**Project Overview**

This repository contains two folders: **Complex food web** and **Stoichiometric RM - food chain model**, each including code for simulating and analyzing ecological dynamics with a focus on stoichiometry and food web structure.

**📁 Complex food web**

This folder contains four main files:

* **main.m**  
  Runs simulations of population biomass (carbon stock) and nutrient-to-carbon ratios over time in a complex food web.
* **foodweb\_dynamics.m**  
  Defines the dynamical equations of the food web model (eqns 1 – 18 in main text)
* **foodweb\_generate.m**  
  Generates the topology of a complex food web (i.e., who eats whom) using the algorithm proposed by Schneider et al. (2016).
* **Functioning\_calculation.m**  
  Calculates ecosystem functioning metrics such as biomass and primary productivity.

**📁 Stoichiometric RM - food chain model**

This folder contains the stoichiometry-constrained Rosenzweig–MacArthur (RM) model (eqns 23 & 24 in main text) used in this study:

* **SimpleFoodChain.m**  
  Defines the dynamics the stoichiometric RM model (eqns 23 & 24 in main text) proposed in this study.
* **plot\_bottom.m** and **plot\_top.m**  
  Generate plots corresponding to Figure 2 in the paper.
* **result\_plot.m** and **U\_new.mat**  
  Used to analyze coexistence patterns of plants and herbivores under different levels of stoichiometric constraints and nutrient supply.