**„Studies on *Ribes* plants, *Cecidophyopsis* mites and Blackcurrant Reversion virus for sustainable resistance breeding and cultivation of *Ribes*”**

**1.1.1.1/18/A/026**

**Project scientific group**

During the first period of the implementation the following researchers of Institute of Horticulture (Leading partner) were involved in the project: project scientific leader Ph.D. Inga Moročko-Bičevska, leading researchers Ph.D. Gunārs Lācis, Dr. agr. Valda Laugale, early career researcher Dr. agr. Arturs Stalažs, Ph.d. student Dmitrijs Konavko, research assistants M.Sc. Toms Bartulsons, M.Sc. Kristīne-Krista Lejniece, M.Sc. Kristīne Vēvere, and laboratory technicians B.Sc. Māris Jundzis and Sanita Dzieviaciena.

Latvian Biomedical Research and Study centre (collaboration partner) project implementation was started by the following employees: BMC group coordinator, new scientist Ph.D. Ina Baļķe, candidate of Ph.D. degree M.Sc. Ieva Kalnciema, scientific assistant M.Sc. Gunta Reseviča, as well as the 2nd year student of the Bachelor of Biology study program, laboratory assistant, Rebeka Ludviga.

**Publicity events**

Information posters according to the publicity requirements of the program, which contain general information about the project (project title, goal, beneficiary, project partners, responsible executor) have been placed at the premises of the Institute of Horticulture (Lead Partner) and Latvian Biomedical Research and Study Center (partner institution).

The information on the start of the project implementation placed on the websites of the beneficiary and cooperation partner:

<http://www.darzkopibasinstituts.lv/lv/projekti/ribes-gints-augu-cecidophyopsis-pumpurercu-un-upenu-reversijas-virusa-izpete-ilgtspejigai>

<http://biomed.lu.lv/lv/petijumi/projekti/visi-projekti/ribes-gints-augu-cecidophyopsis-pumpurercu-un-upenu-reversijas-virusa-izpete-ilgtspejigai-ribes-gints-ogulaju-rezistences-selekcijai-un-audzesanai/>

**Research**

During the reporting period, five expeditions and samples for research in Latvia, Poland, Lithuania, and Finland were collected within **Activity 1**, in total collecting 134 samples of *Ribes* plants. Microscopy and testing of buds for the presence of mites were performed and samples were prepared for DNA isolation. The method for obtaining a DNA sample from a single mite individual was developed and 919 samples of DNA samples were prepared for the analysis. Work has been done to improve the specificity of amplification primers for the ITS region by developing and testing pairs of newly created primers. Practical testing of various types of microscopy for non-destructive analysis of mite specimens and species identification, and further isolation of DNA/RNA from one mite individual has been initiated. Investigation of information and available protocols for the selection of the most appropriate method for isolation of viral RNA from one mite individual has been started.

Within **Activity 2.** the updating of published information on *Ribes* plant resistance to *Cecidophyopsis* species and analysis of scientific literature was done. Information on *Ribes* plant samples analyzed in previous studies, genotyping results of Ce gene was collected and analyzed. The DNA collection of the existing *Ribes* plants, the samples available, the degree of their characterization, the quantitative and qualitative assessment of the DNA of the samples were evaluated. The collection of the existing *Ribes* plant material for DNA extraction has been evaluated.

An analysis of literature has been performed for the isolation of high quality total RNA from plant material with high polyphenol, polysaccharides and antioxidant content. Summarizations of used methods were performed. A protocol plan has been established for methods to be tested for total RNA isolation, for the suitable identification. Comparison of available NGS platforms available at BMC (Ion Torrent, Illumina and MGI) has been performed. Infestation trial for NGS research was established on potted plants in outdoor conditions for black currants, red currants and *Ribes alpinum* infested with three different mite species. Tests for infectious specimens for mite damage and samples for BRV diagnostics prior to infestation were performed to exclude possible contamination of plants before infestation. Experimental samples of *Ribes* plants from the infested plants for optimization of RNA extraction methodology, preparation for NGS analysis were collected and prepared.

Initial evaluation of the local germplasm has been done, gathering data on past evaluation results of *Ribes* plant resistance to *Cecidophyopsis* mites in Institute of Horticulture collections and trials. Information on the phenotypic characterization of the existing *Ribes* genetic resources and statistical analysis of the data was performed. A manuscript of the publication "Phenotypical variability and diversity within the *Ribes* genetic resources collection of Latvia" was prepared and submitted for publication in Acta Horticulturae. Based on the current information on the phenotypic characterization of the *Ribes* genetic resources, an oral report was prepared on "XII International *Rubus* and *Ribes* Symposium: Innovative *Rubus* and *Ribes* Production for High Quality Berries in Changing Environments", 25-28 June 2019, Zurich. Inventory of local-origin *Ribes* genetic resource collections at LatHort field collections in Dobele and Pūre, and the data collected so far, was done to assess what additional observations and data records would be needed to select genotypes for inclusion in the national genetic resource conservation database and international databases.

The evaluation of the local genotypes of the *Ribes* available in the germplasm collections and collected in the earlier expeditions has been started. The evaluation was based on RIBESCO descriptors. A total of 23 gooseberries, 23 blackcurrants and 12 currant genotypes have been evaluated.

A list of genotypes needed for industrial research for in vitro propagation has been developed and the introduction of these plants in vitro has been started, as well as the introduction of the most valuable local genotypes in tissue culture for recovery and further preservation by creating a recovered, virus-free collection.

*Information prepared 31.05.2019.*