

# Efficacy of PHY367WRF in Root-knot Nematode Infested Fields



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## Objective

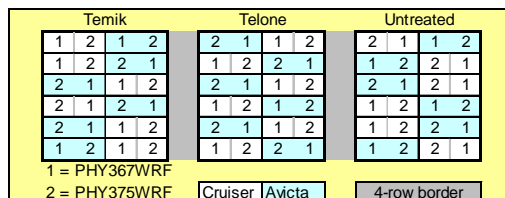
Phytogen Seed Company has developed a new early maturing cotton variety, 'PHY367WRF', that greenhouse studies indicated as being moderately resistant to root-knot nematodes (RKN). The objective of this study was to evaluate the efficacy of this level of host plant resistance to RKN as compared to Telone fumigation, Temik in-furrow and Avicta seed treatment nematicide treatments.

## Introduction

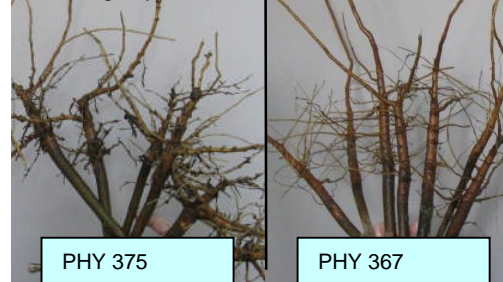
Root-knot nematodes (*Meloidogyne incognita*) are a serious pest of cotton with yield losses commonly ranging from 10% to 25% in infested fields. A highly resistant germplasm line, 'Auburn 623 RNR', was released in 1974 but no commercial varieties have been developed from this source. A higher yielding line, 'LA 887' with moderate RKN resistance was released in 1991 and was marketed as 'ST LA887'. Several transgenic varieties have been developed by backcrossing to this variety (or a sister variety, PM1560), but these have generally been later maturing and not adapted to the North Delta. PHY367WRF (PHY367) is an early maturing variety derived from a proprietary conventional line, '99M-548', that was selected from a cross with ST LA887.

## Materials & Design

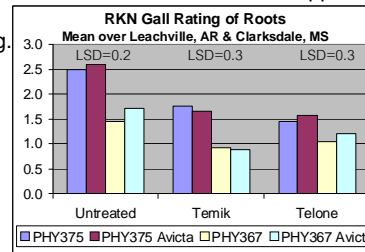
Seed of PHY367 and a comparable RKN-susceptible variety, 'PHY375WRF' (PHY375), was split and treated with either Cruiser+Dynasty (insecticide+fungicide) or Avicta Complete Pak that included Avicta nematicide. RKN-infested fields were identified near Clarkton, MO, Leachville, AR, and Clarksdale, MS. Prior to planting, an 8-row strip was treated with Telone (3 gal/acre) in-furrow and at planting Temik (5 lb/acre) was applied to another 8 rows. A third 8-row strip was untreated for nematodes. The design was a split plot with seed treatment whole plots and variety subplots replicated 6 times and arranged in 3 parallel strips.



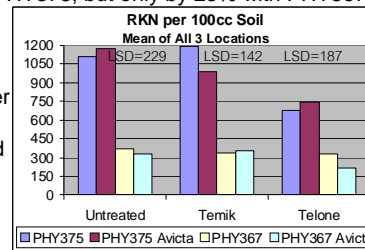
Root Galling Adjacent Untreated Rows - Clarksdale, MS



**Results - Root Gall Rating** – The above pictures reflect observed differences in RKN-induced galling of roots. For each treatment, PHY367 had less severe galling. Both Telone and Temik reduced the severity of galling of both varieties. The roots of PHY367 with soil treatment appeared near normal with only minimal galling. Galling of PHY367 in the untreated strip was equal to PHY375 with soil treatment. Avicta seed treatment did not reduce galling.



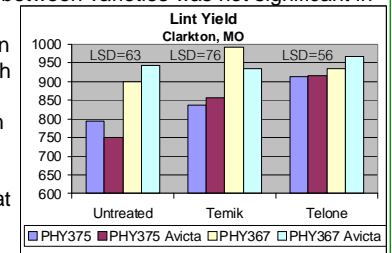
**RKN in Soil** – Soil samples were taken from all three fields at season end and analyzed for nematodes. In each field, PHY367 had significantly fewer RKN than did PHY375. Averaged over all fields and treatments, PHY367 had a 72% reduction in RKN numbers. Telone treatment reduced RKN by 34% with PHY375, but only by 23% with PHY367. The reduction in RKN with PHY367 was greater than with Telone. Neither Temik nor Avicta treatments reduced RKN in the soil at the end of the season.



**Results (cont) – Yield** - Despite significant differences in root galling and ending RKN levels in the soil, differences in yield were observed only at Clarkton, MO. Above average rainfall or extreme field variability masked the beneficial effects of nematicides and resistance at the other locations.

At Clarkton, MO the interaction between varieties and soil treatments was significant. As an indication of the degree that RKN can affect cotton, the yield of PHY375 in the Telone strip was 18% higher than in the untreated strip. The yield of PHY367 was only 3% higher after Telone treatment.

The difference in yield between varieties was not significant in the Telone strip, but it was highly significant in the other two strips with PHY367 yielding 19% more than PHY375 in the untreated strip. Avicta seed treatment did not increase yield at this location in 2009.



## Summary

PHY367 is the first early maturing cotton variety with RKN resistance combined with WideStrike® and Genuity™ Roundup Ready® Flex traits. This study indicated that the moderate RKN resistance in PHY367 was equivalent to Telone and Temik in reducing root galling and it surpassed Telone in reducing ending RKN levels in the soil. There were only negligible benefits to treating PHY367 with nematicide treatments. Avicta had no significant effect in this study, but it may be useful to enhance the durability of resistance.

This study is being repeated in 2010 with the addition of a highly resistant experimental line and the experimental design is a split-split plot. Preliminary results indicate that the positive effect of RKN resistance on yield is expected to be observed more often in RKN-infested fields that also receive at least moderate moisture stress. Relative to that for a susceptible variety, the reduction in RKN galling and RKN numbers in the soil at the end of the season is expected to be a consistent positive result regardless of the level of moisture stress.