Potato Progress

Research & Extension for the Potato Industry of Idaho, Oregon, & Washington

Andrew Jensen, Editor. ajensen@potatoes.com; 509-760-4859

Volume XII, Number 3 | *March 5, 2012*

2012 WA Commercial Seed Lot Pick Up &Trial Information

Info also available each year at: **www.potatoes.wsu.edu**

Commercial potato seed samples are requested for the 2012 Washington Seed Lot Trial. **Two to three hundred whole (single drop) seed is an acceptable sample size, or 50 lbs of 4 oz single drop seed.**

Requested: 50 lbs of 2-4 oz whole seed, no seed treatments (Seed over 6 oz is not acceptable)

A representative sample is needed. Sampling the first (or last) 300 seed from the truck is not likely to provide a representative sample of the lot. Sample tags may be obtained by calling (509-765-8845) the Potato Commission or simply stopping by.

Your assistance with collection and drop off of seed samples is needed. Seed samples may be taken to the WSU Othello Research Unit (509-488-3191) located on Booker Road ¼ mile south of State Highway 26 and about five miles east of Othello. For sample pick up and any questions regarding the seed lot trials please call:

South Basin: Tim Waters (509-545-3511), Mark Pavek (509-335-6861), or Zach Holden (509-335-3452).
North Basin: Carrie Huffman Wohleb (509-754-2011), Mark Pavek (509-335-6861), or Zach Holden (509-335-3452).

In the North Basin, one seed "drop-off" has been established. It is located at Qualls Ag Labs (Mick Qualls, 509-787-4210 ext 16) on the corner of Dodson Road and Road 4; come to front office between 8 am and 5 pm. Please call the numbers below to arrange additional pick up sites. Samples will be picked up at 2:00 pm the day before each planting date (below) to be included. Growers planting in early March should drop their samples off at the Othello Research Center or store the samples and call the numbers below for pick up. For all alternative pick up locations or questions please call Mark Pavek at 509-335-6861 or Zach Holden at 509-335-3452.

PICK UP DATES ARE ONE DAY PRIOR TO THE PLANTING DATES BELOW

Seed lot planting dates for 2012 are:	1st (early)	March 27
	2nd (mid)	April 10
	3rd (late mid)	April 24
	4th (late)	May 8

2012 Potato Field Day - Thursday June 28

This year's virus reading of the seed lots will take place on June 12 and 26.

WSU Extension Launches Irrigated Agriculture Information Service

Washington State University Extension has just launched a new web site for farmers, ranchers and other agricultural industry professionals called the Irrigated Agriculture Information Service. The site, at http://extension.wsu.edu/irrigatedag, is designed to provide users with a customizable source of timely irrigated agriculture information. The service is free and was developed by a team of WSU Extension experts working in the Columbia Basin.

The new system is based on a user-defined set of interests. Users can choose any combination of over 35 topic areas, from apples and cattle production to drip irrigation and wine grape growing. Then alerts and other information, based on those specific user preferences, are sent out by email. Once users create an account and set up topic preferences, they can log back in at any time and change their information preferences.

"We want to provide members of the irrigated agriculture industry with only the information they want, when and where they need it," said Andy McGuire, a WSU Extension educator based in Grant County. "We want to get research results and other information out as quickly as possible to those that use it on a daily basis. This system replaces an older print-based information-delivery system. That not only saves money, it allows us the delivery of specific information to specific audiences. Email gives users the ability to receive timely information at home, in the office, or on a smart phone."

For more information, contact Andrew McGuire, WSU Extension Educator, 509.754.2011 ext. 413; amcguire@wsu.edu.

Potatoes and Health

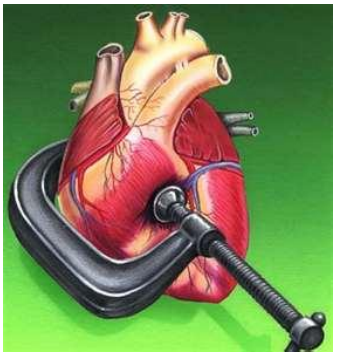
Joe Vinson, Chemistry Department, University of Scranton, Pennsylvania
Roy Navarre, USDA-ARS, Prosser, Washington

You may have seen recent reports in the popular media about an association between potato consumption and weight gain. In the summer of 2011, a Harvard group published a paper in the prestigious New England Journal of Medicine (N Engl J Med 2011; 364:2392-404) stating that potatoes are the leading cause of weight gain. This was an epidemiological study of ~121,000 people spanning 20 years and the study fingered potatoes as a primary cause of obesity in the United States. The report was negative not just about French fries or chips, but even baked, boiled and mashed potatoes. Potato chips and French fries were identified as the leading cause of long term weight gain, more than any other food examined. But even boiled, mashed and baked potatoes were claimed to cause more weight gain than butter, cheese, or sweets and deserts.

This study received tremendous media publicity worldwide and was probably the most negative nutritional information ever reported about potatoes. Reports like this shape both public and media opinion. For example, shortly after the Harvard report linking potatoes to obesity was published, the Los Angeles Times published an editorial calling for a "spud tax" to be levied on potatoes. One limitation of this report is that it is epidemiological in nature and not based on clinical studies. Epidemiological studies cannot show cause and effect, plus it can be problematic to account for complicating factors when interpreting the data. As an example, red meat was also mentioned as a culprit in long term weight gain, but it can be difficult to be sure the weight gain of the people self-reporting to eat red meat is due to red meat versus other aspects of their diet or lifestyle. Some experts have cautioned about the study: "*To attempt to isolate the effect of specific foods on weight changes is fraught with problems," said Lawrence J. Cheskin, who heads the Johns Hopkins Weight Management Center. "One is that people may conclude that if they simply stop eating X, they will reduce the chance of weight gain. This is*

unlikely, and a false conclusion." Similarly, it is likely more a result of people who eat fruit being more health-conscious than fruit per se causing less weight gain." (Source: Washington Post, June 22, 2011)

Many nutritionists and health professionals would argue that the most important factor in determining weight gain is total caloric intake, not type of calories or food source. The Harvard group claims that the starch in cooked potatoes is quickly broken down to glucose when eaten, resulting in a spike in blood sugar and ultimately increased hunger, causing people to eat more. However, this is the opposite of what was reported in a satiety index, developed by Dr. Susanna Holt, which ranks food based on how well they satisfy hunger. Foods that make one feel full score better with the rationale being that the more full one feels, the less one eats. Boiled potatoes (323%) easily had the best score of all 38 foods tested including rice (138%), beef (176%) or cake (65%). It would be interesting to know how the Harvard group reconciles their hypothesis with the satiety index findings.

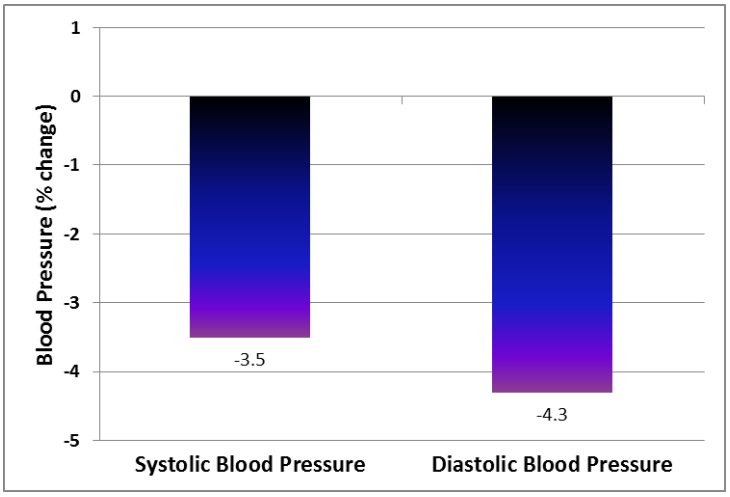


Potatoes are well known to be good sources of vitamin C and potassium, but can also contain significant amounts of other health promoting compounds, including some that might be predicted to affect blood pressure and cardiovascular health. Our group is trying to develop potatoes with even higher amounts of vitamins, minerals and phytonutrients. Over the last several years we have profiled the phytonutrient content of hundreds of potato genotypes including mature potatoes, baby potatoes, yellow-, red- and white-flesh potatoes, wild species and primitive potato germplasm, seeking to better understand the type and range of phytonutrients in potatoes along with better understanding of why one type of potato might have more of a certain phytonutrient than another genotype. Some of the potatoes we screened have antioxidant levels that rival or surpass the leafy green vegetables well known to contain high amounts of antioxidants. We also found that baby potatoes can contain especially high amounts of some phytonutrients . Some people also call these "new potatoes," "early potatoes" or "gourmet potatoes" and they can be found in supermarkets and farmer's markets.

From the beginning of our nutrition work, we thought that profiling the nutritional content of a large number of potato genotypes would have multiple uses and that such profiling would result in our having a large database of hundreds of compounds present in each genotype. Consequently, if we were ever interested in the potential health-promoting effects of a particular compound, we could look in our database and identify a genotype high in the compound of interest.

This is what we did for the blood pressure study described below. Dr. Joe Vinson has decades of experience with compounds such as polyphenols and their potential health benefits. We discussed potential compounds in potatoes that might be expected to show health-promoting effects in a human feeding trial. We were particularly interested in chlorogenic acid because it is the most abundant polyphenol in most potatoes. It is an antioxidant and is thought to have additional health benefits, including anti-hypertensive effects. We were curious whether potatoes might have an effect on blood pressure in a human feeding study. To test this hypothesis we searched our database to identify potatoes with particularly high concentrations of chlorogenic acid and observed that baby Purple Majesty potatoes have high amounts of chlorogenic acid. The potatoes had 10.2 mg/g dry weight (DW) of total polyphenols and 6.5 mg/g DW of anthocyanins. Chlorogenic acid concentrations were 2.7 mg/g DW, plus smaller amounts of additional chlorogenic acid isomers were present. Mel Martin and the J.R. Simplot Co. generously donated several hundred pounds of these potatoes that we then used in the feeding study.

In contrast to epidemiological studies, intervention studies (i.e. clinical trials) give scientists more direct explanations of the effect of diet on health. In a trial funded by the USDA-Agricultural Research Service, we conducted a crossover study with 18 hypertensive subjects with an average body mass index of 29 that were given either 6-8 small microwaved purple potatoes with peel twice daily or no potatoes for 4 weeks and then given the other regimen for 4 additional weeks. The average subject age was 54 years in the supplementation study.



There was no significant effect of potato on fasting plasma glucose or lipids. The Harvard study associated potato consumption with weight gain. Despite the two daily medium servings of potatoes in our study, there was no significant weight gain. Diastolic blood pressure was significantly decreased 4.3%, a 4 mm reduction, while systolic blood pressure decreased 3.5%, a 5 mm reduction. This blood pressure drop is even more interesting when considering that 14/18 subjects were taking antihypertensive drugs at the time of our study. Thus potatoes were an effective hypotensive agent in the diet of people who have high blood pressure. Since high blood pressure is present in 68 million people in the U.S., the consumption of a delicious, healthy colored potato may be a way to decrease our risk of heart disease and stroke. A reduction of blood pressure by 5 mm Hg can decrease stroke risk by 24% and of ischemic heart disease by 21%, plus reduce the likelihood of dementia, heart failure, and mortality from cardiovascular disease. Importantly, four weeks of supplementation with purple potatoes did not show a significant effect on weight or biochemical parameters other than blood pressure, showing that increased potato consumption did not deleteriously effect cardiovascular and diabetes risk factors, but in fact lowered the blood pressure and thus lowered the risk of cardiovascular disease. These blood pressure findings were well covered in the national and international media, both in newspapers and television after they were reported at the American Chemical Society meetings in Denver in August, 2011 by Dr. Vinson. The USPB provided some funding for Dr. Vinson to attend the Denver meeting and present the data.

These results support the rationale to develop potatoes with higher amounts of phytonutrients and strongly suggest that such potatoes will have health-promoting effects. Developing high-phytonutrient potatoes is a primary goal of ARS researchers at Prosser, WA and of the Tri-State breeding program, which is the nation's largest potato breeding effort and includes Idaho, Oregon and Washington with scientists from Washington State University, Oregon State University, University of Idaho and the USDA-ARS. High phytonutrient potatoes are also a key goal of breeding programs in Colorado and Texas. Potato germplasm from the Tri-State program has been subsequently identified with even higher amounts of total polyphenols, chlorogenic acid and anthocyanins than the potatoes used in this study.

This was a relatively small pilot study and the results are worth following up on with additional studies. We do not know which compound(s) were responsible for the BP effect, or whether white potatoes would have a similar effect. Chlorogenic acid is a colorless compound that is also present in white potatoes and is certainly one candidate for the positive effect. Perhaps the only compounds that would be present in purple, but not white potatoes are the anthocyanins. The evidence in the literature for anthocyanins having an effect on blood pressure is conflicted, but one recent human feeding study with pure anthocyanins did not show an effect of anthocyanins on blood pressure. So the interesting question remains of whether white or yellow potatoes can also promote a decrease in blood pressure. Other candidates include potassium which was present at 549 mg/138 g serving in these potatoes. The effect of a Chinese medicinal plant used in Asia to reduce blood pressure is thought to be due to kukoamines. Potatoes, including the purple potatoes in this study and white potatoes, also contain kukoamines. Additional studies will be required to better define the effect of potatoes on blood pressure and to identify the responsible compounds, but these early results are promising and offer guidance for future studies.

Volunteer Potato Forecast - 2012

Rick Boydston and Marc Seymour, USDA-ARS, Prosser

Winter soil temperatures were recorded at the USDA-ARS Paterson research site to provide information on the potential for volunteer potato tubers to survive and become a weed problem in 2012. Soil temperatures were recorded at four depths (2.75, 4.75, 6.75, and 8.75 inches) beneath volunteer spring wheat from mid-November 2011 through February 2012.

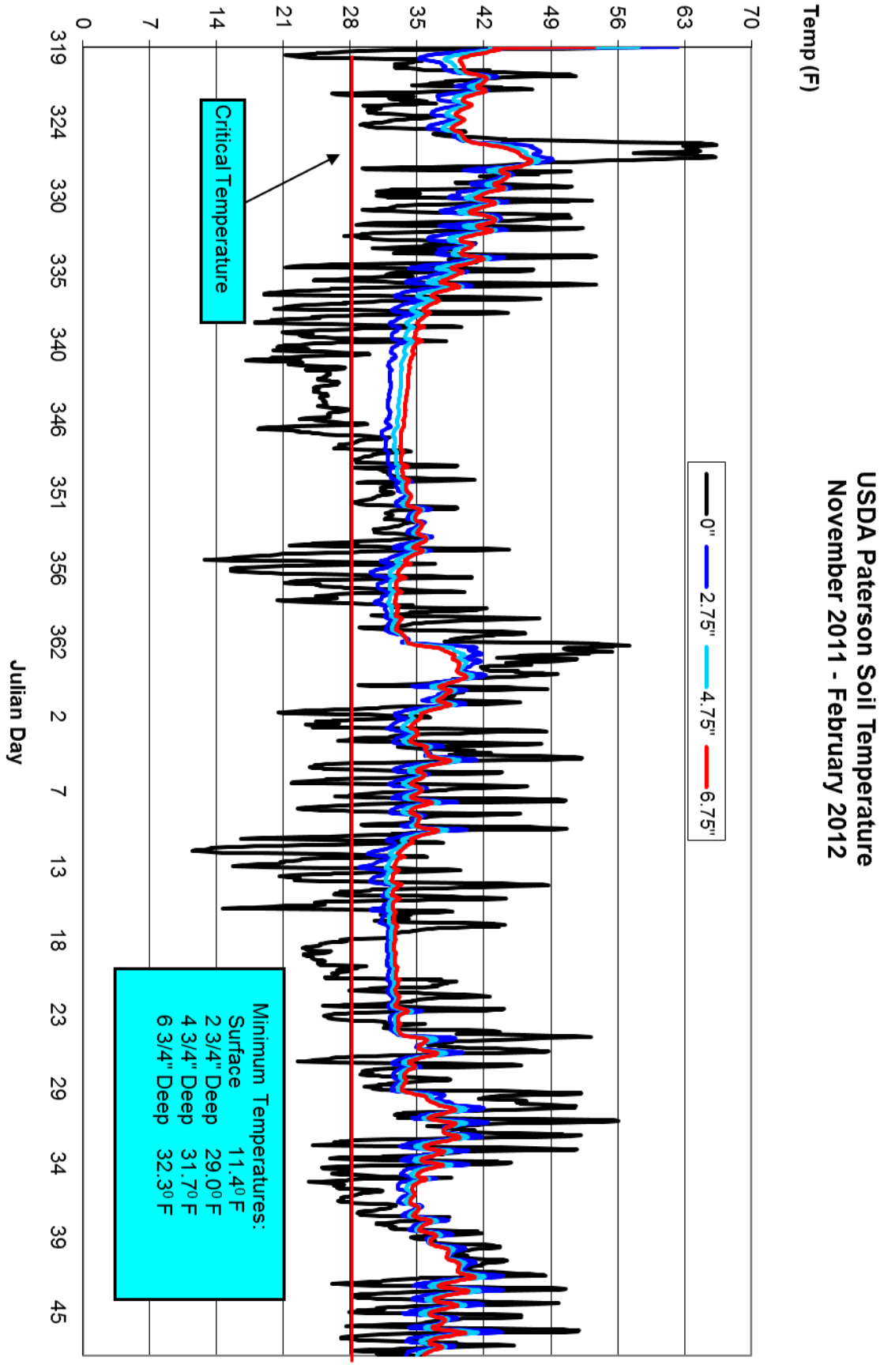
The lowest air temperatures this winter occurred December 23, 2011 and January 12, 2012 with air temperatures reaching 16°F and 11° F, respectively. Soil temperatures reached a low of 29° F at 2 ¾ inches on January 13, which is not cold enough to kill potato tubers. Temperatures at all lower depths remained above 31° F for the same period. Potato tubers are normally killed when they reach temperatures ≤ 28° F.

Only the tubers left on the soil surface to about 1 inch deep were exposed to killing temperatures. Based on previous research on tuber depth (Newberry and Thornton, 2004), we estimate that 67% of the tubers left in the field last fall in the lower Columbia Basin were deep enough to escape killing temperatures. Therefore, volunteer potatoes will be a common occurrence in the lower Columbia Basin this spring and will be more prevalent this crop year than in recent years.

Agrimet weather station data at Hermiston, OR also recorded air temperature of 9.5° F and soil temperature at the 2 inch depth of 25.6° F on January 13, but temperature at the 4 inch depth only reached 29.6° F, not cold enough to kill potato tubers. The ground cover at the Agrimet weather station site consists of nonirrigated weeds and natural vegetation, which could affect the depth to which cold air temperatures penetrate the soil.

Data from the Agrimet weather station in Odessa, WA indicated that air temperatures reached a minimum of 5.2° F on January 16, and soil temperatures reached 20.6°, 25.4°, and 30.6° F at 2, 4, and 8 inches deep, respectively. Therefore, volunteer potatoes may have been killed to deeper depths in the northern part of the Columbia Basin.

For more information on volunteer potato control visit the Prosser USDA-ARS website at; http://www.ars.usda.gov/pwa/prosser


USDA Paterson Soil Temperature
November 2011 - February 2012
Temp (F)
70
63
56
49
42
35
28
21
14
7
0
0"
2.75"
4.75"
6.75"
Critical Temperature
Minimum Temperatures:
Surface 11.4° F
2 3/4" Deep 29.0° F
4 3/4" Deep 31.7° F
6 3/4" Deep 32.3° F
319 324 330 335 340 346 351 356 362 2 7 13 18 23 29 34 39 45
Julian Day