Invasive Urban Pests
of Concern in Arkansas: Insects and Diseases

This is intended to inform citizens about invasive species already in Arkansas or that are anticipated to arrive and impact urban environments. Invasive species arrive via natural dispersal, or by accidental or thoughtless movement. Most invaders go unnoticed until they become plentiful enough to cause economic or environmental damage. Preventing establishment of invasive species is easiest when the invader is detected early, thus, vigilance is crucial. Once an invasive species becomes established, managing its spread may become expensive with the need for multiple control strategies. If you see any of these pests, contact the Arkansas State Plant Board at 501-225-1598.

Recognizing and reporting invasive pests is everyone's responsibility.

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Arkansas Agriculture

Invasive Insects Pests

Asian Longhorned Beetle *Anoplophora glabripennis*

This beetle was first found in Brooklyn, N.Y., in 1996, and is now found in the greater New York City area, New Jersey, Chicago and near Worcester, Mass. The beetle likely arrived in hardwood crates or pallets from Asia. Local interceptions elsewhere in the U.S. resulted in its control.

The Asian longhorned beetle attacks healthy and stressed hardwood trees, like maple, birch, horse chestnut, poplar, willow, elm and ash. Adults are active during summer and early fall.

A mated female chews 35-90 depressions into a tree's bark and lays a single egg under the bark at each site. After hatching, larvae bore into the tree's heartwood. Repeated reinfestation eventually kills the tree. Stopping the spread of this pest involves cutting infested trees and chipping or incinerating all tree remains. Systemic insecticides can be applied to protect high-value trees from becoming infested.

Emerald Ash Borer, *Agrilus planipennis*

This small, metallic-green, Asian beetle was first discovered killing ash trees in Michigan in 2002. Since then, it has spread throughout the midwestern and eastern U.S. and Canada.

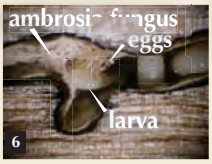
Adults feed on leaves and cause little damage. However, larvae feed on the inner bark of ash trees, which causes tree death. After the first year of infestation, small D-shaped exit holes are found on the trunk and branches. The bark may split vertically above larval galleries.

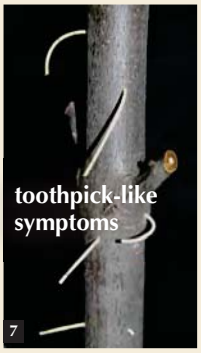
Stressed ash trees are most vulnerable to attack and decline, but even healthy trees in woodlots and urban settings have been killed. Stopping the spread involves cutting infested trees and chipping or incinerating all tree remains. Systemic insecticides can be applied to protect high-value trees from becoming infested.

Granulate Ambrosia Beetle *Xylosandrus crassiusculus*

This invasive pest attacks thin-barked woody ornamentals. It was introduced into South Carolina in the 1970s and was first noticed in Arkansas in 2002.

The beetle significantly damages a wide range of ornamental and fruit trees. Adult females are attracted to damaged, stressed, or transplanted trees, but will also attack healthy trees. Beetles bore into the sapwood of a young tree to create larval galleries; the galleries are inoculated with an ambrosia fungus that is used as food by larvae and adults. The beetle also transmits pathogenic fungi that can ultimately kill the infected plant.



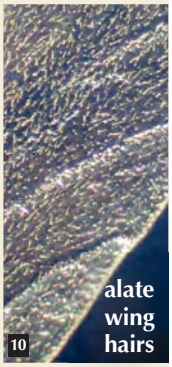


Symptoms of beetle infestation include wilted foliage and strands of boring dust ("toothpicks") protruding from entrance holes. Activity begins in March and peaks in mid to late April. Protective trunk sprays with pyrethroid insecticides have been helpful in preventing attack.

Formosan Subterranean Termite *Coptotermes formosanus*

This invasive pest is the most widely distributed and economically important termite in the world. It was accidentally introduced into southern port cities in the mid-1900s.

Infestations are currently reported from cities throughout the south, as well as California and Hawaii. The Formosan subterranean termite is spread by human commerce, especially in used railroad crossties and landscaping timbers that originate from infested areas.



Formosan termite colonies are generally much larger than native subterranean termite colonies (millions vs. hundreds of thousands). The large colony size of Formosan termites allows for more structural damage to occur in a shorter time. Identification includes presence of winged termites (alates), whose wings are densely covered with small hairs, and soldiers with orange-brown, oval-shaped heads. Alates generally swarm from dusk to midnight on calm and humid spring evenings and are attracted to lights.

Red Imported Fire Ant, *Solenopsis invicta*

Imported fire ants were accidentally introduced into the U.S. from South America about 70 years ago and were first found in Arkansas in 1958, in Union County. Currently, fire ants occur throughout southern Arkansas and have been found in a few northern counties. Most counties in the northern half of Arkansas are free of fire ants, and a quarantine is in effect to prevent the further spread of this invasive pest.

Red imported fire ant workers are aggressive, reddish-brown ants that range from 1/8 to 1/4 inch long. They build conspicuous nests that often appear as dome-shaped mounds of soil. In sandy soils, mounds are flatter and less visible. Mounds are usually built in sunny, open areas, like lawns, athletic fields and parks, but fire ants may also occur in rotting logs, around trees and stumps, under pavement and buildings and occasionally indoors.

When nests are disturbed, numerous fire ants aggressively emerge and attack any intruder. Fire ants inflict a painful, burning sting that results in a pustule and intense itching, which may persist for days. Pustules may become infected. Allergic reactions to fire ant stings can lead to rashes, swelling and even to paralysis or anaphylactic shock. Severe allergic reactions, though rare, may be fatal.

Control methods include broadcast bait applications, individual mound treatments, a combination of the previous two methods and barrier and spot treatments.

Invasive Diseases

Plum Pox (also called Sharka), Plum Pox Virus (PPV)

Plum Pox (aka Sharka) is a disease of stone fruits (nectarines, peaches and plums) that first appeared in Pennsylvania in 1999. The virus is carried in infected nursery stock, grafts and bud wood. The virus is transmitted among plants by aphids.

Symptoms vary among species or cultivars and include light-green leaf veins or yellow to light-green rings on leaves. Distorted fruits can show characteristic rings or spots, making the fruit less marketable.

Managing Plum Pox requires using disease-free planting stock to prevent introduction of infected plants to new areas. Once the virus is introduced, sanitation through removing infected trees is required, because a single infected tree can lead to subsequent infections.

White Rust of Chrysanthemum, *Puccinia horiana*

White Rust of Chrysanthemum is caused by the fungus *Puccinia horiana*. The rust apparently originated in China and Japan, but now occurs worldwide. Outbreaks have occurred in Canada and the U.S. but were successfully eradicated.

Chrysanthemum white rust is recognized by small (up to 4 mm wide) white to yellow spots on the upper leaf surface; the spots eventually become brown. Rust pustules form on the underside of the leaf, beneath small white to yellow spots. Pustules are light pink but become white as they age. Pustules are most common on young leaves and flower bracts, but can be found on any green tissue and even flowers.

Symptoms occur mostly during cooler, wet weather, and usually develop within 5-14 days after infection. Fungal spores can be spread by splashing water or wind. Twelve species of chrysanthemum are susceptible, including pot, spray and garden mums.

Disease management requires sanitation and preventing fungus introduction. The disease spread has been checked primarily by quarantines. Because the rust can spread rapidly, early detection is critical.

Bacterial Wilt of Geranium *Ralstonia solanacearum*

Bacterial wilt of geranium (also called Southern wilt) is caused by the bacterium *Ralstonia solanacearum* race 3 biovar 2. This bacterium also causes a wilt disease in potatoes, tomatoes, peppers and eggplant and a few weeds.

Symptoms include wilting of leaves and/or abnormal yellowing of lower leaves. Wedge-shaped yellow patterns expand toward the leaf edge. Leaf edges become yellow, eventually turning brown. Wilted plants may initially recover at night or during cooler periods, but soon go into a permanent wilt and eventually die. Symptoms are most pronounced during hot weather. Lower leaves tend to wilt first and become chlorotic, and the wilt progresses from older to younger leaves. Leaf spots are rarely present. Brown discoloration appears inside and outside the lower stems. Stems may become very soft and ooze a milky liquid when cut.

The *Ralstonia* bacterium can be transmitted through soil, contaminated irrigation water and tools. Bacteria also may be spread by transplanting and propagating from infected plants, and during plant pinching, but are not readily spread through splashing water or by wind. Management includes sanitation, eradication, and exclusion.

Dogwood Anthracnose, *Discula destructiva*

Dogwood anthracnose is caused by the fungus *Discula destructiva*. It is likely more serious than spot anthracnose, another fungal disease of dogwood. Dogwood anthracnose can lead to tree death under certain conditions. The fungus has killed many dogwoods in the Southeastern United States since its introduction in the early 1970s, and it continues to spread.

Dogwood anthracnose is known to infect flowering dogwood, Pacific dogwood and kousa dogwood. Symptoms range from leaf lesions, twig blights to stem cankers. Leaf lesions are dark brown and irregular in shape, and often originate near leaf edges. The fungus can grow into branches and trunks from infected leaves.

This disease tends to be more severe under cool (65-75^{0}F), wet and shady conditions at higher elevations. Spores of *Discula* can spread on wind-borne

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Tomato Yellow Leaf Curl
Tomato Yellow Leaf Curl Virus

Tomato yellow leaf curl is caused by the tomato yellow leaf curl virus. It is considered to be one of the most serious diseases of tomato, especially in tropical and subtropical regions.

Infected tomato plants are stunted with erect or upright growth; plants infected at an early age will show severe stunting. Leaves of infected plants are smaller, with yellow margins and tend to curl upward. Infected plants have a "bunched" growth appearance. Yellowing of leaves is a symptom of virus infection. Flowers often drop prematurely, reducing fruit production.

Whiteflies can inoculate multiple plants and spread the virus over short distances, eventually infecting entire fields. Long-distance virus spread is mostly via movement of infected transplants. Some perennial weeds may serve as hosts and allow the virus to become established. Infected plants cannot be cured.

Disease management includes resistant varieties, transplants free of whiteflies, sanitation, and weed management. The virus does not appear to be seedborne in tomato.

Dogwood Anthracnose, *Discula destructiva*

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water droplets and by some insects. Young leaves and sprouts are especially susceptible to infection. Long-distance spread of the disease is through infected nursery stock.

Severely affected trees may not be saved. Sanitation and planting resistant varieties are the best ways to manage dogwood anthracnose. Some cultivars of kousa dogwood (*C. kousa*) and hybrids of *C. florida* X *C. kousa* have varying levels of disease resistance.

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Fig. 1, Asian longhorned beetle beside exit hole: Alan Sawyer, USDA-APHIS

Fig. 2, Emerald ash borer adult: Howard Russell, Michigan State University, Bugwood.org

Fig. 3, Emerald ash borer larva: David Cappaert, Michigan State University, Bugwood.org

Fig. 4, Emerald ash borer larval galleries: Art Wagner, USDA-APHIS PPQ, Bugwood.org

Fig. 5, Granulate ambrosia beetle (GAB) adult: John D. Hopkins, University of Arkansas

Fig. 6, Ambrosia fungus, GAB eggs, & GAB larvae: John D. Hopkins, University of Arkansas

Fig. 7, Toothpick-like symptoms caused by GAB adults: John D. Hopkins, University of Arkansas

Fig. 8, Formosan subterranean termite alates: Scott Bauer, USDA Agricultural Research Service, Bugwood.org

Fig. 9, Formosan subterranean termite workers and soldiers: Scott Bauer, USDA Agricultural Research Service, Bugwood.org

Fig. 10, Hairs on wing of Formosan subterranean termite alate: John D. Hopkins, University of Arkansas

Fig. 11, Red imported fire ant mound in turf: John D. Hopkins, University of Arkansas

Fig. 12, Red imported fire ant workers: John D. Hopkins, University of Arkansas

Fig.13, Plum Pox of Peach: European and Mediterranean Plant Protection Organization Archive, Bugwood.org

Fig.14, White Rust of Chrysanthemum: Division of Plant Industry Archive, Florida Department of Agriculture and Consumer Services, Bugwood.org

Fig.15, Southern Bacterial Wilt of Geranium: Jean L. Williams-Woodward, University of Georgia, Bugwood.org

Fig.16, Southern Bacterial Wilt of Geranium: Jean L. Williams-Woodward, University of Georgia, Bugwood.org

Fig.17, Tomato Yellow Leaf Curl: Division of Plant Industry Archive, Florida Department of Agriculture and Consumer Services, Bugwood.org

Fig.18, Dogwood Anthracnose: Joseph O'Brien, USDA Forest Service, Bugwood.org

Fig.19, Dogwood Anthracnose: Stephen Vann, University of Arkansas

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