

Replant, Or Not?

Studies Simplify Difficult Choice When Stand Is Damaged

BETTY VALLE GEGG-NAEGER
MidAmerica Farmer Grower

PORTAGEVILLE, MO.

Research shows it is often better to keep a poor or damaged stand of cotton than to replant it, according to Dr. Gene Stevens, Crop Production Specialist at the Delta Research Center.

"If you have a thin stand, the plants respond by making new vegetative branches that help compensate for the lower stand," he said. "But if you have a good stand often these vegetative branches don't even occur."

In one study conducted by Cotton Specialist

"In the end, all these methods came out the same as far as yield response," he reported.

One part of the study was to determine for a crop insurance adjuster if it is better to count the number of plants per foot of row, or count the number of skips in the cotton plants. This study is also being conducted at Clemson University by Dr. Mike Jones.

"We have the same treatments, same varieties, everything, to see how it does on different soil types," Stevens said. "Jones has a non-irrigated field so his yields are generally lower than ours." Stevens converted the yields to a percent relative amount for comparison at both locations.



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Photo by John LaRose, Jr.

Bobby Phipps in 2004-2005, some leaves of the plants were removed early in the season to simulate hail damage. After the plants grew new leaves, there was not much visible difference in the crop during June, July and August. But by late September the number of open bolls decreased according to the number of leaves removed at the beginning of the season.

Another study that Stevens and Al Wrather conducted was published in the Journal of Cotton Science. Articles in this journal are on-line and free to the public.

"However, sometimes scientific journals are hard for people to understand so we made a simple computer program using results from the research. It is available as an Excel spreadsheet on our internet site at <www.plantsci.missouri.edu>" Stevens said.

Basically it includes a calendar and a farmer can enter the planting date, the average yield history of the field, and how many plants there are per foot of row.

"Say you planted in late April and you had a poor stand, maybe one plant per foot of row; it will show you the yield impact of that," he continued.

By entering a replanting date of late May, you can see the results if you replant it and have an optimal stand.

"What it often shows is you're better off to keep a poor stand planted early than to have an optimal stand planted late," Stevens said. "Our field experiment actually reinforces that."

Often when there's hail damage, the terminal is damaged and the plant dies, adding to the effect. An insurance adjuster would look at how many plants were injured, how many actually died and add those two results together to determine the yield loss.

"In current research at the Delta Center we are focusing on the death component of yield loss," he added. "We have check plots where we planted the full seeding rate of four seeds per foot of row; then we've got really large stand losses – 50 percent, 40 percent, 30 percent, 20 percent and 10 percent stand. That means that we had some plots with 90 percent of the plants destroyed."

"We try different methods to simulate death from hail damage. In one method, we blended Roundup Ready seed with non-Roundup Ready seed. So, for example, in one treatment 90 percent of the seed would be non-Roundup Ready and 10 percent would be Roundup Ready; then we sprayed it giving the effect that hail damage might have caused." Some plants, the non-Roundup Ready plants, were just little nubs that didn't quite die but did not compete with healthy plants.

Stevens also tried low seeding rates, then used a random number generator to destroy some plants.

"You may have evenly planted a thin plot or you may have one that has a clump of plants and then go a long way and have another plant. You would think that would have a bigger impact than if you had an even stand, so that is why we did the random number generator."

"What we showed is plants per foot of row is a good indicator of yield loss; but we found out that looking at the skips in the rows is actually better, particularly if there are long skips. Number of short skips didn't correlate very well at all to lint yield," he related. "If you have three foot or longer skip rows, counting those number of skips actually gives you a better prediction of yield loss than just counting the plants in the row. So probably what we'll recommend to farmers is some combination of those two things, actually using the plants per foot of row and number of skips to evaluate yield loss."

"However, what we found with the planting date in our plant population experiments with Dr. Wrather is often you are better off keeping a poor stand; because of the way the plant grows, it can produce a vegetative branch to compensate a lot for really low stands, and that's better than it is to replant later. A downside of skippy stands is the greater wear and tear on picker feeding big bushy plants through the headers. But if maximum yield is what you're after, it is usually best to keep that stand," Stevens concluded. "Although it may look really ragged like some of our plots here, those plants have an amazing ability to compensate. Also, plant density and long row skips are good predictors of yield loss. If you have hail damage, by looking at how many leaves were removed and how many skips you had you can determine how much loss you have."

His take-home message is if you have seedling loss next spring and can't decide whether to replant, keep the crop.

"If it's obvious that it's a total loss and you've got to replant it, go on and do it as quickly as you can; but if you're really on the fence it's usually better in the end to keep that stand," Stevens said. "Sometime you may have what they call acute stand loss or chronic stand loss. Acute stand loss is when you have a major event like hail that takes a lot of plants, but you have good weather conditions to help the plant grow. Chronic would be when you have some hail damage then seedling diseases set in after that. Every day there's more plants dead than the day before. That really gets tricky as far as knowing whether to keep it or not."

Still, Stevens says he's amazed at how some plants recover from seedling diseases.

"Cotton is really a tough crop, it can be really wimpy, trying to die early in the season; but once it gets going, it really does well." Δ

BETTY VALLE GEGG-NAEGER: Senior Staff Writer, MidAmerica Farmer Grower