High-throughput Phenotyping of Organic Peanuts

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The demand in organic peanut is increasing nationally. However, peanut cultivars adapted to organic production remain limited. Unmanned Aerial System (UAS) is a promising tool that can accelerate peanut breeding. The use of sensor mounted on a drone is known as Unmanned Aerial System (UAS). In this study, we aimed to collect UAS data from 20 peanut accessions grown on a certified organic plot at Texas A&M AgriLife Research-Vernon. Peanut accessions were provided by the Peanut Breeding and Genetics program from Texas A&M AgriLife Research-Stephenville. The experiment was laid out in a randomized complete block design with 3 replications. Drone was flown on July 27, 2021 and September 07, 2021 at 30 meters above soil surface with 85% overlap. Five narrow and high-resolution spectral bands were collected: red, blue, green, near-Infrared, and red edge. Image orthomosaics were obtained using Pix4D and plot-level mean value of each spectral band was extracted using QGCIS. A total of 23 vegetation indices were used using spectral band values. Results showed significant genotypic differences in the computed vegetation indices. The findings can be used to establish a high-throughput phenotyping platform to accelerate organic peanut breeding.