THE CONCEPT of TYPE--DISEASES

William Merrill
6 March 2000
Prepared for the New England
Christmas Tree Pest Management Short Course

There are between 200 and 250 different diseases that can affect Christmas trees. Unfortunately, most have never been investigated. Thus, this seems at first glance to be a huge mass to try to understand. However, nearly **all Christmas tree diseases can be grouped into one of eight categories**, which are **called type-diseases**.

A **type-disease** is a collection of from a few to over a hundred different diseases that are very similar in that the individual members of each type-disease (1) have similar or closely related pathogens, (2) have the same disease cycle from infection to ultimate death of the all or part of the plant, (3) have the same or very similar environmental requirements, and hence (4) have the same control procedures. **There are eight type-diseases affecting Christmas trees in the Northeast**. If one knows one typical representative of each type-disease, he/she can extrapolate that to all others in the same category and be correct most of the time. As in everything, there are occasional exceptions that screw up this process.

So instead of having to learn. all of the details and control procedures for 200 to 250 different diseases, one merely has to know the details about one typical representative of each of the eight type-disease. Anyone should be able to learn and remember the details of eight different diseases, and therefore anyone should be able to diagnose and control (if controls are available) nearly any Christmas tree disease he/she encounters.

THE ROOTS

ROTS OF SUCCULENT ROOTS: caused by soil-borne fungi that attack the fine feeder roots of plants, killing them, and hence killing the tree. Normally associated with wet seepage areas. Control by avoiding seepage areas.

ROTS OF WOODY ROOTS: caused by soil borne fungi that usually survive in stumps of roots of dead or felled trees often for extended periods, and which then seek out and attack the root systems of other trees, killing them. They often grow up into the lower base of the stem, attacking and killing the cambial layer which lies directly beneath the bark. Control by block management and stump removal, and by not planting a new seedling right beside the stump of a tree recently cut.

THE STEM

STEM CANKERS: caused by numerous fungi which attack stressed trees anywhere on the twigs. branches. or stems. They attack and kill the cambium (generative tissue that lies between the bark and the wood). They can girdle the twigs, branches, or stem, killing them. Thus these diseases usually are site related. Beware of planting trees which require mesic soils on sites with shallow soil over rocks or in areas with deep sandy soils..

TIP BLIGHTS: caused by fungi that attack and kill the very ends of young elongating shoots, thus stunting branch development. Relatively little is known about most of these diseases. Thankfully, they are not too common, but when they do occur they can be extremely destructive. In general, I know of no available efficacy data for chemical controls other than Bordeaux Mixture.

THE FOLIAGE

SOOTY MOLD: is not really a disease as the fungi to not infect the plant. Instead, they grow on the excrement (so-called honey-dew) of aphids and scales. They develop during the later summer and can encrust the foliage with a layer of black hyphae up to an inch or more thick. Sooty mold indicates the presence of an insect population that is out of control! Prevent by using insecticides.

NEEDLE RUSTS: are common and occasionally can be destructive. There are sixteen needle rusts just on balsam fir. These fungi are obligate parasites, that is, they live only on living tissues. With a couple of exceptions, they cannot spread from conifer to conifer, but must alternate in mid- to late summer to an alternate and unrelated host. They have the same degree-day relationships as their conifer hosts. They form resting spores on the alternate host, which geminate in early spring at the time of bud break to form another infectious spore type, which then is wind borne to infect the young emerging needles of the conifer. There is only one cycle per year. Frequently the best control is to eliminate the alternate host, thus breaking the cycle.

NEEDLECASTS: are common on virtually all conifers, and about 130 have been described. They also have the same degree-day relationships as their host, producing spores which infect the young succulent emerging needles. Most cause no symptoms until the following mid-winter when the infected foliage begins to discolor and die. The fungus forms spores on these needles prior to budbreak which are wind-borne to infect young newly emerging needles. The true needlecasts, like the rusts, have only a single infectious cycle per year at the time of bud break. Control is via fungicides.

NEEDLE BLIGHTS: are not too common in the Northeast but can be extremely destructive. These fungi attack any age foliage any time of the year that the temperature is above freezing and free moisture is present on the needles. They have almost continuous cycles Therefore, they are difficult to control, their hosts requiring protection from March to December. Control is via fungicides.