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Seasonal Profiles of Polarized Reflectance and Leaf Inclination Distribution of Wheat Canopies

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Abstract: Reflectance and polarized reflectance in the visible red band were measured for wheat canopies in a wide range of solar zenith angles to explore the relations among reflectance and polarization, view and illumination geometry, and crop canopy development. The reflected sunlight in a 10° field of view was measured with a radiometer at approximately 1.6 m in height. The view zenith angles were set from 0° to 75° at 15° intervals, and the observation azimuth was towards the sun. The relation between the polarization and solar zenith angle depended both on the view zenith angle and the growth stage. Multiple regressions were applied to estimate the polarization and reflectance at solar zenith 40°. Seasonal profiles of LAI, leaf inclination distribution, reflectance, and polarized reflectance indicate that polarization includes information for canopy structure such as leaf inclination distribution. Observations at solar zenith angles of more or less than 40° may also give similar results when the view zenith angle is appropriately set, corresponding to the solar zenith angle at the time of measurement.

Keywords: [LAI](#), [Leaf inclination angle](#), [Polarized reflectance](#), [Reflectance](#), [Solar zenith angle](#)



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