



# Potato Progress

Research and Extension for Washington's Potato Industry

Published by Washington State Potato Commission [www.potatoes.com](http://www.potatoes.com)

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Volume I, Number 9

November 26, 2001

## Pattern of Plant Growth, Dry Matter and Nitrogen Distribution in Russet Burbank Plants

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Understanding the pattern of potato plant growth over the growing season is important to develop and modify management practices to improve the nutrient uptake efficiency, yield and quality of tubers. In this study, growth pattern and production and partitioning of dry matter and nitrogen into different plant parts of Russet Burbank plants are evaluated under irrigated conditions in a sandy Columbia Basin soil.

The data used in this report are part of a 4 year study (published elsewhere) on the evaluation of different tillage methods and irrigation regimes on Russet Burbank and Hilite Russet. A linear move system was used to deliver water. Cut potato seed pieces were planted at a rate of 18,453 plants/acre at 6 inch depth. We used recommended best management practices of fertilization, irrigation, and pest management. The experiment was conducted with a randomized block design with four replications.

We randomly sampled four plants per plot on a weekly interval beginning 32 days after planting until the plants attained maturity as evident from full growth of the tubers and decline in leaf weight due to senescence. Dry matter weight and nitrogen content were determined in each plant part across all samples.

Since year to year variation was negligible, we show only one year mean data across all treatments for the Russet Burbank cultivar. Tuber weight increased rapidly during 60 to 100 days after planting and leveled off thereafter (Fig.1). At final maturity, the tuber dry weight represented about 0.66 lbs per plant, corresponding to 6.1 ton per acre dry matter. Rapid leaf expansion and growth occurred from 30 days after planting and continued until about 100 days (Fig. 1). Following was a rapid decrease in leaf weight due to senescence and collapse of the tops later in the growing period until tuber maturity. At full maturity, tuber weight accounted for 83 percent of total plant dry weight, while stem and leaf dry weights accounted for 7 and 10 percent, respectively (Fig. 2).

Nitrogen uptake pattern was similar to that of dry matter accumulation. Tuber N content increased rapidly from 60 to 100 days after planting (Fig. 3). The increase in leaf N preceded that of the tuber N. However, about 60 days after planting, N accumulation in the tuber increased rapidly compared to that in the leaves. Leaf N content decreased rapidly beginning about 100 days after planting due to senescence.

During the peak growth period, total N in all plant parts accounted for 310 lbs/acre. Of this total N amount, 77% was in the tuber, 20% in the leaves, and 3% in the stems. Only N in tuber

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represents the true N removal from the soil system on an annual basis, since plant tops were returned to the soil during devining prior to tuber harvest. In this example, the tuber N was about 238 lbs/acre. The tuber yield was 35 tons/acre.

(This report is extracted from a paper published in the "Journal of Plant Nutrition".)

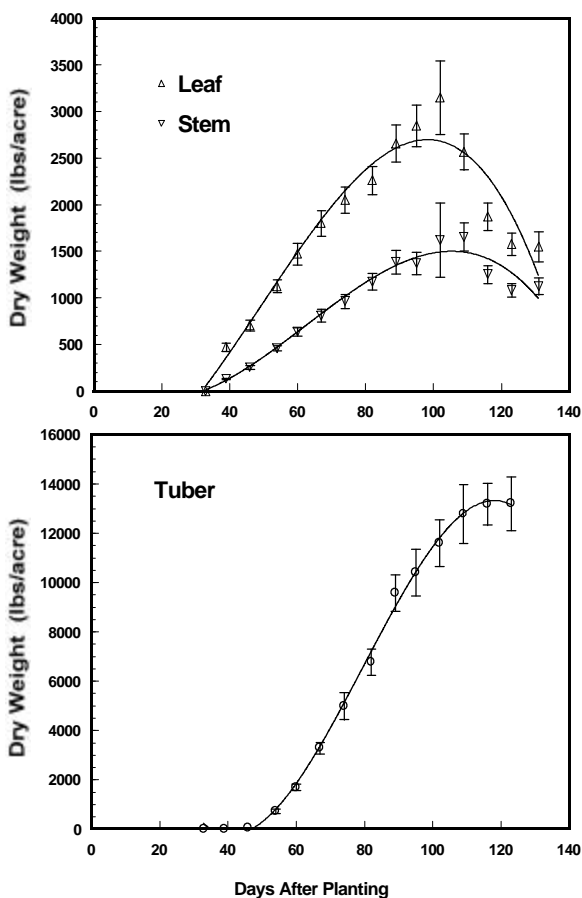


Fig. 1. Pattern of dry matter accumulation in tuber, leaf, and stem of Russet Burbank potato cultivar. Vertical line at each data point represents the standard error of the mean.

Fig. 3. Pattern of nitrogen accumulation in tuber, leaf, and stem of Russet Burbank potato cultivar.

Fig. 2. Partitioning of total plant dry matter into tuber, leaf, and stem of Russet Burbank potato cultivar.



## WSPC Research Proposal Review Meeting Dates

The Washington State Potato Commission's research proposal review process is about to get underway. This year we have a number of new scientists, and some intriguing proposals. All "new" proposals will be presented to the seventeen members of the Research Council in December. New proposals that pass the first round and all returning projects will be heard again in February. All research review meetings are open to the public. Interested potato growers are particularly encouraged to attend.

### Dates and Locations for Research Reviews:

Preliminary Research Review (Moses Lake, Hallmark Inn): December 11, 9am-2pm.

Final Research Review (Pullman, Holiday Inn Express): February 13-14, 2002.

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## Pesticide Labels on the Worldwide Web

At the commission office, we frequently need to refer to pesticide labels for reasons related to trade, EPA questions, use patterns, etc. For those of you who are interested, the web site maintained by Crop Data Management Systems, Inc. provides a **free** pesticide label and MSDS database. The vast majority of pesticide labels of interest to agriculture can be found on their site. The link best to start from is:

**<http://www.cdms.net/manuf/manuf.asp>**.

If you know the manufacturer of the product, click on the company's name. If you do not know the manufacturer, the search tool is very useful. All searches are based on trade names, **not** active ingredient.

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## OSU's Potato Information Exchange

Oregon State University's Potato Information Exchange web site might be of interest to some of you. The site is overseen by Al Mosley in the OSU Department of Crop and Soil Science. The web site describes itself thus:

"The PIE is an information clearing house for growers and other production-oriented professionals. It provides text on most aspects of production, storage, and marketing and links to many additional topics of interest such as weather, food and water quality, pesticides and endangered species. Linkages to a long list of informative private and public web pages are available under Related Web Sites. Always check these sites for additional information on any subject."

**<http://www.css.orst.edu/potatoes/>**