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Lygus Bug Activity in the Red River Valley

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Introduction:

Populations of the tarnished plant bug (TPB), *Lygus lineolaris* (Palisot de Beauvois), also commonly referred to as the Lygus bug, have frequently reached alarming levels in the Red River Valley (RRV) during the past five years. The insect has a broad host plant range that includes many crop and weed species common to the RRV, and is believed to be an economic threat to several crops. It prefers feeding on reproductive and meristematic regions of plants such as flowers, seeds, and growing points. The insect feeds by inserting its piercing/sucking mouthparts into plant tissue, injecting digestive enzymes that breakdown plant cells, then consuming the resulting matter. Adult *L. lineolaris* overwinter among plant debris. There are believed to be three generations per year in the RRV, with adults and nymphs present concurrently. *L. lineolaris* has 5 immature stages, all of which feed on plant material. Host plant sequences, in which there is a natural succession of preferred host plants have been documented with Lygus bugs. Obtaining a better understanding of the insect's biology will help in devising control strategies.

Methods:

In this experiment, TPB populations were monitored at two locations (Page, ND and Crookston, MN) in the RRV. Two sites were selected at each location with four host crops in close proximity to each other. Sugarbeet, sunflower, alfalfa, and dry bean were used as host crops. Once a site was selected, 4 zones were established in each field for sampling. One sample would then be taken weekly from each zone in each field. Since growth habit and canopy characteristics were unique among habits, separate sampling techniques were designed to adequately assess relative densities in each canopy type. A leaf blower/vacuum was modified into an insect vac for sampling in sugarbeet. For each sample, the vacuum was moved in a circular motion through the foliage then placed directly above the crown for five seconds. Each sample resulted from vacuuming 20 plants. Sunflower was sampled by tapping the head of the plant four times over a funnel that flowed into a sample bag. An individual sample consisted of ten tapped sunflower heads. Alfalfa and dry bean were sampled using a sweep net with 10 180-degree sweeps being taken in each of the four zones. Growth stage of each crop was recorded throughout the sampling period along with any other information that could be relevant to our further understanding of the biology of this insect in RRV cropping systems. A Z-score analysis was performed for each crop. The overall mean subtracted from each response value and the resulting value was then divided by the standard deviation to derive activity levels over time for each crop and location. Thus, the resulting values indicated density changes from the mean for each crop.

Results & Discussion:

Our trapping results are presented graphically in Figures 1-4. Since different sampling methods were used for the respective habitats, direct comparisons between individual crops are not possible. It is useful, however, to look at the line of a particular crop in relation to events or changes in the line of another crop. Our results indicate that alfalfa acts as a reservoir crop in the RRV host plant sequence. Alfalfa is continually in a state of growth and is present from early spring to late fall. Levels of *L. lineolaris* in alfalfa peaked during flowering. Shortly thereafter the crop was harvested which stimulated the insects to disperse. Generally, the flowering of dry bean fields corresponded with the second cutting of alfalfa, resulting in an increase in lygus bug activity. In comparison to 2001 activity in sunflower seemed to be lower in 2002; however peak activity was observed after full bloom in our second study year. Activity in Sugarbeet, a vegetative crop in the Red River Valley started after other crops were senesced and/or harvested. Levels then steadily increased until the cold weather of late September resulted in a natural season-end decline in overall activity.

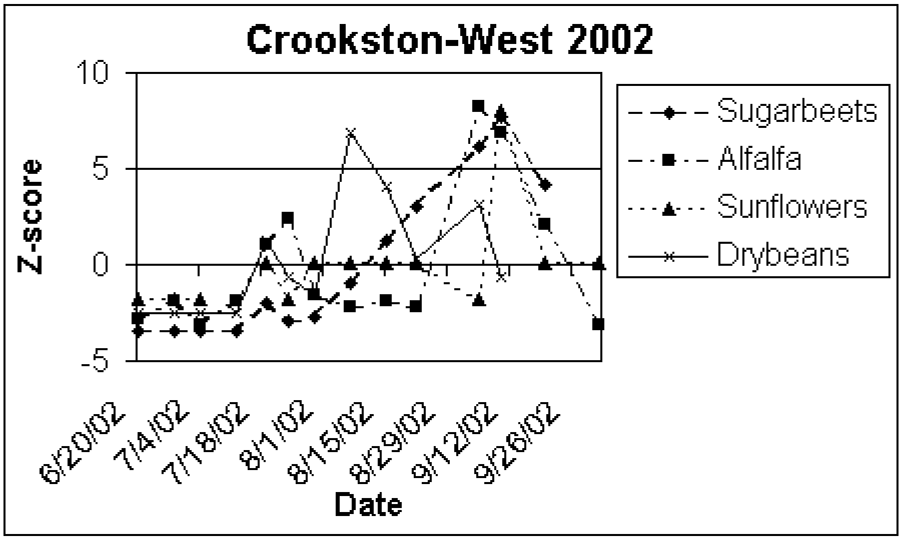

Figure 1. Abundance of TPB (adults and nymphs combined) in various host plant habitats, Crookston, MN, west location, 2002. Note: Alfalfa harvests occurred on 18 June and 26 July; dry bean began flowering on 30 July; and sunflower bloom began on 7 August.

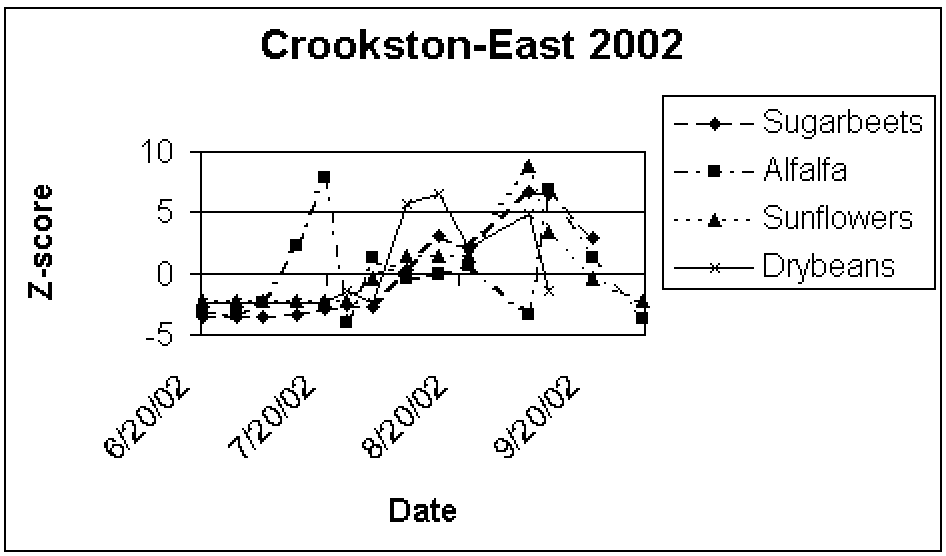

Figure 2. Abundance of TPB (adults and nymphs combined) in various host plant habitats, Crookston, MN, east location, 2002. Note: Alfalfa harvests occurred on 18 June and 20 July; dry bean began flowering on 30 July; and sunflower bloom began on 4 August.

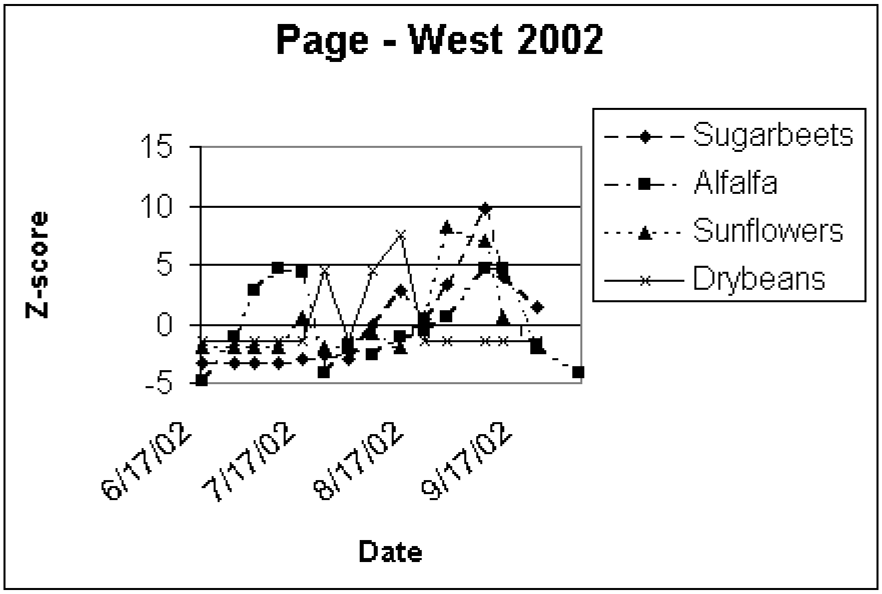

Figure 3. Abundance of TPB (adults and nymphs combined) in various host plant habitats, Page, ND, west location, 2002. Note: Alfalfa harvests occurred on 16 June and 20 July; dry bean began flowering on 29 July; and sunflower bloom began on 3 August.

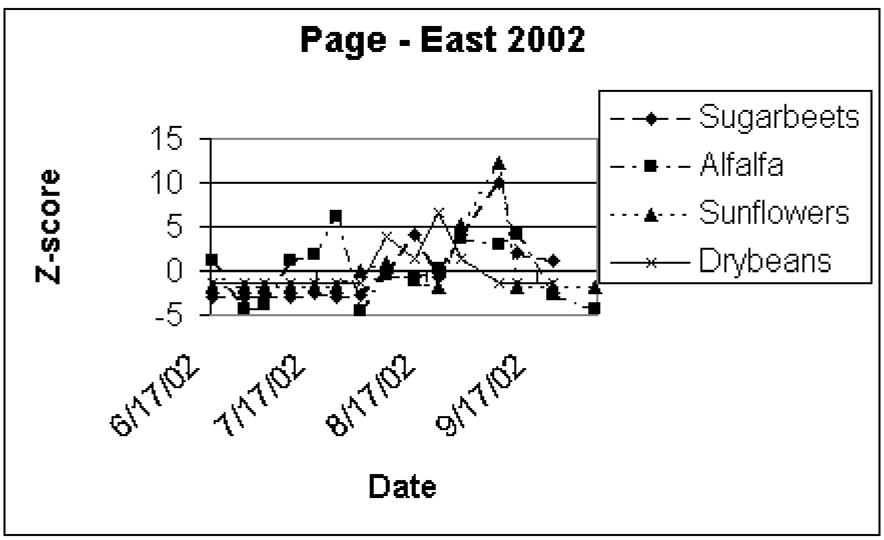

Figure 4. Abundance of TPB (adults and nymphs combined) in various host plant habitats, Page, ND, east location, 2002. Note: Alfalfa harvests occurred on 20 June and 24 July; dry bean began flowering on 29 July; and sunflower bloom began on 30 July.