Changes in Hyperspectral Reflectance of Ageing and Senescing Cotton Leaves Exposed to Enhanced Ultraviolet-B Radiation and Carbon Dioxide. (C02-reddy163720-Poster)

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Abstract:

Experiments were conducted during summer of 2001 in controlled environments to determine the effects of biologically effective UV-B radiation doses (0, 4, 8, 12 and 16 kJ d) and the interaction of UV-B doses (0, 8, 16 kJ d) and CO2 on growth, development and physiology of cotton. The objective was to determine the effects of UV-B radiation and CO2 on leaf ageing and senescence processes. Measurements were made on leaf numbers 1 (oldest), 3, 6 and 9 (top most fully expanded) of the mainstem. Leaf hyperspectral reflectance (350-2500 nm), pigments, phenolic compounds and photosynthesis were measured. Chlorophyll content was reduced by enhanced UV-B but unaffected by leaf ageing. Phenolic content increased with increasing UV-B and leaf age. Photosynthesis measured during the experimental period indicated that higher doses of UV-B radiation accelerated the leaf ageing process, and elevated CO2 did not ameliorate this ageing process in cotton. Spectral reflectance influenced by chlorophyll was significantly ($P < 0.05$) increased by the UV-B doses, while leaf age or elevated CO2 did not modify the reflectance pattern.

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