

CROP ROTATION--ITS IMPACT ON COTTON PRODUCTION IN RENIFORM INFESTED FIELDS

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Abstract

Cotton yields in 1996 from a crop rotation study initiated in 1994 were not significantly greater than continuous cotton. These results contrast sharply from 1995 results in which most rotation systems produced yield increases. The failure to produce a response could be attributed to relatively good growing conditions for cotton this past season. As growing conditions return to normal, substantial yield increases are expected in the coming years.

Introduction

This rotation study was begun in 1994 to find alternative, effective methods to managing reniform nematodes in cotton. The more popular nematicides have effectively controlled reniform sufficiently to produce profitable increases most years. However, nematicides are expensive, fail to work under certain conditions and pollute the environment.

Crop rotation with other nonhost crops could produce added benefits such as improved weed control and fewer soil pest and disease problems.

The purpose of this rotation study is to find an acceptable and profitable cropping system.

Methods

A crop rotation system using alternative nonhost crops to reniform nematodes was developed. Nonhost crops were selected based on their suitability as a useful commodity crop for the producer and their resistance to reniform nematodes.

Cropping schemes through 1998:

Rotation	Year				
	1994	1995	1996	1997	1998
1.	Corn	Corn	Cotton	Corn	Corn
2.	Corn	Corn	Corn	Cotton	Corn
3.	Corn	Cotton	Corn	Cotton	Corn
4.	GS	GS	Cotton	GS	GS
5.	GS	GS	GS	Cotton	GS
6.	GS	Cotton	GS	Cotton	GS
7.	Bahia	Bahia	Cotton	Bahia	Bahia
8.	Bahia	Bahia	Bahia	Cotton	Bahia
9.	Soybean	Soybean	Cotton	Soybean	Soybean
10.	Soybean	Cotton	Soybean	Cotton	Soybean
11.	Cotton(T)	Cotton(T)	Cotton(T)	Cotton(T)	Cotton(T)
12.	Cotton	Cotton	Cotton	Cotton	Cotton

GS = Grain Sorghum.

T = Temik in-furrow at 7 lb/acre, untreated cotton will have Di-Syston in-furrow at 5 lb/acre.

Results

The rotation study was placed in a cotton field that had been historically damaged by reniform nematodes. Twelve cropping systems were arranged in a randomized complete block design and replicated 8 times. Plots are 8 rows wide and 50 feet long. Yield data, nematode data and fertility data was taken from the two center rows. Nematode soil samples were collected at planting and during cotton harvest. Weed and insect control was according to Auburn University's recommendations.

Discussion

The cotton rotation study in Escambia County, AL completed the third year of a multi-year study to determine the beneficial effect of alternative cropping systems on cotton production in heavily infested cotton fields.

Yield results from the 1996 test were rather disappointing but not unexpected (Table 1). Although all cropping systems except soybean outproduced the untreated check. None of the cropping systems or Temik produced significant yield increases in 1996. This is in sharp contrast to the 1995 season when yields were substantially higher in rotation plots (Table 2). Failure of these systems to outyield continuous cotton with no nematicides could be attributed to ideal growing conditions for cotton over most of the 1996 season. Reniform nematodes, known to be stress pathogens, were not able to cause significant damage to cotton because of the overall favorable conditions for optimal cotton growth. This agrees with previous nematicide tests conducted under similar conditions. Further data need to be collected over a longer period to determine if crop rotation is economically effective.

Table 1. Rotation Study--Escambia County-1996

Cotton Yield					
Rotation	1994	1995	1996	Sd Cot lb/A	Lint lb/A
1	Corn	Corn	Cotton	2008	702
2	GS	GS	Cotton	2137	748
3	Bahia	Bahia	Cotton	2171	760
4	Soybean	Soybean	Cotton	1791	627
5	Cotton T	Cotton T	Cotton T	2077	727
6	Cotton	Cotton	Cotton	1851	648

Table 2. Rotation Study-Escambia County-1995.

Cotton Yield				
Rotation	1994	1995	Sd Cot lb/A	Lint lb/A
1	Corn	Cotton	1594	622
2	GS	Cotton	2137	833
3	Soybean	Cotton	1963	766
4	Cotton T	Cotton T	1617	631
5	Cotton	Cotton	1473	574
LSD (0.05)			203	79
LSD (0.01)			294	107

Literature Cited

Rush, Dru E. And W. S. Gazaway. Nematicides-effective alternatives for controlling reniform nematodes. In Proceedings of the National Cotton Council Conference. National Cotton Council. (ED) D.A. Richter and J. Armour. Memphis, TN.

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