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Dutch Elm Disease

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Dutch Elm Disease

Co-authored by specialists in the Departments of Horticulture-Forestry, Plant Science, and Entomology-Zoology, South Dakota State University.



Dutch elm disease (DED), fatal to elm trees, made its first known South Dakota appearance in 1967 in Minnehaha County. By the summer of 1972, infected trees were found in 26 counties, as far north as Deuel County, as far west as Tripp County, and as far south as Union County. Minnehaha County estimated 500 trees were infected and removed in 1971. Removal costs range from \$30 to more than \$200 per tree, depending upon circumstances.

DED is a fungus which plugs the water conducting system of a tree. The tree then dies of desiccation (lack of water).

Spores of the DED fungus are carried by certain elm bark beetles from dead, infected, over-wintered elm wood to nearby healthy trees, causing new infections in the spring from mid-May to July. The disease can also be spread through natural root grafts between adjacent trees. Once the disease is in a given block or area it is estimated more than 70% of the infections occur through root grafts.

Elms the Only Victims

All species of American elms are susceptible to DED. The fast-growing Siberian elm occasionally becomes partially infected but on a practical basis it is considered resistant as it does not function as a reservoir for the beetle and/or the fungus inoculum.

Symptoms

The first visible symptom of DED is wilting leaves turning prematurely yellow or brown on one or more branches. Infected branches will show brown streaking when the bark is peeled back. If the wood immediately beneath the bark is white with no streaking, DED is probably not involved.

Since other diseases can cause similar symptoms, visible signs of DED are not positive indicators of the disease. If an elm tree shows wilting of the foliage and brown streaking of the wood, it is necessary to secure a laboratory analysis for positive identification. To sample a suspect tree, cut off a branch about one-half inch in diameter which is showing active wilting symptoms. Cut this branch into 5 or 6 pieces each about 6 to 8 inches long. (Small twigs are of no help in laboratory tests for DED.) Tie pieces together, label, (include your name and address) and place them in a container for mailing. Send to Extension Plant Pathologist, Plant Science Department, SDSU, Brookings, S. D., 57006. Do not wrap samples in wet towels. Results of the laboratory test will usually be available within 7 days after receipt of samples.

Action

If you receive a positive report, remove the infected tree and destroy it by burning or burying in a land fill operation. Elm wood to be used in fire places should have the bark removed before it is stored. If the infected tree is growing near healthy elms, dig trenches or fumigate with Vapam the soil area along the drip line between trees to break or kill root grafts. Natural root grafts often occur between trees spaced up to 50 feet apart. It also will be necessary to break root grafts of the second set of trees on each side of the infected elm, if the elms are growing in a row as often the case in boulevards.

Dead elm wood is a potential breeding place for elm bark beetles, so *regardless of cause of death of an elm tree or any of its parts, remove the tree or the branches that are dead and destroy the wood.*

Infected branches show a brownish discoloring of the sapwood. Pulling back the bark will show a brown streaking.

COVER PHOTO. First symptoms of DED are premature yellowing or browning of leaves in well-defined sections of the tree crown.

National Controls

Wasp-like insects introduced from Europe are being released experimentally in some areas as predators of the elm bark beetle larvae. The wasp lays its eggs in dead or dying elm wood where the eggs hatch and the young attack and kill elm bark beetle larvae. Success with this technique is limited at present.

Sex attractants and feeding attractants are also being tested as controls on elm bark beetle populations.

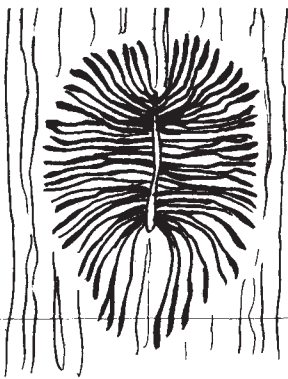
Resistant elms are being sought and checked for immunity against DED. Some trees which show a high degree of resistance have parentage from milder climates than in South Dakota and may not be hardy in this area. The first hybrid elms resistant to DED will be released for testing this year by the U. S. Department of Agriculture, but their hardiness in South Dakota is yet to be determined.

Insecticides and fungicides are being screened for effectiveness and public acceptance. Research with a systemic fungicide, Benomyl (tradename, Benlate), is encouraging. Benomyl can be used as a foliar spray or injected into the trunk of the tree. Use of Benomyl is restricted to trained arborists.

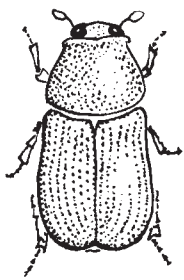
Insecticide control programs are not presently being recommended in South Dakota.



When DED symptoms are evident, send samples to SDSU laboratories for positive identification. See section, "Symptoms," for details on sending samples.



Typical tunneling under elm bark by the European elm bark beetle.



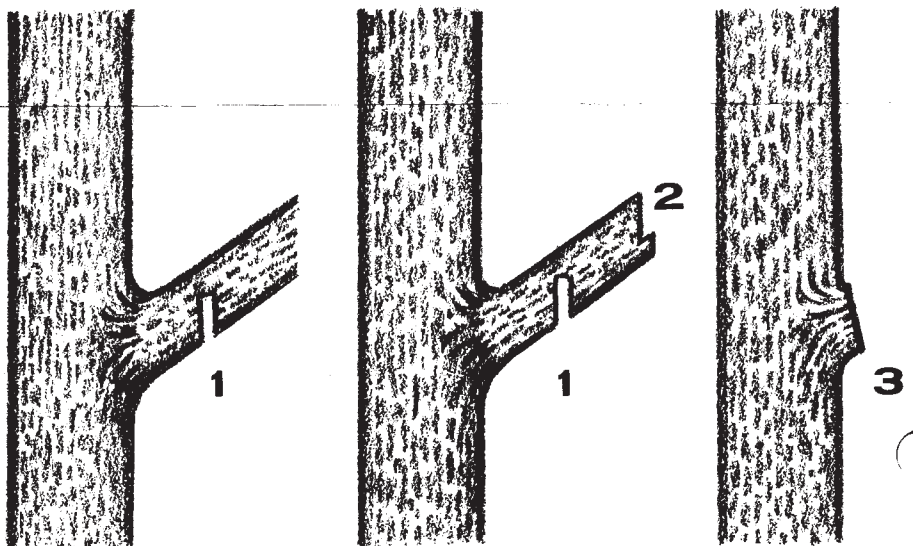
The elm bark beetle is the initial spreader of DED. Spores cling to its body and are spread from infected trees to healthy trees. The beetle is about an eighth to a quarter inch long.

Do Your Part

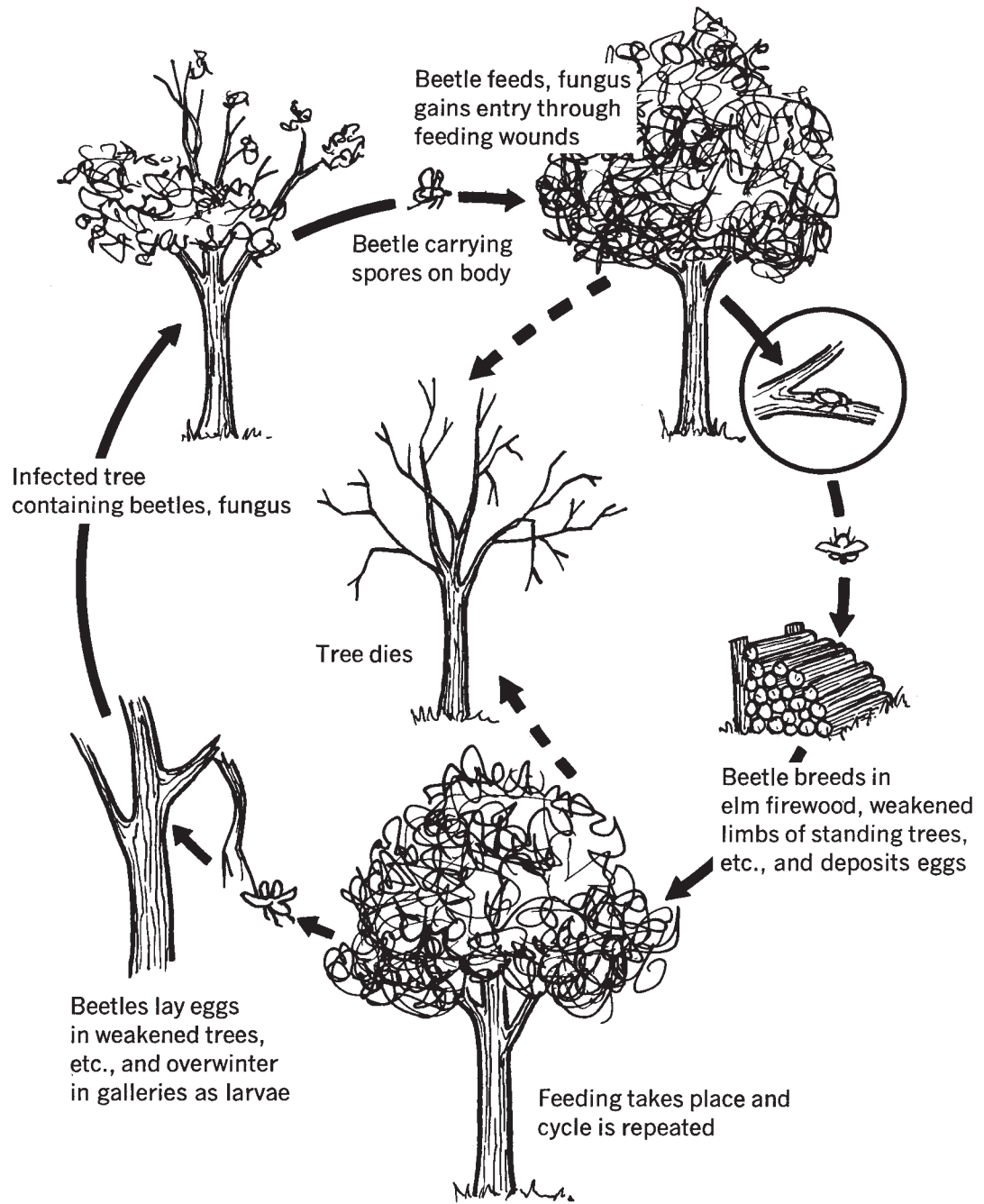
- Do not plant elms where root-grafting with other elms is possible. Place young elms at least 75 feet apart.
- Keep established elms vigorous by deep watering during drought periods and occasional fertilizing.
- Prune dead or dying branches from growing trees. Burn or dispose of dead elm wood to eliminate a home for over-wintering beetles and a possible reservoir for the disease.
- Encourage "tree bank" establishment now so that when DED does take its toll of elm trees, there will be larger (15 to 20 feet) trees available to replace the elms. (A tree bank planting is a planting of small inexpensive trees. They are managed and grown into larger trees for eventual moving into desirable locations.)
- Do not over-plant one particular tree species. Mix the populations. If a particular species is subjected to an epidemic, its death, removal and absence will not create financial and environmental hardship.
- Keep informed through contact with the South Dakota Nurseryman's Association, the Cooperative Extension Service at SDSU or through your county Extension agent, and other natural resource agencies.

Prune dead, dying or damaged elm wood. Destroy by burning or bury the removed wood. All dead elm wood is a breed-

ing reservoir for elm bark beetles when the bark is left intact. Strip off the bark if the wood is to be used as firewood.



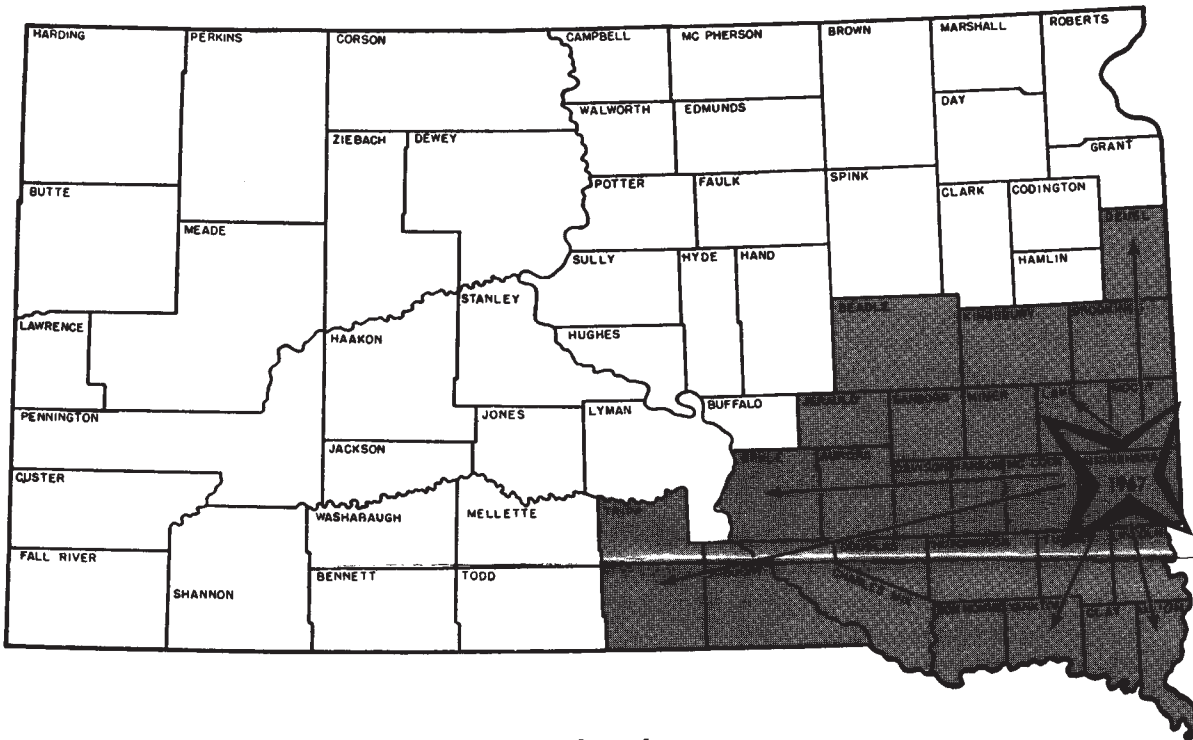
Stub cutting a heavy member to prevent splitting the wood and stripping the bark. Make first cut from below at 1; cut off the limb from above at 2. Then remove the stub with a cut at 3.



A schematic representation of transmission of Dutch Elm Disease by the European elm bark beetle. Beetles will breed in standing dead elm wood or pile elm wood. Destroying dead elm wood is necessary in a good Dutch Elm Disease control program.



Minimize root grafting between planted elm trees by placing them at least 75 feet apart.

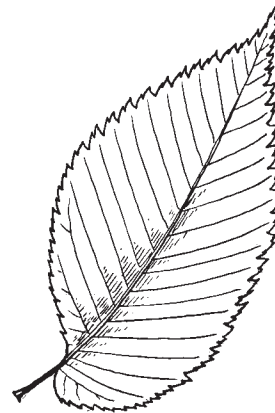


Progress of Dutch Elm Disease in South Dakota since the initial confirmed infection in 1967.

No endorsements of specific products or equipment named is intended, nor is criticism implied of those not mentioned.

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The typical elm leaf has a double serrated leaf edge.



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U. S. Department of Agriculture

