



Canadian Agri-Science Cluster for Horticulture 2

Progress Report December 2014

<p>Activity 16, Potato 15</p> <p>Zebra Chip and Potato Psyllid Survey and Monitoring</p>
<p>Lead Researcher</p> <p>Dan L. Johnson, PhD, University of Lethbridge</p>
<p>Collaborators</p> <p>Larry Kawchuk, PhD, Agriculture and Agri-Food Canada Scott Meers, Alberta Agriculture and Rural Development</p>
<p>Activity Objectives</p> <p>To survey the occurrence of zebra chip disease of potatoes in Canada, and test symptomatic tubers for the presence of the causative agent <i>Candidatus Liberibacter solanacearum</i>; and to survey for the insect vector, potato psyllid, by conducting field sampling, identifying species and stages, mapping occurrence if found, developing and implementing a monitoring program, assessing the effects of weather and regional variations and movements, determining potential geographic range, and constructing a geographic forecasting model of the insect life history and development.</p>
<p>Research Progress to Date</p> <p>1) To detect the presence of <i>Candidatus Liberibacter solanacearum</i> (Lso), the causative agent of Zebra chip, genomic DNA was extracted from plant tissues or psyllids using the Mericon DNA extraction kit from Qiagen. Polymerase Chain Reactions (PCR) methods were used to test for DNA of the pathogen. The testing method was correct in identifying known positive calibration samples. All Canadian plant samples and psyllids submitted in 2014 for analysis were negative for Lso. The data for 43 samples of diseased plant material tested are available on request.</p> <p>2) Network participants conducted field sampling for the insect vector, <i>Bactericera cockerelli</i>, potato psyllid, and sent yellow (sticky) sampling cards to the University of Lethbridge for microscopic examination. A total of 1,175 yellow sampling cards were used in weekly field sampling, and the insects on the card grids of 875 of these were examined in the laboratory. The data are available on request. The number of samples in 2014, by province, were as follows: Alberta 560 (including Promax Agronomy >400, U of Lethbridge 160) Manitoba AFRD 59; New Brunswick 500; PEI 11; Quebec 45; ON, BC, NL, NS: sent in no field sample cards in 2014.</p> <p>In addition, over 200 “possible” potato psyllids were reported and supplied by field samplers or other contributors. None of these included any <i>Bactericera cockerelli</i>, potato psyllid, but did include psyllid</p>

species in other families, and Psocoptera (bark lice), which are superficially similar in appearance. Other insects were noted where possible, as a service to network participants and growers whose fields were sampled. All field sampling was conducted by network participants, and card assessments, photography, and archiving were conducted by the P.I.

3) Mapping of the appearance of the potato psyllid was not required, because none were found. A graduate student working on GIS, forecasting, and related topics was not yet hired, because funds for graduate students and summer assistants have not been obtained yet.

4) To assess the effects of weather, discussions were held with US potato psyllid specialists (including personal meetings with entomologists, including Dr. Erik Wenninger, University of Idaho, Kimberly Research & Extension Center, 3806 N 3600 E, Kimberly, ID, an expert in field sampling and forecasting of this insect), and statistical studies and modelling were initiated. Detailed weather databases have been requested from Alberta, and will be obtained for other provinces. Modeling software was identified to be obtained in 2015, and a literature search of life history parameters and development times was conducted. Participation in the USA Zebra Chip workshops and conference was delayed until funding is available.

A requested report of progress was provided to the Canadian Horticultural Council on November 5, 2014. Results were presented in posters and presentations at the Potato Growers of Alberta Annual General Meeting, Red Deer, AB, November 19, 2014. A research article is being prepared on the results of two summers of sampling in Canada.

Early Outcomes or Challenges

Early Outcomes

1. Potato psyllid and zebra chip have not yet entered Canada, as noted in the next section.
2. A photographic guide for researchers, network participants, growers, and advisors is a desired technology transfer product that we intend to provide in 2015.
3. We will continue to conduct field sampling, and plan to make sampling more regular and detailed.

Challenges

1. Many of the samples in 2014 were returned late in the summer, and we will try to convince network participants to send samples soon after collection. Some of the samples had no location, and were of limited value in mapping or understanding of diversity and insect movement.
2. Suction sampling, tower sampling, drone sampling, sweep sampling, leaf examination during regular field visits, and other innovative forms of sampling are in our plans for coming seasons, but the budget for supplies and minor equipment is minimal and does not allow for detailed research of this kind. We will seek other sources, if possible.

Key Message(s)

Potato psyllid and zebra chip have not yet entered Canada. Although confidence would be increased if we had staff or students to assist in more regular and distributed sampling, the 2013 and 2014 did not find evidence of the presence of potato psyllid or zebra chip in Canada. The sampling was sparse but adequate to find the insect vector and pathogen if they were present. Sampling was also supported by grower awareness and development of the network.



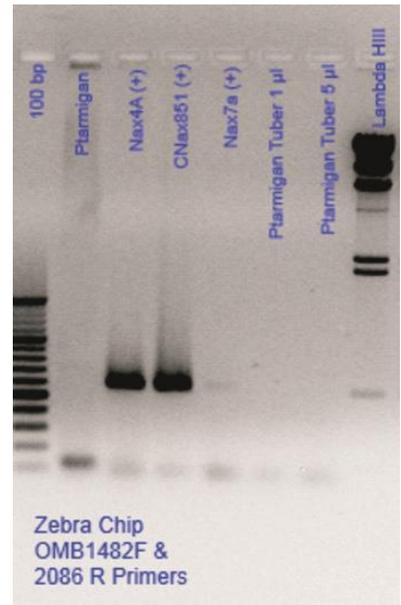
Potato psyllid 1 Bactericera Cockerelli in Idaho



Potato psyllid 2 Bactericera Cockerelli in Idaho



Example of yellow sticky card sample



Example of zebra chip molecular test