flynn, Extension Plant Pathologist, Iowa State University

Should you be concerned if conifer needles turn brown? After all, these trees are commonly called "evergreens." If green needles turn brown, take a minute to consider some possible reasons for the change.

First, understand that normal changes take place in evergreen trees as fall approaches. Spruce, pine, fir, arborvitae, and other conifers go through a seasonal needle loss or fall needle drop that involves shedding the oldest (innermost) needles. Before dropping, these needles may be bright yellow or even brown. This natural needle loss is often most dramatic on white pine, which tend to keep only 1-year's worth on needles on the tree. Other conifer species, such as spruce and fir, retain their needles for several years. Needle loss on arborvitae can be especially alarming because the oldest foliage turns dark brown and is thus noticeable.

To help distinguish a disease problem from a routine occurrence, consider browning pattern and the time of year. Normal needle loss typically begins to occur as fall approaches. The entire tree shows yellowing or browning of the inner needles, not just a few scattered branches or just the lower branches.

Keep in mind that some conifers drop all of their needles each season. Examples of these trees are bald cypress and larch, often referred to as deciduous conifers. All of their needles are supposed to turn brown and generally drop off the tree by winter. There have been unfortunate cases where these trees were removed because they were mistakenly thought to be dead.

A second reason evergreen needles turn brown is the presence of a disease organism. Spruce and pine tree samples are among the most common samples submitted to the ISU Plant Disease Clinic. Following are brief descriptions of common diseases of spruce and pine in Iowa.

Sphaeropsis (Diplodia) tip blight is a frequent problem on Austrian pine and also occurs on Scots pine. Newly emerging shoots turn brown and show stunted needles. In the fall, small black fungal

Reddish brown bands and tip browning characteristic of Dothistroma needle blight.

Normal fall needle browning on bristle cone pine.

Rhizosphaera needle cast on spruce.

Stunted, brown shoots on Austrian pine.

Normal fall needle yellowing on white pine.

structures can be seen at the base of infected needles and on the scales of the cones. Annual destruction of new growth gradually causes trees to decline.

Dothistroma needle blight and **brown spot needle blight** are common diseases of Austrian pine and Scots pine, respectively. In both diseases, the needles develop yellow-to-brown spots or bands where a fungal infection occurs. The fungus eventually encircles and constricts the needle, causing tissue death from that point outward. Affected trees are brown. In general, these two diseases begin on the lower branches of a tree and spread upward over a several years.

Rhizosphaera needle cast is a troublesome fungal disease on spruce trees, especially blue spruce trees. Older (innermost) needles turn purple-brown and drop from the tree prematurely. Viewing affected needles with a hand lens shows small, black fungal structures arranged in a row along the length of the needles. As with many of the conifer needle diseases, the disease usually starts on lower branches and spreads upward.

There are several measures that can be taken to prevent and control needle diseases of conifers. Inspect trees for problems before planting and avoid planting susceptible trees near infected trees. Promote good air circulation by proper tree spacing and weed control. Keep trees growing vigorously by mulching and watering as needed. Don't prune trees when the foliage is wet.

If a fungal disease is established, management consists of protectant fungicide sprays. For most needle diseases, fungicides are applied in the spring as the new growth emerges, and sprays are repeated once or twice, depending on the disease.

Keep in mind that other factors can cause browning of needles. Planting a tree too deep, rodent or deer feeding, insect and mite feeding, drought stress, mechanical injury to the base of the tree, and salt spray damage also may cause browning. An accurate diagnosis of the problem is critical to correctly manage the situation.

A good reference for diagnosing infectious disease problems on conifers is the Iowa State

University Extension bulletin PM 1528 "Common Diseases of Conifers in Iowa." This bulletin is available through your local county extension office or from the ISU Extension Distribution Center at http://www.extension.iastate.edu/Pages/pubs/ or by calling (515) 294-5247.

If you would like assistance diagnosing a conifer problem, submit a sample to the ISU Plant Disease Clinic. Collect samples that show a range of symptoms, from early to advanced and provide a detailed description of the problem (overall pattern of browning and how quickly the problem has progressed). There is a $10 fee for disease diagnosis. For more information visit their Web site at www.isuplantdiseaseclinic.org or call (515) 294-0581.

Interior Pests: Ants

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

There are approximately 8,800 different species of ants in the world. Only 700 different species are found in the United States and only 42 ant species have been documented from Iowa. Of those, only 12 are routinely encountered in or around homes and other buildings. Ants rank as one of the most common insect pests in schools and other buildings. Although ants play a beneficial role in most environments, ants in the school are undesirable because they can contaminate food, damage the structure, or alarm students and staff simply by their presence.

Successful ant pest management begins with accurate identification. Proper diagnosis opens access to useful information about pest biology, behavior and habits, and the best method of control, if needed.

Ants are notoriously difficult to identify. Most ants are small and hard to see without magnification (10× hand lens). Even the larger ants look alike to the untrained eye. The accompanying guide (see pages 5 and 6, which can be removed for ease of use) provides diagnostic drawings and descriptions of the eight most common ants found in buildings in Iowa. Only worker ants (the wingless caste) are described.

If you would like help in identifying the ants present in your school, collect several specimens in a watertight vial, add rubbing alcohol (not water), and put the vial in a crush-proof box or padded envelope. Include your name and contact information and where the specimens were found. Take this parcel to your local county extension office or mail directly to the Iowa Insect Diagnostic Clinic, 104 Insectary, Iowa State University, Ames IA 50011. There is no charge for specimen identification.

In addition to correct identification of the ant species involved, successful ant pest management involves the following:

- inspection,
- elimination of contributing conditions,
- exclusion,
- barrier sprays,
- direct nest treatment, and
- baiting.

Inspection is essential for determining where ants are a problem. Area monitoring with glue boards or other sticky traps works well. Bait stations containing a small amount of food also can be used to determine where ants are nesting or foraging.

Candy, peanut butter crackers, cookies, and other student treats that are not kept in a plastic or glass container are inviting visits from foraging ants. Classroom birthday parties often leave many morsels of food on the floor for ants to find. If you are not able to clean the area thoroughly once festivities are done, inform the building maintenance staff, especially for carpeted rooms that do not easily reveal dropped food crumbs.

Excluding ants is very difficult because of their small size. Ants can easily pass under doors, around closed windows, and through cracks in foundations. Repairing large structural defects and caulking cracks where ants are known to gain access to the facility help pest management efforts.

Exterior barrier insecticide sprays can be effective for outdoor species that are foraging indoors. Treat the school perimeter, nests, trails, and areas of activity. Interior treatments should be limited to cracks and crevices in areas where ants are most active. Locating and treating only the nest is a very effective way of decreasing the ant population.

Baiting has become the most popular ant control technique during the past 5 years. Baits have the advantages of being effective, targeted (pest-specific), long-lasting, very low hazard, and compatible with most IPM programs.

Successful ant baiting requires that you learn the needs and habits of your targeted species and match the available products to your pest. The location, number, and amount of bait must be adjusted to site conditions. Baits also must outcompete other food sources; cleanliness and sanitation are critical to bait success. Baits may seem more expensive and require time for acceptance, but improved results are usually worth the extra cost. Interior insecticide treatments are counterproductive to ant baiting programs.

Guide to Common Ants in Iowa

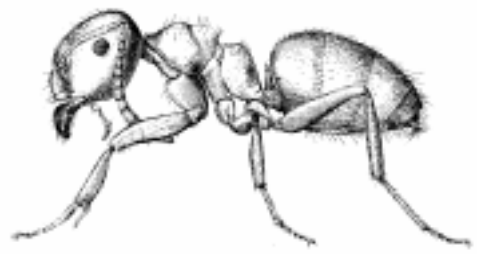
(Wingless workers only)

Prepared by Donald R. Lewis, Department of Entomology
Iowa State University

Pharaoh ant, *Monomorium pharaonis*
1/16 inch; 2 nodes; light yellowish red
12 antennal segments, w/3-segmented club

Larger yellow ant
Acanthomyops interjectus
1/4 inch; 1 node; yellow-orange
Very small eyes

Thief ant, *Solenopsis molesta*
1/16 inch; 2 nodes
Light brown to yellow
10 antennal segments, w/2-segmented club



Field ant, *Formica* spp.
3/8 inch; 1 node
Brown to black
Thorax silhouette uneven in side view

Odorous house ant, *Tapinoma sessile*
1/8 inch; 1 node that is not easily seen
Dark brown to black
Abdomen slopes forward over node

"Smaller" carpenter ant
Camponotus nearcticus
1/4 to 1/2 inch; 1 node; brown; red thorax
Evenly rounded thorax

Pavement ant, *Tetramorium caespitum*
1/16 to 1/8 inch; 2 nodes
Yellowish red; 1 pair of spines on thorax
Sculptured lines on head

Black carpenter ant,
Camponotus pennsylvanicus
1/2 to 3/4 inch; 1 node; black
Evenly rounded thorax

Adapted from USDA Technical Bulletin 1326 (1965).

Biology of Common Ants in Iowa

Ant Species	Food Preferences						Size Variation		Queens		Colony Propagation
	Honeydew	Sweets	Protein	Oils	Seeds	Insects	Monomorphic	Polymorphic	Single	Multi	
Pharaoh ant		✕	✕	✕		✕	✕			✕	Budding; extended colonies
Thief ant		✕	✕	✕	✕	✕	✕		✕		Swarms, late summer
Odorous house ant	✕	✕				✕	✕			✕	Swarms, fall; budding; extended colonies
Pavement ant	✕	✕		✕	✕	✕	✕			✕	Swarms, spring to fall
Larger yellow ant	✕	✕				✕		✕	✕	✕	Swarms, late spring

Adapted from Stoy Hedges (1998) Field Guide for the Management of Structure-Infesting Ants, 2nd ed.

Pesticides Use in and around Schools

by Mark Shour, School IPM Coordinator, Iowa State University

Of the various chemicals used in and around schools, pesticides are currently receiving special scrutiny. Concern about chemical insults to wildlife and the overall environment has influenced legislative efforts since the 1970s. Governmental inquiries about how pesticides affect children were met with few definitive answers, largely because most research efforts to determine the effect of pesticides on humans have focused on adults. A child's body size; contact with the environment; greater intake of air, food, and water; and metabolic differences relative to adults lead some to conclude that pesticides are more hazardous to children than adults. Others cite poison control center data that rank pesticides much less hazardous than other chemicals and thus suggest that pesticdes do not pose a significant risk if properly applied and stored.

While these debates ensue, keeping school facilities clean and free of harmful pests must occur. Using integrated pest management (IPM) methods can meet the demands of maintenance schedules and minimize unnecessary exposure to pesticides and other chemicals, but first a few basic questions must be answered: What are pesticides? Which pesticides are used at your school? What is the difference between pesticide toxicity and hazard?

A pesticide is any substance or mixture of substances intended for preventing, destroying, repelling, or reducing the severity of pest incidence. Some common groups of pesticides (and the pest controlled) are insecticides (insects, mites, and spiders), herbicides (weeds), fungicides (fungi), rodenticides (mice and rats), and molluscicides (slugs and snails). Another group of pesticides is the disinfectants, chemicals that kill disease-causing organisms.

Some situations where pesticides can be used in and around schools as an IPM tool include ants in the lunchroom, cockroaches in the kitchen, white grubs in athletic fields, weeds in parking lots and along fences, and microorganisms ("germs") on water fountains and in swimming pools. Even in these situations, the concentration, placement, and timing of a pesticide application are crucial for the safety of people and other nontarget organisms.

The pesticide label is the resource for the safe use, storage, and disposal of a product, as well as telling you what to do if pesticide poisoning occurs. This printed information on the container also gives an indication of how toxic the pesticide is to humans through the use of "signal words." "Caution" is the word associated with the least toxic pesticides, "Warning" with moderately toxic products, and "Danger-Poison" with the most toxic pesticides.

The toxicity (or poisonous nature) of a product is only a part of the hazard (or risk) associated when using a pesticide. The amount of chemical that enters the body, the way the pesticide enters the body (eyes, skin, mouth, or lungs), and the number of times you contact the substance also are involved. These factors are collectively called exposure. If a moderately toxic pesticide (Warning signal word) is placed in an area with virtually no human exposure, the associated risk from the treatment is low. Conversely, if a product with the Caution signal word is applied to a surface where humans frequently contact it (e.g., student desks), a very hazardous situation occurs. A complicating factor in these considerations is whether the exposure to a pesticide causes acute (immediate) responses or whether it is one of several exposures that lead to chronic effects (long-term).

The decision to use a pesticide in a school IPM program is not easy. It must be preceded with unsuccessful, nonchemical management strategies and a careful assessment of the potential hazard associated with pesticide use.

Pesticide application to turfgrass.

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Special Offer for Iowa Schools

Iowa State University Extension is offering a video set *The ABC's of IPM* at a reduced cost to all school districts in Iowa. These professionally produced videos provide instruction, content, illustrations, and examples of integrated pest management for school facilities. The material is applicable to school staff, faculty, and administrators.

The five-video set and accompanying user guides are available for $75 plus $5 for shipping and handling (a savings of $75). If you are interested in purchasing this resource for your district, contact Dr. Mark Shour by fax at (515) 294-8027 or e-mail mshour@iastate.edu

Integrated Pest Management for Schools is published by Iowa State University Extension, with funding support from the Iowa Department of Agriculture and Land Stewardship through a grant from the U.S. Environmental Protection Agency. To subscribe write to School IPM, 109 Insectary, Ames, IA 50011-3140 or call 515-294-1101. Please indicate that you are inquiring about *Integrated Pest Management for Schools*. Mark Shour, Department of Entomology, is executive editor of the *Integrated Pest Management for Schools* newsletter; Julie Todd, Department of Entomology, managing editor; and Beth Kroeschell, freelance production designer.

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