2002 BELTWIDE COTTON CONFERENCES, ATLANTA, GA – JANUARY 8-12

# POSSIBLE CONTRIBUTION OF ROOT-KNOT NEMATODES AND BLACK ROOT ROT TO YIELD STAGNATION SOUTHEAST ARKANSAS

**T.L. Kirkpatrick**
**University of Arkansas Southwest Research and Extension Center**
**Hope, AR**
**C.S. Rothrock**
**University of Arkansas**
**Fayetteville, AR**
**D. Plunkett**
**Arkansas Cooperative Extension Service**
**Little Rock, AR**
**K. Williams**
**Arkansas Cooperative Extension Service**
**Hamburg, AR**

## Abstract

Stagnation, defined here as the lack of capacity for growth, has characterized cotton yields in Arkansas for the last 10 years. Although yields in some years have been adequate, no trend toward increased yield over time has been seen. Recent new developments in crop production, including new conventional and transgenic cotton cultivars, more effective pesticides, and more efficient use of growth regulators have been widely accepted by growers throughout the state. Unfortunately however, cotton growers have not seen concomitant yield improvements in many fields. Two soil borne organisms that are widely distributed throughout the major cotton growing areas of the state are the root-knot nematodes (*Meloidogyne incognita*) and *Thielaviopsis basicola*. Both organisms are pathogenic to cotton, and recently the interaction between them has been shown to be particularly detrimental to cotton stand establishment, growth, and yield.

Records from the past three years (approximately 15,000 samples) from the Arkansas Nematode Diagnostic Laboratory indicate that at least 30% of cotton fields statewide have a detectable population of root-knot, and many of these fields have very high population densities at harvest each year. In some areas, particularly the southern Mississippi River Delta region, samples from some counties consistently show well over half of the fields sampled each year contain this nematode. Since 1995, an extensive sampling effort has been ongoing in Ashley County, AR, in the extreme southern part of the state to determine the incidence of both root-knot and *T. basicola*, and to assess their involvement in cotton yield performance. In this county, 78% of fields assayed contained *T. basicola* and 55% contained root-knot nematodes. Paired plot studies conducted during the 2001 season indicate that lint yield was 242 lb/acre lower where both organisms were present at high levels than where neither was present.

The extent to which these organisms are found in Ashley County is likely and indication of the situation in surrounding counties as well. In addition, the high incidence of the root-knot nematode that has been found throughout the state points to a potential for yield limitation on a broader scale. Results of nematicide trials conducted in the region from 1993-2001 by both research and Cooperative Extension personnel indicate a consistent positive yield response to either aldicarb (Temik) or 1,3-Dichloropropene (Telone II). The presence of *T. basicola* in the majority of these sites was unfortunately not determined. At least circumstantially, these data, along with grower experience in the area, appear to point to the involvement of either the root-knot nematode, *T. basicola*, or both organisms together in the lack of consistent yield improvement that has been experiences by cotton growers in the region.