Highlights of Peanut Genome Initiative Accomplishments

The entire peanut industry supported the 5-year Peanut Genome Initiative. The industry is already reaping benefits from the PGI. Here are research highlights to date:

- The diploid wild parent species of todays' cultivated peanut were sequenced and were utilized to construct the cultivated peanut genome in the proper molecular sequences and positions.

- The cultivated peanut has also been sequenced, and the assembly of the genome is 99.996% complete. HudsonAlpha says the genome is the best tetraploid genome ever assembled.

- Molecular markers have been developed from the sequencing data, which has led to the 2nd generation of a single nucleotide polymorphism (SNP) chip that is currently being utilized by breeders to evaluate breeding populations.

- Molecular markers for genes conveying resistance have been associated with late leaf spot, early leaf spot, white mold, TSWV, root knot nematode, and rust. Markers for high oleic oil chemistry have also been identified. Some of these are already being used in active breeding programs.

- Populations, for breeders use, have been developed with high levels of leaf spot resistance from wild species.

- Many genes have been identified that express traits at different developmental stages of growing peanut.

- Hybrid populations have been generated that contain an array of highly desirable characters for use by breeders to associate molecular markers with specific traits.

- Interspecific hybrid populations have been generated that are being used to introgress desirable genes from diploid peanut species into the cultivated genome.

- Peanut collections from all over the world are being genotyped to document the genetic diversity. Progress has been made in accessing the ICRISAT peanut germplasm collection in India.

- Thousands of different lines of peanut are being phenotyped for dozens of different traits. These phenotypes are being matched with genotypes which will help identify markers for even more desirable traits.

- PeanutBase, the on-line Breeders Toolbox, was developed and is widely used as a resource for genomic information and tools — as well as information about germplasm and the peanut community in general.

- The Peanut Foundation has sponsored Advances in Arachis Genomics and Biotechnology conferences, which have fostered international collaboration on peanut genomics.