PHYSIOLOGICAL ASPECTS OF COTTON FRUIT SHED

John Snider
University of Georgia
Tifton, GA

Abstract

The physiological basis and consequences of fruit shed in cotton are of interest to a wide range of stakeholders. Importantly, the presence of fruit shed in a cotton field may indicate some level of yield limiting stress or it could simply be a function of normal, intra-plant competition for resources, so it is important for crop consultants to understand how certain factors might influence the abscission process. Firstly, it is important to note that the position of a cotton boll along a fruiting branch can influence fruit retention, with the highest retention observed at the first position and declining substantially for positions at successively more distal locations from the mainstem. Fruit age also influences the tendency to shed, where young bolls (within the first week after flowering) are the most likely to shed, and bolls greater than 14 days past flowering are very unlikely to shed. Insect pressure can cause abscission for a range of floral bud and boll stages, even large squares and flowers, which do not typically abscise under normal conditions. High temperature stress limits boll retention more than vegetative growth by interfering with reproductive processes such as pollen formation and viability or the process of pollination and fertilization. Water application to an open flower can cause pollen grains to burst, thereby limiting fertilization and seed set, which results in the abscission of young fruit. Drought and nitrogen deficiency can limit yield by decreasing total fruiting site number and/or fruit retention. When increased abscission is observed under these stresses, it is because total source strength (leaf area and photosynthetic activity) is insufficient to support the developing boll load. Conversely, excess application of either of these inputs can produce rank growth and lower fruit retention as a percentage of total fruiting sites generated. Producers should also be aware that cotton routinely sheds a large percentage of its fruit even under non-stressed conditions, with a seasonal peak in boll shed that roughly coincides with the days immediately following the onset of peak bloom. Previous research published in the early 1980s indicated that it was not unusual for cotton to shed 60% of all squares it initially produced. In a more recent evaluation of fruit retention (2019) in Georgia, a high yielding cotton crop (1900 lb per acre) showed fruit shed was comparable to previous reports (approximately 59.7%).