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RENIFORM NEMATODE MANAGEMENT WITH VARIABLE RATE NEMATICIDE APPLICATIONS

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Abstract

Two studies were conducted in 2002 to examine the benefit of site specific variable rate applications of the nematicide Vapam for the management of the reniform nematode (*Rotylenchulus reniformis*). One test was established in the fall of 2001 after the cotton crop was harvested and a second test established prior to planting in the spring of 2002.Treatments included Vapam applied at the conventional rates of 3.0, 5.0, and 8.0 gallons per acre and a variable rate aplication of 3.0 - 8.0 gallons per acre based on nematode population numbers. The highest cotton yields were recovered from the variable rate applications in each test. In Test 2, two gallons variable application rate of Vapam per acre produced a yield of 1,706 lbs of lint per acre when applied only to site specific locations based on reniform nematode numbers.

Introduction

The reniform nematode (*Rotylenchulus reniformis*) is the most serious nematode pest to Mississippi cotton production. This nematode has been found in 51 cotton producing counties and is estimated to infest over 32.4 percent of the cotton acerage in Mississippi. Yield losses attributes to this nematode have averaged 27.6 percent since 1990.

Nematode management techniques available to Mississippi cotton producers are limited. Without the availability of mid-south cotton varieties with reniform resistance, most producers rely on the use of nematicides to reduce nematode numbers at planting.

Currently nematicides are applied as a single rate without regards to the spatial distribution of the in-field variation in nematode numbers. The spatial distribution of plant-parasitic nematodes is in a scattered pattern across an infested field. Areas exist in the field where no there are no nematodes present. Other areas of the field may seem uniformly infested with the nematode but the population levels will vary. This is an ideal situation for site-specific applications of nematicides using variable rate technology. Therefore the purpose of this study was to examine the utility of site specific nematicide applications using variable rate technology based on nematode density maps created from georeferenced nematode sample points.

Materials and Methods

Each study was conducted in a field that was naturally infested with the reniform nematode in Quitman county Mississippi. Each field, approximately 20 acres in size, was sampled on one-half acre grids to determine nematode population numbers and to georeference their locations in the field. Within field one nematode numbers ranged from 512 to 21,414 reniform per 500cm^3 soil. In field two there were locations that no reniform were recovered therefore nematodes numbers ranged from 0 to 19,900 reniform per 500cm^3 soil. Reniform population numbers were then arranged into three groups, low (0 - 4,000 nematodes), medium (4000 - 8,000 nematodes), and high (greater than 8,000 nematodes) in Test 1 and low (250 - 5,000), medium (5,000 - 10,000), and high (10,000 - 15,900) in Test 2. A nematicide prescription map was developed using the three nematode densities. Nematicide treatments consisted of Vapam applied at the uniform rates of 3.0, 5.0, and 8.0 gallons per acre and a variable rate appliction of Vapam 3.0 - 8.0 gallons per acre depending on the reniform nematode population numbers. Low levels of reniform received the low rate of Vapam 3.0 gallons per acre, medium nematode levels received Vapam at 5.0 gallons per acre, and high nematode levels received 8.0 gallons per acre. Temik 15G was added as a standard treatment in test 1.

The experiments were a completely random design with three replications. Plots consisted of 12 rows across the lenght of the field with a 38-inch row spacing. Vapam was injected 16 - 18 inches deep in the row and the row was immediately hipped with disk

hillers to prevent any loss of the nematicide. All plots were maintained with standard production practices recommended by the Mississippi Extension Service commonly used in the area. Plots were irrigated as needed with either a center pivot or in-furrow system. Plots were harvested on 25 October, Test 1, and on 15 November Test 2, using a cotton picker equipped with a yield monitor. Yields were recordrd as pounds of lint per acre.

Results and Discussion

The variable rate site specific applications of Vapam improved the yield of SureGrow 215 BG/RR cotton at both locations. In Test 1, cotton yields were 987, 939, 918, 907, and 924 lbs of lint per acre in the treatments that received Vapam at 3 - 8 (variable rate), 8, 5, and 3 gallon per acre and Temik 15G (5.0 lb per acre), respectively. The variable rate application used a total of 6.5 gallons of Vapam per acre compared with the conventional applications.

In Test 2, cotton yields were 1,705, 1,570, 1,702, and 1,365 lbs of lint per acre where Vapam was applied at 3 - 8 (variable rate), 8, 5, and 3 gallons per acre, respectively. The variable rate site specific application produced the highest yields with a total volume of 2 gallons of Vapam per acre compared to the conventional one rate Vapam applications.

Disclaimer

The interpretation of data may change with additional experimentation. Information is not to be construed as a recommendatuion for use or as an endorsement of a specific product by Mississippi State University or the Mississippi Agricultural and Forestry Experiment Station.