METAP Project – On disentangling major plant defence theories along a large-scale productivity gradient

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Résumé

Facing escalating biodiversity loss, ecosystem disruption, and ecological mismatches, understanding the background of plant-herbivore interactions becomes crucial. METAP (Manipulative Experiments: Trees, Arthropods, Predators), a collaborative project spanning 40 European sites, aims to offer a perspective connecting the long-standing debate between the 'green world hypothesis' and the 'resource availability hypothesis,' suggesting that plants are active regulators of herbivory, adapting their defence strategies to site-specific productivity. By focusing on the pedunculate oak (*Quercus robur*), a keystone deciduous species in European forests, the study addresses the question of how variations in Net Primary Productivity (NPP) influence the deployment and effectiveness of plant chemical defence, a subject critical for advancing our understanding of large-scale patterns of herbivory pressure, plant-herbivore interactions, and trophic cascades functioning. This study provides unprecedented insights into the complexities of plant defence mechanisms across the NPP gradient, offering a nuanced view of plant defensive investment and its implications for macroecological theories. Employing a novel methodology, we induce plant defences using the plant hormone Methyl Jasmonate (a trigger of chemical defensive reaction in plants) across various environmental conditions to simulate herbivore attack, allowing for an examination of plant defence strategies in natural settings. This presentation will introduce the project's scope, including a theoretical deep view of the different plant defence strategies trade-offs within productivity gradients. Additionally, the innovative ecological approaches as well as preliminary insights derived from the initial phases of fieldwork will be presented. As we await comprehensive results, the project exemplifies the value of collaborative, large-scale ecological research in addressing complex and not fully understood ecological phenomena.

Mots-Clés: Macroecological theories, plant defence, plant herbivore interactions, large scale herbivory patterns, collaborative studies

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