THE USE OF VYDATE ON SOUTHERN ROOT-KNOT NEMATODE TOLERANT COTTON IN THE HIGH PLAINS OF TEXAS

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Abstract

The loss of Temik 15G for nematode management in cotton has been costly to the Southern High Plains of Texas. Root-knot nematodes infest over 40% of the acreage, particularly the lighter textured soils (Wheeler et al. 2000, Starr et al. 1993). Cotton lint losses for this region, in the absence of nematode control, are estimated at 26% (Orr and Robinson, 1984). In the absence of Temik 15G, a combination of other tools is necessary. It may be possible to improve profitability in the presence of root-knot nematode, using some other options, which up to now have not been greatly tested. The cotton varieties with partial nematode tolerance in combination with Vydate CLV have been explored the past two years in Hockley County, Texas. Based on the two year's data, managing southern root-knot nematodes using partial tolerant cotton and foliarily applying Vydate C-LV at 2nd true leaf through 4th true leaf stage of cotton growth is critical to achieve best cotton lint yields. All Vydate treatments were significantly better than check. Two applications of Vydate @17 oz beginning at the 4th true leaf stage followed by another application 7 days later was best; followed closely by the two applications of Vydate @ 8.5 oz at 2nd true leaf with another application 7 days later. The Vydate C-LV treatments provided a gain of $83.41 to $148.91 over check.

Introduction

Plant parasitic nematodes are an economically important pest of cotton throughout most of the cotton growing areas of the United States. On the Texas High Plains, the southern root-knot nematode, *Meliodogyne incognita*, is predominate nematode species of the population infesting cotton. In irrigated cotton where nematode populations are historically high (usually areas where sandier soils are most prevalent) many growers opt to utilize a partial nematode tolerant cotton variety since the loss of Temik. The use of foliar applied Vydate has provided protection from nematodes when it was used alone or in combination with Temik. Partial nematode tolerant cottons have yield loss when not protected chemically by nematicides as demonstrated when Temik was available. The need for additional control has encouraged the use of Vydate CLV following plant stand establishment.

Therefore, the objective of this study was to determine the efficacy with and without foliar applied Vydate for control of southern root-knot nematode in partial nematode tolerant cotton varieties based on final cotton lint yields from two years in Hockley County, Texas.

Materials and Methods

Field trials were conducted in Hockley County, near Levelland, Sundown and Ropesville, Texas. Based on fall soil sampling each year, a minimum of 7,000 eggs and 1,500 root-knot juveniles were present per 500 cm^3 of soil from study fields. Cotton containing Flex or Glytol and Bollgard II or WideStrike technology in 'FiberMax 9170', 'Deltapine 1032', or 'Phytogen 367, 375, or 499' was planted on 12 May 2011 near Sundown; 'FiberMax 2011, 2484', 'Deltapine 1219', 'Phytogen 367', 'Stoneville 4288, or 5458' was planted on 17 May 2012 near Ropesville; and 'FiberMax 9160', 'Stoneville 5458', 'Deltapine 1044', 'Phytogen 367, 375, or 499' was planted on 22 May 2012 near Levelland on 40-inch rows and irrigated using a pivot or drip irrigation system. Plots were a minimum of 6-rows wide × 50-feet long. Plots were arranged in a randomized complete block design with 3 replications. Foliar applications of Vydate CLV were applied with a self-propelled sprayer calibrated to deliver 17 gallons per acre. Vydate CLV applications were made on 8 and 15 June 2011 at Sundown, 12, 19 and 26 June 2012 at Levelland, and 7, 14 and 21 June 2012 at Ropesville. A detailed list of treatments are outlined in Table 1. Test locations were scouted weekly to minimize the impact of insect pests such as thrips and plant bugs. No additional insecticides were needed. Plots were harvested on 26 October 2011, and 17 and 23 October 2012 using a stripper. All samples were weighed, ginned and classed. Cotton lint yield data was analyzed using complete factorial and the means were separated using an F protected LSD ($P \leq 0.05$).

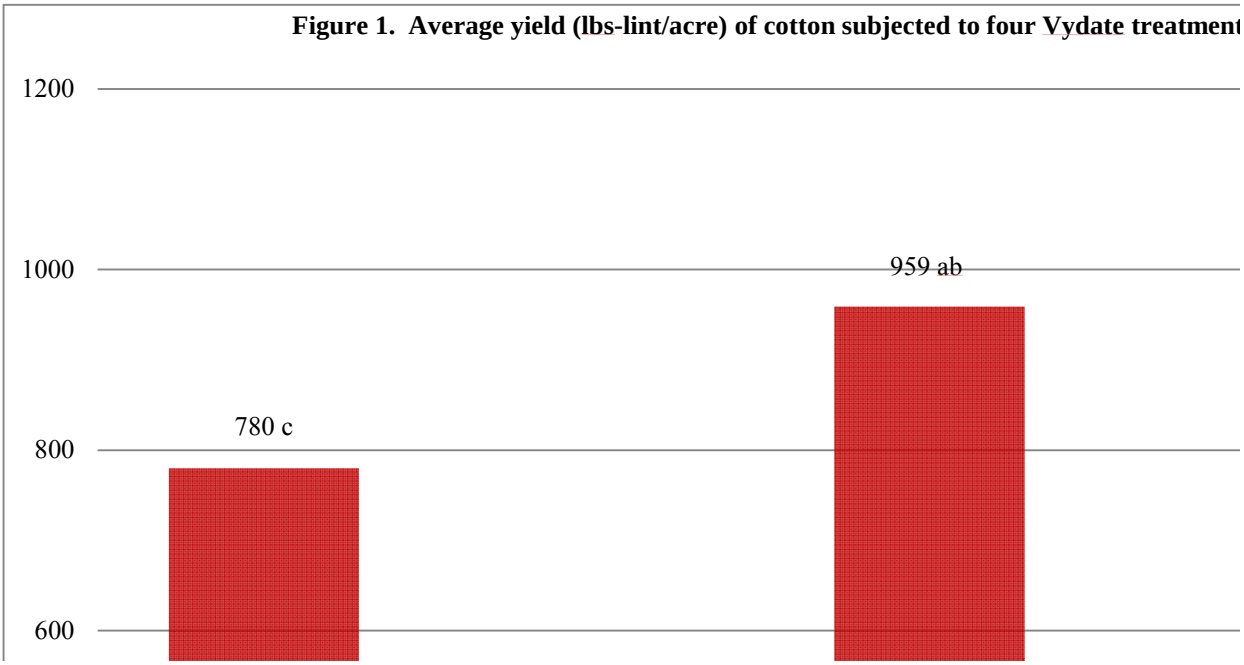
Table 1. Treatment regimens for southern root-knot nematode on partial tolerant cotton varieties 2011-12

1) Untreated check
2) Early foliar application of Vydate CLV 8.5 oz at 2 true leaf cotton stage, followed by Vydate CLV 8.5 oz 7 days later (2012 only)
3) Foliar application of Vydate CLV 17 oz at 4 true leaf cotton stage
4) Foliar application of Vydate CLV 17 oz at 4 true leaf cotton stage, followed by Vydate CLV 17 oz 7 days later

Results and Discussion

All treatments provided significantly (P=0.05) higher cotton lint yields than the untreated check (780 lbs lint/acre) (Fig. 1). Vydate C-LV applied foliar to 4 true leaf stage cotton with one 17 oz application provided 954 lbs. lint/acre. When applied at the 4 true leaf stage with 17 oz followed by another 17 oz 7 days later it is significantly better yield at 1096 lbs. lint/acre. When applied twice at 8.5 oz beginning at 2 true leaf stage cotton the yield was 959 lbs. lint/acre, which is not significantly different from the 17 oz rate applied once or twice. When analyzing for interactions, Vydate treatments and variety treatments were significant. The interaction term was not significant. Therefore, the benefits of Vydate treatments were consistent across all varieties. No effect was noted on cotton lint grades in any of the years. The value of Vydate for southern root-knot nematode control for both years is shown in Table 2.

Figure 1. Average yield (lbs-lint/acre) of cotton subjected to four Vydate treatment



The check is the base of comparison with $0.00 value. The early Vydate application at 2 TL with 8.5 oz fb 8.5 had a value of $86/acre. This is very similar to the value of one application of 17 oz at 4 TL of $83/acre, and with same treatment cost of $14/acre. Compared to two applications of 17 oz starting at 4TL provided a value of $149/acre, despite the doubling of cost of treatment of $28/acre.

Table 2. Value of Vydate treatments on southern root-knot nematode 2011-2012, Hockley and Cochran Counties, Texas

Treatments	Cost of Treatment[1]/acre	Value[2] of Yield Change/acre over Check	Value of Treatment[3] Per acre
Check	$0.00	$0.00	$0.00
Vydate 8.5 oz @ 2 TL, fb 8.5 oz 7 DAT	$14.03	$100.24	$86.21
Vydate 17 oz @ 4 TL	$14.03	$97.44	$83.41
Vydate 17 oz @ 4 TL, fb 17 oz 7 DAT	$28.05	$176.96	$148.91

[1]Cost based on 2012 local price.
[2]Value is based on cotton loan price average for TX Southern High Plains for 2012 at $0.56
[3]Value of treatment is difference in Cost of treatment minus Value of Yield Change.

Summary

Based on the two year's data, managing southern root-knot nematodes using partial tolerant cotton and foliarily applying Vydate C-LV at 2nd true leaf through 4th true leaf stage of cotton growth is critical to achieve best cotton lint yields. All Vydate treatments were significantly better than check. Two applications of Vydate @17 oz beginning at the 4th true leaf stage followed by another application 7 days later was best; followed closely by the two applications of Vydate @ 8.5 oz at 2nd true leaf with another application 7 days later. The Vydate C-LV treatments provided a gain of $83.41 to $148.91 over check.

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