

# Protecting Elm Trees from Elm Bark Beetle on the Texas High Plains

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**M**any elm trees on the Texas Southern High Plains have recently had to be removed because they were dying. Generally it is upon removal, or after severe decline, that people notice round,  $\frac{1}{16}$ <sup>th</sup>-inch holes in the bark of trunks or branches. The lesser European elm bark beetle causes the holes, but there is more to the story and the beetles are usually just the final chapter.

Most healthy trees can defend themselves against insect attack to some degree. In fact, most insects that live under bark prefer to lay eggs in unhealthy trees, and often avoid healthy trees altogether.

However, some conditions can weaken trees and make them susceptible to insects. The general decline in health of some trees on the High Plains can be attributed to hot summers with little rain, which often cause drought stress in trees. While not directly fatal, periods of drought stress can predispose trees to insect and disease attack.

Other conditions that can make trees vulnerable to such attacks are lack of nutrients because of poor fertilization, inadequate space for root development, wounds inflicted on the trunk or branches, or crowding by other trees.

In addition, some types of trees are just not suited for the climate of the High Plains and will not thrive no matter how much care they receive. A list of recommended trees (and those to be avoided) is available from your county Extension office.

Common elm species on the High Plains include Siberian, American, cedar and Chinese. Of these, American, cedar and Chinese seem to be the most trouble-free.

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## Recognizing and understanding the bark beetle

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The lesser European elm bark beetle (*Scolytus multistriatus*) was introduced to the United States in 1904 near Boston, MA, and is now widely distributed in the eastern half of the United States and on the High Plains.

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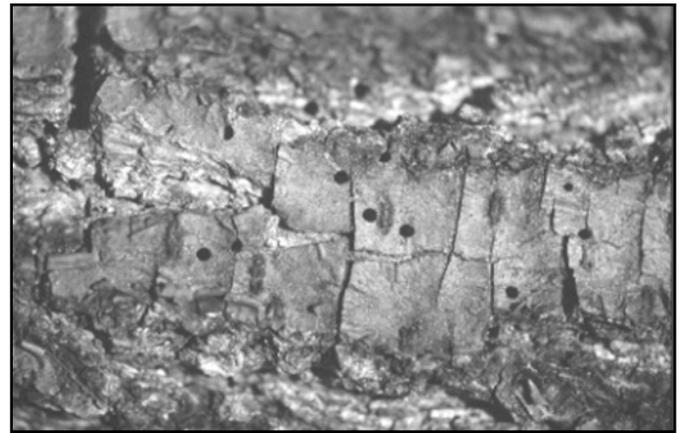


Figure 1. Exit holes in trunk.

This insect passes the winter in the larval stage beneath bark and emerges as an adult in April and May. Adults are about  $\frac{1}{8}$  inch long, dark reddish-brown to black, and generally cylindrical in shape.

They feed on young elm bark, usually in the crotches of elm twigs of both healthy and unhealthy trees. However, they prefer to lay their eggs in unhealthy trees. Eggs are laid in groups in sapwood beneath the bark of trunks or larger branches.

After the eggs hatch, small larvae feed in galleries beneath the bark. As they grow, the larvae extend the galleries outward from the center chamber where the group of eggs was first laid. Last-stage larvae then enter the pupal stage and eventually become adults.

New adults bore outward through the bark, leaving their small, characteristic holes as they exit the tree. Because galleries interrupt the transport of nutrients, the leaves of infested branches may turn yellow and then die.

It is difficult to find the galleries under bark before the adults exit. To confirm the presence of lesser European elm bark beetles, remove the bark either before or after adults emerge and look for galleries. Heavy infestations may be accompanied by a mix of fine sawdust and insect excrement that accumulates on the ground, unless strong winds carry it away.



Figure 2. Galleries caused by larvae feeding beneath bark.

To find ways to preserve High Plains elms, Extension personnel from Parmer/Bailey, Hockley/Cochran and Lubbock counties monitored adult abundance in 2000 with financial assistance from the Integrated Pest Management Grant Program, as administered by the Texas Department of Agriculture. They placed traps in these counties and baited them with a synthetic sex pheromone, or chemical attractant, specific for the lesser European elm bark beetle.

The researchers found that adults were present from April until October. The number of adults gradually increased from April through June, and peak captures occurred in early July.

After this peak, beetle populations gradually declined over the next few months. Many adults were captured in October; it is likely they were present until frost. There are at least two generations of beetles per year.

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## Beetle management

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Adults are present and laying eggs for 6 to 7 months. If insecticides are to be used to protect elm trees, they must be the kinds that persist for several months, and they may need to be reapplied during the summer.

The list of pesticides available to homeowners changes rapidly. The local Extension office would be a good starting point for a list of current insecticide options. For insecticide to be effective, most of the tree must be treated. This may be a problem for some people because in many cases, the trees are too

large for typical homeowner-owned pesticide application equipment to do the job adequately. Also, applications to large trees usually result in much pesticide getting on the applicator, and most people lack the necessary protective equipment to ensure their personal safety.

Commercial tree care companies have the equipment necessary to do the job properly, and they also have access to several insecticides that are unavailable to homeowners. Insecticide is an option to treat stressed or unhealthy trees. **However, the best management option is to help trees remain healthy and thus avoid attracting egg-laying beetles.**

Meaningful and beneficial practices for homeowners, landowners and municipalities should include:

- Water deeply and adequately around the drip line of the tree several times a year.
- Make a broadcast application of fertilizer (contingent upon a soil test) to provide the nutrients necessary for growth.
- Avoid crowding root systems with concrete or asphalt structures.
- Be careful not to damage young trees while mowing or trimming grass.
- Maintain proper tree spacing and avoid overcrowding.
- Always use proper pruning techniques to avoid damaging the tree and increasing its susceptibility to diseases and insects.
- Remove dead or dying elm trees promptly, because they serve as a source of beetles. Then burn them or put them in a landfill right away.

Unfortunately, saving elms for firewood may ensure a continued supply of beetles for at least a year after felling. Applying insecticides to firewood is not recommended both from a legal and public health standpoint and because the toxin will not reach the insects under the bark.

If it is important to use the trees for firewood, you may be able to kill the insects by wrapping a small woodpile in plastic for several summer months. The plastic will cause the temperature in the woodpile to rise above a point that kills insects.

This practice is occasionally followed for pines that have been killed by pine beetles. Although it is not foolproof, it may serve where the wood is important as firewood. Wrap the piles immediately after the wood is cut and stacked. Do not use wind-damaged plastic, because it will not allow the woodpile to heat properly.

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## Dutch elm disease

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In many parts of the United States, the lesser European elm bark beetle (and its relative the native elm bark beetle, which is not found in the Texas High Plains) carries the fungus that causes Dutch elm disease. Although the disease is fatal, it is important to note that even though the beetle carrier is found on the High Plains, the disease itself is not. There is

no evidence that the lesser European elm bark beetle is carrying Dutch elm disease on the High Plains of Texas.

If you want to plant an elm in the Southern High Plains, good selections are American, cedar and Chinese elms. Avoid planting Siberian elms here.

In addition to elms, many other deciduous trees grow well in this area. Use the list below to help you choose trees to plant or replant.

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## Southern High Plains tree selection

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One of the best ways to avoid pest problems is to plant varieties well adapted to our climate. Adapted plants do not undergo as much stress as those that must constantly struggle to survive.

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## Recommended Deciduous Shade Trees

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Cedar elm (native) <i>Ulmus crassifolia</i>	Largely overlooked, the cedar elm suffers from the bad press given the undesirable Siberian elm. Yet the cedar elm is a hardy, durable and attractive tree with few pest problems. Yellow fall color; resistant to Dutch elm disease.
Chinese elm (Lacebark, Littleleaf) <i>Ulmus parvifolia</i>	A lovely tree with pinkish bark, yet remarkably drought tolerant. No serious pests. One of our better introduced trees.
American elm <i>Ulmus americana</i>	Dutch elm disease has not reached Texas, so this favorite tree should be planted. Some “resistant” varieties are available from northern growers, but your best bet is to grow a Texas native. Several new USDA selections and hybrids look promising.
Pecan (native) <i>Carya illinoensis</i>	The state tree of Texas does well in most locations in the state. In the South Plains, “Pawnee,” “Caddo,” “Shoshoni,” “Maramec,” “Mohawk” and “Osage” are recommended.
Zelkova <i>Zelkova serrata</i>	Similar in appearance to the elms, the Zelkova is seldom used but makes a stately shade tree with yellow fall foliage. Apparently drought tolerant.
Chinese pistache <i>Pistacia chinensis</i>	A drought-tolerant tree of medium size. It provides lovely reddish to yellow fall color. A good shade tree.
Texas red oak <i>Quercus macilandica</i>	This Texas Hill Country tree is a winner in the area. A tough stately tree which colors red to crimson in the fall. Susceptible to oak wilt.
Bur oak (native) <i>Quercus macrocarpa</i>	Tough enough to plant in parking lots, yet stately in appearance. Resistant to oak wilt.
Blackjack oak <i>Quercus marlandica</i>	A xeric form of this oak found in Central Texas grows only 30 feet tall; it should be used more widely here.
Chinquapin oak (native) <i>Quercus muhlenbergii</i>	Several outstanding specimens of this hardy tree (including two reaching 50 feet on the Texas Tech campus) attest to its landscape potential. Native to river bottoms, so it is not for xeriscape.
Texas redbud <i>Cercis canadensis</i> var. <i>texensis</i>	This Texas native, with its small, glossy leaves, is drought tolerant and puts on a show of magenta color in early spring. Attractive when mass planted or in an esplanade.
Mexican redbud <i>Cercis canadensis</i> var. <i>mexicana</i>	Native to extreme Southwestern Texas, similar to Texas redbud and also drought tolerant.
Eastern redbud <i>Cercis canadensis</i>	Because it is native to East Texas, not as drought tolerant as the Texas and Mexican varieties.
Nogalito/river walnut <i>Juglans microcarpa</i>	A native of the Hill country, this tough little Texas tree makes a beautiful yard tree. Only about 30 feet tall.
Western soapberry <i>Sapindus drummondii</i>	A native tree near here, the soapberry is tough and has some yellowish fall coloration. Popularly planted.
Desert willow <i>Chilopsis linearis</i>	Commonly used in dry landscapes, this small to medium tree produces large flowers of white to burgundy. Several of the Texas A&M introductions have excellent flower colors.

Honeylocust <i>Gleditsia triacanthos</i>	This tree is overused in the South Plains. Select only the thornless and fruitless cultivars. Not a stately tree, but durable, pest-free and provides filtered sunlight, allowing turf to grow beneath.
Bald cypress <i>Taxodium distichum</i> var. <i>distichum</i>	Use this deciduous conifer only in wet locations and well-watered landscapes. Good around playa lakes. Bagworms can be a problem. Use seed sources from Central or West Texas.
Jujube <i>Ziziphus jujuba</i>	This small tree does well here and should be planted in groups of three or more for a good show. Has suckers, messy fruit.
Rusty blackhaw <i>Viburnum rufidulum</i>	A spectacular white flowering small tree native to Central and East Texas. Does well in Lubbock.
Chaste tree <i>Vitex agnus-castus</i>	This small, aromatic, lavender-flowering tree may be the West Texas crape myrtle. Drought tolerant. White-flowering form available.
Mesquite <i>Porsopis glandulosa</i>	Good tree for a Southwestern-type (desert) landscape. Does not survive long in heavily watered and fertilized landscapes. Attractive flowers, but has thorns and seed pods.
Panicled golden raintree <i>Koelreuteria paniculata</i>	This 30-foot tree flowers yellow in the spring and provides attractive fruit through the fall. Some evidence of winter damage recently; boxelder bug is a problem.
Shumard oak (native) <i>Quercus shumardii</i>	
Ornamental pear <i>Pyrus calleryana</i>	“Aristocrat,” “Bradford.”
Osage orange (native) <i>Maclura pomifera</i>	Fruitless, thornless cultivars only.
Lacebark elm <i>Ulmus parvifolia</i>	Avoid areas with cotton root rot.

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## Recommended Deciduous Flowering Trees

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Crape myrtle <i>Lagerstroemia indica</i>	This small tree may not be hardy in the Panhandle Region, but is a favorite in Lubbock. Many cultivars, including semi-dwarfs and dwarfs. Some cultivars may freeze. Subject to powdery mildew.
Flowering peach, plum and apricot <i>Prunus</i> spp.	These colorful trees usher in the spring with their bright flower. Hardy. Watch for borers.
Crabapple <i>Malus</i> spp.	Among the most widely planted flowering trees in the area. Drought hardy.
Callery pears <i>Pyrus calleryana</i>	The “Bradford” pear is most widely used, but may break apart under snow loads or in high winds. Try “Aristocrat” or “Capital.” White flowers in abundance, excellent burgundy fall color.

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