IMPACT OF *LYGUS* BUGS ON COTTON FIBER YIELD AND QUALITY UNDER SUPPLEMENTAL AND FULL IRRIGATION PRODUCTION CONDITIONS

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Abstract

The impact of late season *Lygus* infestation on cotton yield and fiber quality was assessed under supplemental and high irrigation regimes. Two cotton varieties and two *Lygus* densities were evaluated using field cages. Cages were removed a week after release of bugs and plants were sprayed with an insecticide to achieve an acute infestation. In another study, 20% bolls were removed from the top third of the plant to mimic late season *Lygus* infestation. The study revealed that the impact of *Lygus* injury was more pronounced under water-deficit growing conditions; likely because late-season lint yield compensations were limited due to reduced water availability limiting continued boll growth and fiber development. *Lygus* bugs significantly reduced lint yield both in supplemental and full irrigated cotton; however, cotton in water-deficit condition was more severely impacted by *Lygus* than under fully irrigated cotton. Cotton variety DP 1823NRB2XF performed better both in supplemental irrigation and full irrigation treatments than DP 1830B3XF.

Introduction

Lygus appears to be an increasing concern for the Texas High Plains growers in recent years. *Lygus* bugs utilize >300 host species including cotton in the cotton growing regions of the United States. The shift in cotton production system from 60:40% irrigated:dryland to 40:60% in the last decade has altered the cotton production practices. This shift from irrigated to dryland farming warranted to manage cotton pests effectively to increase profitability. Plant bugs have a general inclination to attack the stressed plants and cause significant damage. Cotton plant responses to *Lygus* injury under a range of irrigation regimes remain uninvestigated. The overall goal of this study was to characterize the effects of drought conditions on *Lygus* infestation behavior and plant response to *Lygus* injury.

Materials and Methods

A multi-year study was conducted in a multi-factor split-plot randomized block design with two water levels (full irrigation vs supplemental irrigation) and two infestation levels (*Lygus* augmented versus control). In 2018, *Lygus* were collected from nearby alfalfa fields and released in cages. *Lygus* were released on one 3-ft cotton row section per plot. Multi-plant (5-7 plants) cages were used to contain the released insects. The control plots were flagged and sprayed with insecticides. One plant from each treatment was removed and processed for *Lygus* damage assessment. Number of fruits aborted and internal/external boll damage as well as number of damaged seeds per boll were recorded. In 2019, a 5-ft section was flagged, and 20% bolls were removed from the top third of the plant to mimic *Lygus* bug infestation. Plants within flagged area were harvested, and lint yield and quality were determined.

Results and Discussion

Lygus bugs significantly reduced lint yield both in supplemental and full irrigated cottons; however, cotton in water-deficit condition was more severely impacted by *Lygus* than under fully irrigated cotton. DP1820B3XF had numerically lower lint yield than DP1823NRB2XF in both supplemental and full irrigation treatments (Fig. 1). In cotton variety DP1820B3XF, percent yield reduction was 48% in supplemental irrigation while percent yield reduction in full irrigation was 31%; however, in DP 1823NRB2XF, percent yield reduction in supplemental irrigation was 23% while the reduction in full irrigation was 21%. Thus, DP1823NRB2XF performed better both in supplemental and full irrigation treatments in our production situation (Fig. 2). In 2019, significantly higher lint yield was recorded from control plots in full (high) water treatments than simulated treatments. No differences in lint yield was recorded amongst treatments in low (supplemental) water treatments (Fig. 3).

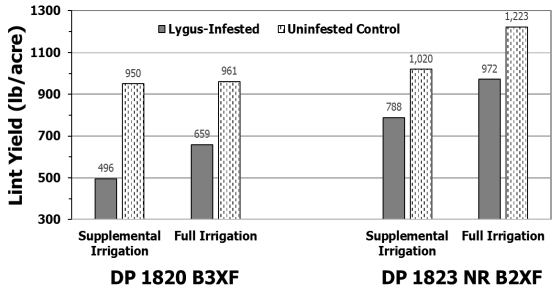

Figure 1. Cotton lint yield losses due to *Lygus* infestation under supplemental versus full irrigation production conditions, Lubbock, Texas, 2018.

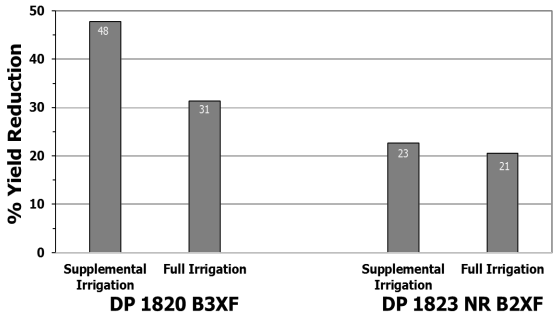

Figure 2. Percent lint yield losses in two cotton cultivars due to *Lygus* infestation under supplemental versus full irrigation production conditions, Lubbock, Texas, 2018.

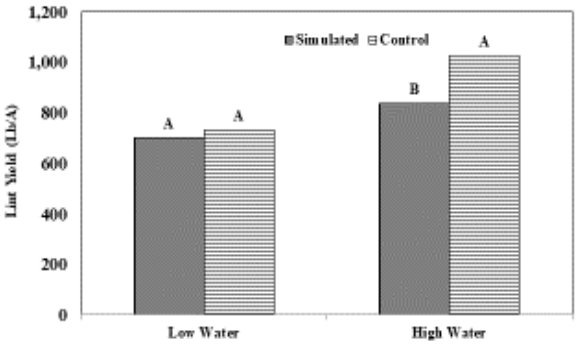

Figure 3. Cotton lint yield losses observed due to *Lygus* simulated damage under supplemental vs full irrigation, Lubbock, Texas, 2019.

References

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