NAWF AS A SIGNAL OF PHYSIOLOGICAL CUTOUT

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Abstract

Understanding cotton development is essential if management is to be able to respond to crop requirements and environment to influence crop growth. Crop monitoring provides a means of following crop development and providing signals of pending production problems. The COTMAN system of crop monitoring is based upon the fruiting dynamics of the plant. Within the system, the flowering date of the last effective boll population (physiological cutout) initiates the accumulation of heat units used for end-of-season management decisions. Early work in 1989 (using a standard Delta-type cultivar on a silt loam soil in the north Delta) indicated that the number of flowers to produce a pound of seedcotton was relatively constant for NAWF = 10 to NAWF = 6, then increased dramatically at NAWF< 5. A critical value of NAWF = 5 has since been confirmed in California and under other good growing conditions. The objective of the studies reported here was to evaluate contrasting cultivars, nitrogen rates, mepiquat chloride and geographical location on the critical value of NAWF. The effects of three cultivars (Tamcot HQ95, Deltapine 20, and HyPerformer HS46) at Keiser (Sharkey clay) and three pre-plant nitrogen levels within long-term nitrogen studies at Keiser and Marianna (silt loam) on critical NAWF value were evaluated in 1994 and 1995. The effects of mepiquat chloride were evaluated at Marianna in 1995. Geographical location, with additional treatments of mepiquat chloride and low nitrogen were evaluated in 1997. Within each test, tags (with date and NAWF recorded) were placed on first-position flowers. Number of flowers per pound of seedcotton and fiber quality (except the mepiquat chloride test) were determined for each NAWF category.

Based on flowers required and fiber quality, NAWF = 5 generally appeared to best characterize the critical NAWF value in the cultivar and nitrogen tests. However, NAWF = 4 became relatively more important with the zero preplant nitrogen and the HQ95 cultivar. The importance of NAWF = 4 was also enhanced by application of mepiquat chloride. The effect of geographical location was not clear in 1997. In most cases, NAWF = 5 defines the last effective boll population, but flowers at NAWF = 4 become more important in stressed conditions and, perhaps, with mepiquat chloride. If a field is approaching physiological cutout normally, there is little time between NAWF 5 and 4. Using NAWF = 4 as the critical value may increase the probability of mainly monitoring late-maturing plants with low productivity and the likelihood of producing secondary growth. The date of the NAWF value chosen for physiological cutout is important because it initiates the accumulation of heat units used for end-of-season management decisions, and represents the flowering date of the last effective boll population that will yield bolls of acceptable weight and quality.

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