Peanut Germplasm Resources and Genetic Vulnerability Considerations

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The USDA-ARS managed National Plant Germplasm System (NPGS) maintains and distributes peanut germplasm resources for research and educational purposes. The germplasm resources represent most of the peanut global genetic diversity and serve as a primary resource for domestic as well as global research community for peanut improvement. The germplasm resources provide desirable traits for peanut improvement and have been used to develop high yielding, climate resilient cultivars for domestic producers. The germplasm collection contains approximately 9,500 accessions of both cultivated and wild species, preserved as seeds in cold storage at the Plant Genetic Resources Conservation Unit, Griffin, GA. All germplasm is also backed up at the National Laboratory for Genetic Resources Preservation, Fort Collins, CO. Several active genetics, genomics and breeding programs exist at state universities, the USDA-ARS facilities in GA and OK and two private seed companies. Although the 2019 certified seed acreage included 21 cultivars developed by these programs for commercial seed production, only a few cultivars dominated in each of the peanut production regions. Further, the cultivars within a breeding program tend to have some common genetic background. Thus, the dominance of a narrow list of cultivars with related pedigrees may make the crop vulnerable to pests and pathogens. Currently, the vulnerabilities, threats and limitations facing peanut include i) evolving and emerging pathogens and pests, especially seed borne viruses and the peanut smut fungus, *Thecaphora frezii*; ii) lack of efficient diagnostic tools and resources for detection of these pathogens and pests; iii) insufficient knowledge of genetic diversity within the US peanut germplasm collection and commercial cultivars for evolving/emerging pathogens and pests leading to unknown degree of genetic vulnerability; iv) inconsistent international pest/pathogen monitoring systems; v) threat to *in situ* conservation of landraces and wild species due to global climate change and urbanization; vi) international treaty restrictions for germplasm access and exchange; and vii) reduced operational capacity for public breeding and plant genetic resource management.