

Crop Vulnerability Update for Potato

Vulnerabilities & Threats

- Susceptibility to many current, evolving and emerging pathogens and pests.
- Narrow US genetic base for commercial varieties.
- US production is input-intensive.
- Changing climates: hotter, drier—reducing yields.
- Some crop wild relatives (CWR) endangered in situ.
- Reduced budgetary support and operational capacity for breeding and plant genetic resource (PGR) management.

NPGS PGR Status & Impacts

- **Status:** Large collection (ca. 6000 accessions) with superior representation of CWR, managed as tubers and seeds in cold storage and greenhouses at Sturgeon Bay, WI. Accessions backed up at Ft. Collins and internationally.
- Rigorous disease and quarantine protocols in place, but add time and expense to germplasm import.
- **Impacts:** Protects and genetically improves top US vegetable with ca. \$4 Billion/yr production value, and up to 25 tons/acre state average yields.
- NPGS source of base germplasm for most new US potato varieties; host-plant resistance to many diseases and pests; base genetics for specialty potato varieties.

Genetic research & breeding capacities

- ARS breeding and genetics programs at Beltsville, MD/Orono, ME & Madison, WI. Prosser, WA & Aberdeen, ID collaborative breeding with CO, MI, MN TX, WI state projects; OR, ID, and WA state projects as NW Variety Development Program.
- Very high quality requirements for 30+ traits.
- Cultivar selection lengthy (10+ yr); need rapid reliable disease-free propagation methods.
- Pepsico-Frito and Michigan State provide genetic marker and genotyping-by-sequencing (GBS) data.
- Germplasm evaluations by public & private sectors.

Priority Issues

- Additional budgetary support crucial for expanded NPGS potato PGR management capacity, handling high PGR demand (80% of collection distributed/yr.), and additional PGR evaluations and genomic characterizations.
- Additional budgetary support crucial for expanded potato breeding capacity, especially for host-plant resistance to biotic stresses, tolerance to abiotic stresses, and input use efficiencies.
- Additional CWR should be acquired.
- See https://www.ars-grin.gov/nr6/tac/CGC_PotatoVuln2014.pdf for more info.