

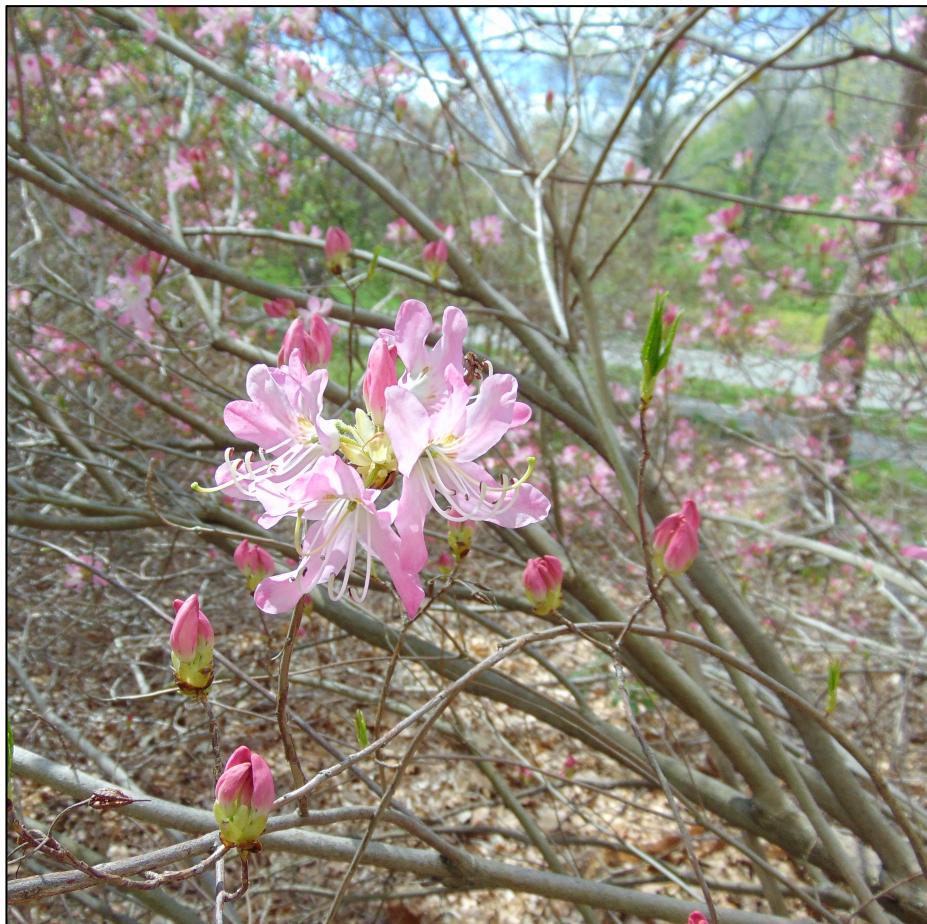
Hysteranthy Hysteria

Dan Buonaiuto, September 26, 2017

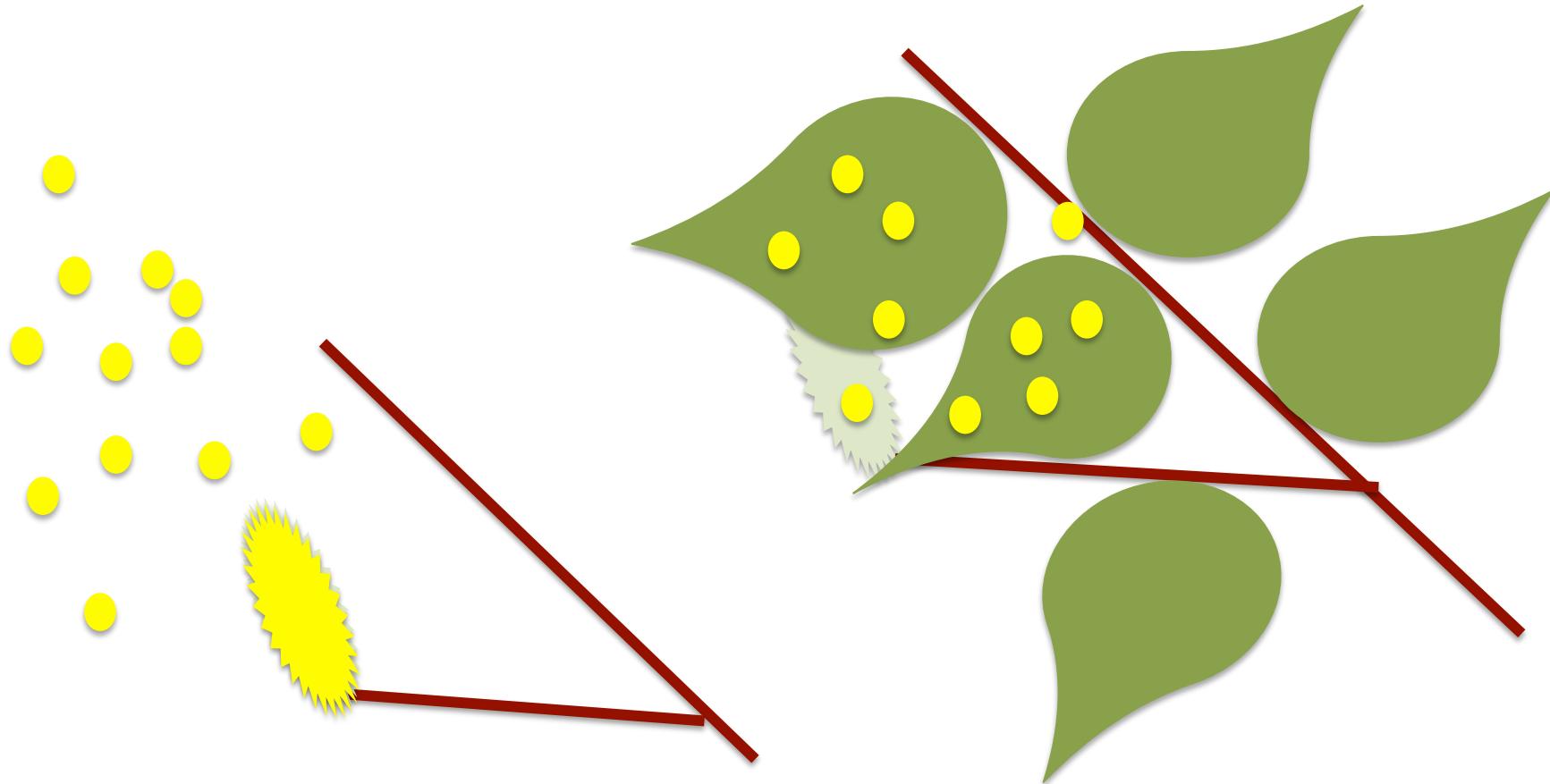
Why do some species flower before leafout, while others leafout before flowering?

To what degree are these patterns stable, especially in a changing climate space?

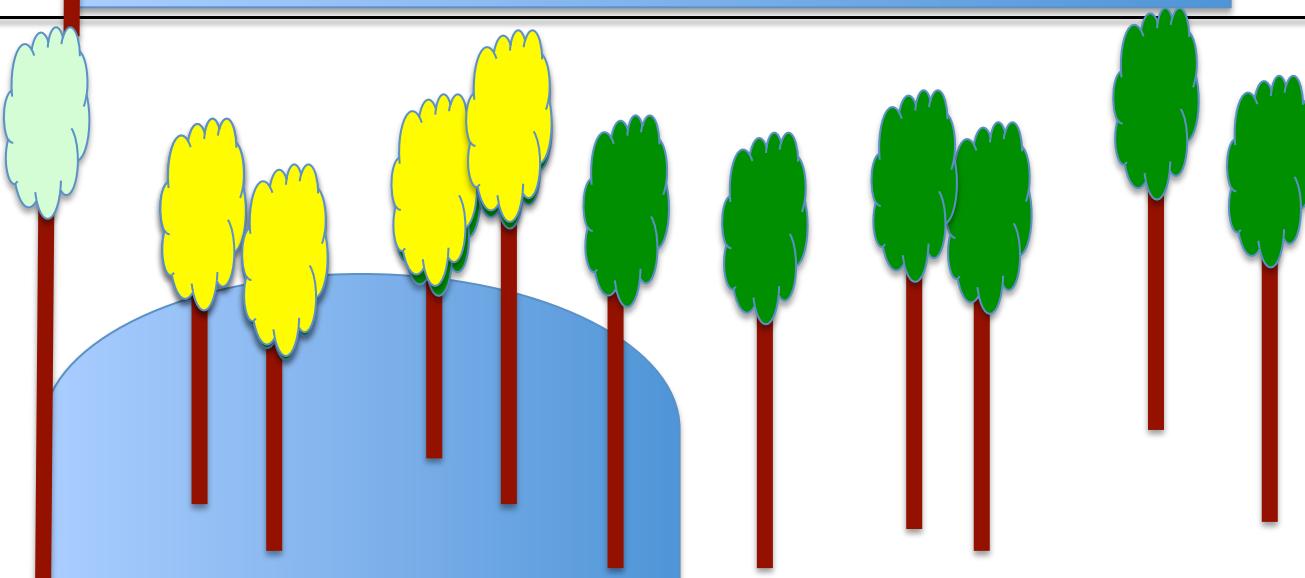
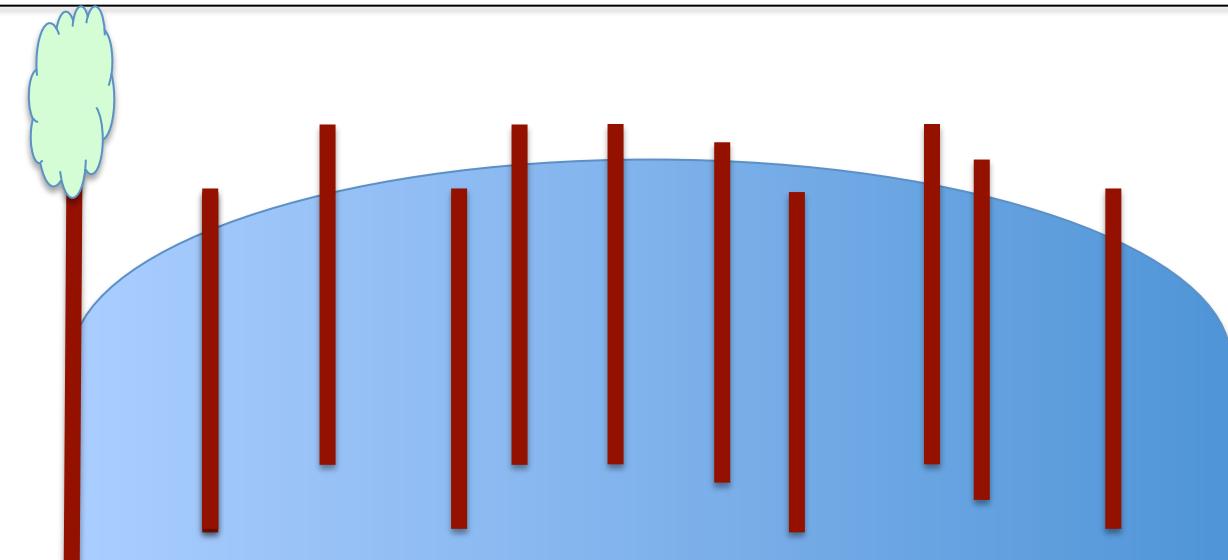
If patterns are flexible, **what are the implications** for tree reproduction and demography?



Wind pollination efficiency



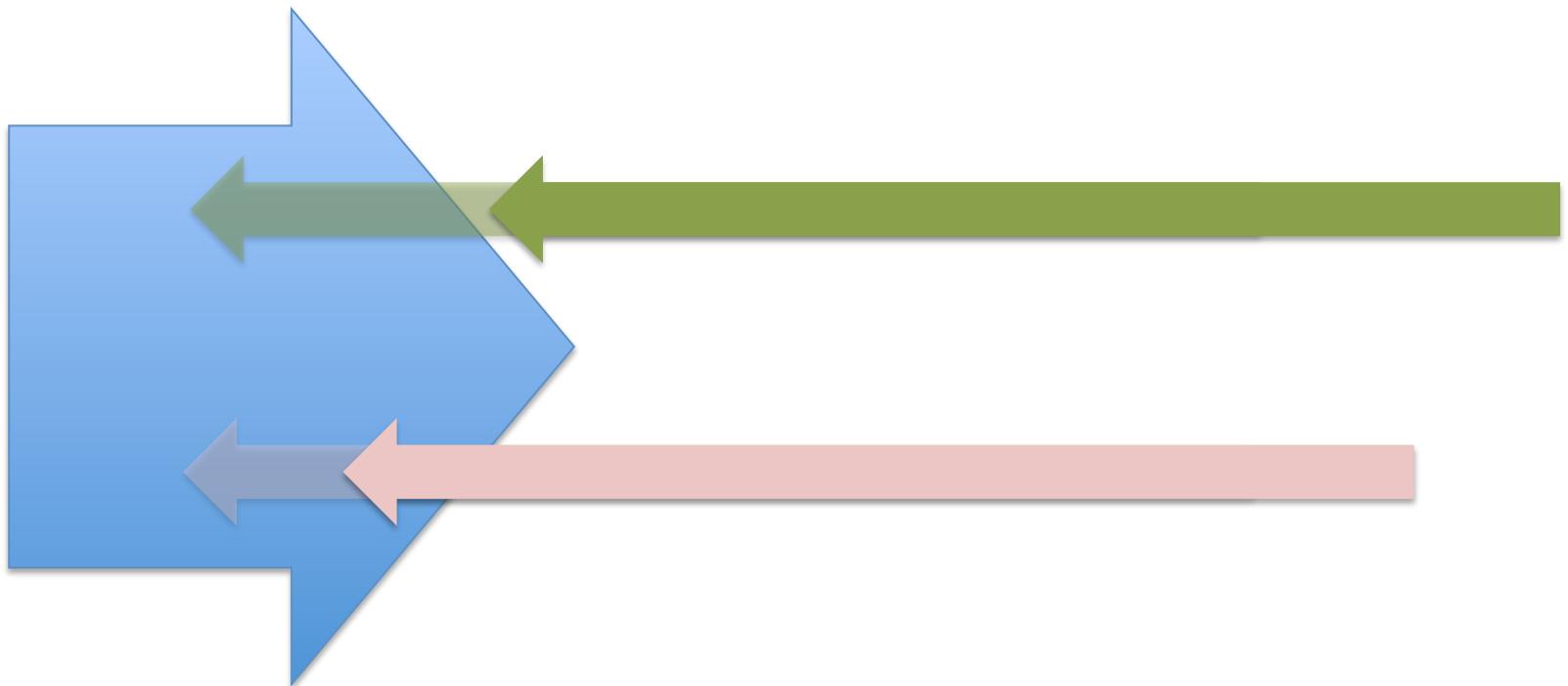
Wind pollination efficiency II



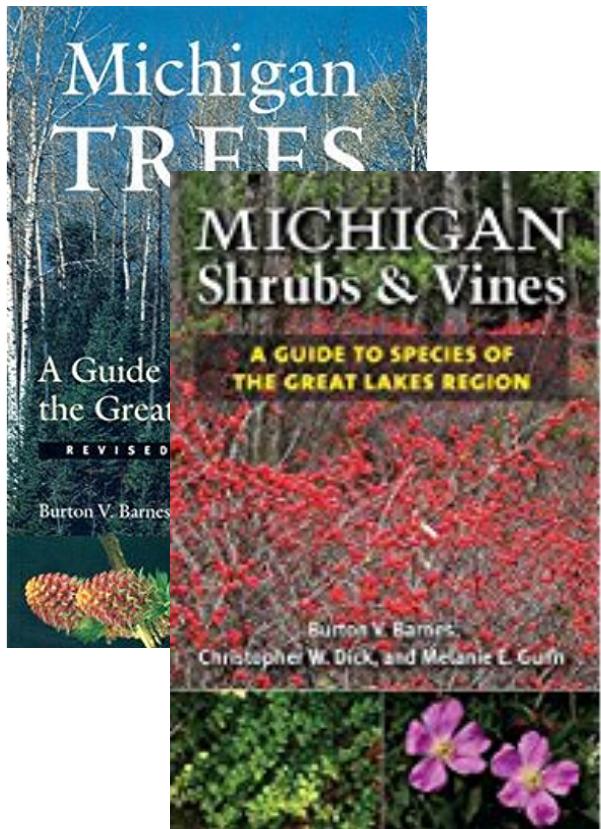
Insect visibility



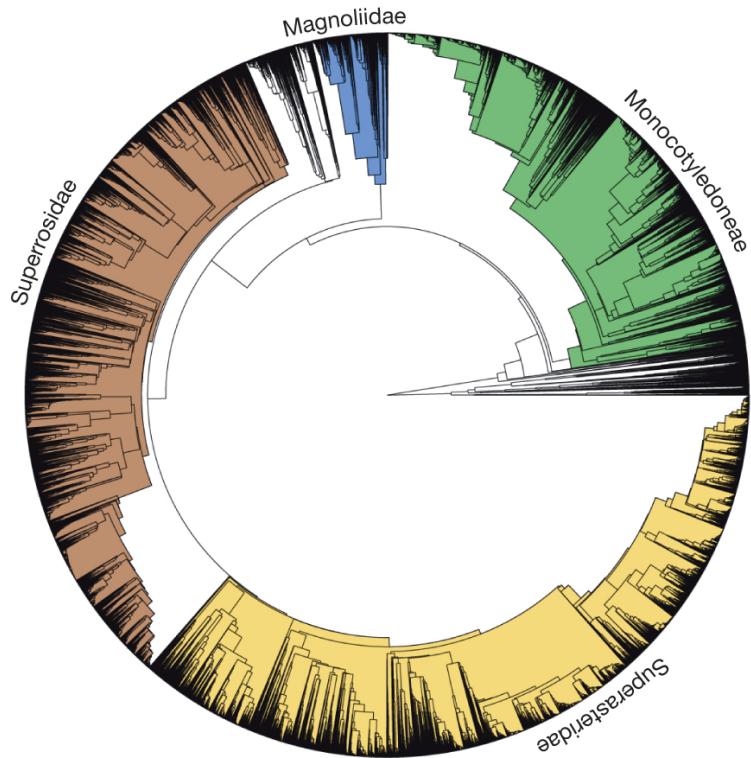
Differential selection



Data:



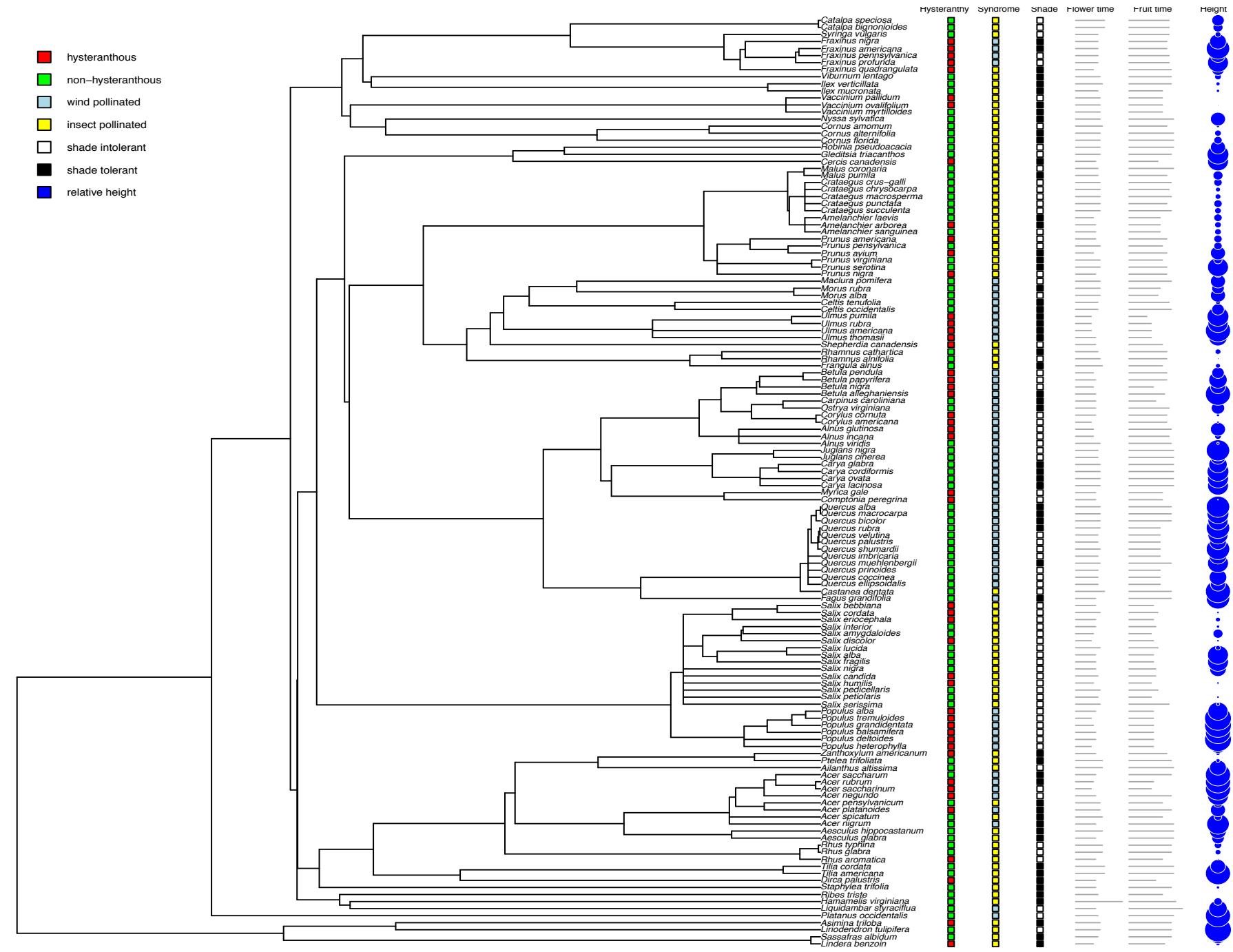
Phylogenetic Tree:



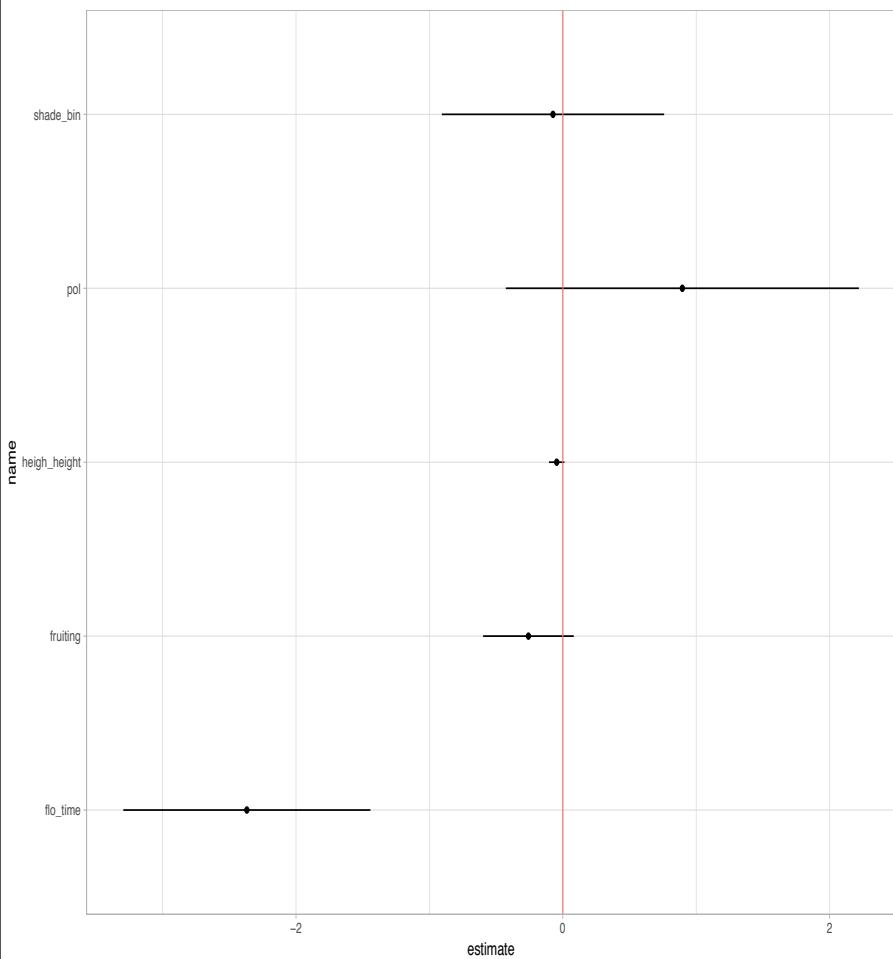
From: AE Zanne *et al. Nature* **000**, 1-4
(2013) doi:10.1038/nature12872

Model: $\text{Pr}(\text{Hyst}(0,1)) \sim \beta_1 x_1 + \beta_2 x_2 \dots + \varepsilon$

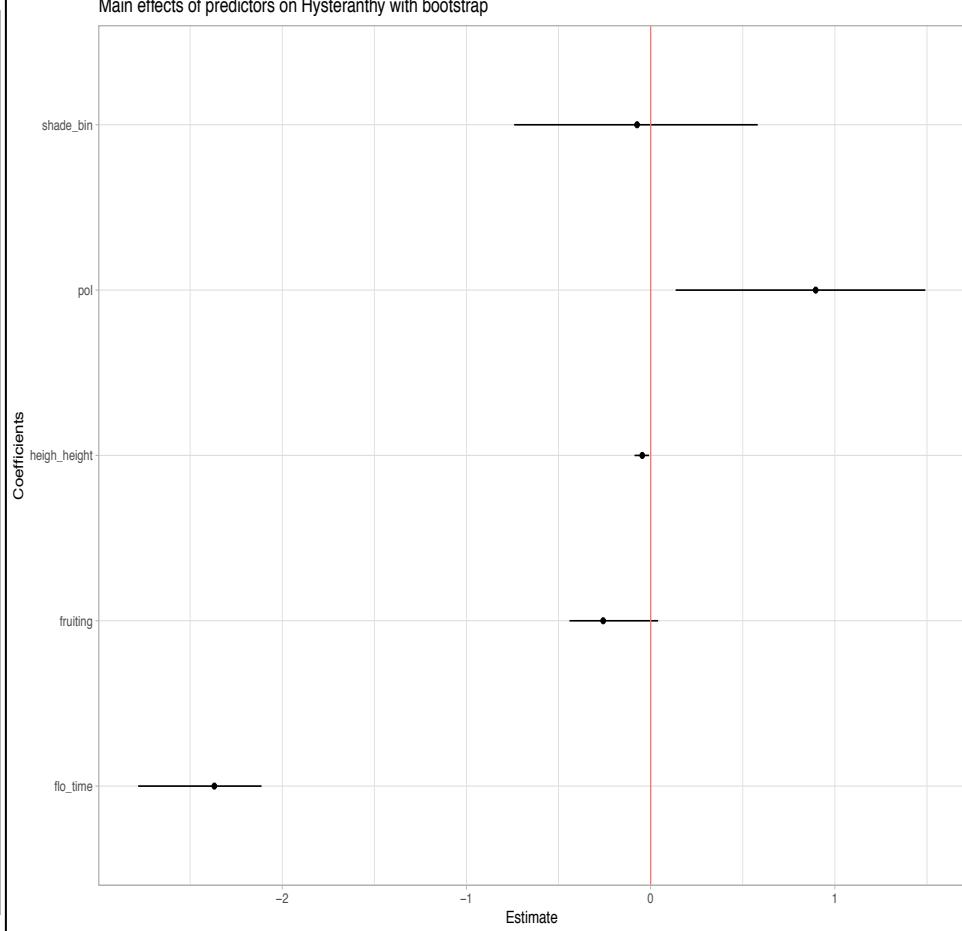
- hysteranthous
- non-hysteranthous
- wind pollinated
- insect pollinated
- shade intolerant
- shade tolerant
- relative height



Main effects of predictors on Hysteranthy



Main effects of predictors on Hysteranthy with bootstrap



Model validation, inference space



USFS Silvics Manual:

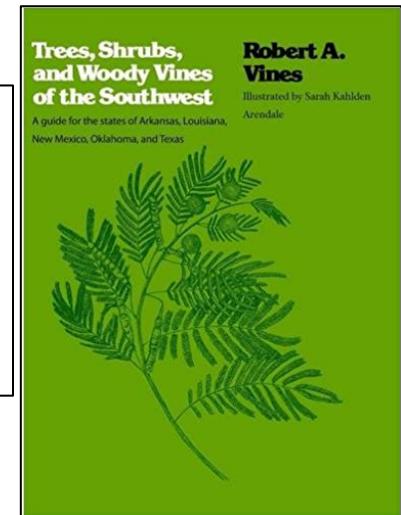
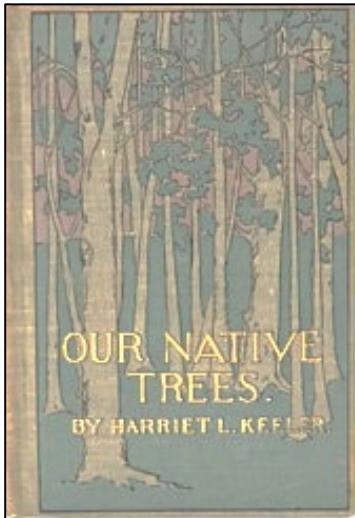
- Non-parallel data
- Missing predictors
- $N \sim 50$, few df

In progress:

- Non-parallel data
- Missing predictors
- $N \sim 100+$, model convergence more likely

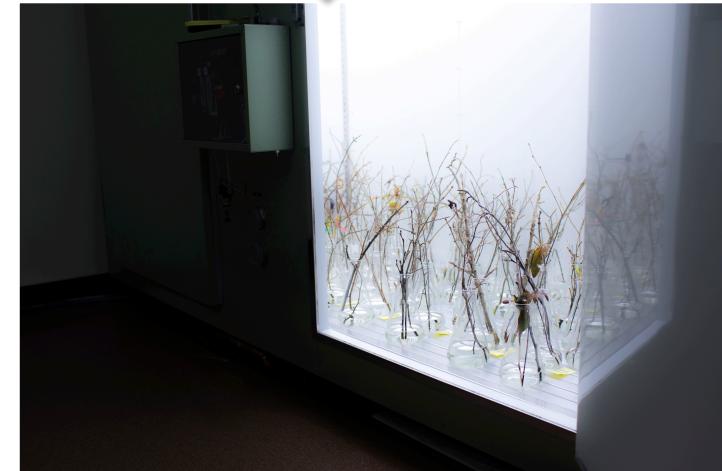
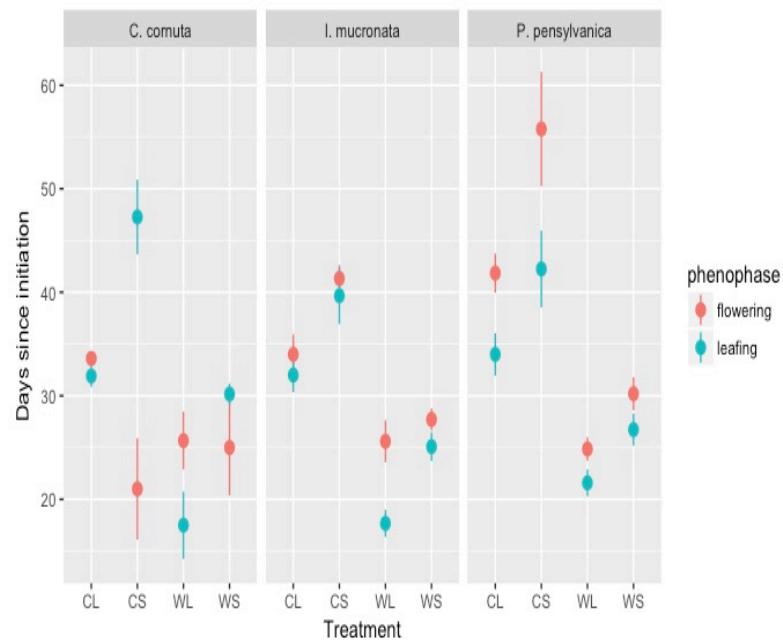
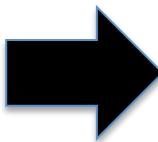
Published 1900!

- Non-parallel data
- Missing predictors
- $N \sim 50$, few df



	mod2	mod3	mod3a	mod4	mod4a	mod5	mich4cent	mod5cent
Pol	0.238	0.86	0.16	0.851	0.91	0.89	1	0.86
Flo_time	-2.57	-2.653	-2.32	-2.71	-2.39	-2.37	-12.52	-11.3
height	X	-0.052	X	-0.049	-0.046	-0.045	-1.76	-0.66
shade	X	X	X	-0.18	X	-0.07	X	-1.2
fruiting	X	X	-0.23	X	-0.25	-0.25	-0.76	-0.05
	Silv1	Silv3	Silv4cent					
Pol	1.48	0.98	0.26					
flo_time	-3.17	-3.26	-10					
av_fruit_time	X	0.08	X					
fruiting	X			-3.69				
height_cent	X	X		-0.51				
	Keeler2	Keeler3(cent)						
Pol	1.16	1.89						
flo_time	-4.16	-21.5						
height		-0.67						

Part II: To what degree are these patterns stable, especially in a changing climate space?

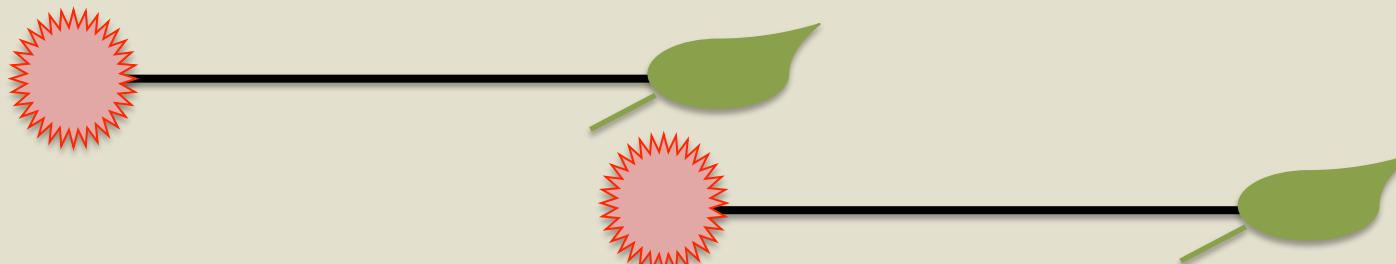


Possible patterns

Null



1.

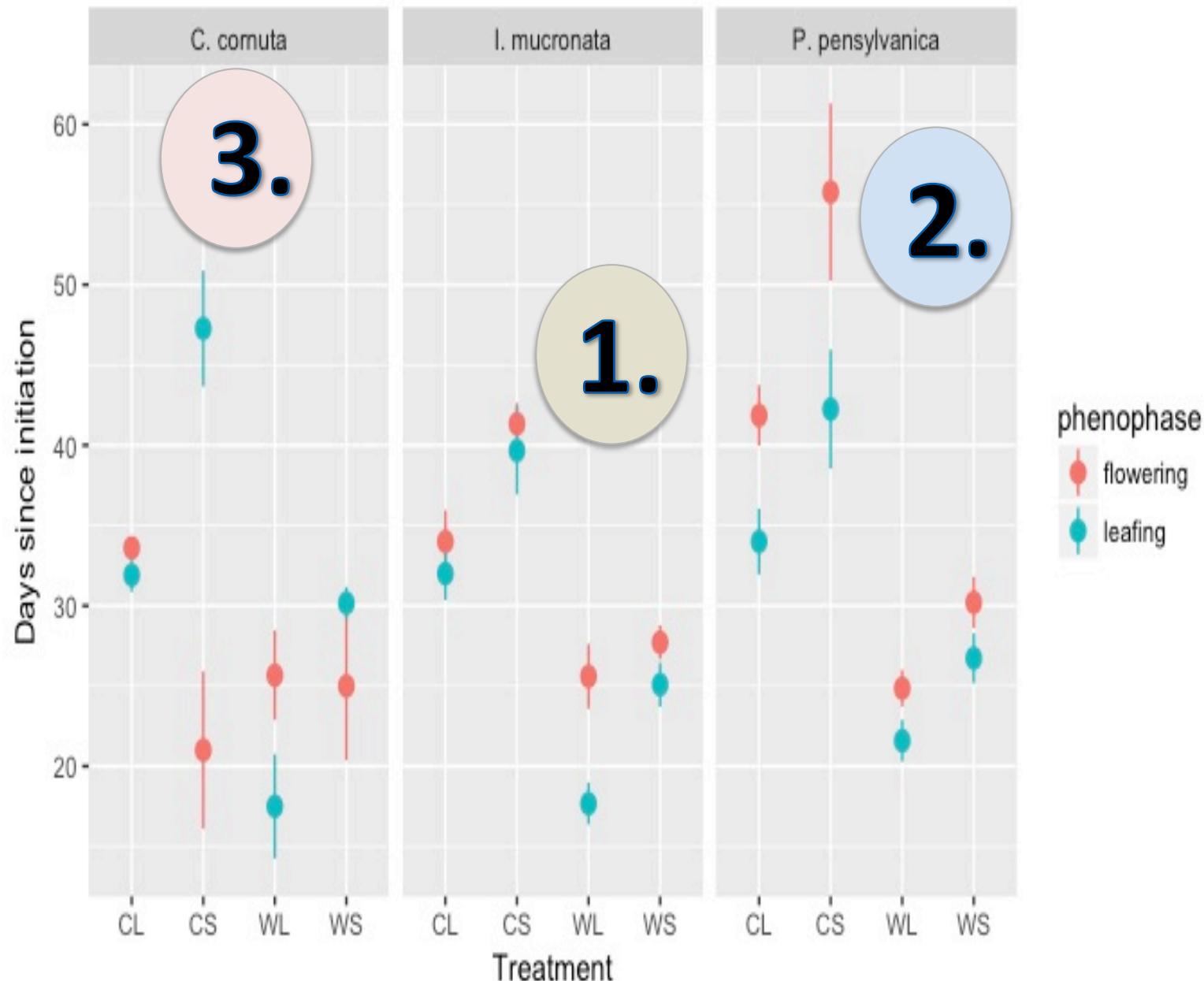


2.



3.





Sunday	Monday	Tuesday	Wed	Thur	Fri	Sat
October:						
22	23 Cut (HF)	24	25	26 Place (WH)	27	28
29	30	31	1 NOV	2	3	4
5	6 Alt Cut (HF)	7	8	9 Alt Place (WH)	10	11

Questions, Comments, Discussion

