COTMAN PLANT-BASED ECONOMIC INJURY LEVEL: UPDATE

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Abstract

The break-even component in COTMAN is used to calculate a plant-based Economic Injury Level (EIL) tailored for each cotton field. When an Economic Threshold (ET) is used to initiate control of insect pests to prevent plant injury from exceeding the EIL, one usually has no clearly defined or tailored EIL with which to evaluate the ET. COTMAN provides an EIL that can be used to evaluate any ET for one or more species that attack squares using a calculation that the user can tailor to fit specific cotton prices, costs, and crop expectations. The calculation involves 13 factors, but elasticity analyses of the factors used in calculations show that **R**, **T**, and **ARGB** exert a strong influence on the calculations. These were the focus of this research. **R** is the symbol used in COTMAN for plant compensation or Recovery capacity; **T** is symbol for Total number of main-stem nodes with sympodia at first flowers. It is one measure of plant stress. **ARGB** refers to the Aggregate change between sample dates in the square Retention-Growth Balance (**ARGB**).

In theory more plant compensation (a higher **R-**value) can be used in calculation of the plant-based EIL when one can predict a low **T** and can assume the associated plant stress eventually will be relieved. So experiments were used to vary plant stress, measure **T**, and observe levels of **R**. To be confident that the crop is monitored well enough to prevent excessive injury from occurring, procedures should detect slight changes in plant injury and growth. Thus known levels of square removal were used to test the procedure and sensitivity of **ARGB**.

Results supported the thesis that a plant-based EIL can be tailored to fit individual cotton fields by making better use of plant compensation in addition to using realistic crop expectations, management costs, and cotton price estimates. In this study, a **T**-value of 6.6 would have allowed an **R**-value 30%, which is greater than the default **R** of 19%, with no yield loss. In the well managed plots detection of the loss of a single 1st position square per plant was indicated by statistically significant changes in **ARGB**-values. The sensitivity of **ARGB** reflects aggregate change, however, it does not define the proper balance of retention and growth for different plant activities. The dynamics of the **ARGB** must be better understood to be functional.

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