

Daniel Buonaiuto

OEB 53

April 19, 2017

Green is the color of spring, but any keen observer walking the temperate, deciduous forest of the Eastern United States early in the season would readily witness that it is often the subtle whites, reds and yellows of emerging tree flowers that are the first harbingers of spring in temperate forest communities. In some deciduous tree species, seasonal flowering proceeds leaf development, while in others, it is leaf expansion that occurs first. The study of phenology, the timing of annual life cycle events, has a long history, and even in the late 1800's, naturalists speculated that such contrasting floral-foliate sequences were not merely incidental, but that these patterns, in and of themselves, may be adaptive tradeoffs (). However, despite increasing scientific interest in the study of phenology over the past several decades, the phenology of reproductive (flowering, fruiting) and productive (budburst, leafout and drop) stages have long been treated separately, and both the mechanisms and effects of floral-foliate phenological patterns remain poorly studied empirically (?).

Even finding suitable language to describe floral-foliate patterns in the existing literature is an difficult endeavour.

if it is adaptive, we must understand it in climate change

to that end, In section one of this paper, I will present the dominant hypothesis for proteranthly in the context of life history theory, evaluating both empirical and theoretical evidence for their support. In section two, I will discuss some of the biological mechanisms that may partition and constraint phenological sequences as an attempt to evaluate the relative independence of foliate and floral phenophases in a given individual. In the final section of the paper, I will discuss these evolutionary tradeoff and physiological mechanism in the context of global climate change.

life history theory

selection on leafing

selection on flower

this is achieved by environmental cues

tradeoff for proteranthly vs. seranthly efficiency vs. investment covaries with general tradeoff of early vs. late flowering plus pollination efficiency-less floral investment, minus: frost damage or delayed leaf out, sink of NSC seranthly pro: earliest leaf out. use that years photosynthate for reproduction con: may need more floral investment evidence: Wind pollination arose at same time of deciduousness, modeling wind flow through canopy, interception in that bog paper. dogwoods

genetics same cues (cherry paper) my work