Florida Soybean Rust Sentinel Plots – 2005

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In the Santa Rosa County (just east of Escambia County) sentinel plot, disease was not detected until August 8 and 100% disease incidence was detected (Figure 5) beginning one month after the initial infection was detected on August 10. In disease incidence and severity (Figures 5 and 6) beginning one month after the initial infection was detected.

Results (cont.)

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Introduction

In 2005 a series of soybean sentinel plots were established across the soybean producing states to monitor the occurrence and development of soybean rust (Phakopsora pachyrhizi) (SBR) in North America. As part of the coordinated project, 26 sentinel plots were established across Florida (Figure 1). The first sentinel plot found positive for soybean rust in the United States in 2005 was in Marion County (central Florida), on June 29. It was also the plot furthest south to become positive. The next plot to become positive was in Escambia County (western Florida) on July 18. Most sentinel plots became positive in August. Ultimately, all of the sentinel plots became positive from Marion County to Escambia County except for Madison County (north-central Florida). In Madison County rust was detected in a nearby commercial field. The 6 plots south of Lake Okeechobee never developed disease. In every positive plot, the disease was first observed on the MG3 plants. In general, it took about 4 weeks after detection before the disease began to reach a logarithmic growth phase. In 2005, Florida experienced a wet spring/early summer but in the middle of August it turned dry, slowing the advance of the epidemic in the sentinel plots.

Materials and Methods

All of the 15 X 15 m sentinel plots in Florida were planted in March with MG3 (DP&L3861), MG5 (DP&L5915), and MG7 (DP&L7670) RoundUp-Ready soybeans. Most of the plots received at least one application of glyphosate. Pests were monitored at least weekly for SBR. After detection, 100 random leaf samples were taken from mid canopy and rated for incidence and severity. The severity index was: 0% = 0, 1% = 1-2.5%, 2% = 2.5-5%, 3% = 5-10%, 4% = 10-15%, 5% = 15-25%, 6% = 25-35%, 7% = 35-67.5%, 8% = 67.5-100%, using the charts developed by Bayer CropScience. Incidence was from 0 to 100% (0 to 1 in the following graphs).

Results

In all of the positive plots, the MG3 were the first soybeans to have SBR. It then spread to the MG5 and MG7 soybeans. SBR was first detected in one sentinel plot in Marion County Florida on June 29 (Figure 2). The second sentinel site to become infected in Florida, July 16, was in Escambia County. Disease severity assessment began one month after detection. By then most of the leaves were diseased, but severity continued to increase (Figure 3). Disease progress (Figure 3) and frequency analysis over time (Figure 4) indicated that disease increased by one severity point every two weeks.

In the Santa Rosa County sentinel plot, disease was not detected until August 8 and 100% disease incidence was detected (Figure 5) beginning one month after the initial infection was detected on August 10. In disease incidence and severity (Figures 5 and 6) beginning one month after the initial infection was detected.

Discussion

In the Gadsden County Hill 3 sentinel plot, first detected with rust on August 10, it is apparent that the increase in the severity of the epidemic decreased (Figures 7 and 8) as the weather conditions became dry (Figures 9 and 10) in the plots.

Conclusions

The Florida sentinel plot program was very successful in detecting SBR before it was detected in commercial fields. In all positive sentinel plots, the earlier MG3 plants were the first to become infected. Warm weather did not decrease the epidemic progress, but dry weather did. The sentinel plot program shows promise as a means to monitor the annual spread of SBR from south to north Florida and, in association with sentinel plots in more northern states, the annual spread of SBR into the Midwest.

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