Genetic Variation for Drought Tolerance and Oil Quality Traits In A Groundnut Population Using Sensing Technologies

JAPHETH Z.N.*[1], AKROMAH R. [1], KENA A.E. [1], OTENG-FRIMPONG R. [2], BALOTA M. [3], HOISINGTON D. [4] AND RHOADS J. [4], KASSIM Y.B .[2]; [1]Department of Crop and Soil Sciences, KNUST. [2]CSIR-Savanna Agricultural Research Institute, Tamale. [3]Virginia Tech, Suffolk. [4]Feed the Future Innovation Lab for Peanut

Drought is the most important abiotic constraint to groundnut production and quality in the world. Approaches to mitigate the effect of drought under rain-fed groundnut production is urgently needed, and as a result, developing drought-tolerant varieties is seen as part of the solution. The study objectives were to; (i) Assess the yield of a population segregation for drought under rainfed conditions. (ii) Determine the oil composition within a segregating population. (iii) Estimate the components of genetic variations within the population. The experiment was conducted at CSIR-SARI during the 2020 rainy season under rainfed conditions. Ninety-four (94) genotypes and three known performing local checks (CHINESE, NKATIESARI and SARINUT 1) were planted in an augmented block design with 19 blocks. Data were recorded for Days to emergence, Days to first flower, Days to 50% flowering, Plant height (PH), Soil and Plant Analysis Development (SPAD), Chlorophyll fluorescence, NDVI readings, Canopy temperature, Early Leaf Spot, Late Leaf Spot, Days to maturity, Fresh weight of haulms/plot/kg, Dry weight of pods/plot/kg and oil composition. All genotypes reached 50% flowering about 31 days after planting (DAP), Days to first flower ranged from 25 to 29 days, NDVI60 showed a weak relationship with ELS (r^2 = 0.43) and PH (r^2 = 0.44) at 60DAP. Pod yield varied from 533.3 $kgha^{-1}$ (genotype 14GAF1325) to 3,700 $kgha^{-1}$ (genotype 14GAF1385). High pod yield was observed in the genotypes 14GAF1385, SARINUT-1, 14GAF1382, CHINESE, and 14GAF1335. These genotypes can therefore be cultivated in low-rainfall areas and used as parents in breeding programs to produce drought-tolerant groundnut cultivars.