Effect of drought stress on leaf and whole canopy radiation use efficiency and yield of maize. (C02-earl105443-Poster)

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Abstract:

Drought stress reduces yield of maize by reducing i) canopy absorptance of photosynthetically active radiation (PAR), ii) radiation use efficiency (RUE), and iii) harvest index (HI). These component limitations to yield were quantified in a two-year field study in GA. The relationship between RUE at the single leaf level (estimated using chlorophyll fluorescence techniques) and RUE at the whole crop level was also examined. Two levels of soil water deficit and a control treatment were established using drip tape irrigation, and dry matter harvests were taken at mid-season and physiological maturity. Mild and severe stress treatments reduced yield by 63 and 85% in 2000, and by 13 and 26% in 2001. Reduced canopy absorptance of PAR was a minor yield loss component. Yield losses attributable to reduced RUE and reduced HI were usually similar. Dry matter accumulation was not linearly related to PAR interceptance, due to decreased RUE in the water stress treatments. However, the linear relationship was restored when daily intercepted PAR was adjusted by the current estimate of photosystem II efficiency, suggesting that this parameter can be used as a meaningful indicator crop RUE.

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