



Elm bark beetle, Smaller European

Scolytus multistriatus

Order Coleoptera, Family Scolytidae;
bark or engraver beetles
Introduced pest

Host plants: All species of elm and Japanese Zelkova

Description: Adult beetles are 2–3 mm long with black head and thorax and reddish-brown elytra. Larvae are white, C-shaped and legless, with a brown head.

Life history: Adults emerge in the spring or early summer when elm leaves have fully developed, and feed in twig crotches on healthy elms. They move to and excavate egg galleries in weak or stressed elms, and larvae live in galleries, which they construct under the bark. Egg galleries of native elm bark beetles run against the grain, while smaller European elm bark beetle egg galleries run with the grain. Beetles vector *Ophiostoma (Ceratocystis) ulmi*, the causal agent of Dutch elm disease. Beetles emerge from diseased elms and fly to healthy elms to feed carrying spores of the fungus. When these fungus-infested beetles feed on healthy tree branches, they make small wounds in the wood, and the fungus enters the branch through these wounds. The fungus spreads to the entire portion of that tree and causes the leaves to wilt. There are multiple generations a year.

Overwintering: Larvae under bark.

Damage symptoms: The foliage of diseased branches wilts, turns yellow, then brown, and finally dies. Exiting beetles leave numerous pin-sized holes in the bark. Frass gathers under infested trees. The diagnostic key is brown streaks in infected sapwood.

Monitoring: Monitor American elms for wilt symptoms throughout the summer, but particularly in April and May. Remove any suspicious branches and send them to a diagnostic laboratory for analysis. Carefully watch trees for any signs of further wilting. If wilt occurs in more than 25% of the tree crown, the tree cannot be saved. Look in May for flagging and yellowing in crown terminals. Hang pheromone traps in early spring to monitor the appearance of adults beetles.

Physical control: Trees can be saved by eradicator pruning, if the disease is detected early. Infested trees and diseased or damaged branches should be removed, burned, or buried. If you suspect a tree has Dutch elm disease, remove a recently wilted branch and strip off the bark. Locate the wilted branch and remove the bark until clean sapwood (not discolored) is found. Remove the branch approximately 10 feet below the junction of clear and discolored sapwood. Be sure to disinfect pruning tools in a 10% household bleach solution. Eradicator pruning may result in the loss of a major tree limb. Nevertheless, many American elms can be saved by this pruning method. Infested trees that cannot be saved should be removed, burned or buried to prevent further spread of the patho-



Galleries in elm tree caused by smaller European elm bark beetle. Larger main galleries are adult egg-laying galleries. Smaller galleries are larval-tunneling galleries. Smaller European elm bark beetle main egg-laying galleries run with the grain, while main galleries of native elm bark beetle run against the grain. (104)



Smaller European elm bark beetle adult. (103)
Photo: John Davidson

gen. If wilt occurs in more than 25% of the tree crown, the tree cannot be saved. Check to see if adjacent elms are within 25–50 feet before removal. If so, disrupt root grafts by trenching before cutting the tree down. It must be assumed that all American elms within 50 feet of a diseased tree are root-grafted. Trenching is a relatively quick and effective means of breaking root grafts. Mark a line or arc at the midpoint between two adjacent trees. The line or arc should extend such that all potential root grafts can be broken. A straight line may be more convenient on tightly spaced trees, but the line should extend beyond the tree drip line. Dig a trench 24 inches deep following the line or arc using a trencher, vibratory plow, or spade. Be sure to check with local utilities before



Elm bark beetle, Smaller European (continued)

digging. After trenching, the soil may be replaced. Place another trench beyond the second tree in situations where there are multiple elms and the disease in the first tree was not diagnosed early.

Cultural control: Elms should be maintained in a healthy and stress-free condition by proper watering and fertilizing. Pruning outside the dormant season should be avoided. Also, plant resistant elms. Native species of elms, including American, red or slippery elm, rock elm and cedar elm are very susceptible to Dutch elm disease. The Siberian elm, *Ulmus pumila*, is tolerant, but not resistant. Siberian elm has certain other undesirable characteristics that may limit planting. Some resistant hybrid elms have been developed. Resistant cultivars include 'Accolade', 'Cathedral', 'Commendation', 'Frontier', 'Homestead', 'Patriot', 'Pioneer', 'Prospector', 'Regal', 'Sapporo Autumn Gold', 'Triumph', and 'Vanguard'. Resistant varieties of American elm are 'American Liberty', 'Independence', 'New Harmony', 'Princeton', and 'Valley Forge'.

Chemical control: The use of insecticides to suppress early beetle populations has diminished in recent years. Certain insecticides may be applied to trees in April to prevent feeding by emerging beetles. Although this technique will help suppress beetle populations, it is not recommended. Certain systemic fungicides are labeled for preventive and therapeutic control of Dutch elm disease. These chemicals are injected into root flares and are translocated throughout the tree. Tree injection should only be attempted by trained personnel. Do not attempt injections unless you have been trained to do so! Therapeutic injection is risky. It is only effective on trees showing less than 5–10% crown symptoms and not at all effective on trees infected through root grafts. Even under these conditions, there is no guarantee that the treatment will be effective. Injection should be used in conjunction with eradicant pruning. Consult a trained arborist before proceeding with therapeutic injections. Also, injection is expensive, so only specimen trees should be considered for treatment. Fungicides currently labeled for preventive injection specify that the fungicide activity in the tree will last for approximately three years. Trees must then be reinjected. Injection is not a substitute for sanitation. Do not expect to save your elms by injection alone.

Biological control: Smaller European elm bark beetle has eight species of parasitic wasps, clerid beetles, and the fungus *Beauveria bassiana* that attack it. In damp habitats, 92% of overwintering larvae were killed by *B. bassiana* (Mandelin 1963). Since the beetle vectors a deadly fungus, biological control cannot be counted on to manage the beetle.

Plant mortality risk: High

Biorational pesticides: None

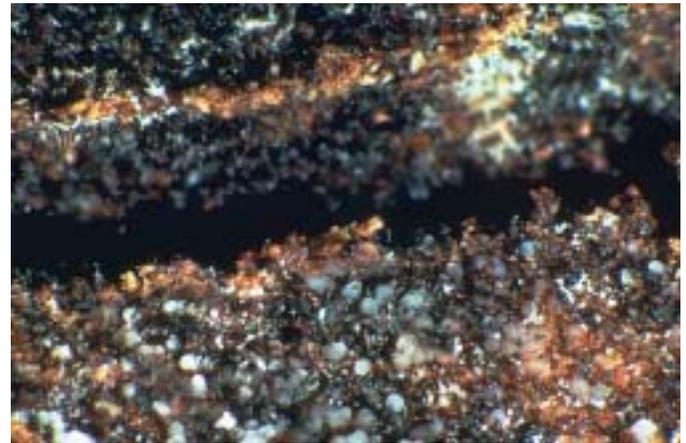


Photo: John Davidson
Ophiostoma ulmi fungus fruiting bodies inside galleries of smaller European elm bark beetle. (105)

Photo: John Davidson

Conventional pesticides: chlorpyrifos (nursery only), permethrin, bidrin. Use of a fungicide-injection program is most beneficial to protect valuable specimen trees. Use copper sulfate pentahydrate (Phyton 27), debacarb (Fungisol), propiconazole (Alamo), thiabendazole (Arbotech).