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Andrew Jensen, Editor. Submit articles and comments to: ajensen@potatoes.com
108 Interlake Rd., Moses Lake, WA 98837; Fax: 509-765-4853; Phone: 509-765-8845.

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# A Study of Specialty Clones' Yield Performance in Early and Late Harvests

**Chuck Brown[1], J. M. Crosslin[1], Richard Halvorson[2], Robert Halvorson[2], Dave Halvorson[2], R. Quick[1], L. Hamlin[1], W. Hutson[1], R. Castañeda[1], R. DeLorme[1]**

**[1] USDA/ARS, Prosser, WA, [2] Halvorson Farms, LLC**

Specialty potato varieties have options for market niches. This includes mainstream fresh market channels, but also customers that are searching for small sizes and are willing to pay premium prices. We planted a number of trials on the Halvorson farms in Toppenish, Washington. This area is renowned for early harvested of red-skinned varieties with intense color. The potato fields are rill irrigated from canals. These clones were planted April 1 and water was cut off from the early harvest on June 30 and July 30 in the late harvest. Actual harvest and removal from the field was conducted on both groups on August 20, 2008. The data are expressed in hundredweights per acre (cwt/A) of the different size classes. Upon first examination it is apparent that the early water cutoff has a large effect on total yield (Figure 1). In the early trial only one clone achieved 600 cwt/A of total yield and all the rest were at 400 cwt or lower. In the late harvest two clones stood at 600 cwt, four at 500 cwt, and two at 450 cwt. All of these clones expanded their "under 4 oz." size category comparing early to late water cutoff. Although POR06PG57-4 was the top clone as far as total yield, it expanded its "under 4 oz." and "4 to 6 oz." size yield from 125 to 250 cwt/A. The clone POR06 PG48-2 doubled its total yield with the extended availability of water. Clone POR06PG48-1 more than doubled its total yield from 200 to 525 cwt/A. The clones POR05PG10-1 and POR06PG24-1, originally selected for a production of the smallest size category, increased their "under 4 oz." yield from approximately 100 to 200 cwt/A. The responses from these four clones illustrate a point about genotypes that differ in their performance under an early harvest and later harvest scheme. It is possible to push the small tuber set genotypes to substantially increase their small size yield with extra time and water. The genotypes that are high yielding with representation in all size categories "57-4" and "48-2," in contrast, expanded total yield and other size categories dramatically. These clones may in the end be more profitable for the grower because there is product that is suitable for multiple market niches. For the "small potato" market a variety that has substantially higher set of small tubers would be ideal. The "10-1" and "24-2" produce yields that are too small for both early and late harvests. Future efforts in breeding and selection will focus on extremely high set small potato genotypes and high varied size yield with substantial representation in the under 4 oz. category and the capacity to expand that category with additional growth time and water.

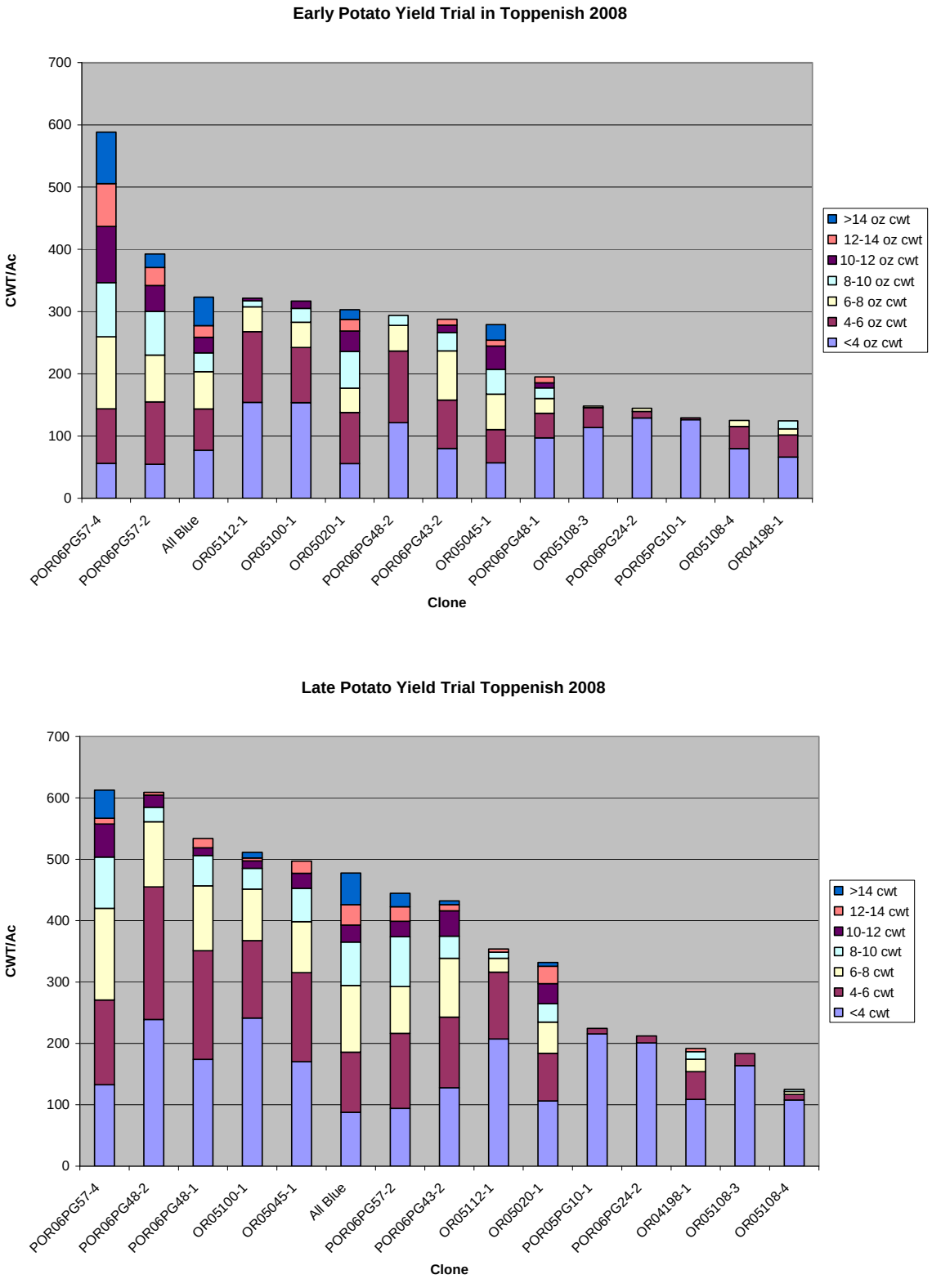


Figure 1. Total yield and yield of different size categories where one group experienced and early water cutoff and the late group had water for an extra month.

# Finding Resistance in Potato Germplasm to the Potato Tuberworm

**Silvia I. Rondon**
**Oregon State University, Hermiston Agricultural Research and Extension Center, Crop and Soil Science, Hermiston, OR 97838**

The evaluation of potato germplasm for resistance to potato tuberworm is a valuable tool to integrate in tuberworm management programs; however, few attempts have been made to identify varieties/cultivars resistant to tuberworm. Thus, we conducted a study over a 2-year period at the Hermiston Agricultural Research and Extension Center (HAREC) in Hermiston, Oregon. In 2006 and 2007, clones representing potato germplasm from several sources were evaluated. Potato entries were planted at HAREC to obtain tubers for testing. Plots were planted and maintained using agronomic practices standard for the region. Overall, 125 germplasm were screened in the field and in the laboratory (partial list presented in Table 1). For field experiments, field material was harvested following standard procedures. Two tubers per germplasm were placed back in the field (Fig. 1).


**Fig. 1 Field setting: two tubers per repetition per cultivar.**

Tubers were not covered with soil and were placed on the surface of the soil exposed to natural populations of potato tuberworm for 15 days and retrieved before frost. Tubers were placed in marked paper bags and stored before they were sliced and graded. The number of eyes per tuber, number of mines per tuber and live larvae were counted per each tuber.

In the laboratory, individual tubers were placed in containers with 50 tuberworm eggs laid in paper filter placed on the tubers near eyes. After allowing time for hatching and infestation, tubers were carefully sliced and scored. Germplasm with less than one hole per tuber were considered highly resistant; one to two holes were considered

resistant, two to four susceptible and more than four holes highly susceptible (Fig. 2). Tubers of Spunta G2 were used as control. All germplasm tested in this study, including commercial varieties Russet Burbank and Ranger Russet, showed susceptibility to tuberworm although some germplasm such as T88-4, Q174, NY123 and PA00N10-5 had fairly low numbers of mines and larvae in the field and laboratory experiments; in some cases significantly less than the standard commercial lines. This suggests a promising characteristic.

Incorporation of host plant resistance to tuber penetration by larvae together with appropriate cultural practices including limitation of exposure time of tubers in the field may provide the best management option in the future.

**Table 1.** Partial list of the germplasm for the field and laboratory potato tuberworm resistance studies, Hermiston, OR (Rondon et al. 2009)

| Germplasm | Origin | Pedigree |
|---|---|---|
| A0008-1TE | Pacific Northwest Tri-State | Blazer Russet X A95109-1 |
| A970066-42LB | Pacific Northwest Tri-State | AWN86514-2 X A86102-6 |
| PA00N10-5 | Pacific Northwest Tri-State | PA95A14-22 X Russet Bulk A |
| PA99N2-1 | Pacific Northwest Tri-State | AO84275-3 X G6582-3 |
| PA99N82-4 | Pacific Northwest Tri-State | PA95B4-149 X Russet Bulk |
| PACIENCIA | International Potato Center | *S. tuberosum* Group a*ndigena* |
| RUBI | International Potato Center | *S. tuberosum* Group *andigena* |
| NY123 | New York | Advanced hybrids with *S. berthaultii* |
| Q174-2 | New York | Advanced hybrids with *S. berthaultii* |
| T88-4 | New York | Advanced hybrids with *S. berthaultii* (N142-72 X Pike) |
| R. BURBANK | Commercial | Early Rose X Unknown |
| R. RANGER | Commercial | Butte X A6595-3 |
| SPUNTA G2 | Michigan | *Bacillus thüringensis* Bt-Cry5 gene |

Information from:

Rondon, S.I., D. Hane, C.R. Brown, M.I. Vales, and M. Dŏgramaci. 2009. Resistance of potato germplasm to the potato tuberworm (Lepidoptera: Gelechiidae). J. Econ. Entomol. 102: 1649-1653.

Rondon S.I., OSU, HAREC; D. Hane, OSU, HAREC; C.R. Brown, USDA-ARS; M.I. Vales, OSU, Crop & Soil Science; M. Dogramaci, OSU Posdoc 2006-07.

For more information regarding this article, contact email silvia.rondon@oregonstate.edu

Fig. 2 Potato tuberworm damage.

# Potato Late Blight

See also: http://www.potatoes.com/research.cfm

## Tuber Late Blight



Tuber infection begins superficially, but can invade entire tuber. Sporulation can occur on cut or uncut tubers.

## Management

1. Prevention is key
2. Harvest during dry weather
3. Tuber temperatures going into storage should be less than 68 F
4. Mancozeb and metiram fungicides on the soil surface late season may help prevent tuber infection
5. Foliar applications of phosphorous acid at harvest and in storage can reduce late blight tuber rot
6. Late blight infection often leads to other kinds of tuber rots in storage -- it is best to NOT STORE late blight infected potatoes, and there are no chemical treatments that will cure an infected pile of potatoes

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## General Information

**Causal Agent:** *Phytophthora infestans*
**Biology:** Pathogen of potato and a few related plants; infection encouraged by humid and wet conditions
**Dispersal:** Sporangia move in the wind; zoospores in water
**Fungicide resistance:** *P. infestans* is well-known to become resistant to site-specific fungicidesused against it. Fungicides should be rotated frequently to prevent resistance. See: http://www.potatoes.com/pdfs/FungicidesPressReduced.pdf

**Washington State Potato Commission (Phone: 509-765-8845)**