

Anatomical Characteristics Correlated to Peg Strength in *Arachis* Species

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Wild, diploid *Arachis* species are a great source of biotic and abiotic stress resistances and tolerances for peanut breeding programs; however, these species also have undesirable characteristics such as small seed size, low yield, and weak peg strength. Peg strength has been shown to have a positive, linear relationship with yield in cultivated peanut. Therefore, the weak peg strength of wild *Arachis* species could be detrimental to yield and might need to be selected against when introgressing useful alleles from wild species. To enable breeders to effectively utilize these wild species, we sought to characterize peg strength and anatomical characteristics correlated with peg strength in seven *Arachis* species, as well as four allotetraploids, six (cultivated peanut lines x allotetraploid) F₁ hybrids, and two cultivated peanut breeding lines. For each genotype, five mature pegs were tested for peg strength and subsequently cross-sections for three of the five pegs were taken and analyzed for peg anatomical characteristics including total peg cross-section area, average bundle cap area, total bundle cap area, bundle cap as a percent of peg area, bundle cap number, average distance between bundle caps, total distance between bundle caps, and tannin cell count. Genotype was a significant indicator for peg strength and all the anatomical characterization parameters ($P < 0.05$). Peg strength was positively and highly correlated with peg area, average bundle cap area, total bundle cap area, and bundle cap number. Peg strength comparable to that of peanut breeding lines was recovered in the F₁ hybrids. Because weak peg strength in the wild species appears to be recessive, it will likely be selected against in the process of introgression.