

PARKANO RESEARCH STATION

The Parkano Research Station was established in 1961 to carry out peatland research. Today the research activities have expanded to cover, for instance, artificial regeneration and forest health and vitality.

Sustainable timber production on peatlands presupposes, in addition to effective drainage, a balanced nutrient status. Comprehensive information about the nutrient status of the peat is needed to achieve such a state. New research topics of current interest are the

afforestation of exhausted peat beds and the production of greenhouse gases from drained peatlands.

The regeneration of forests through seeding increases Finland's competitiveness in the export market for sawtimber because seeding provides a good starting point for the growing of pine sawlogs. A substantial proportion of the current volume growth of our forests is obtained from stands regenerated by seeding during the 1950's and 1960's. The effects of seeding substrate, seeding time and seeding method on the success of seeding are being investigated at the station. Special emphasis is placed on mechanized seeding, and combining natural regeneration and seeding.

Research into forest health is a multidisciplinary programme that involves about half of the station's resources. The work carried out at Parkano includes research into forest health in Western Finland, forest vitality fertilization and forest vitality. Cooperation has been established with domestic and foreign research institutes and the environmental authorities.



photo Erkki Oksanen

Head of the station Olavi Laiho

Research projects whose principal researcher is stationed at Parkano:

- Artificial regeneration
- The nutrient status and sustainable timber production of peatlands
- The use of worked-out peat beds for timber production
- The Western Finland Forest Health Project
- The radioecology of forest environments

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PUNKAHARJU RESEARCH STATION

The Punkaharju Research Station has specialized in forest genetics research such as biotechnology, resistance breeding and seed orchards, and research into the effects of climate change on forests. The success of exotic tree species in Finnish conditions is also being studied at the station.

The biotechnology project is investigating the vegetative propagation of forest trees and gene technology. The aim is to maintain the genetic diversity of trees and to investigate their genetical regulation and structure, and the possibilities of transferring beneficial genes.

The station's resistance breeding is directed at cultivation reliability. Types of birch unpalatable to moose, hares and voles are being developed in this project.

The seed orchard research is aimed at the production of high-quality seed for regeneration sowing throughout the whole country. The climate change project is investigating the adaptability of present-day tree species to climate warming.

Punkaharju's 5-ha arboretum and surrounding park forest contain over 20 species of conifer and 20 species of hardwood. Finland's first gene pool forest, designed for maintaining the inheritable variation of natural forests, has also been established in the Punkaharju Experimental Area.

Head of the station Juhani Häggman

Research projects whose principal researcher is stationed at Punkaharju:

- Biotechnology-based forest tree breeding
- Breeding and seed-production populations

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photo Jouko Lehto

Head of the station Ari Ferm

Research projects whose principal researcher is stationed at Kannus:

- The need for maintenance ditching and development of suitable techniques
- Afforestation methods for abandoned fields
- Short-rotation cultivation methods
- Improvement thinnings in young forest

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photo Risto Lauhanen

Head of the station Heikki Smolander

Research projects whose principal researcher is stationed at Suonenjoki:

- The carbon and nitrogen status of forest trees
- The biological principles and technical development of transplant production
- Forest modelling
- Cell damage diagnostics – fumigation experiments

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photo Erkki Oksanen

KANNUS RESEARCH STATION

Research at the Kannus Research Station focuses on the use of wood as an energy source. Maintenance ditching required on drained peatlands and silvicultural research are other central topics at Kannus.

One of METLA's new research priorities is the underexploitation of Finland's forest resources. The use of wood as an energy source holds a central position in this work. Improvement thinning, energy-wood harvesting and the collection of cutting residues in young forests are being investigated at Kannus.

Drained peatlands require maintenance ditching from time to time. The need for such measures and their effects on the growth and condition of the tree stand are being studied at Kannus. Light ditching machines are also being developed for maintenance ditching.

Owing to its position close to the Ostrobothnian coast the station's research programme naturally includes the coastal forests. The most important multidisciplinary project is research into the afforestation of agricultural land, special attention being paid to competition between the transplants and ground vegetation, and the nutrient status of agricultural soil.

SUONENJOKI RESEARCH STATION

The Suonenjoki Research Station was established in 1968 to specialize in nursery research and in forest regeneration. The same topics still occupy a central position in the station's work today.

The seedling nursery is aimed at improving the hydrological properties of the peat substrate in containerized seedling production. The effects of planting density on the properties and success of the transplants in the field are also being investigated. The nursery

research also includes the development of herbicide spraying methods in order to reduce the exposure of nursery workers and loading on the environment.

The carbon and nitrogen status project is investigating the effects of environmental factors on the fixation of carbon and nitrogen by conifers. Special attention is being paid to the relationship between needle nitrogen concentrations and the photosynthetic capacity of trees.

The cell damage diagnostics project is developing microscopy methods for characterizing the cell damage caused by air pollutants and other stress factors. The forest modelling project is developing mathematical and statistical methods for forestry planning purposes.

The station's researchers participate in national projects with the institute's departments and other research stations, e.g. studies on the damage caused by air pollutants and Scleroderris canker to forest trees, and research into the mechanization of cuttings.

The Suonenjoki Research Station also has a research nursery. It produces about 1.3 million transplants annually for METLA's research forests, as well as for practical artificial forestation work.

JOENSUU RESEARCH STATION

The Joensuu Research Station is concentrating on research into forest cultivation principles, forestry planning and multiple forest use.

Research into the basic principles of forest cultivation at the Joensuu Research Station covers the nutrient status of peatlands and the effects of the ground vegetation and sprout thickets on the initial development of seedlings.

An information system for forest management and planning is being developed at the station. The forest information system consists of a geographical information system used to collate forest data and statutory plans and guidelines for special areas from a number of information sources. The system can be used, for instance, to ensure that small pockets of grove woodland are not subjected to commercial forestry measures.

When it was established in 1991, the Koli National Park was placed under the management of the Joensuu Research Station. A landscape study and recreationalist questionnaire survey were started in the area. The results help to develop the planning and management of the Koli area. The multiple forest use research programme, started in 1990, is investigating the compatibility of timber production and other forms of forest use.

MUHOS RESEARCH STATION

The Muhos Research Station has specialized in research on forest regeneration, forest health, the management of peatland forests and the modelling of birch stand development. The station's researchers are participating in 22 of the institute's research projects and 55 of the subprojects. Most of the research is long-term, lasting for 20–30 years even.

The research into the effects of air pollution on forest ecosystems is part of the forest health programme. National research on heavy metal deposition using bioindicators was started in 1984, and the work is continuing. The distribution and effects of industrial emissions from Kostamus, Russia, are being investigated as part of the Karelian Forest Health Project.

The station has the longest tradition in Finland of research into the effects of forestry on watercourses: the work was started at the Kivesvaara experimental field already in 1974, and is now being expanded as part of the METVE Project.

The forest regeneration research is concerned with both artificial and natural regeneration. The main emphasis in peatland forestry research is on the nutrient status of drained peatlands. Peatlands have a very sensitive nutrient status, and the monitoring and prediction of changes in the nutrient status caused by timber production requires continuous research.

Head of the station Jari Parviainen

Research projects whose principal researcher is stationed at Joensuu:

- Effects of forest management on the growth, yield and return of thinned forests
- Tree growth regionality
- Information management and planning system for METLA's research areas
- Statistical analysis of permanent experiments
- Minor forest products
- Planning and economics of multiple forest use

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photo Erkki Oksanen

Head of the station Jukka Valtanen

Research projects whose principal researcher is stationed at Muhos:

- Natural forest regeneration
- Ecological principles of forest regeneration methods
- Heavy metal surveys using bioindicators

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ROVANIEMI RESEARCH STATION

The main emphasis at the Rovaniemi Research Station is on research into forest health, multiple forest use, forest regeneration and the modelling of forest growth. The possibilities offered by geographical information systems and image management are being utilized to an ever-increasing extent at the station.

The most important of the forest health projects currently being carried out at the station is the Lapland Forest Damage Project. It is investigating the effects of industrial emissions from the Kola Peninsula, Russia, on forest ecosystems in Lapland. The nature conservation and wilderness project is studying the special characteristics of nature in Lapland. Wilderness research is directed at the use

of statutory and other wilderness areas and the importance of wilderness areas for recreation. Environmental economics is concerned with estimating the non-priced benefits of the forest.

The research station was originally established to solve questions connected with the regeneration and timber production of Lapland's forests. Nowadays the timber production research involves modelling the early development and growth variation of forests and the tree stand of drained areas. Forest regeneration research is concerned with site classification, the physiology of forest trees and forest regeneration methods.

Two of the national parks located in the far north, the Pallas-Ounastunturi and Pyhätunturi parks, are managed by the research station. As the manager of Finland's oldest national parks, METLA is responsible for ensuring that the conservation targets are attained. There are also excellent opportunities in the area for research activities, teaching, hiking and earning a nature-based living.

KOLARI RESEARCH STATION

The Kolari Research Station concentrates on research into forest tree breeding, multiple forest use, forest zoology and peatland forestry. At present, however, the main emphasis is shifting to problems associated with the timber line.

The possibility of climate change sets new challenges on forestry research. The research is aimed at determining how well our tree species have already adapted to the environment, and whether they can withstand environmental changes. Adaptation is being studied by

following the annual rhythm and flowering timetable of trees. The results show that the adaptability of trees weakens on moving northwards, but that there are no signs of genotypic impoverishment compared to southern Finland.

The breeding research involves the testing of plus tree progenies and estimating the proportion of background pollination in seed orchards. The station is participating in joint Nordic research on fell birch and tree species trials.

The Kilpisjärvi, Kolari and Laanila research areas are the responsibility of the research station. Malla Nature Park, Saana Nature Conservation Area and the Saariselkä holiday centre are located in these areas.

Head of the station Martti Varmola

Research projects whose principal researcher is stationed at Rovaniemi:

- The Lapland Forest Damage Project
- The measurement and data servicing of the permanent growth plots
- Modelling of the early development of stands and trees and the wood production effects of seedling stand treatment
- The growth and yield of peatland forests
- Nature conservation and wilderness areas

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photo Kari Mikkola

Head of the station Tapani Tasanen

Research projects whose principal researcher is stationed at Kolari:

- Ecology and genetics of timber line forests.

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