EFFECTS OF EARLY INFESTATIONS OF TWO-SPOTTED SPIDER MITES (TETRANYCHUS URTICAE) ON COTTON GROWTH AND YIELD L. Orellana G. Lorenz University of Arkansas Cooperative Extension Service Lonoke, AR A. P. G. Dowling University of Arkansas Fayetteville, AR N Taillon

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Abstract

To evaluate the impact of early-season mite infestation on cotton yield, cotton trials were established in late May of 2012. Cotton plants were infested during three plant growth stages, 4th true leaf, 6th true leaf and at squaring. Within each plant stage, two-spotted spider mites (*Tetranychus urticae* Koch) were left at three different durations (short, medium and long) and a control plot was kept mite free for the duration of the experiment. Leaf damage was assessed; plant heights were measured at squaring and seed cotton yields were measured at harvest. Infestations started at 4th true leaf had higher leaf damage score (~2). Infestation started at 4th true leaf and 6th true leaf with longer duration resulted in lower plant heights at squaring, as well as lower yield. These results indicate that cotton yield is reduced when spider mites remain on plants for an extended time, even when damage may not be obvious.

Introduction

Historically spider mites have been considered a late-season pest of cotton in the Mid-South. Since 2005, infestations of spider mites have been reported in cotton as early as first and second nodes (Catchot et al., 2006). Insecticide (Temik 15G) applied during planting previously prevented early spider mite infestations. Currently, infestation of spider mites can occur in cotton with seed treatments or foliar applications (Gore et al., 2012). Infestations of spider mites can increase dramatically under dry weather and dusty conditions (Demirel and Cabuk, 2008). Cotton trials were established in late May of 2012 to evaluate the impact of early-season mite infestation on cotton growth and yield.

Methods

Trials were established the 25^{th} of May in Lee County, AR. Cotton plants were infested during three plant growth stages, 4^{th} true leaf, 6^{th} true leaf and at squaring. Within each plant stage, two-spotted spider mites (*Tetranychus urticae* Koch) were left on cotton for three different time durations, short (3 -6 d), medium (9-10 d) and long (11-28 d). The combination of plant stage and duration of infestation resulted in 9 treatments. Plots had mites only for the duration of infestation, as miticides kept plants mite-free before and after infestation. Additionally, there was a control plot which was kept mite free for the duration of the experiment. The experiment had six replicates with plots of two 38 inch rows, 15 feet long. The variety of cotton used was DP 0912 B2RF. Mites we reared on green beans in a greenhouse. Cotton plants were infested by cutting bean plants at the base of the stem, and interweaving them through the entire length of the row. Mite counts were made using a standardized methodology to assure that plots were sufficiently infested. Leaf damage was assessed on a plot basis using a visual standard scale 0 = no damage 5 = total reddening (Gore et al., 2012). Leaf damage was assessed between 3 and 6 days after infestation, and then once a week thereafter. Plant heights were measured from the base of the plant to the terminal at squaring for five plants per plot. Cotton plots were harvested and seed cotton yield measured.

Results and Discussion

Leaf damage ratings were between 0 and 3. Infestations started at the 4th true leaf had the highest leaf damage scores (Table 1). Leaf damage scores during 4th true leaf was ~ 2 for all the treatments, except for the first sampling date. Plant heights were measured at squaring, hence data for only the 4th true leaf and the 6th true leaf stages are reported (Table 2). There was a trend to reduction in plant heights when spider mites were present longer. However, only the treatments with the longer duration infested during the 4th true leaf (4-L) and the 6th true leaf (6-L) showed significant differences, when compared to the control. Plants of these two treatments were significantly smaller than the control. There was a tendency towards lower yield when mite duration increased (Table 3). Just as with plant heights, the 4th true leaf (4-L) and the 6th true leaf (6-L) infestations with long durations had significant reductions in yield. These results indicate that cotton growth and yield are reduced when spider mites remain on plants for an extended time, even when damage may not be obvious.

Treatments	26 DAP Leaf Damage Score	31 DAP Leaf Damage Score	41 DAP Leaf Damage Score	45 DAP Leaf Damage Score
4-S	1.1	1.8	0.3	0.5
4-M	1.2	2.2	0.8	0.8
4-L	1.4	2.1	2.0	2.3
CNTL	0.4	0.6	0.4	0.6

Table 1. Mean scores for leaf damage during infestations at 4th true leaf and short, medium and long infestation durations and control.

Table 2. Mean plant heights at squaring for infestation treatments started at the 4th true leaf and 6th true leaf

Treatments	Plant Heights (in) (± SE)	
4-S	18.9 (± 0.5) a	
4-M	17.8 (± 0.4) abc	
4- L	15.6 (± 0.4) d	
6-S	17.4 (± 0.4) bc	
6-L	16.7 (± 0.6) cd	
CNTL	18.2 (± 0.5) ab	

Means followed by same letter do not significantly differ (P=.05)

Treatments	Yield (lb/acre)* (± SE)
4- S	2712.59 (± 197.16) ab
4-M	2811.93 (± 108.28) ab
4- L	2422.23 (±128.82) b
6- S	3186.34 (±188.19) a
6-L	2406.95 (± 191.15) b
SQ-S	3018.24 (± 279.98) a
SQ-M	3048.80 (± 129.54) a
SQ-L	2735.52 (± 144.33) ab
CNTL	2852.68 (± 85.37) a

Table 3. Mean seed cotton yield for infestation treatments started at 4th true leaf, 6th true leaf and squaring

Means followed by same letter do not significantly differ (P=.05)

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References

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