Field trials show that Cytokin Bioregulator Concentrate (zeatin glycosides plus bioactive metabolites) and/or C.A.L.F.A. (bioactive microbial metabolites) are effective in promoting increased yields in dryland and in irrigated cropping systems. Increased water use efficiency when either or both of the products are used in cultural practices has also been noted. With the rising concern for water availability for agricultural irrigation, a three-year study was initiated at Texas A&M University to determine how these products might be used to optimize yields and profitability in situations with limited water availability. Three water regimes were selected: natural rainfall, 60% ET replacement, and 100% ET replacement. In the Natural ET Replacement trial, the best treatment produced a statistically significant increase of 143 lb of lint per acre. In the 60% ET Replacement trial, the best treatment produced a statistically significant difference yield of 97 lb lint per acre. In the full ET replacement trial, no statistical differences were observed. It was noted however, that the C.A.L.F.A. + Cytokin Bioregulator in the 60% ET trial produced a higher numerical yield than the control in the 100% ET replacement trial.