Greetings

Plan: intro, concepts, ignore calibration, results, conclusion

**Introduction:**

Surprising diversity of alpine grasslands --> an introduction to the concept of ecosystem services

From communities’ properties to ES

But threaten by global global change

Need to understand responses and dynamics to predict and manage

Require new approach to ecology: from species to trait ecology

The role of modelling: link drivers with community dynamics and properties

--> The need for dynamic mechanistic models at community scale

But

1) not enough diversity (few species or functional groups),

2) intra-specific variability: genetic + epigenetic + phenotypic plasticity (PP) = what impact on dynamics?

**Questions:**

Technical question: how to introduce PP in a mechanistic IBM of grassland communities.

How PP alters community properties and dynamics?

*12 min*

**Concepts:**

1. What makes a niche?

Definition of niche

PP: Niche filling vs competitive exclusion

1. How to build a diverse community?

Strategy axis and strategy space

Trade-offs and the leaf economics spectrum

1. How to model plasticity?

Passive and active plasticity

Plasticity as a strategy (and not a growing process)

Rules: subspace and drivers (full or not, optimisation or equilibrium)

1. Model’s overview

Scales and processes

Simplification hypotheses

The plasticity: memory and reactivity and rules = assumptions (species specific or not) (growth optimisation or eq are also assumption)

Plasticity algorithms: objective function (eq. or opt) and plastic dimensions (RSR, full)

Simulations and output

*25 min*

**Results:**

Individual scale: Set-up and simulation plan

Components of growth: tissue efficiency, overall balance

Static gain in homogeneous conditions

Dynamic gain in heterogeneous conditions

Consequences:

* Dominant strategy: limiting the risk (+ to exploitative sp.)
* Diversity: niche widening, increase competition (should promote coexistence because asymmetric)

Community scales: Set and meta-community rules

* Increase diversity: but shift from beta to alpha diversity
* Not about density, but effective niche widening, and increased competition

**Discussion**

Convergence vs divergence. Yes widening niche and stabilizing mech, but convergence where observe divergence: different assumption to model avoidance and resistance (fixed rate vs fixed quantity, continuous)

Dynamics: more diversity, more stability, reduce risk for critical transition?

*40 min*

**Conclusions & perspectives**

Integrated plasticity: assumptions and perception of multiple resources/stresses & diversity FW

PP mitigate interaction and stabilize coexistence, with potentially large effects at the meta-community scale and great potential to adaptation to climate change.

Ready to do: better calibration, climate change scenarios, competition interactions (transitivity and differentiation)

Promising directions: meta community dynamics, stability of communities and invasibility

*45 min*