

# ASSOCIATION OF DOGWOOD BORER WITH THE RECENT DECLINE OF DOGWOOD

by Gerald S. Walton

**Abstract.** In 1984 and 1985, 290 flowering dogwoods in Connecticut that were exhibiting symptoms of the recent decline that has affected many flowering dogwoods in the Northeast were examined in order to relate fungal leaf spots, trunk injuries, dogwood borer infestation, planting location and/or tree size to occurrence of the decline. None of these factors appears to be related to the incidence of the decline. However, dogwood borer infestation does appear to be related to the progression of the decline when greater than 30-35% of the crown is symptomatic.

In the late 1970's in southeastern Connecticut and southwestern New York, the health of many flowering dogwoods (*Cornus florida*) began to decline. This disorder has spread throughout most of Connecticut, into central New York and Pennsylvania and New Jersey. A similar disorder of *Cornus nuttallii* has been reported from Washington (1, 6). The initial symptoms occur on the lower portion of the crown and include leaf spotting, leaf necrosis and twig dieback. As the disease progresses, the symptoms are noted throughout the lower crown, sometimes involving larger stems, and finally spread to the upper part of the crown. Epicormic growth begins to appear and these leaves and twigs often become infected. Infected, necrotic leaves commonly remain attached to the twigs in the winter. In many instances, trees are killed.

Although I have isolated fungi from the affected tissue, the causal factor of the decline has not been determined. The inoculation of these fungi into healthy dogwoods has not caused disease. Daughtrey and Hibben (2, 3) have isolated an anthracnose fungus, *Discula* sp., from declining dogwoods, but they have not reported successful inoculation of the fungus into healthy dogwoods. This same fungus also has been implicated as the cause of the disorder in Washington (6). At present, the decline of the dogwoods in the Northeast is believed to be caused by a weakening of the tree by one or more stress factors, such as cold winter temperatures, excessive spring rains, summer drought and/or trunk injuries, with subsequent infection with canker causing fungi (2, 3, 7).

In this paper I report the relationship between the severity of decline and incidence of borers.

## Methods

In 1984 and 1985, 166 and 124 flowering dogwoods, respectively, were examined in an attempt to relate decline to leaf spotting fungi, dogwood borer infestation, trunk injuries, planting location and tree size. These dogwoods were growing in parks, private lawns, forests and along roadsides in several areas of Connecticut. Decline symptoms were rated on a scale of 0 to 10 which represented the following approximate percentages of the crown that showed leaf spots and twig dieback: 0 = 0%; 1 = 1-5%; 2 = 10%; 3 = 20%; 4 = 35%; 5 = 50%; 6 = 65%; 7 = 80%; 9 = 95 to 99%, and 10 = 100%. Trees were rated for leaf spotting using the same scale. Incidence of dogwood borer infestation was determined by examining the trunk and main branches for exit holes, sawdust-like material, and roughened and injured areas of the bark. When any of these symptoms were found, some probing was done with a knife in an attempt to find borer galleries. This examination did not try to determine the extensiveness of the infestation but only if borers were present. The lower trunk was examined for injuries and the percentage of the trunk circumference affected was estimated. Tree diameter was measured 2 feet from the ground unless the first branches occurred below this point. When this occurred, the measurement was made just beneath the point of origin of the branches.

## Results and Discussion

None of the factors (leaf spotting fungi, dogwood borer infestation, trunk injuries, planting location, and tree size) was related to the incidence of decline but a possible relation did appear between severity of decline symptoms and dogwood borer infestation. From the combined data of 1984 and 1985, borers were found in approximately a third of both healthy

dogwoods and those in the initial stages of decline (severity rating of 1) (Table 1). Because borers were found as frequently in healthy trees as they were in trees in the initial stages of decline, this suggests that borers are not the primary causal factor of the decline. This conclusion also agrees with the symptomatology. The dogwood borer feeds within the phloem and cambial layer (5) causing a disruption of the vascular system which results in off-color foliage, wilting of the terminal shoots and dieback of the crown of the tree. These symptoms occur throughout the crown and not only on the lower branches as is true in the initial stages of this decline.

The proportion of trees infested with borers generally increased as the decline severity increased. When the severity rating was 7 or greater, a higher percentage of the trees were always infested with borers. In trees with moderate severity ratings, 3 through 6, there was considerable variation as to whether the greater proportion of the trees was infested with borers or not. Since there were no significant differences between the two years, the data have been combined and plotted in Figure 1. Borer incidence increased linearly with severity rating,  $y = 34.1 + 4.4x$  ( $r^2 = 0.5934$ ). This equation indicates that

at least half of the trees with severity rating of 3 to 4 will often be infested with borers.

There are at least two possible reasons why the trees with a severity rating greater than 4 had the

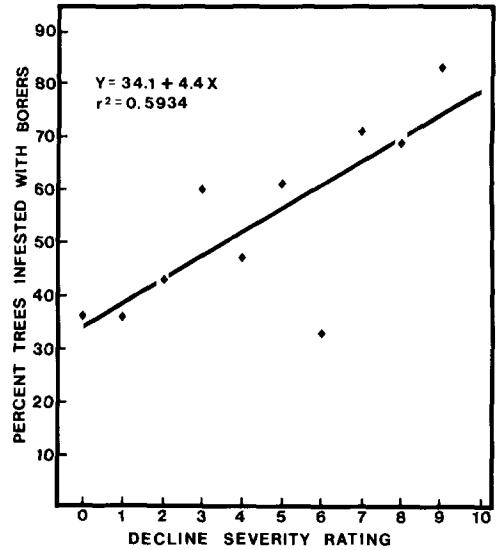


Figure 1. Relationship between the percentage of dogwoods infested with borers and the decline symptom severity rating using the combined data of 1984 and 1985.

Table 1. Percentage of dogwood trees infested with borers within each decline severity rating.

Rating	1984		1985		Both years combined	
	No. of trees	% with borers	No. of trees	% with borers	Total trees	% with borers
0	11	45	11	27	22	36
1	30	37	26	35	56	36
2	32	28	36	56	68	43
3	25	56	22	64	47	60
4	21	48	13	46	34	47
5	13	69	5	40	18	61
6	7	43	5	20	12	33
7	10	70	4	75	14	71
8	12	67	1	100	13	69
9	5	80	1	100	6	83
Total	166	48	124	48	290	48

greater percentage of the trees infested with borers. Declining trees could simply be more attractive to borers than healthy trees. However, Potter and Timmons (4) reported that crown dieback did not significantly affect the chance of infestation. This suggests the second possibility that borers are an important factor in the causation of the severe decline symptoms and the ultimate death of many of the trees, especially in landscape plantings.

Borers clearly are not the only factor that causes the severe decline symptoms and ultimate death of many trees as shown by examination of dogwoods in wooded areas. A number of these dogwoods had greater than 35% of the crown affected yet 64% of the trees were free of borers. In conclusion, it appears that the recent decline of the flowering dogwood probably is not initiated by a dogwood borer infestation, but that, borers may be important in the progression of the decline.

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### Abstract

KHATAMIAN, H. 1985. **Staking and wrapping trees for winter**. *Grounds Maintenance* 20(9):70-71.

Staking young trees is particularly important when planting bare-root or container-grown trees that have weak trunks. Protective staking also is necessary when there is danger of damage from lawn equipment or vandals. When planting large trees, a support or anchoring system is required to minimize shifting of the newly transplanted root ball. Thin- and smooth-barked young trees like maple, mountain ash, honeylocust, and London plane are susceptible to damage from sudden exposure to sun. To protect the trunk from sun damage, winter desiccation, equipment, or animals, wrap the tree up to the first limb. Use paper tree wrap, burlap strips, vinyl tree guard, or a similar material. Start wrapping from the bottom of the trunk, overlapping on each turn to give a shingle effect that will help keep the trunk dry. Secure the wrap with twine or heavy string, wrapping in the opposite direction of the tree wrap.