COTMAN OVERVIEW

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Nothing magic about COTMAN

- Does not predict yield
- Does not give “Cookbook” recipes for production
- Is not a cure all for cotton production problems
COTMAN Components

ממשלה SQUAREMAN

Monitors crop from 1st squares to 1st flowers

BOLLMAN (NAWF)

Monitors crop from 1st flowers to cutout
COTMAN Components

**SQUAREMAN**
*Before 1\textsuperscript{st} Flowers*
- Fruit retention
- Pace of crop growth
- Pre-flower Stress

**BOLLMAN**
*After 1\textsuperscript{st} flowers*
- Boll Loading Stress
- Crop termination
- Insecticides
- Irrigation
- Defoliation
Plant Development

COTMAN is based on the following assumptions:

- Planting to 1st squares in 35 days
Squaring Node Development

Every 2.7 days a new sympodial node on the main-stem.
Flowers at 60 days after planting

1st Squares to 1st flowers in 25 days
From 1st Squares to 1st Flowers

- Squaring node every 2.7 days
- 9.25 squaring nodes at the time of the first flowers
After first flowers, boll loading stress will reduce the pace of squaring node accumulation.
Flowers will *move up* the plant.
Crop Carrying Capacity

The boll load that slows terminal growth and the production of new squares to zero.
1st Flowers to Cutout

- Physiological Cutout at 80 DAP
- 5 squaring nodes above the first position white flowers (NAWF = 5)
Target Development Curve

Days after planting

Squaring Nodes

Tar
aget Develo
g
Tar
aget Develo
g

9
10
6
7
8
4
5
2
3
1
1
0

30 40 50 60 70 80 90

60
70
80
90
Target Development Curve

Days After Planting

NAFS/NAWF

0 1 2 3 4 5 6 7 8 9 10

30 40 50 60 70 80 90
Crop growth VS. TDC

- Shows growth status of your crop compared to a STANDARD
- Identify stress
- Use crop monitoring to improve decision-making
Field Setup (1 time per season)

FIELD SETUP
- Field Name
- Acreage
- Planting Date
- Cultivar
- Row Spacing
- Re-plant (Y/N)
- FN
- Stand count
SQUAREMAN Data

- Start at PHS
  (Usually node 5-6).
- Collect weekly.
- 4 areas/field.

Plant Height

SQUAREMAP
SQUAREMAN Crop Growth Curve: Early Development

Days from Planting

Squaring Nodes

Target
Actual

0 2.5 5 7.5 10 12.5
0 30 40 50 60 70 80 90
SQUAREMAN Crop Growth Curve: Flat Slope

Days from Planting

Squaring Nodes

- Actual
- Target
SQUAREMAN Crop Growth Curve: Steep Slope after Slow Start

![Graph showing crop growth over days from planting](image-url)

**Axes:**
- Y-axis: Squaring Nodes
- X-axis: Days from Planting

**Legend:**
- **Target**
- **Actual**

**Data Points:**
- Squaring Nodes:
  - Node 1: 10 ft
  - Node 2: 7.5 ft
  - Max Node: 30 ft
  - Target Node: 40 ft
  - Actual Node: 50 ft

**Calibration:**
- 0 to 12.5 on the Y-axis
- 30 to 90 on the X-axis
Maturity

Key to better end-of-season management is an accurate in-season measure of maturity.
Standard measures of maturity

- % open bolls
- NACB

Require us to “guess” about which boll population is the last one we can pick
COTMAN removes “GUESSING” from end-of-season management

Defines the **Last Effective** boll population:

- % boll retention
- Contribution to yield
- Plant development
- Weather data
Boll Retention

NAWF = 5

% Retention, 1st Position Bolls
Flower Power

NAWF = 5

Seedcotton (lb)/100 Flowers
Contribution of Lint Yield Above NAWF = 5, 4, and 3
Texas Upper Gulf Coast

2005-06, Irrigated, 1500 lbs lint
2005, Dryland, 750 lbs lint
BOLLMAN Data (NAWF)

- Collected once per week
- Start at first flower
- Count # of nodes above white flower.
- Get 5 counts from 1 row and 5 from adjacent row.
- Repeat at 4 locations in the field.
BOLLMAN Data (NAWF)

- Stop counting at the last unfurled leaf in the plant terminal. (BE CONSISTENT)

- Collect NAWF data until cutout (NAWF = 5).
Use COTMAN to identify **cutout**:

- Physiological (Crop)
- Seasonal (Weather)
Cutout

Physiological cutout

- Cutout based on crop development (carrying capacity) - No end-of-season weather restraints
- \( \text{NAWF} = 5 \) prior to latest possible cutout date. (Bourland et al. 1992)
- Cutout at 80 DAP.
Cutout Con’t.

Seasonal cutout:

- Natural cutout restricted due to weather
- Crop development limited by end-of-season weather constraints (Zhang et al. 1994).
- NAWF = 5 AFTER the latest possible cutout date
Cutout

• From NAWF=5
  – Heat unit calculations begin
    • Historical weather file
    • Actual or current
Are Bolls Safe from Insect Attack?

350 HU’s after flower:
- Bollworm
- Tobacco Budworm
- Boll weevil
- Lygus species

450 HU’s for:
- Stink Bugs

Are Bolls Safe from Insect Attack?

500-550 HU’s after flower:
- Fall Armyworm

650 HU’s for:
- Defoliating insects

COTMAN (End-of-Season)

- NAWF = 5 is the last effective boll population (Weather considerations)
- 350 HU’s and bolls resist insect penetration
- Cutout + 350 HU’s = no more spraying
End of Season Management
(Crop Susceptibility to fruit feeding insects)

- Identify last effective boll population. (NAWF)
- Track heat unit accumulation.
- Stop spraying for:
  - Bollworm
  - Tobacco Budworm
  - Boll weevil
  - Plant Bugs
End of Season Management
(Irrigation)

- Identify last effective boll population. (NAWF)
- Track heat unit accumulation.

- Terminate irrigation.
  - 350-400 DD60’s for North Arkansas
  - 400-450 DD60’s for Central Arkansas
  - 450-500 DD60’s for South Arkansas
End of Season Management (Defoliation)

- Identify last effective boll population. (NAWF)
- Track heat unit accumulation.
- 850 DD60’s start evaluating defoliation.
On-Target Fruit Development Rate, Physiological Cutout

Days from Planting

Squaring Nodes

Latest Possible Cutout

Target Actual

TDC 5
SQUAREMAN on Target, Rapid Decline in Nodes-Above-White-Flower
Slow Square Development, Low Nodes at First Flower, Delayed Cutout

Days from Planting

Squaring Nodes

Days from Planting

Latest Possible Cutout

Target Actual
## Overall Average – Insecticide Reduction Effects

<table>
<thead>
<tr>
<th>COTMAN</th>
<th>Full-Season</th>
<th>Difference</th>
<th>Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>837.7</td>
<td>839.6</td>
<td>1.90</td>
<td>19.32</td>
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</table>
Time Requirements

- Approximately 20 minutes per field
- Reduce time for insect scouts
- Two different crews
COTMAN.TAMU.EDU
Thank You
COTTON INCORPORATED
FOR AMERICA'S COTTON GROWERS