

# Potato Breeding Report 2018

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## Certified Seed Acreage

Figure 1 shows the 2016–2018 certified seed acreage for UW-Madison varieties released in the past 10 years. For chip processing, the 2010 release ‘Accumulator’ has a small but steady following in Maine; acreage for the 2010 release ‘Nicolet’ appears to be increasing; and the 2015 release ‘Hodag’ is undergoing commercial-scale evaluation by several growers. For the red fresh market, the 2014 release ‘Red Endeavor’ appears to be gaining traction in Washington state, where the longer growing season enables better management of skin set. Acreage of the 2016 release W8405-1R, which was named ‘Red Prairie’ by the SpudPro committee this past year (Figure 2), continued its upward trajectory in 2018. The 2017 release W8893-1R is also starting to get commercial exposure and “turning heads” with its beautiful appearance (Figure 3). Figure 4 compares the yield and tuber size of Red Prairie and W8893-1R against Dark Red Norland over the past four years. In the russet category, the 2017 release W9133-1rus is targeted to the early fresh market and stands out for its full shape and blocky ends. The 2018 release W9433-1rus bulks extremely quickly but has later maturity and lighter skin. We also released W9576-11Y for the yellow market in 2018.

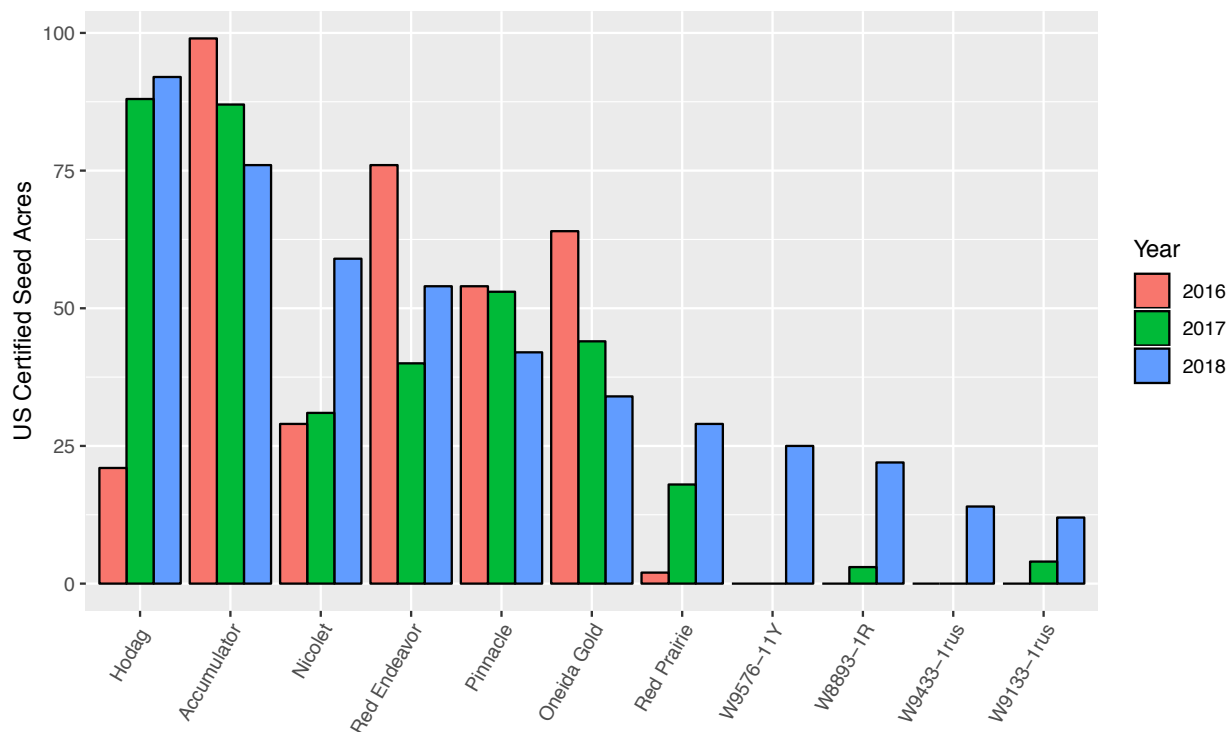


Figure 1. US Certified Seed Acreage for UW-Madison varieties.



**Tuber Appearance:** Shallow eyes, oblong shape, skin color similar to Red Norland

**Yield Potential:** Consistently one of the highest yielding clones in small plot trials across Upper Midwest

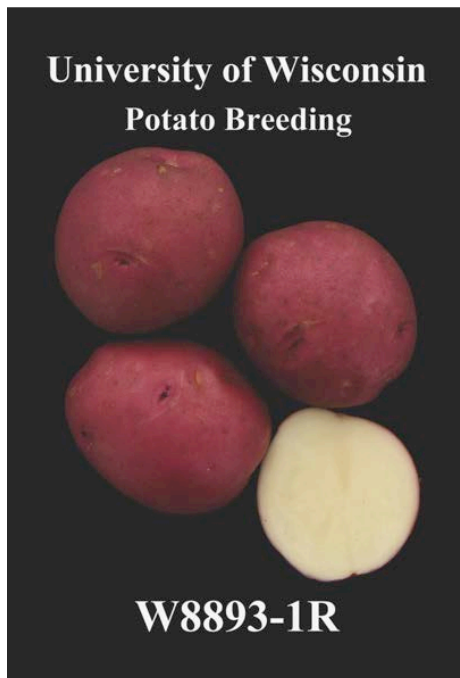
**Tuber Set:** About 5 more tubers per plant than Red Norland

**Maturity:** 7–10 days later than Red Norland. Skin set has been comparable to Chieftain in WI Central Sands

**Internals:** Resistant to hollow heart, slightly susceptible to internal brown spot

**Common scab:** Average tolerance

Figure 2. Red Prairie, released in 2016.



**Parentage:** W1101R x Dakota Rose

W8893-1R is a potential replacement for Dark Red Norland (DRN), with similar vine maturity, skin set, common scab tolerance, and Verticillium wilt susceptibility.

Relative strengths of W8893-1R:

1. Darker red skin
2. Uniform and stable red color
3. Tuber appearance (round shape, shallow eyes)

W8893-1R produces 2-3 more tubers per plant than DRN, which leads to a smaller size distribution.

W8893-1R has similar total yield as DRN 90 days after planting but yields 10% less after 120 days.

Figure 3. W8893-1R, released in 2017.

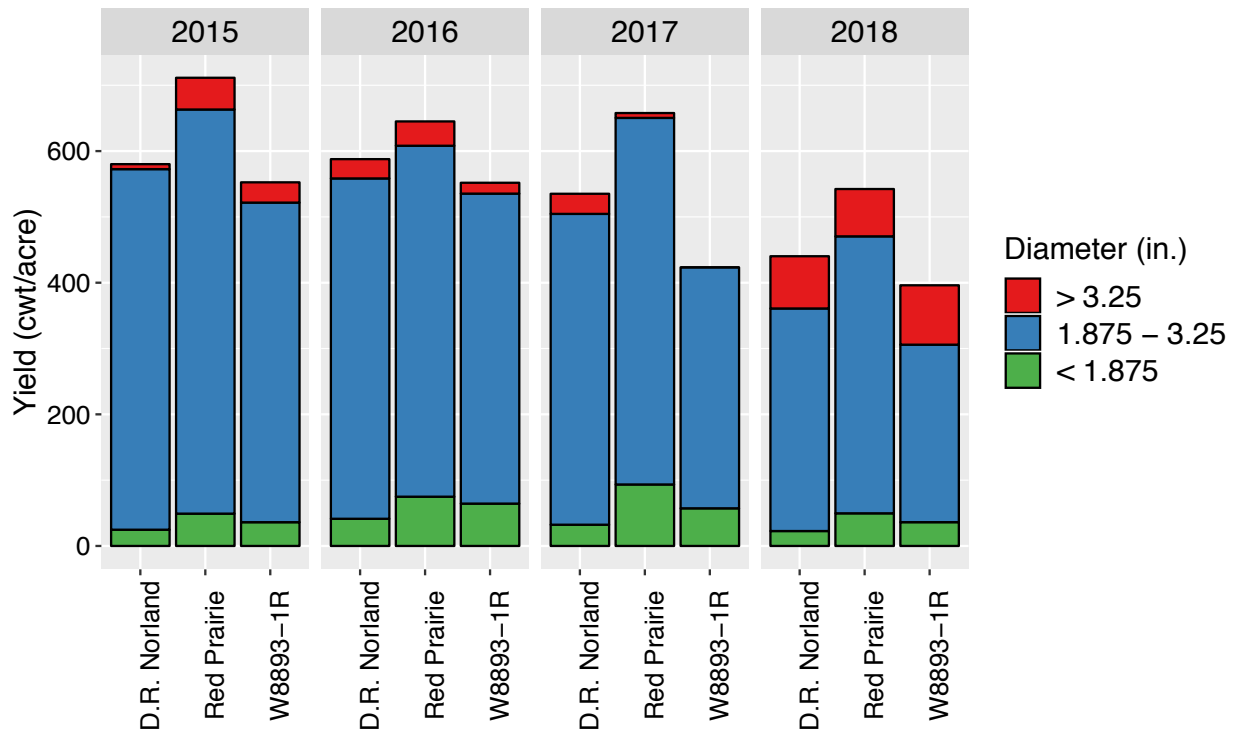


Figure 4. Yield and size comparison between Dark Red (D.R.) Norland, Red Prairie (W8405-1R), and W8893-1R, grown at the Hancock Agricultural Research Station. The first vine-kill application was 100–110 days after planting (depending on year).

### Advanced Chip Processing Clones

**W9968-5** (Fasan x Nicolet) was evaluated for a second year in the national SNAC trial in 2018. Its strengths were high specific gravity (comparable to Atlantic) and yield. Several locations reported stem-end defects in the 2018 trial, so the clone has been discontinued from the Potatoes USA Fast Track program.

**W12078-76** (Hodag x Lelah) had the highest average merit score among Tier 1 clones in the National Chip Processing Trial in 2017. It performed well again in 2018 (top 25% of Tier 2 clones) with respect to agronomics and fry quality but was in the bottom quartile for tolerance to common scab.

### Advanced Fry Processing Clones

**W9742-3rus** (A99134-1 x Dakota Russet) graduated from the National Fry Processing Trial in 2017, having earned consistently high marks for tuber type and agronomics. It has high specific gravity (higher than Ranger Russet), often exceeding 1.090 at the Hancock Research Station. Overall fry color has been good across years, with a low incidence of sugar end defects (Fig. 5). In 2018 it was tested at several locations across North America by fry processing companies.



Figure 5. Fry performance of W9742-3rus vs. Russet Burbank after 1 month of storage at the Hancock Research Station.

### Breeding for Late Blight Resistance

The UW-Madison program is utilizing several sources of late blight resistance for breeding. Our initial focus was on the *R8* gene, which is present in the cultivars Jacqueline Lee and Missaukee from Michigan State University. Based on the published sequence of this gene, a genetic marker was developed (Figure 6) and used to screen 13 clones from the UW program. Six clones were identified as containing *R8*, and two of these had sufficient agronomic merit to use as parents in the 2018 crossing block.

For russet breeding, we have utilized Payette Russet as a source of resistance, which is a 2015 release from the Tri-State Variety Development program. Payette has shown strong resistance to the US-23 strain of *P. infestans* in Michigan field trials, as well as in a whole-plant bioassay we conducted last year (Figure 7). The identity of the resistance gene in Payette is unknown, but experiments are underway to identify it.

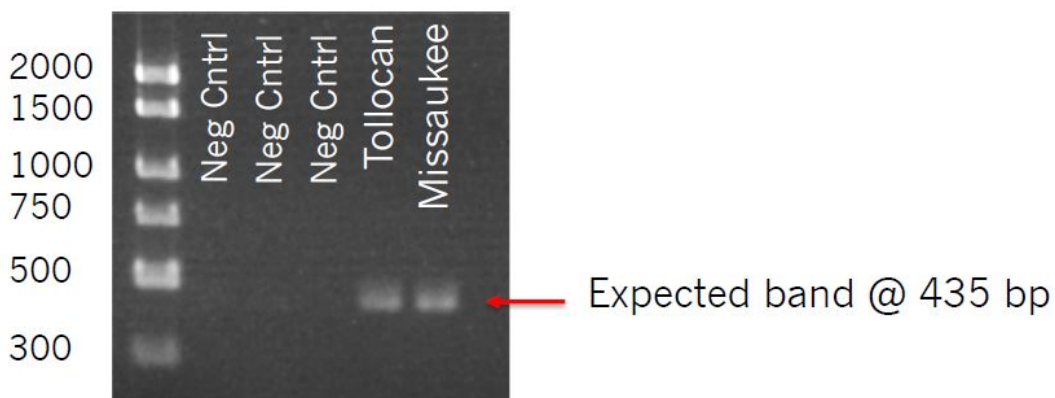


Figure 6. Development of a DNA marker for *R8* resistance to late blight, which is present in Missaukee and its parent Tollocan.



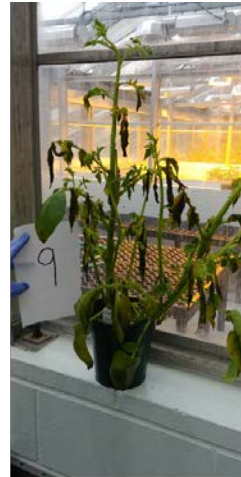
No lesions, healthy plant



~ 25% of foliage with small or medium lesions, mild chlorosis



~ 75% of foliage with large lesions, moderate chlorosis



100% of foliage affected, severe rot

Figure 7. Photos from a whole plant bioassay with the US-23 strain of *P. infestans*, conducted at UW-Madison. The most resistant clone in the experiment, pictured on the far left, was Payette Russet.