Using Remote Sensing Technologies to Differentiate Drought Tolerant Recombinant Inbred Lines of Peanut

A.-B. CAZENAVE*, N. KUMAR, and M. BALOTA. Tidewater Agricultural Research and Extension Center, Virginia Polytechnic Institute and State University, Suffolk, VA, 23437; D. HAAK, SPES, Virginia Tech, Blacksburg, VA, 24061; J. DUNNE. Crop and Soil Sciences, North Carolina State University, Raleigh, NC, 27607.

Worldwide peanut (*Arachis hypogaea*, L.) production is very sensitive to drought events that can limit yield and quality. While peanuts require a minimum of 600 mm of water regularly scattered throughout the growing season, the summer months of June, July and August are often deficient in precipitation, leading in recurrent drought events. This limited availability in water during these months is impacting yields. Water can be supplemented through irrigation but only 35 % of the peanut acreage in the U.S. are equipped of such systems, leaving most of the field under rainfed agriculture. Therefore, it is crucial to peanut producers to adopt drought tolerant cultivars, with improved yield and quality, in order to maintain the U.S. peanut stakeholder competitiveness in the market place. Phenotyping breeding is commonly used to select lines within the breeding pipeline. However, manual measurements of traits in field is laborious, time-consuming and sometime subjective. Development of platforms, such as unmanned aerial vehicles (UAV), equipped with remote sensing technologies can acquire data fast, with increased resolution, reliability and repeatability of the measurements. In this study, 340 recombinant inbred lines (RIL) were grown at two locations in Virginia and North Carolina. This RIL population was developed from the cross of N08086olJCT and ICGV 86015. N08086olJCT is a large seeded Virginia-type and high yielding line whereas ICGV 86015 is an early-maturing drought tolerant Spanish-type line coming from the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). Regularly throughout the growing season, ground and aerial data were collected using standard red-green-blue, near-infrared and thermal cameras. Manual and remote sensing data were compared in order to more reliably differentiate and identify drought tolerant RILs.