

Cotton Crop Monitoring: Terminology

Cooperative Extension Service
College of Agriculture and
Home Economics



Guide A-222

Shane Ball, Extension Agronomy Specialist

This publication is scheduled to be updated and reissued 7/03.

Abscission: Loss of a plant structure from an abscission zone (for example, when a plant loses a leaf).

Abscission zone: Area at the base of a leaf petiole or peduncle of a square or boll where the plant structure separates during abscission.

Anthesis: Developmental stage of a flower when fertilization takes place, generally associated with white flowers.

Average internode length: Height (length) of the main stem divided by the number of main-stem nodes.

Axil: The upper angle between the petiole of a leaf and the stem from which it grows.

Boll count: Average number of bolls per sampled unit.

Boll load: Cotton plant's capacity to retain and develop fruit, within limits of its genetic constitution and the prevailing environmental conditions.

Boll opener: A chemical, such as ethephon or Prep™, that increases the rate of boll opening at crop maturity.

Canopy: The covering formed by the leaves of the plant population in a crop.

Compensation: The cotton plant's response to fruit loss in terms of new growth, added development, or adjusted fruit retention.

Cotyledonary node: Opposite nodes at the base of the plant where cotyledons (seed leaves) attach to the plant.

Cracked boll: First visual sign of boll opening, when the carpel walls separate along sutures.

Crop termination: Ceasing active crop growth to prepare for harvest.

Cutout: Termination or extended lapse in terminal growth, due to the development of the boll load sink and the resulting demand for available nutrient and photosynthate resources.

a. Physiological cutout: Crop development stage characterized by an average NAWF of 5.

b. Seasonal cutout: When the last effective flower date is determined by end-of-season weather restraints rather than crop maturity.

c. Premature cutout: Early cutout associated with excessive stress.

Damaged (aborted) terminals: Damaged main-stem tissue in the plant apex, causes a loss of apical dominance.

DD60's from NAWF = 5: A method used to assist with end-of-season management decisions based on the development of the last effective boll population sequenced by DD60 accumulation. Research has shown that 350 heat units (DD60's) are required after physiological or seasonal cutout.

Defoliant: Any of a variety of chemicals that induce leaf drop when sprayed on the cotton plant.

Defoliation: Removal of the plant's or crop's leaves by a defoliant, crop development, weather, mechanical means, or certain insects and diseases.

Earliness: An imprecise term used to represent the rapid development or maturation of the harvestable cotton crop relative to the available growing season.

Effective fruiting period: The time between first square and cutout.

First flower: Stage of crop development at which about one-half of the plants in a population have developed at least one white flower.

First fruiting branch: First formed sympodial branch on the main stem.

First fruiting node: Lowest main-stem node above the cotyledonary node from which a sympodial branch develops. Usually occurs at main-stem nodes 5 to 9.

First-position bolls: Bolls on sympodial branches at the nodal position nearest to the main stem.

First square: The first fruiting bud to appear on a cotton plant. Also the stage of growth when approximately 50% of the plants have a visible square.

Flowering interval: The time in days or heat units between the appearance of white flowers either at adjacent fruiting positions along the same sympodium (horizontal flowering interval) or at the same fruiting position on the next higher sympodial branch (vertical flowering).

Fruit retention: Presence of a square or boll at a fruiting position.

Fruit shedding: Physiologically induced separation of a square or boll from a plant, usually induced by some damage to squares/bolls or stress on the plant.

Fruiting node: Main-stem nodes that produce sympodia or fruiting branches.

Fruiting position: A specific nodal position on a sympodium where a reproductive structure may be produced. Positions may be sequentially numbered from the site nearest the main stem. A fruiting position may have a scar (where fruit is aborted), a square, a flower, or a boll.

Growing degree days or DD60's: A concept based on a temperature threshold (usually 60°F for cotton) above which the crop grows and below which little or no development occurs.

Harvest (picking) capacity: The number of acres of cotton that can be picked per day.

Harvestable boll: A mature or immature boll that will open before the end of the growing season to permit mechanical harvest.

Height-to-node ratio: Average internode length determined by dividing the total plant height in inches by the total number of main-stem nodes.

Internode: The stem section between two nodes, that is, the space between two successive true leaves on the main stem or a branch.

Last effective flower/boll population: The latest developing population of fruit that has a high probability of being retained and developing into bolls of adequate size and fiber properties.

Last possible flower/boll: The latest developing individual flower/boll that will develop into a harvestable boll.

Late crop: A subjective term that refers to bolls produced on the upper part of the plant canopy usually late in the season.

Main stem: The central axis of the plant consisting of a terminal meristem and a series of internodes with one main-stem leaf at each node.

Main-stem node: The part of the stem at which a main-stem leaf is attached.

Maturity: Describes the completion of natural growth and development.

a. Crop maturity: Crop maturity is related to a field population of plants that has developed to the point that no additional inputs are required.

b. Boll maturity: A mature boll is one that has sufficient nutrition to open normally if the subtending leaf is removed.

Node: A point of attachment of plant structures (leaves or fruit) to the main stem or branches of a plant.

Nodes above first square (NAFS): A measure of the number of main-stem nodes above the first fruiting node or first square.

Nodes above white flower (NAWF): A measure of the number of main-stem nodes above the uppermost white flower in the first fruiting position.

Open boll: A boll in which the carpel sutures have abscised and allowed the seedcotton to become exposed and dry.

Plant monitoring: One of a series of measurements on the plant or crop, usually made sequentially during the growing season.

Plant population: An estimate of the number of plants per unit area.

Regrowth: The resumption or continuation of growth that may occur after applying a harvest-aid chemical.

Sample site: Location in the field where samples are taken. Generally, four or more sample sites will be randomly selected for each field.

Sampling: Process of selecting and monitoring a subset of the field population of plants to estimate the status of the entire field.

Scar: A mark left on the stem or branch where a leaf square or flower abscised.

Shed/shedding: Separation of a leaf, square, or boll from a plant, usually induced by some stress.

Squaring nodes: Collective term for NAFS (prior to first flower) and NAWF (after first flower).

Stand (effective stand): The number of plants per area, e.g., plants per acre.

Stratum (Strata): Divisions of a field that enhance sampling designs. For representative sampling, each field may be divided into four or more strata.

Sympodium (sympodia): A segmented fruiting branch where flowers and resulting bolls grow.

Terminal: Usually refers to the growing point in the plant apex.

Terminal node: Uppermost main-stem node from which the main-stem leaf is unfurled.

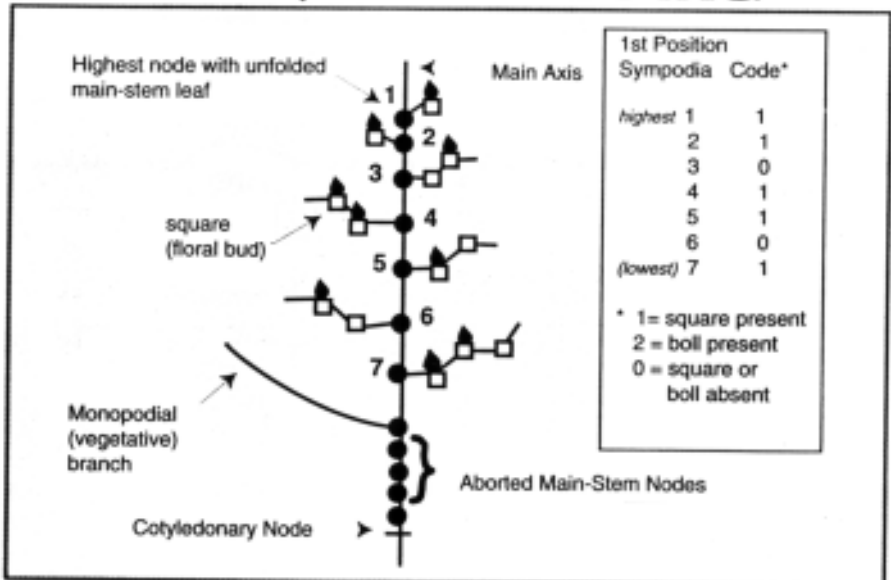
Unfurled leaf: A young developing leaf that has expanded such that the unfolding edges no longer touch each other.

Vegetative node: Main-stem nodes between the cotyledonary node and the first fruiting node.

Vigor index: A measure of early-season growth of cotton plants, typically by evaluating plant height over time or plant height in relation to the number of main-stem nodes, e.g., height-to-node ratio.

White flower: A cotton flower with white petals on the day of pollination. Following pollination, the flower petals turn pink then red.

PLANT SQUARE MAPPING



An example of coding first-position squares on a cotton plant using SquareMap.

Taken from Derrick Oosterhuis and Fred Bourland, University of Arkansas.

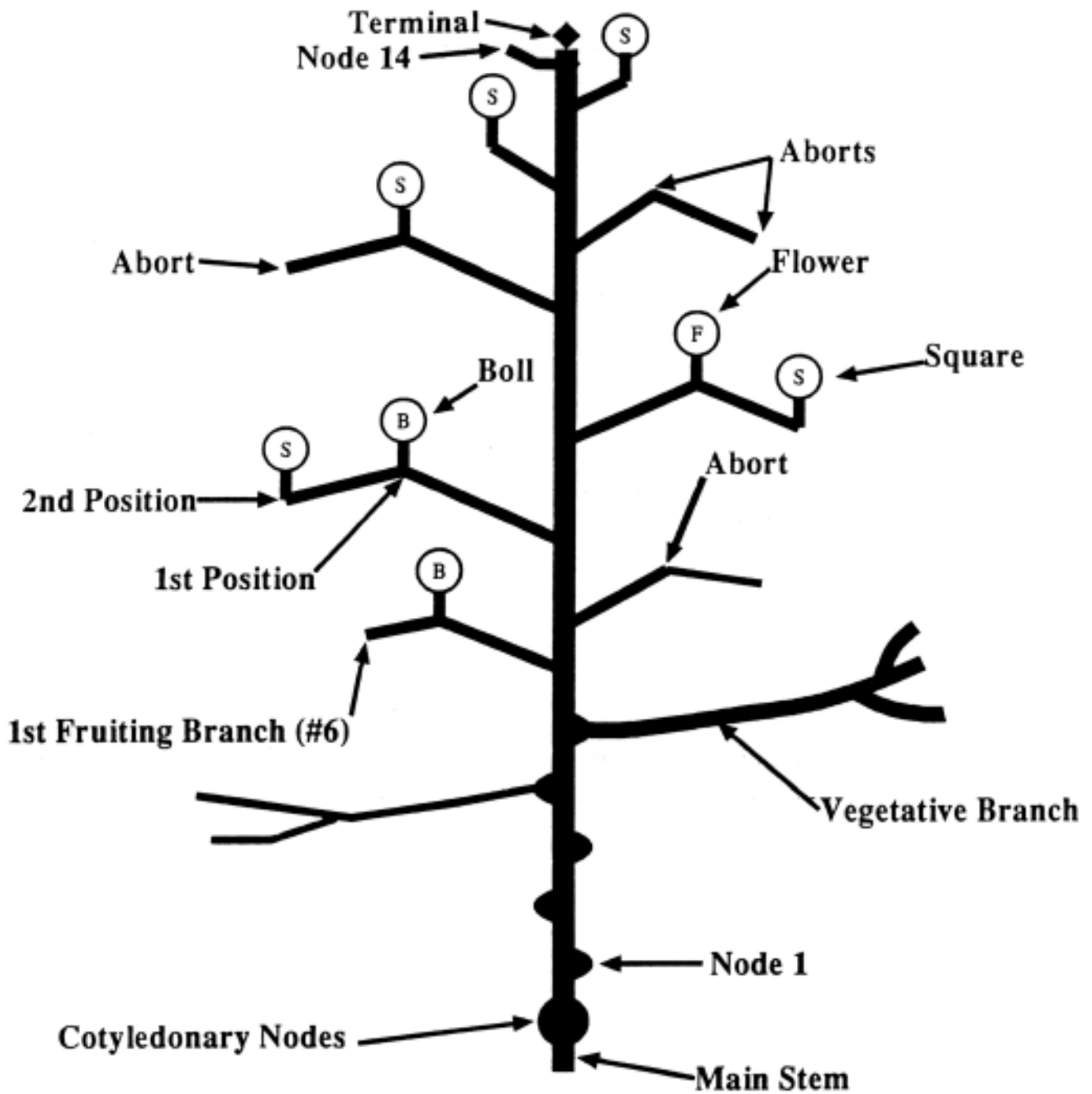


Fig. 3. General cotton plant diagram.

Taken from Jeff Silvertooth: University of Arizona

New Mexico State University is an equal opportunity/affirmative action employer and educator. NMSU and the U.S. Department of Agriculture cooperating.