

TreeBreedex Seminar



What do large genetic field experimental networks across Europe bring to the scientific community?

Thursday, 24 June, 2010
Field trip



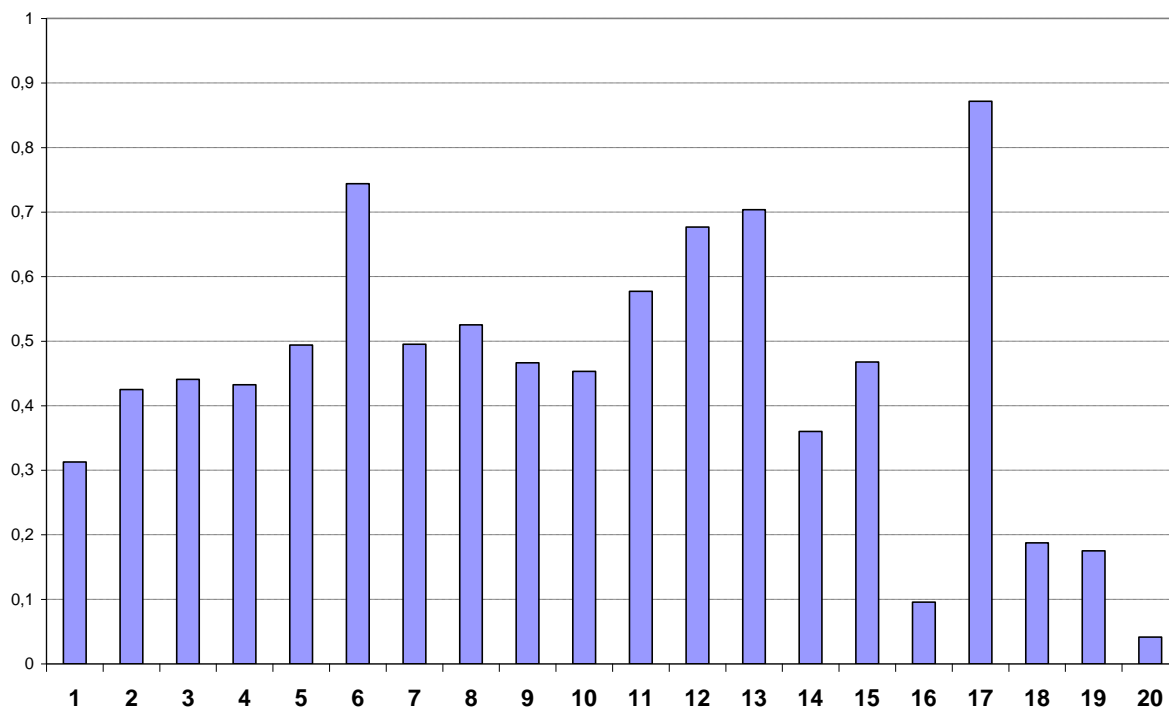
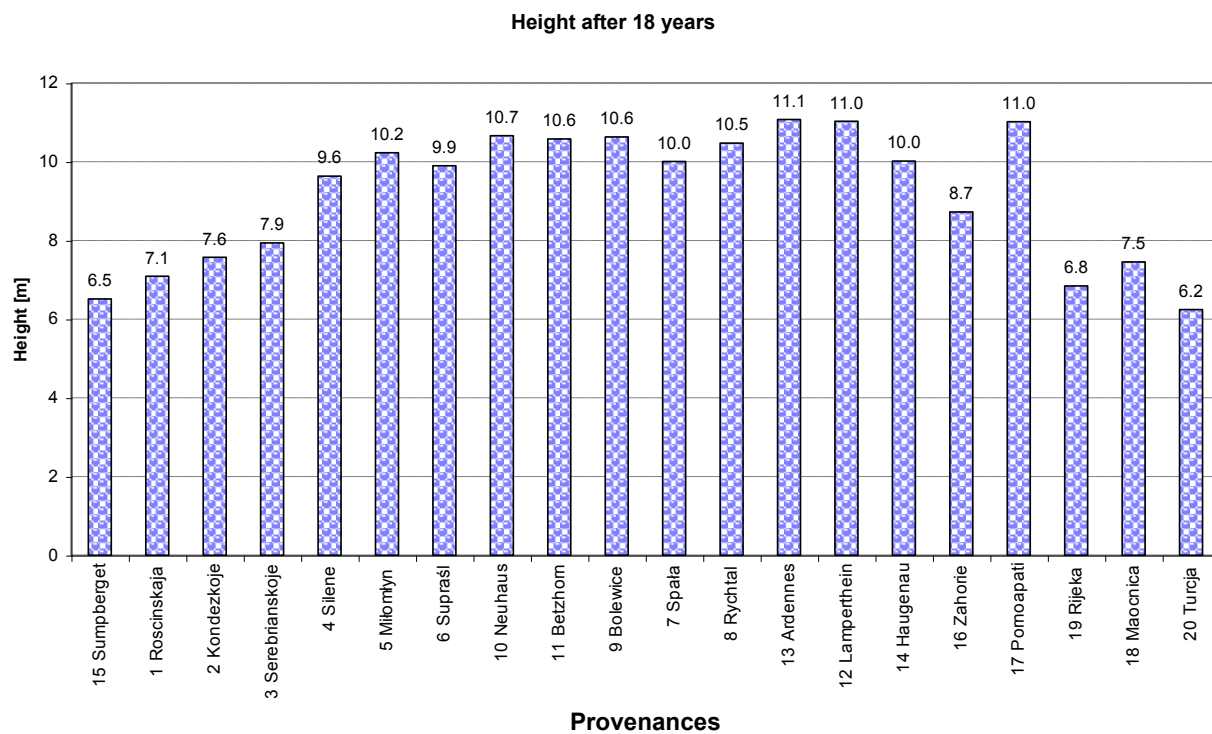
Tuesday, June 22, 2010

11.30 – 13.00 Visit to the experimental plot of Scots pine (IUFRO 1982)

Thursday, 24 June, 2010 - Field trip

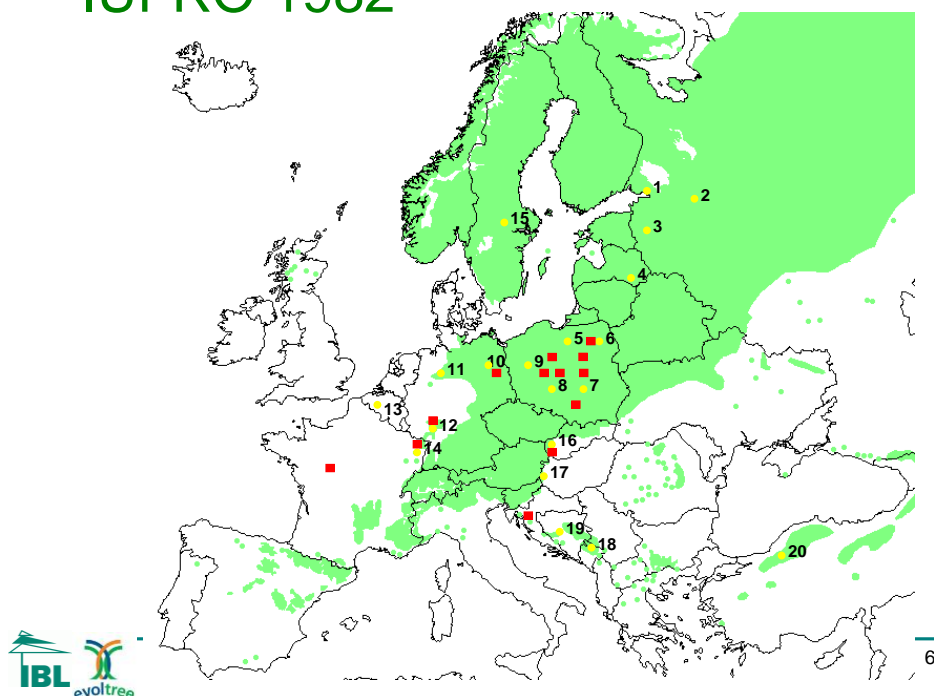
7.30 Leave Sękocin
8.45 – 9.30 Visit to the European larch reserve “Modrzewina”
11.30 Arrive Bliżyn
EVOLTREE Intensive Study Site (ISS) Bliżyn
Świnia Góra reserve and larch stand
Open air lunch
19.00 Arrive hotels

Scots pine demonstration plot - IUFRO 1982 experiment



Sum of cross section area after 27 years of growth

IUFRO 1982



Poulation	Latitude [°N]	Longitude [°E]	Altitude
1 Roščinskaja Dača	60° 15'	29° 54'	80
2 Kondežskoje	59° 58'	33° 30'	70
3 Serebrianskoje	58° 50'	29° 07'	80
4 Silene	55° 45'	26° 40'	165
5 Miłomłyn (Tabórz)	53° 34'	20° 00'	110
6 Supraśl	53° 12'	23° 22'	160
7 Spała	51° 37'	20° 12'	160
8 Rychtal	51° 08'	17° 55'	190
9 Bolewice	52° 24'	16° 03'	90
10 Neuhaus	53° 02'	13° 53'	40
11 Betzhorn	52° 30'	10° 30'	65
12 Lampertheim	49° 30'	8° 30'	97
13 Ardennes	50° 46'	4° 26'	110
14 Haguenau	48° 49'	7° 47'	157
15 Sumpberget	60° 11'	15° 52'	185
16 Zahorie	48° 46'	17° 03'	160
17 Pornóapáti	47° 20'	16° 28'	300
18 Maočnica	43° 10'	19° 30'	1200
19 Prusačka Rijeka	44° 06'	17° 21'	885
20 Čatacik	40° 00'	31° 10'	1400

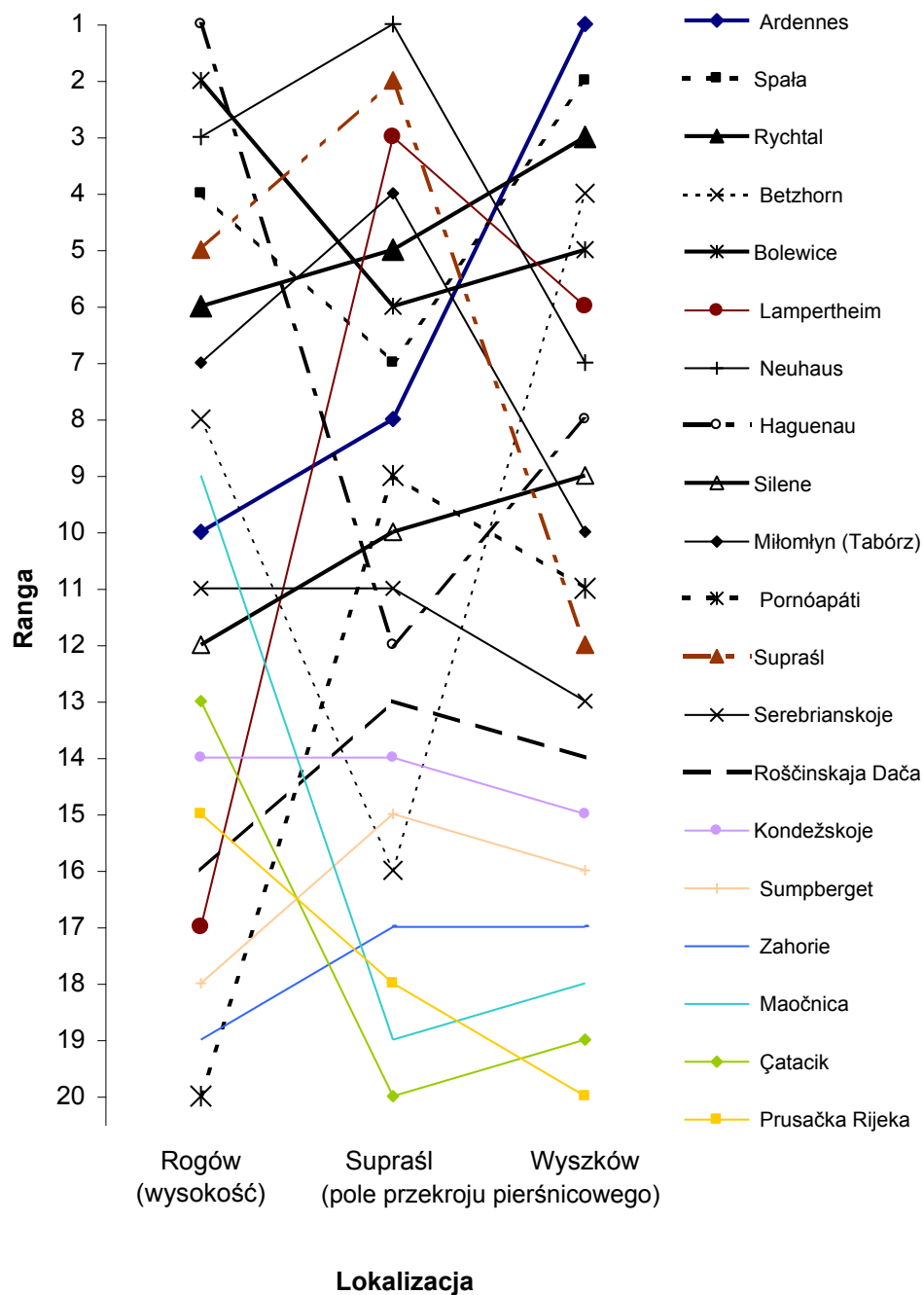
Schema of the demonstration trial in Sękocin

forest road

Scots pine IUFRO 1982 Sękocin

=====	20 Çatacık
=====	19 Prusačka Rijeka
=====	18 Maočnica
=====	17 Pornóapáti
=====	16 Zahorie
=====	14 Haguenau
=====	13 Ardennes
=====	12 Lampertheim
=====	11 Betzhorn
=====	10 Neuhaus
=====	9 Bolewice
=====	8 Rychtal
=====	7 Spała
=====	6 Supraśl
=====	5 Miłomłyn (Tabórz)
=====	4 Silene
=====	3 Serebrianskoje
=====	2 Kondežskoje
=====	1 Roščinskaja Dača
=====	15 Sumpberget

Provenances ranking in IUFRO 1982 experimental areas in Poland after 23 years of growth.



Reserve "Modrzewina"



The Reserve "Modrzewina"- was created in 1959 to preserve and protect the largest in this region population of Polish larch. The total forest area is 406.28 ha, while the area of reserve occupies 332,15 ha. The border of reserve is determined by agriculture area and forests (public and private). The area of reserve is flat (Mazovian Lowland) – 192-193 m. a.s.l.

Strict Reserve of 39,91 ha occupies a rich habitat fresh forest. The participation of Polish larch in tree species composition is very high – 94% with average age 180-210 years. Average height of the trees is up to 40 m. with DBH more then 120 cm.

The tree crown is irregular and open-worked crown, also they have also long, twisted branches with hanging down twigs. Larch creates the upper storey, while the species like oak, Scots pine, hornbeam and lime tree.

The shrub layer is consisted of: hazel tree, alder buckthorn, elder, red-berried elder (95% of total area). The blackberry is dominant species in the forest vegetal cover, especially for sites where the canopy is opened. The remaining part it is covered by 60-years old oak-larch tree stand, where oak is the main species. The tree stem called "Wojewoda" (Voivode) was estimated to be 350 years old it was burned by solders during the second world war in 1945 while hunting.

The habitat of fresh forest covers 80% (292.24 ha) of partial reserve, the rest part belongs to fresh mixed forest and moist mixed forest. The dominant tree species is oak (36%) on the area of reserve together with larch (35%), Scots pine (17%), hornbeam (2%) and admixed tree species: Norway spruce and alder. The average age of trees is 50-70 years. Young natural regeneration occupies 2% of the reserve area.

In a rich shrub layer (75% of the area) dominate: hazel tree, shrub forms of hornbeam, lime tree, mountain ash, bird-cherry and elderberry. The lowest layer there is plenty of blackberry. There are two almost completely dried ponds with total are 1.8 ha in the northern part of the reserve.



The tourist routes are marked within the entire territory of the reserve. The value of natural-landscape attracted here both tourists and amateurs of active holiday pedestrian and cyclists and people who likes to pick up the mushrooms.

Attractions include "interconnected pairs" oak trees with larch in 152c forest compartment and very rare herb layer species (*Potentilla micrantha* Ramond ex DC.).

Near the reserve there is the Central Geophysical Observatory of Geophysics Institute of the Polish Academy of Sciences in Mala Wies in palace complex built in the years 1783-1786 for Basil Walicki and his wife Rosa from Nieborski family, after Second War World the property of the Council of Ministers.



ISS BLIZYN is one of the seven ISS selected across the Europe in frame of the EVOLTREE project

The main objective of EVOLTREE is the limitation of the fragmentation of European research on forest genetics and genomics, creating the foundations for a new discipline, ecosystem genomics, which investigates linkages between genes and ecosystem functioning, looking at the genetic basis of ecosystem process, by linking various disciplines (ecology, evolutionary studies, genetics and genomics). EVOLTREE's joint research activities focus initially on identifying genes of adaptive significance in the face of climate change in some model species from well studied tree genera (Pinus, Quercus, Populus), phytophagous insects (Limantria) and mycorrhizal fungi (Laccaria and Glomus). Research will be then expanded to include a series of target tree species, including Picea abies. A total of seven Intensive Study Sites (ISS) in different forest ecosystem have been selected to host multidisciplinary research activities. Data from this site network will be exchanged and will allow comparing ecosystem processes in different environmental conditions.

ISS are large scale ecosystem plots (a few thousands of hectares) where trees and selected associated species will be mapped, genotyped and phenotyped. The sites will comprise entire portions of landscapes (agricultural land and woodlands) where trees are present in different configurations (from single trees to edges and woods).

The objectives of Intensive Study Sites (ISSs) are:

- Set up of a European network of sites for long term research on the evolution of biodiversity at different hierarchical levels (from genes to phenotypes, from populations to community).
- Assess the spatial structure of biodiversity at various scales and at different hierarchical levels.
- Monitor the population dynamics through demographic and genetic approaches, in trees and their associated species, over different spatial scales.
- Monitor the interaction between species (trees, other plants, vertebrates, insects, and microorganisms) Provide a large-scale support for training, education and dissemination activities

In the past the Blizyn Forests were owned by the bishops from Krakow. In 1789 by the decision of the parliament, they have become the state property and since that time they are continually owned and managed by State Forests. The state ownership warrants the long term planning and management of the area and is the base for the long term utilization of the proposed ISS. Variable landscape, environments and soils, plus natural regeneration cause that most of forests possess high biological (species and genetic) diversity and stand diversity.

Blizyn Forests are among the most diverse forests in Poland. The diversity of insects and fungi species seems large although it has been weakly studied. The local forests are relatively healthy, not suffering from massive pest attacks. The landscape and environment of Blizyn Forests is variable. It is partly an upland area and Swietokrzyskie Mountains are among the oldest (caledonian orogenesis) mountains in Europe. Geological diversity generates large variability of soils and moisture regimes (several streams) which affects the variable composition of forest stands and the existence of mixed forests

THE FOREST RESERVE "ŚWINIA GÓRA"

1. THE SITUATION, AND A GENERAL DESCRIPTION.



The forest reserve „Świnia Góra” exists since 1938; it is placed in the geobotanical territory of the Góry Świętokrzyskie (Holy Cross Mts.), on the contact of two geobotanical districts, that of the Łysogóry Mts. and that of Końskie, at a distance of about 7 kilometres south-west of the locality Bliżyn. The reserve covers about 50 hectares and occupies a part of the hill called Świnia Góra, sloping gently towards south-east and south-west. The difference between the highest and the lowest altitudes in the reserve about 350 and 325 metres above sea-level thus amounts to about 25 metres. The mean annual temperature is about +7°C, the precipitation is evaluated at about

700 millimetres yearly. The area of the reserve is more or less flat and the local surface inclination seldom exceeds 5°.

SITUATION OF THE ŚWINIA GÓRA RESERVE.

The north-eastern; part of the reserve is drained by two small streams running north and mouthing into river Kamienna. The remaining part of the reserve, excepting the areas placed highest, is usually swampy. This is the result of a small slope inclination impeding a quick run-off of rain-water, and also of the impermeability of the subsoil unfavorable to drainage. On a large part of the reserve, especially in its western part, there are pits of various size, periodically or permanently filled with water. These are the traces of a previous lively exploitation of iron ore. The mining activities conducted here troubled or even permanently changed and disfigured some soils as well as plant communities. In spite of that the forests in the reserve belong to the most beautiful in Poland.

2. OUTLINE OF THE HISTORY OF THE BLIŻYN FORESTS

The forests of the reserve „Świnia Góra” give a notion on the primeval forest which still in the XII-th century nearly completely covered the territories between the towns Końskie and Wąchock. In the XIV-th century in the parish Odrowąż (then comprising nearly the whole area of the Bliżyn forests) there lived as little as 180 persons. A colonisation on a rather wide scale gave satisfactory results in the XIV-th and XV-th centuries.

In the territory of the Bliżyn forests as well as in other parts of the Świętokrzyskie Mts. there are iron ores; they were first exploited from the surface layers, and when these came to be lacking, from greater depths by the use of mining pits. The beginning of mining in this region dates from prehistorical times. The first written documents originate from the XV-th and XVI-th centuries, i. e. from the period of the greatest increase in number of the smithies. The iron foundries used charcoal without which the metallurgy could not exist at the time. The burning of charcoal in the XV-th and XVI-th centuries" took a great extent and had its part in destroying the forests. In 1820 there were mines in the environs of Świnia Góra. The ore from the mine in the reserve of to day was brought to Bliżyn and Rejów. In Bliżyn there was a blast-furnace and an open-hearth furnace.

In 1789 the Bliżyn forests were included into the so-called Government Mining Economy in Samsonów (forestry Samsonów) and supplied wood for the needs of metallurgy. An inspection in

1789 as well as the descriptions of the forests in 1830 speak of multispecific forests with an admixture of larch; the latter in some places even dominated.

The requirements of metallurgy were taken into consideration in forest economy; the foundries wanted pine charcoal as the most adequate for iron smelting. These requirements caused the introduction of the pine (*Pinus silvestris*) in areas formerly occupied by the fir (*Abies alba*) and deciduous species. The domination of the pine was also promoted by a great fire in 1834; the latter destroyed more than 3200 hectares of forest, and also contributed to increase the areas of the larch (*Larix* sp.) forest-stands. The conservation of some forest areas until to-day in a state only little damaged must be ascribed to a small utility of the soils for agriculture, to the lack of good roads in former times, as well as to a wet and inaccessible ground.

The main forest communities:

1. The most beautiful parts of the forest with an exuberant under-growth and herb layer belong to association *Fagetum carpaticum* which appears in the most fertile habitats. To this association the author reckoned mixed forest-stands of a varied character (*Abies alba*, *Fagus silvatica*, *Quercus sessilis*, *Q. robur*, *Acer pseudoplatanus*, *A. platanoides*, *Larix polonica*, and other species) as well as nearly monospecific forest-stands, mostly fir (*Abies*), more rarely beech (*Fagus*). The following species characterising the association *Fagetum* and the alliance *Fagion* should be named: *Acer pseudoplatanus*, *Fagus silvatica*, and *Dentaria bulbifera*, as well as *Dentaria enneaphyllos* (the latter growing only in one place). In the stands belonging to this association there also appear, in masses or very numerous: *Asperula odorata*, *Hepatica triloba*, *Sanicula europaea*, *Galeobdolon luteum*, and other species.

2. The second community belonging to order *Fagetalia* is formed by the poor variant of association *Querceto-Carpinetum*. The latter covers a small area in the reserve, growing on very slightly sloping ground (about 3°) and is characterised by a much poorer floristic composition than association *Fagetum*. Only *Carpinus betulus* appears rather numerous among the species characterising this association as well as alliance *Carpinion*. Species from order *Fagetalia*, as e. g. *Galeobdolon luteum*, *Sanicula europaea*, *Paris quadrifolia*, *Eurhynchium Zetterstedtii*, are represented in a comparatively small quantity; again, *Anemone nemorosa* and *Majanthemum bifolium* appear very numerous.

3. Fertile and humid habitats, with frequent outflows of ground-water, are occupied by a riverside forest community, approaching association *Circaeo-Alnetum* by its composition; it develops in fragments on a small area. In the tree layer there are: *Carpinus betulus*, *Abies alba*, *Alnus glutinosa*, and other species. Following species deserve to be named in this association among those locally characteristic: *Cardamine amara*, *Circaea alpina*, *Carex remota*, *Mnium undulatum*. The differential species *Athyrium filix femina* also appears here in masses.