EIROPAS SOCIĀLAIS FONDS

EUROPEAN UNION
CO-FINANSED PROJECT

„Importance of Genetic Factors on Formation of Forest Stands with High Adaptability and Qualitative Wood Properties”

Activity „ Adaptation of the forest trees, distribution of the biomass and quality of the branches”

goals, objectives, expected final results

Objectives of the research activity

1. Select clones with high adaptive capacity, as well as branch quality and opportune stem form;
2. Assess biomass accumulation in different parts of the tree, computing and/or calibrating biomass equations and estimating influence of genetic factors on the biomass distribution and CO_2 sequestration;
3. Disseminate project results and facilitate development of practical applications.

Goals and plans of the research activity

To achieve first objective of the activity: “Select clones with high adaptive capacity, as well as branch quality and opportune stem form” following tasks are scheduled:

a) assess the formation of increment in progeny trials of spruce and hybrid aspen at the age of 2-5 years and time of entry of different phonological phases in pine progeny trials at the age of 20-35 years;
b) analyze the effect of climatic and genetic factors to seasonal growth rhythm in the context of expected climatic changes and recommend clones with the highest probability to maintain maximum productivity in expected climatic conditions;
c) sample at least ten trees representing Kraft class I and II per family of productive Scots pine and Norway spruce clones in progeny, measure branch parameters (type, number per whorl, base diameter, length) in different height of tree and calculate genetic correlations;
d) determine effect of genetic factors on the branch parameters in different height and recommend indicators for the accurate and fast assessment of branch quality of trees.
e) collect cross-cuts from sample trees for stem analysis, estimate influence of genetic factors on tree/stand development, current annual increment and optimize selection age of most productive genotypes

To achieve second objective of the activity: "Assess biomass accumulation in different parts of the tree, computing and/or calibrating biomass equations and estimating influence of genetic factors on the biomass distribution and CO_2 sequestration" following tasks are scheduled:

a) survey biomass of different parts (needles, twigs, stems, strains, roots) of sample trees;
b) determine the biomass of branches in different height of the tree, root biomass and analyze these indicators in the context with the expected increase in the frequency of storms in order to recommend potentially more lasting clones;
c) collect samples from different parts of trees for determination of dry weight and carbon content according to ISO 10694 standard;
d) develop and calibrate biomass distribution equations and recommend clones for stands with specific purposes (management goals);
e) assess increase in CO_2 sequestration, while using bread material in forest regeneration.

To achieve third objective of the activity: "Disseminate project results and facilitate development of practical applications" following tasks are scheduled:

a) produce distance learning course, covering the most important findings of the project in forest management and adaptation context and ensure its availability in different formats;
b) prepare the fact sheets with the various results of the project which can have a direct practical implementation and distribute this information to forest owners via different consulting organizations and unions.

Expected results of activity

Expected outcomes:

- list of hybrid aspen and spruce clones with adaptive capacity/qualities that reduces the risk of negative impact of climatic factors; to be used for further breeding work;
- list of productive pine clones for seed orchard establishment, heaving high adaptive capacity, dynamic development and such biomass distribution, which reduces the risk of negative impact of climatic factors.
- assessment of influence of genetic factors on biomass distribution, based on calibrated biomass equations for different parts of trees for 20-35 year old pine and spruce, as well as till 14 years old hybrid aspen;
- estimated possibilities to improve environmental quality via tree breeding work using improved equations of CO_2 sequestration;
- prepared materials and distance learning course, covering results of the project in broader context of forestry and practical applications;
- results of project covered in scientific publications and reports in scientific conferences as well as in master thesis and undergraduate works