



POTATOES & PESTS PAPAS

Actionable Science Against Nematodes



Figure 1. Southern Idaho potato harvesting

photo by B. Schaefer

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**Fighting Potato Nematodes Together.
Sharing Knowledge.
Finding Solutions.**

Introduction to PAPAS

Welcome to the first newsletter of the PAPAS project! PAPAS, other than meaning potato in Quechua, the native language spoken in the area where potatoes originated in South America, stands for Potatoes and Pests: Actionable Science against nematodes. We are a group of 17 research, extension, and education professionals located in Idaho, Oregon, New York, Washington, and Michigan. And, with a lot of help from our potato stakeholders, were successful in obtaining a four-year \$6.8 million coordinated agricultural project funded by the US Department of Agriculture. The project title is ‘Systems approach to nematode control in US potato’.

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Figure 2. Galls caused by RKN under the potato skin.

photo by C. Gleason

Potato Industry & Nematode Concern

The US potato industry also is faced with infestations of two quarantined nematode species. Infestations of the potato cyst nematodes, *Globodera rostochiensis*, the golden nematode (GN), and *Globodera pallida*, the pale cyst nematode (PCN) are found only in New York and Idaho, respectively. Although these nematodes are not widespread throughout the United States, they have had a tremendous impact on the industry. When PCN was first discovered in Idaho, the industry's international trading partners were so alarmed that many stopped shipments of potato from the US. Fortunately, those markets have all been re-opened through the efforts of the Animal Plant Health Inspection Service (APHIS). Quick action from APHIS, respective state AG departments, and from industry prevented the spread of these invasive nematodes to other potato growing land in the US.

Fortunately for New York growers dealing with the GN infestation, plant breeders have developed many varieties that are resistant to this nematode. However, growers in Idaho do not yet have resistant varieties as a control option for PCN. Currently, PCN in Idaho is controlled by the application of fumigants and spread is prevented through strict phytosanitary regulations that include sanitation of farm equipment leaving an infested field.

Nematode Species

Our research is focused on four nematode species that are especially damaging to potato production. Two root knot nematodes (RKN), *Meloidogyne hapla* which is also known as the northern root knot nematode (NRKN), and *Meloidogyne chitwoodi* which is commonly called Columbia root knot nematode (CRKN). *Meloidogyne hapla* is widespread in the USA and *M. chitwoodi* is scattered in many parts of potato producing land in the west. Tubers infected with *M. chitwoodi* have galls just below the skin (Figure 2). For some markets, these blemishes can cause the rejection of an entire shipment of potatoes. Unfortunately, all varieties of potatoes that are grown in the United States are highly susceptible to both RKN. Because these nematodes infect a wide range of crops, rotation is not always effective. Currently, the only available management option for growers is the application of fumigants and nematicides.

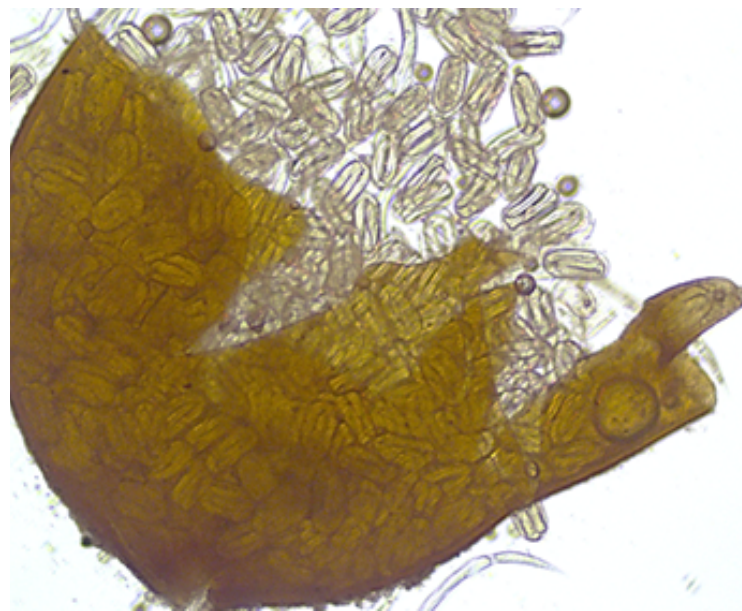


Figure 3. *Globodera pallida* cyst that has been crushed to reveal all of the eggs

photo by Dandurand Lab

Grower Facts & PAPAS Goals

Did you know that if a grower has a nematode problem, 20% of a their production cost goes towards management of invasive nematodes?

Growers faced with an infestation of any of these four species of nematodes have few options for their management.

Through the PAPAS project, we plan to change this.

How are we going to achieve this?

- Improve diagnostic methods so that they are quick and reliable
- Develop support so that growers with an infestation can predict how the infestation will impact their yield, and how to best manage the infestation.
- Provide resistant varieties to all four nematode species.
- Pass this information on to our stakeholders.

NEMATODES CAN REDUCE POTATO YIELD UP TO 80% IN INFESTED FIELDS. AN ECONOMIC IMPACT STUDY OF THE 2016 PCN INFESTATION IN IDAHO ESTIMATED TO RESULT IN A DECREASE OF \$25.6 MILLION IN OUTPUT FOR GROWERS AND THE ECONOMY.



Figure 4. Pale cyst nematode cysts
photo by Dandurand Lab

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Figure 5. Potato field day
photo by Dandurand Lab



Figure 6. Researchers presenting at the 2023 Potato Expo photo by B. Schaefer

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New Additions to PAPAS



Chandni P Shah, PhD is a new PAPAS PostDoc in the EPPN lab at the University of Idaho. She has worked on Eradication of PCN (Potato cyst nematodes) following many strategies and will be working on identifying bioactive compounds from litchi tomato (*Solanum sisymbriifolium*) and understanding their biochemistry for the PAPAS project. She attended Sardar Patel University, India where she completed her BS,MS and PhD in Biotechnology. She comes to the University of Idaho from Gujarat, India



Alex Scalzo is the PAPAS Program Manager. He comes to the PAPAS project with a background in mosquito & vector control management. Alex will be managing and tracking the finances and have other administrative duties for the PAPAS research project. He graduated from Fresno State University with a business management degree in 2016 and is currently working on his master's in public administration through the University of Idaho.

OUR NEXT NEWSLETTERS WILL ELABORATE ON EACH OF
THESE GOALS SO STAY TUNED!
FOR MORE INFORMATION, CHECK OUR WEBSITE:
WWW.POTATONEMATODES.COM