

LATE SEASON PREVALENCE OF *LYGUS HESPERUS* (HEMIPTERA: MIRIDAE) IN THE TEXAS HIGH PLAINS

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Abstract

Information on seasonal prevalence and host plant preference of agriculturally important insect pests, such as *Lygus hesperus* (Knight), can be helpful in predicting its occurrence and movement among crop and non-crop host plants. A field sampling survey was conducted during the fall of 2021 to evaluate the prevalence and host preference of Lygus bugs across seven host plants in the Texas High Plains, including cotton (*Gossypium hirsutum* L.), alfalfa (*Medicago sativa* L.), hemp (*Cannabis sativa* L.), grain sorghum (*Sorghum bicolor* L.), Johnsongrass [(*Sorghum halepense* (L.)], Russian thistle (*Salsola tragus* L.), and pigweed (*Amaranthus palmeri* L.). Sampling demonstrated that the adult Lygus bugs were found predominantly on sorghum followed by hemp and alfalfa with significantly lower abundance on pigweed, Johnsongrass, Russian thistle, and cotton. These host crops were distributed in large patches within the 2-mile radius of each sampling location (County), indicating that the Lygus colonization across these host plants can be attributed to host preference and suitability. Sorghum and alfalfa were also the most reproductively suitable hosts as highest densities of nymphs were recorded on sorghum and alfalfa. Cotton appeared to be the least attractive host plant for Lygus when sorghum, hemp, cowpea, pigweed, and alfalfa were available in the host mosaic. Late season prevalence and abundance of Lygus was considerably higher during the 2021 crop season compared to previous years, which may be largely attributed to frequent, large rainfall events throughout the growing season in 2021 compared to previous years that were typical of low rainfall, semi-arid climate.

Introduction

Lygus bugs have a broad host range of weeds and cultivated crops such as cotton, *Gossypium hirsutum* L. Lygus bugs can be devastating to cotton yield because they feed on the newly developing squares, anthers, and developing bolls. The cotton plant can compensate a portion of yield potential until it becomes too late in the season for squares and bolls to develop and mature (Barman and Parajulee 2013). Cotton is susceptible to Lygus feeding from the time it begins to develop squares to about two weeks after crop cut-out. Schwartz et al. (1998) reported >30 Nearctic species of Lygus in North America but not all are damaging to cotton. Within the cotton growing regions of the United States, the most dominant Lygus species found in the mid-south and southeastern regions is *Lygus lineolaris* (Palisot de Beauvois) also known as the tarnished plant bug; the western tarnished plant bug, *Lygus hesperus* Knight, is the most economically damaging species to field crops and specifically cotton in the western United States including west Texas (Layton 2000, Chen and Parajulee 2010). Lygus has been an emerging issue for the Texas High Plains over the last decade while *L. lineolaris* has been one of the key pests in the southeastern cotton production region (Layton 2000). The Texas High Plains produces between 1.2 to 1.6 million ha of cotton a year, which accounts for about 60% of the total production for the state (Sansone et al. 2002) in a short production season. In recent years, Lygus plant bugs and stink bugs have become more important insect pests because of changes in cotton pest management strategies, including the boll weevil eradication, dominance of transgenic Bt cotton varieties, and reduced use of broad-spectrum insecticides. Fewer insecticides are applied in early season, resulting in increased plant bug reproduction or continued movement into cotton during mid- and late season. While Lygus and other plant bugs are generally not a widespread pest problem in Texas High Plains region, we noticed an increased abundance and activity of these insects during the 2021 crop season, extending their activity to late in the season. Thus, the objective of this study was to survey these late-season insect activity surges in crop and non-crop habitats in the vicinity of cotton crop.

Materials and Methods

Arthropod survey was conducted in three counties (Hale, Lubbock, and Dawson, representing northern, central, and southern regions of the Texas Southern High Plains, Fig. 1) in mid-October (October 18-20, 2021). Beat bucket method was used to survey all crop and non-crop hosts at all sites. Seven host plants, including cotton (*Gossypium hirsutum* L.), alfalfa (*Medicago sativa* L.), hemp (*Cannabis sativa* L.), grain sorghum (*Sorghum bicolor* L.),

Johnsongrass [*Sorghum halepense* (L.)], Russian thistle (*Salsola tragus* L.), and pigweed (*Amaranthus palmeri* L.), were surveyed at each location. Five samples per host were taken at each site. Samples were kept in freezer until processing. Lygus bugs, stink bugs, and arthropod predators were separated from the hosts and identified, counted, and tabulated for analysis. The scope of survey was to document only plant bugs and predatory arthropods.

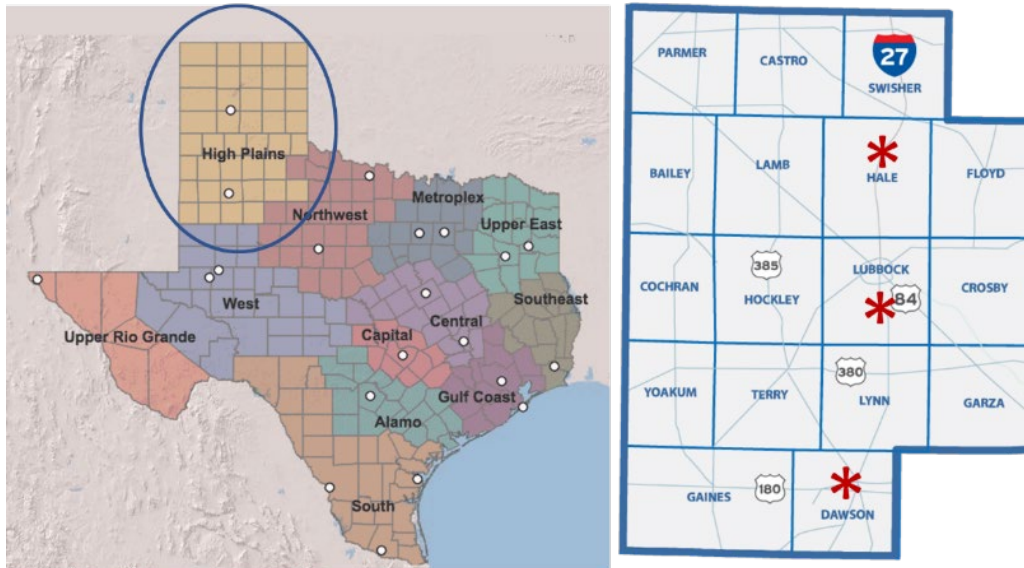


Figure 1. Map of Texas showing the three survey sites in the Texas High Plains region.

Results and Discussion

Late-season survey of prevalent crop and non-crop hosts in the Texas High Plains region revealed that the western tarnished plant bug, *Lygus hesperus*, southern green stink bug, *Nezara viridula* (L.), brown stink bug, *Euschistus servus* (Say), and several predatory arthropods were all quite prevalent across all hosts surveyed. Sorghum was the most preferred host for Lygus at all three survey sites followed by hemp. Hemp was sampled only at the Lubbock location. Lygus reproduction was predominantly on sorghum and hemp was also an important reproductive host. Stink bugs were observed across all host plants in the southern location. Sorghum, alfalfa, and hemp were the most preferred hosts for stink bugs and many predators at all locations. Convergent lady beetle (*Hippodamia convergens* Guérin-Méneville), green lacewing (*Chrysoperla carnea* Stephens), brown lacewing (*Hemerobius* spp.), spiders, damsel bugs (*Nabis* spp.), Chilocorus (*Chilocoruss* pp., minute pirate bugs [*Orius insidiosus* (Say) and *Orius tristicolor* (White)], big-eyed bugs (*Geocoris* spp.), assassin bugs [*Zelus renardii* (Kolenati)], and red-cross beetle (*Collops vittatus* Say) were recorded as prevalent predators in late-season vegetation. These are the same set of predators we generally encounter in cotton during mid-season.

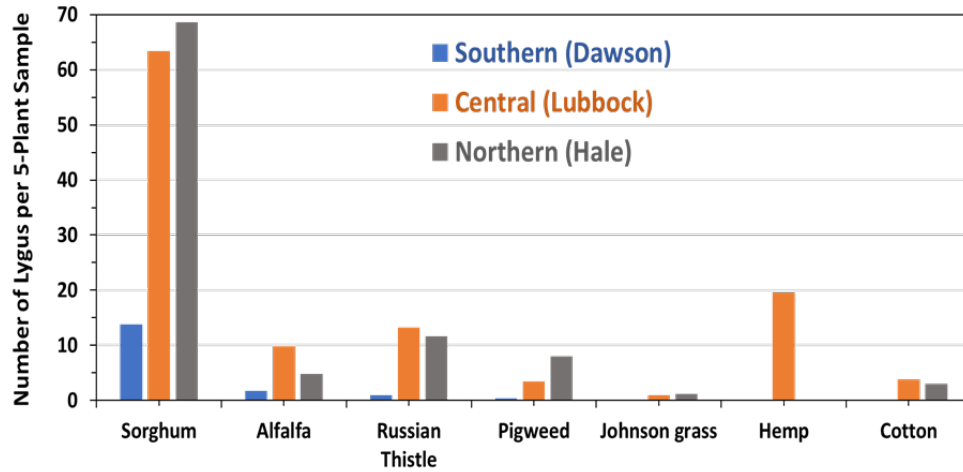


Figure 2. Average number of Lygus per 5 plant samples in three agroecological zones, Southern (Dawson County), Central (Lubbock County) and Northern (Hale County), of the Texas High Plains, 2021.

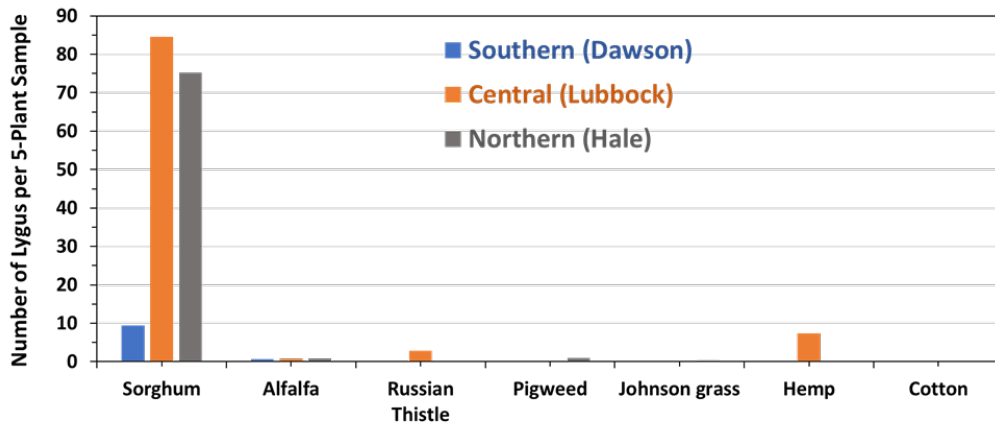


Figure 3. Average number of Lygus nymphs per 5 plant samples in three agroecological zones, Southern (Dawson County), Central (Lubbock County) and Northern (Hale County), of the Texas High Plains, 2021.

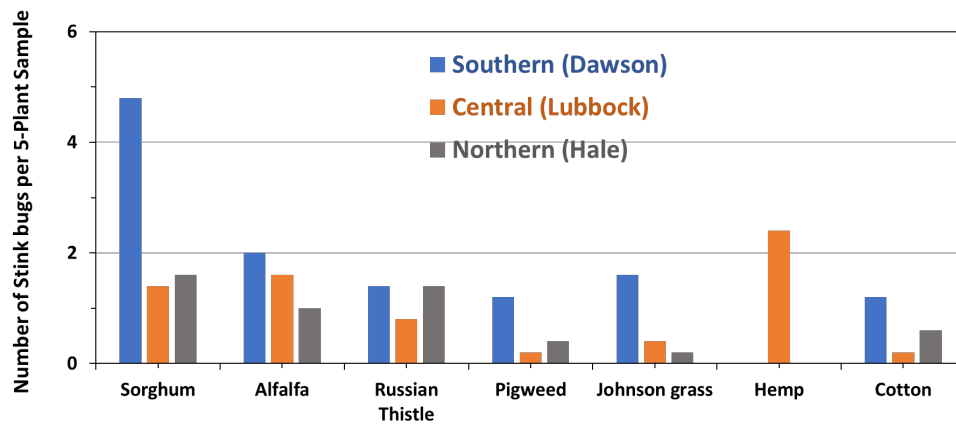


Figure 4. Average number of stink bugs (green and brown stink bugs combined) per 5 plant samples in three agroecological zones of the Texas High Plains, 2021.

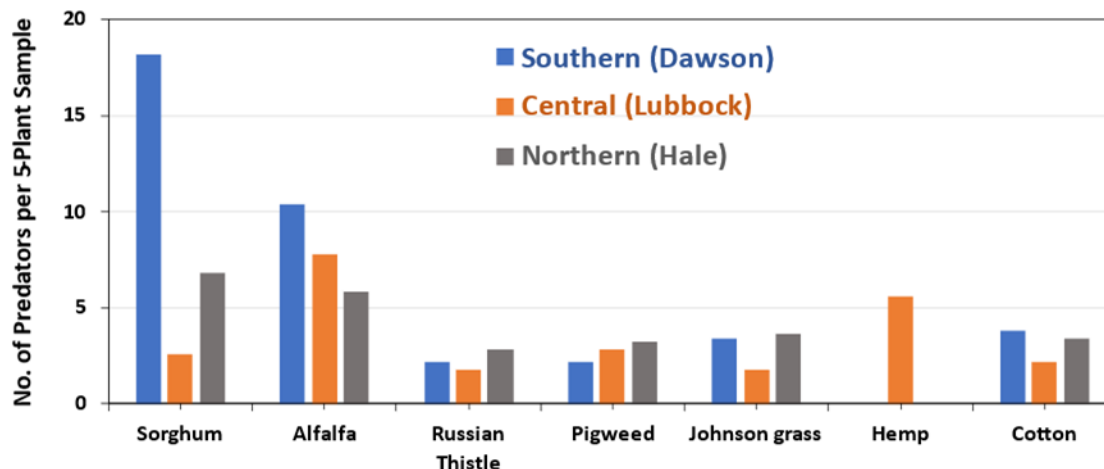


Figure 5. Average number of total predators (all predator species combined) per 5 plant samples in three agroecological zones, Southern (Dawson County), Central (Lubbock County) and Northern (Hale County), of the Texas High Plains, 2021.

Acknowledgments

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