UNIVERSITÉ LAVAL

INSTITUT DE BIOLOGIE INTÉGRATIVE ET DES SYSTÈMES IBIS

CONFÉRENCE

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Exploring missing pieces to our understanding of symbiotic nitrogen fixation: from ecosystems to individual plants

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Pavillon Charles-Eugène-Marchand, salle Hydro-Québec (1210)

Abstract:

Symbiotic nitrogen fixation (SNF) is the largest non-anthropogenic input of nitrogen (N) into terrestrial ecosystems. Yet key uncertainties remain in how we quantify and conceptualize its regulation across scales. In this seminar, I will explore two potential missing pieces that may reconcile long-standing paradoxes in our understanding of SNF. First, I will show evidence that canopy gaps, which are light-rich, dynamic forest micro-environments created by natural disturbances, are likely unmeasured hotspots of SNF. This has implications for our current understanding of ecosystem-scale biogeochemical cycling and Earth System Models. Second, I will present the carbon surplus hypothesis as an alternative framework for understanding SNF regulation at the individual plant scale. This framework may better account for paradoxical results observed across experimental and observation studies, suggesting that SNF is regulated more by plant carbon availability than soil nutrient limitation. Together, these perspectives highlight how expanding our measurements and frameworks, from scales of ecosystem to individuals, can reveal new pathways for linking plant physiology to biogeochemical processes.

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