Biology Seminar

12:30 - 1:30 pm
Friday, March 19, 2021
Seminar to be held via ZOOM

First talk of two in this seminar.

Robert Buchkowski
Post Doctoral Student
Department of Biology
Faculty of Science
Western University

Structure and stoichiometry in soil food webs

Soil food web models are a useful tool for predicting how organisms influence the movement of carbon and nitrogen. They are especially useful for understanding the contribution of each type of organism to the release of these elements into mineral forms (i.e., carbon dioxide, ammonium, etc). However, most soil food web models use very similar methods for grouping species into nodes and apply static estimates for the efficiency with which each node uses carbon and nitrogen. Both assumptions influence our predictions about the loss of carbon dioxide and production of mineral nitrogen in the soil. I will discuss how we can evaluate these assumptions using a sensitivity analysis to explore different model structures and the concepts from ecological stoichiometry to predict nutrient use efficiency.

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UNIVERSITY · CANADA

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Anthony Percival-Smith
Associate Professor
Department of Biology
Faculty of Science
Western University

Second talk of two in this seminar.

Phenotypic non-specificity of transcription factor function

A traditional view of how different phenotypes arise due to changes in the initiation of transcription is explained by the specificity of transcription factor function. Two mechanism are proposed to mediate the specificity: recognition of specific DNA binding sites by TFs and specific cooperative interactions between TFs. However, how well is this view tested? Previously I have found that TFs are not very specific for the phenotypes that they can induce/rescue. However, a majority of the experiments were associated with phenotypes induced by ectopic expression of TFs. The only experiment demonstrating rescue was the ability of Doublesex male to rescue maxillary palp growth of a proboscipedia loss-of-function mutant. To investigate the frequency of phenotypic non-specificity in rescuing TF phenotypes, we investigated the rescue of seven TF phenotypes. We found that DSXM can rescue the lab phenotype; FOXO can rescue an Scr phenotype; ANTP can rescue the Ubx phenotype; and multiple TFs can rescue dsx phenotypes and DISCO can rescue the fru phenotypes. Therefore, phenotypic non-specificity is quite common; only 40 TFs would have to be tested to have a 95% confidence of finding phenotypic non-specificity. The observation of phenotypic non-specificity of TF function has ramifications for experiments suggesting evolutionary conservation of function.

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