ALTERATION OF COTTON PLANT STRESS DYNAMICS BY TARNISHED PLANT BUG FEEDING

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RESEARCH PROBLEM

The early detection of stress in the cotton crop is essential for efficient management and optimal yield. The objective of this study was to determine the change in the stress dynamics of cotton plants injured by tarnished plant bug [*Lygus lineolaris* (Palisot de Beauvois)] feeding.

BACKGROUND INFORMATION

Boll loading is a major source of stress in the cotton plant because of the sharp increase in plant demand for resources. Boll loading is composed of two components, boll retention and boll filling. Prior to first flower, stress due to boll loading is negligible, but it can be expressed as potential stress. Following first flower, actual boll loading stress quickly accumulates until the carrying capacity of the plant is reached. The carrying capacity of the plant is the fruit load that causes production of new vegetative and reproductive structures to cease. Plant bugs feed on squares during the squaring period of growth. This causes shedding and a resultant alteration of potential stress. The alteration of potential boll loading stress prior to flower leads to a modification of actual boll loading stress after first flower.

RESEARCH DESCRIPTION

The experiment was conducted at Wildy Farms, a commercial farm in northeast Arkansas near Manila. The study consisted of 6 replications of 5 treatments of cultivars Stoneville 4892 BR arranged in a randomized complete block design. Each plot was 25 ft. in length and 4 rows (38-in. spacing) wide. Prior to planting, drip-tape irrigation was placed in-furrow to eliminate water-deficit stress. Each treatment received different

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numbers of tarnished plant bug nymphs (TPB) for three consecutive weeks prior to first flower. Insect treatments were 0, 1, 2, 3, and 4 nymphs per 3 plants, respectively.

During plant development, data on plant growth and fruit retention were collected using COTMAN, SCOUTMAP, and COTMAP. At season's end, 10 plants were selected and each first-position boll was marked for location on the plant and bagged separately. These bolls were then ginned in a one-boll gin. The seeds were counted, and lint and seed weight was recorded on a boll-by-boll basis

RESULTS

Percentage of first position squares shed prior to first flower were 3%, 23%, 26%, 37%, and 53% for treatments 1, 2, 3, 4, and 5, respectively.

The final lint yields for treatments 1, 2, 3, 4, and 5 were 1543, 1365, 1369, 1148, and 1003 lb/acre, respectively.

Individual boll data are being analyzed for their contribution to yield. Also, the plant response to shedding of adjacent bolls on the retained boll is being determined, including effects on fiber length, strength, and micronaire.

Present research is centered on relating the various levels of an estimated preflower potential stress created by different TPB densities to the corresponding estimated actual stress plants encountered following first flower.

PRACTICAL APPLICATION

The understanding of *potential* boll loading stress and *actual* boll loading stress will provide the basis for growers and consultants to anticipate the onset of stress and make management decisions to reduce or possibly avoid stress completely.