EVOLUTION OF NEMATODE MANAGEMENT IN COTTON: DOW AGROSCIENCES' COMMITMENT TO SITE-SPECIFIC TECHNOLOGY

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Abstract

Plant-parasitic nematode damage potential to cotton was documented in the late 19th century. A cotton producer can recognize southern root-knot nematode damage due to the galls which develop on the roots. However, all root injury caused by nematodes is not this obvious. Reniform, Columbia lance, and sting nematodes can cause significant yield losses but do not exhibit the obvious symptoms of root galls. Nematode surveys accelerated in the 1980s and led to increased awareness and better understanding of nematode distribution in key cotton producing areas. Published annual yield losses range from 2 to 7%. Management recommendations include crop rotation, cultural practices, host plant resistance and nematicides. Fumigants, which included chloropicrin and 1,3-dichloropropene, were introduced in the 1940s and 1950s and have proven to be very effective against nematodes and certain fungal complexes. Soil applications of aldicarb have been very useful in managing nematodes the past 25 years. Oxamyl, a systemic foliar applied nematicide, was also introduced in the 1980s. Seed treatments, which include abamectin and thiodicarb, have become popular the past 5 years and are now used on most cotton seed sold in the US.

Recent studies using site specific techniques led to increased recognition that damage attributable to nematodes was not equally distributed in most fields. Based on observations that some heavily infested fields showed tremendous stunting while other fields with similar populations did not, nematologists accelerated their research efforts to better understand the underlying factors for the variability. Research in several states revealed that soil texture played a major role in determining where nematode species can survive and reproduce as well as the extent of damage they can cause. The introduction of precision agriculture tools in the early 2000s along with increased support from government grants, Cotton Incorporated and industry, enabled researchers to better understand and characterize the nematode / soil interactions. These efforts have led to development of site-specific technology which utilizes soil variability maps to help determine nematode distribution throughout a field. Site-specific technology enables applicators to inject a fumigant like 1,3-dichloropropene (Telone® II) in areas or zones which are likely to be most "responsive". University research programs have demonstrated significant economic returns on investment in many fields. However, site-specific application will not benefit all growers since some heavily infested fields have uniform soil characteristics conducive to nematode injury. In these situations, the application of a fumigant to the entire field is needed for the greatest economic returns.

Dow AgroSciences fully embraces and supports the site-specific applications of Telone II to help growers achieve maximum return on their investments. Placement of a product in zones where it is most needed is a responsible practice that helps improve the overall success of an effective stewardship program and allows sustainable production in nematode infested fields.
