INTERPRETATION OF CROP GROWTH CURVES GENERATED BY COTMAN

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Abstract

The COTMAN program consists of two expert system: SQUAREMAN and BOLLMAN. SQUAREMAN uses SquareMap data to determine square retention and squaring nodes (plus other variables). BOLLMAN uses nodes-above-white-flower (NAWF) data to measure squaring nodes. Squaring nodes by days from planting (DAP) provide a crop growth curve throughout fruiting period. Before evaluating the crop growth curve, the user must consider the level of square retention, the target development curve (TDC) and the latest possible cutout (LPC) date.

Square retention of first position squares (not generated by BOLLMAN) is determined using SquareMap codes for the presence and absence of first-position squares. SQUAREMAN then summarizes total square shed and shed by nodal positions. The TDC assumes first square at 35 DAP, first flower at 60 DAP, 2.7-day vertical squaring interval and physiological cutout (NAWF=5) at 80 DAP. To determine the LPC date, the user chooses the nearest historical weather data base and an acceptable weather risk. The LPC date assumes 850 DD60's needed for the maturation of last effective flowers, and provides the latest date from which 850 DD60's are likely to be available. Factors used to interpret crop growth curves include: 1) square retention (high or low), 2) alignment (left, near, or right) of the plotted curve relative to TDC, 3) slope (flatter, similar, or steeper) of curve relative to TDC, 4) apogee (less, near, above) of curve relative to TDC, 5) change in slope between sample dates, and 6) physiological cutout date relative to LPC date.

Within SQUAREMAN are 24 sets of decisions rules that are triggered by combinations of position of plotted data relative to TDC, slope, and square retention. Within BOLLMAN, end-of-season decision rules are based on date of physiological cutout relative to LPC date. COTMAN provides a dynamic, interactive means to evaluate plant growth development throughout the fruiting period.