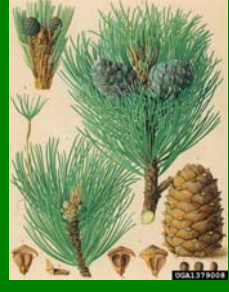


Genetic variation patterns and sustainable management of genetic resources of Eurasian conifers



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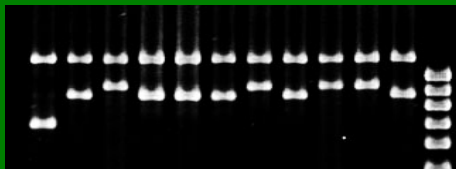
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Related Strategic Objective

4. Meeting the multifunctional demands on forest resources and their sustainable management

Related SRA - Research Areas

- 4-1: Forests for multiple needs
- 4-2: Advancing knowledge on forest ecosystems
- 4-3: Adapting forestry to climate change



Goal:

Development of a comprehensive strategy for the conservation and the sustainable management of genetic resources of selected conifers based on range-wide inventories of genetic variation patterns by using molecular genetic markers

Objectives:

- to develop a comprehensive set of MGMs as indicators and verifiers of genetic diversity for use in genetic monitoring and gene conservation programs for selected pines (*Pinus* spp.) and spruces (*Picea* spp.)
- to characterize of gene pools of conifer species having a broad distribution in Europe and Northern Asia (Trans-Eurasian Conifers, TECs) by means of putatively neutral (SSRs) and potentially adaptive (ESTs; SNPs in candidate genes) MGMs
- to describe the polymorphism of genes that govern important phenotypic variation, and to determine how different evolutionary factors combine to generate the existing diversity.
- to create databases for variation in adaptive traits and combined variation of phenotypic (morphology, growth rate, phenology, cold resistance) and genetic (MGMs, candidate genes) traits in economically important conifers for use in gene conservation and breeding
- to develop markers for the identification of pure species and hybrids in TECs, and to assess the genetic basis of heterotic effects, viability, and fitness in conifer hybrids as potential for their use in forestry (Swiss, Siberian, Korean and Japanese stone pines, spruces)
- to study genetic consequences of drastic environmental change by an investigation of progenies of trees from radioactively exposed areas from the Chernobyl area and the Eastern Urals
- to develop molecular tools to identify, trace and certify the origin of wood from Eurasian conifers for application in conservation



OUTCOME

- ❖ Recommendations for the application of different types of molecular genetic markers (MGMs) in selected conifer species and genera for the sustainable management of their genetic resources including conservation and breeding
- ❖ Development of criteria for the establishment and maintenance of genetic reserves and gene banks for the *in situ* and *ex situ* conservation and use of germplasm in trans-Eurasian conifers (TECs) of high economic and ecological value
- ❖ Development of principles for the application of MGMs in breeding and propagation populations (including seed orchards), managed, and unmanaged forests in Eurasian pines and spruces
- ❖ Databases for polymorphism and variability at MGMs and at economically important and adaptive traits for economically important trans-Eurasian conifers
- ❖ Strategy for the exploration and the use of heterosis and increased fitness in intra- and interspecific hybrids of TECs (stone pines, spruces) in production forests and for maintenance of genetic diversity in threatened species (five-needle pines)
- ❖ Development of operational tools to control the origin of reproductive material and wood based on MGMs
- ❖ Development of genomic resources including DNA sequences for multiple use in breeding programs

Economically important !



Threatened !

