





The First
40
DaysSM

The Most Critical Period In Cotton Production

Expert Recommendations of
Best Management Practices
For an Efficient, Cost-Effective
Cotton Production System
through

Fruiting
to **F**inishSM

**National
Cotton
Council**
OF AMERICA

The
**Cotton
Foundation**



To bring focus to selected **Best Management Practices** in the new, contemporary cotton production systems by addressing the changing pest spectrum, season-long pest management systems, and overall plant health and earliness, with the ultimate goal of high yield and superior quality fiber.

BMPs developed by a multi-discipline, multi-state congress of research and Extension agronomists, pathologists/nematologists, entomologists, physiologists, weed scientists, economists, and crop consultants in *The First Forty Days*[™] and *Fruiting to Finish*[™] Workshops

BMPs

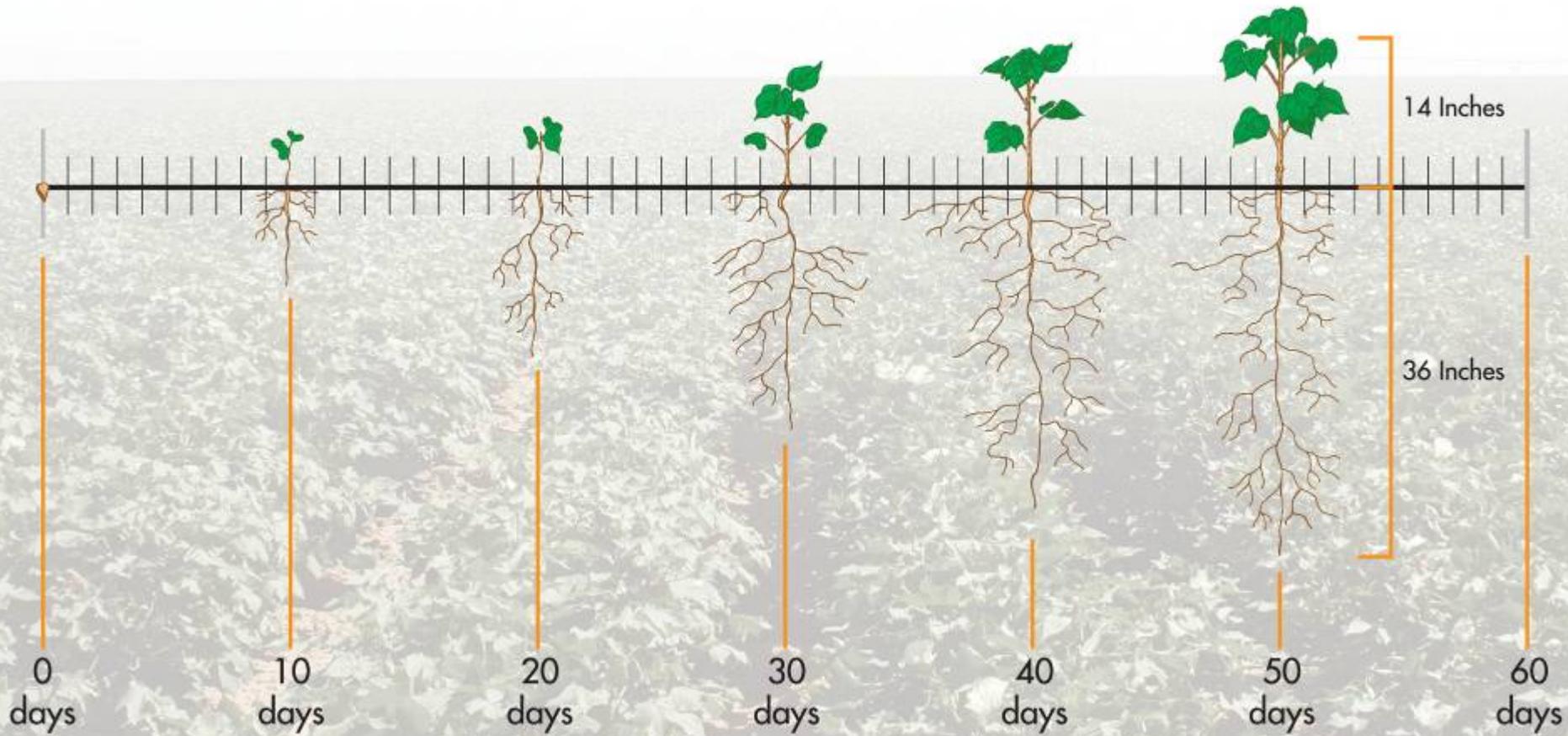


Best Management Practices (BMPs)
Achieving an optimum crop
40 days after planting contributes to an efficient season-long crop management system, including weed control, plant growth regulation, arthropod pest management, fertility, and harvest aid management. The ultimate goal of BMPs is a holistic and integrated, cost-effective crop management system that optimizes yield and fiber quality.

Crop Production/Protection Input
Selection and Quality.

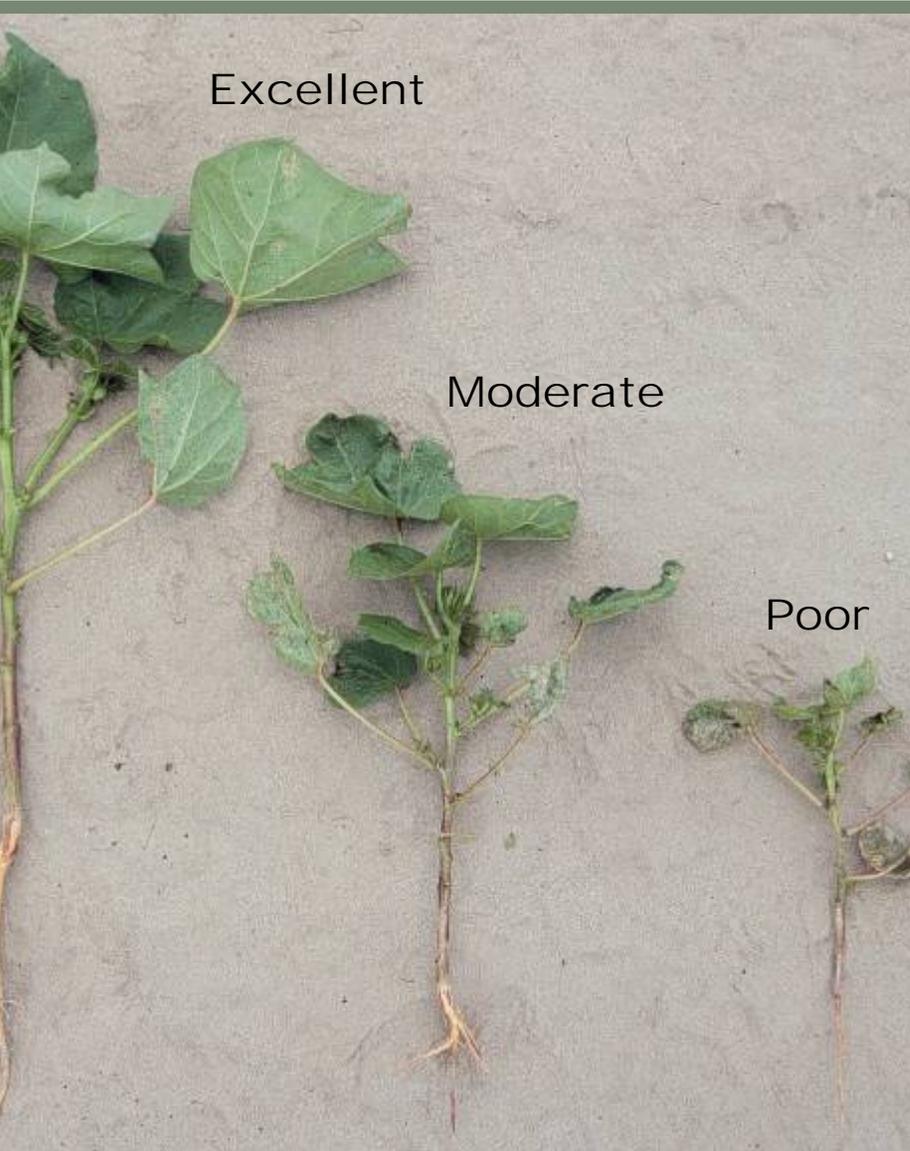
Consider using only proven products from suppliers offering customer service, product support, and industry stewardship.

Early Season Cotton Development



Note: Image source credit to Derrick M. Oosterhuis Ph.D. University of Arkansas

Insect Pest



Insect Pest Management –
Early Season

Choose an at-planting systemic insecticide capable of providing long residual efficacy, based on the field/farm history and experience of the pest manager.

- Evaluate systemic inputs
- Avoid pesticide “convenience application” programs
- Eliminate host plants and insect breeding sites
- Keep seedbeds free of all green plant tissue
- Use proper scouting techniques
- The length of control

Variety & Seed



Variety & Seed Selection

Choose varieties with the genetic potential for higher yield and fiber quality.

Choose varieties with the genetic potential to produce excellent technical fiber.

Plant more than one variety; consider specific traits and crop maturity after yield and quality.

- Consider planting three or four varieties to determine which cultivars and combinations of traits perform the best on a given farm.
- The environment can affect the efficiency of the Bt protein production in varieties.

Select the highest quality seed for planting.

Seedbed Prep



Seedbed Preparation –
Emergence and Plant Population
**Plant uniformly spaced seeds
(drilled or hill-drop pattern) with good
seed-to-soil contact, warm soil
temperatures of at least 65° F, and
adequate soil moisture.**

- Increase the seeding rate in cool soil
- Minimum plant population – 30,000/A
- Consider the plant's architecture
- Soil and air temperatures should be optimum
- Ensure soil moisture is optimum
- Plant higher-quality seed first in cooler soils
- Plant to a depth of 1 to 1 1/2 inches
- Create a pest-free seedbed environment
- Practice farmscape vegetation management.

NOTE: Replanting is discouraged unless there is a significant loss of stand. A plant population of one plant per foot would be more desirable than replanting later in the planting season.

Seedling Disease



Seedling Disease Management
The key to minimizing the impact of seedling disease is to limit the window of vulnerability to pathogen infections by planting into warm, moist soils, which will speed up germination, emergence, and early plant development.

For cotton that must be planted in cooler (< 65° F) soil, or the five-day forecast is for cool weather with a high probability of rain, apply an in-furrow fungicide with active ingredients against both *Pythium* spp. and *Rhizoctonia solani*.

Weed Management



Weed Management

Maintain a totally weed-free crop, using all available tools — including residual herbicides; glyphosate, herbicides with modes of action different from glyphosate; and herbicide-tolerant traits — to minimize competition, improve yield, and preserve quality.

Treat weeds in a timely manner and eliminate weed competition for six to nine weeks after planting.

- Carefully plan the weed control program for the entire farm prior to planting
- Start the season clean and weed-free
- Understand emergence patterns of your weed spectrum
- Stop universal reliance on glyphosate
- Rotate chemistries and engage multiple modes of action
- Use appropriate rates
- Consider use of residual herbicides

Weed Management



Weed Management cont.

- Keep a field record
- Manage the seed bank
- Sanitize equipment
- Recognize that the weed spectrum may require residual herbicides
- Spray by weed size, not by crop stage
- Base herbicide applications on the presence of weeds and the appropriate stage of growth
- Manage possible weed flushes
- Be aware of tankmix antagonism
- Use proper nozzles and spray
- At defoliation, kill or desiccate weeds that reduce harvest efficiency or contribute to the seed bank

Nematode Management



Nematode Management

Use soil sampling techniques to verify the presence of nematodes and determine population levels. Apply a nematicide as recommended by state Extension guidelines and consider rotating crops; under extreme nematode pressure, use a fumigant.

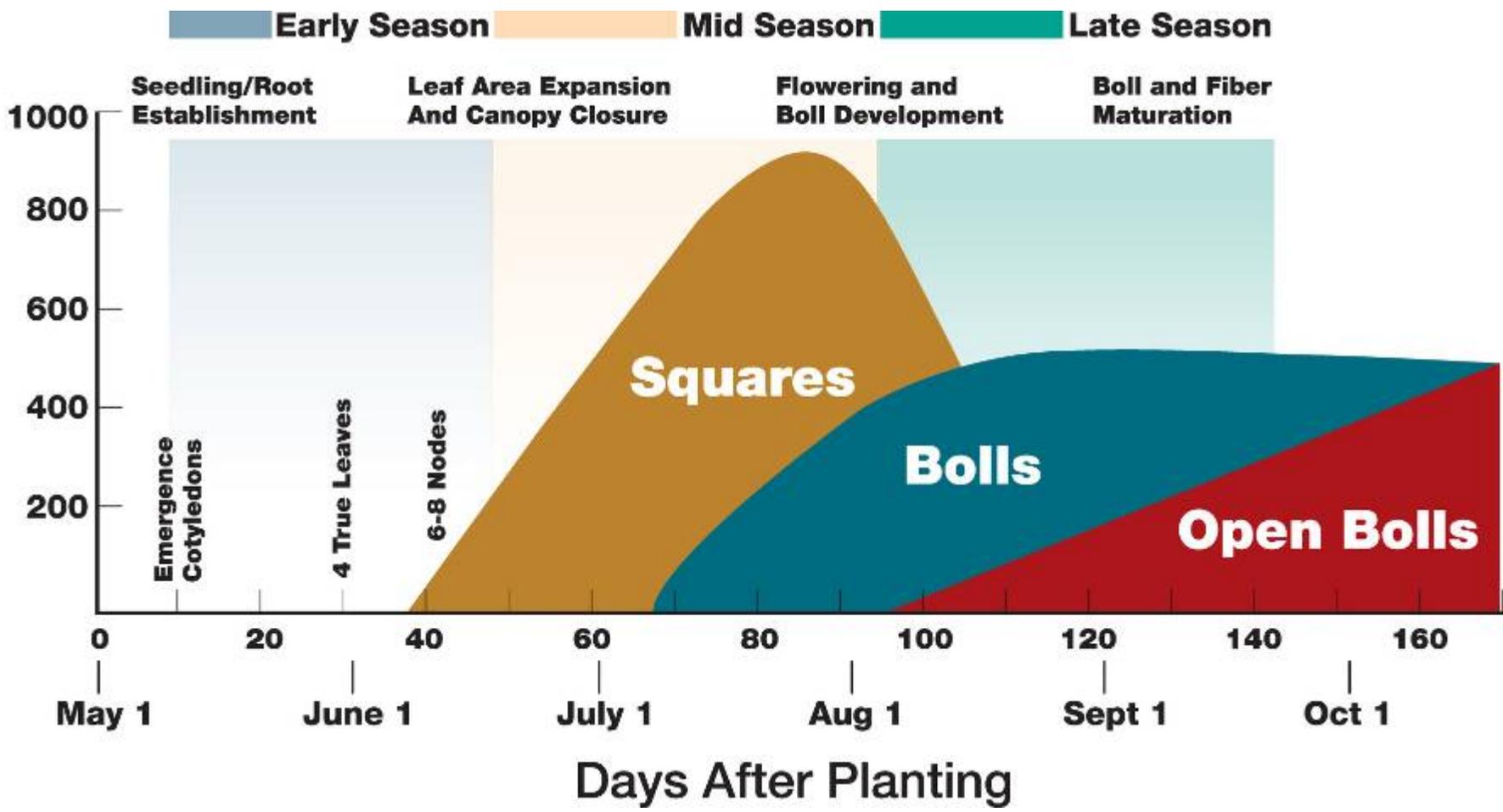
- Plant tolerant or resistant cotton cultivars
- Use crop rotations
- Root health is critical to minimize the impact of nematodes



Maintaining Yield and Fiber Quality
The optimum cotton crop during the
Fruiting to Finish period:

- Square retention
- Boll distribution
- Plant height
- Senescence

Numbers/acre (X1000)



Note: Image source credit to Derrick M. Oosterhuis Ph.D. University of Arkansas

Fertility



Fertility

Know the soil pH and level of residual nutrients. Establish a base level of residual nutrients in the soil, applying sound sampling techniques for nitrogen, phosphorus, potassium, and trace elements, and update at least every two years.

- Sampling depths up to six inches
- A deeper sampling depth is required for nitrogen

Follow established fertility recommendations based on local soil types and soil analysis ...

“Don’t guess, soil test!”

Fertility



Fertility cont.

Avoid the temptation to use foliar application of fertilizers as a part of a planned fertility program. Use of foliar fertilizer materials by small plants is insignificant, because of limited leaf area for absorption. Use of foliar fertilization on large plants seldom will satisfy nutrient needs of the plant. Most if not all nutrients that will be used by the crop can only be supplied by bulk dry or liquid materials.

- Availability of most nutrients depends on soil pH
- Use split applications of nitrogen for best crop utilization
- Fast-fruiting varieties show potassium deficiencies more readily
- Analyze animal-manure fertilizer to match crop needs by field
- Nitrogen and potassium uptake is best with healthy roots
- Foliar-applied nutrients rarely correct deficiencies and generally are much less cost-effective than soil-applied fertilizers

Insect Pest Management



Insect Pest Management

Recognize the potential relationship and contribution of alternate crops and native hosts to pest and natural enemy populations in cotton fields. Manage vegetative growth around cotton fields and consider crops adjacent to cotton fields as sources for insect pests and natural predators.

- Manage insects in alternate weed hosts and crop refuse
- Match the scouting protocols to the technology and region
- Maintain traps to track flights and presence of moths and potential Heliothine problems.

Insect Pest Management



Insect Pest Management cont.

Action thresholds (to initiate treatment) change during the season and depend on the interactions of crop development stages, yield potential, insect pest complex, and recommended products. Refer to action threshold recommendations published by your state's Cooperative Extension Service.

- Use insecticides at recommended rates on specific target stages before economic injury has occurred
- Product misuse may induce pests such as spider mites and cotton aphids
- Insecticidal traits (Bt) in varieties do not perform equally in varying environments
- Bollworm usually is a primary pest in both Bt and non-Bt cotton

Disease Management



Disease Management

There are few disease management options for these diseases during the *Fruiting to Finish* period. Implementing proper BMPs during The First 40 Days is important in reducing disease incidence and severity. Healthy, vigorous plants will sustain lower disease losses.

During *Fruiting to Finish*, management of fertility – particularly adequate availability of potassium and avoiding excessive nitrogen– and irrigation are the best means to avoid disease losses. DO NOT harvest diseased fields for seed.

Water & Irrigation



Water Management and Irrigation
Avoidance of water-deficit stress beginning at first square is critical in establishing adequate plant structure to facilitate yield goals, especially with early-maturing varieties grown in northern locations with a limited growing season. Begin early bloom at or near field capacity and maintain adequate water supplies at least through cutout by constantly monitoring crop water use and soil moisture conditions, and by irrigating before the crop stresses.

Water & Irrigation



Water Management and Irrigation cont.

Monitor plant growth, fruiting, and soil moisture to ensure adequate moisture from early squaring to avoid plant stress. Initiate irrigation prior to first square, if needed.

- Node development is the best evaluation
- The fruiting period is critical for water
- Moisture should be at or near field capacity at first bloom
- Terminate irrigation when adequate water is available at 500 heat units past cutout
- Check out state Extension guidelines to assist in irrigation planning and scheduling.

PGR



Plant Growth Regulation

Beginning at the matchhead square stage, closely monitor plant growth, environmental conditions, and reproductive load; use a PGR as a management tool to restrict rank growth, promote earliness, increase harvest efficiency, and facilitate the deposition of other crop protection products.

Start PGR applications at 9 to 10 nodes – with a height-to-node ratio of no less than 2 on cotton that’s stress-free and well-fertilized.

On larger cotton that’s closer to bloom, base PGR applications on internode length. The threshold for the PGR application would be an internode length of 2.5 inches or more on the longest of the third or fourth internode from the terminal.

PGR



Plant Growth Regulation cont.

Use variable rates to optimize crop performance.

- PGR applications should be made ahead of the growth
- Monitor the crop for growth, square size, and fruit retention
- Based on the environment
- Use the height-to-node ratio or internode length
- Avoid high rates of any PGR prior to blooming
- PGR applications during flowering stages require higher rates
- Applications after cutout are not recommended.
- Significant varietal differences can exist for vegetative growth
- Use a conservative application on moisture-stressed or dryland cotton
- First position square retention of 70 to 80 percent during the season is optimum
- Proper management of rank growth positively affects fiber quality of a crop

Harvest



Harvest Management

Defoliate as early as possible by balancing the realistic yield potential of the crop with the need to preserve quality, schedule harvest equipment, and minimize losses from weathering.

To determine the correct timing for defoliation, dissect the uppermost harvestable bolls and check seeds for maturity. Mature seeds feature dark or black seed coats and would indicate that the crop is ready for defoliation.

Gauge crop maturity to schedule harvest aids timing to: Achieve the best defoliation possible by using a combination of herbicidal and hormonal-type defoliant, coupled with a boll opener, for a quick, clean harvest that preserves both lint yield and quality. Select chemistries and rates appropriate to the local field environment and crop condition.

Post-harvest, proper and effective turn-row management protects yield and fiber quality.

Application Technology



Pesticide Applications and Spray Technology

For insecticides, harvest aids, and some herbicides, thorough spray coverage is of critical importance; applications should be made with a minimum of 10 GPA by ground and 5 GPA by air, using appropriate nozzles.

For glyphosate and other herbicides that do not require thorough spray coverage, drift-reducing nozzles should be used to minimize off-target movement.

- Use application-specific nozzles, pressure, and spray volume for uniform pattern (*follow manufacturer specifications*)
- Reduce ground speed to ensure better coverage
- Don't spray when wind is greater than 10 mph
- Monitor wind direction
- Pay attention to weather patterns

Acknowledgements



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Representation from across the Cotton Belt



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