Cotton Catchment Communities CRC
NSW DEPARTMENT OF PRIMARY INDUSTRIES

COTTON *TALES*

Macquarie Valley and Bourke

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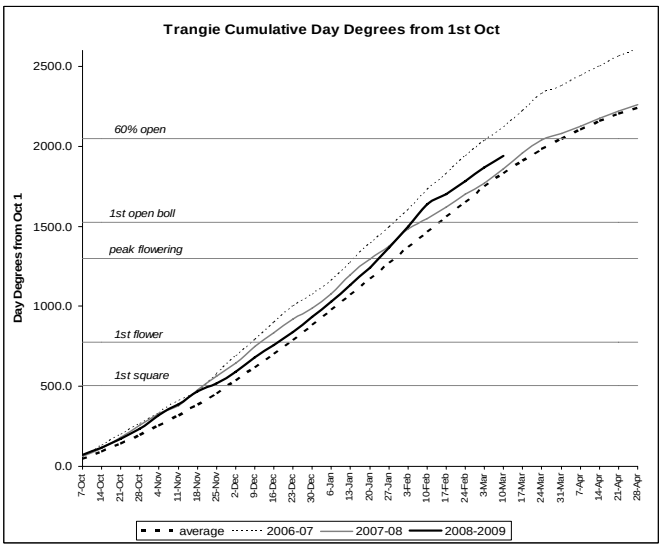

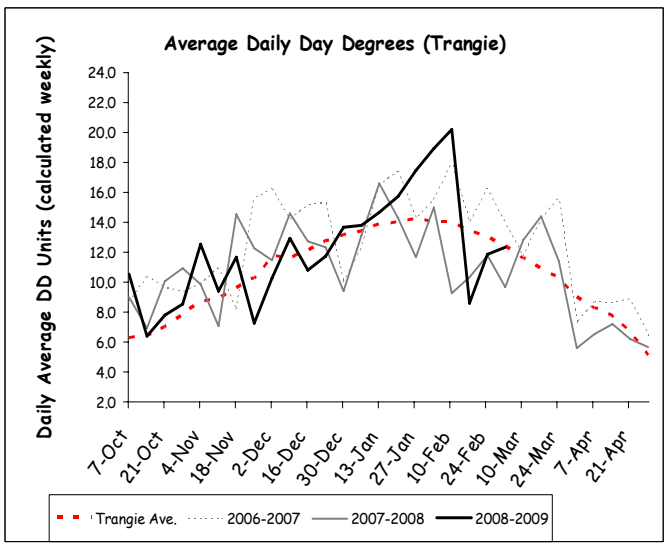

Defoliation Timing

The main aim of defoliation timing is to defoliate as early as possible to avoid potential late season cool/wet weather while not defoliating prior to the crop being physiologically mature.

The cotton plant has a natural mechanism for shedding its mature leaves, known as leaf abscission. The application of defoliation chemicals induces this natural process to remove all leaves at once allowing for a clean harvest. Abscission is controlled by an interaction of hormones in the leaf but the physical leaf drop requires a mechanical force such as leaf weight, wind or rain. Crops that are under stress, particularly moisture stress, are more difficult to defoliate as they typically have reduced leaf weight and the hormone interactions in the leaf are slower to occur. The efficacy of defoliant chemicals in inducing leaf abscission and speeding up boll opening is greatly affected by temperature. Defoliating prior to rainfall or a cool change should be avoided where possible.

The generally recommended practice for defoliation application is to apply defoliants when at least 60% of bolls in the crop are open. At this stage, the unopened bolls are also mature. Defoliating prior to 60% open can lead to immature fibres being harvested. Immature fibres will have lower micronaire and may be more prone to nep formation during lint cleaning.

Research conducted by Robert Long and Michael Bange, CSIRO, investigated the impact of defoliation timing on fibre quality and textile performance using Sicot 71BR. The research found that:

- Yield was significantly less for defoliation applied up to 56% open bolls
- Fibre length was on average 1/32nd inch more for defoliation applied from 77% open bolls
- Lint cleaning generated neps at approximately 100 counts/gram/lint cleaner but there was no significant interaction between defoliation timing and lint cleaning for nep generation
- Defoliation timing had no effect on yarn strength
- Dye uptake in knitted fabric was significantly less for defoliation treatments applied up to 42% open due to more immature fibres

The most common method of determining defoliation timing is to use Nodes above Cracked Boll (NACB). Defoliation can safely occur when NACB=4. At this stage fibre development in the bolls is complete and defoliation can occur without reducing yield or quality.

It takes around 42 day degrees for each new boll to open on subsequent fruiting branches. In warm, sunny conditions this could take around 3 days per node (14 day degrees per day). Over the last two weeks (since 24/02/09) in the Macquarie, the average daily day degrees has been 12. Under these conditions it will take 3.5 days for each new boll to open. E.g. A crop that is currently 8 NACB will be ready to defoliate (at 4 NACB) in 14 days:

8 NACB – 4 NACB= 4

4 x 3.5 = 14 days

In cooler conditions, it will take longer for each boll to open.

NACB is generally very reliable in Bollgard crops as they are typically more even crops that have not been tipped out.

In crops that have large amounts of vegetative branches due to tipping out or gappy plant stands it may be more accurate to cut bolls to determine maturity with the aim of defoliating at 60% open or more.

When bolls are mature the seed coat changes from white/beige to brown and there is no 'jelly' present in the seed. It may be useful to cut some bolls in all crops, even when using the NACB method, to ensure defoliation is occurring when all bolls are mature and that NACB is being accurately assessed.

For more information: The impact of defoliation timing on fibre quality and textile performance, Long, R. and Bange, M. The Australian Cotton Grower Vol. 29 No. 4 August – September 2008.