ON FARM EVALUATIONS OF SOYBEAN APHID CONTROL IN DODGE AND DANE COUNTIES

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Soybean aphid management continues to be a concern for producers, agronomists, and researchers alike. The 3 years of trials in Dodge County and 2 years in Dane County were conducted to help obtain the answer to one of those concerns– when is the best time to control the soybean aphid and maximize economic returns for the grower. Study designs and treatments were individualized and results from each trial will be discussed separately. The findings will be summarized across years and locations.

Dodge County

2001

This trial was no till planted May 15 and was designed to be treated and harvested with field scale equipment. As the first year of soybean aphid research it was set up with individual date, and multiple date sprays and an untreated check. The first treatment was applied on June 28 with very little aphid pressure. The June 28 treatment date became the multiple spray treatment. Additional single treatments were made July 21 and August 3. Weekly scouting did not show a significant increase in population until Mid July with a peak in early August and low levels by late August. Warrior insecticide was applied at 3.5 oz. per acre. There was not a significant difference between the July 21 treatment at 53.5 bu/acre, August 3 at 55.6 bu./acre and the multiple treatments at 55.9 bu./acre. However, there was significant difference for the untreated check at 49.3 bu./acre. Growth stages were July 21 R1-2, and August 3 R3-4.

2002

Aphid levels in 2002 were very inconsistent across the county; however, treatment level populations did occur in the treatment field. The field was no-till planted on May 22, scouted weekly, and sprayed July 19, August 2, August 9, and a multiple spray treatment, which was sprayed July 19, August 2 and 9. Aphid levels began building in mid-July, peaked in early August at more than 1000 per plant, and held a relatively high population until late August. Warrior insecticide was applied at 2.6 oz./acre. Treatments dates and (significant difference ratings) were untreated check 58.7 bu/acre (C), July 19 62.9 bu/acre (AB), August 2 63.7 bu/acre (A), August 9 59.1 bu/acre (BC), and the multiple spray 61.9 bu/acre (ABC). Again the early August treatment was the most effective treatment. Growth stages were July 19 R2, August 2 R4, and August 9 R5.

2003

The trial was no-till planted May 27 and was a seed soybean field. A portion of the field was planted with soybean seed treated with Gaucho. The remainder of the field was planted with no insecticide on the seed. The Gaucho treatment did keep the aphid populations lower initially but was overpowered by the heavy aphid populations of 2003. The difference between gaucho treated and untreated was evident only in the untreated check (36.2 bu/acre vs. 32.6 bu/acre). As in previous years a weekly scouting program was established and the multiple spray plot was abandoned. Aphid levels became significant on July 23 and remained at high levels over 1000 per plant thru August. Mustang Max insecticide was applied at 3.2 oz./acre. There were significant differences in yield in the untreated portion of the field by spray date. Treatment dates and (significant difference ratings) were, July 31 45.8 bu/acre (A), August 7 44.6 bu/acre (B) and July

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24 43.4 bu/acre (B) and the untreated check 32.6 bu/acre (C). 2003 was the year of greatest yield difference with 13.2 bu/acre between the best treatment and the untreated check. Growth stages were July 24 V7-8, July 31 R1-2, and August 7 R3-4.

Dane County

2002

This location was no-till planted in early May. At this location the aphid population did not explode as some locations did in 2002 or in other years. In addition, the soybean aphid populations were observed on the lower half of the soybean plant versus other years when the population was observed initially in the upper canopy. Treatments were applied at the R2 and R4 growth stages on July 23 and August 5. Warrior insecticide was applied at 3.2 oz/acre for both treatments. Aphid numbers were just beginning to appear at R2 and had an average infestation of less than 10 aphids per plant. At the R4 timing the aphid counts had reached 60 per plant. Aphid populations had crashed by August 15 and were not evaluated further. In addition to soybean aphids a moderate population of potato leafhopper was observed at this location with less than 25 per plant, plus there was observed less than 5% defoliation from bean leaf beetle feeding.

Grain yields were quite surprising at this location with the R2 treated plots resulting in 77 bu/acre, the R4 treated plots 74 bu/acre and the untreated check 69 bu/acre. The R2 treatment resulted in the greatest yield while the R4 treatment did not differ statistically from the R2 or untreated check yields. It is possible that a combination of aphid and leafhopper feeding coupled with low measurable rainfall from mid-June until August 3 resulted in yield responses at densities not showing a response before or since.

2003

Soybeans were no-till planted into corn residue May 18. On July 21 aphid counts were less than 100 per plant but exploded to over 800 per plant by the time of the R2 treatment on July 27. Aphid counts had exceeded 1000 per plant by the R4 treatment timing on August 5 and continued to climb until they exceeded 3500 per plant in mid August. Aphid populations did not decline until the week of August 25. Plots were treated with Asana insecticide at 9 oz/acre. Plots were 1.1 acre in size and harvested October 8 using the producer's combine. Each individual plot was weighed and a grain sample was taken for quality testing.

The location suffered from drought conditions seeing little rain from July 15 to September 15 and is a likely cause of the greatly reduced overall yield. Treatments yielded as follows: R2 treatment 43 bu/acre, R4 treatment 33 bu/acre, and the untreated check 27 bu/acre. All treatments differed significantly with an alpha of 0.10. All treatment plots were sampled for oil and protein. The R2 treatment had an oil content of 19.3 vs. 19.9% on the untreated plots; however, no differences could be detected in protein. Given drought conditions, it is difficult to say what factors were influencing oil content.

Conclusions

Soybean aphids are in Wisconsin to stay. Losses caused by the aphids will be dependant on when an infestation occurs, at what level it occurs, and if an insecticide treatment is made. Growers and the professionals that work with them need to scout soybean fields on a regular, recurring basis during July and early August to insure that treatment is both timely and justified. Based on the results of these trials, it appears the soybean aphids did not flourish under the hot conditions in 2002, but the dry conditions in 2003 did not appear to have any negative effect on the population. Natural predators can slow population growth, but they have not been able to

maintain levels below treatment thresholds. Aphid numbers also have the ability to remain high until late August, potentially increasing the benefit of applications later in the growing season, based on soybean growth stage. A full color guide to assist with soybean plant staging and aphid management is available at the conference and from the Dane and Dodge County Extension offices. Based on our findings, late-July to early-August applications that corresponded to R1 through R3 soybean growth stages were the most effective.

Soybean aphid treatment threshold levels have been developed for R1 to R3 stage soybeans and are still being adjusted for later stages of growth R4 and R5. Currently the threshold stands at 250 aphids per plant when the population is actively increasing. As more knowledge is gained threshold levels may be adjusted. Scouting for soybean aphids will require multiple trips to the field to document changes in the population.

The economic impact of soybean aphid treatment is well documented in the 5 trial years presented here. The results of the trials indicate an average increased yield of 10 bu/acre between the untreated check and the most effective treatment. If the assumption could be made that all the soybean fields in the two counties were similar to the trial fields the following economic impact could result annually. Using a 3-year average price for soybeans of $5.17/bushel, applied to the 3-year average soybean acreage grown in the two counties, with a 10-bushel increase in yield from treatment and subtracting a 10 to 14 dollar treatment charge, the economic impact would be $5,862,000 per year for the two-county area.