# 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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## Potato Field Day Program and Seed Lot Entry Summary


**Robert E. Thornton**
**Washington State University, Pullman**


Three hundred and thirty-five samples of seed lots from 13 seed producing areas including four Canadian provinces were planted at the WSU Othello Research Unit this spring. The number and percent of the lots from the various seed areas and the number of lots of the six major varieties in the 2003 and 2002 trials are shown in the table below. Ninety-nine lots were planted on March 27th, 102 lots on April 10th, 90 lots on April 24th, and 44 lots on May 8th. There is no notable change in the percent of lots of most of the cultivars in 2003 compared to 2002; there is a 5% increase in the Russet Norkotah lots and a 3 % decrease in Ranger Russet lots. Other than these percentages, 2003 and 2002 are quite similar. In terms of seed lot origin in 2003 compared to 2002, there are again only minor changes, the exceptions being a lower percent of lots from Alberta and Other Canada seed areas (15% in 2003 vs. 22% in 2002) and a slightly higher percent of lots came from Colorado (7 vs.3 %), Montana (41 vs.30%) and Idaho (19 vs. 18%) for 2003 vs. 2002. These seed lots are a major feature of the upcoming Potato Field Day to be held at the Othello Research Unit starting at 8:30 AM on June 27th (see included program for details). In addition to the opportunity to observe the seed lots in the trial, there is a field day program that includes three concurrent sessions two of which involve research plots at the research unit and visits with researchers. All three concurrent sessions will offer CCA credits. Pesticide applicator recertification credits will be offered for Concurrent Sessions II and III. A hosted lunch will be served from 11:30 am to 1:30 pm.

**2003 Variety x Seed Source**

| Source | Alturas | Burbank | Norkotah | Ranger | Shepody | Umatilla | Other | TOTAL | %TOTAL |
|---|---|---|---|---|---|---|---|---|---|
| ALB | (0) 0 | (22) 18 | (6) 5 | (12) 9 | (0) 0 | (0) 5 | (3) 2 | **(43) 39** | **(14) 12** |
| CAN | (0) 0 | (6) 4 | (1) 0 | (10) 3 | (4) 3 | (1) 0 | (2) 1 | **(24) 11** | **(8) 3** |
| CO | (0) 0 | (0) 0 | (9) 20 | (0) 0 | (0) 0 | (0) 1 | (0) 1 | **(9) 22** | **(3) 7** |
| ID | (10) 8 | (5) 5 | (3) 6 | (15) 22 | (11) 14 | (9) 5 | (4) 5 | **(57) 65** | **(18) 19** |
| MT | (3) 7 | (58) 63 | (8) 17 | (26) 23 | (3) 1 | (19) 25 | (6) 3 | **(123) 139** | **(39) 41** |
| OR | (1) 1 | (2) 3 | (3) 2 | (4) 7 | (3) 1 | (2) 5 | (2) 3 | **(17) 22** | **(5) 7** |
| OTHER | (0) 0 | (3) 1 | (1) 2 | (5) 0 | (1) 5 | (1) 0 | (1) 2 | **(12) 10** | **(4) 3** |
| WA | (1) 1 | (1) 6 | (9) 8 | (4) 5 | (1) 1 | (7) 2 | (4) 4 | **(27) 27** | **(9) 8** |
| **TOTAL** | **(15) 17** | **(97) 100** | **(40) 60** | **(76) 69** | **(23) 25** | **(39) 43** | **(22) 21** | **(312) 335** | |
| **%TOTAL** | **(5) 5** | **(31) 30** | **(13) 18** | **(24) 21** | **(7) 7** | **(13) 13** | **(7) 6** | | **100** |

Figures in "( )" are 2002 totals.

2002 Other Source include ND, SD, NEB, NEV, Unknown

2003 Other Source include ND, NEB, WY, Unknown

# Potato Field Day Program
## June 27, 2003
## WSU Othello Research Unit
(6 miles East of Hwy. 26/17 Junction, South of Hwy. 26)

8:30 - 9:00 am Coffee and Rolls
9:00 - 10:30 am Visit Seed Lot Trial

**Concurrent Session I--Potato Cultural Practices Field Tour**

10:30 am **Potato Plant Stem Number Manipulation Using Chronological Age**
*Robert Thornton* - Washington State University, Pullman

10:45 am **Predicting & Controlling the Productivity of Seed Potatoes**
*Rick and Lisa Knowles* - Washington State University, Pullman

11:05 am **Effects of DMN on Seed Productivity**
*Rick Knowles* - Washington State University, Pullman

11:20 am **Optimizing Storage Regimes in Relation to Tuber Maturity of Processing Potatoes**
*Ed Driskill and Rick Knowles* - Washington State University, Pullman

11:40 am **Russet Norkotah Line Selection Growth and Development**
*Robert Thornton* - Washington State University, Pullman
12:00 - 1:30 pm **HOSTED LUNCH**

**Concurrent Session II--Potato Pest Management Field Tour**

10:30 am **Field Trials Using 'New Chemistry' Fungicides on Potato Diseases**
*Tom Cummings* - Washington State University, Pullman

10:50 am **Potato Insect Pests-Have Some Been Overlooked?**
*Bill Snyder & Joe Munyaneza* - WSU, Pullman & USDA, Wapato

11:15 am **Herbicide Carry Over in Seed Potato Tubers**
*George Newberry* - Washington State University, Pullman

11:45 am **Chemical Vine Desiccation of Russet Norkotah Line Selections**
*Robert Thornton* - Washington State University, Pullman
12:00 - 1:30 pm **HOSTED LUNCH**

**Concurrent Session III--Potato Pest Management Workshop**

10:30 am **The Search For Worm Pests of Potato**
*Pete Landolt* - USDA, Wapato

11:00 am **Recent Research On Black Dot Disease of Potatoes**
*Nadav Nitzan* - Washington State University, Pullman

11:30 am **Managing In-Season Potato Late Blight In The Columbia Basin; A Review of Fungicides, Application Methods, and Cultural Strategies**
*Tom Cummings* - Washington State University, Pullman

12: 00 am **Optimization of the Potato Storage Environment: Ventilation System Operation**
*Nathan Oberg* - Univ. of Idaho, Kimberly, sponsored by NW Energy Efficiency Alliance
12:45 - 1:30 pm **HOSTED LUNCH**

# Sources and Dissemination of the BLTVA in Potatoes

**Pete Thomas, Jim Crosslin, Keith Pike, Alan Schreiber, Andy Jensen, Joseph Munyaneza, Phil Hamm, Mike Nielsen, and Jeff Upton**

We recently presented evidence based on PCR assays (*Potato Progress*, Volume III, No. 3) that the 2002 potato yellows epidemic in potatoes of the Columbia Basin was caused by the beet leafhopper-transmitted virescence agent (BLTVA). The purpose of this article is to provide information about the biology of the BLTVA that may be relevant in management decisions.

**Vector(s) of BLTVA.**

The beet leafhopper is the only known vector of BLTVA, although there has been little or no research to document other vectors. Our team is working to determine whether other vectors are involved in the Columbia Basin. Even if other vectors are involved, there are indications that the beet leafhopper is very important.

**BLTVA transmission is a complex process.**

Phytoplasma infect and multiply in their leafhopper vectors. The BLTVA is vectored by the beet leafhopper in a mode and pattern consistent with that of other phytoplasma by other leafhoppers. Beet leafhoppers acquire BLTVA only by feeding on infected plants. Beet leafhoppers can rarely acquire BLTVA from or transmit it to a plant in as little as 5 min on the plant. However, at least 24 hrs is required to reach a 10 - 20 % acquisition or transmission efficiency. After the leafhopper acquires BLTVA from an infected plant, a minimum incubation period of 14 days is required before the leafhopper can transmit to another plant, but the normal incubation period is 20 to 30 days. An additional 15 to 20 days are required before the inoculated plant can serve as a source of BLTVA to infect leafhoppers for further spread. All of these processes (acquisition, incubation period, transmission), are likely to require more time in potato since the leafhopper does not like to feed on potato, and infected potatoes contain low concentrations of BLTVA.

- **Bottom line: almost all BLTVA transmitted to potato fields will originate outside that field - secondary spread within fields is probably not important.**

**Wild hosts of BLTVA and beet leafhopper.**

- The beet leafhopper relies on winter annuals, especially mustards, to overwinter.

  Females survive winter as adults on winter annual weeds - mainly mustards and red stem filaree. When the fall rains that stimulate growth of winter annuals are delayed until after the summer hosts have frosted or withered, the fall migration is not able to find suitable hosts, and few survive the winter. Young leafhoppers are produced in spring on winter annual weeds from eggs deposited by overwintering females. These young mature in late May and June. Maturation of the winter hosts forces a spring migration to summer hosts, usually in May and June.

- Summer hosts of beet leafhopper include Russian thistle and kochia, although many plants probably act as hosts.

  Two important summer hosts of beet leafhopper are Russian thistle and kochia. Sampling this spring is regularly turning up beet leafhopper on these plants.

- BLTVA can infect many plants, including all mustards tested so far.

  The special affinity of the beet leafhopper for mustard weeds may be critical in the Columbia Basin because the BLTVA also has an affinity for the mustard family. All mustard species that

have been tested are hosts of BLTVA. Thus, the winter mustards may serve as overwintering hosts for both the vector and the BLTVA. This is important since nymphs of the spring brood of leafhoppers may acquire BLTVA from their winter host and be ready to transmit as soon as they return to potatoes.

**Potatoes are not a preferred host of beet leafhopper.**
Like aphids, leafhoppers select preferred hosts by a trial and error process. Our observations chambers show that the beet leafhopper released in a growth chamber on potatoes and sugar beets may visit potato plants for brief periods but accumulate on sugar beets. Although other aspects of the relationship with potato have not yet been investigated, it is probable the beet leafhopper's interactions with potato are similar to its interactions with tomato or pepper. They visit tomato and pepper plants briefly but become hyperactive and then begin to die within 16 hrs when confined on these species.

**Volunteers and potato seed are probably not important sources of BLTVA inoculum.**
- Our studies indicated the BLTVA is perpetuated in only 1.6 % of tubers from infected plants.
- Disease symptoms in potatoes would not appear until about 40 days after the spring leafhopper migration - about mid July.
- Potatoes are a very poor source of the BLTVA. Leafhoppers do not like to feed on potatoes, and it is doubtful that leafhoppers would live long enough on potatoes to complete the incubation period and then transmit the disease. Late season infections, if they occur, could be the product of secondary transmission from summer hosts of the BLTVA originally infected by spring migrants.

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# Ramifications of Multiple Insecticide Applications to Potatoes for Control of Leafhoppers

**Alan Schreiber, Agriculture Development Group, Inc.**

As of the end of May, most potato fields in the southern Basin have received one to three insecticide applications for leafhopper control. Considering that beet leafhopper flights normally occur in late May and June, some potato fields may be treated 5 or 6 times for leafhoppers. A variety of insecticidal products are being used, but products in the pyrethroid class account for most applications. This class of chemistry has a broad spectrum of activity against pestiferous and beneficial organisms. It is well known that repeated applications of pyrethroid insecticides in potatoes result in aphid and mite outbreaks. Fields that have been treated with products containing pyrethroid insecticides, including Ambush, Asana, Baythroid, Pounce, and Leverage, should be scouted twice a week for the presence of aphids and mites.

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# Field Day Dates

Mark your calendar and plan to attend these educational field days this season.

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|---|---|
| Seed Lot Field Day, WSU Othello | June 27 |
| Paterson USDA-ARS Field Day | July 16 |
| Pest Management Field Day, Ag. Dev. Group, Eltopia | August 6 |
| Mount Vernon Potato Field Day | August 21 |