

1 Supplementary Material - Species differences in cue responses
 2 in woody plants of North America

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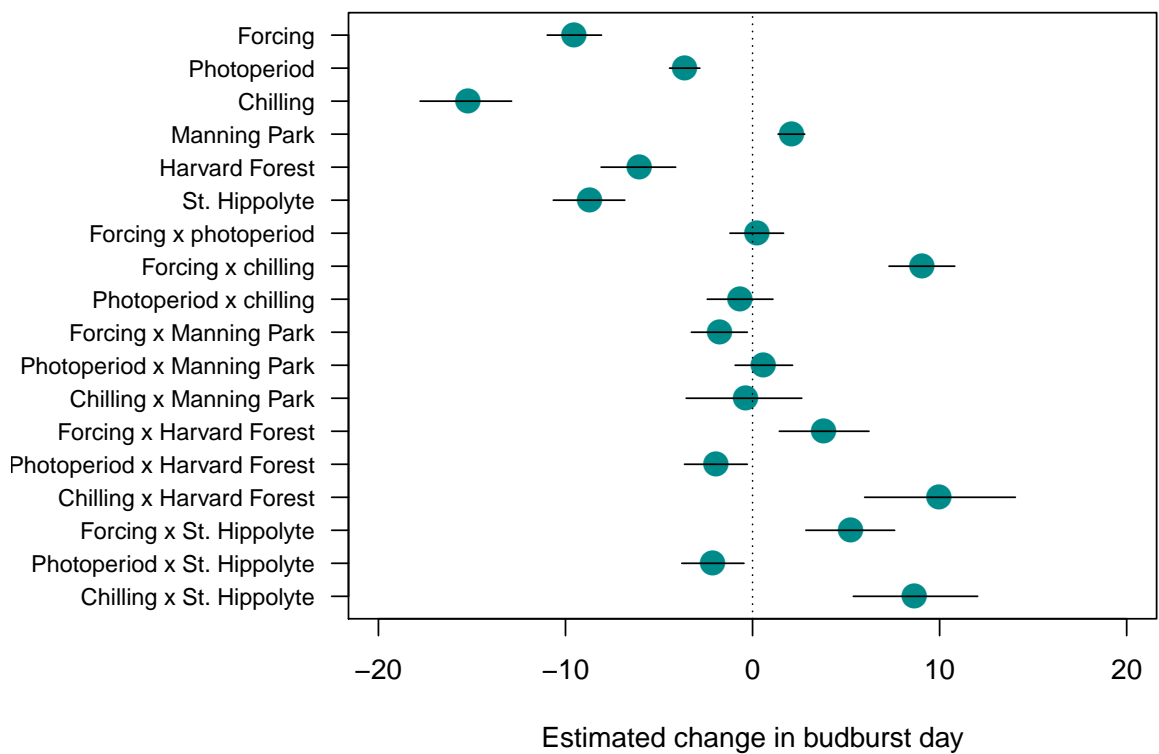
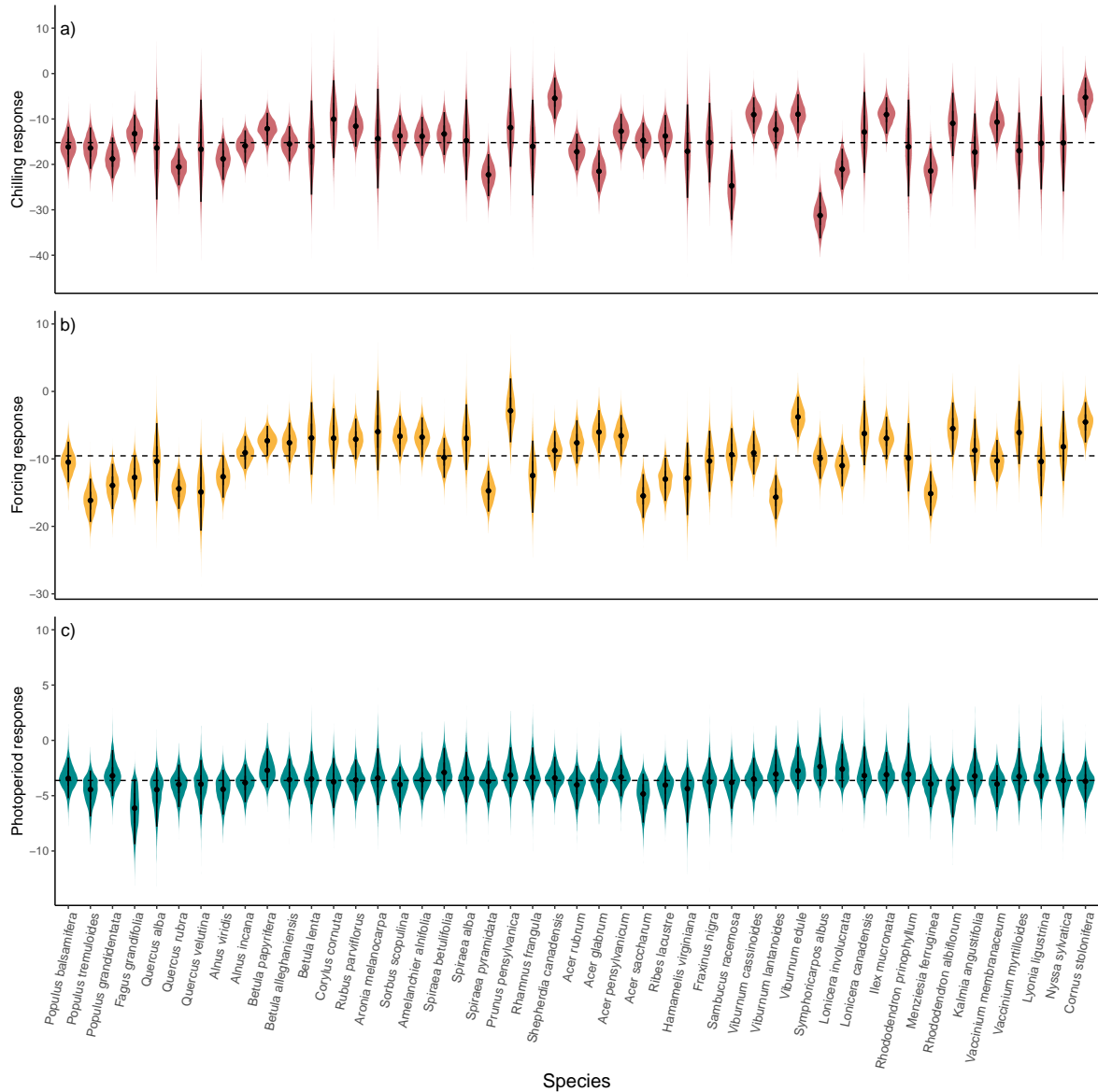


Figure S1: Estimated mean responses in budburst date of first bud to varying forcing, chilling, and photoperiod cues for 47 deciduous woody species across North America. Points represent mean posterior estimate, while bars depict the 95% uncertainty interval. Negative responses represent advances budburst, while positive values represent delaying effects.



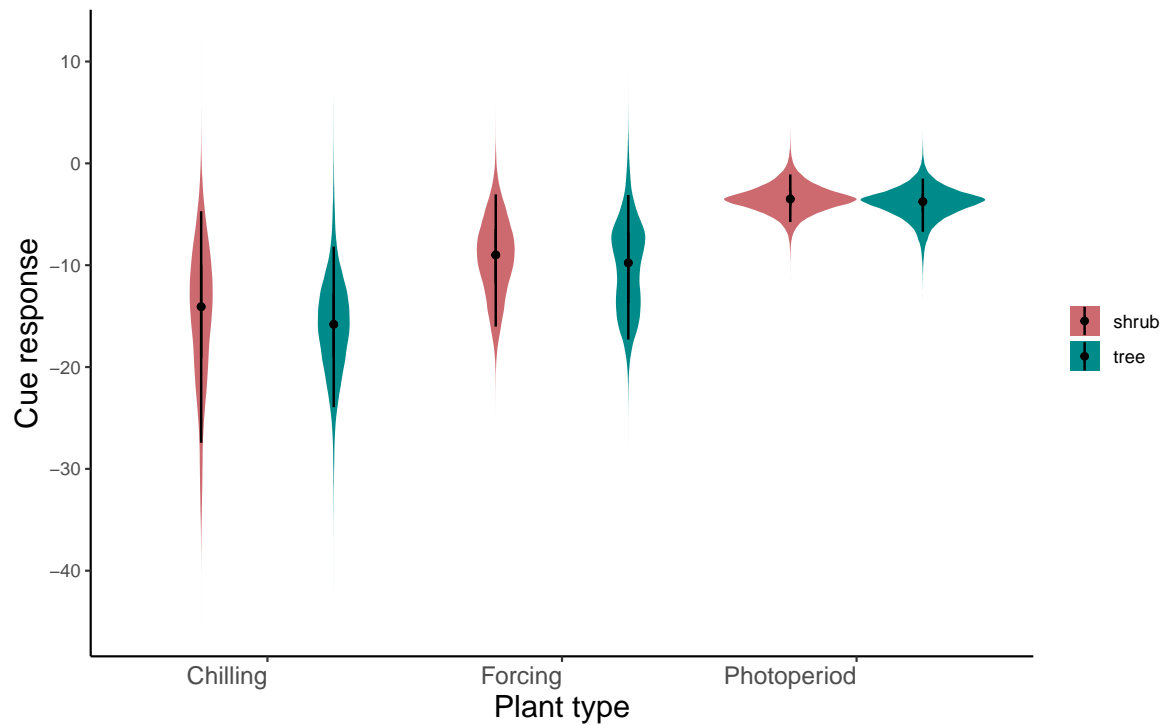


Figure S3: Comparisons of posterior distributions for cues estimates between shrub and tree species. Black circles represent the median cue response, while the thinner black line the 90% quantile interval. The coloured distribution is the the posterior density of the posteriors of the cue responses for all species within a given architectural type. The y-axis spans the entire range of the data.

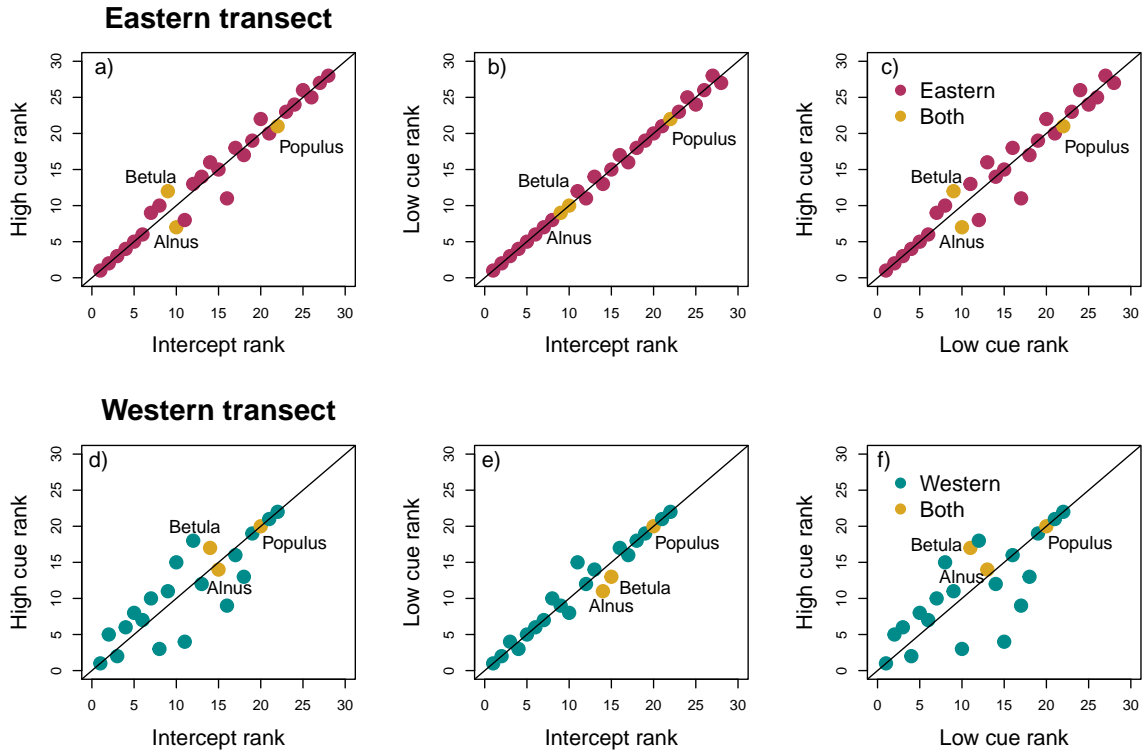


Figure S4: Estimated changes in species ranked budburst order, compared between species level effects (species intercept) and under high cue conditions (a and d), species level effects and under low cue condition (b and e), and ranked order under low and high cue conditions (c and f) for our eastern in red (a-c) and western species in blue (d-f). For the three species that occur in both transect, shown in yellow, *Alnus incana* exhibited the greatest rank change with a difference of three, while *Betula papyrifera* had a rank difference of two and *Populus tremuloides* a rank difference of one.



Figure S5: Species differences were accounted for by including phylogenetic effects on the species intercept. The phylogeny was obtained by pruning the existing tree for flowering plants developed by Smith and Brown (2018)

Table S1: Mean budburst dates across all treatments from raw data for 47 species at our two western sites, E.C. Manning Park (MP) and Smithers B.C.(SM) Canada, and our two eastern sites, Harvard Forest (HF) USA and St. Hippolyte (SH) Canada.

Species	Harvard Forest	St. Hippolyte	Manning Park	Smithers
<i>Acer glabrum</i>			36.00	39.00
<i>Acer pensylvanicum</i>	16.00	18.00		
<i>Acer rubrum</i>	22.00	25.00		
<i>Acer saccharum</i>	45.00	36.00		
<i>Alnus incana</i>			28.00	30.00
<i>Alnus incana</i>	33.00	25.00		
<i>Alnus viridis</i>			44.00	43.00
<i>Amelanchier alnifolia</i>			19.00	18.00
<i>Aronia melanocarpa</i>	14.00			
<i>Betula alleghaniensis</i>	20.00	21.00		
<i>Betula lenta</i>	30.00			
<i>Betula papyrifera</i>				31.00
<i>Betula papyrifera</i>	17.00	18.00		
<i>Corylus cornuta</i>	25.00	19.00		
<i>Cornus stolonifera</i>			15.00	17.00
<i>Fagus grandifolia</i>	42.00	43.00		
<i>Fraxinus nigra</i>	38.00	38.00		
<i>Hamamelis virginiana</i>	44.00			
<i>Ilex mucronata</i>	16.00	15.00		
<i>Kalmia angustifolia</i>	30.00	32.00		
<i>Lonicera canadensis</i>	17.00	16.00		
<i>Lonicera involucrata</i>			22.00	20.00
<i>Lyonia ligustrina</i>	31.00			
<i>Menziesia ferruginea</i>			43.00	46.00
<i>Nyssa sylvatica</i>	32.00			
<i>Populus balsamifera</i>			30.00	31.00
<i>Populus grandidentata</i>	33.00	31.00		
<i>Populus tremuloides</i>			46.00	35.00
<i>Prunus pensylvanica</i>	18.00	16.00		
<i>Quercus alba</i>	45.00			
<i>Quercus rubra</i>	36.00	34.00		
<i>Quercus velutina</i>	52.00			
<i>Rhamnus frangula</i>	32.00			
<i>Rhododendron albiflorum</i>			19.00	
<i>Rhododendron prinophyllum</i>	29.00			
<i>Ribes lacustre</i>			29.00	23.00
<i>Rubus parviflorus</i>			28.00	30.00
<i>Sambucus racemosa</i>			33.00	
<i>Shepherdia canadensis</i>			25.00	24.00
<i>Sorbus scopulina</i>			21.00	19.00
<i>Spiraea alba</i>	18.00	20.00		
<i>Spiraea betulifolia</i>			24.00	18.00
<i>Spiraea pyramidata</i>			26.00	22.00
<i>Symphoricarpos albus</i>			27.00	32.00
<i>Vaccinium membranaceum</i>			22.00	23.00
<i>Vaccinium myrtilloides</i>	13.00	17.00		
<i>Viburnum cassinoides</i>	15.00	18.00		
<i>Viburnum edule</i>			19.00	8.00
<i>Viburnum lantanoides</i>	31.00	28.00		

Table S2: Chill units from our two western sites, E.C. Manning Park (MP) and Smithers B.C.(SM) Canada, and our two eastern sites, Harvard Forest (HF) USA and St. Hippolyte(SH) Canada.

Population	Chilling.treatment	Chilling.Hours	Utah.Model	Chill.Portions
Harvard forest	Field chilling	892	814.50	56.62
Harvard forest	Field chilling + 30 d at 4 degree C	2140	2062.50	94.06
St. Hippolyte	Field chilling	682	599.50	44.63
St. Hippolyte	Field chilling + 30 d at 4 degree C	1930	1847.50	82.06
Smithers	Field chilling + 30 d at 4 degree C	1317	1368.00	54.95
Smithers	Field chilling + 70 d at 4 degree C	1965	2016.00	74.67
Manning Park	Field chilling + 30 d at 4 degree C	1213	1377.00	55.09
Manning Park	Field chilling + 70 d at 4 degree C	1861	2025.00	75.33

Table S3: Proportion of samples per species for which budburst was observed.

Species name	Proportion budburst	Plant type
<i>Acer glabrum</i>	0.83	tree
<i>Alnus incana</i>	1.00	shrub
<i>Alnus viridis</i>	0.92	shrub
<i>Amelanchier alnifolia</i>	0.99	shrub
<i>Betula papyrifera</i>	1.00	tree
<i>Cornus stolonifera</i>	0.99	shrub
<i>Lonicera involucrata</i>	0.87	shrub
<i>Menziesia ferruginea</i>	0.80	shrub
<i>Populus balsamifera</i>	0.98	tree
<i>Populus tremuloides</i>	0.90	tree
<i>Rhododendron albiflorum</i>	1.00	shrub
<i>Ribes lacustre</i>	0.82	shrub
<i>Rubus parviflorus</i>	0.94	shrub
<i>Sambucus racemosa</i>	0.95	shrub
<i>Shepherdia canadensis</i>	1.00	shrub
<i>Sorbus scopulina</i>	0.99	shrub
<i>Spiraea betulifolia</i>	0.94	shrub
<i>Spiraea pyramidata</i>	0.92	shrub
<i>Symphoricarpos albus</i>	0.84	shrub
<i>Vaccinium membranaceum</i>	0.90	shrub
<i>Viburnum edule</i>	1.00	shrub