

Not Your Grandma's Goobers: Designing the Future of Peanut Breeding

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The peanut producer has realized a 130% increase in yield since 1969, with production averaging 4,074 pounds/acre nationwide for the U.S. in 2017. Advances in agricultural engineering, agricultural practices, and chemicals for pests, diseases and weed management have all contributed to increased peanut production efficiency and profitability. Perhaps greatest contribution to sustainable peanut production has been made by area-targeted peanut breeding programs. Charged with hitting the moving target of a 'perfect peanut cultivar', peanut breeders have managed to deliver to their customers by focusing on developing cultivars with traits of high importance such as disease resistance, high oleic acid content, early maturity, and drought tolerance, while advancing essential traits such as yield and grade. Conventional peanut breeding has provided a continuous supply of improved cultivars over the last 50 years. However, this success may be difficult to exceed if only conventional technologies continue to be used. Fortunately, recent advances in molecular technologies have resulted in the sequencing of both the ancestral and cultivated peanut genomes, opening the door for the mapping of traits and molecular marker development. By extensively phenotyping populations designed for trait mapping, steps can now be taken over the next decade to develop trait-specific markers for use in rapidly mining vast germplasm collections, efficiently identifying useful breeding material, pyramiding traits into cultivars and drastically reducing time and resources required for cultivar development. Future generations of peanut breeders will undoubtedly be well-trained in the use of such markers, and will finally have the tools necessary to break through the bottle-neck of the cultivated peanut narrow genetic base. The age of peanut breeding by design may be just around the corner.