

# **The Potato Seed Lot Trial: What the Past 46 Years Tell us about the Future**

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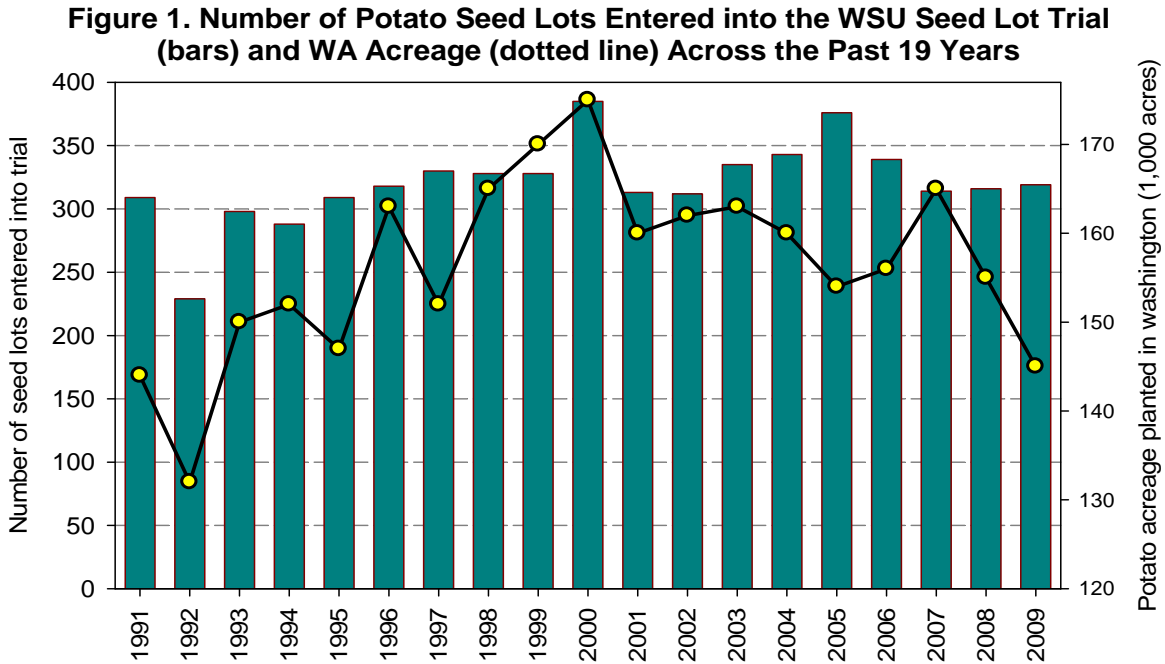
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## **INTRODUCTION**

Poor quality potato seed will impact commercial grower income. Major quality factors are disease, virus, herbicide damage, frost damage, and seed-piece handling. Commercial potato growers typically purchase their seed potatoes from seed-growing regions which typically lie outside of Washington. For quality control, it is essential that each seed lot be grown under controlled conditions for approximately 70 days and evaluated by professionals. The Seed Lot Trial provides Washington potato growers, seed suppliers and handlers a side-by-side comparison of seed lots utilized by Washington commercial potato producers. The potato field day provides potato buyers and sellers an opportunity to observe performance of seed lots of common interest and discuss results. To improve field disease diagnostic skills, WSU, USDA and potato industry personnel exchange ideas and share expertise on field diagnosis of disease symptoms and other seed tuber quality factors. Demonstration trials provide an opportunity for individuals of the Washington Potato Industry to evaluate new and/or different varieties and technology for potential use in their operation.

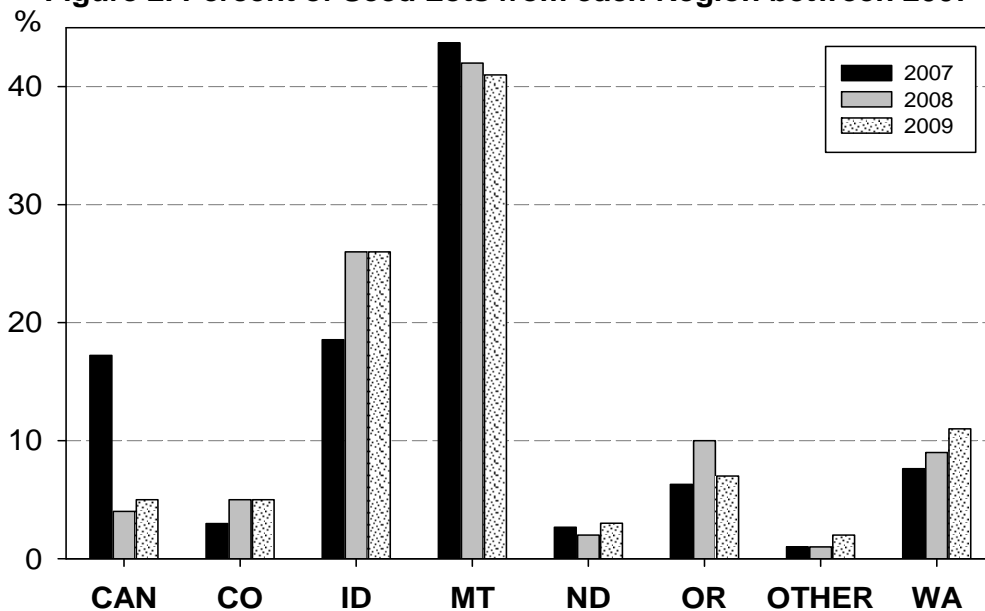
We continue to improve our seed lot reading accuracy. Our plant readers utilize real-time in-field test kits for PVY. The PVY tests allow readers the opportunity to “gauge their eyes” for each cultivar and to test plants exhibiting less-than-obvious symptoms. We continue to incorporate a virus/disease reading training session into our program as a routine requirement prior to the first field reading. The goal of the training session was to utilize expertise from experienced pathologists and seed certification and industry personnel in an effort to aide all who participated in the Washington State potato seed lot screening. All plants in the trial are “proof read” by professionals following general seed lot readings to further reduce false readings and improve the quality of the seed lot trial. The results are available “Washington Commercial Seed Lot Trials” at [www.potatoes.wsu.edu](http://www.potatoes.wsu.edu).

Potato seed lot samples entered into the commercial seed lot trial were up slightly from the previous two years. There were 319 seed lots submitted this year, compared with 316 in 2008 and 314 in 2007 (Figure 1, bars). Potato acreage in 2009 was down 6% from 2008 and 9 percent from 2007 (Figure 1, dotted line).



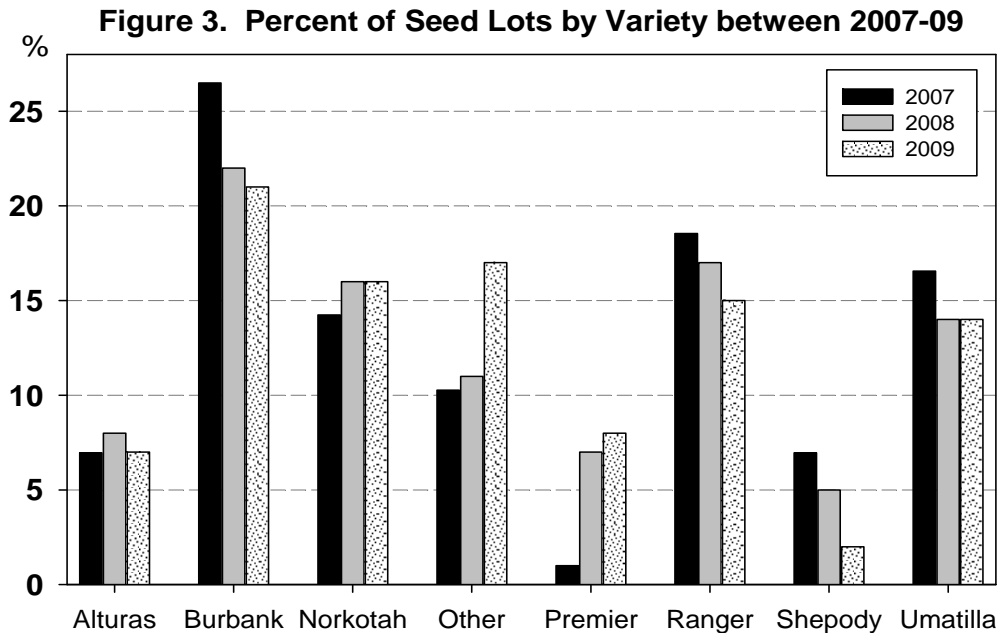
Canada-supplied seed lots are on the increase following the 2008 reopening of the U.S./Canadian border to Alberta-grown seed potatoes (Figure 2). MT seed lot numbers have declined steadily over the past three years, while WA, ND, and “Other” regions have increased slightly. The interest in new varieties is on the rise and some of these other regions may be experiencing growth as growers search for and buy any and all available seed.

**Figure 2. Percent of Seed Lots from each Region between 2007-09**



Russet Burbank, Ranger, and Shepody seed lots have experienced a steady decline over the past several years while samples of Premier Russet and “Other” varieties have jumped dramatically (Figure 3). Alturas, Norkotah, and Umatilla seed lot numbers remained mostly unchanged.

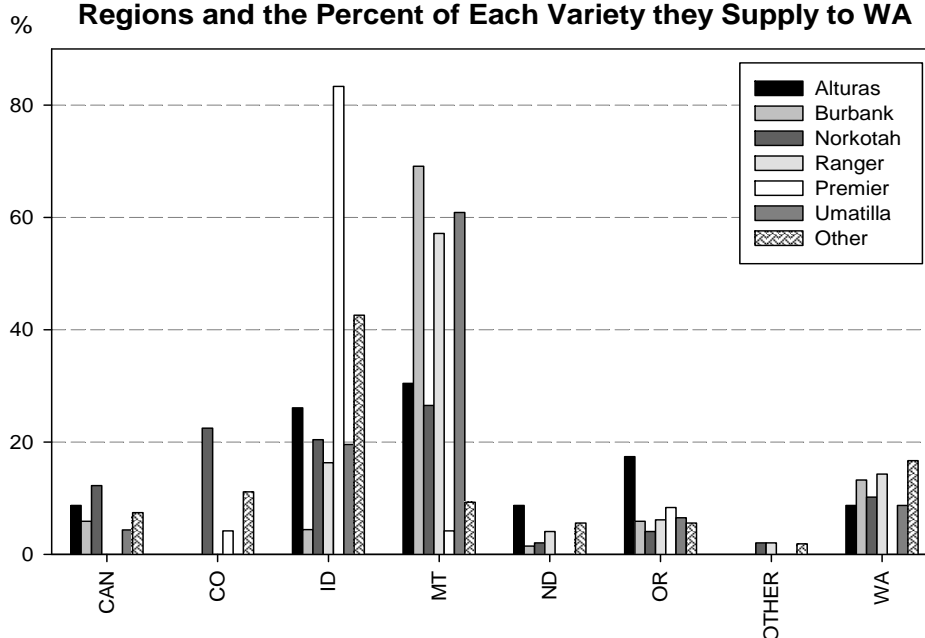
Varieties developed by the Northwest Potato Variety Development Program/PVMI accounted for 49% of the seed lots entered into the 2009 trial and included: Premier Russet, Classic Russet, Alpine Russet, Blazer Russet, Clearwater Russet, Highland Russet, Yukon Gem, Western Russet, Alturas, Ranger, Umatilla, and A88338-1.



Russet Burbank, Shepody, and Ranger Russet seed lot numbers dropped over the past two years, while Premier Russet and “Other” varieties increased (Figure 3). The “Other” variety category has continued to increase over the past 3 years, possibly indicating an increase in the number of attractive, new cultivars being offered on the market place. For the first time, the “other” category makes up 17% of the varieties entered in the seed lot and is second only to Russet Burbank.

Based on the seed lots received in 2009, Montana, Idaho, Oregon, Washington and Canada continue to provide Washington growers with a wide selection of varieties (Figure 4), while Colorado and the “other” regions appear to specialize by offering fewer varieties. Idaho appears to have contributed the lion’s share of Premier Russet. Although it’s important to note that the seed lot samples may not provide a fair representation of what is actually available from each seed region. It does, however, represent what many Washington growers purchased from each region.

**Figure 4. 2009 Washington Seed Lot Profile - Seed Growing Regions and the Percent of Each Variety they Supply to WA**



**Disease Content (Tables 1-3, Figures 6 & 7)**

**Leaf Roll** – Leaf Roll continues to decline in incidence and is becoming rare (Table 1). This is likely due to the use of new pesticide chemistries in the seed growing regions. Leaf Roll appears to have become a non-issue in the commercial seed lots.

	2005	2006	2007	2008	2009
Disease	%	%	%	%	%
Leaf Roll	4	5	3	3	0.6
Black Leg	11	10	14	23	10
Mosaic	45	42	42	39	30

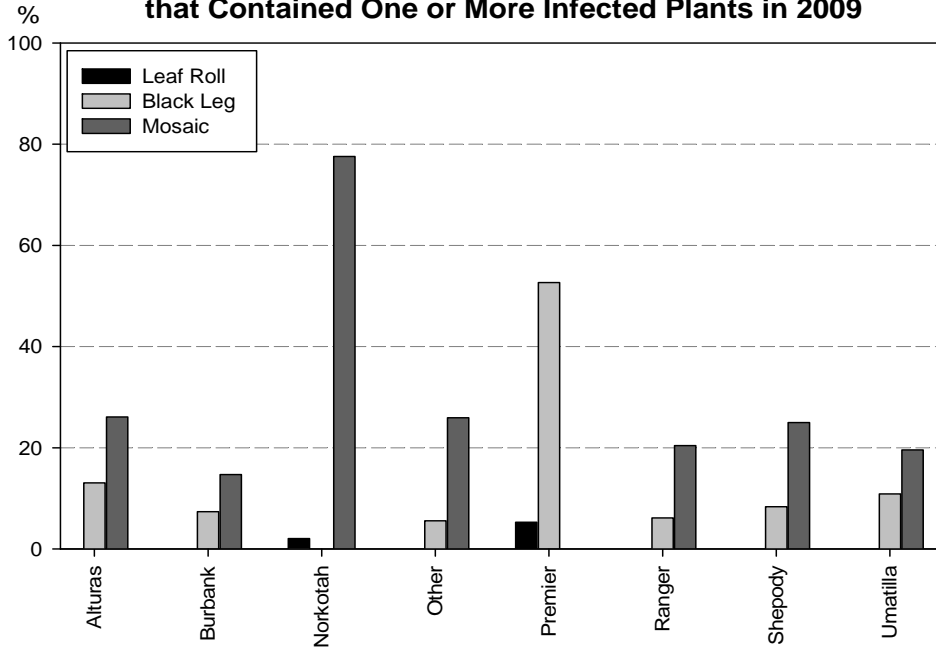
**Black Leg** – Ten percent of the 319 seed lots in the 2009 trial contained one or more plants showing black leg symptoms, compared to 23% in 2008 (Table 1). Only 1% of the seed lots had 10 or more Black Leg infected plants (Table 2). Similar to 2008, many Premier Russet contained black leg in 2009 (Figure 5) and 5% of the Premier seed lots had severe black leg (>10 plants) (Figure 6.) Because the variety is somewhat new to the system, seed growers may need a few years of trial and error before they determine the best way to grow and harvest Premier while also reducing black leg. Already, we see improvement in Premier when the 2009 seed lot readings are compared to 2008. Idaho and Oregon had the highest occurrence of severe black leg (Figure 7). None of the other regions provided seed lots with severe black leg infection.

**Table 2.**

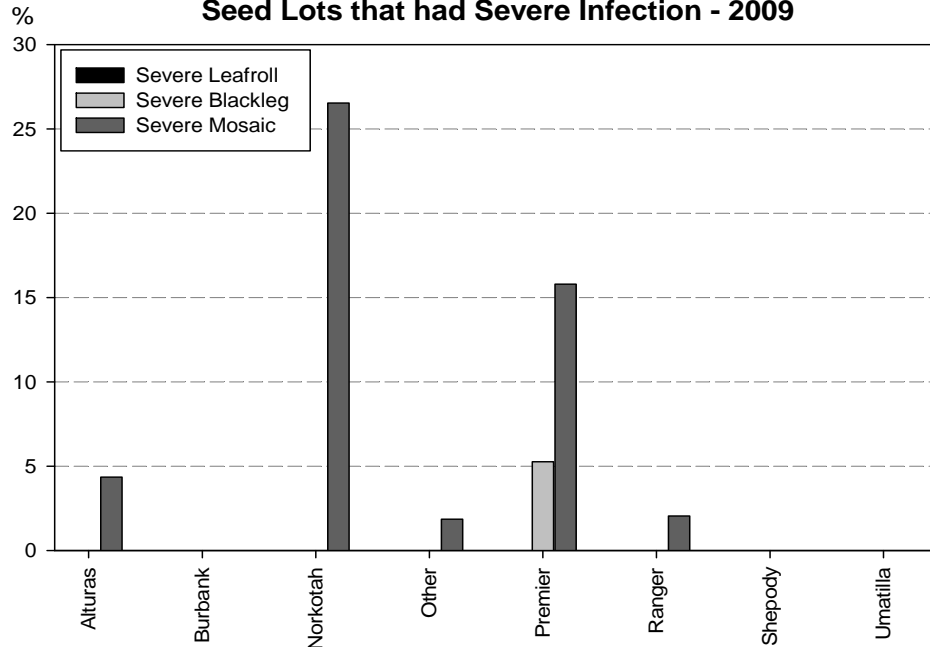
**2009 Seed Lots with Severe Disease Loads (>10 Plants)**

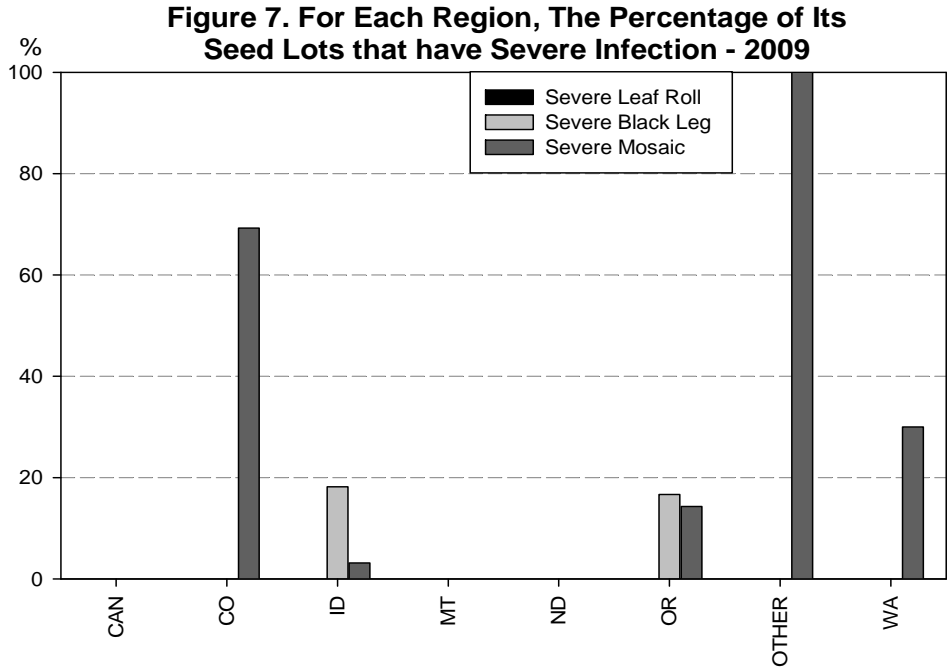
Disease	%	
	<u>Total Lots with Disease</u>	<u>Lots with &gt;10 Infected Plants</u>
Leaf Roll	0.6	0
Black Leg	10	1
Mosaic	30	5

**Figure 5. For Each Variety, The Percentage of Seed Lots that Contained One or More Infected Plants in 2009**



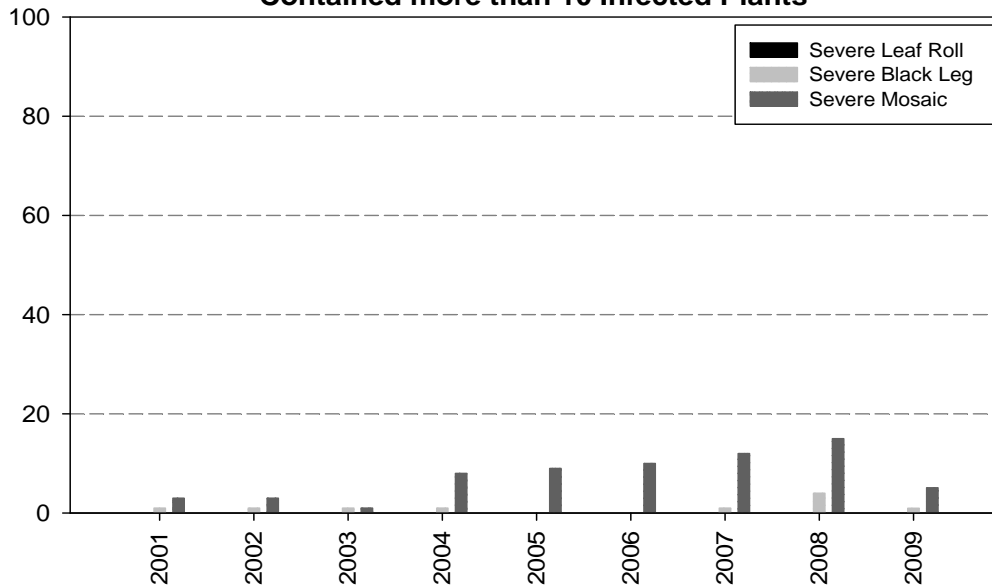
**Figure 6. For Each Variety, The Percentage of Its Seed Lots that had Severe Infection - 2009**





**Mosaic** – Mosaic remains a concern (Tables 1-2, Figures 5, 6 & 7) but appears to have declined in incidence and severity from the previous five years. Thirty percent of the 2009 seed lots had some level of mosaic (Table 1). However, only 5% of the 2009 seed lots had severe infection compared with 15% in 2008 (Table 2, Figure 8). The increase over the past several years was likely due to the increase in PVY-sensitive varieties like Norkotah and the Norkotah strains and perhaps a change in pesticides and their management. The sudden decrease from 2008 may be the result of intense efforts from state certification agencies and the Western Regional Coordinating Committee for Potato Virus and Disease Control (WERA-89). Both these sets of organizations have been working together to combat all potato diseases, especially PVY. A huge drop in PVY was seen between the 2008 and 2009 Idaho seed lots (data not shown). This is most likely due to an overhaul of their testing procedures. Colorado, WA, and the “Other” locations provided the most seed lots with severe mosaic (>10 plants) in 2009 (Figure 7).

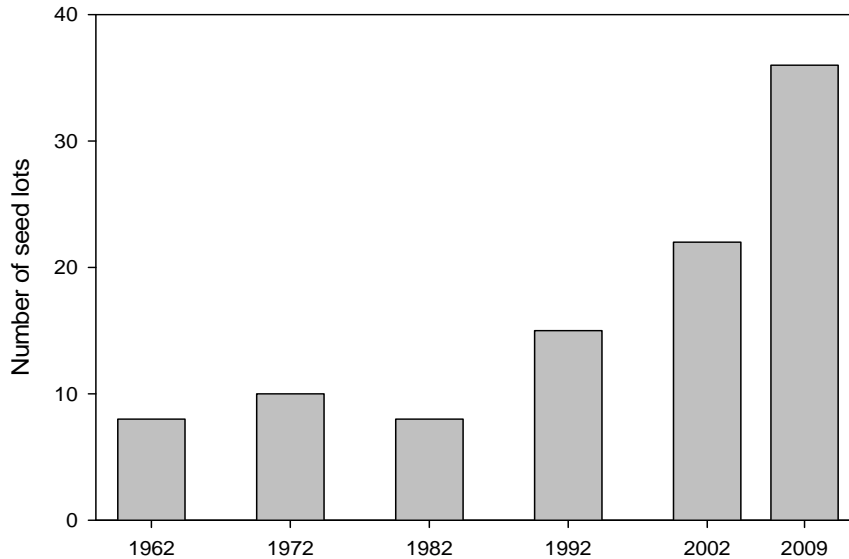
**Figure 8. Percent of Total Seed Lots that Contained more than 10 Infected Plants**



**HISTORICAL DATA**

Washington State University has conducted the seed lot trial in cooperation with the Washington State Potato Commission and industry for 45 years (1961-78, 1982-2009). The number of varieties entered in to the trial over the project’s duration is shown below (Figure 9). Below, we list the top six cultivars from 1962-2009, listed in 10 year increments, or less. The data showed us what we already suspected – we are growing a lot more varieties now than we were in the past. In 1962, only eight varieties were entered into the trial. In 2009 there were thirty six entries.

**Figure 9. Number of Potato Varieties and Variety Strains entered into the WSU Seed Lot Trial Since 1962.**



## TOP SIX VARIETIES ENTERED INTO THE SEED LOT TRIAL EACH YEAR

**1962 :** Russet Burbank 84%, White Rose 5%, Early Gem 4%, Dazoc 2%, Others 2%, Norland 1%.

**1972:** Russet Burbank 66%, Norgold 28%, Kennebec 3%, Others 2%, Red Pontiac 1%, Norchip 1%, Norland 1%.

**1982:** Russet Burbank 70%, Norgold 15%, Lemhi 7%, Others 2%, Kennebec 2%, Nooksack 2%, Butte 1%.

**1992:** Russet Burbank 45%, Russet Norkotah 26%, Shepody 13%, Ranger 6%, Others 6%, Nooksack 3%, Yukon Gold 2%.

**2002:** Russet Burbank 31%, Ranger 24%, Russet Norkotah 13%, Umatilla 13%, Shepody 8%, Others 7%, Alturas 5%.

**2008:** Russet Burbank 22%, Ranger 17%, Russet Norkotah 16%, Umatilla 14%, Others 11%, Alturas 7%, Shepody 7%.

**2009:** Russet Burbank 22%, Others 17%, Ranger 16%, Russet Norkotah 16%, Umatilla 15%, Alturas 7%, Premier 8%.

### SUMMARY:

Seed lots planted in Washington are entered into the seed lot trial and examined for seed-borne diseases and chemical carry-over. In essence, the seed lot trial serves as a quality control instrument for Washington growers and associated seed producers. It also provides a historical gauge of the health of the seed growing industry.

Overall, PVY incidence and severity dropped from last year. This is likely due to intensive efforts by state certification agencies and the Western Regional Coordinating Committee for Potato Virus and Disease Control (WERA-89). The true test will be whether or not the lower level can be maintained, or even reduced. **Norkotah continues to contain unacceptable levels of PVY**; close to 80% of the seed lots containing one or more plants displaying PVY symptoms. In addition, more than 25% of the infected Norkotah seed lots were loaded with severe PVY infection. Out of all of the main seed contributors to Washington, **Colorado continues to provide the most seed lots infected with PVY**. Potato breeding projects are aware of the problem and are focusing on developing PVY resistant varieties.

On the upside, leaf roll has virtually disappeared. This decline is likely due to better pesticides, management, and certification. The public exposure coming from the Washington State seed lot trial has likely helped “push” many of the seed producers into top-tier crop management; and for that, we are thankful. All other diseases and conditions seem to be acceptably low, although blackleg is still a concern.

Due to successful breeding programs and the on-set of the Plant Variety Protection Act (PVP), seed growers – now more than ever - need to make sure they do their homework before committing to a new variety.



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