



AgrInnovation Program Stream B

2016-17 Annual Performance Report

For projects or activities that started late, it is expected that answers may be brief for some questions and not applicable or premature for other questions. Indicate “Not applicable” if the question is not relevant at this time.

Name of Recipient: Eastern Canada Oilseeds Development Alliance Inc. (ECODA)	
Project Title: Market-Driven Research for Soybean and Canola Supply Chain Profitability	
Project Number: AIP-P025	Period Covered by Report: 2016-04-01 to 2017-03-31
Activity #: 16 Name of Activity: Assessment of the impact and interactions of emerging crops on potato-based cropping systems	Principal Investigator: Aaron Mills

1. Performance Measures. See Annex A for an explanation of each measure.

Innovation Items	Results Achieved	Provide a description (2-3 paragraphs) for each item produced and describe its importance to the target group or sector. Explain any variance between results achieved and targets. Use plain language.
# of Intellectual property items flowing from the project		
# of new/improved products		
# of new/improved processes or systems		
# of new/improved practices		
# of new varieties		
# of new/improved genetic materials		
# of new/ improved gene sequences		
# of improved knowledge		

Information Items	Results Achieved	Provide the complete citation for each item. Please see Annex A for examples.
# of peer reviewed publications		
# of information items		
# of media reports		



# of information events	1	Cropping systems in PEI: Preliminary study results; Talk was delivered as part of the 2017 PEI Soil and Crop Association meeting.; 2017/03/02 - 2017/03/02 (Invited)
		Provide the # of attendees
# of individuals attending information events	300	300
		Provide the # of attendees who intended to adopt new information or technology
# of individuals attending information event who intend to adopt new innovation	150	It is anticipated that about half of attendees, 150, will adopt the information presented.
		Provide the name, degree completed and date of completion
# of persons who completed a M.Sc. or Ph.D. during project		

2. Executive Summary

The Executive summary contains two parts: Key highlights of activities and scientific results and Success story. Information may be used for internal and external communication purposes. Write for a general audience using plain language. Do not include sensitive or confidential information.

Key Highlights - This section describes the key activities and final scientific results of an activity/ project in such a way that readers can rapidly become acquainted with a large body of material without having to read it all. Include a brief statement of the problem(s), background information, concise analysis and main conclusions. Suggested length – maximum 1 page.

The end of the first phase for this study was completed in 2016 (three year rotation). The results clearly show differences between the different cropping systems with regards to their effects on potato yield and quality during the potato phase of each rotation. Overall, it appeared that canola did show beneficial effects on the potato yield and quality, however only when it was grown once in the rotation. This was also the case with soybean where back-to-back soybean resulted in the lowest total marketable yield. The traditional barley underseeded with clover, showed intermediate effects on marketable yield of potato.

Nematode community dynamics varied with year. This is not unusual as “year” effect tend to contribute the greatest amount of variability in most field experiments. There were population shifts observed, and there were differences in the total amount of plant feeding nematodes on a rotation-by-rotation basis. Plant feeding nematodes interestingly enough were present in higher numbers in rotations containing canola rather than soybean. These data are counter to the notion that canola may have some biofumigant effects against plant feeding nematodes.

The phospholipid fatty acid profiles showed limited rotation effect. Cropping systems containing forage tended to be higher in the relative abundance of mycorrhizal fungi. Also, higher fungal to bacterial biomass ratios were observed in rotations containing canola. Again, this counters the notion of biofumigatory properties of canola against soil fungi.



Success Story - A success story presents a significant result or an important milestone achieved. It is intended to showcase achievements in applied research. Focus on research results, successful technology transfer, potential for pre-commercialization, and/or potential impact. A Success Story is not a progress report for each activity (suggested length 2 – 3 paragraphs).

Not applicable.

3. Objectives/Outcomes (technical language is acceptable for this section)

Provide a brief summary that includes introduction, objectives, approach/methodology, deliverables/outputs, results and discussion, and any Ph.D or Master students recruited to work on the project.

At the end of the first phase (three-year rotation), there were clear differences between the various cropping systems on potato quality and yield.

Table 1: Cropping systems evaluated for the first phase 2014-16.

Year 1	Year 2	Year 3
Buckwheat	Buckwheat	Potato
Corn	Forage mix	Potato
Barley	Clover	Potato
Canola	Spring Wheat	Potato
Corn	Canola	Potato
Canola	Canola	Potato
Soybean	Soybean	Potato
Corn	Soybean	Potato
Soybean	Forage mix	Potato
Canola	Forage mix	Potato

Overall, it appeared that both canola and soybean when grown for two years between potato crops resulted in significant losses in both yield and quality (**Fig. 1**), however the effects were more dramatic with soybean than with canola.

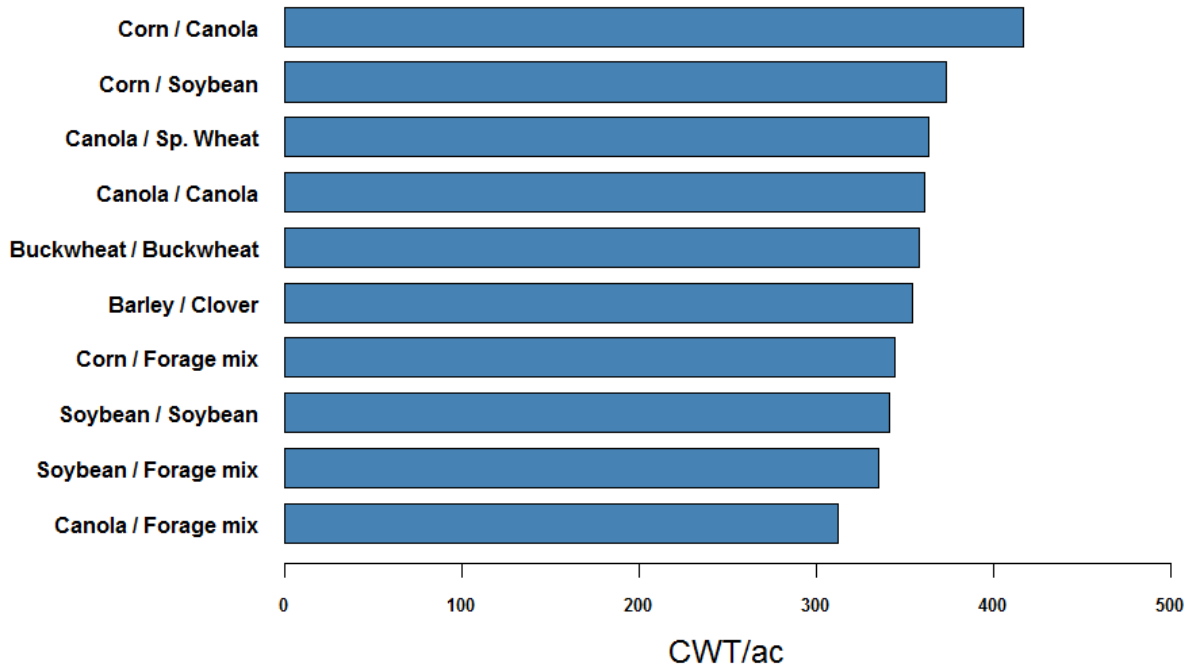


Figure 1: Total marketable yield of potato crop following various other crops.

Data were also collected which indicate that cropping systems which contain forages or forage mixes tended to have higher levels of mycorrhizal fungi (Fig. 2) as well as a higher fungal to bacterial biomass ratio (indicator of soil decomposition pathways) (Fig.3). A higher f:b is indicative of a more stable and sustainable soil biological system.

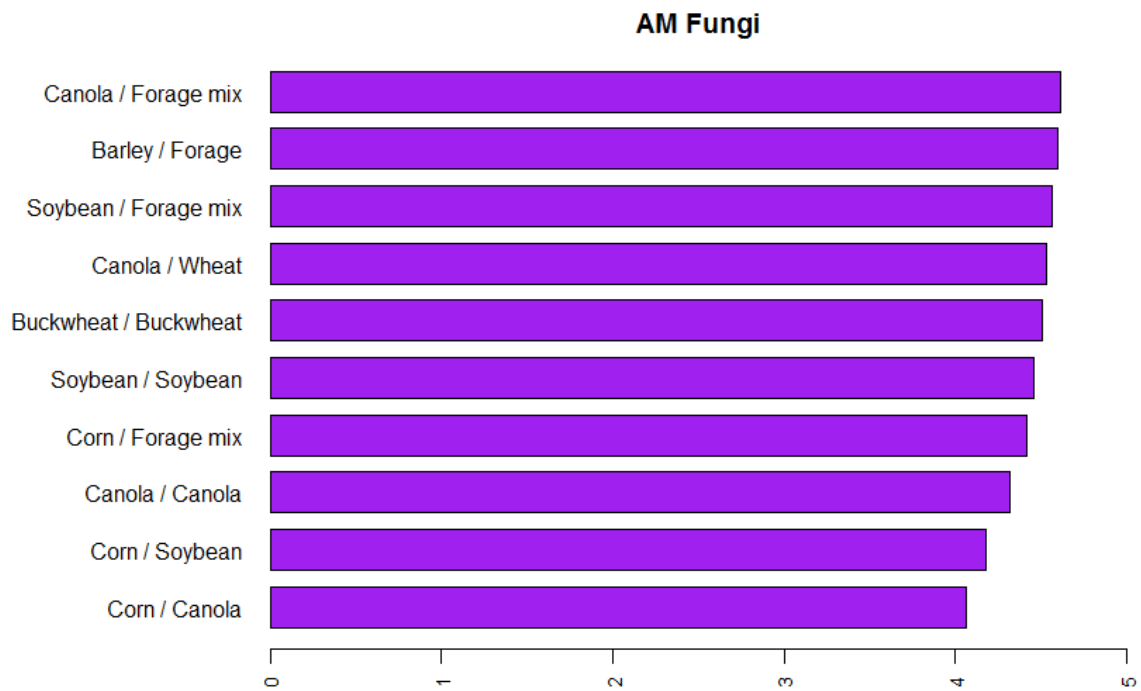
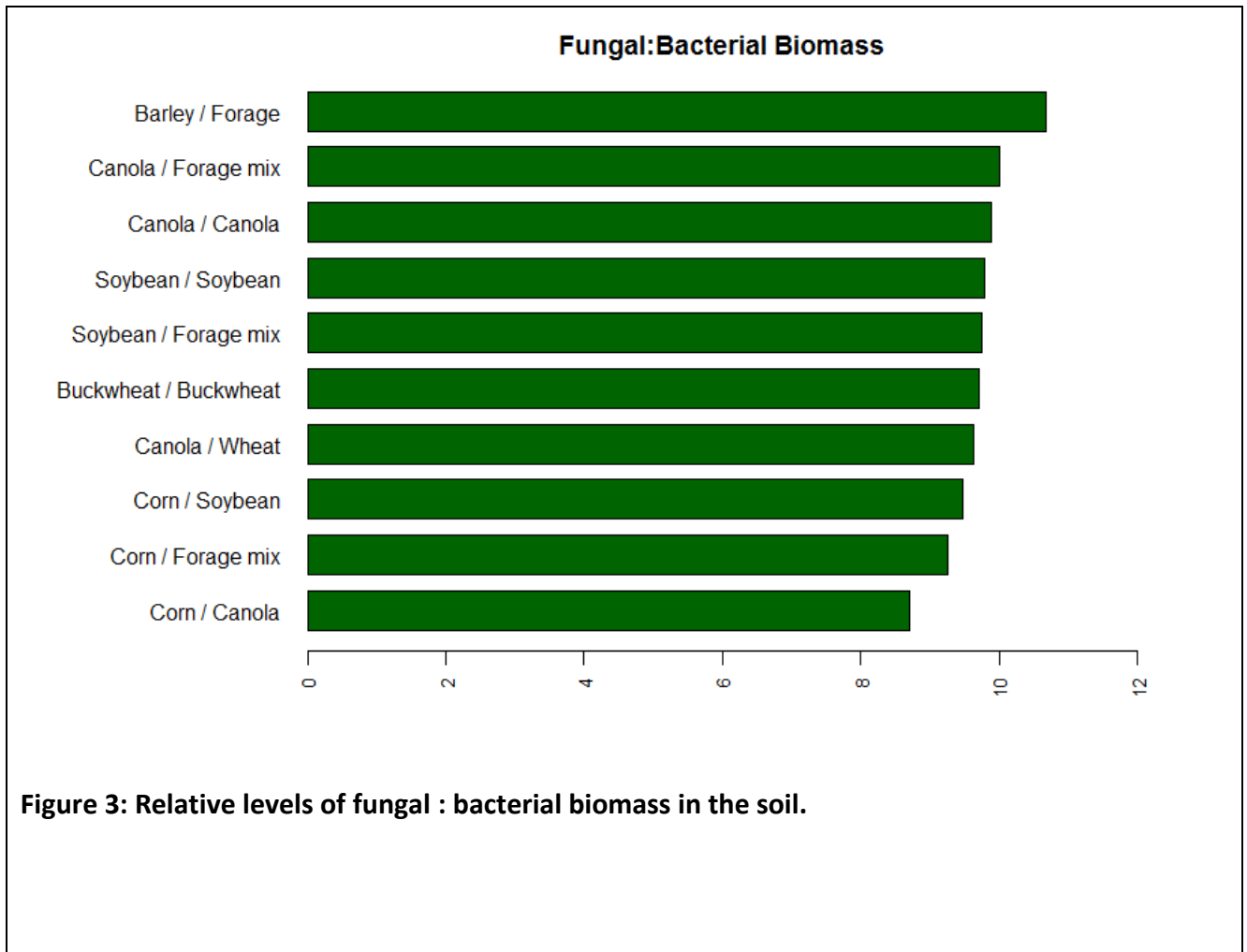


Figure 2: Relative levels of mycorrhizal biomass in the soil for each rotation



4. Issues

- Describe any challenges or concerns faced during the project. How were they overcome or how do you plan to overcome?
- Describe any potential changes to the work plan and the budget. How were or how will they be managed?

Most of the project went according to plan. What amounted to tremendous bad luck with growing corn for the rotations, there were not any useable data from any of the corn plots aside from biomass data. PEI is not conducive to growing corn consistently from year to year. It is recommended that the corn plots be dropped from the experiment and replaced with a cover crop such as pearl millet or sorghum-Sudan grass.

5. Lessons Learned:

Describe the key lessons learned gained as a result of executing the project (e.g., a more efficient approach to performing a specific task for activity / project).

More focus on corn planting with regards to seed placement and herbicide types.



6. Future Related Opportunities:

Describe the next steps for the innovation items produced by the activity/project. Is additional research required? Is there potential for commercialization or adoption?

Interesting results have emerged from the first phase of this project. Based on these findings, there is potential for further research into different cropping systems including these emerging crops. Canola is an excellent crop for potato-based cropping systems and warrants further research.



Annex A

Innovation Items	
Performance Measures	Description
# of Intellectual property items flowing from the project	These include: declaration of invention, patent application, patents, trademarks, copyrights, trade secrets, signed license agreements, and royalties generated. This does not include IP for plant varieties; those should be reported under “# of new varieties” below.
# of new/improved products	New products could include: a new commercial product, bacterial strain, cartographic product, cell culture, analysis certificate, computer software, database, enzyme, equipment/instrument, fertilizer, hormone, methodology, model, monoclonal antibody, pest control product, polyclonal antibody, standard reference-chemical, standard reference-biological, standard reference-plant, etc.
# of new/improved processes or systems	This is the set of operations performed by equipment in which variables are monitored or controlled to produce an output. A combination of inter-related components or processes is arranged to perform a specific function and generate a given outcome.
# of new/improved practices	This is for a research that generated new knowledge that can be applied directly on the ground by the sector. This is mostly for new agronomic practices but can also cover new practices by processors.
# of new varieties	This includes registered varieties, cultivars, or breeds. This includes invention disclosure, protection and license for new plant varieties. For each new variety, please provide the registration number and the variety name.
# of new/improved genetic materials	This could include genetic map and gene probes. Include new varieties, cultivars or breeds in category “New varieties.”
# of new/ improved gene sequences	The discovery of order of bases of a DNA [segment] making up a gene.
# of improved knowledge	This category is for reporting results following completion of the final year of the activity, or results against an activity’s improved knowledge target. It is intended for results that do not fit in any of the above categories.
Information Items	
Performance Measures	Description
# of peer reviewed publications	<p>These are published items such as: research papers published in scientific journals, books, book chapters, review articles, conference proceedings, research notes, or other that receive peer-review. Items that are not yet published (ex. manuscripts in development or review) should not be reported.</p> <p>For each reported item, please provide the following: author(s), year of publication, article title, title of journal, volume (issue), and page number(s).</p> <p>If the item is a book or a book chapter, add name of publisher.</p> <p>If the item is an article for conference proceedings, add title of published proceedings, location, and year/month/day.</p>
# of information items	<p>Information items include: posters, abstracts, pieces in publications such as trade journals, articles in industry magazines or press, industrial reports (confidential or not), technical bulletins, brochures, guides, flyers, newsletters, other technical transfer publications. If an item is published in a medium whose audience is the general public, it should be reported in the # of media reports category below.</p> <p>For each reported item, please provide the following: author(s), article title, title of magazine/trade publication etc., page number(s), type of information item such as poster or abstract or guide etc., and year/month/day.</p>



# of media reports	<p>Examples include articles or interviews about project results in media such as newspaper, tv, radio, and internet (announcements about project funding are excluded). (These are items prepared by a third party, usually with input by the project). If an item is published in an industry journal, newspaper, or magazine, it should be reported in the # of information items category above.</p> <p>For each reported item, please provide the following: author(s), article title, name of interviewee(s), source of reports (TV or radio interview etc.), and year/month/day.</p>
# of information events	<p>These are events such as a scientific meeting, symposium, conference, industry meeting, or field day where a project participant has been invited to present a talk or presentation directly related to the activity.</p> <p>For each reported item, please provide the following: name of presenter, title of presentation, name of the event, location, and year/month/day.</p>
# of individuals attending information events	Please provide the number of attendees per event.
# of individuals attending information event who intend to adopt new innovation	Please provide the number of attendees intending to adopt the new innovation per event.
# of persons who completed a MSc or PhD during project	Only students who completed their MSc or PhD in the last year should be included in this category. For each reported graduate, please provide the following: the name of the student, degree completed and date of completion.