Crop Management for Defoliation

Plant Water Status

- If – plant is not water-stressed enough
  Then – defoliation may be more difficult and regrowth can occur.

- If – plant is too dry or water stressed
  Then – desiccation may take place where the leaves dry up quickly and stay on the plant “stuck” leaves

From “Crop Management for Defoliation”. J.S. Silvertooth. Publication AZ1213
Crop Management for Defoliation

Plant Water Status

- **Method 1.** Apply defoliant after twice the time has elapsed compared with late season irrigation interval.

  Not an exact method – dry down can vary
  - boll load
  - weather
  - soil water holding capacity
  - amount of water applied in last irrigation

From “Crop Management for Defoliation”. J.S. Silvertooth. Publication AZ1213
Crop Management for Defoliation

Plant Water Status

- Method 2. Estimate soil water depletion – target defoliation when approximately 70% of PAW is depleted.

Need to know:
- soil texture
- water holding capacity
- depth of soil profile filled with last irrigation
- ET rates (AZMET/Cotton Advisory)

From “Crop Management for Defoliation”. J.S. Silvertooth. Publication AZ1213
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Plant Water Status


Procedure:
- Locate top first position boll to be harvested
- Count nodes down the stem to the first cracked boll
- When 4 nodes separate bolls, defoliants can be applied for upland (3 nodes for Pima)

Crop Management for Defoliation

Nitrogen Fertility Status

- If plant is high in N fertility, then may have delay in maturity, more vigorous plant, and difficulty in defoliation with more potential for regrowth

- Limit N applications to no later than peak bloom

- Petiole nitrate-N concentrations greater than 3000 ppm can lead to defoliation problems

From “Crop Management for Defoliation”. J.S. Silvertooth. Publication AZ1213
Crop Management for Defoliation

Honeydew Deposits

- Large amounts of honeydew (from whiteflies or aphids) on the leaves can reduce uptake of defoliants by the plant
- Possible sticky cotton and “trashy” lint from poor defoliation can result
- Additional incentive to control insects

From “Crop Management for Defoliation”. J.S. Silvertooth. Publication AZ1213
Crop Management for Defoliation

Weather Conditions

- Warner conditions cause the plant to be more physiologically active – promotes defoliant activity

- Hot and dry conditions will accelerate crop dry-down – more desiccation from late application

- Defoliant rate based on temperature and HU accumulation

From “Crop Management for Defoliation”. J.S. Silvertooth. Publication AZ1213
## Weather Conditions

<table>
<thead>
<tr>
<th>Defoliant rate(^1)</th>
<th>HU accumulation (14 d following)</th>
<th>Daytime high temp.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low</td>
<td>&gt;300</td>
<td>90° F</td>
</tr>
<tr>
<td>Medium</td>
<td>200 – 300</td>
<td>80° F</td>
</tr>
<tr>
<td>High</td>
<td>&lt;200</td>
<td>70° F</td>
</tr>
</tbody>
</table>

\(^1\)Always read and follow manufacturer’s label

From “Crop Management for Defoliation”. J.S. Silvertooth. Publication AZ1213
PPO Herbicides/Defoliants

• New products to the defoliation market
• Class of chemistry/mode of action not new
  – Soybean and corn herbicides
  – Goal
  – Chateau
  – Aim
  – ET
  – Resource
PPO Herbicides/Defoliants

- Inhibit protoporphyrinogen oxidase enzyme
- Pigment synthesis pathway
- Inhibition starts a reaction that causes cell membrane to leak
- Leaking cell membranes rapidly dry and disintegrate
Symptoms start with occurrence of a “water soaked” appearance within hours.

Day 1 to 3 dessication of the leaf tissue occurs (often bronze colored).

Some products will form a abscission layer at the base of the leaf petiole.

**PPO Herbicides/Defoliants**
PPO Defoliants

- Used as a stand-alone product
  - Contact material
  - Expect 20 to 50% defoliation
  - Multiple applications needed for satisfactory results
  - High rates/high temperatures can result in leaf stick
PPO Defoliants (Stand-alone)
PPO Defoliants

- Used as a tank mix
  - Visible symptoms more rapid but defoliation not greatly increased at 7 DAT.
  - Can see increase in overall performance
PPO Defoliants (tank mix)

![Bar chart showing defoliation percentage over time for different treatments.](chart.png)
PPO Defoliants

• Used as a follow-up treatment
  – Logical fit in market with other contacts (paraquat, chlorate)
  – Has provided statistically better “clean up” than paraquat or chlorate. However economics is an issue (how much defoliation is enough)
PPO Defoliants (follow-up)
Cotton Defoliation

- Evaluating defoliation timing based on heat unit accumulation – effect on fiber quality and yield
Yield

Hence, the graph illustrates the yield (lbs lint/A) for different HU Accumulation thresholds: 650, 750, 850, 950, and 1050. The thresholds 'No threshold', '95 threshold', and '90 threshold' are shown on the x-axis.

The yield values are represented on the y-axis, which ranges from 0 to 1400 lbs lint/A. The colors of the bars correspond to the HU Accumulation levels, indicating the yield for each threshold.