Photo: I.Lavrinenko

Photo: Ye.Patova

1 This lake, situated in the floodplain of the Ortina river, a 1st order tributary of the Pechora river, near the Severgasprom gas exploitation field is still inhabited by valuable species of Coregonids common in the region.

2 Participants of the 2nd SPICE Project Coordination Meeting in the House of Science of the Kola Science Centre, Apatity, Russia, February 2001.

3 The Ekaterinburg Institute of Economy's specialists Ilya Yimadi and Elena Ignatieva executed an assessment of the actual economic situation and forecast for future developments in the Pechora region.

4 Prior to the flight to the next field site. From left to right: Ari Nikula, Peter Crittenden, Tony Walker, Tarmo Virtanen, Sergei Sendimirov, Vladimir Dauvalter, Gennady Shulepov, Osmo Ratti, Peter Kuhry.

FULL TITLE OF THE PROJECT

GENETIC DIVERSITY, POPULATION BIOLOGY AND CONSERVATION STATUS OF AN ENDANGERED PRIMEVAL-FOREST LICHEN, *LOBARIA PULMONARIA*, IN AN EAST-WEST TRANSECT THROUGH EURASIA

BRIEF PREHISTORY OF PROJECT

The Project is initiated by a Swiss lichenologist Christoph Scheidegger. He is famous for his works on ecology of lichens indicating old-growth forests and on population biology of rare lichen species. C. Scheidegger paid special attention to the studies of biology and ecology of epiphytic lichen *Lobaria pulmonaria*.

Lobaria pulmonaria is a conspicuous foliose lichen species that was common in pre-industrial periods in humid temperate and boreal regions of the Northern Hemisphere, and cooler part of the tropics. During the last decades, population of this lichen considerably declined in most parts Central Europe. The major threat to this species is the established practice of forestry management leading to destruction of old-growth humid forests, and air pollution, even at low levels (Scheidegger & Schroeter, 1995). Considering that lichen is a symbiotic organism, its reproduction is a very complex process, which often limits the population size in a changing environment. The research performed by C. Scheidegger in Switzerland showed that the present small population size of *Lobaria pulmonaria* is limited by a low rate of successful recolonization events in managed forests, which causes local extinction even under favorable conditions (Scheidegger 1995; Scheidegger, Frey & Zoller 1995). For conservation purposes, in Switzerland there were performed successful attempts to increase population size by additional transplantation of thallus fragments and vegetative diaspores (Scheidegger 1995; Scheidegger et al. 1995; Scheidegger, Frey, Walser, 19998). Recent published results revealed that genetic variability of nuclear ribosomal large subunit (nLSU) and of the internal transcribed spacer (ITS1) of *Lobaria pulmonaria* from Central Europe allowed the detection ofdiverse and impoverished populations (Zoller, Lutzoni & Scheidegger 1999a; Zoller, Scheidegger & Sperisen 1999b). New approaches to studies of population biology of rare species were leaborated and tested in Central Europe. It was necessary to test recently developed methods in a continent-wide level.

Photo: V.Kanev

During the present Project, for the first time population biology and conservation activities grounded upon scientific approach. Especially the hypothesis of how small populations would improve their conservation status through inoculation of additional trees with *Lobaria pulmonaria* was tested. Moreover, transplantation of the lichen originating from various regions will show whether there are regional differences in *Lobaria pulmonaria* concerning ecotypes with various characteristics of growth and development. The awaited result was to find out if the lichen contains several ecotypes and to check a hypothesis if the ecotype is connected with the genetic type.

If we keep in mind that the East Asia, including the Far East, is the area of the greatest genetic diversity of *Lobaria,* we can test the hypothesis that genetic diversity is the highest in the East and gradually declines westwards. The data on genetic variation allows one to define the future priorities for conservation of local population of *Lobaria pulmonaria*. For the first time, scientific survey comprised the major part of species distribution area.

MAP OF THE PROJECT TERRITORY

DATES OF IMPLEMENTATION OF PROJECT

2001-2003

FUNDING ORGANIZATION

Swiss National Science Foundation (SNSF)

PROJECT CO-ORDINATOR

PD Dr. Christoph Scheidegger
Swiss Federal Institute for Forest, Snow and Landscpae Research, WSL, 8903, Birmensdorf

RESPONSIBLE SCIENTIST

Dr. Tatyana Pystina (on behalf of Institute of Biology)

GOAL AND TASKS

The project aims at developing new and implementing modern conservation strategies for primeval forest lichens and assessing conservation priorities for key-populations of the widely distributed but regionally rare and endangered foliose lichen species *Lobaria pulmonaria* in Euro-Asia. Main scientific objectives are the following:

task 1 To determine genetic diversity and specificity of populations within and among the study areas
task 2 To determine ecotope differentiation and adaptation of Lobaria pulmonaria to different climatic areas
task 3 To elaborate and test a conceptual model for the life cycle of epiphytic lichens
task 4 To elaborate and test conservation strategies at the species and habitat level for an effective improvement of the regional conservation status
task 5 To assess the conservation status of the lichen for the regions, taking into consideration the different scenarios of future forest management

PARTICIPATING ORGANISATIONS

task 1 Swiss Federal Institute for Forest, Snow and Landscape Research, WSL
task 2 Botanic Institute named after N.G.Kholodny, National Academy of Sciences, the Ukraine
task 3 Institute of Plant and Animal Ecology (Ekaterinburg)
task 4 Sakhalin Botanic Garden (Yuzhno-Sakhalinsk)
task 5 Institute of Biology, Komi Science Centre UrD RAS (Syktyvkar)

Photo: T.Pystina

Photo: T.Pystina

Photo: T.Pystina