

Preparing the Cotton Crop for Harvest Strategies in 2012

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Defoliation:

Although it is one of the last management decisions in the cotton production cycle, defoliation timing and application are critical to producing a profitable crop. Improper timing will compromise both cotton yield and quality. In light of the premium and discounts for fiber quality the proper use of harvest aid chemicals is of paramount importance.

Nitrogen Nutrition Effects

- Influence vegetative growth and maturity and extent of natural senescence at time of defoliation
- High nitrogen concentrations in plant tissue delay abscission zone formation in both leaf petioles and sutures in the boll walls

Crop Water Status

- Water stress at the time of defoliation tends to reduce response to harvest aids
- Wilted leaves tend to delay absorption
- Increasing water stress hastens boll opening, but sufficient moisture must remain for defoliant to activate the abscission layer

Importance of Proper Timing

- Economic incentive to defoliate and harvest early
- Better weather & more hours for harvest-early
- Improper timing – reduction of fiber quality and yield
- Decisions have to be made field by field

Influence of Crop Conditions on Harvest-Aid Chemicals

Fields with uniform and/or heavy boll load with abrupt cutout vs. late plantings and/or low boll retention, rank growth in Upland and Pima varieties.

The following are guidelines based on information from multi-year field research trials:

The effectiveness of defoliation varies each season and often from field to field depending on nitrogen status of the crop, boll load, irrigation termination, temperatures, and soil types. Guidelines were developed to manage two basic scenarios 1. A crop with a high boll load and early termination. When irrigation termination and nitrogen depletion are synchronized with boll maturity high yielding fields become easy to defoliate.

Factors to consider when selecting a defoliation strategy.

1. Most fields we have seen have a heavy boll load, abrupt cutout, and warm temp >80° F.
 2. Ginstar/Adios treatments usually give effective defoliation. Lower rates (4-6 oz should be effective for Acala's and 5-8 oz on Pima). Def and Folex in combination with ethephon are effective. It is better to start with the lowest rate of Ginstar/Adios to be effective and have to come back than to freeze the leaves due to a high rate which is more likely to occur with 90 F. plus temperatures..
- Standard rates of chlorate plus paraquat, ET, or Shark as secondary treatments are effective. ET

or Shark should be included as part of the first and second applications for suppression of annual morningglory.

2. With late plantings, low bottom retention, rank growth in Acala or Pima, or cooler temperatures. at application, vigorous, late-maturing fields with smaller boll loads like many fields are this season higher application rates of :

Best Conditions for Effective Defoliation

- Moderate to high air temperatures (day time - > 80 F.; night time - >60 F.).
- Relatively low plant & soil nitrogen levels.
- Soil water levels moderate (plants can't be water stressed).
- Uniform crop development; crop at cutout.
- Weeds, insect & disease – under control.
- Complete defoliant coverage – good penetration within the canopy.

Minimum temperatures for optimum performance

	Degrees F
• Sodium Chlorate	50
• Paraquat	<50
• Tribufos	55-60
• Dimethipin	55
• Ethephon	60
• Thidiazuron	65

(*Night temperatures above 60°F are best for defoliation, below 60°F slower defoliation)

With more vigorous plants with a high proportion of later-maturing bolls, it may be desirable to consider some different practices to improve chances for acceptable defoliation, desiccation, control regrowth, and to improve chances of getting later-maturing bolls to open. Growers need to look at the calendar, judge the likelihood that good weather will continue, and decide which bolls they really can afford to wait for.

- Pretreatments of Ginstar/Adios or ethephon are very helpful. Sequential applications are required. The first application aims to open canopy. Higher rates are required on second application to defoliate or desiccate remaining leaves.

Strategy One: UCCE studies demonstrated benefits in defoliation and boll opening by applying a pre-treatment of 4-6 oz of Ginstar/Adios at about 40 percent open boll or 6 nodes above cracked boll (NACB) followed by later treatments (at 4 NACB) of: (1) Ginstar at 6-8 oz; or (2) Ginstar/Adios in combination with a boll opener material (such as Prep, Cotton Quick, Finish or others); or (3) Def/Folex plus a boll opener. Ginstar/Adios rates should be adjusted if changes in air temperatures occur at application or are anticipated in the days following application. In many cases in both Acala and Pima, a final application of sodium chlorate and Paraquat or Shark or ET will also be useful in desiccating remaining leaves and improving opening of last-remaining bolls. Applying ethephon at 6 NACB slightly reduced yield and quality compared to 4 NACB but may be necessary to hasten harvest.

Strategy Two: Another approach for vigorous, late-maturing cotton fields, particularly when there are concerns that the fields are just not making progress in opening up bolls, involves use of glyphosate as a pre-treatment in non RR varieties. Results showed some advantages in earlier opening of later-developing bolls with the glyphosate pre-treatments. Glyphosate should not be applied before about 8 NACB for these pre-treatments in Acala varieties, since the research showed yield losses of 5 to 12% with earlier applications at 10 NACB. Ginstar/Adios has been

effective on late maturing Pima if it does not appear to be changing in maturity. If and when cotton moves closer to the 6 NACB the start with the pretreatments of Ginstar or Ginstar plus ethephon.

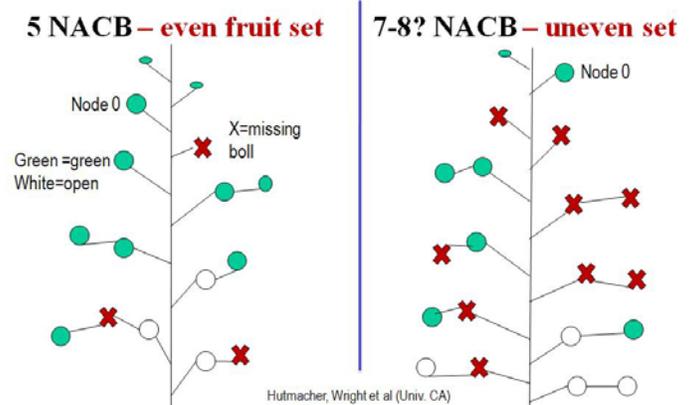
	Advantages	Disadvantages
Ginstar, Adios	Very effective, no odor, regrowth control	Crop rotation restrictions
Def/Folex+ ethephon	Very effective, warm & cool weather performance, whitefly control	Odor, spray restrictions
Sodium chlorate + paraquat Shark, ET	Less effective cheap, warm-cool weather performance Replacement for above and cheap, broadleaf control	Salts

Pay attention to the calendar, the weather, and consider how much risk you want to take in choosing a final harvest date. Consider these steps:

1. Keep an eye on predicted trends in the weather.
2. Consider your own experience with how many days of harvest will likely be needed from harvest of your first field to the last field.
3. Decide what you think is the last harvest date you consider to be an acceptable risk.
4. Count back about 21-28 days from those desired harvest dates, and start with your defoliation program on those dates no matter what maturity stage (what NACB) the crop is in.

Many CA growers are familiar with data sets from University Acala and Upland cotton defoliation trials in the 1980's and 1990's which suggest that, on the average, defoliations initiated at 8 NACB would result in yield losses of about 5% when compared with initiation at 4 NACB, while those initiated at 6 NACB would reduce yields 2 to 3%. However, those same studies acknowledged that when a very large percentage of the total crop consists of bolls on the upper 6 to 9 fruiting branches, losses from early defoliant applications can be substantially more (over 10%). Particularly under circumstances of mostly a mid-canopy and top-crop, the closer you can get to 4 to 6 NACB prior to first defoliant application, the lower the yield loss.

Crop Assessment for NACB use
NACB works well in some situations, less well in others



NACB Technique Defoliation Timing

- When 3 Nodes Above Cracked Boll (Pima)
- When 4 Nodes Above Cracked Boll (Upland)

Harvest Aid Considerations for Vigorous, Late- Maturing Fields in SJV

A. 6 NACB (40% OB) Pre-treatment of 3-6 oz of Ginstar/Adios treatments or 3-6 oz of Ginstar, Adios treatments plus a boll opener (more aggressive) Start at 8 NACB Pima. You may need to go even earlier on Pima if the crop is not maturing due to cold weather.

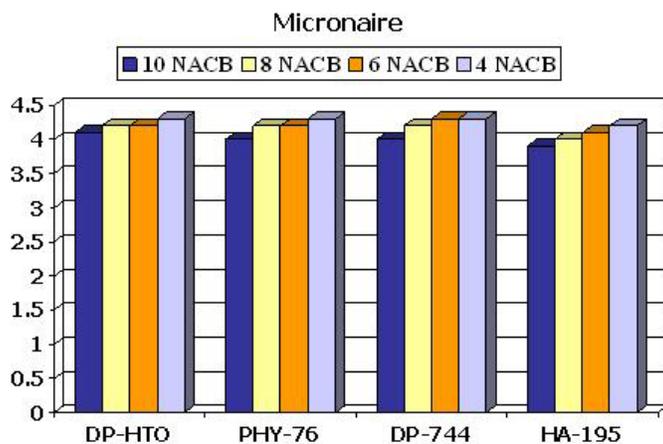
B. 3-4 NACB (50-65% OB)

Ginstar, Adios at 5-10 oz; in combination with a boll opener material (such as Prep, Cotton Quick, Finish); or Def/Folex or ET, Shark, plus a boll opener or Sodium Chlorate plus paraquat.

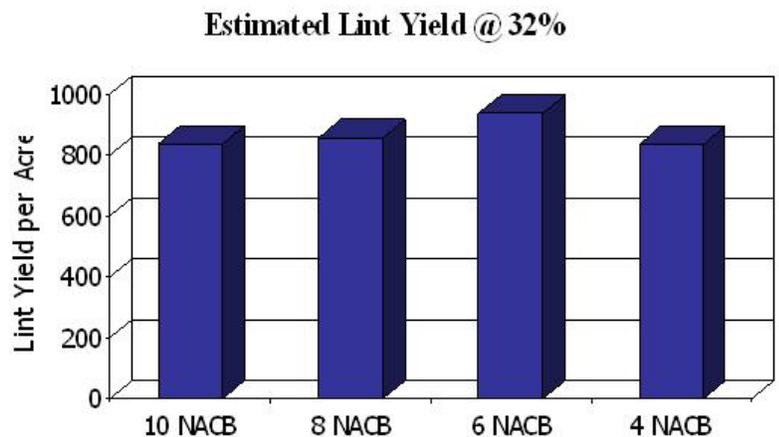
C. In many cases in both Acala & Pima, a final app. of chlorate & Paraquat, Shark, or ET will also be useful in desiccating remaining leaves & improving opening of last-remaining bolls. Shark or ET app. will also help dry remaining broadleaf weeds.

The following are UCCE studies conducted on Pima demonstrating yield and quality responses to different timings and varieties.

2003 Pima Variety by Timing Defoliation Study



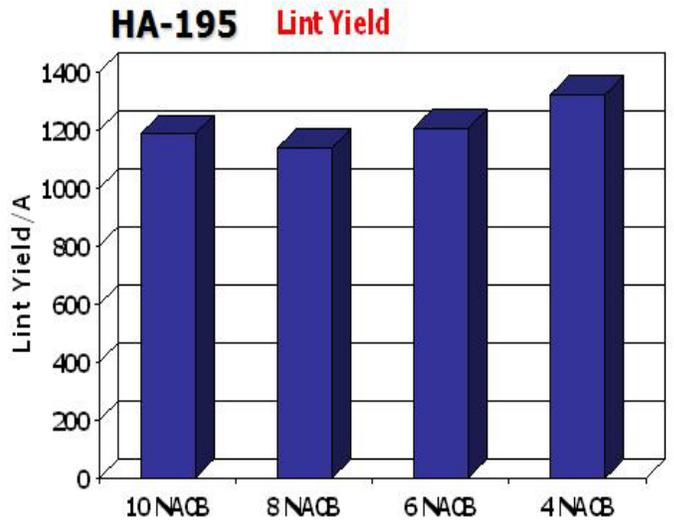
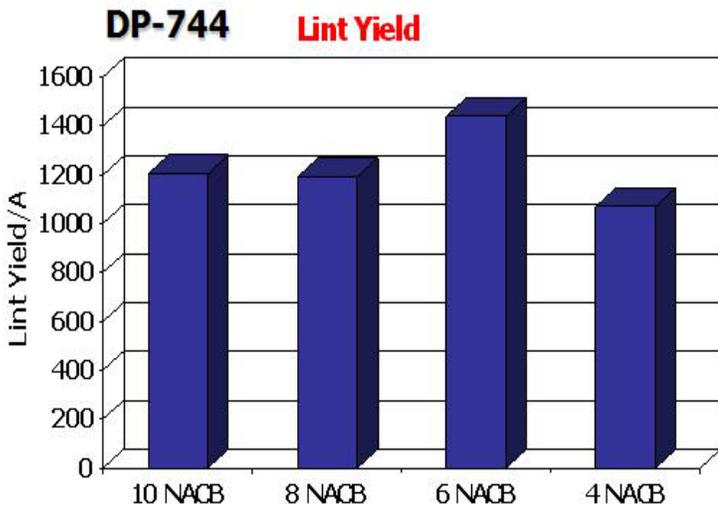
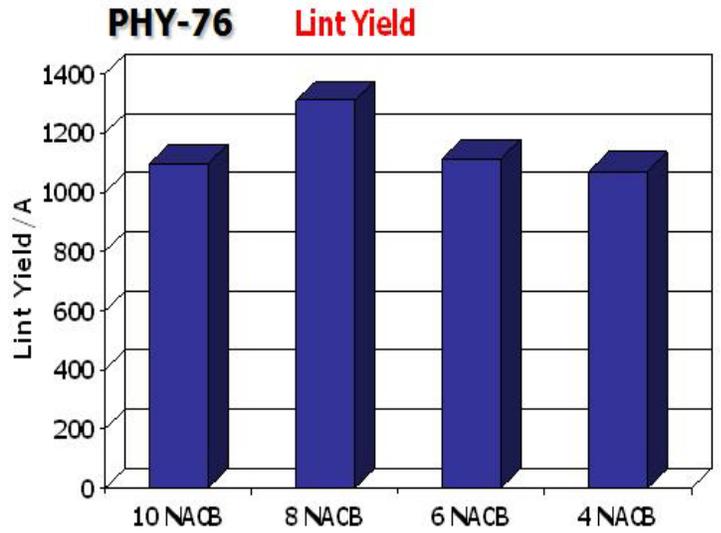
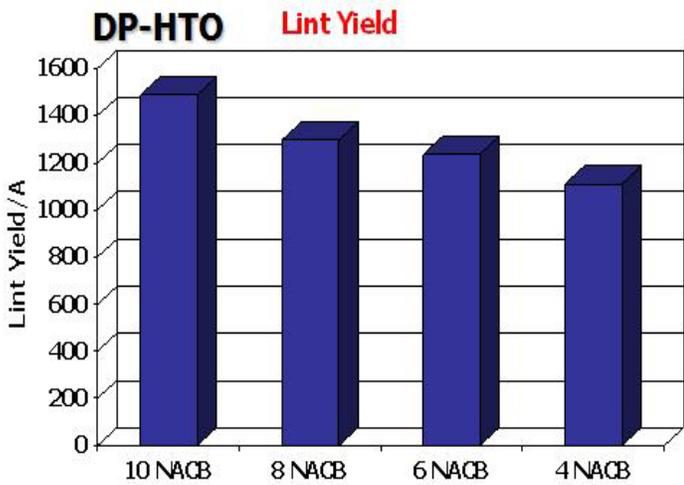
2005 Pima Variety Defoliation Timing PHY-800



- A. **Ginstar (13oz) + CottonQuik (1.75qts)**
- B. **Defol6 (3qts) + Gramoxone Inteon (10.7oz) + Induce (1.6pts)**

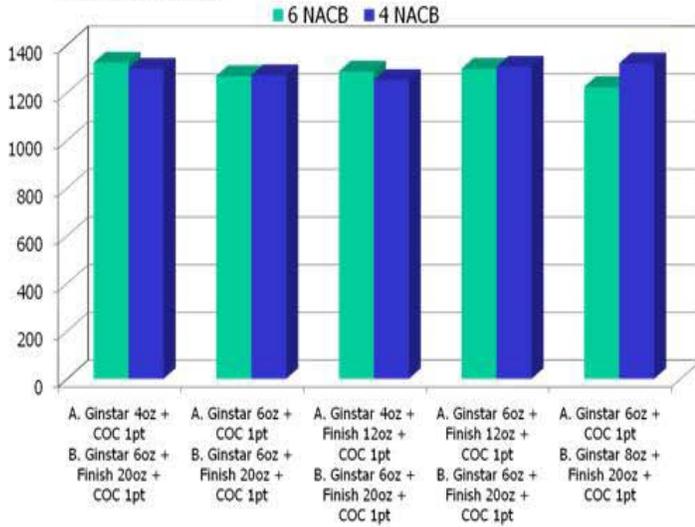
4 Varieties/Def. Pima Timing Studies-2003,2004 2 locations
1 Def. Timing Study, PHY-76 2003,2005

2003 Pima Variety by Timing Defoliation Study

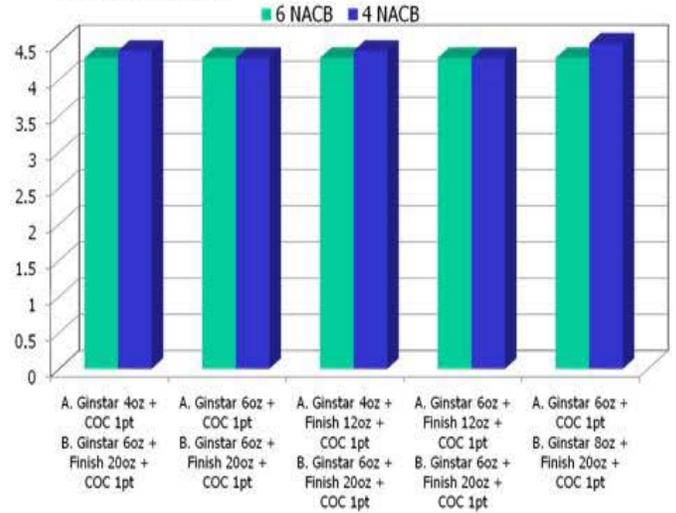


2008 Acala Defoliation – Ginstar Pretreatment Approach

Lint Yield

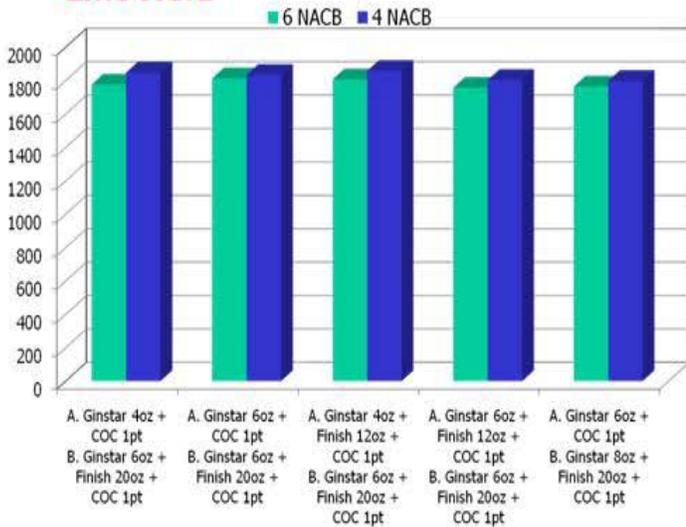


Micronaire



2009 Acala Defoliation – Ginstar Pretreatment Approach

Lint Yield



Micronaire

