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DETECTION SURVEYS FOR DOGWOOD ANTHRACNOSE
ON THE NATCHEZ TRACE PARKWAY

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by

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Abstract

An initial survey of 33 miles of the Natchez Trace Parkway identified one swamp dogwood, Cornus stricta Lam. as infected with the Discula fungus. The infected tree located near milepost 339.1 was removed and destroyed. A subsequent survey of 136 miles of the Natchez Trace found no additional dogwood anthracnose present. The flowering dogwoods around milepost 339.1 were examined closely and signs and symptoms of Discula were not found. Historical information and information on disease distribution are contained in this report.

INTRODUCTION

Dogwood anthracnose is causing mortality of Cornus florida L. in the following southeastern states: Alabama, Georgia, Kentucky, North Carolina, South Carolina, Tennessee and Virginia (Sites and Hess, 1989).

Forest Pest Management (FPM), USDA Forest Service is surveying National Forests and other Federal lands in an effort to delineate distribution of this disease on these lands in the South. As part of this effort, two surveys were conducted on the Natchez Trace Parkway in 1989. January 12, 33 miles were surveyed from milepost 337 to milepost 370. The second survey, conducted November 28 and 29 began at the northern terminus of the Parkway and extended south to the Tennessee Tombigbee Waterway including the 33 miles previously surveyed. The surveys consisted of roadside reconnaissance of dogwood species using winter leaf retention as the key element for examining individual trees for possible Discula infection.

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TECHNICAL INFORMATION

Dogwood Anthracnose

Since 1977, unusual amounts of dieback and mortality of both native and cultivated dogwoods Cornus florida L. have been observed in widespread areas of the northeastern United States. The declining condition was first reported as lower branch dieback disease and affected dogwoods were found in southeastern New York, southern Connecticut, northern New Jersey, and eastern Pennsylvania (Daughtrey and Hibben 1983). Initial studies found that a fungus, a species of Discula was consistently associated with the diseased trees (Hibben and Daughtrey 1988). A similar disease of western flowering dogwood, Cornus nuttallii Aud. in western Washington was observed and named dogwood anthracnose (Bythe and Davidson 1979). A comparison of symptoms, signs, and isolates of Discula from C. nuttallii in Washington and from C. florida in New York were made and found that the same disease occurs in both locations (Hibben and Daughtrey 1988). The disease has also been found in Oregon, Idaho and British Columbia affecting C. nuttallii.

Initial symptoms of dogwood anthracnose are small, purple-rimmed leaf spots or larger tan blotches that may enlarge to kill the entire leaf. Infected leaves often cling to trees after normal leaf fall. The fungus also can infect twigs, killing them back several inches, and in some cases to the main stem. The dead portions of twigs are tan and may be covered with orange fungal spores. There may be a purple border between dead and healthy twig tissues. In infected plants, numerous epicormic shoots often form up and down the main stem and on major branches. These become infected and die. When they do, the fungus often grows into the main stem, causing annual cankers. Trees are often killed 2 to 3 years after the first attack. The disease kills trees of all sizes, and is more severe in the forest-grown dogwoods (Daughtrey, Hibben and Hudler 1988).

The genus Discula contains imperfect fungi that produce one celled, elliptical conidia from dark globose fruiting structures. These conidiomata have been consistently associated with symptomatic leaves and shoots and can over-winter producing viable conidia. The abundance of conidiomata on stems and on attached and fallen leaves provides ample inoculum for infection whenever moisture and temperature are favorable (Hibben, Daughtrey, 1988). Predisposing climatic factors such as drought, cool wet springs, or abrupt temperature fluctuations are believed to be a factor in disease incidence (Daughtrey and Hibben 1983; Hibben and Daughtrey 1988).

Host

Flowering dogwood is a shade-tolerant, deciduous understory tree commonly found in mixed pine-hardwood stands in the eastern and southeastern United States. It is a member of the dogwood family (Cornaceae), which is represented by approximately 100 species found mostly in temperate regions (Mitchel et al 1988). There are six species found in the southeastern United States; flowering dogwood being the most common. It is one of the most popular native ornamental trees in the east and numerous cultivars have been developed for landscaping purposes. Dogwood is considered an important food plant for numerous game and nongame wildlife species (Mitchel et al 1988). The foliage,

twigs, and fruit contain high amounts of calcium, providing nutritional value to wildlife as well as soil enhancement. Dogwood litter decomposes more rapidly than other species, thus making its mineral components more readily available (Fowells 1965).

Dogwood grows on a variety of soils ranging from deep, moist soils along streambanks to well drained, light upland soils. It is a shallow rooted species and is susceptible to moisture stresses caused by drought and flooding. Early leaf fall, dieback, and mortality may result from either moisture extreme (Fowells 1965).

SURVEY METHOD

Both surveys were conducted by driving the Trace at 15 to 20 miles per hour, scanning approximately 75 feet on each side for dogwoods with winter leaf retention. Individual trees were examined at sites where leaf retentions were observed. Twig and leaf samples were collected from suspect trees, labeled and placed in plastic bags. Site and tree conditions were documented. The first survey samples were mailed by overnight express to Asheville, NC for laboratory examination. The second survey, samples were packed on ice and transported to Alexandria, LA for laboratory culturing.

Laboratory Procedures

Twig and leaf samples from suspect trees were placed in moist chambers to induce sporulation. Portions of twig samples were also surface sterilized and placed on fresh potato dextrose agar, acidified to p.h. of 4.7 with lactic acid.

RESULTS

One Discula infected swamp dogwood was found at milepost 339.1 during the January 12th survey. The site was revisited May 25, 1989 while the infected tree was in bloom and the species confirmed as Cornus stricta Lam. The Park Service removed and destroyed this one tree as recommended by FPM. Flowering dogwood, C. florida at MP 339.1 site appeared to be healthy and laboratory results were negative for the Discula fungus.

The survey of November 28 and 29 resurveyed the initial area of 33 miles plus an additional 103 miles.

This survey examined seven sites which had one or more dead dogwoods or a partially dead tree. Laboratory results from these sites found no evidence of Discula.

CONCLUSION

The results of both surveys found that most of the dogwoods along the Natchez Trace Parkway are healthy and free from major pest problems. The area that revealed the most damage was a 51 mile section from MP 337 to MP 398.

Most of the damaged trees were located several yards into the woods setting and not adjacent to the roadway shoulders. There are a number of factors that can contribute to scattered incidence of dogwood damage and mortality; including dogwood borer, club-gall midge, crown canker and site stress such as drought or excessive moisture. At this point there does not appear to be a serious threat to the dogwood population along the Trace. Continued surveillance is recommended for the section of the Trace from MP 337 to MP 398.

Forest Pest Management crews will establish permanent impact plots in the 3 northwestern counties of Lauderdale, Lawrence and Winston, Alabama, during the summer of 1990.

The impact plots will consist of annually monitoring 10 dogwood trees per plot and recording damage by dieback classes. Damage symptoms will be laboratory examined for Discula. The plots will be established by latitude and longitude coordinates at 15 minute intervals. The establishment of these plots will provide a reliable method of monitoring dogwood anthracnose incidence in northwestern Alabama.

RECOMMENDATIONS

The Natchez Trace Parkway offers a highly visible scenic byway featuring numerous displays of dogwoods. During routine maintenance of the Parkway, monitoring the condition of the dogwoods is advised; noting any changes such as decline or mortality occurring in localized areas. Maintaining healthy dogwood can best be achieved through avoiding mechanical or chemical injury to trees, and utilizing proper culture techniques. These methods include; maintaining health and vigor of trees through watering during drought periods, mulching to reduce watering needs, pruning and disposing of dead and diseased twigs and branches, and improving air circulation around trees to help dry foliage and reduce infection. Application of a balanced fertilizer in early Spring may also help the trees to resist the disease. Fungicide treatments, cultural controls and sanitation have had some success in maintaining dogwoods infected with Discula sp. in high value areas of the Northeast. If fungicide treatments are to be considered, method and rate of application, timing, type of fungicide and its environmental consequences will need to be evaluated. The bulletin, "Growing and Maintaining Healthy Dogwoods," should be consulted for additional information.

Investigation of dogwood anthracnose and its potential impact on flowering dogwoods in the south is continuing. FPM will provide updates as more information becomes available.

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Dogwood Anthracnose Survey
Natchez Trace Parkway
January 12, 1989

Site Sampled Sample#/Mile Post#	Location	Sample Collected	Lab Confirmation of <i>Discula</i> sp.		Notes*
			yes	no	
TR-1 361-362	.6 miles N of MP 361 on west side of Trace	Twig & foliage		X	understory dogwood across small stream; several dead branches on 2-3" DBH dogwood
TR-2 358-359 TR-2A	0.1 mile, N&S of MP 359, on both sides of Trace	Twig & foliage		X	6 dead dogwood all in understory near drainage all less 3" DBH
TR-3 352-353	0.9 miles N of MP 352 at McGlameroy Stand, west side of Trace, at exit of McGlameroy pull-off	Twig & foliage		X	green tree with one dead branch
TR-4 339-340	0.2 miles N of MP 339 on west side of Trace, on back slope	Twig & foliage	X		one dogwood with dead branches not a <u>Cornus</u> <u>florida</u> next to a <u>C. florida</u> that had no <u>Discula</u> symptoms
Other field notes	0.5 miles N of MP 357, two dead dogwoods - no samples taken; at MP 337 two green dogwoods with one dead branch each - no samples taken.				

Total area of survey = 33 miles or 600 acres.

Survey was conducted by Nolan Hess, Charles Affeltranger, Plant Pathologists;
and Ron Kertz, Biological Technician.

Dogwood Anthracnose Survey
Natchez Trace Parkway
November 28 & 29, 1989

Site Sampled Sample#/Mile Post#	Location	Sample Collected	Lab Confirmation of <i>Discula</i> sp.		Notes *
			yes	no	
TR-1&2 397-398	MP 397.4; West side of Trace at edge of Park boundary	Twig & foliage		X	one dead dogwood, 2 partially dead dogwoods
TR-3 357-358	MP 357.7; East side of Trace	Twig & foliage		X	Two dead dogwoods, 3 trees with dead limbs
TR-4 356-357	MP 356.1; West side of Trace	Twig & foliage		X	3 partially dead dogwoods
TR-5 355-356	MP 355.9; West side of Trace	Twig & foliage		X	2 dead dogwood trees
TR-6 352-353	West side of Trace at McGlamery Stand pull-off	Twig & foliage		X	one tree partially dead
TR-7 337-338	Just North of MP 337 on West side of Trace	Twig & foliage		X	one symptomatic tree

* All sampled trees were flagged with lime green flagging.

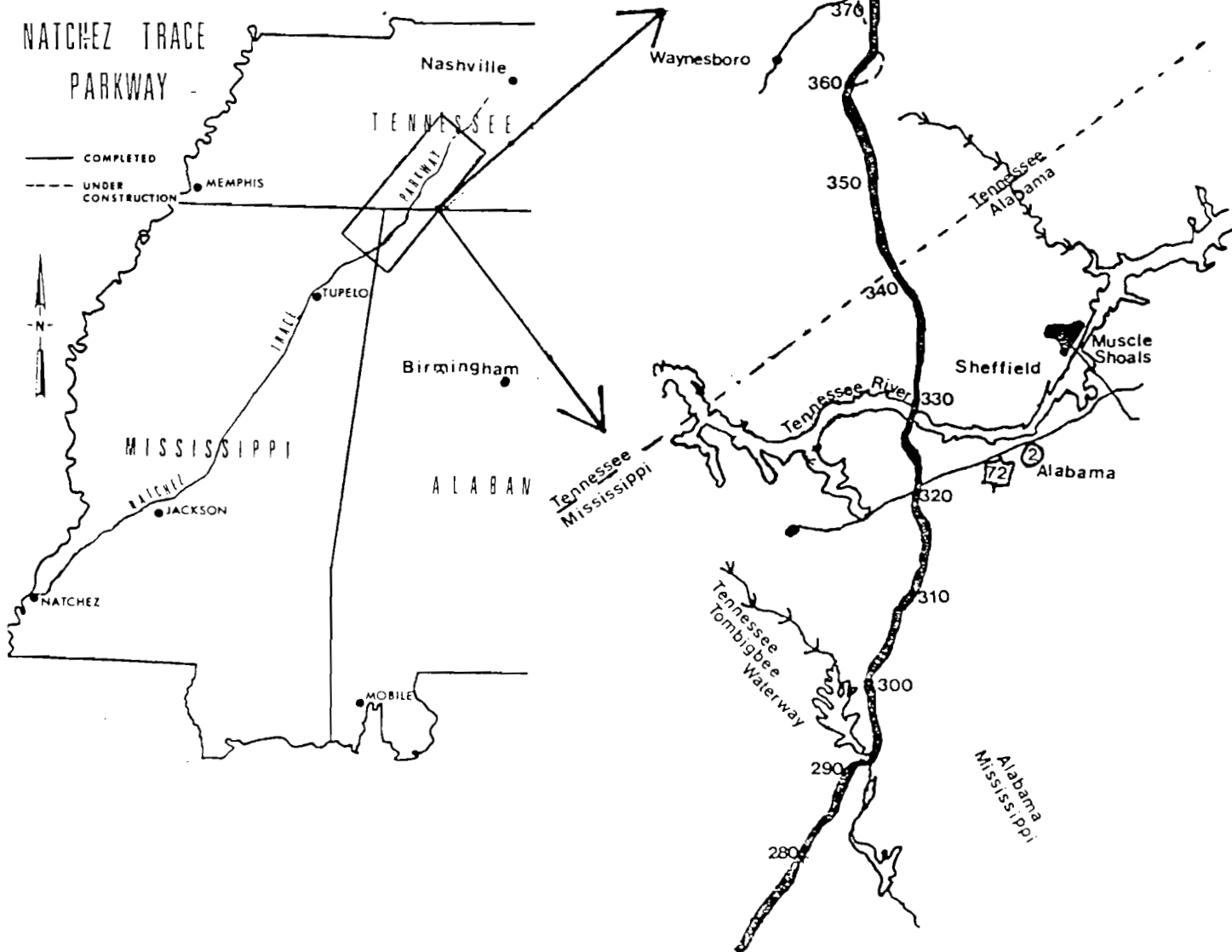
Total area of survey = 136 miles or 2,473 equivalent acres.

Survey was conducted by Nolan Hess, Charles Affeltranger, Plant Pathologists;
and Ron Kertz, Biological Technician.

DOGWOOD ANTHRACNOSE SURVEY OF NATCHEZ TRACE PARKWAY 1989

**Area Surveyed: Terminus to
Tennessee Tombigbee Waterway**

Legend: Mile Post - 340-350 = 10 miles



1989 DOGWOOD ANTHRACNOSE INFECTED COUNTIES

