Module name

Tree Structure and Function

Module coordinator

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Additional teaching staff

Prof. Dr. Siegfried Fink, Dr. Jürgen Kreuzwieser

Syllabus

- Structure of roots, mechanisms of water and nutrient uptake by roots; significance of mycorrhizal symbiosis
- Structure of xylem and phloem; xylem and phloem transport and transpiration
- Leaf structure; CO_2-exchange and photosynthesis in woody plants; tree respiration
- Meristems and growth (cambium, shoot and root primordia, differentiation)
- Source/sink relations in trees and its seasonality
- Physiological basis of carbon fluxes in forest ecosystems
- nutrient requirements of trees, consequences of nutrient deficiency and excess
- regulation of tree nutrition
- nutrient storage and mobilization

Learning goals and qualifications

The students will:

- achieve an in depth understanding of carbon relations of trees from the molecular via the physiological, eco-physiological and tree to the stand level.
- learn the role of trees in water relations of forest and the mechanisms involved in water acquisition, water transport inside the tree and water vapour flux into the atmosphere.
- obtain a detailed understanding of nutrient requirements of trees, nutrient aquisition, the mechanisms involved and its regulation
- understand the relations between structural aspects at the cell, tissue and organ level and the respective physiological functions
- become competent in linking growth processes at the cell and tissue level to “classical” growth parameters used in forestry (annual rings, volume yield etc.)

Teaching and learning methods

Lectures, tutorials

Prerequisites

none

Requirements for registration

none

Distribution of work load

Contact hours 80 h (Lectures, pracs, excursion, exam)

Student learning 45 h (Preparation, reading etc.)

Proposed assessment

Link to learning resources

Preliminary Reading

Marschner H (1995) Mineral Nutrition of Higher Plants. Academic Press, London

Landsberg JJ and Gower ST (1997) Applications of Physiological Ecology to Forest Management. Academic Press, San Diego

Dickison, W.C. (2000): Integrative Plant Anatomy. Academic Press, San Diego

Tyree, M.T. and M.H. Zimmermann (2002): Xylem Structure and the Ascent of Sap. 2nd. Ed. Springer, Berlin

Comments