

## **Benefits of International Seed Exchange of Peanut Wild Species: the *Arachis cardenasii* Case**

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The narrow genetics of most crops is a fundamental vulnerability to food security. Wild crop relatives thus are a strategic resource of genetic diversity for crop improvement and adaptation to new agricultural challenges. We uncovered the previously unknown scale of contribution of one wild species, *Arachis cardenasii*, to the peanut crop. *Arachis cardenasii* originates from Bolivia, was transferred to the USA and used for hybridizations initiated in the 1960s in NC and TX, using the hexaploidy and tetraploid route, respectively. Subsequent multiple germplasm transfers, breeding cycles and unrecorded genetic mixing between lineages obscured the widespread dispersal of genetic contributions from this wild species. By genetic analysis and pedigree research, we identified *A. cardenasii*-enhanced, disease resistant cultivars in Africa, Asia, Oceania and the Americas. In the USA, the most notable examples are: the only source of root-knot nematode resistance derived from the amphidiploid TxAG6, present in several commercial cultivars (through the tetraploid route) and also the cultivar Bailey and Bailey II that carries resistance to ELS (through the hexaploidy route). Most recently, advanced lines with very strong resistance to LLS made their way back into the USA and were used for two germplasm releases: TifGP3 and TifGP4. These cultivars provide widespread improved food security, and environmental and economic benefits. This study highlights the importance of wild species and collaborative networks of international expertise for crop improvement.