Determination and comparison of timing for acquisition of physiological quality of seeds from Georgia-06G and Georgia-16HO – Phase 2

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Introduction. One of the major costs in peanut production is the seed. The quality of a seed lot is represented by a combination of genetic, physical, physiological, and sanitary factors. The physiological quality consists of the components: germination, desiccation tolerance, vigor, and longevity. Environmental conditions affect how these components are acquire by the seeds, which makes it difficult to determine the ideal time seeds have the greatest physiological quality. Moreover, the indeterminate growth habit of peanut plants makes seed production challenging with regards to identifying the quality of seeds from the different maturity levels. Information is still scant on the identification of acquisition of each physiological component of seed maturity and quality. The knowledge and determination of timing of acquisition of each physiological quality components can greatly assist in adjusting the optimal harvest time in which seeds will have maximum physiological quality. **Objective**. Our objectives are to determine the timing for acquisition of physiological quality components of peanut seeds from the cultivars Georgia-06G and Georgia-16HO during seed development. **Materials and Methods**. To this end, these two cultivars were planted in 2021. The field was planted in strips in two different dates, May 7 for GA-16HO and May 14 for GA-06G. Pods were harvested 134 days after planting (DAP) for 2300 GDD, 150 DAP for 2500 GDD, and 160 DAP for 2700 GDD for GA-16HO and 129 days after planting (DAP) for 2300 GDD, 146 DAP for 2500 GDD, and 159 DAP for 2700 GDD for GA-06G. Seeds were divided into groups according to the mesocarp color determined using the peanut maturity profile board. ‘Brown’ and ‘Black’ classes were further divided into two subclasses: ‘Brown 1’, Brown 2’, ‘Black 1’, and ‘Black 2’. Each maturity class was subdivided into two groups, treated and untreated for dormancy. Seeds from each class were tested for germination and vigor. A subsample is currently being tested for longevity and desiccation tolerance. **Results**. Preliminary results are presented only for seeds treated for dormancy release. For Georgia-06G, germination performed in fresh seeds had highest potential acquired in ‘Brown 2’ and maintained in more mature seeds, regardless of which GDD the pods were collected. Vigor was highest between ‘Brown 1’ and ‘Brown 2’ for seeds collected at 2300 and 2500 GDD, whereas it only achieved highest potential in ‘Black 1’ at 2700 GDD. Desiccation tolerance achieved maximum between ‘Brown 1’ and ‘Brown 2’ at 2500 GDD. For Georgia-16HO, germination on fresh seeds reached maximum in ‘Orange’, ‘Brown 1’, and ‘Yellow 2’ for 2300, 2500, and 2700 GDD, respectively. Vigor peaked between ‘Orange’ and ‘Brown 2’ at 2300 GDD, decreasing in ‘Black 1’. At 2500 GDD, vigor in Georgia-16HO did not follow a clear trend, with a peak in ‘Brown 1’ followed by a decrease between ‘Brown 2’ and ‘Black 1’ and an increase in ‘Black 2’. At 2700 GDD, vigor increased progressively from ‘White’ to ‘Brown 2’ and slightly decreased in ‘Black 1’ and ‘Black 2’. Considering the curve of maximum value for greatest seed quality standard, germination and vigor for Georgia-06G were acquired between ‘Brown 1’ and ‘Black 1’ at 2300 GDD, shifting slowly to more mature pods as GDD progresses. For Georgia-16HO, maximum value for germination and vigor were acquired in the brown class. The complete curves for all components of physiological quality in peanut seeds, including desiccation tolerance and longevity, are still in progress.