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ORGANIC TOXICITY

In recent years there has been much discussion on the subject of organic matter toxicity and its relation to the severity of black root rot of tobacco. Organic matter toxicity is due to or at least related to toxins produced during organic matter decomposition.

Decomposition products from small grains and grasses, crops commonly used in the tobacco rotations, have been found to give rise to toxic substances. Such substances were produced most consistently at highest concentrations under conditions of high soil moisture, in heavy soils, and at relatively low temperature conditions.

Organic substances injurious to tobacco plants have been extracted from plant residues that had decomposed under natural conditions. These toxic extracts were found to inhibit germination of seed and growth of tobacco plants. Root injury is usually confined to those parts of the root in direct contact with or in the immediate vicinity of decomposing plant fragments in the soil.

Chemical analysis of roots which have been exposed to the organic toxins have shown that there is an increase in amino acids (food substances) on the surface of these injured roots.

It has been found that tobacco roots which have been injured by organic toxins are more susceptible to black root rot. In some recent research both black root rot resistant and susceptible tobacco varieties were exposed to organic matter extracts, and their relative resistance and severity of disease development were determined. Exposure to the toxins resulted in an apparent breakdown of resistance. There were no significant differences among varieties, and the disease was equally severe on roots of the resistant and the susceptible varieties after toxin treatment. This research might explain in part, at least, the apparent breakdown of resistance that has at times been noted in the field with black root rot resistant varieties.

Organic matter toxicity and root diseases in general can be eliminated or at least drastically reduced if tobacco is grown in a rotation with good grass and/or legume sods.

In continuous tobacco fields the amount of organic toxicity and the amount of root diseases can be reduced if the tobacco field is plowed well in advance (month to 6 weeks) of setting tobacco. Small grains should be turned under by the time they are 18 to 20 inches tall. It is also advisable to add manure and part or all of the fertilizer to the field and turn it under. Adding the fertilizer early will assist in decomposition of the organic matter.

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