

Chapter 5:

COTMAN Sampling and Data Collection

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COTMAN™ plant monitoring data represent a “snapshot” of the crop’s status in a particular field on a specific day. Field data are collected by COTMAN mappers whose responsibility includes selecting appropriate sampling sites and collecting crop growth and maturity and fruit retention information. These crop data are analyzed using the COTMAN software and summarized into reports from which growers make important decisions. Good site selection and mapping techniques are essential for providing accurate information for crop managers to make good decisions.

The SQUAREMAN component of COTMAN is run pre-flower, and the BOLLMAN component is run post-flower (Fig 1). SQUAREMAN reports provide information on pace of crop development and retention of squares and if continued after flowering, boll retention. BOLLMAN reports provide information for end-of-season decision making, in-

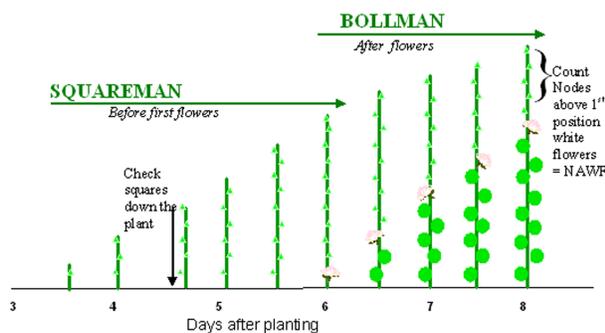


Fig. 1. COTMAN is divided into two components: SQUAREMAN, which is used to monitor preflower plant development and square retention; and BOLLMAN, which is used starting at first flower to help with end-of-season decisions including defining date of physiological cutout, and scheduling insect control and irrigation termination and defoliation timing. Bollman utilizes NAWF data.

cluding the date of crop cutout. It is not necessary to run SQUAREMAN in order to run BOLLMAN.

Data can be collected on paper forms (*See Appendices, page 99*) or on PDAs.

The sampling protocol outlined in this chapter addresses the following questions: Where should sample sites be located in the field? and What, When, and How to sample?

Where Should Sample Sites be Located in the Field?

Field size for COTMAN sampling generally should not exceed 80 acres, and it is recommended that at least 4 sites per field be sampled weekly. If a large field cannot be broken into two or more fields, it is recommended that mappers sample more sites. Up to 64 sample sites can be used per field in the COTMAN software program.

COTMAN mappers should confer with the grower on site selection at the beginning of the season. Field history along with management priorities may affect the areas of the field where the grower wants to make management decisions.

Samples should be taken at sites where plants represent the predominant growing conditions in each field. Sites should be avoided where plants vary greatly because of differences in soil type, drainage patterns (e.g., high or low spots in the field), stand density, or random physical injury (e.g., hail damage or mechanical injury from farm equipment). Samples should be taken in the same general areas in the field and in the same order each week. Mappers should avoid sampling the same plants each week. Sample sites should be located no less than 100 ft from the edge of the field and separated by at least 150 ft.

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Mappers also should avoid:

- Weed infested areas,
- Areas with irregular irrigation patterns such as “dryland” corners of center-pivot irrigated fields or low spots prone to flooding, and
- Replanted areas (these sections of the field will not be apparent later in the season) or areas receiving “spot” treatments.

If there are large portions of the field (25% or more) with obvious plant growth or vigor differences, then the sampling plan should be modified. If the grower feels that a large enough portion of the field is represented by these special situations,

and the grower wants to manage these areas separately, then the field should be divided and treated as two or more separate fields. An example would be a center-pivot irrigated field where plants located in the corners of the field are water stressed and stunted compared to the irrigated portion of the crop. A sampling plan also might be modified if areas of the field are bordered by crops or landscape features that are known habitats for arthropod pests (e.g., a corn field or wooded areas). Mappers should include at least one sample site adjacent to such areas, even if the field is not divided.

What, When and How to Sample

WHAT TO SAMPLE	WHEN TO SAMPLE	HOW TO SAMPLE
Stand Density	Once per season after the plant stand is well established.	Randomly select a starting point where the plant stand appears to be typical for the field. From the starting point count the number of plants in 3-foot row sections in a straight line across 24 consecutive rows. Move at least 150 feet to another site where the plant stand appears typical for the field and repeat the sampling procedure. A “T” stick may be used to facilitate data collection (Fig.2).
First Fruiting Node (FFN)	Once per season at the time of the first SQUAREMAN data collection	Squares should be visible on at least 40% of plants before FFN is determined. Select a starting point at 4 sites in each field where the plants represent those that the farmer will use to make management decisions. Sample 5 consecutive squaring plants in the row by counting the number of nodes upward from the cotyledonary nodes (Fig. 3) to the first fruiting branch. Cotyledonary nodes are counted as zero (Fig 3 and 4). Turn to the adjacent row at the site and sample 5 more plants in the same manner. Go to the next site.
Squaring Nodes and Square Retention (SquareMap)	Once or twice per week from the time squares first become visible until flowers appear.	Repeat the following procedure in 4 to 8 different sites in each field: <ol style="list-style-type: none"> 1. Measure the average plant height (in inches) from soil to terminal. 2. From five consecutive plants in one row: <ul style="list-style-type: none"> * Start at the first fully-expanded true leaf in the terminal (Fig 5). * Check for the presence or absence of first position squares. * Record a “1” if a square is present and enter a “0” if the square has shed. 3. Repeat steps 1 and 2 on the adjacent row. The procedure is shown in Fig. 6.

Nodes Above White Flower (NAWF)

Once or twice per week starting when flowers appear. Sample until NAWF is less than 5 or until latest possible cutout date has been reached. Note: When the crop is just starting to flower, mappers may have to look down the several feet of row to find plants with flowers. As the crop matures, take extra care to sample only first position flowers. Do not count nodes above flowers at the second position, at extra-axillary nodes or on monopodial branches (Fig 7).

From ten plants at each of four to eight sites per field:

- NAWF: Count the number of nodes above the uppermost first position white flower (Fig. 8).
- * When counting, stop at the uppermost unfurled leaf in the terminal. (Do not count a leaf that has not yet unfurled.)
 - * Sample plants from two or more rows at each site.
 - * Skip plants with a terminal aborted above the flower

Weather

Daily, beginning at cutout and continuing until defoliation.

Obtain high and low temperatures (°F) from a reliable local source



Fig. 2. Measure the stand density by counting the number of plants in 3 ft of row from 24 consecutive rows. To facilitate counting plants, construct a “T” shaped sampling stick using a 3-ft PVC pipe attached to a 4-ft piece of 1-inch diameter PVC pipe.

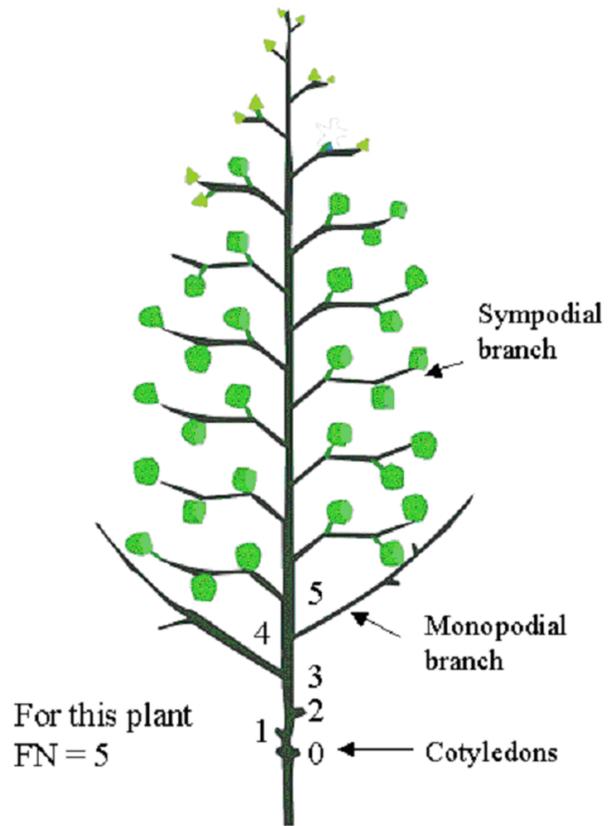


Fig. 3. Count from the cotyledons (node “0”) up to the first main-stem sympodial branch to determine the first fruiting node (FFN). Calculate mean FFN from samples of 10 plants selected at 4 to 8 sites per field.

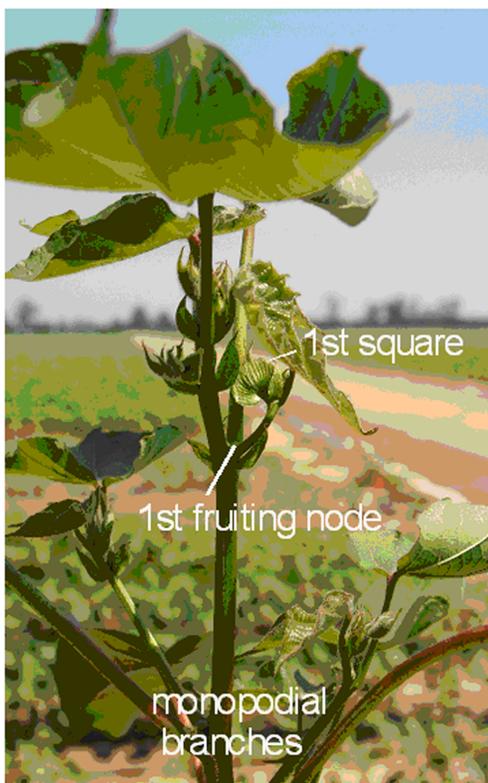
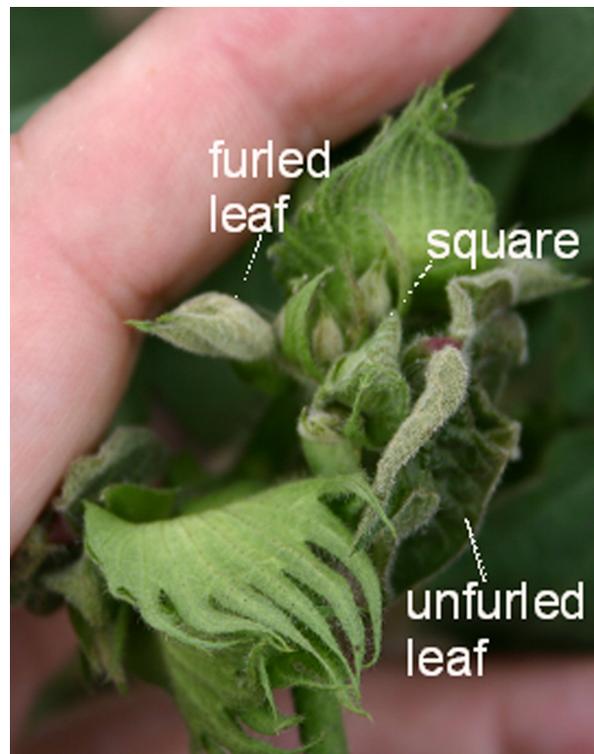


Fig. 5. When using SquareMap, mappers should start counting squaring nodes down from the first unfurled leaf (above). A “one” is recorded for each main-stem squaring node if the square is present and a “zero” is recorded for each squaring node if the square is missing (below).

Fig. 4. Description of cotyledons, main-stem sympodia, monopodia, and first fruiting node.

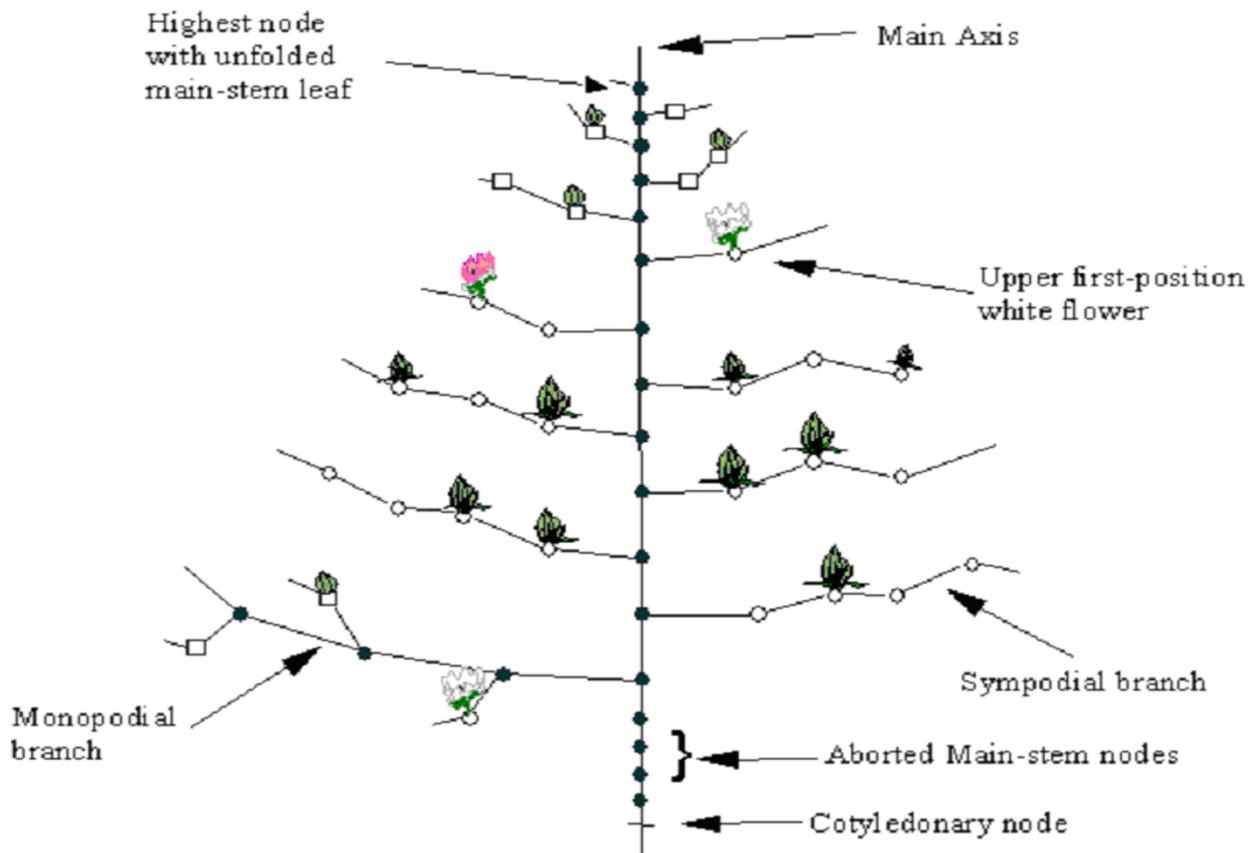


Fig. 8. NAWF: Count the number of nodes above the uppermost first-position white flower.