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RECOVERY AND VIABILITY OF *ROTYLENCHULUS RENIFORMIS* FROM NATURALLY INFESTED FIELD SOIL PLACED IN CONTROLLED COLD STORAGE

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Introduction

The reniform nematode, *Rotylenchulus reniformis,* is rapidly becoming the most economically important pest associated with cotton production in the Southeast United States. This nematode has been found in the eleven states that make up the southeast cotton belt. The highest infestations occur in Alabama, Georgia, Louisiana, and Mississippi. In Alabama and Mississippi, 46 and 32.4% of the cotton producing acres are infested with the reniform nematode, respectively, and it appears to be spreading.

In an earlier study (Birchfield and Martin, 1967), found *R. reniformis* nematodes could survive are remain infective in air-dried soil for 6 months. They concluded this nematode could survive in fallow soil for long periods thus suggesting how easily it could be spread.

Materials and Methods

Soil was collected from two fields naturally infested with the reniform nematode, *Rotylenchulus reniformis,* and the fields had been continuously cropped in cotton. The Alabama field was located in Escambia county, Alabama in a sandy loam soil (65.5% sand, 24.75% silt, 9.75% clay, pH 6.1). The Mississippi field was located in Washington county in silty loam soil (38 % sand, 52% silt, 9.2% clay, pH 5.7). Soil cores, 2-cm-diam. x 20-cm-deep, were collected from each field and throughly mixed. Composite soil samples were sealed in plastic bags, labeled by location and placed in a 4°C incubator. Nematodes were extracted from four replications of both soil types every 30 days. Nematodes were extracted from each 150-cm^3 sub-samples by gravity screening and sucrose centrifugal-flotation. *Rotylenchulus reniformis* vermiform nematodes were enumerated using a stereo microscope. Viability of the extracted *R. reniformis* nematodes was determined in the greenhouse. The four replications of extracted nematodes from each soil type were combined and evenly distributed onto cotton seedlings grown in sterile soil. All nematode population levels were subjected to analysis of variance and means were compared using Fisher's protected least significant difference test ($P \leq 0.05$).

Results and Discussion

Initial *R. reniformis* populations were 3,768 and 2,411 vermiform nematodes per 150-cm^3 for Alabama and Mississippi, respectively. After fifteen months, populations had declined to 598 and 540 vermiform nematodes per 150-cm^3 for Alabama and Mississippi, respectively (Table 1). Numbers of *R. reniformis* remained significantly (P=0.05) similar for the first five and six months for Alabama and Mississippi, respectively. In both soils, *R. reniformis* numbers dropped significantly after the sixth month and the decrease in nematode numbers over the duration of the storage slowed. Numbers of *R. reniformis* did drop below economic thresholds, however, the nematode populations never reached zero. The decrease of *R. reniformis* numbers in the soil was positively related to storage duration. The Alabama and Mississippi linear regressions were $Y = 2300 - 166X$ with $P > 0.0001$, $R^2 = 0.41$ (Table 2) and $Y = 2884 - 195X$ with $P > 0.0001$, $R^2 = 0.62$ (Table 3), respectively.

The effect of storage on the viability of the *R. reniformis* is shown in Table 4 and 5. The reproductive factor (final population /initial population) ranged from 44 to 0.7 in the Alabama soil and 54 to 0.5 in the Mississippi soil. The reproductive factor in either soil never was below 1 for the first twelve months of soil storage. Thus the *R. reniformis* extracted at one through twelve months were viable and did reproduce when placed on cotton roots in the greenhouse. Only the last sample in the thirteenth month produced a reproduction factor of less than 1 in both soils. Viability of the *R. reniformis* was affected by the environment. Initial and one month samples from Mississippi produced reproduction factors significantly higher than all other samples. However, in both the Mississippi and Alabama samples reproduction factors decreased during the winter months of October through March and increased during the summer months of April through September.

The *R. reniformis* nematode does survive in stored soil for long periods of time. The nematode remains viable and is able to increase in numbers even after one year in storage.

Table 1. Population survival of *R. reniformis* in soil when stored at 4º C.

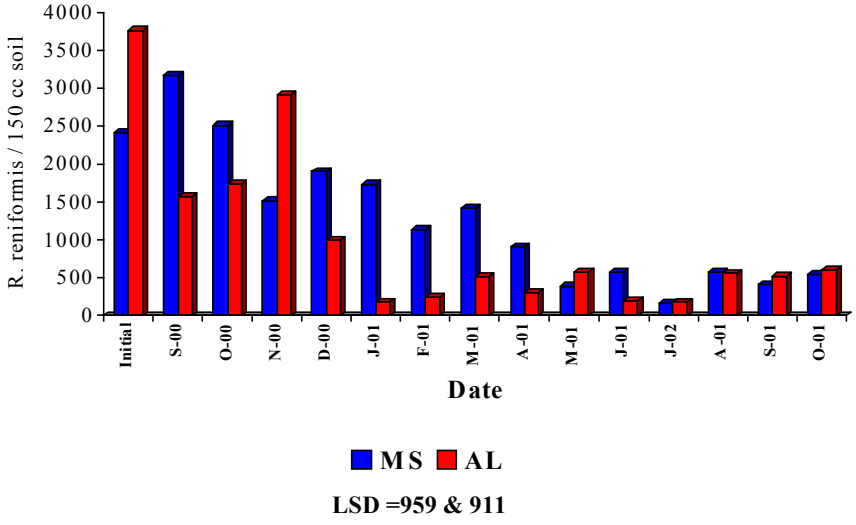

Table 2. Relationship between the Alabama *R. reniformis* population in soil over time when stored at 4º C.

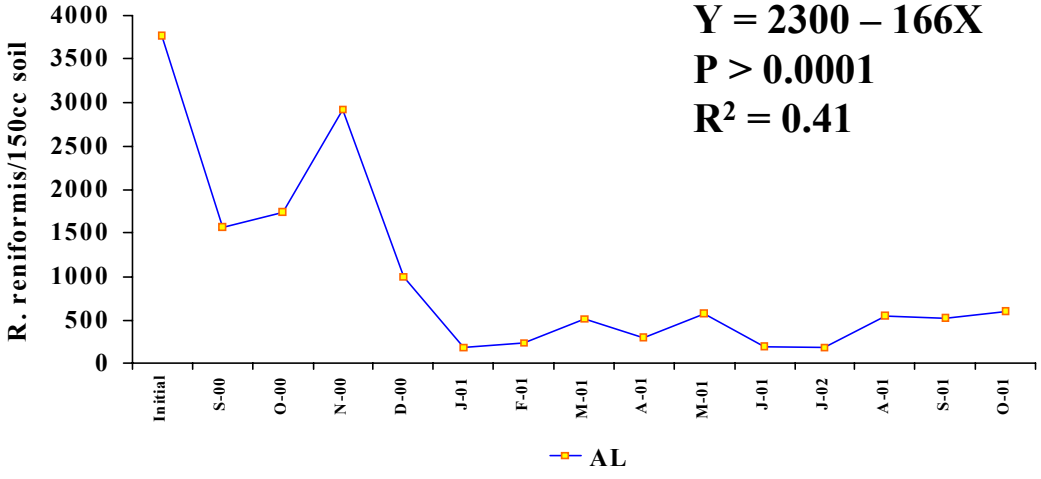

Table 3. Relationship between the Mississippi *R. reniformis* population in soil over time when stored at 4o C.

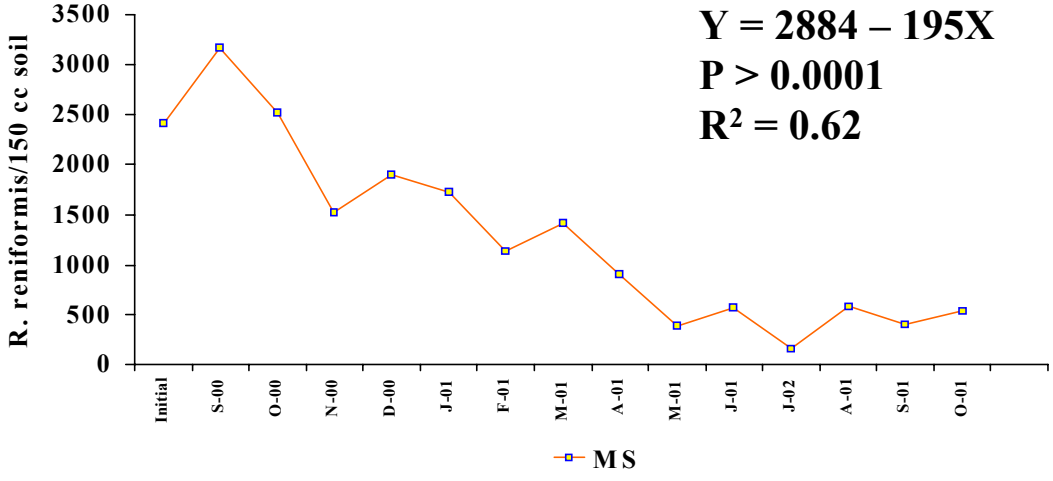

Table 4. Population viability of the Alabama *R. reniformis* after storage at 4° C over time.

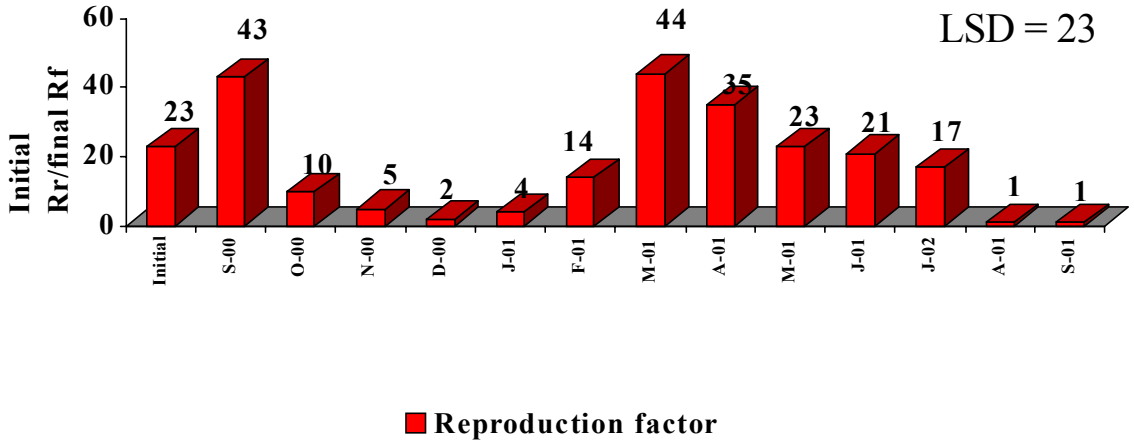

Table 5. Population viability of the Mississippi *R. reniformis* after storage at 4° C over time.