

# EFFECT OF DIFFERENT SOIL TYPES ON THE REPRODUCTION OF RENIFORM NEMATODE

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## Abstract

Six Arkansas soils were tested for suitability as media for the reproduction of *Rotylenchulus reniformis*, the reniform nematode on cotton and soybean. In two soils (Jeanerette Silt Loam and Steele Loamy Sand) reniform reproduction on soybean was greater ( $P \geq 0.05$ ) than on cotton. However, the degree of reproduction on all soils was much less than expected.

## Introduction

The reniform nematode, *Rotylenchulus reniformis*, is a serious threat to cotton and soybean production in Arkansas and the Mid-South. Yield losses in fields infested with this nematode range as high as 50%. Crop rotation, resistant cultivars, and nematicides are the methods available used for control of this disease (Robbins et al. 1994). Rotation is an environmentally friendly method which can decrease inputs in energy and agrichemicals and does not generate harmful residues. *Rotylenchulus reniformis* multiplied rapidly on castor growing on sandy loam and loam, moderately on clay loam, and very poorly on sandy soil (Sivakumar and Seshadri. 1972). However, no comparison has been made between cotton and soybean crops grown in the same type of soil. The objectives of this study were to determine which types of soil favors nematode reproduction and to determine the best soil for cotton and soybean.

## Materials and Methods

The reniform nematode susceptible cultivars 'Suregrow 125' Cotton and 'Braxton' Soybean were planted in the following: Jeanerette Silt Loam, Dundee Silt Loam, Convert Fine Sandy Soil, Steele Loamy Sand, Sharkey Clay, and Sharky Silt/Clay. Sufficient numbers of seeds of cotton and soybean were germinated in vermiculate to allow for the transplanting of individual dicotyledon seedling to each of ten pots (reps) of cotton and soybean for each of the 6 soils in 10 cm-dia clay pots. Each pot was inoculated with 2000-2500 vermiform reniform nematodes one a day after transplanting. After eight weeks the number of reniform eggs, juveniles, females, and males was determined by sodium hypochloride extraction of the roots and sieving and sucrose centrifugation extraction from the soils and the total number per pot was determined by adding the root and soil numbers.

## Results and Analysis

Analysis of variance detected significant differences ( $P \geq 0.05$ ) between nematode numbers among soil types and the two crops. There was also significant ( $P \geq 0.05$ ) interaction between soil and crop (Table 1). The average number of nematodes on cotton and soybean was different on six types of soil (Table 2). In the Jeanerette Silt Loam and Steele Loamy Sands, the number of nematodes on soybean was significantly higher ( $P \geq 0.05$ ) than on cotton. In Convert Fine Sandy Loam, Dundee Silt Loam, Sharkey Clay and Sharkey Silt/Clay the average number of nematodes on cotton and soybean were not different. On average, less nematode reproduction was observed on cotton than on soybean).

## Discussion

Soybean tends to support more nematode reproduction than cotton. Reproduction of reniform nematode in different types of soil is different. The same crop grown in different type of soil supports different levels of nematode reproduction. Different crops grown in the same type of soil may have different effect on nematode reproduction.

## References

- Robbins, R. T; L. Rakes, C. R. Elkins. 1994. Reniform nematode reproduction and soybean yield of four soybean cultivars in Arkansas. *Journal of Nematology*. 26:656-658.
- Sivakumar, C.V. and A. R. Seshadri. 1972. Effect of soil texture on the reniform nematode, *Rotylenchulus reniformis*. *India Journal of Nematology*. 2:1, 83-86

Table 1. Analysis of variance for reniform nematode numbers in different soil types and crops.

Source	DF	Mean Square	F Value	Pr > F
Treatment	11	11033452.6	4.1	<0.0001
Soil	5	13010076.27	4.84	0.0005
Crop	1	13928843.04	5.18	0.0250
Soil x Crop	5	8756952.28	3.26	0.0091
Error	100	2689771.8		

Table 2. The average number of nematodes on cotton and soybean on six soil types.

Treatment	Mean	Signif.
Jeanerette Silt Loam: Soybean	6394.7	a
Jeanerette Silt Loam: Cotton	3637.2	ef
Dundee Silt Loam: Soybean	3684.5	ef
Dundee Silt Loam: Cotton	2990.5	f
Convert Fine Sand: Soybean	5350.7	abcd
Convert Fine Sand: Cotton	6261.5	ab
Steele Loamy Sand: Soybean	5674.3	abc
Steele Loamy Sand: Cotton	3830.4	ef
Sharkey Clay: Soybean	4484.9	cdef
Sharkey Clay: Cotton	4833.1	bcde
Sharkey Silt/Clay: Soybean	4110.9	df
Sharkey Silt/Clay: Cotton	3896.7	def

$$LSD_{0.05} = t 0.05 * (2689771.8 * 2/9)^{1/2} = 1515$$

Means followed by different letters indicate significant difference at  $P \geq 0.05$ .