



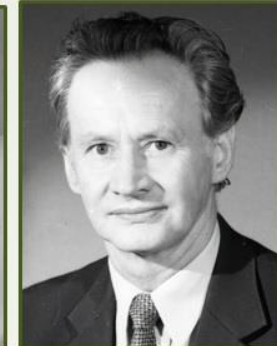
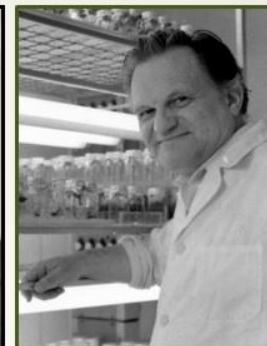
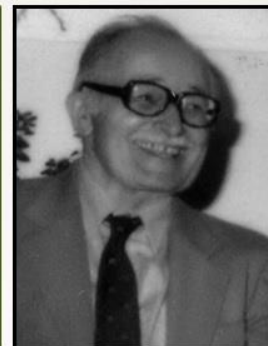
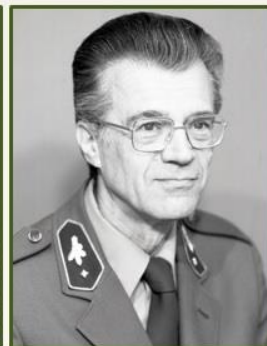
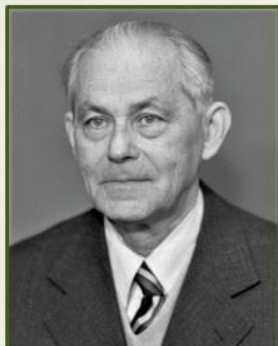
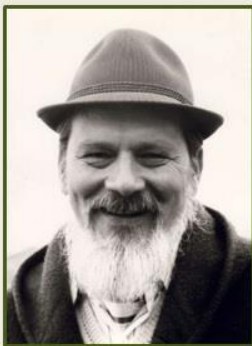
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# Towards the Activities of the Department of Forest Tree Species Biology and Breeding

Josef Frýdl, Petr Novotný, Pavlína Máchová, Helena Cvrčková, Martina Komárková

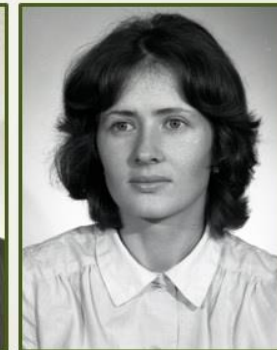
**Forestry and Game Management Research Institute,  
Strnady 136, 252 02 Jíloviště, Czech Republic**

3<sup>rd</sup> Bilateral Workshop of Forest Research Institutions from the Czech Republic (FGMRI) and Saxony (Staaatsbetrieb Sachsenforst), 20. - 22. 9. 2022 (Josef Frýdl, FGMRI, Czech Republic)



## Historical overview:

- 1923 **Division of Silviculture** (Brno, prof. J. Konšel)
- 1951 **Division of Forest Tree Species Biology and Breeding** (Strnady)
- 1956 **Arboretum** (Pinetum) **Sofronka** (K. Kaňák)
- **J. Hofman - V. Samek - J. Šindelář - A. Šika - Z. Zavadil - K. Kaňák - V. Chalupa - B. Vinš - K. Vančura - J. Malá, ...**
- **In current time - ca 19 employees, including technical staff**



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**Arboretum (Pinetum) Sofronka  
(transferred to Pilsen City  
Administration in 2009 )**



Karel Kaňák

1922 – 2007



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## Main domains of research:

- **Classical breeding and improvement**
- ***In vitro* biotechnology**
- **Molecular genetics**
- **International co-operation (IUFRO, EUFORGEN)**



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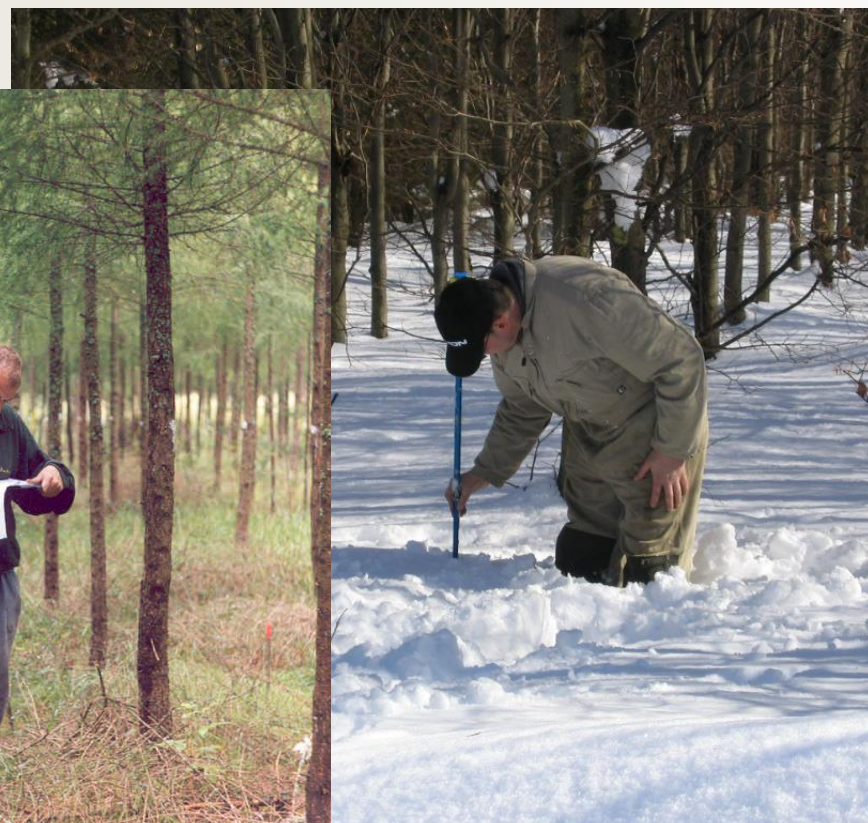


## Classical breeding and improvement

- **Continuation in long-term breeding programs of coniferous and broadleaved tree species (provenance research, testing of FRM resources)**
- **Solution of research projects aimed to conservation of tree species biodiversity (genetic resources) – clonal archives, seed orchards, genetic conservation units (GCU), unique ecotypes and their populations, etc.**
- **Testing of introduced forest tree species and their provenances in the Czech Republic conditions (*Pseudotsuga menziesii*, *Abies* spp., *Picea* spp., *Pinus contorta*, *P. nigra*, etc.)**



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## Breeding and Improvement – Recent research projects, eg.

- Proposal of methodological procedures for implementation of the control system for declared origin of reproductive material by DNA analysis for selected important forest tree species used for artificial forest renewal in conditions of the Czech Republic (2018-2022)
- Preservation of genetic resources of Ore Mountains resistant Norway spruce variants (2020 – 2024)
- Research and protection of valuable remaining populations of Norway spruce in relation to adaptation to increased climate extremity (2020 – 2024)
- Forest tree breeding with the application of biotechnological and molecular methods (long-term activities and projects)

# Main Research Aims of the Division of Biotechnology of Forest Trees

Rescue and reproduction of the forest tree species (organogenesis, somatic embryogenesis)

- Outputs: Forestry guidelines – methodologies for about 30 forest tree species ([www.vulhm.cz/aktivity/vydavatelska-cinnost/lesnicky-pruvodce/](http://www.vulhm.cz/aktivity/vydavatelska-cinnost/lesnicky-pruvodce/))



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# Main Research Aims of the Division of Biotechnology of Forest Trees

Rescue and reproduction of the forest tree species (organogenesis, somatic embryogenesis)

- **The National Bank of Forest Tree Species Explants (2014-2027)**
- Conservation and reproduction of threatened forest tree species native to the Czech Republic (*Sorbus torminalis*, *Malus sylvestris*, *Ulmus minor*, *Ulmus glabra*, *Ulmus laevis*, *Tilia cordata*, *Prunus avium*)



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# Main Research Aims of the Division of Biotechnology of Forest Trees

## Rescue and reproduction of the forest tree species (organogenesis, somatic embryogenesis)

- Monitoring the condition of *in vitro*-based plantlets (24 years)
- Testing of the cryopreservation methods
- Phytoremediation potential of forest tree species



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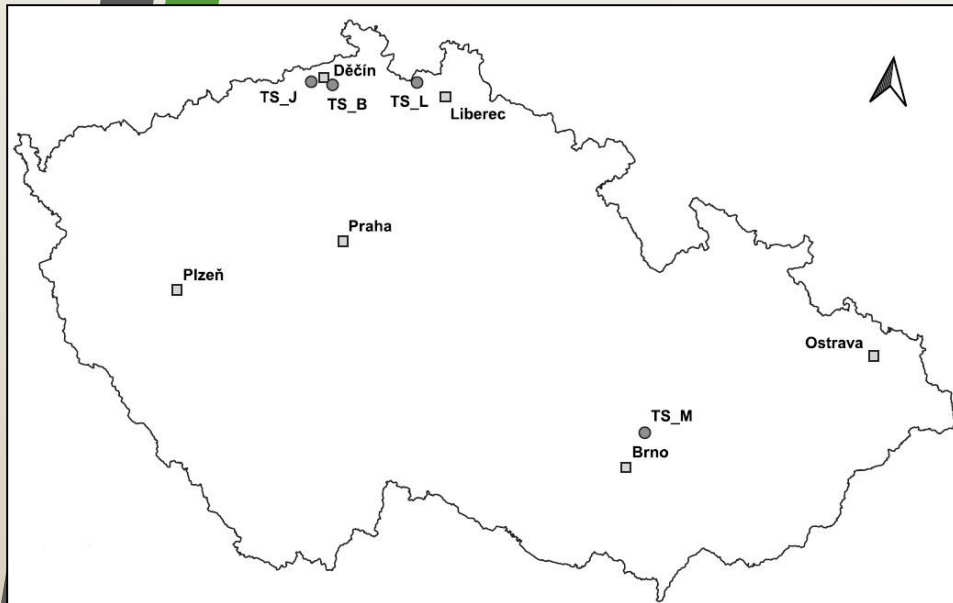
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## Main Orientation of the Division of Molecular Genetics

- Study of determination of genetic variability and adaptability of forest tree species by DNA analyses
  - methodologies for about 23 tree species
- Genetic screening of seed orchards and nurseries (*Picea abies*, *Abies alba*, *Pinus sylvestris*, *Larix decidua*, *Fagus sylvatica*, *Tilia cordata*, *Prunus avium*, ..)
- Identification of genetic resources

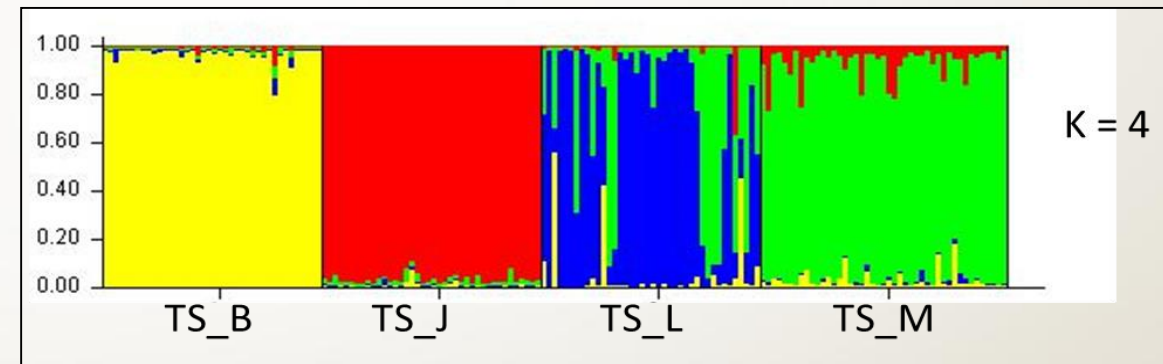


# The Genetic Differences and Structure of Selected Populations of *Taxus baccata*



Map of the geographical locations of the four *Taxus baccata* populations included in this study.

## STRUCTURE analysis



- Seed orchard TS\_L shares high level of own genetic diversity
- To prevent introgression, we suggest to not include any of tested pops into the TS\_L unit



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Repatriation of  
common yew  
(*Taxus baccata* L.)  
to forests in  
Lužické Mts. (North  
Bohemia)



Thank you for your attention