	<h1>Potato Progress</h1> <p>Research &amp; Extension for the Potato Industry of Idaho, Oregon, &amp; Washington          Andrew Jensen, Editor. <a href="mailto:ajensen@potatoes.com">ajensen@potatoes.com</a>; 509-760-4859  <a href="http://www.nwpotatoresearch.com">www.nwpotatoresearch.com</a></p>
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## Genetic Diversity in Columbia Root-Knot Nematode, and a Request for Help in Research

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Columbia root-knot nematode (CRKN; *Meloidogyne chitwoodi*) includes several populations that differ in their host range and distribution. One of these, called race 1, was thought to be predominant, and to control it alfalfa was recommended as a rotation crop<sup>1</sup>. In fact, alfalfa in rotation was shown to significantly reduce CRKN race 1 levels<sup>5,6</sup>. Unfortunately, in the 1980s, a population of CRKN was discovered on alfalfa, and it was called race 2<sup>7-9</sup>. CRKN race 1 and race 2 look identical, but they differ in their hosts, and we can distinguish these two races by growing them on carrots and alfalfa. Race 1 can reproduce on ‘Red Cored Chantenay’ carrot, not on Thor alfalfa. Race 2 can reproduce on alfalfa, not on ‘Red Cored Chantenay’ carrot<sup>8-10</sup>. It is valuable to know if race 1 and/or race 2 is present since growing alfalfa as a rotation crop could be useful to control CRKN (race 1) or could provide no benefit (race 2). The only way to differentiate race 1 and race 2 is by testing their ability to reproduce on these different plants (carrots, alfalfa). These host tests are time-consuming and labor-intensive. A faster method to distinguish CRKN races is needed.

In addition to race 1 and race 2, there are additional populations of CRKN, two of which are called Roza and CAMC2. These are unique because they were discovered by scientists studying CRKN resistance in wild potato. The wild species *Solanum bulbocastanum* accession SB22 is resistant to both race 1 and race 2, but is susceptible to Roza and CAMC2<sup>11,12</sup>.

It is impossible to visually distinguish these CRKN populations, but they differ genetically. We have received funding from the Northwest Potato Research Consortium and WSDA to study the DNA of these CRKN populations, working to sequence their genomes. The Gleason lab is also working on gene expression in the four populations (race 1, race 2, Roza, and CAMC2). The main goal is to use information from the DNA and genes to develop simple diagnostic tools that can distinguish the four populations. With this information, growers could make informed management decisions depending on the population(s) present in each field. In addition, data about the genetic variability underpinning virulence among populations will

help with resistance breeding, ultimately assisting in breeding more durable potato resistance. The results from this research will help reduce the reliance on chemical controls for nematodes by allowing for better crop rotation planning, and it will ensure that nematode resistant potatoes (when released) are used appropriately on fields where they will be effective.

One of our goals is to determine how widespread the races of CRKN have become across the potato growing regions of the Northwest. We want to know which populations are predominant or if there are mixtures in a field/region. We are particularly interested in the idea of genetic exchange of potato virulence. You, the growers, can help us with our research by sending us your infected potatoes. If you have CRKN-infected potatoes, we want them!

## **Potato Growers - we want your sick potatoes!**

The goal of this study is to survey the variability of CRKN and to develop better tools to identify resistance-breaking CRKN races. **WE NEED YOUR HELP!** - We need potato tubers that show symptoms of CRKN infection. Typical symptoms include galls (bumps) on the surface of tubers and small brown spots in the flesh under the skin (see photos).

- We need to know the location these tubers were grown (at minimum county level, but more detailed information is welcome).
- We need 10-15 tubers with symptoms per field.

If you see tubers that show typical nematode symptoms as described above, please contact us (Cynthia Gleason, 509-335-3742; [cynthia.gleason@wsu.edu](mailto:cynthia.gleason@wsu.edu); or Sagar Sathuvalli 541-567-6337 x 109, [Vidyasagar@oregonstate.edu](mailto:Vidyasagar@oregonstate.edu)). We will cover shipping fees. **Your participation in this project is greatly appreciated!**

You can send your samples directly to Cynthia Gleason at WSU in Pullman. Shipping address (please contact Cynthia prior to shipping to arrange for free shipping): Cynthia Gleason, Department of Plant Pathology, Washington State University, 100 Dairy Road, 201 Johnson Hall Pullman, WA 99164. Alternatively, for growers in the Tri-Cities or Oregon, you can drop off samples to Sagar Sathuvalli at 2121 S 1<sup>st</sup> Street, Hermiston Agricultural Research & Extension Center, Hermiston, OR 97838.

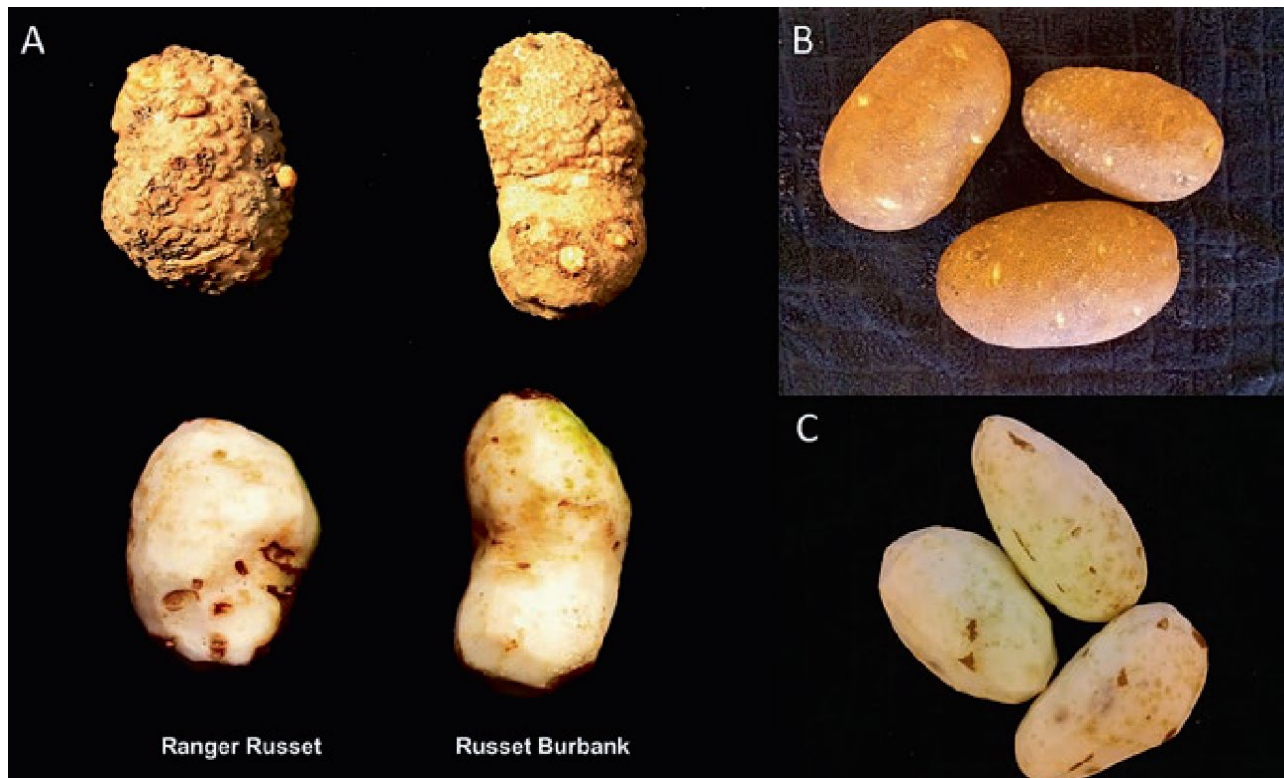


Fig 1. Potatoes infected with CRKN. Photo: [Parasitic Nematodes in Sustainable Agriculture of North America](#). 2018.

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