

Soybean Yield Response when Controlling Threshold Levels of Aphids at Growth Stage R-5

Cooperators: Ray Johnson and Virgil Jons

Nearest Town: Moorhead

Tillage: Conventional

Previous Crop: Wheat

Row width: 30"

Variety: Pioneer 90M60 (RR)

Experimental Design: Randomized Complete Block with sub sampling, with three replications and two locations

Treatments: Applied 8-10-05; chlorpyrifos (16 fl oz/a); esfenvalerate (5.8 fl oz/a); untreated check



Purpose of Study:

The recommended treatment threshold for soybean aphid is 250 aphids per plant. The current university recommendation emphasizes that this number has been a reliable guideline for soybeans at the R-1 (first flower) to R-4 growth stage (full pod). However, at R-5 (beginning seed) the yield response when treating for these population levels of aphids is less predictable, and in earlier studies the yield response is often not substantial enough to recover the input costs.

One challenge to gathering reliable data that reflects the impact of threshold populations reached at the R-5 growth stage has been knowledge of the size of the aphid population prior to observing threshold numbers. The sites selected for this study had been sampled one week prior to reaching the treatment threshold. Earlier observations at the field sites had estimated aphid infestations to be well below treatable numbers. Fields were originally surveyed July 22 to assess population levels of bean leaf beetle present, not a usual situation in the region.

In addition, spider mites were observed on lower canopy leaves during initial field visits. Spider mites have become a problem in the region during hot, dry weather conditions. Mites have also been problems in soybean fields where insecticides have been applied for insect pest problems such as grasshoppers.

The objectives of this study were to:

1. Determine the impact on soybean yield when controlling at the treatment threshold level of soybean aphid when reached at R-5 stage soybeans when aphids were known to be below threshold prior to this growth stage;
2. Observe the effect on spider mite populations following the application of an organophosphate insecticide (chlorpyrifos, Lorsban) or a pyrethroid insecticide (esfenvalerate, Asana)

Results:

Both insecticide treatments resulted in a significant reduction in the aphid populations by 2-DAT (days after treatment) and continued through 5-DAT when compared to the untreated check (Figure 1). Insecticide treatments were not significantly different from one another. It should be noted that the soybean aphid population also began to decline naturally in the untreated check plots during the post-treatment aphid counts. Natural declines in the aphid populations have been observed in the region in previous seasons, often coinciding with late R-5 and R-6 stage soybeans in mid-August.

Partnership/Funding:

Minnesota Soybean Research and Promotion Council

For additional information:

Phillip Glogoza

Soybean Yield Response when Controlling Threshold Levels of Aphids at Growth Stage R-5 (*continued*)

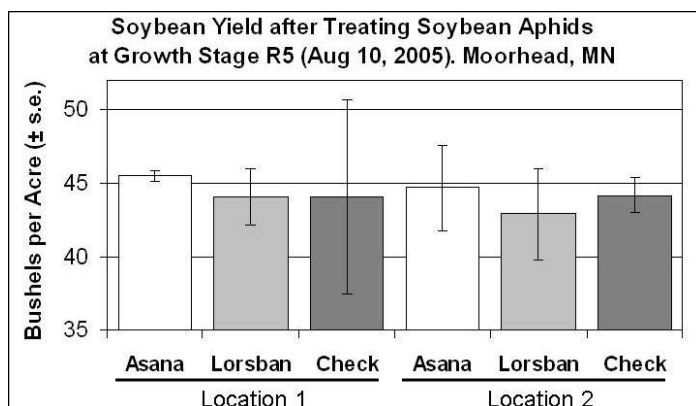
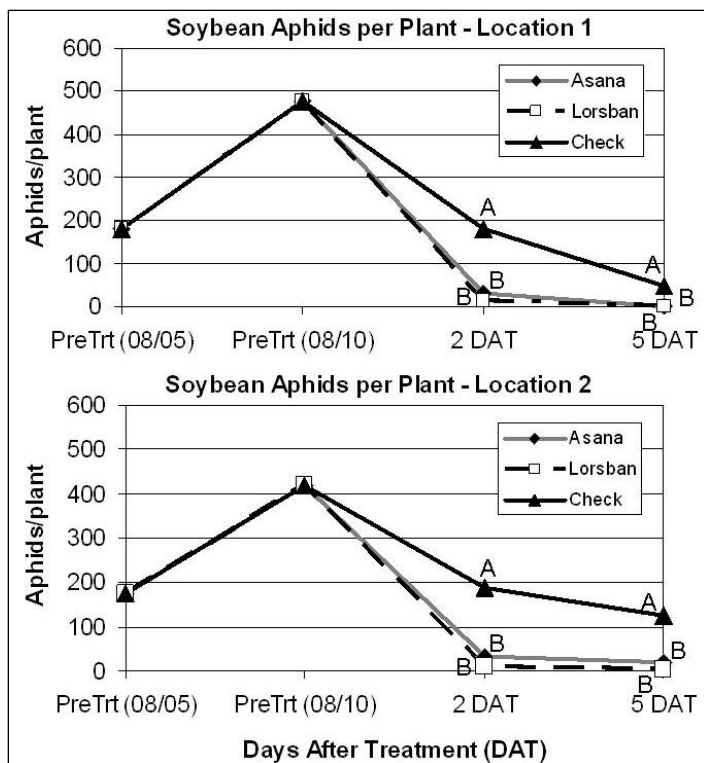


Figure 2. Soybean yields from two test site locations. Yields were not significantly different from each other. Moorhead, MN, 2005

Figure 1. Mean number of soybean aphids per plant observed from five days prior to insecticide treatments to five days after treatment. Data points by observation day with the same letter are not significantly different from each other. Moorhead, MN, 2005

Yields were not significantly different between treatments (Figure 2). Reducing the aphid populations with insecticide treatments at this stage did not result in a response that would justify the additional production input in this study. Observed yields in the study were consistent with the 40 bu/acre average and a yield monitor range of 35 to 50 bu/acre reported by the cooperator.

The mite populations at 6-DAT, estimated in the field by counting the number of mites dislodged by tapping a randomly selected leaflet over a clean, white surface until no new mites were observed, responded differently than the aphids. The organophosphate treatment reduced populations to a size that was significantly less than the check and the pyrethroid treatment (Figure 3). The pyrethroid treatment had significantly greater numbers of mites than the untreated check at Location 1. Historically, pyrethroid insecticides have not been good miticides. These results suggest growers be cautious when selecting an insecticide when spider mite populations are present and favorable weather conditions for mites are occurring.

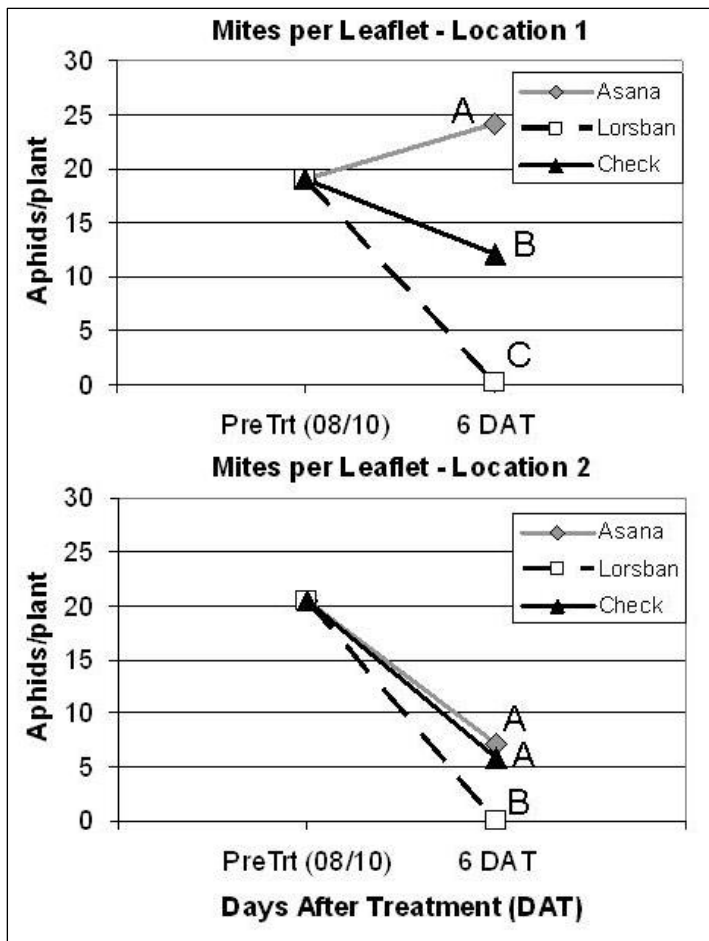


Figure 3. Mean number of mites per soybean leaflet after treatment with a pyrethroid insecticide (Asana) and an organophosphate insecticide (Lorsban). The data points a 6-DAT followed by the same letter are not significantly different from each other. Moorhead, MN, 2005