Climatic drivers and intrisic biological processes shape masting dynamics...

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December 15, 2025

1. Intro (all forests → stand sync → ind. trees)

   The acceleration of climate change is predicted to have abrupt ecological effects worldwide. Rapid shifts to novel climate conditions with more extreme events have the potential to disrupt key ecological processes. Feedback mechanisms could break down resilience and potentially drive ecosystems toward critical transitions. In particular, many forest ecosystems are show sign of increased sensitivity to biotic and abiotic disturbances. Forests could adapt if they can rely on their regeneration capacity, which promotes post-disturbance recolonization and the establishment of individuals better adapted to new conditions.

   Regeneration in many temperate and tropical forests depends on tree species that have a high variability in reproduction across years, with most individuals of a population reproducing synchrounously. These two characterisics—variability and synchronicty—define masting, which is hypothesized to have strong fitness benefits, mostly because it could allow a higher proportion of seeds to escape predation. Masting could also favor greater pollen exchange and genetic outcrossing across individuals, favoring the production of seedlings that may be better adapted to new climatic conditions. However, disruption of this reproductive timing by climate change could trigger cascading effects on forest resilience.

   ... Population-level masting arises from the reproductive behavior of individual trees.

2. Results and discussion

   - We built a model that matches conceptual figure
     - alternate states (latent)
     - states encode constraints
     - tree level estimates lead to stand estimates!
     - and we added climate
   - Model identifies 2 states (here, figure with the two distributions)
     - masting is real! Mirror the intro
     - some level of synchrony within stands
     - say how often they transition in average conditions...
   - Climate impacts on masting (figure of climate effects)

  - warm summer increase transition
  - frost decrease number of seeds
  - no efect of spring (supp mat)
- Our projections vs current studies
  - current studies: ACC leads to more seeds via more masting
  - but even if you drive warming way upp you still get a plateau
  - this even happens with summer temp effect on M to M (figure proj)
  - To actually ahve a breakdown, we would nee the parameter valeu on M to M to be at least as important as NM to M
- How constraints prevent breakdown!
  - ...
- But synchrony does appear to go down
  - Review previous results and overall figure
  - these years look less synchrone...
  - but here, it could be driven both by within and between asynchrony
  - (what level of between-stand synchrony predict..?)
  - evolutionary benefits of mating depends on scale of synchrony
    rightarrow which scale depends on which evolutionnary model you consider, but for seed predators... should be quite small (foraging distance = X km)
- Asynchrony indeed driven by multiple factors
  - within between
  - discuss results... maybe figure with %?
- What drives synchrony?
  - bad years could act as precise cue, and with biol. constraints it would explain the following synchrony
  - how ACC could change those dynamics, and on which scale?
  - (Unclear how breakdown at tree and then at stand level?)
  - basically, we need to figure out the biology useful for predictions with ACC