

It's All About Timing

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Harvest preparation includes removal of mature foliage (defoliation), arresting juvenile growth and stimulating the opening of mature bolls. The application of chemical defoliant is designed to alter the hormonal balance in the crop to enhance the natural process of defoliation and boll opening. For this reason, **the crop must still be physiologically active for effective defoliation to occur.** The crop should also be heading towards senescence with all harvestable bolls matured. The following techniques for defoliation timing each have their advantages and disadvantages. **So the use of more than one indicator is recommended.**

Two times the late season irrigation interval is usually a good indicator of a crop's readiness for defoliation. With a late season irrigation interval of 12 days, for example, the crop would be ready for a defoliant application 24 days after the final irrigation. Hot, dry conditions or coarser textured soils will shorten the interval while cooler conditions or finer textured soil may lengthen it. This simple technique should be combined with one of the following techniques to ensure proper timing.

Percent Open Boll is simply the ratio of unopened, **harvestable** bolls to those that are fully opened and/or cracked. The most common recommendation for defoliation application is at 60% open bolls. This estimate can be made by measuring a length of row and counting the total number of mature bolls and the total number of cracked or open bolls in that same area. The number of cracked and open bolls divided by the total number of mature bolls multiplied by 100 gives the percent open boll for that area of the field. When using desiccant-type chemicals such as sodium chlorate, a higher percentage of open bolls (>85%) is needed to reduce damage to developing bolls.

Nodes Above Cracked Boll (NACB) is a good predictor of percent open boll and is quicker to estimate. A cotton crop with approximately 60% open bolls normally has NACB = 4. The value for NACB is determined by counting the total number of mainstem nodes between the uppermost first position open or cracked boll and the uppermost first position harvestable (mature) boll (Fig. 1A).

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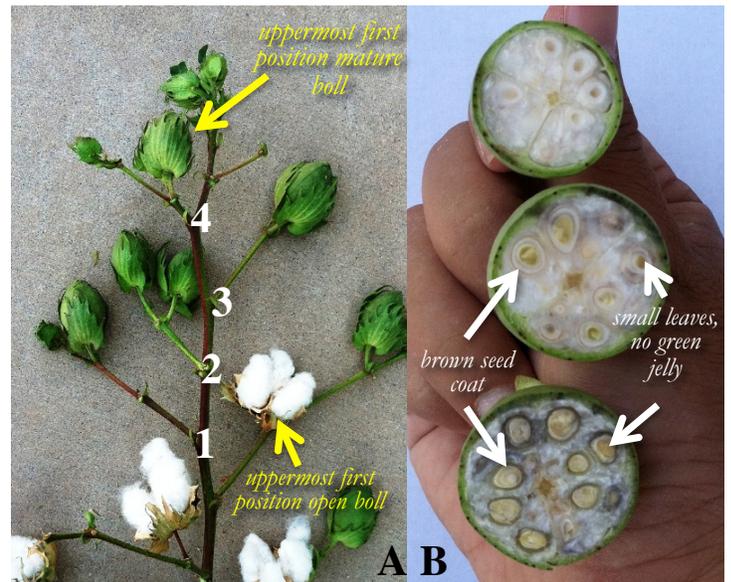


Fig. 1. A, Nodes above cracked boll (NACB) is 4 and **B**, non-mature boll (top) and mature bolls (middle and bottom)

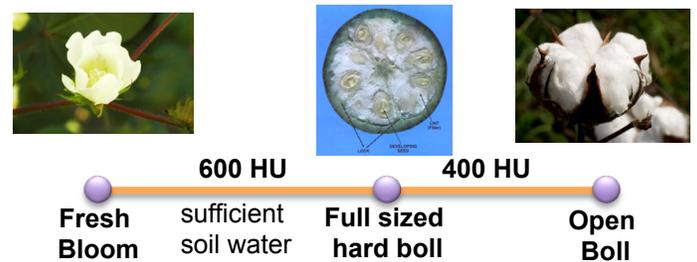


Fig. 2. Heat units required for fresh blooms to reach mature bolls and open bolls

Heat Unit Accumulations have been well correlated to crop development and its maturation. Approximately 600 HUs (86/55°F thresholds) are required for a fresh bloom to develop into a mature, harvestable boll (Fig. 2). For example, a fresh bloom that is set on 10 September around Maricopa, AZ, will on average require approximately 26 days to mature into a harvestable boll (6 October). The maturity of questionable bolls can be determined by utilizing a sharp knife to cut the boll in a cross-section. If the boll is difficult to cut in cross section and no jelly is present within the seed walls, the boll is considered mature and harvestable (Fig. 1B).

These techniques have proven effective in planning and timing an effective defoliation application. **Use of more than one of the techniques will fine tune the correct timing of defoliant application and enhance the efficiency with which the crop is defoliated and prepared for harvest.**

Also see:

- Brown P.W. & J.C. Silvertooth. 2011. Boll maturity dates for late season cotton flowers. http://cals.arizona.edu/azmet/Boll_Maturity_2011.pdf
- Silvertooth J.C. 2001. Deciding on the final irrigation. <http://cals.arizona.edu/pubs/crops/a-1212.pdf>
- Silvertooth J.C. 2001. Crop management for defoliation. <http://cals.arizona.edu/pubs/crops/a-1213.pdf>
- Ayala, F. & J.C. Silvertooth. 2001. Physiology of cotton defoliation. <http://cals.arizona.edu/pubs/crops/a-1240.pdf>