

**EVALUATION OF HOST PREFERENCE OF *LYGUS HESPERUS*****Apurba K. Barman****Texas Agricultural Experiment Station****Lubbock, TX****M. N. Parajulee****Lubbock, TX****Stanley C. Carroll and Ram B. Shrestha****Texas Agricultural Experiment Station****Lubbock, TX****Abstract**

*Lygus* bug is becoming an important pest of cotton after bollworm in the Texas High Plains while it is an economic pest of cotton in the mid-south. *Lygus* can utilize numerous crop and non-crop hosts and the availability and phenological synchrony of these hosts with cotton may largely determine the resulting intercrop movement of *Lygus* between cotton and non-cotton hosts. A field study was conducted in the Texas High Plains in 2005 to evaluate the host preference of *Lygus* to cotton and four non-cotton plant hosts. Four non-cotton hosts and cotton were planted in a randomized complete block with four replications. The non-cotton hosts included alfalfa (*Medicago sativa* L.), wild sunflower (*Helianthus annuus* cv. maximallia), Russian thistle (*Salsola iberica* L.), and pigweed (*Amaranthus palmeri* L.). *Lygus* sampling began in late July when all host plants attained full foliage growth and the sampling continued until November when hosts plants senesced. Sampling consisted of 50 sweeps per plot and the data recorded as number of adults and nymphs retrieved per plot per week. Russian thistle and alfalfa attracted and retained significantly higher numbers of *Lygus* adults throughout the season compared with sunflower, pigweed, or cotton. *Lygus* reproductive activity, measured in terms of nymphal abundance, followed the patterns observed for adult abundance. That is, Russian thistle and alfalfa supported significantly higher nymphal abundance compared with the other three hosts examined. In other words, cotton did not appear to be an attractive host for *Lygus* when Russian thistle and alfalfa were available in the host mosaic.

**Introduction**

In recent years, infestations of *Lygus* have increased considerably in the Texas High Plains. It is considered the second most important yield reducing insect pest in cotton in the United States (Williams 2004). *Lygus* utilizes more than 300 host species including cotton, but cotton is not considered the most preferred host. The first generation *Lygus* in the spring appear in alfalfa and other weed hosts where they spend two or three generations (Barlow et al. 1999) before they move to cotton. Squaring and boll development period are the most susceptible stages of cotton for *Lygus* infestation and during that period adults move to the adjacent cotton field from spring hosts. Movement of *Lygus* from non-cotton hosts to cotton is believed to be due to recurrent harvesting of nearby alfalfa fields and destruction or senescence of nearby weed hosts. The objective of this study was to evaluate the preference and colonization of *Lygus* bugs to four selected non-cotton hosts that are prevalent in the Texas High Plains along with cotton.

**Materials and Methods**

Four non-cotton host plants that have been identified by previous research to support large number of *Lygus* in the Texas High Plains and cotton were planted in a randomized block design with four replications (Fig.1). The non-cotton hosts included alfalfa (*Medicago sativa* L.), wild sunflower (*Helianthus annuus* cv. maximallia), Russian thistle (*Salsola iberica* L.), and pigweed (*Amaranthus palmeri* L.). Plot size was 12 rows wide x 60 ft long. Russian thistle and pigweed plots were established by transplanting young plants collected from the naturally occurring roadside weed patches, whereas sunflower, cotton, and alfalfa seeds were planted directly to the experimental plots at different planting dates to mimic the natural mosaic of these host plants. Sampling for *Lygus* colonization and reproduction began in late July when all host plants attained full foliage growth. Sampling was performed by using a sweep net and the number of adults and nymphs retrieved by each sampling effort were recorded per plot. Sampling was conducted at weekly intervals until all host plants were terminated or *Lygus* numbers reached to undetectable levels.

**Results**

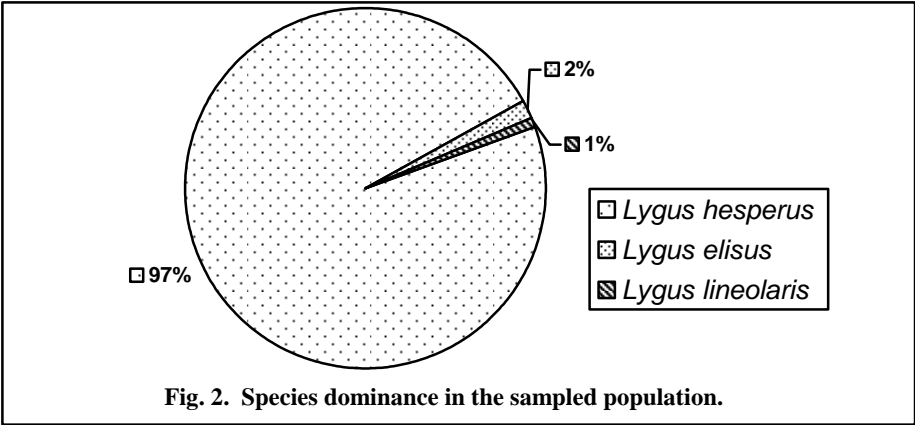
The collected *Lygus* bugs were subjected to initial species identification based upon keys for male individual (Mueller et al., 2003). Combined over all five host plants and all sampling dates, *Lygus* complex consisted of 97% *L. hesperus*, 2% *L. elisus* and 1% *L. lineolaris* (Fig.2). Species composition did not vary with host plant species. This predominance of *Lygus hesperus* in the Texas High Plains is in corroboration with previous reports from the region. Weekly sampling throughout the cotton growing season (Fig. 3) indicated that *Lygus* preferred to stay more in Russian thistle (24.69 adults/50 sweeps) followed by alfalfa (22.53) whereas cotton was least preferred (1.55). Similarly, number of nymphs recovered was highest in alfalfa (19.21 nymphs/50 sweeps) followed by Russian thistle (14.91) with the lowest number (0.23) retrieved from cotton. Russian thistle and alfalfa supported similar densities of both adults and nymphs. Patterns of population build up (Fig. 4) in selected hosts show that the adults began colonizing early in August in both alfalfa and Russian thistle, but alfalfa was less preferred compared to Russian thistle in mid-season. When Russian thistle senesced in late season and the freshly cut alfalfa provided a better habitat for wandering *Lygus*, alfalfa become the favored choice in late season. Harvesting of alfalfa during late season had no effect in the movement of *Lygus* to cotton as cotton was already a less attractive host for *Lygus*. Availability of *Lygus* nymphs, as an indicator of reproduction in a specific host shows that Russian thistle and alfalfa were both preferred hosts but the pattern follows the crop maturity schedule (Fig. 5). Results of this experiment provided information on how *Lygus* population changes due to presence of different hosts and its effect on movement of this pest to cotton. A strategic sampling for *Lygus* in nearby weed hosts and its interpretation would be helpful in arresting movement of this pest to cotton and minimize usage of insecticides.

### Reference

- Barlow, M. V., L. D. Godfrey, and F. N. Robert. 1999. Population dynamics of *Lygus hesperus* (Heteroptera: Miridae) on selected weeds in comparison with alfalfa. J. Econ. Entomol. 92: 846-852.
- Mueller, S. C., C. G. Summers, and P. B. Goodell. 2003. A field key to the most common *Lygus* species found in agronomic crops of the central San Joaquin Valley of California. University of California Agricultural and Natural Resources Publication #8104.
- Williams, M. R. 2004. Cotton insect losses-2003, pp. 1249-1257. In Beltwide Cotton Conferences, National Cotton Council, Memphis, TN.



**Fig. 1. Layout of treatments in experimental field.**



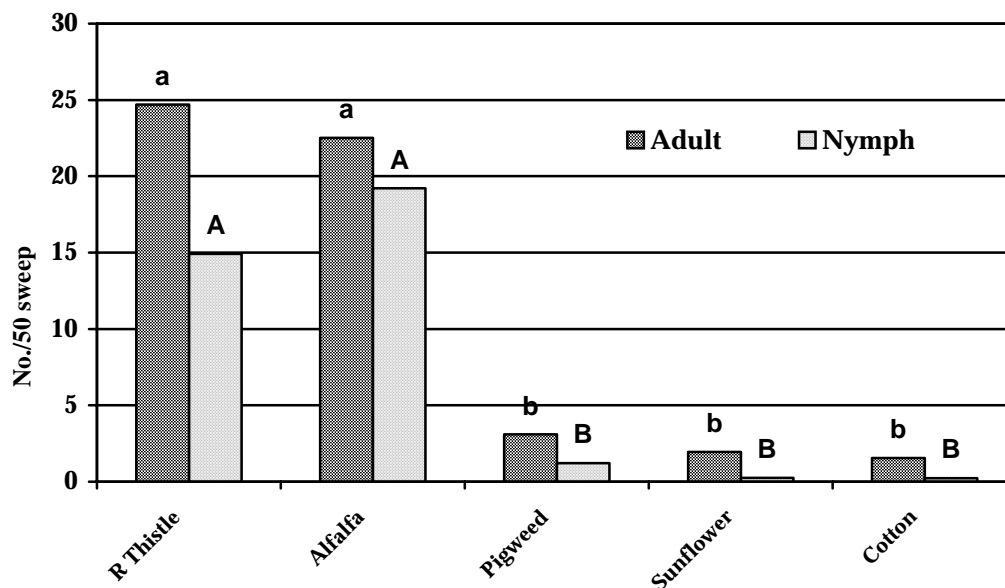


Fig. 3. Seasonal average of *Lygus* adults and nymphs in different hosts.

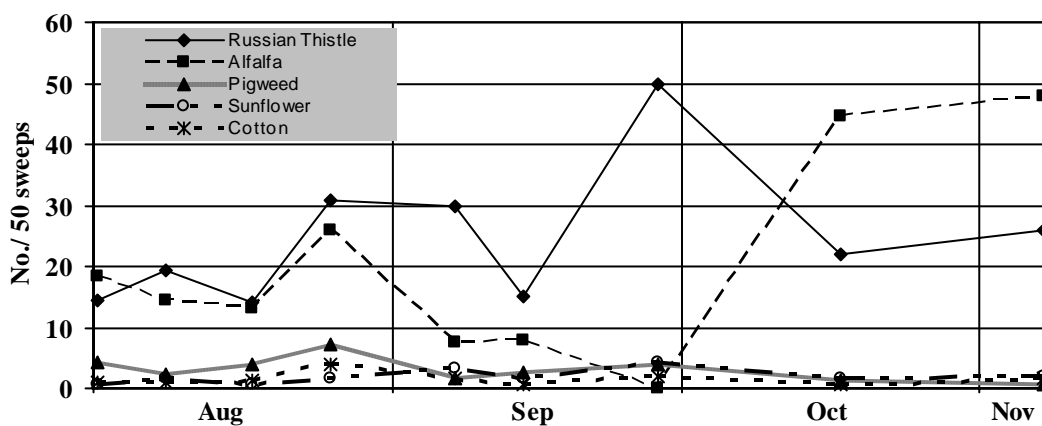


Fig. 4. Abundance of *Lygus* adults in selected hosts during cotton season.

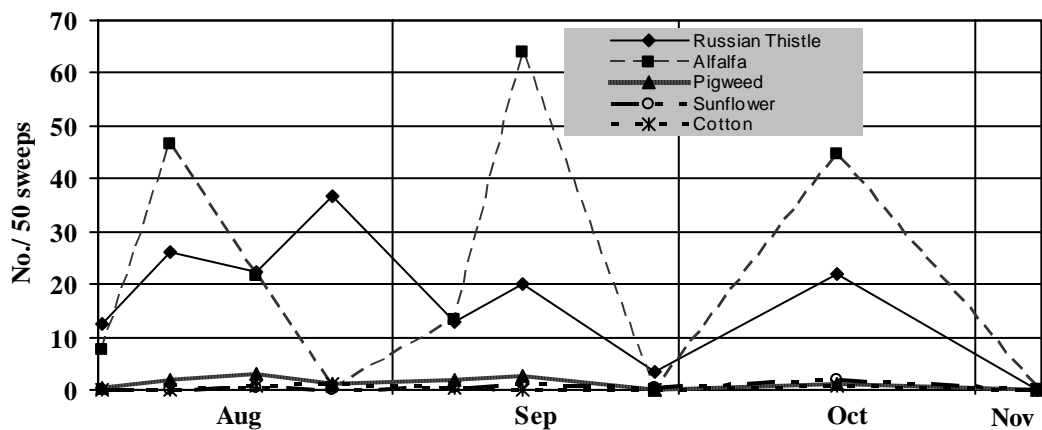


Fig. 5. Abundance of *Lygus* nymphs in selected hosts during cotton season.