When to Terminate Irrigation in Cotton

- Deciding when to terminate irrigation can affect final yields as well as efficiencies in cotton production.
- Proper irrigation termination in cotton relies on observations of plant developmental stage, not by referring to calendar date.
- Irrigation termination decisions should be made on a field-by-field basis taking into account: plant developmental stage, soil type and soil moisture status, the type of irrigation system used, geography, boll load and crop health.
- Applying too much water late in the season may lead to problems such as unnecessary vegetative growth, delays in boll maturity, and can even reduce defoliant efficacy.

General Termination Guidelines

Proper irrigation termination in cotton relies on observations of plant developmental stage (usually boll developmental stage), with some recommendations coordinating plant developmental stage with accumulated heat units. The water holding capacity of the soil (soil type) and the type of irrigation system used will also impact when irrigation should be terminated. In some cases, irrigation may be terminated earlier on soils with a high water holding capacity because sufficient water may remain in the soil to bring the crop through maturity.

Generally, furrow irrigation systems deliver 2 to 3 inches of water per acre each time a field is watered and are more likely to fill the soil to field capacity with an irrigation. Pivot and drip irrigation systems do not deliver as much water per application as furrow irrigation. Application amounts may be substantially less depending on well capacity. Irrigation may need to be terminated later when pivot or drip irrigation is used as less water is applied per application.

Termination Recommendations

Boll developmental stage. Generally, furrow irrigation termination is recommended when cotton reaches first cracked boll. If termination of furrow irrigation occurs earlier, the uppermost bolls may have inconsistent development. The increased moisture associated with continuing to irrigate after first cracked boll can lead to boll rot and hardlock.\(^1,2\)

Because pivot irrigation systems deliver less water per application, pivot irrigation can be terminated about 10 days after first cracked boll. Applying water from an overhead system after bolls have opened can lead to boll rot and hardlock, but lack of adequate water can be more damaging, potentially leading to reduced weight and fiber quality in the uppermost bolls, which can translate into yield loss.\(^1,2\)

Heat unit accumulation after cutout. Another recommendation is to terminate furrow irrigation when heat units have accumulated to a specified amount after cutout. Cutout occurs when the number of nodes above the uppermost first position white flower is equal to five (NAWF = 5). The amount of accumulated heat units after cutout needed before terminating irrigation may vary between 350 to 500 depending on the geography, soil type, irrigation system, boll load, and when irrigation was initiated.\(^3\)

A research study on furrow and subsurface drip irrigation concluded that delaying irrigation termination until 380 heat units past cutout resulted in substantial yield increases over irrigation termination at 0 and 190 heat units past cutout.\(^4\) The results concluded that delaying irrigation termination until well past cutout is important for promoting higher yields for both irrigation systems.

Late-Season irrigation Precautions

Applying a small amount of additional moisture after the recommended termination period may help small bolls mature; however, applying too much water may cause problems such as unnecessary vegetative growth, delays in boll maturity, and can even reduce defoliant efficacy. Too much moisture can also increase pest pressure and the potential for boll rot. The additional expense of late-season irrigation may not be realized in final yield.

These termination guidelines are general. Irrigation termination decisions should be made on a field-by-field basis taking into account: plant developmental stage, soil type and soil moisture status, the type of irrigation system used, geography, boll load, and crop health.

Sources


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