Drought-Induced Small Plants within the Pure Line Runner-Type Peanut Cultivar, 'Georgia-10T'

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During 2011 at Tifton and Plains, Georgia, there was an early-season drought stress period during May and June. Drought-tolerant plants were identified and tagged which appeared green and turgid amongst otherwise dry and severely-wilted plants within several runner-type peanut cultivars. Pod and seeds were harvested from these drought-tolerant individual plant selections (IPS) for increase and testing. During the fall and winter of 2014-15, a greenhouse drought study was utilized to test these IPS's compared to the parental check cultivars. Similar, a few green and turgid plants were again found within the same check cultivar, 'Georgia-10T' after exposing the plants to an early-season drought stress period between 60 and 90 days after planting. Seed from IPS of both naturally occurring and artificially drought-induced plants produced similar normal and small-plants. Replicated preliminary yield tests were conducted during 2017 to compare these IPS to the check cultivar, Georgia-10T. Results from these field trials showed that the smaller-plants produced from early-season drought stress had significantly reduced yield, grade, pod size, and seed size as compared to the larger plant selections and the Georgia-10T parental cultivar. In a greenhouse study conducted during the fall and winter of 2017-18, these small plants were found to have a significantly shorter internode length and mainstem height compared to the same small plants treated with gibberellic acid (GA) which were taller and had longer internode lengths after one and two months. These small plants resulted from both artificially and naturally occurring early-season drought-induced stress within the pure-line runner-type peanut cultivar, Georgia-10T, were apparently caused by lack of GA. The normal and small-plants each have bred true-to-type following several self-generations. The ramification of these findings suggest the importance of even early-season irrigation, especially for seed production of peanut cultivars to avoid subsequent development of similar low-yielding, small-plants induced by drought-stress.

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