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## Tittle: Evaluation of relationships between crop height and image spectral reflectance in peanut crops through the length of rotation using UAV-derived lidar and optical imagery in South Central Georgia, U.S.

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**Abstract**

Peanuts are a substantial oilseed crop worldwide, considered one of the most important legumes, not only for their economic importance but also for their nutritional value. While considering the economic significance of peanuts, it is important to monitor growth for management purposes, which could lead to increased productivity. Monitoring large agricultural areas using remote sensing technology can provide cost-effective information throughout the crop length and aid management decision making. This study aims to evaluate the relationship between plant height and vegetation spectral reflectance values at different growth or crop development stages in peanut plantations in Atkinson County in Georgia. We collected optical imagery and Light Detection and Ranging (lidar) data four times (vegetative to pod development) during the growing season and generated canopy height models and vegetation indices. Correlation analyses were applied to examine the relationships between the LiDAR-derived canopy height and the imagery-derived vegetation indices at each data collection time, as well as spatial analyses to evaluate variability across the field. This research can provide valuable information on spatial growth variability, guiding informed decision-making for crop management practices like irrigation and fertilization.

**Keywords:** remote sensing, plant height, vegetation indices, lidar.