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ARTICLES THIS ISSUE

Physiological Shed of Squares and Small Bolls

Sandy Stewart, Ph.D.

Over the past several days, a large amount of fruit shed has taken place most Louisiana cotton fields. Squares of various sizes and small bolls have been aborted and abscised from the plant. While this happens every year, the shock of its occurrence never seems to wear off. In years such as this when early square retention was as high as was generally found, the volume of fruit shed, when it occurs, tends to magnify the shock. The whole situation begs the questions of why does it occur and what can be done about it now? Fruit shed can generally be classified as either being physiological or insect related.

Physiological Shed

Cotton plants have a limited number of fruiting positions that can be reasonably expected to be retained and harvested. The number changes from year to year, field to field, and even plant to plant, but is dependent on environmental conditions. Due in part to its perennial growth habit, the plant produces a large number of fruiting positions, but will inevitably retain less than half of them. Some shed is caused by insect damage and feeding, while the rest is a physiological response to the environment.

Although the exact environmental cause of physiological shed is not completely understood, physiological shed generally takes place in specific sizes of fruit. One to three day old bolls are the most sensitive to physiological shed. Bolls become less sensitive to shed as they age and are virtually assured of remaining on the plant after 14 days. Small squares are sensitive to environmental influences that will cause shed, but as square size increases, the likelihood of shed becomes less.

Each fruiting site can be thought of as drain on the photosynthate energy produced by the plant. If the photosynthate produced by the plant is not enough

to supply the demand of each fruiting site, then the pant simply begins to shed fruit that have a large energy demand. Young bolls have the largest energy demand and the presence of a large number of immature bolls on the plant greatly increases the overall demand for photosynthate. This is a classic catch-22 situation in which a large portion of Louisiana cotton can now be found. Early square retention was very high, the bloom period is only a few weeks old, and there are a larger number of small bolls appearing quickly on the plant. Consequently, the photosynthate demand on the entire plant is extremely high, so some physiological shed is inevitable.

Unfortunately, this large demand on plant energy reserves has come at a time when low sunlight due to recent rains, some waterlogged conditions, and high temperatures all contribute to decreased photosynthetic capacity and temporary environmental stress. All of this leads to a large amount of physiological fruit shed that has recently been observed. In some ways, the level of shed appears to be magnified by the high early retention levels at which most fields entered the bloom period.

The good news is that cotton is a perennial plant and will continue to produce squares and fruiting sites. The decreased fruit load on the plant, while disappointing, results in less overall demand for photosynthate and increases the likelihood of retaining small bolls from this point forward. This should not be taken to mean that all small bolls will be retained from this point forward, as the fundamental relationship of photosynthate supply and the demand of supporting an increasing number of fruiting positions will not go away. However, in order to retain bolls on the upper half of the plant, some shed from the lower half of the plant is inevitable. Moreover, it should be remembered that it is only mid-July and the effective bloom period for cotton in Louisiana can last through late August. This means that there is ample time left for production and retention of upper node fruiting sites. Minimizing water stress in the future, and controlling rank growth to increase sunlight penetration in the plant are the two most important management strategies that can be employed at this point in time to support the photosynthetic activity of the plant.

PGR Applications to Control Rank Growth in Large Cotton
Sandy Stewart, Ph.D.

Since the week of July 4th, there have been a number of calls concerning plant growth regulator (PGR) rates on large cotton that has had ample rainfall and/or some fruit shed. The questions could be summarized by "How high of a rate of mepiquat is needed on large cotton?"

Growing conditions have been excellent in terms of soil moisture. This fact, coupled with the physiological shed observed in most fields, results in cotton plants that have tremendous growth potential. Basically, the fruit load has been lightened while simultaneously providing adequate moisture for growth.

Fruit load and mepiquat are the two best plant growth regulators we now have at our disposal. Of the two, fruit load is by far the most effective, so protecting the squares and bolls on the plant will a be a critical factor in managing the plant size from this point forward. Having said that, how should mepiquat be used as a management tool right now?

Mepiquat Rates for Large, Blooming Cotton

Once cotton has entered the bloom period, it generally requires increasing rates of mepiquat to effectively control vegetative growth. In well-watered conditions, less than a pint of mepiquat chloride (Pix, Mepex, others) or mepiquat pentaborate (Pentia) is largely ineffective on cotton that is in mid- or late-bloom. Therefore, if mepiquat is to be used, the higher end of the labeled rate, which ranges from 16 to 24 oz per acre, is appropriate in mid- or late-bloom cotton with any appreciable plant size. Some growers may not be accustomed to using mepiquat at rates this high; however, it should be remembered that larger plants that have been blooming for several weeks will require large doses to control vegetative growth and sequential applications may be required in some cases.

Rates in excess of 24 oz/acre of either mepiquat chloride or mepiquat pentaborate are off-label. Rates in excess of 24 oz in one application will not provide additional suppression of vegetative growth.

Stance contains mepiquat chloride and is an effective PGR. The label allows for up to 3 oz/acre of Stance in one application. If Stance is to be used in large, mid- or late-bloom cotton, 3 oz will be needed. Following that, a sequential application of Stance at 3 oz or another mepiquat product is likely to be required.

Rain-Free Periods for PGRs

Questions have been asked concerning the rain-free period needed following application of PGRs. All labels, with the exception of Pentia, suggest the addition of a surfactant to decrease the rain-free period from 8 to 4 hours. Pentia labeling indicates a rain-free period of 2 hours without surfactant and 1 hour with a surfactant. If rainfall occurs in sooner than these rain-free periods after application, expect a re-treatment to be needed at the original rate.

DATE TO REMEMBER

August 23 – Dean Lee Research Station Field Day, Alexandria. Begins with registration at 3:30 with field tours and supper to follow. Contact Dr. John Barnett at (318) 427-4424 or jbarnett@agcenter.lsu.edu for more information.

Below is a list of contacts, both agents and specialists, in Louisiana cotton-producing parishes. They are ready and willing to assist you in any way they can.

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