

72nd FEFCO

Forest Ecosystem Function Colloquium (FEFCO) は、地域や地球全体のレベルで森林生態系の機能とその持続的活用法を統合的に理解することを目的とし、研究者間の学術交流を推進します。

第72回森林生態系機能コロキウムは、Ülo Niinemets博士にご講演いただきます。どなたでも参加できますので、多くの皆様のご参加をお待ちしております。京都大学農学研究科森林生態学研究室がホストを務めます。

72nd FEFCO

2024/11/1 15:30 - 16:30

Faculty of Agriculture Main Building, S174
and ZOOM



↑ Zoom form for
registration

Prof. Ülo Niinemets
(Chair of Crop Science and Plant Biology,
Estonian University of Life Sciences)

Global variation in within-canopy photosynthetic acclimation

Extensive light gradients, typically 10- to 50-fold, are the most prominent feature of plant canopies. These gradients are responsible for major within-canopy variations in foliage structural, chemical and physiological traits. As a key acclimation response to variation in light availability, foliage photosynthetic capacity per area (A_{area}) increases with increasing light availability within the canopy, maximizing whole canopy photosynthesis. However, A_{area} is a composite variable that can be deconvoluted into different combinations of constituent traits, including structural traits (leaf dry mass per unit area, M_A), chemical (nitrogen content per dry mass, N_M , and area, N_A) and physiological (photosynthetic nitrogen use efficiency, E_N ; photosynthetic capacity per dry mass, A_{mass}). This presentation analyses which traits most plastically acclimate to canopy light environment and drive within-canopy photosynthetic gradients in different plant functional types. This presentation further analyses temporal sources of variation in within-canopy photosynthetic acclimation. The presentation highlights that fast canopy-expanding species that grow in highly dynamic light environments, actively modify A_{area} by nitrogen reallocation among and partitioning within leaves. In contrast, species with low rate of leaf turnover generally exhibit a passive acclimation response with variation in A_{area} primarily determined by light-dependent modifications in leaf structure during leaf growth. Due to limited reacclimation capacity in species with low leaf turnover, within-canopy variation in A_{area} decreased with increasing leaf age in these species. This analysis concludes that the rate of leaf turnover is the main determinant of how species acclimate to canopy light environment.