

## Day Degree accumulation to the 17 Nov 09

District		Season 09/10	Season 08/09	Hot Shock	Cold Shock
Emerald	From 22/09/09	693	688	10	5
Emerald	From 1/11/09	229	245	4	0
Theodore	From 22/09/09	654	646	9	11
Theodore	From 1/11/09	220	243	6	0

## Crop Stages versus Day Degree Accumulation.

Emerg.	5th leaf	1st Sq	1st Flow	Peak Flow	Cracked Boll	60% open
80	330	505	777	1302	1527	2050

## Heat stress in Cotton

Taken from article by Michael Bange & Rose Roche (CSIRO/Cotton CRC). Thanks to Sandra Deutscher for assistance.

Given the weather in CQ this week it is pertinent to consider the impacts of heat stress on yield & quality.

### Impact on cotton growth:

- Cotton can regulate its leaf temperature to maintain optimum growing temperatures. However when leaf temperatures rise too much during the day, this slows the function of plant enzymes for photosynthesis & growth. This can cause an increase in square and boll shedding and a reduction in seed number per boll. This can all lead to a decrease in yield.

- Warm nights (>26°C minimum) mean that leaf temperature & respiration remain high, consuming energy that the plant would have normally used for additional growth.

### Plant tissue damage

- Heat stress can also damage plant tissue. This happens when the plants ability to cool evaporatively has been effected (at night or during a hot humid day) increasing the plant tissue temperature to approach or exceed air temperature.

- Two known consequences of tissue damage from severe heat stress are:

- *Parrot Beaked Bolls* – Small bolls with uneven seed numbers between the locks caused by poor pollination/seed set particularly in one lock. High temperatures reduce the viability of the pollen at flowering. This reduces boll size & can reduce yield.

- *Boll Freeze, Cavitation or Boll Dangle* – Occurs when young bolls die before the abscission layer forms. So instead of dropping off the fruit hangs on the plant by a dangling piece of tissue.

## Effect on fibre quality

- Heat stress can also reduce the interval between flowering & boll opening, shortening the time to maturity & reducing yield. This may increase final micronaire by limiting the number late set bolls that can have lower micronaire.

- Fibre length can also be affected by sustained periods of high temperatures as the time required for fibre elongation is reduced, not allowing for genetic potential for fibre length to be reached.

## Management implications

- Where possible it is important to ensure that heat stress is not accompanied by water stress. Cotton plant responses to water stress vary depending on the stage of growth at which the stress occurs, the degree of stress, & the length of time the stress is imposed. Both yield & fibre quality can be impacted. Where irrigation is available, decreasing the interval between irrigations maybe necessary to avoid water stress.

Growth stage	Reduction in yield with one day of stress (kg lint/ha)
Squaring	9.2
Peak flowering	18.8
Late flowering	16.1
Boll maturation	3.6

Source: Hearn & Constable 1984

- Fruit loss (through shedding, boll freeze, or parrot beaking) can cause the crop to grow rank following heat stress. Management during & after periods of high temperatures involves closely monitoring vegetative growth rate (VGR), fruit retention & boll size. If excessive vegetative growth is detected, the use of mepiquat choride (PIX®) is recommended. Using a growth regulator to limit vegetative growth is preferred rather than limiting water as this may increase fruit shedding.

## FIBREpak - from seeds to good shirts

Fibre quality is affected by a number of interacting factors: variety, seasonal conditions, crop & harvest management, & ginning can all determine whether or not the spinner's requirements are met. While some of these factors cannot be controlled, there are many that can. Better understanding of the nature of fibre & the factors that affect its quality, can help to maintain Australia's position world wide as a producer of excellent fibre.

FIBREpak is succinct guide to all things that relate to fibre quality, from biology of fibre production to management tips throughout the production.

**FIBREpak available @ [www.cottoncrc.org.au](http://www.cottoncrc.org.au) or contact Susan for a hardcopy.**