Leaf and Whole Canopy Photosynthesis of Maize Grown under Elevated CO2 and Various Temperature Regimes. (A03-kim141536-Poster)

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Abstract:

Maize plants (Zea mays L.) were grown in closed sunlit growth chambers at 370 or 750 ppm CO2 with 19/13, 25/19, 31/25, 35/29, or 38.5/32.5 C day/night temperatures. Both leaf and whole canopy photosynthetic rates, and quantum yield were influenced by temperature, whereas no clear effect was observed in response to elevated CO2. Single leaf photosynthetic characteristics of intact leaves grown under ambient and elevated CO2 were virtually unchanged when exposed to varying levels of CO2, suggesting that photosynthetic acclimation to elevated CO2 did not take place. Stomatal conductance, however, decreased under elevated CO2. Canopy photosynthetic rates (as CO2 fixed per ground area) remained either unchanged or exhibited modest decreases in response to elevated CO2 during latter stages of vegetative growth. While elevated CO2 has been reported to result in increased photosynthesis and growth in C4 plants due to improved water use efficiency under water-limiting conditions, no such advantage was observed in our investigation in which plants were grown in well-watered soil with ample nutrients at various growth temperature regimes.

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