

## 2014 Potato Breeding Program Field Research Summary

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In 2014, the North Dakota State University Potato Breeding Project is conducting field research and producing certified seed potatoes at locations across North Dakota and western Minnesota. Research trials are grown at eight sites, and seed at three. This year we also planted a little show plot for an event at Peterson Farm Seeds. It is great to have the chance to showcase some of our beautiful cultivar releases. Field trials and seed production efforts are summarized here.

Non-irrigated (dryland) sites include Crystal, Hoople and Grand Forks, ND. The fresh market trials are planted on the farm of Dave and Andy Moquist (O.C. Schultz), just north and east of **Crystal**. Trials include the North Central Regional Potato Variety Trial (NCRPVT) with a new design and focus of fresh market types this year. The NDSU entries include ND6002-1R, ND7132-1R, ND7882b-7Russ, ND092242C-1R, ND102784B-3R, and ND113207-1R in the NCRPVT. The State Fresh Trial and the Preliminary Fresh Market trial are also planted at this site; state fresh trial has 22 promising red selections compared to industry checks. The preliminary fresh trial has 105 entries, including industry standards.

The focus of the trials at **Hoople, ND** is chip processing. This non-irrigated site on the Lloyd Oberg farm includes the state chip trial (24 promising selections and chip industry standards), the preliminary chip processing trial (65 entries), in addition to the National Chip Processing Trials (NCPT, unreplicated and replicated). The NCPT has goals to rapidly identify replacements for Snowden with long-term chip processing potential, and Atlantic, primarily to address its susceptibility to internal heat necrosis, while providing high yield potential and high specific gravity, and that can withstand production environments in the south. ND7799c-1 is an entry in the replicated National Trial.

We are focusing on Colorado Potato Beetle (CPB) resistance breeding efforts at the NPPGA research site south of **Grand Forks** and have two trials evaluating defoliation by this 'super' pest. Seventy three seedling families and 426 genotypes with CPB resistance breeding will be evaluated for defoliation levels. A second year of the trial addressing vine kill options using dessicant rate and timing to achieve optimum skin set for Dakota Ruby (ND8555-8R) is being conducted by Dr. Jose Rodriguez.

Irrigated trials are grown at Inkster, Larimore, Oakes, and Williston in North Dakota, and at Park Rapids, MN. The irrigated NRPVT fresh market trial and the irrigated State chip trial (20 advancing selections and industry checks) are planted at **Inkster, ND**, at the Forest River Colony under a linear irrigation system. A replicated trial to screen for Verticillium wilt resistance is a collaborative effort with Dr. Neil Gudmestad's program. In 2014, in collaboration with Dr. Harlene Hatterman-Valenti and Collin Auwarter, we also have a metribuzin sensitivity screening trial. Sixteen cultivars and selections are being evaluated. Information from these latter two trials is important for developing cultivar management information for potential cultivar releases.

The **Larimore** site is at the Hoverson Farms research mini-pivot built in support of potato improvement research efforts. Trials include the State processing trial (24 selections, cultivars and industry standards), the preliminary processing trial (101 entries), maintenance of out-of-state selections, and out-of-state seedlings. The National French Fry Processing trial (NFPT), supported by the USPB, is conducted at this location, with the goal of identifying russet selections with French Fry processing potential with low acrylamide levels. The processing trial at **Oakes** is conducted at the Oakes Research Extension Center. There are 22 entries in the 2014 trial including 13 advancing NDSU dual-purpose russet selections and nine industry standards. An irrigated processing trial is grown in cooperation with Dr. Jerry Bergman, Tyler Tjelde, Chuck Stadick, and Tom Rolfstad, at the Nesson Valley Irrigation Research Site, east of **Williston**. There are 22 entries including, 13 advancing NDSU dual-purpose russet selections and nine industry standards. This work is supported by the MonDak Economic Development group and the North Dakota Specialty Crops program. In 2014, a processing trial with 20 entries and a new scab evaluation trial with 80 entries are planted at **Park Rapids** on the RDO Farm.

Seed Production occurs at three locations. The seedling nursery is at **Langdon** at the Langdon Research Extension Center. The nursery is coordinated with the help of Dr. Randy Mehloff and his staff. The materials, representing 240 families, are entered for certification with the North Dakota State Seed Department (NDSSD). We anticipate selection at this nursery after Labor Day, in early to mid September.

Seed maintenance and increase lots are planted at **Absaraka, ND**, on the Ken McLean Farm, and at **Baker, MN**, on the James F. Thompson Farm. The Absaraka site is in collaboration with Dr. Gary Secor. The lots are entered for certification with the North Dakota State Seed Department and the Minnesota Department of Agriculture, respectively. Seed produced at these sites is used for maintenance, for trials, and is shared with research collaborators at NDSU and with research and potato industry collaborators in North Dakota, Minnesota, and around North America. Additionally, selections identified as having resistance to late blight via the detached leaf assay, and those identified as possessing resistance to PVY via marker-assisted selection, are fast-tracked for agronomic evaluation.

Additional trials are grown at some of these sites described listed above, and also at Prosper, ND, by our cooperating colleagues in Plant Pathology. Dr. Gary Secor's research group conducts late blight resistance evaluations, at the NDSU Prosper site. Dr. Neil Gudmestad and Dr. Ray Taylor evaluate pink rot, Pythium leak and *Phytophthora nicotianae* resistance of advancing NDSU selections and parental genotypes from materials grown at Inkster. On campus, seedling and minituber production is underway in the Agricultural Experiment Station Greenhouse complex. Finally, we are working with Dr. Ian MacRae evaluating the possibility of employing remote sensing for PVY detection, in consultation with Dr. Neil Gudmestad and Willem Schrage.