Harvest Preparation

- Variety selection, fertility, pest management are critical
- Last but most important part of producing a cotton crop
- Scheduling for defoliation and harvest operation
- Removal of foliage
- Facilitate boll opening

Successful Defoliation Benefits

- Increased picker efficiency
- Elimination of trash in harvested s
- Faster drying of dew
- Increased picking hours per day
- Straightened lodged plants
- Reduced incidence of boll rot

Defoliants

- Catergorized as either ***Herbicidal*** or ***Hormonal***
- Hormonal Defoliants:
  - Increased ethylene synthesis
  - results in abscission zone formation in boll walls & leaf petioles
  - Bypass herbicidal injury, less likely to cause desiccation (leaf stick)
  - Freefall, Finish, First Pick & Prep

- Herbicidal-type Defoliants:
  - injures plant, plant produces ethylene, ethylene promotes abscission & leaf drop.
  - Applying at too high rates for the temp kills leaf too quickly before ethylene can be produced, results in desiccation (leaf stick)
  - Folex, Aim, Display & ET

Percent Open Bolls

- 60% open boll the most common recommendation for defoliant application
- Research in LA shows maximum yield obtained when defoliation occurs before 60% open bolls
- Cases of large fruiting “gaps” & large percentage of less mature bolls in upper region of plant, optimum defoliation timing may occur later than 70% open boll
- Research shows maximum yield can be achieved with application ranging from 42% to 81% open, depending on crop maturity & fruit distribution

Nodes Above Cracked Boll (NACB)

- Determined by:
  1. locating the uppermost first-position boll that is cracked open with visible lint
  2. counting the number of main-stem nodes to the uppermost harvestable boll
- NACB takes into account potential fruiting gaps
- Most recommendations call for defoliation at 4 NACB
- Low plant population & skip-row cotton: defoliated at 3 NACB
- Lower plant population usually means a later-maturing crop, with a significant portion of yield coming from outer-position bolls & bolls set on vegetative branches

Accumulated Heat Units After Cutout

- Recommends defoliation after accumulation of 850 heat units (DD60's) after cutout
- DD60=measure of accumulated heat needed for growth & development using a 60°F minimum
- Research in LA indicates defoliation timing may be greater than 850 heat units (1050 heat units) beyond a cutout of NAWF 4 (4 main-stem nodes above uppermost 1st position white flower)
- Requires making a determination of cutout

  - Daily DD60 = (daily high + daily low) / (2-60)
  - ***Example: 95 + 74 = 169/2 = 84.5 – 60 = <u>24.5 DD60's</u>***

Visual Inspection

- Grower should always visually inspect unopened bolls for maturity
- Mature Boll:
  - Difficult to slice in cross-section with a knife
  - Seeds have begun to form a tan/brown/black seed coat
- Once dark seed coat is formed, defoliation will not affect yield of those bolls adversely
- Bolls need 40-60 days to mature, depending on temperature
- Walk fields, examine bolls that can reasonably be expected to mature

Visual Inspection (cont.)

- Research in LA shows that on average cotton is harvested from a 12-14 node range on the plant

- 12 Node Rule:
  - Helps identify last harvestable boll & defoliation timing
  1. Identify lowest first position boll that is expected to be harvested
  2. Count up 12 nodes
  3. The boll present at that position is likely to contribute to yield

- In some cases, 14th node from bottom could be considered harvestable

- Bolls produced above that position are unlikely to contribute to yield

Harvest Scheduling

- Defoliating only the amount of acreage that can be harvested within the 12-day period following treatment greatly reduces exposure of lint to weathering loss & possible grade discounts

- Regrowth:
  - May need to be controlled more aggressively in delayed harvests
  - In severe cases, an additional application of desiccant may be required

- Defoliation may not always be warranted:
  - Cotton that is completely cutout will drop some leaves naturally
  - If harvested with care, defoliation not needed to eliminate leaf trash & prevent staining
  - Harvest an adequate sample to evaluate effects on ginning efficiency
  - Limited research in LA suggests that as little as 20% green leaf on plant can affect final grade
  - Proceed with caution when deciding to eliminate defoliation

Defoliation of Late-Maturing Varieties

- Initiate fruiting on higher nodes & cutout earlier

- More likely to continue to produce small, green bolls in top of plant
  - Value of waiting on these is questionable (lack of "stormproofness")
  - Temptation to wait on these to mature
  - May need to be picked with some green bolls, can be done without reducing yield

Spray Coverage

- Two most important factors: Carrier volume & nozzle selection
- Carrier Volume:
  - Defoliant activity increases as carrier volume increases
  - 15 GPA suggested, <10 GPA not recommended (increases need for 2nd app)
  - Higher water volume is more inconvenient, but cheapest thing added t the tank
- Nozzle Selection:
  - Drift-reduction nozzles control drift & placement of spray solution
  - As droplet size increases, coverage of leaf surfaces can decrease
  - Decreased activity at low operating pressures and/or low volumes
  - Flat Fan & Hollow Cone: excellent coverage/recommended for most apps
  - Always operate within nozzle manufacturer guidelines to obtain maximum coverage & minimal drift

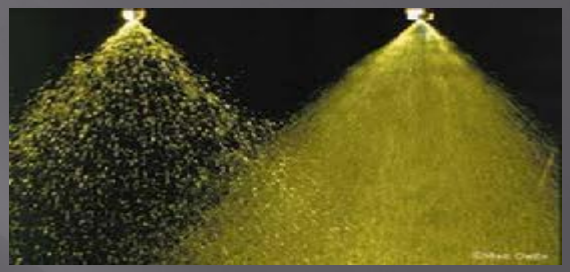

Table of Expected Activity of Various Harvest Aids

Material	Estimated minimum temperature	Expected activity			
		Mature leaves	Juvenile growth	Regrowth prevention	Boll opening
Def 6 / Folex 6 EC	60°F	Excellent	Fair	Poor	None
Thidiazuron	65°F	Excellent	Excellent	Excellent	None
Ginstar EC	60°F	Excellent	Excellent	Excellent	None
Aim EC	55°F	Good-Excellent	Excellent	Poor	None
ET	55°F	Good-Excellent	Excellent	Poor	None
Resource	55°F	Good-Excellent	Excellent	Poor	None
Blizzard	55°F	Good-Excellent	Excellent	Poor	None
Ethephon	60°F	Fair	Poor	Poor	Excellent
Finish 6 Pro	60°F	Excellent	Poor	Fair	Excellent
FirstPick	60°F	Good / Excellent	Poor	Poor-Fair	Excellent
Glyphosate	55°F	Fair	Fair	Excellent	None
Sodium Chlorate	55°F	Fair	Fair	Poor	None
Paraquat	55°F	Desiccation	Excellent	Poor	Fair

Rotational Crops Restrictions

- The following table summarizes harvest aid label restrictions for planting wheat following cotton

Label Restrictions for Planting Small Grains Following Application as a Harvest Aid in Cotton	
Material	Recrop interval following application for planting small grains
Def 6 / Folex 6 EC	None
Thidiazuron	14 days
Ginstar EC	1 month
Aim EC	None
ET	None
Blizzard	None
Resource	30 days
Ethephon	30 days
FirstPick	30 days
Finish 6 Pro	30 days
Glyphosate	None
Sodium Chlorate	None
Paraquat	None

Harvest Aid Materials

- No one harvest aid or tank mix may be appropriate for every situation

- Selection:
  - Based on prior experience & price
  - Consider environmental & crop conditions, yield potential & value of crop

- Refer to label for:
  - Use directions
  - Precautions
  - Notes
  - Appropriate rates
  - Adjuvant use
  - Pre-harvest intervals
  - Tank mixes allowed

Harvest Aids for Cotton

Product	Active Ingredient	Labeled Rate of Product per Application per Acre	Acres Treated by 1 Gallon or Pound Product	Remarks
Aim EC	carfentrazone-ethyl	0.25 – 1.6 oz	80 – 512	Can provide desiccation of morning glories and other broadleaf weeds. Use an adjuvant according to label directions. Maximum of 3.2 oz per season. Rainfall within 6 to 8 hrs after application may reduce efficacy. Leaf desiccation potential may increase with higher rates under high temperature. Low rate application ranging from 0.25 to 0.5 oz per acre is labeled as a Managed Maturity Application at 15% open boll being optimum.
ET	pyraflufen-ethyl	1.5 – 2.75 oz	47 – 85	Can provide desiccation of morning glories and other broadleaf weeds. Use an adjuvant according to label directions. Maximum of 5.5 oz per season. Rainfall within 1 hr after application may reduce efficacy. Leaf desiccation potential may increase with higher rates under high temperatures.
Resource	flumiclorac pentyl-ester	6 – 8 oz	21 – 32	Apply with 1 – 2 pt COC or methylated seed oil. Maximum of 14 oz per season. Rainfall within 1 hr of application may reduce efficacy.
Blizzard	fluthiacet-methyl	0.5 – 0.6 oz	256 – 213	Use an adjuvant according to label directions. Maximum of 1.25 oz per season. Rainfall within 1 hr after application may reduce efficacy.
Def 6 Folex 6 EC	tribufos	1.3 – 1.5 pt	5.3 – 6.1	Maximum of 1.5 pt per season. Rainfall within 1 hr after application may reduce efficacy.

Harvest Aids for Cotton

Product	Active Ingredient	Labeled Rate of Product per Application per Acre	Acres Treated by 1 Gallon or Pound Product	Remarks
FirstPick	ethephon + synergist	3 – 3.5 qt alone 1.5 - 2 qt tank-mix	1.1 – 1.3 2 - 2.67	Effective defoliation when applied alone to very mature cotton. Most consistent defoliation and regrowth inhibition observed with tank mixes. Maximum of 3.5 qts per season.
Finish 6 Pro	ethephon + cyclanilide	1.3 – 2.67 pt	3 – 6	Rainfall within 6 hrs after application may reduce efficacy.
Several brands	ethephon	1.3 – 2.67 pt	3 - 6.1	Maximum of 2 lb per season (2.67 pt of a 6 lb formulated material). Rainfall within 6 hr after application may reduce efficacy.

Harvest Aids for Cotton

Product	Active Ingredient	Labeled Rate of Product per Application per Acre	Acres Treated by 1 Gallon or Pound Product	Remarks
Several brands	glyphosate			For non-Roundup Ready cotton only. Use labeled rates for weed control.
Gramoxone Inteon	paraquat	See label		See label for specific application timings. Maximum of 2 pt per season. Rainfall within 15 min of application may reduce efficacy. Can provide desiccation of weeds.
Several brands	sodium chlorate	See label		Can provide desiccation of weeds.

Harvest Aids for Cotton

Product	Active Ingredient	Labeled Rate of Product per Application per Acre	Acres Treated by 1 Gallon or Pound Product	Remarks
Dropp SC Freefall SC	thidiazuron	1.6 – 6.4 oz 1.6 – 6.4 oz	40 – 80 40 – 80	Thidiazuron is temperature sensitive; either avoid or use higher rates in cooler conditions. Rainfall within 24 hrs after application may reduce efficacy.
Ginstar EC	thidiazuron + diuron	6.4 – 16 oz	10 – 40	Higher rates and tankmixes with other products and adjuvants can increase likelihood of desiccation under high temperatures. More active than thidiazuron alone under cooler conditions. Maximum of 16 oz per season. Rainfall within 12 hrs after application may reduce efficacy.

Display

- Display applied at 0.6 or 0.8 **oz**/A resulted in approx. 65% leaf defoliation 7 DAT but 75 to 85% defoliation at 20 DAT
- Defoliation level at both intervals was equal to that observed for Aim at 1 oz/A
- Display at 0.8 oz/A rate resulted in 38% leaf desiccation at 7 DAT when combined with Dropp and Prep compared with 13 and 24% for Aim at 0.5 **oz**/A and Def at 8 oz/A, respectively. Desiccation was not observed at 20 DAT.
- Vine desiccation at 14 DAT ranged from 81 to 85% and was equal for Display applied at 0.6, 0.8, or 1 **oz**/A.
- Display resulted in activity similar to that observed with other PPO type defoliants when applied under Louisiana growing conditions.