

**silviculture**

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***New Perspectives and Tasks For Forest Research in Central Europe  
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**Silviculture research** in FGMRI is covered by **Research station at Opočno** and it is focused traditionally on measures supported **not only growth and stability** of forest stands but also **other forest services**.

In the last period, several **topics** became more important (projects ongoing in 2022):

## The reforestation and forest thinning of nurse and target tree species mixtures with the production and non-productive functions of the forest in the area of large-scale die of spruce stands (2018-2022).

The main objective of the project will be **to establish effective procedures for the restoration of spruce forests** in areas of its intensive large-scale subsidence with **the use of both nurse and target trees**, so that the successive stands are sufficiently differentiated, have a **high degree of stability and has production and non-production functions** under changing conditions environment.

The partial aims will be **to verify the methods of planting the stands and introducing target trees as a two-phase restoration** in rapidly dying forests, planting nurse stands and **optimizing of thinning** in these crops to increase their stability, the economic efficiency of the processes will also be assessed.



## Methods for minimization of damage caused by wind and snow in forests stands in connection with climate change (2018-2022).

The project will **contribute to forest stands' stability** support in main forest management types.

The project aims to prepare a base for **minimizing potential risks resulting from harmful abiotic agents such as wind and snow** in changing climatic conditions thus supporting a safe wood production service of forests.

The results are to be applied as a conception level **supporting a state forestry policy** by means of **Regional Plans of Forest Development**, and a detailed one concerning particular forestry enterprises.

A basis provided by the research **can be implemented into** realization of the government-approved **National Action Plan of an adaptation to climate change** and the key actions of the National Forestry Program



## Approaches for supporting silver fir in managed forests in the Czech Republic (2019-2023).

The aim of the project is to **optimize both production and stability of silver fir** from mitigation the climate change point of view; fir is a commercial, partly neglected, tree species used in managed forests in the Czech Republic.

Research is to focus on **provenances production variability**, vigor and health (resilience) on long-term experimental plots. Also risks such as **abiotic damage, nutrition sustainability and soil-improving function and biotic pests** such as insects and fungi are to be evaluated and mitigating measures are to be suggested.

**Seed emergence** rate increasing measures and **silviculture approaches** in both pure and mixed stands with fir are to be in focus including the silver fir wood properties. The results are to be a basis of publications and forestry practice guides.



## Fertilizers with zeolite for forestry industry (2019-2022).

The purpose of the project is **to create a methodology for sustainable management of forest soils and nutrition of forest trees (including planting stock in forest tree nurseries) with help a new types of zeolite-fertilizers.**

The aim of the project is **to build and test the fertilizers for applying in forest management** - to optimize their composition, properties and effects in a way that would allow their use in forestry. Fertilizers will be made for the use in forest stands on poor and acidified soil and also in forest tree nurseries with a focus on the wider application of bare-root planting technology.



## **Tools and measures to minimise damage to the roots of nursery plants after planting caused by wild boar (2019-2022).**

The purpose of the project is **to create a methodology for limiting the damage caused by wild boar to deciduous plantings** in the woods.

This methodology will be based on extensive inventory of damage and experiments, and will include an assessment of all relevant factors, including analysis of peat growing media and nutrition systems used for cultivation.

The research **input will be a detailed analysis of the factors that reduce or increase the risk of damage, and guidance on practical measures.** The main result will be certified methodology with a deadline of 10/2022. Partial results will be available to users continuously in the form of articles in the professional journals and on the web-sites



## Optimization of fertilization and management systems of forest nursery soils – second stage (2019-2022).

The purpose of the project is **to create a methodology (manuals) for sustainable management of soils in forest nurseries and for optimization of fertilizing of bare-root planting stock by cultivation on mineral soils.**

This methodology will be based on extensive inventory of soil fertility and nutrition experiments. The work will include an evaluation of all relevant factors, **including testing of soils and fertilization systems.** The main benefit will be the professional book for practical nurserymen with **recommendations for the green manuring, for the soil preparation and fertilization and for the production of forest reproductive material.** The project is based on the solution of previous project (from period 2014-2017).

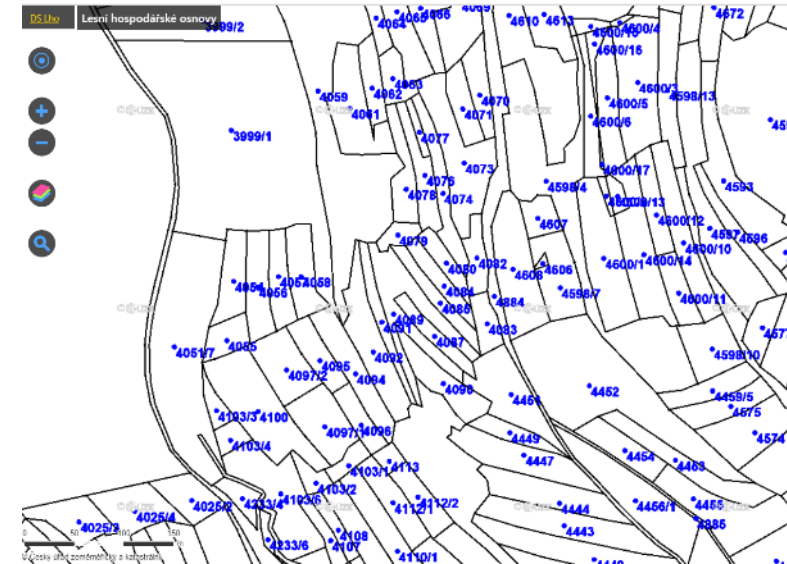




## Sustainable management in small-owner forest estates (2021-2023).

The objective of the project is to **develop basis for improvement of management applied by small-forest owners**. Based on the up-to-date knowledge, small-forest owners' management approaches will be modified and verified **including their economic evaluation**.

Particular objectives such as proposal of management measures tailored to a type of forest estate, **recommendations for state forestry authorities decisions and proposal of subsidy policy adjustment** will be formulated. The specific objective of the project is a **direct transfer of knowledge and demonstration of recommendations** to the stakeholders.



## The potential how to employ European larch in the Czech forests under GCC (2021-2024).

The project deals with:

- I. **production potential** of E. larch in admixture and its increment;
- II. **ecol. demands** and ways how to use natural regener. of E. larch in a wide range of light con. (from a clear cuts con. to con. beneath a shelter);
- III. **microclimatic function** of E. larch as a pioneer sp. with respect to a growth of climax tree sp. (growing beneath a shelter of E. larch young plantations);
- IV. **paleo-botanical research** of the postglacial development of the forest sp. comp. with a focus on the detection of presence of E. larch in the Czech Rep.;
- V. **analysis of the oldest historical notes** about E. larch in historical literary sources;
- VI. **molecular analysis** of the origin of E. larch populations in the Czech Rep.;
- VII. **interaction of E. larch with valuable plant species and communities.**



# Forest functions in the past, present and future - what can society expect from forests under climate change? (2021-2024).

The project deals with the **ability of managed forests to provide ecosystem functions in future conditions characterized by higher drought and heatwaves occurrence** – wood production (inc. carbon storage) and climate change mitigation (regulation of landscape energy and water balance) **in the Czech Rep. and Norway**. We will focus on:

- 1) different site conditions;
- 2) potential for adaptation of important tree spec. (spruce; pine; beech),
- 3) potential for silvicultural measures implementation,
- 4) potential to apply those measures in practise.

The goals will be reached by use of: timelines, climate models for predictions (till 2050); remote sensing and validation of its outputs with detailed field measurements both in **long-term research plots** and forests managed by VLS and Glommen-Mjøsen.



## Potential of geographically non-native species in the forestry sector of the Czech Republic (2022-2024).

The objective of the project is **to get knowledge on a use of geographically non-native woody species in Czech forestry**. Relevant knowledge from both domestic and foreign literature sources will be gathered. The project will focus on **questions such as GND biology and site demands, their production, silviculture, impact on site, vulnerability to diseases and risk of invasive spreading**.

Long-term silviculture and provenance experiments will be reevaluated and databases updated. To verify origin, methods of genetic screening are to be a base for database. The project outputs are to be **focused on explication of GND classification utilizable for civil service decision making and on silvicultural guides proposing mixtures with native woody species**.



## Comprehensive assessment of wood-producing and non-wood-producing functions of pioneer tree species stands (2022-2024).

The project's objective is **to assess dataset from long-term experiments involving pioneer tree species stands (PPD)**, silvicultural treatment's effect on their production (value) potential and fulfilment of ecosystem services, including economic efficacy of PPDs utilization for energetic purposes.

The project will **also evaluate qualitative and quantitative production for various pioneer tree species (mainly birch, aspen, alder)**, their influence on soil environment and microclimatic conditions adjustment to introduce tree species with "climax growth strategy".



Other topics (for example focused on Douglas-fir, declining spruce stands, ameliorative and stabilizing tree species) were included to the projects in the last decade (see list of projects for details - available on <https://www.vulhm.cz/en/activities/research-projects/>)

In the frame of projects solution, **we cooperate with universities, research institutes and also with forest enterprises and forest owners.**

The emphasis is primarily on applied **outputs for practice** (forest guides, verified technologies, etc.) or for state (or public) administration (documents for changes in legislation and concepts, etc.), **but scientific articles or monographs are also requested.**





Thank you for your  
attention!

