

**PROJECT TITLE: FUNCTION OF PHOSPHOROUS ACID RELATED COMPOUNDS ON SUPPRESSION OF LATE BLIGHT IN POTATOES (PT2)**

**There are four objectives in this project.**

**Objective 1: Study of phosphorous acid –response proteins for their functions against late blight in foliage and tubers**

We successfully completed all the deliverables and outputs stated in the proposal. The individual proteins respond to PA were identified. The disease resistant pathways and their molecules were also identified. The functions of these PA-triggered proteins were confirmed for their relationship to the plant defense mechanisms against the pathogen *P. infestans*. The outcome provided inside information on the molecules that are responsive to PA treatment, which are essential for chemical manufacturers to design new and innovative pesticides/agents. As well, the identified proteins provided information for researchers to design DNA markers. These DNA markers could be used by breeders for selecting late blight resistant cultivars.

**Objective 2: Effect of phosphorous acid on disease development on foliage and tubers**

This part of the work was also completed with extra data obtained. The electron microscopy work provided information about the disease developmental pathways. It also provided the visual data about the health status of the pathogen at its particular stage of the life cycle. The results from both target goals helped us to understand the mode of actions of PA on the microorganism. Control of sporangia production, either from infected plants or tubers in cull piles, could significantly reduce the spread of the pathogen, causing late blight disease in potatoes.

**Objective 3: Examination of translocation of phosphorous acid in potato plants and in potato tubers and subsequent functions against pink rot and other tuber diseases**

This part of the project has becoming a key element for the entire project. It is completed with much extra data. The translocation data is an important addition in understanding the mode of actions of PA on late blight suppression. Observations from our field trials had shown that tubers treated by PA acquired more resistance to tuber rot during storage. This could be the results of the systemic function of the fungicide. Since other reports have indicated the protective function of PA to pink rot, this data provides additional data for disease management in potato storage. Much of the data has been presented at industrial meetings across Canada.

**Objective 4: Effective use of phosphorous acid in potato production systems**

This part of the work contained many more trials than planned in the original proposal. Data related to the effect of PA on seed quality, disease resistance and germination rate were collected. The information obtained is of great value to guide growers to properly manage the use of the fungicide. In particular, we could not find any significant effect of PA on seed germination, canopy cover and plant height, therefore, we believe that the use of PA related fungicides are save when used in season and postharvest treatment. We do not recommend the use of PA on seed treatment prior to planting as the fungicide may damage the eyes where shoots emerge.