Minnesota Nurserymen's newsletter

Prepared by
UNIVERSITY OF MINNESOTA
Institute of Agriculture
- Agricultural Extension Service
- Horticulture Department

In Cooperation with
- Minnesota Nurserymen's Association
- Minnesota State Horticultural Society

Vol. 4 No. 7 and 8 July - August 1957

WINTER INJURY SURVEY

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Due to the extensive damage occurring in nursery and ornamental plantings last winger, a questionnaire was sent to nurserymen in representative areas of the State. The questions appearing on the survey sheet were developed in cooperation with members of the staff in the Department of Horticulture and in the Department of Plant Pathology. The information received will be added to similar information which we expect to obtain over a period of years. The objective of this effort will be to produce information which will be helpful in overcoming this condition.

Eighteen nurserymen, representing all areas of the State, responded. These men grew sizeable acreages of general nursery stock. They gave considerable thought to preparing their answers and we are sincerely appreciative of their efforts in working toward a solution of this problem.

A few points that appear to be significant in the survey are listed here for consideration at this time. Answers to questions asked in regard to various types of arbor vitae were especially interesting. Damage to plants is indicated in the following manner: Heavy-H; medium-M; light-L; slight-S; none-N. Numbers are used to indicate the number of answers in each group. Globe (Woodward) 9H; 1M; 2L; 5S; 12 did not grow. Siberian 1H; 1M; 2L; 5S; 7N; 2 did not grow. Pyramidal 5H; 8M; 2S; 2N; 1 did not grow. American 4H; 7M; 2L; 4N; 1 did not grow. The answers given above referred to established plants and not those which were transplanted in 1956. It is interesting to note that only one nursery indicated heavy damage to Siberian arbor vitae. That nursery had heavy damage on all types of arbor vitae. Nine nurseries reported heavy damage to established plantings of Globes.

It was noted that soil moisture was generally deficient going into the winter. Only one nurseryman had the soil tested where damage occurred. Snow cover was lacking, except in the Duluth area. Damage was not so severe in that section of the State. Damage appeared to be most severe in southwestern Minnesota.

OAK WILT AND ITS CONTROL*

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Oak wilt has become an important disease in Minnesota. It is most prevalent in the area south and east of the Twin Cities. However, it occurs as far west as Mankato and north as far as St. Cloud and Taylors Falls, with occasional infections as far north as Brainerd.

All species of oaks native to Minnesota are susceptible to wilt. But those in the red oak group are more frequently infected - and killed more rapidly by the wilt - than the bur and white oaks.

Oak Wilt Symptoms

Soon after a red oak is infected with the fungus which causes the wilt, the leaves toward the top of the tree begin to turn color. They turn a dull green, then brown, with the discoloration usually progressing from the tips of the leaves toward the base. Within a few weeks after these symptoms appear, the tree dies. Infections in red oak are almost invariably fatal; only rarely will the tree survive for more than a short time after infection.

Bur and white oaks are much less susceptible than red oaks. The infection usually results in the death of scattered branches in the crown of the tree. These trees may survive for one or more years, but eventually they become greatly disfigured or die.

Cause of the Disease

Oak wilt is caused by a fungus now know as Endoconidiophora fagacearum. Presumably both it and the disease it causes have been present in the north central states for many decades. If so, the disease long went unrecognized. Only in 1944 did research workers at the University of Wisconsin and the Forest Products Laboratory prove that oak wilt was a definite, specific, single disease caused by a single fungus. Since then oak wilt has been fonnd to be important from Minnesota east to Pennsylvania and Maryland, and south to Missouri and Tennessee.

The fungus grows in the outer sapwood of the trees, maiuly in the vessels which conduct food and

*Taken from Minnesota Farm and Home Science 14(1):13-14. Oct. 1956.

water from the roots up to the leaves. It causes these vessels to plug up, cutting off the tree's supply of water.

By the time symptoms first become apparent on the leaves of red oaks, the fungus is present in the conducting vessels throughout the entire tree. It can be found in the veins of the wilting leaves, in the outer sapwood throughout the trunk, and in the outer wood of the roots. The fungus dies in the branches a few weeks after the tree dies - but may remain alive in the trunk for some time. It may produce masses of spores on mats of mycelium under the bark.

How the Fungus Spreads

Roots of the red oak grow out for some distance from the tree. When several oaks are growing near one another, the roots of one tree come in contact with the roots of nearby trees and form natural grafts. Once the oak wilt fungus enters a tree, it spreads rapidly through the conducting vessels--and through such root grafts into the nearby red oaks. By the time any tree shows the symptoms, the fungus is likely to have spread by this means to all nearby trees.

The fungus continues to spread outward from the original infection center. It is common to find rather large patches of infection in which the trees at the center are dead and decayed, those farther out dead but not yet decayed, and those at the border dying.

The fungus has another means of spreading; it can jump for considerable distances to initiate new areas of infection. As mentioned, it may remain alive for some time in the trunk of a diseased tree, producing spores on the mats of mycelium under the bark. The center part (pressure pad) of these mats forces out and ruptures the bark, exposing the fungus to the air.

These fungus masses have a rather fragrant odor, seemingly attractive to certain kinds of insects - especially to a group of small beetles known as Nitidulids. These beetles pick up spores of the oak wilt fungus as they crawl over the pads. They then fly to other oak trees to feed on the sap flow from fresh wounds, depositing the spores as they do so to spread the infection. We're not certain how far such insects can fly, or be carried by the wind. But evidently they can travel from at least several hundred yards to a mile or more.

Control of Oak Wilt

Once red oak trees are infected there is no way of saving them, at least by any means now known. Control must therefore be aimed at halting the spread of the fungus through root grafts, at preventing formation of spores that might be spread by insects, and at avoiding wounds on healthy trees that might be inoculated by the spore-carrying beetles.

If a new infection appears in an area where large numbers of red oaks are growing, both the infected tree and those immediately surrounding it should be destroyed at once. As explained, by the time symptoms of the wilt become obvious on an infected tree, the fungus has already spread through the root grafts to neighboring trees. Thus, destroying only the obviously infected tree is not likely to stop spread of the disease.

If eliminating apparently healthy trees nearby the dead or dying ones sounds like a drastic measure, it is. Furthermore, after removing a tree the stump should be poisoned. (The trees to be destroyed should be poisoned regardless of whether they are removed.) Chemicals such as "silvicides" can be used which reach into the root system to kill both the roots and the fungus located there.

Ammate or mixtures of 2, 4-D and 2, 4, 5-T in oil are good silvicides for this purpose. Sodium arsenite is more effective - but the danger of persons being poisoned by contact with it is such that it can be used only with extreme caution. We do not recommend sodium arsenite for general use.

It is also possible to trench around an infected tree to cut the roots and so prevent the fungus spreading through root grafts. To make sure that all roots likely to form grafts with nearby trees are cut, the trench needs to be about 40 inches deep. It should be dug at least half-way out from the infected tree toward surrounding healthy ones.

As a precaution, a second trench should be dug around the area enclosing seemingly healthy trees nearest the infected oak. If those have already become infected through root grafts, then, further spread of the fungus will be limited.

To reduce production of spores by the fungus, recently wilted trees should either be (1) girdled with a cut extending well through the sapwood all around the base of tree, or poisoned by applying a silvicide to a 6-inch wide band of exposed sapwood all around the trunk, or (2) felled and hauled away.

Usually an oak that dies of wilt in July will not produce a crop of spores on the mats under the bark until September or October. Those wilting later than July usually do not produce such a crop of spores until the following spring. The evidence we have to date indicates that the spores produced in the spring are more important in the spread of the disease than those produced in the fall. Also, the trees appear to be much more susceptible to infection in the spring, when they are growing vigorously, than in late summer when growth has slowed.

For these reasons, it is important to avoid pruning or trimming oaks during the spring season. They are then in their most susceptible state and the spores likely to be abundant. However, the trees may still be infected in the summer and fall, so it is best to limit pruning to the winter months, January through March.

Positive Identification

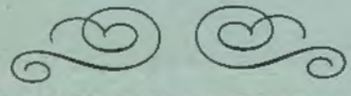
The only way to identify oak wilt positively and with 100 percent assurance is to recover the wilt fungus from the diseased tree. This is done in the laboratory. Pieces of wood from suspected trees are placed on a culture medium and kept until the fungus grows out of the wood.

Samples sent to the laboratory for such a test should be 6 to 10 inches long, and cut from branches at least half-an-inch in diameter. The pieces should be taken from branches on which the leaves are dying but not yet completely dead.

SALES POINTER* - - -

Note these pointers from ad experts: Ads with pictures get more attention than those without. Ads with big pictures are better than those with small ones. Small ads often attract more readers per dollar than big ones, but fewer total readers. As ads increase in size, they get more readers, but seldom in direct proportion to the size increase. Long, single column ads get less attention than those using the same amount of space spread over two or three columns. Full color increases number of readers and usually is well worth the extra cost. Specific information and helpful suggestion headlines attract more attention and include more text reading than general claims of quality. Price display (dollar figures) has good attention value. (This includes news of price reductions.)

* From Central Flower News 9(5):2 May 7, 1955

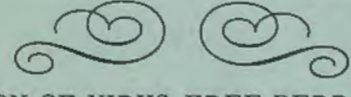


QUACK GRASS CAN BE CONTROLLED

Anon.
Cyanagrams 5 (2): 6-8 Summer 1956

Amino triazole, applied at the rate of 8 lbs of 50% material in 50 gallons of water per acre with a power sprayer, was effective in controlling a heavy stand of quack grass. Treatment was made in spring when plants were growing vigorously. Thorough wetting of all foliage is necessary. After spraying, a delay of 2 weeks before plowing should be allowed to permit the herbicide to permeate the entire plant system. The "white" appearance, or lack of chlorophyll, indicated that the amino triazole had moved through the plant. The land was plowed and planted immediately after plants showed these symptoms. Weak regrowth of quack grass occurred during the summer and new seedlings appeared. Spot treatments using ½ lb. of 50% amino triazole in 3 gallons of water were used to kill these plants. Many deep-rooted annual and perennial weeds, as well as grasses and woody weeds, were controlled effectively also. Roughly, the cost was $20 per acre.

R. J. Stadtherr



PRODUCTION OF VIRUS-FREE BERRY PLANTS IN BRITAIN[1]

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The fact that virus-free plants permit strawberry varieties to achieve a higher level of production than otherwise wonld be possible has been recognized in Britain for more than 25 years. Visual inspection of plants has been discarded for some time as a means of developing virus-free foundation stock of strawberries, and more recently with raspberries.

It is now well known that visual inspection is ineffective. For example, at least four different viruses cause visual symptoms in red raspberries, but five other viruses are known that cause stunted growth and lower yields without the appearance of recognizable foliage symptoms.

The development and production of virus-free foundation stock in Britain appeared to me to be well ahead of practices in this country, particularly in heat treatment to rid foundation stock of virus. At present there is no Minnesota source of basic foundation stock available for propagation by growers, and it will take a little time to develop such a source. Dr. T. H. King is at work on this problem at University Farm, St. Paul. The Michigan Station initiated such a program in 1950 and after six years they have, for the first time this year, stock of three virus-free varieties available from Michigan nurseries for grower use. So far as we know there is no source of heat-treated virus-free raspberry stock available anywhere in this country, such as was seen in Scotland.

Method used in Britain - Plants are grown under glass at temperatures of about 100° F. for up to three weeks. This treatment usually frees the plants from all virus diseases. Some varieties are more tolerant than others to such high temperatures. In the case of raspberries, the plants must be thoroughly established in pots to stand such treatment. The plants are tested soon after they recover from the heat treatment and again at a later date. The second test with raspberries is made about two months after the heat treatment by means of grafting by inarching onto Rubus Henryi. If virus is present in the heat treated stock, the growing tips of R. Henryi will die back. This work is done at horticultural research stations.

The next step is to propagate the virus-free stock in greenhouses or screenhouses which are kept free from aphids capable of transmitting virus. Such planting stock is known as "Mother Stock" or by some other appropriate name. With strawberries, small lots of plants, often 50 plants of each variety, are distributed to cooperating nurseries for planting in isolated places, usually 20 miles from other strawberries. At the East Malling Station tested stocks are distributed to the Nuclear Stock Association Ltd., a non-profit organization sponsored by the National Farmers' Union. Regulations under which such plants may be grown differ somewhat in England and Scotland. In the latter country, no spraying of the planted stock is permitted and the planting is condemned if aphids are found. The resulting plants usually are known as "Basic Foundation Stock."

Plants of the "Basic Foundation Stock" are distributed to other growers located at least five miles from growing areas. Isolation is not too serious a problem because the only wild strawberry is F. vesca on which aphids rarely are found. These plantings must be sprayed with specified insecticides and the first visual inspections are made at this stage. Fifty plants of original "Mother Stock" now will have produced from 30,000 to 40,000 plants, usually known as "Elite" stock. Virus-free stocks produce more plants than do ordinary plants.

The last step is the production of commercial planting stock from plantings of "Elite" stock. Such plants must be one mile from fruiting beds, and they

[1] Taken from: Minnesota Fruit Growers Association Newsletter No. 9, April 8, 1957.

are sprayed or dusted and inspected. Thus, the commercial grower can obtain planting stock three years from the time that the "Mother Stock" was distributed from the research station. A special method of culture is practiced in these "Elite" plantings whereby the runners from two adjoining hills are rooted in the space between the two hills. The same thing is done with the next two hills. This leaves an open space between each second and third hill. If a diseased plant is found, it and its runner plants together with the other plant of the pair can be easily removed.

Editors Comments
R. J. Stadtherr

THE MORTON ARBORETUM

Mr. Roy Nordine, propagator, Morton Arboretum, Lisle, Illinois, gave an interesting illustrated lecture on the arboretum and its plants at the Minnesota Nurserymen's 31st Annual Convention.

The arboretum was founded in the fall of 1921 by Mr. Joy Morton, a son of J. Sterling Morton, the Arbor Day founder. The salt magnate had as a childhood ambition the establishment of an arboretum to carry on practical scientific research in the culture of trees and shrubs.

From an original site of about 200 acres, the present land area has expanded to about 1400 acres. Approximately a half of the arboretum is in native woodland with about 3 acres of virgin prairie. There are many well-marked trails and 12 miles of black-top roads within the area. Every endeavor has been made to create a pleasing landscape effect. There are long vistas and lays. Mr. Morton emphasized trying to increase the love of plants within the general public.

Over 4,800 different species, varieties and hybrids of woody plants are growing in the arboretum. More than twice that number have been tested there. The goal is to grow every shrub, tree and vine capable of surviving in their climate.

Some of the special features include 125 different hedges with from 60 to 70 informal types. Areas devoted to ground covers, old-fashioned roses, woody peonies and daylilies have been established. The lilac collection contains over 300 named varieties while there are about 250 named ornamental crab apple varieties. There are many other outstanding collections of particular genera.

To further the interest of the public in plants, an educational program was begun in 1942. Students from 8 to 80 years old have enrolled in these classes. Many different courses are given including nature studies, ecology, plant identification, propagation, landscape design, general gardening, and care and maintaining trees and shrubs. Duration of classes are from 1 to 10 weeks. In some classes, enrollment is limited to 25 to 30 students, but in many there are over 100.

Of especial interest to nurserymen is the research in plant propagation, as well as the vast testing program. The research program will be increased with the addition of new greenhouses and cold-storage facilities. Research on nutrient deficiencies studies will be undertaken. They have an extensive file on nursery catalogs to help locate sources of plant materials. A library and herbarium are provided for research workers and students. An information bulletin is published on popular horticultural subjects. Some of the various interesting plants which Mr. Nordine showed and believed might have a possibility in Minnesota included the following:

Abeliophyllum distichum, Amelanchier grandiflora, Azalea mollis, Bereris thumbergi aurea, Cotinus coggygia "Grootendorst Purple", Daphne mezereum, Lonicera tatarica nana, and Rosa setigera, "Prairie Rose".

He showed slides of some very beautiful hornbeams, dogwoods, hawthorns, magnolias and viburnums which we would like to include on our recommended lists.

LAWNS

Remember early August through early September is an excellent time to seed a new lawn. Extension Folder 165, "The Home Lawn" will give recommendations on procedures to follow in making a fine lawn. Copies may be obtained by writing to the Bulletin Room, University of Minnesota, St. Paul Campus, St. Paul 1, Minnesota.

Other timely lawn chores include: controlling crabgrass to prevent seeds from maturing, renovating weak turf, killing many small dandelions which are coming up now and giving the lawn a second aplication of fertilizer.

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