Coordinated phenological responses to environmental cues across a community of temperate forest plants

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Outline

1. Introduction
   (a) Phenology is super important, to ecosystems and trophic levels and stuff ... and also to coexistence within one trophic level—the temporal niche
   (b) Climate change has increased research (and interest in phenology) – lots of change seen, but as data across species has piled up, somewhat conflicting and contrasting results (Fu, chilling etc.). Touch on invasions here?
   (c) Accurate predictions clearly require a fuller understanding of the interacting environmental cues that drive phenology within a community. We list out the cues (and say temporal niche again).
   (d) We somewhere say that we expected a trade-off between cues!
   (e) Here we study these cues in some forests.
2. Results
   (a) Strong main effects of forcing, chilling and photoperiod. Strong interactions of forcing x chilling; some other important interactions
   (b) Species varied in their cues, but all species has all 3 cues. Shrubs generally had weaker cues than trees, though this was not always consistent.
   (c) Responses varied quantitatively depending on whether BB or LO was considered.
3. Discussion
   (a) Species and community responses
      i. Spring phenology and community assembly: Our results suggest species have paced budburst and leafout due to a mix of thee major environmental cues. In contrast to any trade-off between cues, we found coordinated responses across the community. This means ...
      ii. All species had all cues. This jives with many models of phenology (cite Chuine etc.) but diverges from some stated assertions and from a number of chamber studies. Why? Because the cues all interact so if you clip branches

once chilling is met or perhaps do the Weinberger thing, you might not see chilling and/or photoperiod cues.

(b) Comparing cues

i. Big effects of forcing and chilling, and photoperiod

ii. Chillng at two levels gave similar responses

iii. Forcing and chilling offset (cite Fu, Cook etc.) – implications for climate change

iv. Site had smaller effects, but chilling x site was substantial (raises concerns for single site chilling studies?)

(c) Comparing phases: BB vs. LO

(d) Conclusions: Tie it all back to climate change

i. Tie to exotic/non-native work? Tie to pioneer/climax work?

ii. This means predicting any one species' response to climate change may not be simple, let alone predicting community-level responses.

Methods:

Total observations, total clippings, total individual trees ....

Some references