Diverse Collection of Andean Beans Offers Underutilized Genetics for Food Security

Large-seeded dry beans, such as kidney and cranberry beans, are an important food in the Americas and in Africa. But breeding efforts in these seed types, known as Andean beans, have lagged behind those for small-seeded dry beans such as navy and black beans. One constraint to breeding progress has been lack of genetic diversity within the Andean bean market classes. Based on this need, a team of researchers assembled a group of 396 large-seeded dry bean accessions from Africa, the Caribbean, Europe, and N. and S. America. These accessions, including landraces and improved cultivars, have been named the Andean Diversity Panel (ADP).

In an recently published article in Crop Science, the researchers report on the genotyping of the ADP with ~6,000 single nucleotide polymorphism (SNP) markers to assess the diversity of the accessions. The ADP was also evaluated for agronomic and consumer acceptance traits in locations in the U.S., Caribbean, Tanzania, and South Africa. A number of accessions were identified with value for disease resistance, cooking time, and nutritional value. The ADP is a resource for bean breeders in Africa and the Americas.

Study Identifies Genes for Resistance to Aflatoxin Accumulation in Corn

Corn is the world’s most productive crop, but this important food-, feed-, and fuel-producing species can be infected with Aspergillus flavus. This fungus produces aflatoxin, a potent carcinogen that also damages human and animal immune systems. While creating resistant varieties is a common method for reducing aflatoxin, progress has been slow in transferring resistance, via plant breeding, from resistant (but low-yielding) breeding lines to new cultivars.

In an article in the September–October 2015 issue of Crop Science, researchers report on the identification of corn genes associated with reduced aflatoxin levels. These genes were identified through association mapping of a diverse panel of 300 maize varieties. Aflatoxin levels were measured following field inoculation of each variety with A. flavus spores, and the entire genome of each variety was analyzed via Genotype-by-Sequence (G-b-S) data sets. The correlation of aflatoxin levels and DNA sequence data sets detected associations with 27 putative resistance genes. Following validation, these genes will allow researchers to study the mechanism by which maize resists aflatoxin accumulation. And genetic markers developed within these genes will now allow plant breeders to more quickly develop new, resistant commercial corn varieties.

Stocking Strategies Affect Efficiency of Pasture–Animal Production

As a means of defining and validating stocking strategies for sustainable, productive pastures, scientists use comparative databases including data from both clipped plots and grazing experiments. Research on the forage-animal interface documents relationships among forage growth, regrowth, production, nutritive value, and animal performance that are achieved at various levels of forage mass by using different stocking rates and/or stocking methods. Grazing experiments have been initiated and designed for a variety of objectives that may include comparing forage varieties, understanding the impact of stocking on persistence and stand maintenance, and expanding knowledge of forage-animal relationships. However, multiple factors affect the efficiency of pasture–animal production.