MANAGING EARLY VERSUS LATE SEASON INSECTS IN LIMITED IRRIGATION COTTON

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Abstract

The Texas High Plains is a semi-arid region with characteristic low rainfall, with production agriculture supported by limited irrigation or rain-fed. As a result, the cropping system in this region is largely low-input and the producer decision-making in economically profitable input use is a challenge. The objective of this study was to quantify the impact of single (thrips or cotton fleahoppers as early season pests and Lygus as a late season pest) versus multiple (thrips and cotton fleahoppers or thrips and Lygus sequentially) pest infestations on cotton lint yield and fiber quality under three irrigation water regimes (water-deficit treatments). Once such data are available, the subsequent objective is to develop a dynamic optimization economic model that maximizes the net returns from management of single versus multiple pest infestations under water-deficit crop production conditions. In 2018-2020, thrips and fleahoppers versus thrips and Lygus impacting cotton production risks were evaluated with five combinations of single versus sequential infestations each under three water-deficit (near-zero deficit or full irrigation, supplemental, and high deficit or dryland) regimes, replicated four times. Water deficit conditions and insect infestations impacted crop growth profile as well as lint yield and fiber quality. Lint yield was similar across all five treatment combinations under dryland condition while the sequential infestation of two pests (2018) and cotton fleahopper augmentation (2019) significantly reduced the lint yield compared to untreated control under irrigated condition, indicating the impact of drought conditions on modulating the effect of insect pests as well as the plant's compensatory ability. In 2020, data were highly variable. Nevertheless, the trend was similar to that in previous two years. Lygus and thrips+Lygus all reduced lint yield under dryland condition. These treatments also reduced lint yield under irrigated conditions, but no significance was observed due to greater data variability. The study was funded by Cotton Incorporated Texas State Support Committee and USDA NIFA Grant No. 2018-70006-28892.