**Laboratory of ecophysiological anatomy**

**Research topic A): Plant ecophysiology under impact of environmental factors**

studies focused on the role of plants in globally changing environment connected mainly with anthropogenic pollution

**Current research projects:**

1. **Assessment of Mining Related Impacts Based on Utilization of HyMap Airborne Hyperspectral Sensor.** *GAČR 205/09/1989 (2009-2013)*
   - international project:
     **Project PI at the Czech geological survey** Mgr. V Kopačková
     **PI at Charles University – doc. J. Albrechtová**

**collaborations:**
- Global Change Research Centre AS CR, v.v.i.– Ing. J. Hanuš
- Martin- Luther University, Halle, Germany – prof. C. Glaesser
- University of Zurich, Switzerland – Dr. Z. Malenovský
- at the Charles University: Department of Applied Geoinformatics and Cartography – Dr. Potůčková, Dr. Kupková
Sokolov – north-western Czech Republic (field research + remote sensing)

Assessment of vegetation physiological status using hyperspectral data.
Sample collection in adjacent Norway spruce forests.

Sample collection at post-mining heap Lítov, which is recultivated with Scots pine and spontaneously regrew by Silver birch.

Substrate with high content of trace elements: As, Pb, Hg.

Our goal is to assess the tree physiological status (Norway spruce, Scots pine and Silver birch) based on relationships between foliage chemistry and reflectance.

Using laboratory spectroscopy we search for suitable vegetation indices, which are tightly related with contents of important biochemical leaf compounds such as: photosynthetic pigments, phenolics and lignin. These relationships are later used for interpretation of HyMap data.
Publications and outputs from last 5 years:


Jan Mišurec, Veronika Kopáčková, Zuzana Lhotáková, Jan Hanuš, Joerg Weyermann, Petya Entcheva-Campbell, Jana Albrechtová: Utilization of hyperspectral image optical indices to assess the Norway spruce forest health status (manuscript under preparation)
Laboratory of ecophysiological anatomy

Research topic A): Plant ecophysiology under impact of environmental factors

A1. Assessment of environmental impacts on trees

Current research projects:

2. Impact of CO₂ enrichment and irradiance on structure and performance of forest tree photosynthetic apparatus at different hierarchical levels. GACR P501/10/0340 (2010-2014)

PI: J. Albrechtová

Collaborations:
- Institute of Physiology, AS CR, v.v.i. – Dr. L. Kubínová, Dr. J. Janáček
- Global Change Research Centre AS CR, v.v.i. – Dr. Šprtová, Dr. Urban, prof. Marek
- University of Zurich, Switzerland – Dr. Z. Malenovský(GAČR), Dr. Joerg Weyermann
- University of New Hampshire, USA – prof. BN. Rock, prof. S. Ollinger
- University of Maryland, NASA Goddard Space Flight Center, USA – Dr. P. Entcheva-Campbell
A1-2. Impact of CO$_2$ enrichment and irradiance on structure and performance of forest tree photosynthetic apparatus at different hierarchical levels.
A1-2. Impact of CO₂ enrichment and irradiance on structure and performance of forest tree photosynthetic apparatus at different hierarchical levels.

Elevated CO₂ concentration enhances photosynthetic rates in both – Norway spruce and European beech. At the level of mesophyll we did not find any anatomical changes in spruce needles.

- What is the cause of enhanced photosynthetic rates? Changes at chloroplast ultrastructure, activity of electron transport rates in PS I and PS II or Rubisco activity?
- Are there any changes in content and proportion of nonstructural saccharides?
Publications and outputs from last 5 years:


Holá, D, Kočová, M, Rothová, O, Hlízová, E, Fridrichová, L, Lhotáková, Z, Albrechtová, J (submitted) A universal method for the isolation of photochemical from conifer needles and its possible application in photosynthetic studies. Photosynthetica