The Prairie Arborist, December 1989, pages 40-44.

Pests of Trees and Shrubs: A Different Perspective

K.I. Mallett
Forestry Canada, Northwest Region
Northern Forestry Centre, 5320 122 Street
Edmonton, Alberta, T6H

Insect and diseases are a perennial problem of trees and shrubs in the prairie provinces. The insect pests and the diseases caused by microogranisms are, for the most part, well known. But a large component of urban tree diseases are caused by agents other than microorganisms, those we call abiotic diseases. In this paper I will discuss the major abiotic diseases that are being identified in regional diagnostic laboratories and their significance to arboriculture.

In the prairie provinces commercial growers, landscapers, tree maintenance personnel and homeowners have access to diagnostic facilities for tree pest problems. In Alberta diagnostic labs are operated by the Alberta Special Crops and Horticultural Research Center (ASCHRC) in Brooks, and the Alberta Environmental Center in Vegreville. Horticultural advisory services are offered by the Alberta Tree Nursery and Horticultural Center in Edmonton. In Saskatchewan, the diagnostic lab or Saskatchewan Agriculture is located in Regina. In Manitoba, the diagnostic lab of Manitoba Agriculture is in Winnipeg. Forestry Canada monitors the health of forests through the Forest Insect and Disease Survey (FIDS) and offers a pest advisory service for urban tree problems in the prairie provinces. These labs are kept very busy throughout the year with agricultural, horticultural and woody ornamental specimens. Trees and shrubs make up a large component of the total specimen loads of these labs. At the ASCHRC in Brooks this year 32% of all specimens were trees or shrubs.

The tree and shrub specimens submitted to the labs have a wide variety of problems caused by insects and diseases. Figure 1 shows the total tree and shrub specimens for three of the labs, broken down into those caused by insects and disease. The insect problems on trees are relatively easy to identify as being an insect problem; however, sometimes it is not so easy to identify the insect causing the problem or what to do about it. Disease specimens are those that are affected by either microorganisms such as fungi, bacteria and viruses or those that are affected by some environmental problem such as frost damage, chemical injury, etc. Most tree diseases that are caused by microorganisms can be quickly identified by the diagnostician, some of the environmental diseases can be very

difficult to diagnose and for the client the diagnosis may be very difficult to believe. There are several reasons for this. One being that trees are long lived and so the current problem may be a consequence of some event that occurred several years ago, an example being Cytospora canker on a winter injured branch. A second reason that is encountered with woody ornamental is the sheer size of some specimens. Obviously, dead or dying trees are physically impossible to dig up and send to the lab and so a sample is submitted. Often the sample is a single leaf of a twig that may or may not be indicative of the disease. A third reason is ignorance, many people do not have a good knowledge of tree biology or arboriculture.

Figure 2 shows the breakdown of disease specimens for four diagnostic labs. I have divided the problems into three areas, pathogens or those diseases caused by microorganisms, physiological which includes nutrient, climatic damage etc. and chemical which include herbicides and road salts. This figure demonstrates several interesting points. The first is that over half of the disease specimens in Saskatchewan and Manitoba are caused by pathogens and yet in southern Alberta only 13% of the specimens are. However, in southern Alberta 59% of the specimens were physiological diseases which is probably a reflection of the effects of the winter weather in this area on trees.

Of the pathogens found on trees there are no real surprises. Fireblight, Cytospora canker, Septoria canker and silverleaf tend to be common problems. At this time there are no real threatening diseases of the urban forest in the prairie provinces other than Dutch elm disease.

Climatic damage is one of the most common abiotic disease problems and is found in all three provinces but is most pronounced in Alberta. There are three factors which affect the amount of damage that occurs, the weather, the tree species and the cultural practices that have been applied to the tree.

Chinooks, warm dry winds, are often experienced in southern Alberta and to a lesser degree in northern Alberta and Saskatchewan during the winter. The sudden changes in temperatures as well as the accompanying dry winds can desiccate trees very quickly. Often trees do not exhibit the symptoms of desiccation until the following spring. Early winters can damage many trees that have not adequately hardened off. Late spring frosts in recent years have caused problems in a variety of trees.

Tree species and provenance are very important to the amount of winter injury sustained. Tree species that are planted in the prairie provinces must be able to grow in a short period of time and then prepare for winter. They must be able to withstand not only cold temperatures but low relative humidity. Provenance, or the geographic locality of where the original selection came from is critical. Native white spruce from southern Alberta planted in northern Alberta will not survive as it breaks bud before the last spring frosts and does not go dormant early enough in the fall. This same principle affects many of our ornamental tree species.

Cultural practices such as late summer fertilizing often promotes the growth of young succulent tissues that do not harden off adequately and are winter killed or damaged. Inadequate soil moisture in the root zone can lead to winter desiccation particularly in the Chinook areas.

Figure 2 shows that a large proportion of specimens were received that had chemical injury. Saskatchewan and Manitoba labs did not receive as many specimens as ASCHRC or ForCan, the reasons for this are uncertain. The most common kind of chemical injury is that due to herbicides and in particular soil sterilants. In my experience the majority of the herbicide injury specimens on trees are from homeowners who have treated some part of their yard with a soil sterilant to eliminate unwanted grass or weeds. Many of these people have no idea that tree roots grow to the distances that they do and in some cases do not realize that the chemicals can harm the trees. There have been some cases of commercial paving companies using sterilants underneath driveways with resulting damage to nearby trees. Other herbicide damaged trees are found in farm shelterbelts that are damaged by spray drift from nearby agricultural crops.

Other chemical damage that is common is due to road de-icing salts used in the winter. The salts affect plants in two ways, through runoff onto the soil and through spray onto the foliage. The salts can cause soil salinization with the resulting poor growth or death of the tree. Salt spray can cause damage to needles on conifers.

I believe that something can be done to reduce the damage from abiotic diseases. Like most problems that humans face this can be done through education, particularly the public and municipal managers. It is difficult to control the weather but planting trees that can survive our winters can be done. We must educate the public and the managers who control budgets why it is important to demand that only those cultivars (those from the correct provenance) be planted and not those that are the cheapest. Cultural practices that promote winter injury must be discouraged. Amateur and professional alike have to be made aware of the correct use of soil sterilants. The garden centers and retail outlets that sell the sterilants must make sure that the client understands the effects of the chemical. De-icing salt problems can be reduced by planting more salt tolerant species along roadsides and using different salts. Public works departments and the municipal managers have to be made aware of the problem of plant injury as well as soil salinization and the resultant costs of this damage.

In summary diseases caused by pathogens and abiotic factors make up a significant portion of the health problems of trees of the prairie province but are difficult and ongoing problems to deal with. Winter injury, and chemical injury are two of the major abiotic factors problems seen in diagnostic labs in the prairie provinces. This type of damage could be reduced dramatically through education.

Acknowledgements

I would like to thank Mr. D. Kaminski, Diagnostician, Alberta Special Crops and Horticultural Research Centre; Ms. G. Jesperson, Provincial

Fig 1. Insect and Disease Specimens Received to Date 1989

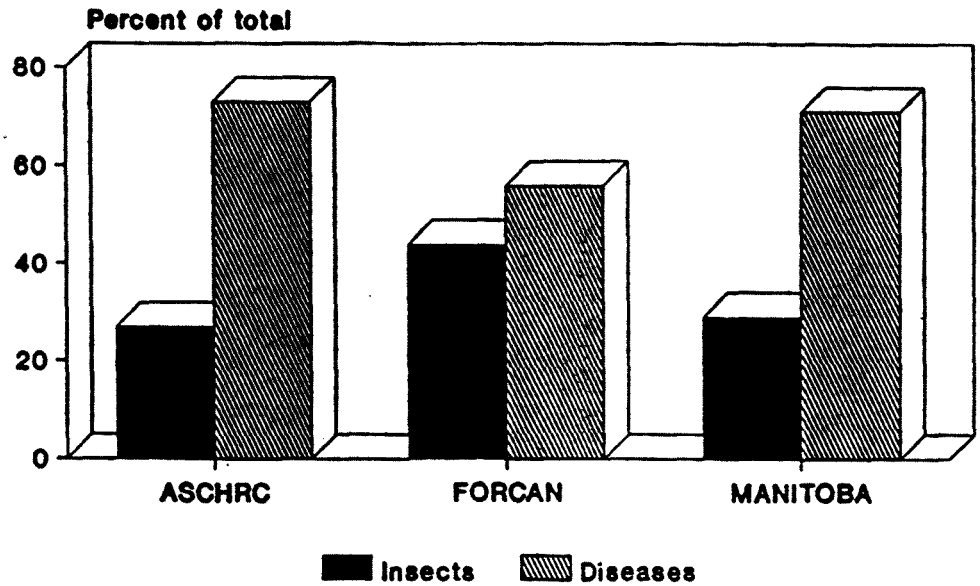
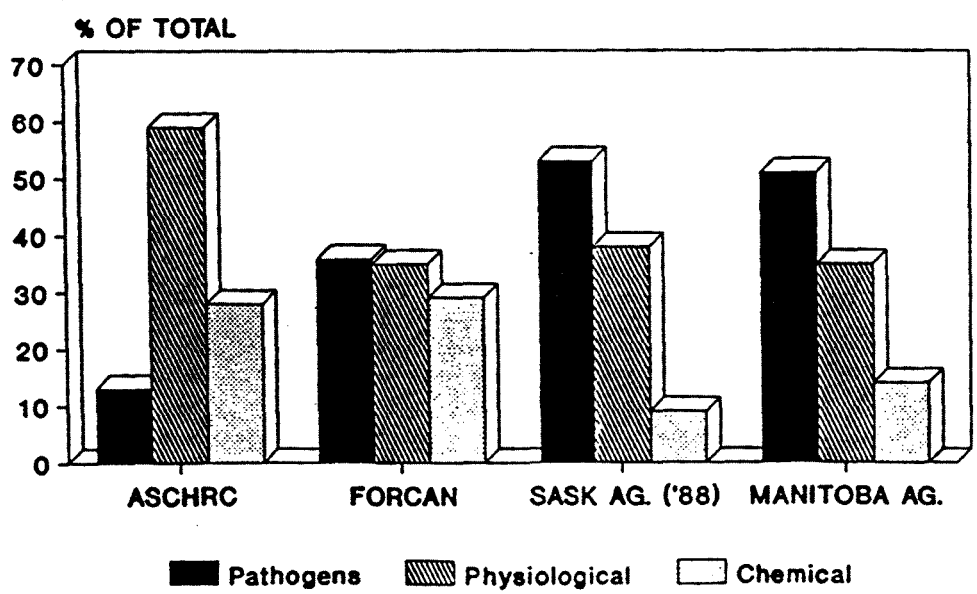


Fig 2. Disease Specimens Received To Date 1989



Plant Pathologist, Saskatchewan Agriculture; Dr. G. Platford, Plant Pathologist Manitoba Agriculture, and Mr. F.J. Emond, Chief Ranger, Forestry Canada, Northern Forestry Centre for contributing statistics concerning tree pests.