

The 5th WASWAC World Conference

**ADAPTATION STRATEGIES
FOR SOIL AND WATER CONSERVATION
IN A CHANGING WORLD**

Excursion
BĚLOTÍN AND BESKYDY MOUNTAINS



19th–23rd June 2023

Olomouc • Czech Republic

EXCURSION

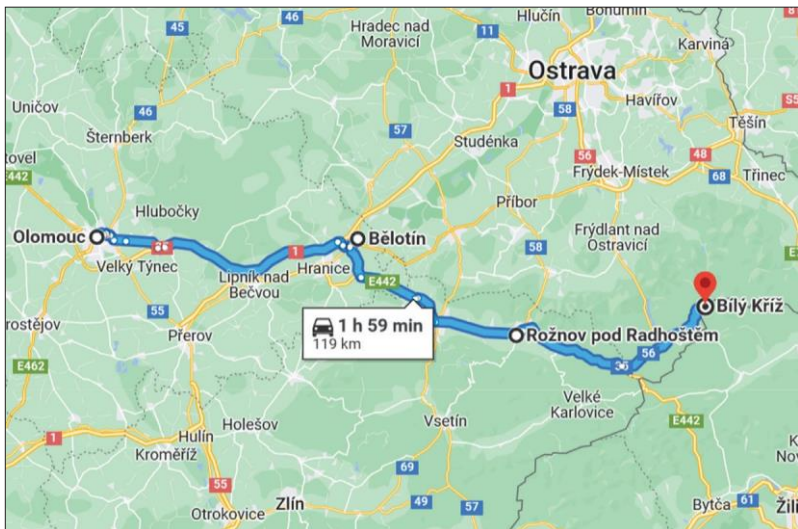
BĚLOTÍN AND BESKYDY MOUNTAINS

BĚLOTÍN AND BESKYDY MOUNTAINS

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During the excursion from Olomouc to the Beskydy Mountains we will visit

- the village of Bělotín and view landscape restoration
- the Wallachian Open Air Museum in Rožnov pod Radhoštěm
- the Bílý Kříž Experimental ecology study site



Route: Olomouc – Bělotín – Rožnov pod Radhoštěm – Bílý Kříž

Bělotín and landscape restoration in the village cadastre

Locality Description:

Eduard Kavala, the Mayor of Bělotín and
Renáta Brundová, Head of State Land Office, branch Přerov

Bělotín is a village within the Přerov district, about 38 km east of Olomouc, the regional capital. It has approximately 1,800 inhabitants, and

the area of the cadastre is also approximately 1,800 hectares. The first written mention of the village dates from 1201 in a document of the Margrave of Moravia, and in the following centuries the area experienced a rich, and often dramatic history.

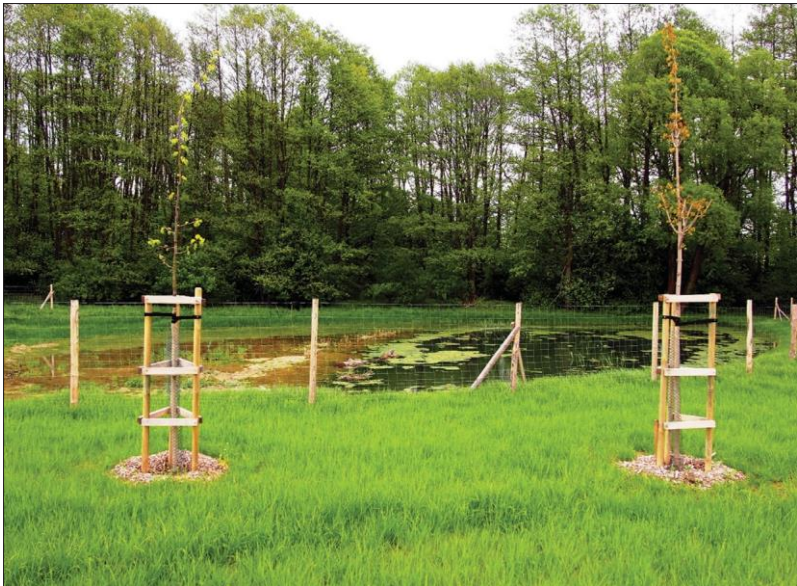


The present day village is adorned with 15 sandstone sculptures by the academic sculptor Michal Moravec.

When visiting Bělá pod Bezdězem, we will gain a brief insight into the village's development up to the present day, but we will pay particular attention to the development of the landscape and the restoration which has been carried out. This project was undertaken in the area about 5 years ago and included a number of measures ensuring the permeability of the landscape (field roads), protecting agricultural land from the negative effects of erosion, increasing the retention capacity of the landscape, and measures contributing to increasing the diversity and ecological stability of the landscape. The following images show some of the measures we will observe.



Even major transport infrastructure can coexist with the cultural landscape. The Malý and Velký Bělotín ponds were built on the site of a historical medieval pond in the lower part of the village.



Constructed ponds and pools are an important element for retaining water in the landscape and a significant biotope for a number of organisms.



Erosion was a significant factor in soil degradation after the collectivization of agriculture. Nowadays, the municipality successfully „fights“ erosion in cooperation with farmers, even in a completely unconventional way – by planting plum trees and currant bushes with grassy strips between them.

Wallachian Open Air Museum in Rožnov pod Radhoštěm

The Wallachian Open-air Museum, the first museum of its type in this country and the only one of its kind until the 1970s, is situated in the town of Rožnov pod Radhoštěm in the foothills of the Beskydy Mountains. The Open Air Museum has three parts – Little Wooden Town, Wallachian Village and Water Mill Valley. We will visit this last mentioned part as part of the excursion.

Water Mill Valley

Water Mill Valley is a unique collection of living structures and pieces of machinery that are operated by the power of mountain water and also human hands. It is situated in a flat valley meadow by an old millrace where technical buildings documenting the development and specialisation of the village economy from the second half of the 17th century to the 19th century were built from the 1970s onwards.

A visit to Water Mill Valley, which opened to the public in 1983, offers a unique chance of seeing a water mill, a sawmill and a fulling machine in motion. You can see how the blacksmith worked at the tilt-hammer.

The heavy hammers are put into operation on special occasions. Oil pressing also only takes place during special events in view of the age of the machine. The beginning of the tour of the depot from Ostravice will acquaint you with old means of transport and agricultural machinery from the end of the 19th century and the first half of the 20th century.



The Bílý Kříž Experimental ecology study site

Locality Description:

Michal V. Marek, Marian Pavelka

Global Change Research Institute, Czech Academy of Sciences, Brno

Experimental ecological study site of Bílý Kříž (further EESS) is located in the region of the Moravian-Silesian Beskydy Mts. (Czech Republic) and its coordinates are 49°30' N and 18°32' E. Geological subsoil is formed by flysch layer with dominant sandstones. In 1998–2013 the mean annual air temperature amounted to 6.8 ± 1.0 °C, mean annual relative air humidity to 84 ± 4 % and mean annual sum of precipitation to 1265 ± 216 mm.

EESS is a part of international measuring network FLUXNET. In 2007 EESS was included into significant infrastructures within ESFRI (European Strategy Forum on Research Infrastructures), project ICOS (Integrated Carbon Observation System).

The study site is operated by Global Change Research Institute CAS. EESS was established in 1986 within the framework of the project „Complex Research of Immission Impact on the Forests and Forestry of the Beskydy“.



Currently, multiple research teams operate at EESS applying various methods with different scientific aims. Among the most important initiatives belong 1) long-term monitoring of matter and energy fluxes; 2) ecophysiological research focusing on better understanding of photosynthesis, respiration and transpiration; 3) estimation of spruce stand productivity combined with forest management development that would improve its resilience and carbon capture; 4) remote sensing hyperspectral imaging for mapping of physiological characteristics with high spatial resolution; 5) integration of the acquired information in order to better understand the studied ecosystems and to predict their future response to changing climate.

Measurements are carried out at the following plots:

- climatological station
- spruce stand
- grassland
- cultivation glass domes
 - stand within cultivation glass domes with ambient CO₂ concentration
 - stand within cultivation glass domes with elevated CO₂ concentration

Climatological station

The altitude of the climatological station is 894 m above sea level and there are operational buildings, a meteorological booth and an automatic station for air quality measurement. There are sensors for incident solar radiation measurements placed on the roof of the operational building. Sensors for air temperature and relative humidity are placed inside the meteorological booth. Rain gauges are placed on the open space area and sensors for soil temperature measurement are placed in several soil depths. Automatic station for air quality measurement, whose owner is Czech Hydrometeorological Institute, is used for CO₂, NO_x, O₃, heavy metals, radioactivity and volatile particles measurements. The station is a part of measuring networks EUROAIRNET and IRIS

Spruce stand

Research in spruce stand started in 1994. Studied stand was established in 1981 using row planting of 4-year-old seedlings of Norway spruce (*Picea abies* [L.] Karst.) in planting spacing of 2×1 meter and row orientation in N-S direction. Stand belongs to forest site complex 5S—Nutrient-medium Fir-Beech. Stand consists of pure and evenaged Norway spruce. Forest

growth stage is pole stand. The forest is geobiocenologically classified as Abieti-Fageta. There is a meteorological mast (height of 36 meters) placed in the stand. The altitude of the mast placement is 875 m above sea level. Mean slope of the stand is 13° with SSW exposition.

Geological subsoil is formed by flysch layer with dominant sandstones. Haplic and Entic Podzols are the soil types in the stand. The soil is moderately deep up to *Holcus mollis* shallow, from loamy-sand to sandy-loam with high content of soil skeleton in the low layers. The soil depth is maximum 60–80 cm. The densest root layer is 5–15 cm.



Grassland

The research in the grassland started in 2003. By 2008 the studied grassland was divided into two parts – mown grassland (mowing was done once during the growing season) and non-mown grassland. The originally mown grassland was formed by phytocenose of Nardus-Callunetea (dominating plants: *Festuca rubra* agg. L., *Nardus stricta* L., *Veronica officinalis* L., *Hieracium laevigatum* Froel.) and the originally non-mown grassland was formed by phytocenose of Molinio-Arrhenatheretea (dominating plants: *Rumex acetosa* L., *Hypericum maculatum* Crantz., L., *Achillea millefolium* L.). There is a meteorological mast (height of 6 meters) placed in the grassland.

The altitude of the mast placement is 860 m above sea level. Grassland is on the slope of 8.5° and it is exposed towards the south-east. Geological subsoil is formed by claystone. Soil type is Gleyic Luvisol.

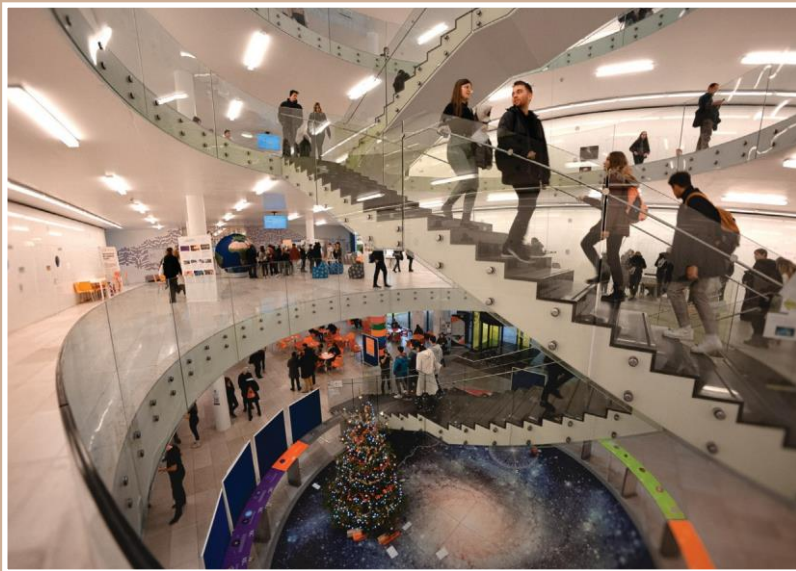


Cultivation glass domes

Experiment determining influence of elevated CO₂ concentration started at EESS in 1992. In 1992–1995 open-top chambers were placed in the spruce stand for planting an individual tree of Norway spruce in elevated CO₂ concentration. Research of influence of elevated CO₂ concentration on forest tree stand has been carried out at EESS since 1996 using cultivation glass domes.

The platform of the cultivation glass domes is 9 × 9 meters. CO₂ concentration is maintained ambient in the first cultivation glass dome (A – ambient). Conditions expected in the second half of the 21st century are simulated in the second one (E – elevated) – it is approximately double CO₂ concentration in comparison to the concentration at the end of 20th century. At first there was spruce stand planted in cultivation glass domes, since 2007 mixed stand of spruce and beech has been planted.

Notes:



Faculty of Science • Palacký University in Olomouc

