Harnessing the Wild Side of Peanuts: Morphological and Reproductive Characterization of Wild Peanut Relative-derived Synthetic Tetraploids

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Peanut cultivar improvement is limited by peanut's narrow genetic base, yet wild peanut relatives with diverse and strong resistances can be used as donors in breeding programs. To introduce genetic resources from these wild peanut relatives into peanut breeding programs, crosses were made among A-genome wild relatives (male) with several B-genome wild relatives (female) and the genomes of these materials were then doubled to produce four different synthetic tetraploids (*IpaDur*, *IpaCor*, *IpaSten*, and *ValSten*). This study seeked to characterize these materials to assure efficient utilization of these materials when they are released to breeding programs. Therefore, selfed seed from these synthetic tetraploids along with two peanut breeding lines, and F_1 progeny made from crosses between the breeding lines and one synthetic tetraploid (*IpaCor*), were grown in the field in a randomized complete block design. Morphological and reproduction characterization included flower measurements (hypanthium area, banner area and pigment absorption, wing area, and biweekly flower counts), main stem height, average internode length on primary laterals, reproductive vs. vegetative node ratio, plant body weight, leaf measurements (area, dry and fresh weight, and pubescence density), and pod and seed measurements (presence/absence of seed beak, 100 pod and seed weight, and pod and seed count). For most traits, one or more synthetic tetraploid was significantly different from one or both of the cultivated lines. In general, synthetic tetraploids had larger flowers, longer average internode lengths on primary laterals, greater leaf pubescence density, and smaller seeds than peanut breeding lines. These traits should be considered when using these materials in breeding programs to assure maximum effectiveness of breeding efforts.