



Potato Progress

Research and Extension for Washington's Potato Industry

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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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Predicting Tuber Set & Size Development from Stem Numbers

Rick Knowles & Lisa Knowles
Washington State University, Pullman, WA

Early season stem counts are an accurate predictor of tuber set and size development. We have just completed a 4-year project to model the stem number/tuber set relationships for Ranger Russet, Russet Burbank (northern seed) and Umatilla Russet seed-tubers. Seed-tubers were aged during storage to create a wide range of stem numbers for each cultivar. The range of aboveground stems depended somewhat on cultivar, but in general the aging treatments resulted in 2.5 to 6.8 stems per seed piece.

Figure 1 shows that the number of tubers per stem decreases with increasing stem number for each of the cultivars. Note that, at any given number of stems per plant, Umatilla Russet typically sets more tubers per stem than Ranger and Russet Burbank (top three graphs). This results in a greater number of tubers per plant for Umatilla than for Russet Burbank and Ranger Russet (2nd row of graphs), which in turn results in smaller average size tubers for Umatilla over the entire range of stem numbers (3rd row of graphs).

The relevance of these trends to controlling tuber size distribution in relation to market needs is seen in the tradeoff between average tuber weight and number of tubers per plant (bottom graphs). Regardless of cultivar, the greater the number of tubers per plant, the lower the average tuber weight. Note that Ranger tends to set fewer tubers per plant, Russet Burbank is intermediate, and Umatilla Russet sets the most tubers per plant, resulting in an opposite ranking of the cultivars for average tuber size (Ranger>Burbank>Umatilla). Interestingly, these changes in tuber set and size development occurred with little effect on total and marketable (U.S. #1 + <4-oz) tuber yields, except when stem number exceeded about 5.6 stems per plant for Umatilla (Figure 2). These relationships provide the basis for estimating tuber size distribution and yield from aboveground mainstems early in the season.

End-of-season yield profiles, defined by <4 oz, 4-6 oz, 6-10 oz, 10-12 oz, 12-14 oz, >14 oz, and total marketable tuber yields, can be estimated from stem numbers for northern- and southern-grown seed with the program provided on our website, www.ionophore.com/seed. The yield profile calculator was recently updated to include all of the data collected during the 4-year project. Instructions on how to measure stem numbers, along with limitations of the calculator for estimating yield and grade profiles from different seed sources and cultivars, are also provided on the website. Relative yield profiles for two or more crops (e.g. derived from different seedlots) grown in close proximity under the same management conditions in the Central Columbia Basin can be estimated from stem numbers measured just prior to row closure (e.g. early June). Such estimates of yield potential early in the season provide an opportunity to adjust management practices through the remainder of the season, to optimize yield and tuber size distribution from a particular crop in relation to market needs.

Our research at the Othello Field Station currently focuses on modeling stem number/tuber set relationships for Russet Norkotah strains, so that tuber size profiles can be controlled with greater precision for the fresh market. We are also extending our seed productivity studies on Ranger and Russet Burbank to determine how at-harvest seed maturity interacts with storage and handling of seed prior to planting, to affect yield potential. Studies to determine the extent to which predicted yields (based on stem counts after planting and seed butanol content before planting) can be altered through adjusting management practices, such as in-row spacing, are also underway. These studies, along with others designed to optimize the attainment of physiological maturity in relation to subsequent processing quality during storage, will be showcased at the Othello field day on June 25. We welcome the industry to come out and view our plots.

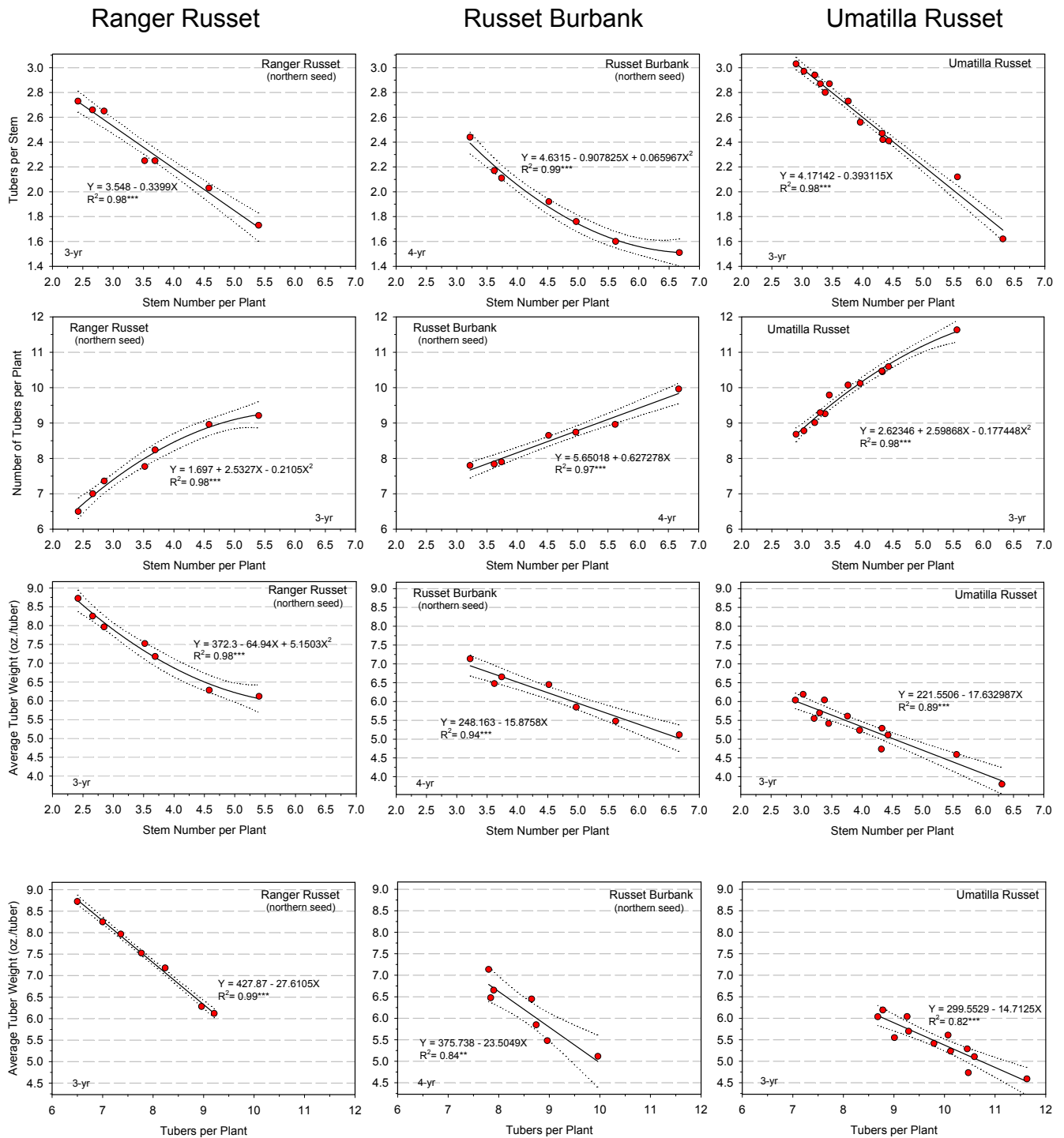


Figure 1. Stem number/tuber set relationships for Ranger Russet (left), Russet Burbank (middle) and Umatilla Russet (right) potatoes in the Central Columbia Basin. Data are averaged over 3 or 4 years as indicated. Line equations for average tuber weight are based on g/tuber. Dotted lines indicate 95% confidence intervals.

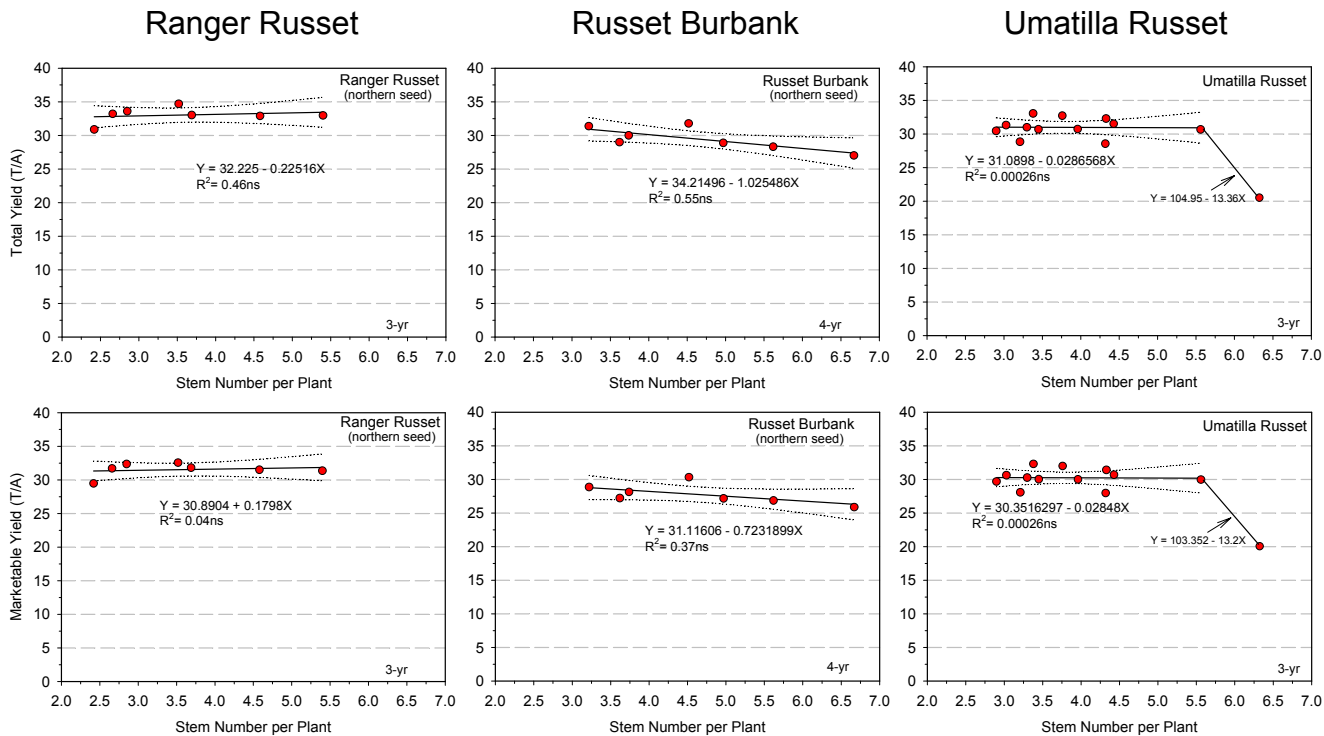


Figure 2. Effects of increasing stems per plant on total and marketable yields (U.S. #1 + undersize) of Ranger Russet (left), Russet Burbank (middle) and Umatilla Russet (right) potatoes in the Central Columbia Basin. Data are averaged over 3 or 4 years as indicated. Dotted lines indicate 95% confidence intervals.

Beet Leafhopper Counts

For the most recent beet leafhopper counts region-wide, see the following web site:

www.potato.prosser.wsu.edu

All evidence gathered so far is pointing toward beet leafhopper as the most important vector of the “purple top” or “yellows” disease caused by the BLTVA phytoplasma. Data at the above web site only reflect beet leafhopper numbers. Beet leafhopper numbers region-wide have been steadily increasing for weeks, but are still not extremely high.

Potato Progress Switching to E-mail or Fax Distribution

In an effort to cut postage costs, the Commission is moving most of its newsletter distributions to e-mail and fax. If you want to continue to receive Potato Progress, you will need to be sure that we have a valid e-mail address or fax number (unless you have neither). Note that the e-mail form of Potato Progress will arrive as a PDF, and so you will need Acrobat Reader on your computer to view the attachment. **If you have not yet responded to previous enquiries, please fax, e-mail, or call Andrew Jensen at the commission office with your preference.**

USDA-ARS & WSU-IAREC Potato Cropping Systems Field Day

July 8, 2004

9:00 Welcome and Introductions

Research Presentations:

Bio-Fuel Variety Trials (Hal Collins/ A.Hang/ S. Fransen/ P. Wanderschnieder)

Nitrogen & Irrigation Rate Studies (Ashok Alva/ Javier Marcos)

Screening Beans for *Sclerotinia* White Mold Resistance (Phil Miklas)

N Rate Trials in Potatoes Under Reduced Tillage (Ashok Alva/ Hal Collins)

Gaseous N-Losses from Potato Under Center Pivot Irrigation (Shawel Haile-Mariam/ Hal Collins)

Reduced Tillage Effects on Arthropod Pests. (Dave Horton/Joe Munyaneza)

Leafhoppers and Phytoplasma Diseases in Potatoes. (Joe Munyaneza/ Jim Crosslin/Andy Jensen /Phil Hamm)

Potato Variety Trials (Mark Pavek)

Speciality Potatoes and Observation of New Selections (Chuck Brown)

Mesotrione Plant Back. Onion, sugarbeet, peas, carrots (Rick Boydston)

Volunteer Potato Control in Sweet Corn with Atrazine/Mesotrione Combinations. (Rick Boydston)

12:30 Lunch (Sponsored by Agri Northwest)

Contact: H. Collins USDA-ARS

Phone: (509) 786-9228

FAX: (509) 786-9277

USDA-ARS/WSU -IAREC : Potato Cropping Systems Field Day at Paterson

