Cotton Crop Monitoring: Very Early Evaluation

Cooperative Extension Service
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Guide A-220

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Cotton monitoring using selected plant measurements to follow crop and fruit growth and development has become a widely accepted technique throughout the United States Cotton Belt. Crop monitoring is an excellent management tool. It allows growers to follow fruiting progress during squaring, follow flowering in relation to development of nodes along the main stem, and assist with end-of-season management decisions.

This is the first in a series pertaining to cotton crop monitoring. The series is designed to clarify crop monitoring terminology, techniques, and interpretation.*

COTYLEDON

Cotyledons are seed leaves (or embryonic leaves) that store oil, protein, and minerals for germination and early seedling growth. The cotyledons perform the plant's photosynthesis after germination and before true leaves develop. As the first true leaf and subsequent leaves develop, the contribution of cotyledons diminishes. They eventually abscise from the cotton plant.

Early damage to cotyledons (such as from herbicides, thrips, or blowing sand) can reduce seedling vigor and growth.

HYPOCOTYL

The hypocotyl is the portion of a seedling below the cotyledons but above the roots. The hypocotyl is important to cotton emergence because it determines the cotyledons' height above the soil, an indication of crop vigor.

TRUE LEAF

The first true leaf with a petiole (the stem that supports the leaf blade) and all true leaves develop above the cotyledons. Thus, true leaves include both leaves on the main stem and on branches (or *sympodial* leaves).

The first true leaf is an important stage in cotton crop monitoring and evaluation. Its appearance provides producers with a tool to aid in making management decisions such as when to irrigate during this developmental stage.

GERMINATION

Germination is seed growth that results in the seed coat rupturing as the embryonic root or *radicle* pushes through the pointed end of the seed. During germination, the seed swells, absorbing water first through the basal end of the seed and eventually through the whole seed coat. Germination also involves absorption of oxygen, activation of enzymes, digestion of seed reserves, respiration, conversion of nutrients from the soil and photosynthesis, and initiation of cell division and enlargement.

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* To obtain NMSU publications on cotton emergence or other topics, contact the Department of Agricultural Communications, Bulletin Office, P.O. Box 30003, MSC 3AI, New Mexico State University, Las Cruces, NM 88003, or phone (505) 646-2701. To download publications form the World Wide Web, point your browser to http://www.cahe.nmsu.edu/references/jfagproducers.html

EMERGENCE

Generally, emergence is the appearance of cotyledons above the soil surface. This developmental stage is closely correlated with climatic factors. Producers base many subsequent management decisions (such as whether or not to replant) on emergence.

Agronomists generally refer to a crop as having emerged when 50 percent of the planted seed has emerged.

The first structure to emerge is the hypocotyl, which emerges in an arched shape. As the hypocotyl straightens, the cotyledons are pulled from the soil and subsequently unfold and expand.

In New Mexico, hill-dropping (or planting three seeds together) is gaining popularity as a strategy for increasing emergence. It's based on the premise that multiple seedlings exert more upward pressure on the soil than a single seedling.

STAND

Stand generally refers to the number of plants per acre. The quality of a stand depends not only on the number of plants per acre, but also on the uniformity of plant distribution, length of skips or areas where no seeds emerge, and overall vigor of the seedlings.

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