Development of New Synthetic Tetraploid Wild Peanuts.

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Wild peanut species harbor many beneficial alleles conferring resistance or tolerance to various biotic and abiotic stresses. However, it is not a straightforward task to use these unique genes by conventional hybridization between wild and cultivated peanuts as the vast majority of wild species are diploid, in contrast to tetraploid cultivated peanut, and their F1 hybrids are sterile. To overcome this barrier and introduce the desirable traits into cultivated peanut, we generated four synthetic tetraploid wild peanuts by inducing chromosome doubling of diploid wild hybrids. We identified visible phenotypic variations among the tetraploid individuals and Fluorescence In Situ Hybridization (FISH) was conducted to confirm the polyploidy of the synthetic wilds. These new tetraploid wilds are being used to make crosses and backcrosses with cultivated peanuts and to develop germplasm with good disease resistance by combining phenotype evaluation and marker-assisted selection. Our new tetraploid wild accessions can be used directly to transfer disease/pest resistance genes into cultivated peanut. Furthermore, these new germplasms also offer valuable resource for molecular mapping the disease resistance genes/QTLs in wild peanuts and other related studies including peanut genomics and domestication.