

**RELATIONSHIP BETWEEN CARBON ISOTOPE
DISCRIMINATION AND COTTON YIELD**

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Abstract

Improved stomatal conductance and leaf gas exchange is important in increasing yield of US cotton varieties. Because carbon isotope discrimination is closely associated with stomatal conductance and leaf gas exchange, it may be associated with cotton yield and dry matter accumulation. This study, conducted at three Texas locations (College Station, Lubbock, and Temple), two growing conditions (irrigated and dryland), and with twelve varieties, was conducted to determine if carbon isotope discrimination was associated with yield of upland cotton (*Gossypium hirsutum* L.). The experiments revealed a linear, positive relationship between carbon isotope discrimination and lint yield under all environments examined. Overall, carbon isotope discrimination accounted for 55% of the variation observed in lint yield. The goodness of fit (r^2) ranged from 0.25 to 0.85 over the environments examined. We believe that the accuracy and reliability of this technique can be improved. Because carbon isotope discrimination is well correlated with stomatal conductance, we may be able to use this technique to screen germplasm for this trait in cotton improvement programs.