

Post-harvest Plant Analysis for Earliness in Cotton

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Summary

Post-harvest analyses of cotton plants has supplied historical data about the growth and fruiting patterns in a cotton crop as related to earliness.

Plant mapping provides information needed to develop plant breeding criteria and to characterize plant responses to cultural and management practices. Weekly mapping of cotton plants in the field provides the maximum information about a crop, and its growth and fruiting patterns. However, the work is tedious, time consuming during a busy season, and is usually done in an unfavorable environment. In the post-harvest method, the historical evidence of a plant's growth and fruiting pattern is recorded from harvested plant 'skeletons' that are stored in 30 gal. plastic trash bags. The time required for sampling is minimal during a busy season, leaving the analyses for off-season work in a favorable environment. Information derived from the plant skeletons are final plant height and weight, main stem node numbers and internodal lengths, and the fruiting site status on each fruiting branch as determined from the remaining burrs or the square and boll abscission scars.

A study was made on 1980 post-harvest plants of three Pima genotypes, Pima S-5 and the early/short strains 79-106 and 79-103 which were released in 1980 for interspecific hybrid cotton production by Carl V. Feaster and E. L. Turcotte. Supplemental field data were planting date, irrigation dates, flower counts, plant heights, and sequential pickings of seedcotton.

Final plant heights were significantly different (S-5= 137 cm, 79-106= 95 cm, 79-103= 77 cm), resulting from different growth rates. However, the post-harvest internodal measurements, when fitted to irrigation dates, showed a common rate of mainstem node production of 3.2 days per node for the three strains over a 6-week period of rapid plant growth.

The earliness of 79-106 and 79-103 as compared to Pima S-5 was established by the analysis of the sequential pickings. The post-harvest plant analyses supplied supportive evidence for the earliness as based on fruiting patterns. In the early-short strains 1) flowering started at lower nodes, 2) flowering rates were higher during the early season and lower during the late season, 3) bolls set at higher rates with fewer sheds at the fruiting sites of the first 30 flowers, 4) third and fourth fruiting branch nodes set more bolls, 5) more fruit set at the main stem, and 6) more fruiting branch sites bore two bolls, where one is common.

One cause of excessive fruit shed in Pima S-5 may have been the plant's tallness resulting in an increased internal shade. The shorter strains appeared to produce more open canopy resulting in greater light interception near the fruiting sites.