## The Peanut Black Pod Trait as an Alternative Determine Peanut Seed Maturity

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Various methods to determine peanut maturity have been developed, and they have been widely used by growers, extension agents and crop consultants; however, most are based on the assessment of color in the mesocarp layer of the hull. Branch, et al. (1997) evaluated a true breeding accession which expressed pods with a black exocarp as an indicator of maturity, thus making the assessment of maturity much more straightforward. The objectives of this study were, to 1) evaluate the genetics of the black pod (*Bp*) trait and confirm its similarity to previous reports; 2) evaluate the correlation between maturity indices based on both exocarp and mesocarp; 3) assess and evaluate possible maturity prediction models to determine the mesocarp maturity index based in the exocarp maturity index, and 4) assess and evaluate possible maturity prediction models based on pixel color analysis of exocarp digitals scans in the black pod accession. $F_2$ and $F_3$ populations were used to evaluate the genetics of the *Bp* trait by fitting them to a 3:1 and 1:2:1 ratios respectively. Mesocarp and exocarp maturity indexes (MMI and EMI) were calculated from an $F_5$ population, utilizing 10 genetically different lines. Plots were harvested at 2100, 2300 and 2500 aGDDs as determined by the use of PeanutFarm. $F_2$ and $F_3$ populations fitted the 3:1 and 1:2:1 ratios respectively ($p>0.05$). A strong and significant ($p<0.05$) correlation was found between the maturity indices calculated using exocarp and mesocarp color classifications at the three harvest dates. Additionally, it was possible to build accurate models for the prediction of the MMI based on the EMI for each harvest time. EMI was more consistent across the harvest dates and the exocarp coloration was found to occur before than the color change in the mesocarp. Lastly, a model was developed that predicts the mesocarp DIM value based on the pixel classes of the exocarp scans of pods from a sample of pods from the whole plots. Although, the model was robust and accurate, the DIM method needs some modifications to classify exocarp color more accurately as it was built on mesocarp coloration. These results indicate that the *Bp* trait is a single and dominant gene similar to the one previously identified by Branch, et al., (1997). It was also confirmed that it is possible to use maturity evaluation of the exocarp color to predict the mesocarp color evaluation. In the same way, the digital analysis of pixel color could also be utilized with some slight modifications. By introducing this trait to commercial varieties, the time required to assess maturity could be significantly reduced and the likelihood of mature harvest would increase.