

The second Nordic-Baltic workshop on forest disturbances in Iceland

The second workshop "Natural disturbances dynamics as component of ecosystem management planning" organised jointly by the Forest Research Institute of the Estonian Agricultural University and Icelandic Forest Research (the research branch of the Iceland Forest Service) in collaboration with the SNS, the Nordic Forest Research Co-operation Committee, was held at Geysir, Iceland, on October 11-15, 2003.

The Nordic-Baltic network on forest disturbances incorporates researchers dealing with various aspects of disturbances and their ecological effects in forests. The first meeting of the network was held in Hiiumaa Island, Estonia, in 2002 (Baltic Forestry 8 (2), 2002). Now, 21 researchers from Denmark, Estonia, Finland, Iceland, Latvia, Lithuania, Netherlands and Sweden gathered to discuss the topic for the second time.

The following papers were presented at the workshop session:

- Disturbances in forest ecosystems in Iceland - Gudmundur Halldórsson (Iceland)
- The history of native Icelandic woodlands - Ólafur Eggertsson (Iceland)
- Marine aerosol, a disturbance factor in coastal forests in Iceland - Thorbergur Hjalti Jónsson (Iceland)
- The modelling approach and quantitative analysis in disturbance studies - Kalev Jõgiste (Estonia)
- The problem of scale: past and present fire disturbances in Sweden - Mats Niklasson (Sweden)
- Some new research ideas about dead wood dynamics in beech forests - Katrine Hahn (Denmark)
- Gap dynamics of forested ecosystems and disturbances - Floor Vodde (Netherlands)
- Windthrow studies in Denmark - Eva Ritter (Denmark)
- Forest disturbances in Lithuania - Kęstutis Armolaitis (Lithuania)
- Disturbances and the frame of network - Timo Kuuluvainen (Finland).

The presentation session was followed by a group work in which the planning of network activities was a discussion subject. A preliminary plan of activities for the next year was drafted.

During these two days of excursions guided by Dr Adalsteinn Sigurgeirsson, several natural woodlands and forest plantations affected by natural disturbance factors as well as different study sites and

experimental areas of the Icelandic Forest Research Station were visited.

Iceland is an island of about 103,000 km², situated in the North Atlantic Ocean. About 280,000 people live in Iceland, mostly in towns with about 8% of the total population living in rural areas (Statistics Iceland, 2000).

Iceland's humid and maritime climate is strongly influenced by the Gulf Stream. It is described as cool temperate in the lowlands and subarctic in the highlands. Precipitation generally varies between 600 and 1500 mm per year in lowland areas, but large tracts of Northern and Eastern Iceland receive less than 600 mm.

The present vegetation in Iceland varies from barren, degraded, desert-like wastelands to lush woodlands and forests. Iceland has however the lowest forest cover of all countries in Europe in terms of percentage of total land area. At present forests or other wooded land is found on 1,3% of the land area, out of which 30.000 hectares, or 0,3% of the land area, can be considered forest (European Forest Institute 2003). About 2/3 of the "forest" is composed of native downy birch (*Betula pubescens* Ehrh.) forest and about 1/3 is planted forest of various species, mostly exotic conifers such as Siberian larch (*Larix sibirica* L.), Sitka spruce (*Picea sitchensis* (Bong.) Carr.) and lodgepole pine (*Pinus contorta* Dougl.). In addition, about 100,000 ha or 1% of the total land area is classified as "other wooded land", which is mostly downy birch scrub less than 5 m in height. Other native tree species in Iceland are rowan (*Sorbus aucuparia* L.), which is uncommon, aspen (*Populus tremula* L.), which is very rare and tea-leaved willow (*Salix phylicifolia* L.), which is common but only rarely attains tree height (5 m). Other woody species never reach 5 m in height.

A major proportion of Iceland's terrestrial ecosystems has been devastated since human settlement began, about 1100 years ago (Thorarinsson 1961; Arnalds 1987). Native birch woodlands have been reduced from the original 25-30% of the land area to just over 1%. According to "The book of Settlement" (Landnámabók), which was written by Ari "the learned" Þorgilsson in the early 12th century, Iceland was covered by forest "between mountain and shoreline" when the Norse settlers first arrived in the late

9th century A.D. This account may suggest that much of the deforestation had already taken place at the time, 250 years after settlement (Blöndal and Gunnarsson 1999).

Land degradation and soil erosion continues to represent the most serious environmental problem in Iceland (Arnalds and Barkarson 2003; OECD 2001). Much of the past devastation and degradation trend has been brought about by a complex interaction of deforestation, overgrazing, periods of climatic deterioration and volcanic eruptions that have led to the smothering of vegetation in treeless landscapes, by volcanic ash and tephra (Arnalds and Barkarson 2003). The consequence has been the formation of landscapes that are almost totally barren or deserts (Arnalds *et al.* 2001), often mistakenly regarded as “natural moonscapes”. During one of the excursion days, we made a visit to one such region; the Thjórsí valley in interior South Iceland. Most farms in this valley were abandoned following heavy ash deposition from a nearby volcano, Mt. Hekla, in 1104 A.D. and which lead to subsequent soil erosion. Since that time the valley is a vast, uninhabited sandy desert, where the drifting sand is a serious obstacle to the re-establishment of vegetation cover. Birch woodlands still survive in a few sheltered locations within the valley, such as within the forest enclosure at Skarfanes (owned and managed by the Iceland Forest Service), which we visited on the tour.

In a country that is basically devoid of forests (as is the case in Iceland) any existing forest is of value, e.g. for conservation, shelter or amenity, even if this forest is not considered productive or commercial in any traditional sense. In such situations, increasing forest cover can be a worthy goal in itself. It is against the background of loss of woodland and serious soil erosion that the Icelandic government has a stated aim of increasing the woodland cover of low land (land below approximately 300m altitude) to 5% over a 40-year period. Over the period from 1993 to 1999, nearly 27 million trees were planted, 33.7% being broadleaf species (birch, poplar and willow), 63.2% being conifers (spruce, pine and larch) and 3.1% being ‘other species’ which were undefined (Anonymous 2001). Most afforestation in Iceland is funded by loans to private landowners. These loans cover 97% of establishment costs, to be paid back by 15% of the value of all eventual income from the sale of forest produce.

In 1999, Icelandic forestry celebrated its centennial at Thingvellir in South Iceland. Forestry in Iceland is considered to have started with the planting of the “Pine Stand” at Thingvellir in 1899. The seedlings came from Denmark and the pines, that still survive, are mountain pine (*Pinus mugo* Turra and *P.*

uncinata Mill. ex Mirb.) and Siberian stone pine (*P. sibirica* Du Tour). We paid a visit to this “first and oldest forest plantation in Iceland” during our excursion, however, Thingvellir is far more famous for other reasons than it being the site of the oldest forest plantation in Iceland! In fact, it is a protected natural shrine, owing to its history and nature (Thingvellir National Park 2003). No single place epitomizes the history of Iceland and the Icelandic nation better than Thingvellir by the river Öxari. At Thingvellir – literally “Parliament Plains” – the Althing general assembly was established around 930 and continued to convene there until 1798. Major events in the history of Iceland have taken place at Thingvellir. The Thingvellir area is also of interest for its nature and geology. It is part of a fissure zone running through Iceland, being situated on the tectonic plate boundaries of the Mid-Atlantic Ridge. The faults and fissures of the area make evident the rifting of the earth’s crust, between the North American and Eurasian tectonic plates.

During the excursion we also visited the National forest at Haukadalur, near Geysir. The forest at Haukadalur has been owned and managed by the Iceland Forest Service since 1938. Haukadalur played a major role in the early medieval history of Iceland, being the centre of some of the most powerful chieftains of South Iceland and a centre of learning - perhaps the site of the first school in the country. Erosion and land degradation in the area were the main factors leading to its gradual economic demise and by the early 20. century the farm had to be abandoned. The vegetated land of Haukadalur once stretched all the way up to the crater row Jarlhettur, when the desert Haukadalsheidi (meaning originally the “Haukadalur heathland”) was fully vegetated. Haukadalsheidi has now become one of the areas with the greatest erosion problems of the country. The Haukadalur forest is now managed with multiple-use objectives; economic (wood production; non-wood products); protective (soil and water conservation) and recreation / amenity.

The beautiful nature of Iceland and the impressive experiments of reforestation evoked exciting ideas for research and management. The hard work of Icelandic foresters serves as a good example of solving problems coming from history and developing sustainable management for future.

ADALSTEINN SIGURGEIRSSON

Icelandic Forest Research Station, Mógilsá

KALJO VOOLMA

Estonian Agricultural University, Tartu