ANATOMY AND MORPHOLOGY OF FRUITING FORMS

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Abstract

As a woody perennial, cotton has the most complex, vegetative and reproductive morphology of any annual crop grown. Its growth habit produces both vegetative and reproductive organs simultaneously. This growth causes very complex production distribution pattern of carbohydrate throughout the structure of the crop. Maximizing this production and distribution of energy is, of course, the goal of all growers and research effort. One of the earliest comprehensive descriptions of cotton plant morphology is that of J.M. Hector in *Introduction to the Botany of Field Crops* (1936) and the Russian monograph *The Structure and Development of the Cotton Plant* (Baranov and Maltzev, 1937). Mauney *The Anatomy and Morphology of Cotton* (1966, 1984, 1986) updated these descriptions based on anatomical details observed by Mauney and Ball (1959), which more accurately analyzed the association of the two branch buds found at the base of each leaf. No new observations, which alter our understanding of the structure of the plant, have developed over the decades since the descriptions. So this review will use them to interpret the several interesting features of highly productive modern cultivars as follows. 1) Fruiting branches form as the first axillary terminates in a flower. In vigorously flower plants, the second axillary also converts for vegetative to fruiting. 2) When environmental conditions are excessively hot and humid the flowering stimulus may be relaxed and vegetative branches occur above the first fruiting branch. 3) Some cultivars may form four-bract squares on the early fruiting branches. This anomaly is caused when the flowering stimulus is weak and the branch attempts to form the second node (leaf) of the branch before terminating in the flower. 4) Cutout is due to the fact that as the plant diverts carbohydrates into boll development the rate of development of new vegetative nodes slows more than the rate of development of existing flower branches. Thus all the flowering nodes are used until a fresh wave of vegetative growth produces more nodes. 5) Flower sterility is caused by high temperature and humidity during the development of the pollen grains. This occurs about three weeks before the day the flower blossoms.