

Tables

Species	Family	flower-leaf sequence classification
<i>Acer pensylvanicum</i>	Sapindaceae	flowers after leaves
<i>Acer rubrum</i>	Sapindaceae	flowers before leaves
<i>Corylus cornuta</i>	Betulaceae	flowers before leaves
<i>Comptonia peregrina</i>	Myrtaceae	flowers before leaves
<i>Ilex mucronata</i>	Aquifoliaceae	flowers with leaves
<i>Ilex verticillata</i>	Aquifoliaceae	flowers after leaves
<i>Prunus pensylvanica</i>	Rosaceae	flowers with leaves
<i>Prunus virginiana</i>	Rosaceae	flowers with/after leaves
<i>Vaccinium corymbosum</i>	Ericaceae	flowers after leaves
<i>Viburnum acerifolium</i>	Adoxaceae	flowers after leaves

Table S1: **Flower and leaf phenological sensitivity to environmental cues was investigated in 10 species.** Flower-leaf sequences classifications are based on Barnes & Wagner (1981,2004) and Barnes *et al.* (2016). We also sampled cutting from *Acer saccharum* and *Betula alleghaniensis* but did not include them in this analyses because they failed to flower under any treatment conditions.

	Estimate	Havard_Forest	sd	Chamber_30_days	Chamber_60_days
1	Utah Model	979.64	248.34	720.00	1440.00
2	Chill Hours	1170.71	273.07	720.00	1440.00
3	Dynamic Model	86.56	16.64	21.25	43.50

Table S2: Chilling comparisons between feild and experimental conditions

	Estimate	Est.Error	Q2.5	Q25	Q75	Q97.5
Intercept	70.81	9.18	52.99	64.94	76.88	88.08
Chill	-30.41	5.40	-40.45	-33.89	-27.15	-19.25
Light	5.87	5.13	-4.17	2.42	9.16	15.92
Force	-17.76	5.21	-28.21	-21.10	-14.29	-8.22
Chill:Light	-5.17	4.35	-13.62	-8.03	-2.31	3.56
Chill:Force	12.37	4.84	2.62	9.26	15.51	21.85
Light:Force	-12.62	4.10	-20.50	-15.37	-9.87	-4.79

	Estimate	Est.Error	Q2.5	Q25	Q75	Q97.5
Intercept	77.53	9.92	58.14	71.05	83.88	97.18
Chill	-21.23	7.42	-35.35	-26.14	-16.32	-6.07
Light	-5.72	5.70	-18.28	-9.01	-2.03	4.86
Force	-18.98	6.51	-32.09	-23.02	-14.93	-6.37
Chill:Light	-0.88	6.11	-13.59	-4.72	3.21	10.55
Chill:Force	7.01	6.62	-6.35	2.98	11.11	20.31
Light:Force	-5.61	6.42	-19.08	-9.51	-1.46	6.37

Table S3: Phenological sensitivity of leaf (top) and flower (bottom) buds to environmental cues. Caption needs work.

	Species	Estimate	error	Q2.5	Q25	Q75	Q97.5	phase	sequence
1	ACE.PEN	-10.71	3.92	-17.87	-13.48	-8.19	-2.28	leaf	first
2	ACE.PEN	-17.43	6.15	-30.48	-20.68	-14.00	-5.59	flower	second
3	ACE.RUB	-16.76	7.25	-33.11	-20.21	-13.09	-2.88	flower	first
4	ACE.RUB	-28.39	6.22	-40.52	-32.69	-24.08	-16.20	leaf	second
5	COM.PER	-13.28	3.33	-19.62	-15.50	-11.17	-6.60	flower	first
6	COM.PER	-15.47	3.69	-23.06	-17.82	-13.01	-8.53	leaf	second
7	COR.COR	-15.55	4.50	-24.71	-18.13	-12.87	-6.79	flower	first
8	COR.COR	-19.82	4.04	-28.13	-22.41	-17.10	-11.99	leaf	second
9	ILE.MUC	-10.44	3.81	-17.42	-13.09	-8.05	-2.45	leaf	first
10	ILE.MUC	-16.05	4.06	-24.19	-18.58	-13.47	-7.94	flower	second
11	ILE.VER	-8.66	3.73	-15.58	-11.19	-6.19	-1.12	leaf	first
12	ILE.VER	-20.43	10.72	-43.88	-25.92	-14.18	-2.14	flower	second
13	PRU.PEN	-10.24	4.14	-18.67	-12.99	-7.50	-2.14	leaf	first
14	PRU.PEN	-13.85	4.02	-21.59	-16.46	-11.40	-5.39	flower	second
15	PRU.VIR	-26.68	5.11	-37.14	-30.02	-23.09	-17.20	leaf	first
16	PRU.VIR	-23.69	7.67	-40.07	-28.74	-17.84	-10.95	flower	second
17	VAC.COR	-7.06	3.85	-14.45	-9.62	-4.56	0.66	leaf	first
18	VAC.COR	-13.10	3.60	-20.30	-15.49	-10.79	-5.99	flower	second
19	VIB.ACE	-12.68	3.78	-19.97	-15.14	-10.29	-5.10	leaf	first
20	VIB.ACE	-21.60	8.52	-39.63	-26.63	-16.00	-6.85	flower	second

Table S4: Phenological sensitivity of leaf and flower buds to forcing at high levels of chilling and forcing. Caption needs work.

² **Figures**

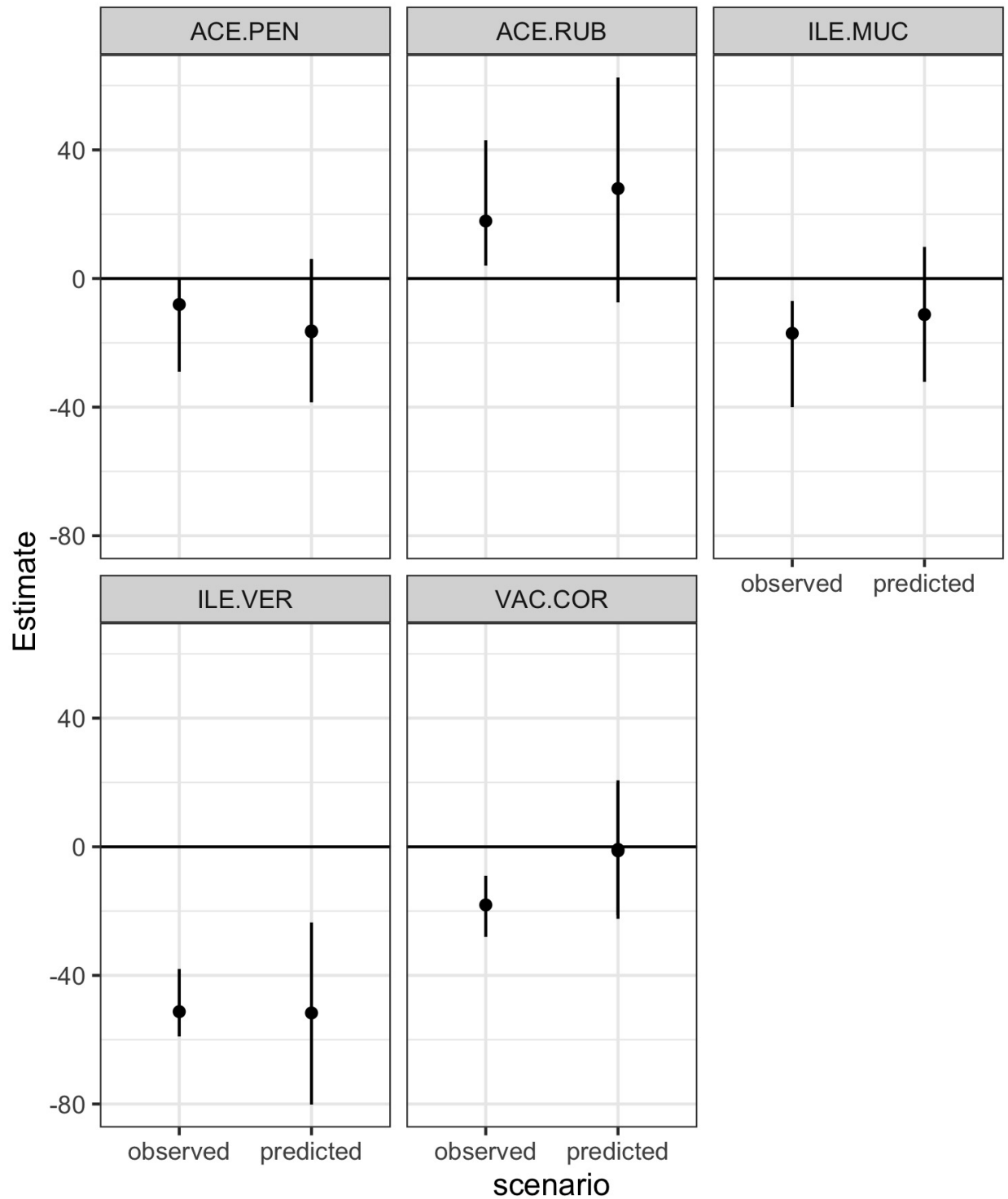


Figure S1: Model predictions of flower-leaf sequence interphases (days between phenophase) under artificial conditions designed to approximate “average” field conditions reflect FLS interphases observed at Harvard Forest in Pertersham MA.. This comparison suggest that the baseline environmental treatments applied in our experiment appropriately capture natural conditions. Dot represent means FLS interphase in both datasets, and lines represent the 89% credible intervals and the full range of observations for our model predictions and Harvard Forest data respectively. Harvard Forest phenological records are from O’Keefe (2015).

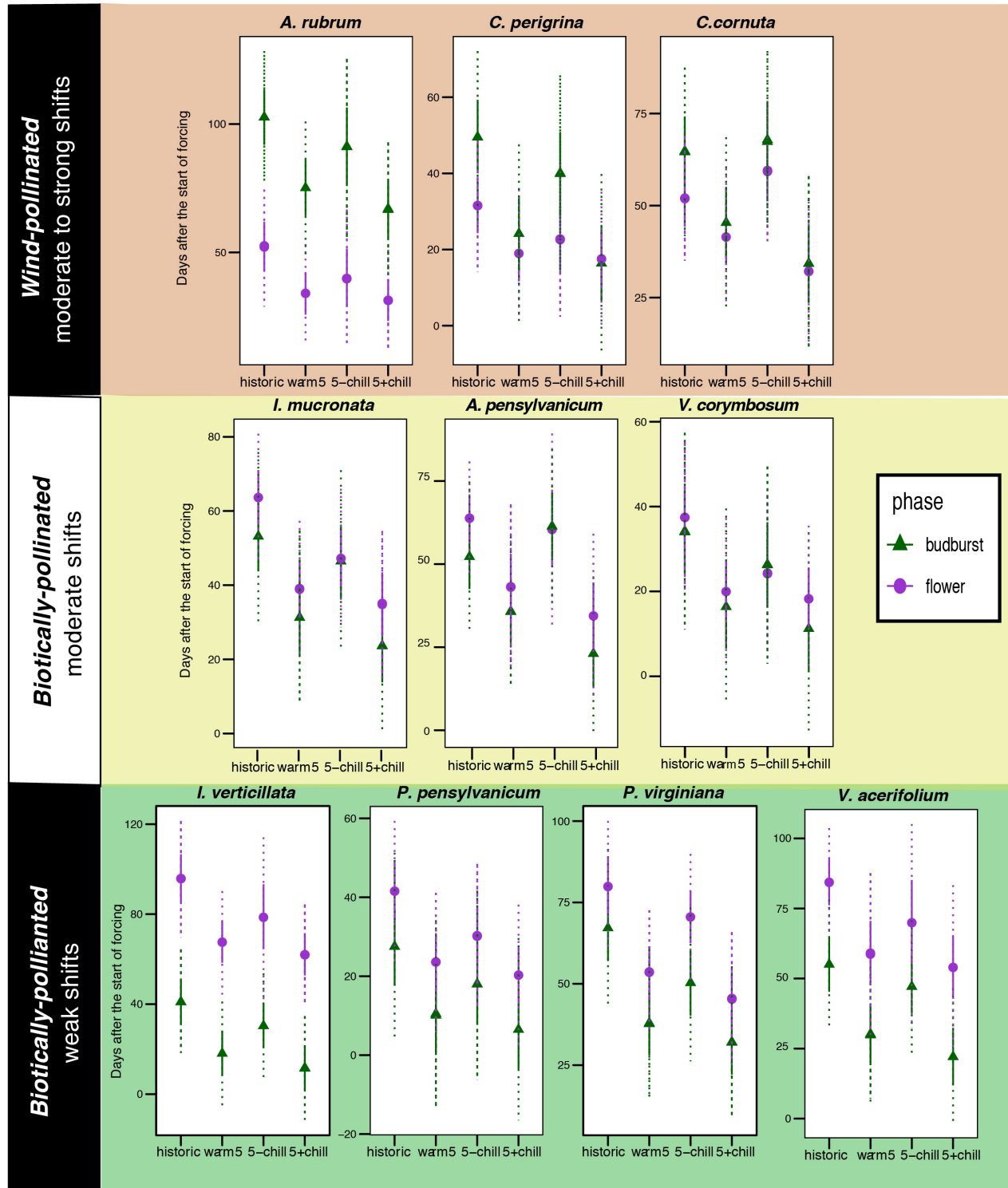


Figure S2:

Supplimentary Methods

Simulations

To better understand the patterns of phenological sensitivity generated by the precocity hierarchy hypothesis (PHH) and the differential sensitivity hypothesis (DSH) respectively, we mathematically simulated the underlying physiology of each hypothesis, and these simulations to generate flower and leaf phenology under two levels of chilling, forcing and photoperiod in a fully factorial simulation.

For the PHH we assigned flowering and leafing a critical heat sum threshold (F^*) above which the phenological event would take place. We did this using a growing degree model with a base temperature of 5°C (). For the PHH simulations, we assigned flowering an F^* of 200 GDDs and leafing an F^* of 400 GDDs. In this scenario we let increased both chilling and photoperiod reduce the F^* value for each phenophase by 100 and 20 respectively.

For the DSH we assigned flowering and leafing identical F^* values of 400. As in the previous scenario, we let increased chilling and photoperiod reduce the F^* values, but these cues reduced the F^* for leafing by 200 and 0 respectively and for flowering by 100 and 20.

We also included a third scenario that included both initial F^* differences of the PHH (flowering: 200 and leafing: 400) and the differential response to chilling and photoperiod of the DSH (flowering: -100 chilling, -20 photoperiod, leafing -200 chilling, 0 photoperiod).

References

- Barnes, B.V., Dick, C.W. & Gunn, M.E. (2016) *Michigan Shrubs Vines: A guide to species of the Great Lakes Region*. University of Michigan Press, Ann Arbor, MI, USA.
- Barnes, B.V. & Wagner, W.H.J. (1981,2004) *Michigan Trees: A guide to the Trees of the Great Lakes Region*. University of Michigan Press, Ann Arbor, MI, USA.

- ²⁷ O'Keefe, J. (2015) *Phenology of Woody Species at Harvard Forest since 1990*. Harvard Forest Data Archive:
²⁸ HF003., Petersham, MA, USA.