As in previous years, the North Dakota State University Potato Breeding Project is conducting field research and producing certified seed at locations across North Dakota and western Minnesota. Research trials are grown at eight sites, and seed production in 2016 is taking place at one site. Our field research and seed production efforts are summarized here:

Non-irrigated research sites include Crystal, Hoople and Grand Forks, ND. The fresh market trials are conducted 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) which was revamped a few years ago to focus on the fresh market sector. NDSU entries include ND6002-1R, ND6961B-21PY, ND7818-1Y, ND7834-2P, ND7982-1R, and AND99331-2PintoY. The Fresh Trial includes 30 entries, 20 advancing selections and 10 industry standards. Skin and flesh colors vary from the standard red skinned/white fleshed, to purple skinned/yellow fleshed genotypes. The Preliminary Fresh Market Trial has 30 entries, 19 selections (primarily red skinned and white fleshed) compared to 11 industry standards. Lloyd, Steve and Jamie Oberg host the trials at Hoople, ND, focused on chip processing. The non-irrigated Chip Trial includes 15 promising advancing selections compared to 9 chip industry standards. The National Chip Processing Trial (NCPT), with the goal of rapidly identifying 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 include 97 unreplicated selections (Tier 1) and 40 replicated entries (Tier 2) from US potato breeding programs. NDSU selections entered in Tier 1 include ND4100C-19, ND5255-59, ND102642C-2, ND102858CB-2, ND102921C-3, ND113278-3, and ND113394CAB-7. Two defoliation trials focusing on Colorado Potato Beetle (CPB) resistance breeding efforts are planted at the NPPGA Research Farm south of Grand Forks. Fifty seedling families and 215 genotypes with CPB resistance breeding will be evaluated for defoliation. Materials include families and selections with glycoalkaloid mediated resistance, glandular trichomes, and some with both resistance mechanisms stacked. In collaboration with Dr. Darrin Haagenson from the USDA Potato Worksite at East Grand Forks, MN, a third trial with a focus on developing Colorado Potato Beetle resistance is being conducted. Foliar and tuber tissue of 24 genotypes will be assessed for their glycoalkaloid profiles. A replicated trial addressing vine kill options using dessicant rate and timing to achieve optimum skin set for Dakota Ruby (ND8555-8R) is being conducted with three cultivars and four vine kill treatments. Finally, Steffen Falde, a Plant Sciences Masters student, has a field trial looking at the potential use of remote sensing to evaluate PVY infection of potato fields. This project is funded through the North Dakota Department of Agriculture’s Specialty Crops Block Grant Program (NOGA 14-208 and ND 15-0026) and is evaluating chlorophyll content and reflectance of 12 cultivars inoculated with two PVY strains (separately), compared to the uninfected controls.

Irrigated trials are grown at Inkster, Larimore, Oakes, and Williston, ND, and at Park Rapids, MN. The trial at Inkster, at the Forest River Colony, conducted in collaboration with Dr. Harlene Hatterman-Valenti is a metribuzin sensitivity screening trial, evaluating 26 advancing selections and cultivars. Information from this trials is important for developing cultivar management information for new and potential cultivar releases. The Larimore site is hosted by Carl, Michael and Casey Hoverson at Hoverson Farms, and includes the Processing Trial (36 selections, cultivars and industry standards), the preliminary processing trial (88 entries),
maintenance of out-of-state selections, and out-of-state seedlings (about 26,000 from the ID, ME and TX programs). 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; 44 selections from US breeding programs are being compared to Russet Burbank and Ranger Russet. NDSU entries include ND050032-4Russ, ND070927-2Russ, ND091938BR-2Russ, ND092007R-2Russ, and ND092355CR-2Russ. The irrigated NCRPVT fresh market trial (30 entries including the NDSU lines listed above) and the irrigated Chip Processing Trial (15 advancing selections and nine industry checks) are planted at this site. The Preliminary Chip Processing Trial with 68 entries was moved to this site for the first time and a new trial in 2016 is in collaboration with a group of researchers in the Pacific Northwest assessing glycoalkaloid content of PNW breeding selections and cultivar releases grown in different US production areas. The trial at Oakes is conducted at the Oakes Research Extension Center. There are 18 entries including 10 advancing dual-purpose russet selections and industry standards and 8 fresh market selections and industry checks (red skinned/white flesh, yellows, etc.). A similar trial is being conducted at the Nesson Valley Irrigation Research Site, east of Williston, in cooperation with Dr. Jerry Bergman and Tyler Tjelde. Trials at Park Rapids on the RDO Farm include the processing trial with 16 entries, a common scab evaluation trial with 28 entries across market types, and our replicated screening trial for Verticillium wilt resistance, conducted in collaboration with Dr. Neil Gudmestad’s program. Twenty-five genotypes across market types are being evaluated.

In 2016, the seedling nursery, along with seed maintenance and increase lots are planted near Baker, MN, on the James F. Thompson Farm. Single hills from 211 families are being evaluated and are entered for certification with the Minnesota Department of Agriculture. We anticipate selection at this nursery after Labor Day, in early to mid September. Seed produced is used for seed maintenance and increase, for research trials, and is shared with research collaborators at NDSU and with research and industry collaborators in North Dakota, Minnesota, and across North America. Additionally, several selections from the INIA program at Osorno, Chile are being increased and evaluated for adaptation in collaboration with Drs. Gary Secor and Julio Kalazich, the INIA potato breeder.