

NEMATODES

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The purpose of these comments is not to announce some new and terrible problem. Nematodes no doubt have been with us as long as we have been cultivating plants. However, the wide-spread importance of nematodes and the nature of the troubles they cause has been recognized only within the past 20 years or so, even though some of them, like the root-knot nema, the bulb nema, the foliar nema, and a few others, have been well known for much longer. Twenty years ago the amount of money spent on nematode work was exceedingly little, whereas today many millions of dollars are spent annually in nematode research and nematode control, and the results have been spectacular. Nematode control on some very large acreage crops has become routine and industries or sections of industries have been built on the production and application of nematode control chemicals.

Nature of damage

Most of the well-known nematodes cause clearly visible responses by the plants. Root-knot nematode attack results in formation of conspicuous galls or knots on the roots, bulb nematode causes enlargements in the leaf blade and rotting of the bulb scales, and the leaf nematode causes browning and dying of the foliage. The more recently recognized trouble-makers, however, do not cause such conspicuous symptoms - which probably is the reason their importance was not appreciated (?) sooner. In contrast to most other disease-producers, recognition of the nature and significance of many of these "new" nematodes has been a result of the development of control materials rather than the cause of their development. Plants grown in soil treated with chemicals which were known to kill nematodes but not fungi were found to make tremendous growth responses. This led to careful studies which showed that certain nematodes previously had been feeding on the roots and retarding plant growth.

Some of these root-invading nematodes actually caused visible lesions on the roots, followed by a definite rotting. With others, the roots appeared reasonably healthy although the nemas were feeding on the cell contents. In either case, the net effect was either a holding-back of potential growth, or a definite degeneration or "running out" of plants grown on the infested soils. An indirect effect in some cases was that the nematode-invaded plants were more subject to attack by disease-producing fungi.

Different kinds of nematodes

The studies in recent years have shown that not only are there many wholly different types of nematodes, but also many different varieties of a given type. For example, whereas root-knot nematodes were once just root-knot nematodes, we now know that there are at least six distinct species of root-knot nemas. Some

of these are found in one part of the country but not another, some will attack one sort of plant but not another. We no longer can say that nematodes from one type of crop necessarily will be a hazard to a following crop of another type of plant.

Most of us know that root-knot nematodes usually, but not always, cause conspicuous swellings on the roots and poor growth of the plants. We should also know that their activity is favored by high temperature and that they are practically inactive below 55°F. Spread and development of root-knot is favored in light sandy soils, not in heavy soils. And although some nematodes are resistant to drying, all stages of root-knot are killed by complete drying.

Another type of nematode also may be found within the roots--the root lesion nematode. The root lesion nematodes are not gall-producers, but do produce visible brown lesions on the roots. These lesions look like certain fungus lesions and may be mistaken for them. Root lesion nemas cause stunting, low production and other degeneration symptoms in the plants.

The spiral nematodes, the sting, stubby root, dagger, stylet, and pin nematodes all feed on the surface cells and may be very hard to find by simply examining the roots. Like the root-lesion nemas, they cause stubby or restricted root growth and general loss of vigor of the plants.

Some general characteristics

It is never safe to make generalizations, yet there are a few characteristics which seem to apply to most of the nematodes with which the florist is concerned. A few of these are given here:

Nematodes are very small "worms" -- mostly just too small for most of us to see without magnification.

Under favorable conditions nematodes may build up rapidly; for example, a single root-knot female may lay 500 to 1000 eggs and the life cycle may be completed in less than 30 days.

Most nemas are favored by soil moisture which is optimum for good root growth.

Most nemas are favored by relatively high soil temperatures (85 to 90°F), but the unprotected stages are killed by short exposures to temperatures too low to kill most fungi, for example, 110°F for 2 hours or 120°F for 10 minutes will kill root-knot nematodes.

Last, but not least, nematodes, in addition to being easily killed by temperature treatments, are killed by relatively low dosages of a number of fumigant materials. Thus, while nematodes may cause serious trouble if not controlled, a number of very effective methods and materials for controlling them already are available.