

Growth modelling in mixed-species stands

Course content:

Modelling forest growth in monospecific stands under different management regimes and environmental conditions is challenging. All the more so in mixed-species stands, where the presence of several species means an increase in stand structure and the interaction of the species modulates competition effects on growth.

The two-day course on growth modelling in mixed-species stands starts with a first comparison of the special features when modelling growth in mixed-species stands vs. monocultures. The different modelling approaches looking at model philosophy, i.e. from empirical to process-based, and spatial level are briefly introduced with a special focus on including mixture effects.

In the second part of the course the focus moves from the pure explanation of growth processes to the application of growth functions in simulators. What are the prerequisites, what are the challenges and limitations for growth simulators in mixed-species stands?

The theoretical presentations along with discussions will be accompanied by exercises.

Participation requirements: basic knowledge of forest growth, good command of R, curiosity and active participation

Language of instruction is English

Lecturer: PD Dr. Matthias Albert (NW-FVA)

Date & time: June 11 (9-12 lecture & 2-4 exercises)

June 12 (9-12 lecture & 2-4 exercises)

Place: [FSR 2.1](#) (June 11) and [FSR 1.2](#) (June 12)

Credits: 1 ECTS (attendance of at least 80 % and successful completion of the exercises)

Registration: Please send an email to serena.mueller@forst.uni-goettingen.de

Schedule:

Day 1:

- General introduction
 - Which stand and tree attributes are regarded when speaking of growth modelling?
 - What are the special features when modelling growth in mixed-species stands vs. monocultures?
- Overview on empirical vs. process-based model approaches
 - What are the specific features of empirical (statistical) models?

- How do process-based models function?
 - What are the advantages, disadvantages and field of application of both approaches?
- Spatial levels of statistical growth modelling: data requirements, how to integrate mixing effects, strengths and limits
 - Stand-level models
 - Cohort models
 - Single-tree models
- Exercises

Day 2:

- From growth modelling to growth simulators taking TreeGrOSS1 as an example
 - Elements of a simulator: growth functions, mortality functions, ingrowth, thinning algorithms
 - Extension of the simulator with a regeneration module
 - Extension of the simulator with a climate-sensitive site index model
- Application for scenario analysis
 - Prerequisites for simulations
 - Why scenario analysis?
 - Projections of Enrico plots
- Exercises

¹ TreeGrOSS is the statistical single-tree growth simulator of the Northwest German Forest Research Institute