Mid-Season Plant Mapping for Cotton

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Cotton plant mapping after first bloom is a tool that can be used in making management decisions. Two new concepts have been introduced for this stage of plant mapping: Nodes Above White Bloom (NAWB) and Nodes Below White Bloom (NBWB). These two measurements are used to summarize growth (NAWB) and boll status (NBWB).

Sampling for mid-season plant mapping is similar to that for early season plant mapping. Randomly select at least 20 plants from throughout the field. Avoid plants adjacent to large skips and plants with damaged terminals. In addition, sample only plants with a first-position bloom. Plants can be mapped in the field or after removal by cutting below the first fruiting branch. Because only nodes and first position aborts are recorded, the time for mid-season mapping is less than for early season mapping.

Nodes Above White Bloom (NAWB)

Nodes above white bloom indicates energy a plant has above that required to fill bolls, reflecting excess energy that produces additional terminal growth. Nodes above white bloom actually measures terminal growth between the appearance of a pinhead square and bloom. If the boll load uses most of the nutrients provided by roots and leaves, very little is left over for continued terminal growth, indicated by lower NAWB. When the boll load is low enough that excess nutrients are available, NAWB will remain high or possibly increase.

When mapping NAWB, begin counting at the first node above the first-position white bloom and continue to the terminal node with a main stem leaf at least 1 inch in diameter. Count and record all the first-position aborts (damaged or missing squares) above the white bloom.

Normally fields will have from 9 to 11 nodes above the white bloom at the early bloom stage. At mid-bloom this number generally drops to 8 or 9. If the number of nodes remains 9–11 at mid-bloom, then boll size or fruit retention is inadequate, and an application of the plant growth regulator PIX®* should be considered. If NAWB nears 5 at mid-bloom, there is a danger of early cutout and the crop was not pushed adequately with nitrogen and water.

Nodes Below White Bloom (NBWB)

NBWB measures the fruiting progression. During the bloom period, heat units are generally more stable and therefore not as limiting to growth as in early or late-season growth periods; consequently, development from square to bloom occurs at a fairly consistent rate. An additional NBWB should accumulate every 3 days, allowing NBWB to follow crop progress through bloom. Medium to short growing seasons have a limited duration to effectively set bolls. Normally the crop is set on about 10 nodes in New Mexico. Longer seasons may have the crop set on up to 15 nodes.

Using the same plants used for determining NAWB, count the number of nodes below the white bloom down to the first fruiting branch. Count and record all the first-position aborts below the white bloom. This measurement divided by the NBWB will provide percent boll retention.

Boll retention is generally high at early bloom, but drops off toward cutout. Assuming a normal cotton crop is set on 10 nodes or less, NBWB provides an estimate of how much more season is necessary to set the crop. Cotton experiences its greatest shed during the young boll stage, as young bolls are particularly sensitive to physiological causes of shed such as water stress, high temperature, leaf damage, and excessive shading. When boll retention is low following high pre-bloom square set, it may need prompt attention to remedy the effects of physiological cause of shed.

In-season plant mapping is a powerful cotton management tool. Observing the growth and development of the plant and its fruiting pattern closely, along with understanding what is normal, provides the cotton producer with appropriate options. Many times a poor situation can be substantially improved as a result of plant mapping.

Consider the following examples of data obtained by mapping at harvest time. The first field had relatively low boll retention (less than 50%) on all fruiting branches. The second had 50% or better retention on nodes 9 through 14; the third, good boll retention on nodes 6 through 17. As would be expected, the yield of field 1 was relatively low, field 2 was good, and field 3 was excellent.

Early season and mid-season plant mapping would have indicated problems with field 1 that could have been improved with the proper management practices. The cause for poor fruit set and retention could have been determined and appropriate measures to encourage better retention applied.

The second field set and retained a good early crop. If the season was favorable, yield could have been improved by adding water and nitrogen to encourage additional fruit retention in the upper part of the plant.

It is evident that conditions were favorable in the third field by the good boll retention throughout the plant. In-season plant mapping showed what was happening in the field and allowed the producer to manage the crop, taking advantage of its yield potential.

*The use of the trade name does not constitute an endorsement for, or discrimination against any other product, by NMSU Cooperative Extension Service.

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