Supplementary Material: Differences in traits predict phenological responses to daylength more than temperature

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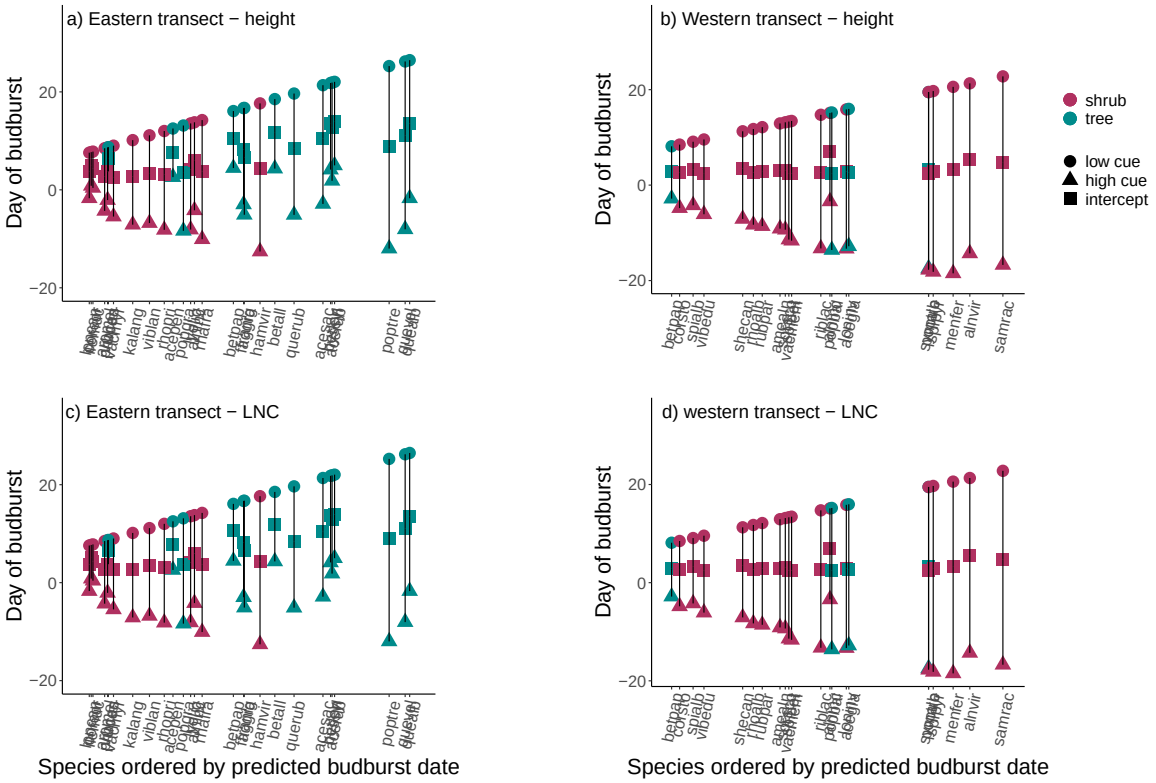

Figure S1: We found the estimated day of budburst differed between our full model (intercept plus cues, depicted as triangles for high cues and as circles for low cues), versus the intercepts only model (without cues, shown as squares). Species are ordered in increasing budburst dates for both the **a & c** eastern **b & d** and western populations, and in general span from early budbursting shrubs shown in red, to late budbursting trees shown in blue. **a & b** For traits such as height we found distinct partitioning of budburst across shrub and tree species, but this was not the case for all traits,**c & d** with the ranked order of species in our model of leaf nitrogen content exhibiting a highly mixed budburst order for our shrub and tree species.

Tables

Table S1: We obtained the temperature data we used to calculate field chilling from the nearest weather station to each site. Temperature data for the fall of 2019 and winter 2020 was obtained from the Hope Slide weather station for our E.C. Manning park samples and the Smithers airport weather station was used for our Smithers samples. For our eastern samples, weather data for the fall of 2014 and winter 2015 was obtained from weather stations at Harvard Forest and in St. Hippolyte respectively. Listed below are the total chill units that include both field and experimental chilling.

Site	Chilling treatment	Chill hours	Utah model	Chill portions
Harvard forest	Field chilling	892	814.50	56.62
Harvard forest	Field chilling + 30 d at 4°C	2140	2062.50	94.06
St. Hippoltye	Field chilling	682	599.50	44.63
St. Hippoltye	Field chilling + 30 d at 4°C	1930	1847.50	82.06
Smithers	Field chilling + 21 d at 4°C	1317	1368.00	54.95
Smithers	Field chilling + 56 d at 4°C	1965	2016.00	74.67
Manning park	Field chilling + 21 d at 4°C	1213	1377.00	55.09
Manning park	Field chilling + 56 d at 4°C	1861	2025.00	75.33

Table S2: Summary output from a joint Bayesian model of height and budburst phenology in which species are partially pooled. The effect of transect is modeled as a dummy variable and latitude as continuous, with an interaction term between latitude and transect. The model includes environmental cues as z-scored continuous variables, allowing comparisons to be made across cues.

	mean	5%	25%	75%	95%
Transect	7.58	-1.08	4.05	11.08	16.16
Latitude	0.05	-0.03	0.02	0.08	0.12
Transect x latitude	-0.20	-0.39	-0.28	-0.12	-0.01
Forcing	-10.31	-12.59	-11.09	-9.41	-8.35
Chilling	-13.44	-17.22	-14.81	-11.99	-9.89
Photoperiod	-2.54	-4.03	-3.20	-1.94	-0.81
Trait x forcing	0.28	-0.07	0.14	0.42	0.61
Trait x chilling	0.25	-0.46	-0.04	0.54	0.96
Trait x photoperiod	-0.34	-0.52	-0.41	-0.27	-0.16

Table S3: Summary output from a joint Bayesian model of DBH and budburst phenology in which species are partially pooled. The effect of transect is modeled as a dummy variable and latitude as continuous, with an interaction term between latitude and transect. The model includes environmental cues as z-scored continuous variables, allowing comparisons to be made across cues

	mean	5%	25%	75%	95%
Transect	-24.13	-42.56	-31.70	-16.66	-5.88
Latitude	0.16	0.00	0.09	0.22	0.31
Transect x latitude	0.52	0.11	0.35	0.68	0.92
Forcing	-9.14	-11.41	-10.07	-8.30	-6.53
Chilling	-12.52	-16.21	-14.03	-11.12	-8.55
Photoperiod	-3.79	-5.68	-4.46	-3.08	-2.01
Trait x forcing	0.20	-0.06	0.09	0.30	0.46
Trait x chilling	0.16	-0.34	-0.04	0.37	0.65
Trait x photoperiod	-0.20	-0.34	-0.26	-0.15	-0.07

Table S4: Summary output from a joint Bayesian model of wood specific density and budburst phenology in which species are partially pooled. The effect of transect is modeled as a dummy variable and latitude as continuous, with an interaction term between latitude and transect. For this model the trait data was rescaled by 10 and environmental cues were included as z-scored continuous variables, allowing comparisons to be made across cues.

	mean	5%	25%	75%	95%
Transect	7.24	4.42	6.04	8.42	10.01
Latitude	0.04	0.01	0.02	0.05	0.06
Transect x latitude	-0.15	-0.21	-0.17	-0.12	-0.09
Forcing	-14.91	-22.87	-17.59	-11.74	-8.63
Chilling	-20.94	-33.15	-25.21	-16.26	-9.75
Photoperiod	-0.61	-4.12	-2.14	0.82	3.30
Trait x forcing	1.73	-0.26	0.89	2.53	3.75
Trait x chilling	2.66	-0.94	1.32	4.04	6.11
Trait x photoperiod	-0.93	-1.99	-1.38	-0.51	0.19

Table S5: Summary output from a joint Bayesian model of LMA and budburst phenology in which species are partially pooled. The effect of transect is modeled as a dummy variable and latitude as continuous, with an interaction term between latitude and transect. For this model the trait data was rescaled by 100 and environmental cues were included as z-scored continuous variables, allowing comparisons to be made across cues.

	mean	5%	25%	75%	95%
Transect	-22.04	-26.60	-23.92	-20.18	-17.51
Latitude	-0.15	-0.20	-0.17	-0.14	-0.11
Transect x latitude	0.48	0.38	0.44	0.52	0.58
Forcing	-2.68	-19.52	-9.07	4.01	13.94
Chilling	-2.67	-30.26	-13.87	8.06	26.04
Photoperiod	-13.97	-23.12	-18.10	-10.12	-3.54
Trait x forcing	-0.59	-1.97	-1.15	-0.04	0.83
Trait x chilling	-0.87	-3.29	-1.80	0.09	1.43
Trait x photoperiod	0.89	0.01	0.57	1.24	1.65

Table S6: Summary output from a joint Bayesian model of LNC and budburst phenology in which species are partially pooled. The effect of transect is modeled as a dummy variable and latitude as continuous, with an interaction term between latitude and transect. The model includes environmental cues as z-scored continuous variables, allowing comparisons to be made across cues.

	mean	5%	25%	75%	95%
Transect	-4.71	-12.82	-8.03	-1.40	3.24
Latitude	-0.14	-0.21	-0.17	-0.11	-0.06
Transect x latitude	0.04	-0.13	-0.03	0.11	0.22
Forcing	-14.43	-32.60	-21.41	-7.56	3.76
Chilling	-35.11	-68.11	-47.92	-22.15	-4.07
Photoperiod	6.39	-2.39	2.55	9.84	16.53
Trait x forcing	0.45	-1.26	-0.19	1.13	2.04
Trait x chilling	2.07	-0.81	0.96	3.24	4.82
Trait x photoperiod	-0.91	-1.69	-1.22	-0.61	-0.11