

Crop Vulnerability Update for Soybean

Vulnerabilities & Threats

- Narrow genetic base for U. S. soybean crop and considerable genetic uniformity. Diversity study of commercially available cultivars would be prudent.
- Numerous evolving and emerging pathogens, insect pests.
- Changing climates: unpredictable floods, droughts.
- Reduced budgetary support and operational capacity for plant genetic resource (PGR) management and germplasm enhancement.
- Lack of personnel and infrastructure (screenhouse and greenhouse) for seed borne virus clean-up and seed increase
- Limited access to crop wild relatives (CWR) threatened in situ (*G. soja* and perennial *Glycine* species).

NPGS PGR Status & Impacts

- **Status:** Large (22,000+ accessions) collection stored at Urbana, IL; majority of collection is backed up at Ft. Collins, CO and Svalbard, Norway.
- Characterized with genetic markers (SSRs, SNPs, GBS).
- Agronomic and disease resistance traits evaluated.
- **Impacts:** NPGS source of resistance to diseases (e.g., soybean cyst nematode) and pests (e.g., aphids); tolerance of abiotic stresses (extreme temperatures, moisture). Improved germplasm lines developed and requested by public and private breeding programs.

Genetic research & breeding capacities

- ARS breeding and genetics programs at Urbana, IL and Stoneville, MS.
- U.S. university genetics and breeding programs.
- Robust commercial soybean breeding programs.
- New genomic tools: accelerated progress for breeding and understanding the structure of genetic diversity in soybeans and CWR.

Priority Issues

- Additional budgetary support for management capacity (storage, equipment, and personnel): maintenance; genetic characterizations; disease resistance and other evaluations (e.g., chemical composition); additional gap analyses and acquisition of additional CWR.
 - Increasing cold room storage space and storage conditions (need equipment that better maintains 4°C; and/or upgrade to -18°C)
- Additional funding of germplasm enhancement to improve yield/agronomics of diverse cultivars with host-plant resistances; tolerance/resilience to abiotic stresses; protein and food-grade traits; meeting emerging market demands.