

Managing Late-Season Aphids In Soybeans

Introduction

We are still learning about soybean aphids and how different seasons will impact the aphids' ability to cause yield loss. Aphid populations can change very abruptly. As we approach mid- to late-August, aphid populations in your fields may just be reaching economic thresholds, or if you sprayed earlier, re-infestation may be occurring.

As we approach the end of the season, aphids become more migratory, and can be a significant infestation one day and gone the next.

However, a critical factor late in the season is soybean stage. At R5, soybean has reached roughly 70 percent of its dry matter content, and at R6 roughly 95 percent. This means that a soybean plant that has reached R6 has only about five



Source: Zach Fore, Pioneer Area Agronomist

percent of its yield potential remaining to protect. Yield loss can still occur during late R5 and into R6, but the aphid densities that result in significant yield losses are substantially higher than the current threshold of 250 per plant (80% of plants). The exact economic threshold value for late season aphid infestation has not yet been defined. Generally, treatment at the R6 stage or later will not result in economic returns, regardless of aphid populations. Here are definitions of the R5 and R6 stages:

R5 Beginning seed	Seed 1/8 inch long in a pod at one of the four uppermost nodes on the main stem with a fully developed leaf.
R6 Full seed	Pod containing a green seed that fills pod cavity at one of the four uppermost nodes on main stem with fully developed leaf.

Should Economic Thresholds For Soybean Aphid Be Changed Based On Higher Soybean Prices?

An excellent detailed article on this question was written by Jon Tollefson, Matt O'Neal, and Marlin Rice, Iowa State

University, Dep't. of Entomology. A brief summary of the article is here. You can access the full article at: http://www.extension.iastate.edu/CropNews/2008/0730tollefs_onriceoneal.htm

The economic injury level (EIL) for soybean aphid has been determined to be an average of 654 plus or minus 95 aphids per plant. This calculation indicates that when there are 654 aphids per plant, the yield loss they cause will equal the insecticide and management costs to control them. This calculation was based on a \$8.65 to \$21 range of control costs, with 30 to 60 bushels per acre yield and market values of \$5.50 to \$6.50 per bushel. The **economic threshold (ET)** is a decision point. It is the number of pest insects that need to be present for a control to be applied and keep the increasing pest population from reaching the EIL. The current ET is 250 aphids per plant on 80+ percent of plants.

Now that the market value for soybeans has risen, a lowered EIL can be calculated. David Ragsdale (U of MN), the lead author on the paper describing the existing EIL for soybean aphids, calculated a new EIL for soybeans selling at \$15 per bushel, with \$8 per acre control cost, and an anticipated yield of 50 bushels per acre. With these values the EIL is lowered to 452 aphids per plant.

Although a lower EIL has been calculated, a lower ET is NOT recommended. Here is why:

The current 250 aphid per plant economic threshold (ET) is below the level where yield loss can be observed. In the field research from which the original EIL and ET were calculated, there were no yield losses observed for populations that peaked at 250 aphids per plant.

Lower ET's do not provide greater yield protection. In follow up studies conducted in Iowa, there has not been significant yield protection when insecticides were applied at populations at or below 250 aphids per plant.

In 2007 and 2005, soybeans that received an insecticide applied at the 250 ET had higher yields than plots that did not receive an insecticide. Plots that received an insecticide at much lower thresholds, greater than 10 per plant, required multiple applications but were indistinguishable from those that received an insecticide at the 250 ET. In 2006, when aphid populations peaked at less than 250 per plant, ISU entomologists did not see a yield difference between treated and untreated plots; details of the report are available at: www.soybeanaphid.info/.