

Peanut Seed Germination and Seedling Emergence as Affected by Storage Conditions

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High germination and vigor of peanut seeds are important constituents to overall successful peanut production. Exposure of seeds to unfavorable conditions of temperature and relative humidity (RH) over time can result in loss of germination and vigor. The objective of this experiment was to determine the differences in seed germination and emergence of runner-type peanut seed when stored in different conditions across a broad range of temperatures and RH. Three storage environments were evaluated in this study. Two storage environments had extreme diurnal fluctuations in temperature (12-46 °C) and RH (33-85%). These environments were compared to a consistent temperature (18-27 °C) and RH (42-54%) environment. Seeds from the cultivar GA-06G were maintained in each respective storage environment for 72 days. Seeds were then removed from the storages and maintained in a cold room until germination and vigor measurements were taken. Seed germination and vigor were evaluated using a thermal gradient table with temperature ranges of 13 to 32.5 °C. Seeds were placed in Petri-dishes and incubated for a total of 7 days. The number of germinated seeds were counted daily up to five consecutive days starting on day three. In addition, seedling emergence was evaluated by planting seeds from each storage condition in pots in two growth chambers under different temperatures. Temperatures of 18 to 24 °C and 21 to 29 °C were established as the two temperature regimes to simulate an early planting and an optimum planting. Emergence was recorded daily from 5 to 18 days after planting (DAP). Storage environment affected peanut seed germination on the thermal gradient table. Seeds that experienced the higher diurnal temperatures and RH had the lowest germination percentages. Seeds stored in more consistent conditions of temperature and RH had the highest germination percentage throughout the storage duration. Emergence of seedlings grown under controlled environments were significantly affected by chamber temperature regime from 6 to 10 DAP, with higher emergence in pots grown under 21-29 °C. From 9 to 12 DAP, emergence was significantly affected by temperature regime and storage, with higher emergence in pots grown under 21-29 °C. From 12 to 18 DAP, storage condition significantly affected emergence, with higher emergence in pots grown under 21-29 °C. Seeds planted in suboptimal temperature conditions will affect emergence, but overall emergence was significantly affected by storage. This study suggested that storage conditions with extreme diurnal fluctuations of temperature and RH negatively affect seed germination, vigor and seedling emergence when compared to more consistent storage conditions.