Supplemental materials: False spring damage on temperate tree seedlings is amplified with winter warming

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Supplemental Materials and Methods: Data analysis and model equations

Using Bayesian hierarchicial models, we estimated the effects of chilling duration, false spring treatment and all two-way interactions as predictors with species modeled hierarchically as grouping factors. False spring treatment is written as 'tx' in the equation below and chilling was split into two binary predictors: 'chill1', which is denoted as '0' for 8 weeks of chilling or '1' for 6 weeks of chilling and 'chill2' which is '1' for 4 weeks of chilling:

$$\begin{aligned} y_i = {} & \alpha_{species[i]} + \beta_{tx_{species[i]}} X_{tx} + \beta_{chill1_{species[i]}} X_{chill1} + \beta_{chill2_{species[i]}} X_{chill2} \\ & + \beta_{txchill1_{species[i]}} X_{txchill1} + \beta_{txchill2_{species[i]}} X_{txchill2} + \epsilon_i \end{aligned} \quad (1)$$

,

$$\epsilon_i \sim N(0, \sigma_y)$$

The α and each of the five β coefficients are modeled at the species level, as follows:

$$\begin{aligned} \alpha_{species} &\sim N(\mu_\alpha, \sigma_\alpha) \\ \beta_{tx_{species}} &\sim N(\mu_{tx}, \sigma_{tx}) \\ \beta_{chill1_{species}} &\sim N(\mu_{chill1}, \sigma_{chill1}) \\ \beta_{chill2_{species}} &\sim N(\mu_{chill2}, \sigma_{chill2}) \\ \beta_{txchill1_{species}} &\sim N(\mu_{txchill1}, \sigma_{txchill1}) \\ \beta_{txchill2_{species}} &\sim N(\mu_{txchill2}, \sigma_{txchill2}) \end{aligned}$$

where i represents each unique observation, *species* is the species, α represents the intercept, β terms represent slope estimates, and y is the phenology or growth measurement.

For the shoot apical meristem model, we used a Bernouilli distribution, which is modeled as:

$$
\begin{aligned}
y_i &\sim Binomial(1, p) \\
logit(p) &= \alpha_{species[i]} + \beta_{tx_{species[i]}} X_{tx} + \beta_{chill1_{species[i]}} X_{chill1} + \beta_{chill2_{species[i]}} X_{chill2} \\
&\quad + \beta_{txchill1_{species[i]}} X_{txchill1} + \beta_{txchill2_{species[i]}} X_{txchill2} + \epsilon_i \\
&,
\end{aligned}
\tag{2}
$$

The α and each of the five β coefficients are modeled the same as the other models:

$$
\begin{aligned}
\alpha_{species} &\sim N(\mu_\alpha, \sigma_\alpha) \\
\beta_{tx_{species}} &\sim N(\mu_{tx}, \sigma_{tx}) \\
\beta_{chill1_{species}} &\sim N(\mu_{chill1}, \sigma_{chill1}) \\
\beta_{chill2_{species}} &\sim N(\mu_{chill2}, \sigma_{chill2}) \\
\beta_{txchill1_{species}} &\sim N(\mu_{txchill1}, \sigma_{txchill1}) \\
\beta_{txchill2_{species}} &\sim N(\mu_{txchill2}, \sigma_{txchill2})
\end{aligned}
$$

Model estimates for the shoot apical meristem model were modeled on the logit scale (shown in all tables) and were converted to probability percentages in all figures for easier interpretation by following the 'divide by four' rule (Gelman & Hill, 2006).

References

Gelman A , Hill J. 2006. *Data analysis using regression and multilevel/hierarchical models.* Cambridge university press.

Supplemental tables and figures

Table S1: Summary of simple linear regression model of day of budburst across chilling treatments.

term	mean	std.err
Intercept	20.95	1.27
Chilling 6 Wks	4.84	1.78
Chilling 4 Wks	7.63	1.76

Table S2: Summary of simple linear regression model of duration of vegetative across chilling treatments.

term	mean	std.err
Intercept	15.63	0.56
Chilling 6 Wks	0.65	0.79
Chilling 4 Wks	2.72	0.78

Table S3: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on duration of vegetative risk (days between budburst to leafout).

	mean	2%	10%	25%	75%	90%	98%
Intercept	13.37	10.74	11.67	12.69	14.02	15.09	16.13
Tx	3.62	1.60	2.31	3.09	4.16	4.92	5.55
Chill 6 Wks	2.14	0.06	0.77	1.59	2.68	3.54	4.36
Chill 4 Wks	2.72	-1.04	0.21	1.78	3.63	5.23	6.76
Tx:Chill 6 Wks	-1.52	-4.14	-3.33	-2.25	-0.80	0.32	1.19
Tx:Chill 4 Wks	-0.65	-3.46	-2.48	-1.39	0.11	1.22	2.12
Intercept	16.44	13.59	14.54	15.69	17.17	18.38	19.55
Acer saccharinum,Intercept	-2.14	-5.53	-4.22	-2.88	-1.31	-0.30	0.47
Alnus incana rugosa,Intercept	2.80	-0.10	0.83	1.96	3.63	4.97	6.02
Betula papyrifera,Intercept	1.43	-1.62	-0.47	0.65	2.19	3.46	4.56
Betula populifolia,Intercept	-0.89	-3.95	-2.90	-1.62	-0.10	0.97	1.83
Cornus racemosa,Intercept	0.96	-1.82	-0.82	0.22	1.67	2.90	3.89
Salix purpurea,Intercept	-1.14	-4.46	-3.22	-1.89	-0.33	0.78	1.66
Sorbus americana,Intercept	-2.02	-5.28	-4.17	-2.75	-1.20	-0.16	0.58
Viburnum dendatum,Intercept	0.62	-2.28	-1.31	-0.12	1.37	2.57	3.53
Acer saccharinum,Tx	-0.46	-3.13	-2.01	-0.86	0.03	0.63	1.31
Alnus incana rugosa,Tx	0.52	-1.40	-0.66	-0.03	0.98	2.15	3.25
Betula papyrifera,Tx	0.56	-1.01	-0.45	0.00	0.99	2.18	3.20
Betula populifolia,Tx	-0.53	-3.29	-2.18	-0.90	0.00	0.48	1.07
Cornus racemosa,Tx	0.22	-1.48	-0.83	-0.14	0.54	1.54	2.56
Salix purpurea,Tx	-0.03	-2.38	-1.38	-0.41	0.35	1.30	2.16
Sorbus americana,Tx	-0.48	-3.10	-2.09	-0.89	0.03	0.59	1.23
Viburnum dendatum,Tx	0.15	-1.77	-1.05	-0.23	0.51	1.53	2.46
Acer saccharinum,Chill 6 Wks	-0.62	-3.79	-2.54	-1.14	0.02	0.63	1.43
Alnus incana rugosa,Chill 6 Wks	0.50	-1.84	-0.90	-0.08	1.00	2.44	3.50
Betula papyrifera,Chill 6 Wks	0.65	-1.20	-0.57	-0.00	1.15	2.55	3.87
Betula populifolia,Chill 6 Wks	0.15	-2.13	-1.20	-0.29	0.55	1.79	2.95
Cornus racemosa,Chill 6 Wks	0.02	-2.41	-1.43	-0.38	0.44	1.47	2.43
Salix purpurea,Chill 6 Wks	0.38	-1.96	-1.11	-0.16	0.90	2.24	3.36
Sorbus americana,Chill 6 Wks	-0.85	-4.29	-2.99	-1.44	-0.05	0.47	1.07
Viburnum dendatum,Chill 6 Wks	-0.32	-3.26	-2.03	-0.76	0.19	1.05	1.94
Acer saccharinum,Chill 4 Wks	-1.07	-5.96	-4.08	-2.15	0.08	1.81	3.19
Alnus incana rugosa,Chill 4 Wks	1.75	-2.66	-1.14	0.59	2.88	4.88	6.45
Betula papyrifera,Chill 4 Wks	-0.73	-5.31	-3.75	-1.82	0.38	2.13	3.58
Betula populifolia,Chill 4 Wks	1.43	-3.13	-1.43	0.26	2.56	4.43	6.14
Cornus racemosa,Chill 4 Wks	-0.44	-5.17	-3.39	-1.51	0.66	2.41	3.82
Salix purpurea,Chill 4 Wks	-5.08	-10.17	-8.34	-6.28	-3.78	-2.23	-1.03
Sorbus americana,Chill 4 Wks	0.89	-3.66	-2.09	-0.27	2.05	3.87	5.43
Viburnum dendatum,Chill 4 Wks	3.11	-1.18	0.29	1.91	4.26	6.17	7.74
Acer saccharinum,Tx:Chill 6 Wks	-0.71	-4.47	-3.06	-1.31	0.03	0.83	1.77
Alnus incana rugosa,Tx:Chill 6 Wks	0.52	-2.14	-1.13	-0.12	1.09	2.72	4.14
Betula papyrifera,Tx:Chill 6 Wks	0.42	-2.37	-1.18	-0.13	0.94	2.38	3.86
Betula populifolia,Tx:Chill 6 Wks	-0.36	-3.76	-2.35	-0.85	0.18	1.17	2.32
Cornus racemosa,Tx:Chill 6 Wks	0.08	-2.89	-1.60	-0.35	0.53	1.79	2.88
Salix purpurea,Tx:Chill 6 Wks	0.77	-1.65	-0.79	-0.02	1.40	3.14	4.55
Sorbus americana,Tx:Chill 6 Wks	-0.56	-4.13	-2.75	-1.10	0.09	0.98	2.00
Viburnum dendatum,Tx:Chill 6 Wks	-0.41	-3.91	-2.51	-0.92	0.18	1.16	2.20
Acer saccharinum,Tx:Chill 4 Wks	-0.03	-3.32	-1.95	-0.53	0.46	1.88	3.22

Table S3: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on duration of vegetative risk (days between budburst to leafout).

	mean	2%	10%	25%	75%	90%	98%
Alnus incana rugosa,Tx:Chill 4 Wks	-0.11	-3.80	-2.21	-0.60	0.46	1.75	2.99
Betula papyrifera,Tx:Chill 4 Wks	0.25	-2.56	-1.41	-0.29	0.71	2.37	3.78
Betula populifolia,Tx:Chill 4 Wks	-0.44	-4.26	-2.68	-0.91	0.16	1.16	2.18
Cornus racemosa,Tx:Chill 4 Wks	-0.57	-4.79	-2.90	-1.06	0.08	0.93	1.87
Salix purpurea,Tx:Chill 4 Wks	-0.10	-3.70	-2.18	-0.66	0.46	1.90	3.30
Sorbus americana,Tx:Chill 4 Wks	0.33	-2.44	-1.36	-0.25	0.85	2.58	4.08

Table S4: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on growing season length.

	mean	2%	10%	25%	75%	90%	98%
Intercept	258.78	223.40	236.81	251.16	267.25	278.06	287.72
Tx	-9.91	-23.20	-19.27	-13.56	-6.11	-0.96	3.09
Chill 6 Wks	13.71	1.71	5.64	10.36	17.01	21.91	25.60
Chill 4 Wks	13.33	1.19	5.29	10.01	16.57	21.78	25.62
Tx:Chill 6 Wks	-1.81	-18.04	-12.82	-6.32	2.64	9.34	14.64
Tx:Chill 4 Wks	10.05	-6.19	-1.16	5.53	14.61	21.14	25.79
Intercept	264.27	227.15	241.91	256.81	272.76	284.09	294.17
Acer saccharinum,Intercept	19.02	-10.10	-1.12	10.24	26.81	42.18	55.76
Alnus incana rugosa,Intercept	39.43	9.57	18.63	30.49	47.20	63.31	77.66
Betula papyrifera,Intercept	0.45	-29.43	-19.52	-8.27	8.28	22.64	35.64
Betula populifolia,Intercept	15.01	-13.93	-5.30	6.24	22.78	38.20	52.32
Cornus racemosa,Intercept	-44.11	-74.72	-65.15	-52.70	-35.90	-21.98	-8.50
Salix purpurea,Intercept	35.31	6.52	15.20	26.58	42.91	58.52	72.16
Sorbus americana,Intercept	-39.22	-70.47	-59.78	-47.92	-31.08	-16.46	-2.96
Viburnum dendatum,Intercept	25.82	-3.10	5.53	16.86	33.71	48.87	62.73
Acer saccharinum,Tx	0.71	-14.16	-8.81	-2.44	3.76	10.52	17.00
Alnus incana rugosa,Tx	5.52	-8.37	-3.89	0.85	9.46	17.70	23.85
Betula papyrifera,Tx	2.45	-10.95	-6.06	-0.96	5.54	12.90	19.94
Betula populifolia,Tx	3.64	-9.19	-4.50	-0.05	6.85	14.35	20.29
Cornus racemosa,Tx	-6.00	-23.76	-17.54	-9.93	-1.36	3.06	7.65
Salix purpurea,Tx	3.78	-10.69	-5.34	-0.08	7.34	14.90	21.40
Sorbus americana,Tx	-9.45	-29.33	-23.05	-14.12	-3.75	0.37	3.02
Viburnum dendatum,Tx	4.95	-7.70	-3.48	0.52	8.50	16.50	21.96
Acer saccharinum,Chill 6 Wks	-0.26	-12.13	-6.98	-1.93	1.41	6.48	11.30
Alnus incana rugosa,Chill 6 Wks	-2.34	-17.98	-11.83	-4.44	0.29	3.56	7.67
Betula papyrifera,Chill 6 Wks	-0.11	-11.31	-6.88	-1.78	1.55	6.46	11.42
Betula populifolia,Chill 6 Wks	-0.17	-12.31	-6.78	-1.82	1.44	6.23	11.47
Cornus racemosa,Chill 6 Wks	2.95	-6.47	-3.03	-0.12	5.26	12.73	19.51
Salix purpurea,Chill 6 Wks	-1.45	-15.83	-9.76	-3.27	0.68	4.74	8.69
Sorbus americana,Chill 6 Wks	1.58	-9.31	-4.86	-0.73	3.60	9.97	15.96
Viburnum dendatum,Chill 6 Wks	-1.35	-15.15	-9.09	-3.04	0.64	4.55	8.89
Acer saccharinum,Chill 4 Wks	-2.02	-19.28	-11.66	-4.17	0.74	4.75	9.01
Alnus incana rugosa,Chill 4 Wks	3.12	-8.40	-3.93	-0.23	5.75	14.22	21.16
Betula papyrifera,Chill 4 Wks	-0.18	-13.49	-7.83	-2.22	1.94	7.24	12.25
Betula populifolia,Chill 4 Wks	0.77	-11.70	-6.65	-1.37	2.86	8.86	14.31
Cornus racemosa,Chill 4 Wks	-2.11	-17.92	-11.67	-4.80	0.72	5.53	10.65
Salix purpurea,Chill 4 Wks	3.38	-7.32	-3.64	-0.09	6.23	13.88	20.56
Sorbus americana,Chill 4 Wks	-3.20	-20.13	-13.75	-6.09	0.16	3.93	8.31
Viburnum dendatum,Chill 4 Wks	2.60	-7.65	-4.10	-0.36	4.98	12.55	18.58
Acer saccharinum,Tx:Chill 6 Wks	-2.68	-23.50	-14.71	-4.81	0.45	4.33	8.62
Alnus incana rugosa,Tx:Chill 6 Wks	-0.05	-16.51	-9.52	-2.34	2.27	9.22	16.02
Betula papyrifera,Tx:Chill 6 Wks	-0.62	-16.50	-9.29	-2.56	1.50	6.93	13.70
Betula populifolia,Tx:Chill 6 Wks	0.79	-13.04	-6.91	-1.36	2.70	9.99	17.58
Cornus racemosa,Tx:Chill 6 Wks	1.25	-12.89	-7.10	-1.37	3.63	11.58	19.25
Salix purpurea,Tx:Chill 6 Wks	-0.32	-16.52	-9.64	-2.48	1.90	8.49	14.86
Sorbus americana,Tx:Chill 6 Wks	0.92	-14.13	-7.85	-1.61	3.14	11.40	19.34
Viburnum dendatum,Tx:Chill 6 Wks	0.15	-14.69	-8.04	-1.93	2.22	8.63	15.25
Acer saccharinum,Tx:Chill 4 Wks	0.81	-13.03	-6.91	-1.59	2.71	10.14	18.33

Table S4: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on growing season length.

	mean	2%	10%	25%	75%	90%	98%
Alnus incana rugosa,Tx:Chill 4 Wks	-0.42	-18.98	-10.44	-2.57	2.10	8.58	14.53
Betula papyrifera,Tx:Chill 4 Wks	-0.77	-16.83	-10.08	-2.65	1.44	6.85	12.81
Betula populifolia,Tx:Chill 4 Wks	0.85	-13.04	-7.14	-1.29	2.81	9.81	17.28
Cornus racemosa,Tx:Chill 4 Wks	-1.58	-20.40	-12.32	-3.89	1.08	6.74	13.06
Salix purpurea,Tx:Chill 4 Wks	0.54	-15.56	-8.53	-1.80	2.75	10.34	18.01
Sorbus americana,Tx:Chill 4 Wks	0.03	-16.40	-8.87	-2.47	2.22	9.84	17.63

Table S5: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on shoot apical meristem damage.

	mean	2%	10%	25%	75%	90%	98%
Intercept	-1.68	-4.65	-3.49	-2.25	-1.03	-0.13	0.68
Tx	2.07	-0.42	0.61	1.51	2.60	3.58	4.61
Chill 6 Wks	-0.53	-5.64	-3.63	-1.53	0.51	2.33	4.17
Chill 4 Wks	-0.18	-3.35	-2.07	-0.82	0.51	1.61	2.75
Tx:Chill 6 Wks	-0.21	-4.25	-2.41	-0.98	0.60	1.92	3.34
Tx:Chill 4 Wks	0.28	-2.60	-1.60	-0.51	0.99	2.40	3.99
Acer saccharinum,Intercept	-0.45	-3.53	-2.38	-1.18	0.27	1.44	2.54
Alnus incana rugosa,Intercept	0.44	-2.16	-1.28	-0.27	1.09	2.36	3.64
Betula papyrifera,Intercept	0.32	-2.31	-1.43	-0.37	0.96	2.23	3.43
Betula populifolia,Intercept	-2.15	-6.79	-4.94	-3.02	-1.08	0.04	1.05
Cornus racemosa,Intercept	0.94	-1.78	-0.86	0.15	1.62	2.98	4.28
Salix purpurea,Intercept	1.56	-0.95	-0.14	0.79	2.25	3.57	4.83
Sorbus americana,Intercept	-2.48	-8.23	-5.93	-3.42	-1.19	-0.05	0.81
Viburnum dendatum,Intercept	1.84	-0.89	-0.00	1.03	2.58	3.90	5.11
Acer saccharinum,Tx	-0.08	-2.98	-1.75	-0.54	0.40	1.52	2.86
Alnus incana rugosa,Tx	0.42	-2.10	-0.97	-0.09	0.87	2.27	3.77
Betula papyrifera,Tx	-0.21	-3.24	-1.89	-0.62	0.24	1.21	2.54
Betula populifolia,Tx	-1.23	-7.03	-4.50	-1.95	-0.05	0.53	1.26
Cornus racemosa,Tx	0.83	-1.70	-0.73	-0.01	1.35	3.52	6.42
Salix purpurea,Tx	-0.41	-3.57	-2.15	-0.86	0.09	0.93	2.06
Sorbus americana,Tx	-0.62	-5.42	-3.30	-1.24	0.12	1.30	2.71
Viburnum dendatum,Tx	1.43	-1.26	-0.56	0.07	2.12	5.51	9.44
Acer saccharinum,Chill 6 Wks	-3.92	-16.21	-10.63	-5.39	-1.57	0.23	1.52
Alnus incana rugosa,Chill 6 Wks	-0.17	-5.50	-3.35	-1.29	0.95	3.00	5.13
Betula papyrifera,Chill 6 Wks	-1.96	-8.74	-5.81	-3.14	-0.57	1.27	3.23
Betula populifolia,Chill 6 Wks	2.17	-3.16	-1.27	0.68	3.48	6.17	8.67
Cornus racemosa,Chill 6 Wks	0.86	-4.19	-2.22	-0.36	1.99	4.30	6.56
Salix purpurea,Chill 6 Wks	-0.46	-5.74	-3.59	-1.55	0.63	2.69	4.98
Sorbus americana,Chill 6 Wks	-2.90	-17.31	-10.27	-4.52	-0.34	1.95	3.78
Viburnum dendatum,Chill 6 Wks	5.87	-0.04	0.97	2.95	7.48	14.25	21.82
Acer saccharinum,Chill 4 Wks	-1.58	-7.47	-4.63	-2.37	-0.42	0.53	1.60
Alnus incana rugosa,Chill 4 Wks	-1.42	-6.46	-4.32	-2.22	-0.33	0.56	1.59
Betula papyrifera,Chill 4 Wks	-0.43	-4.14	-2.58	-1.12	0.28	1.57	2.83
Betula populifolia,Chill 4 Wks	0.56	-3.60	-2.12	-0.43	1.46	3.66	5.55
Cornus racemosa,Chill 4 Wks	-0.09	-3.92	-2.40	-0.79	0.67	2.07	3.20
Salix purpurea,Chill 4 Wks	0.06	-3.17	-1.99	-0.63	0.74	2.18	3.48
Sorbus americana,Chill 4 Wks	-0.37	-6.14	-3.60	-1.34	0.68	2.62	4.40
Viburnum dendatum,Chill 4 Wks	3.26	-0.28	0.20	1.59	4.35	7.91	11.92
Acer saccharinum,Tx:Chill 6 Wks	-0.65	-8.36	-4.47	-1.24	0.23	1.96	4.00
Alnus incana rugosa,Tx:Chill 6 Wks	0.12	-3.75	-2.05	-0.45	0.66	2.39	4.50
Betula papyrifera,Tx:Chill 6 Wks	0.18	-4.05	-2.06	-0.47	0.69	2.91	5.48
Betula populifolia,Tx:Chill 6 Wks	1.30	-2.09	-0.92	0.00	2.10	5.41	8.54
Cornus racemosa,Tx:Chill 6 Wks	-1.06	-7.96	-4.78	-1.80	0.03	0.94	2.28
Salix purpurea,Tx:Chill 6 Wks	0.22	-3.42	-1.74	-0.38	0.73	2.70	4.64
Sorbus americana,Tx:Chill 6 Wks	-0.37	-9.27	-4.39	-0.99	0.57	2.71	5.35
Viburnum dendatum,Tx:Chill 6 Wks	0.11	-7.38	-3.87	-0.87	0.87	4.60	9.62
Acer saccharinum,Tx:Chill 4 Wks	0.35	-3.25	-1.77	-0.32	0.82	3.00	5.96
Alnus incana rugosa,Tx:Chill 4 Wks	-0.09	-4.24	-2.25	-0.63	0.41	1.96	4.23

Table S5: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on shoot apical meristem damage.

	mean	2%	10%	25%	75%	90%	98%
Betula papyrifera,Tx:Chill 4 Wks	0.07	-3.48	-1.82	-0.40	0.55	1.97	3.60
Betula populifolia,Tx:Chill 4 Wks	-1.34	-10.73	-5.87	-1.96	0.02	0.92	2.05
Cornus racemosa,Tx:Chill 4 Wks	0.81	-2.28	-1.16	-0.10	1.32	4.28	7.73
Salix purpurea,Tx:Chill 4 Wks	-0.38	-4.53	-2.76	-0.87	0.21	1.33	2.53
Sorbus americana,Tx:Chill 4 Wks	0.73	-3.06	-1.55	-0.19	1.28	4.38	7.63
Viburnum dendatum,Tx:Chill 4 Wks	-0.06	-6.79	-3.54	-0.95	0.61	3.57	8.46

Table S6: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on total season growth.

	mean	2%	10%	25%	75%	90%	98%
Intercept	22.29	-1.65	5.53	15.37	29.23	39.00	45.84
Tx	-5.66	-16.87	-13.01	-8.61	-2.74	1.78	5.46
Chill 6 Wks	-8.15	-18.85	-15.17	-10.85	-5.33	-1.36	1.91
Chill 4 Wks	-11.63	-23.62	-19.31	-14.37	-8.70	-4.46	-0.68
Tx:Chill 6 Wks	3.15	-14.58	-8.23	-1.16	7.50	14.61	21.54
Tx:Chill 4 Wks	10.93	-6.78	-0.11	6.69	15.23	21.90	27.49
Intercept	15.22	-7.32	-0.82	8.69	21.64	31.17	37.50
Acer saccharinum,Intercept	44.26	20.05	26.71	37.24	51.33	61.78	70.07
Alnus incana rugosa,Intercept	56.70	31.83	38.97	49.50	63.79	74.53	81.81
Betula papyrifera,Intercept	26.16	1.50	8.88	18.94	33.28	43.84	51.34
Betula populifolia,Intercept	58.32	34.35	41.00	51.30	65.21	75.66	83.06
Cornus racemosa,Intercept	7.07	-17.95	-10.46	-0.05	14.13	24.41	31.86
Salix purpurea,Intercept	118.56	93.27	100.70	111.12	125.96	136.36	145.18
Sorbus americana,Intercept	-15.25	-39.36	-32.62	-22.33	-8.24	2.02	9.74
Viburnum dendatum,Intercept	41.12	17.44	24.02	33.88	48.21	58.31	66.16
Acer saccharinum,Tx	-2.91	-18.26	-12.25	-5.33	0.06	3.37	7.27
Alnus incana rugosa,Tx	2.89	-8.19	-4.07	-0.28	5.49	13.29	19.51
Betula papyrifera,Tx	-0.07	-12.84	-7.68	-2.18	2.05	7.55	12.33
Betula populifolia,Tx	-0.54	-13.89	-8.37	-2.62	1.50	6.57	11.70
Cornus racemosa,Tx	0.50	-11.88	-6.74	-1.62	2.53	8.44	14.30
Salix purpurea,Tx	-5.24	-24.38	-17.78	-8.86	-0.41	2.34	5.99
Sorbus americana,Tx	0.85	-10.21	-5.72	-1.10	2.71	8.50	13.63
Viburnum dendatum,Tx	-0.00	-12.24	-7.65	-2.08	2.04	7.67	12.62
Acer saccharinum,Chill 6 Wks	0.88	-9.83	-5.05	-1.02	2.56	8.43	13.61
Alnus incana rugosa,Chill 6 Wks	-2.22	-18.95	-11.68	-4.31	0.41	3.90	8.19
Betula papyrifera,Chill 6 Wks	-1.51	-15.00	-9.31	-3.12	0.58	3.93	7.70
Betula populifolia,Chill 6 Wks	0.68	-9.69	-5.35	-1.12	2.31	7.86	13.73
Cornus racemosa,Chill 6 Wks	2.09	-7.05	-3.38	-0.31	3.86	10.72	17.05
Salix purpurea,Chill 6 Wks	1.31	-11.06	-5.91	-1.13	3.37	10.83	17.81
Sorbus americana,Chill 6 Wks	0.40	-9.52	-5.16	-1.23	1.92	6.80	12.16
Viburnum dendatum,Chill 6 Wks	-0.63	-12.85	-7.73	-2.34	1.22	5.41	10.01
Acer saccharinum,Chill 4 Wks	0.19	-12.34	-6.83	-1.77	2.05	7.61	14.25
Alnus incana rugosa,Chill 4 Wks	3.05	-7.76	-3.66	-0.20	5.67	13.58	20.65
Betula papyrifera,Chill 4 Wks	-0.54	-14.72	-8.35	-2.27	1.41	6.06	11.44
Betula populifolia,Chill 4 Wks	-0.43	-14.91	-7.89	-2.29	1.62	6.58	11.60
Cornus racemosa,Chill 4 Wks	-0.52	-13.41	-8.15	-2.49	1.41	6.55	12.35
Salix purpurea,Chill 4 Wks	4.10	-7.11	-3.28	-0.03	7.02	16.96	26.00
Sorbus americana,Chill 4 Wks	1.00	-8.73	-5.25	-1.08	2.57	8.98	15.40
Viburnum dendatum,Chill 4 Wks	-0.37	-13.90	-8.10	-2.18	1.66	6.54	11.06
Acer saccharinum,Tx:Chill 6 Wks	-2.71	-24.99	-16.26	-6.42	1.27	8.01	16.18
Alnus incana rugosa,Tx:Chill 6 Wks	-4.87	-28.84	-20.05	-9.40	0.21	6.38	12.66
Betula papyrifera,Tx:Chill 6 Wks	-7.65	-34.05	-24.15	-12.48	-1.07	2.77	7.59
Betula populifolia,Tx:Chill 6 Wks	1.64	-16.81	-9.88	-2.16	5.29	14.48	22.16
Cornus racemosa,Tx:Chill 6 Wks	7.18	-8.58	-3.25	0.93	11.98	23.36	32.60
Salix purpurea,Tx:Chill 6 Wks	0.68	-21.78	-13.91	-3.89	5.10	15.63	25.28
Sorbus americana,Tx:Chill 6 Wks	1.24	-16.64	-9.70	-2.24	4.80	12.97	22.10
Viburnum dendatum,Tx:Chill 6 Wks	3.14	-13.72	-7.31	-1.09	6.91	16.53	25.85
Acer saccharinum,Tx:Chill 4 Wks	-2.03	-22.27	-14.34	-5.33	1.48	8.17	14.49

Table S6: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on total season growth.

	mean	2%	10%	25%	75%	90%	98%
Alnus incana rugosa,Tx:Chill 4 Wks	6.92	-8.41	-3.43	0.49	11.68	23.62	34.41
Betula papyrifera,Tx:Chill 4 Wks	1.47	-15.43	-9.10	-1.82	4.61	13.25	21.76
Betula populifolia,Tx:Chill 4 Wks	-0.33	-19.27	-11.56	-3.64	2.90	10.70	18.32
Cornus racemosa,Tx:Chill 4 Wks	-4.43	-26.99	-18.10	-8.03	0.05	5.06	10.32
Salix purpurea,Tx:Chill 4 Wks	-3.25	-29.25	-19.37	-7.42	1.35	9.31	16.77
Sorbus americana,Tx:Chill 4 Wks	-0.72	-20.38	-11.71	-3.56	2.24	9.48	16.61

Table S7: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on total biomass.

	mean	2%	10%	25%	75%	90%	98%
Intercept	51.72	30.01	37.24	46.32	57.49	65.03	70.28
Tx	0.57	-5.79	-3.81	-1.20	2.39	4.96	6.94
Chill 6 Wks	-2.12	-8.48	-6.76	-3.98	-0.23	2.50	4.57
Chill 4 Wks	-2.73	-10.07	-7.66	-4.69	-0.81	2.07	4.40
Tx:Chill 6 Wks	-3.33	-12.94	-10.00	-5.96	-0.61	3.21	6.26
Tx:Chill 4 Wks	-3.88	-12.80	-9.92	-6.44	-1.44	2.36	5.55
Intercept	49.17	27.50	34.54	43.88	54.87	62.22	67.80
Acer saccharinum,Intercept	4.87	-14.87	-8.66	-0.97	10.31	19.41	26.70
Alnus incana rugosa,Intercept	43.46	24.27	30.00	37.37	48.99	58.57	66.13
Betula papyrifera,Intercept	-12.39	-32.00	-26.21	-18.19	-6.79	2.45	9.95
Betula populifolia,Intercept	5.05	-14.48	-8.65	-0.88	10.51	19.98	27.47
Cornus racemosa,Intercept	-2.43	-22.07	-16.08	-8.20	3.04	12.54	18.81
Salix purpurea,Intercept	33.72	13.89	20.16	27.69	39.29	48.71	56.48
Sorbus americana,Intercept	-30.13	-49.46	-43.61	-35.83	-24.60	-15.26	-8.26
Viburnum dendatum,Intercept	-13.51	-33.06	-27.13	-19.21	-8.09	1.16	8.59
Acer saccharinum,Tx	0.00	-5.99	-3.34	-0.85	0.78	3.37	6.52
Alnus incana rugosa,Tx	0.92	-4.61	-2.35	-0.36	1.90	5.68	9.34
Betula papyrifera,Tx	0.23	-5.86	-3.15	-0.69	1.02	4.07	6.86
Betula populifolia,Tx	0.31	-4.83	-2.71	-0.55	1.06	3.90	6.65
Cornus racemosa,Tx	-0.65	-8.22	-4.77	-1.41	0.39	2.23	4.38
Salix purpurea,Tx	-0.51	-7.97	-4.89	-1.48	0.59	2.87	5.53
Sorbus americana,Tx	-0.37	-7.47	-4.24	-1.27	0.60	3.03	5.70
Viburnum dendatum,Tx	0.34	-5.35	-2.77	-0.56	1.13	4.02	7.12
Acer saccharinum,Chill 6 Wks	0.91	-5.56	-2.83	-0.41	1.97	6.02	9.73
Alnus incana rugosa,Chill 6 Wks	0.07	-8.23	-4.92	-1.21	1.39	5.12	8.27
Betula papyrifera,Chill 6 Wks	-1.46	-11.46	-7.34	-2.73	0.18	2.26	4.55
Betula populifolia,Chill 6 Wks	0.14	-7.11	-3.92	-0.94	1.17	4.35	7.73
Cornus racemosa,Chill 6 Wks	-0.97	-10.03	-6.13	-2.05	0.39	2.62	5.20
Salix purpurea,Chill 6 Wks	0.90	-5.66	-3.12	-0.55	2.13	6.45	10.09
Sorbus americana,Chill 6 Wks	0.67	-5.70	-3.32	-0.67	1.76	5.77	9.38
Viburnum dendatum,Chill 6 Wks	-0.27	-8.12	-4.70	-1.34	0.84	3.85	6.93
Acer saccharinum,Chill 4 Wks	-1.38	-11.68	-7.56	-2.94	0.37	3.06	6.06
Alnus incana rugosa,Chill 4 Wks	1.86	-6.32	-3.15	-0.25	3.82	8.65	12.00
Betula papyrifera,Chill 4 Wks	-0.99	-10.25	-6.67	-2.57	0.62	3.87	7.01
Betula populifolia,Chill 4 Wks	1.48	-5.53	-2.73	-0.28	3.03	7.38	10.78
Cornus racemosa,Chill 4 Wks	-0.90	-10.01	-6.35	-2.37	0.67	3.71	6.33
Salix purpurea,Chill 4 Wks	3.70	-2.71	-1.03	0.50	6.00	11.61	16.03
Sorbus americana,Chill 4 Wks	-1.09	-10.23	-6.80	-2.76	0.57	3.74	7.10
Viburnum dendatum,Chill 4 Wks	-1.77	-12.03	-8.03	-3.40	0.17	2.48	4.91
Acer saccharinum,Tx:Chill 6 Wks	-1.60	-13.99	-8.72	-3.33	0.46	3.41	6.52
Alnus incana rugosa,Tx:Chill 6 Wks	2.10	-7.45	-3.96	-0.36	4.27	10.47	15.70
Betula papyrifera,Tx:Chill 6 Wks	-3.18	-17.18	-11.95	-5.44	-0.07	1.89	4.62
Betula populifolia,Tx:Chill 6 Wks	1.43	-6.99	-3.61	-0.47	3.06	8.38	13.74
Cornus racemosa,Tx:Chill 6 Wks	0.08	-9.82	-5.95	-1.55	1.67	6.36	11.01
Salix purpurea,Tx:Chill 6 Wks	1.72	-7.73	-4.09	-0.51	3.69	9.51	14.68
Sorbus americana,Tx:Chill 6 Wks	-0.16	-10.17	-6.35	-1.96	1.50	6.03	10.73
Viburnum dendatum,Tx:Chill 6 Wks	1.03	-7.61	-4.45	-0.89	2.72	8.17	13.30
Acer saccharinum,Tx:Chill 4 Wks	-0.94	-11.78	-6.91	-2.11	0.58	3.15	6.10

Table S7: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on total biomass.

	mean	2%	10%	25%	75%	90%	98%
Alnus incana rugosa,Tx:Chill 4 Wks	0.47	-9.06	-4.97	-1.08	1.91	6.74	10.94
Betula papyrifera,Tx:Chill 4 Wks	0.56	-7.12	-3.96	-0.79	1.73	5.95	10.76
Betula populifolia,Tx:Chill 4 Wks	0.63	-6.68	-3.46	-0.62	1.76	5.58	10.39
Cornus racemosa,Tx:Chill 4 Wks	-0.61	-10.42	-5.96	-1.68	0.68	3.72	6.98
Salix purpurea,Tx:Chill 4 Wks	-1.00	-12.66	-7.77	-2.24	0.66	3.70	7.01
Sorbus americana,Tx:Chill 4 Wks	0.31	-8.05	-4.44	-1.02	1.53	5.64	9.71

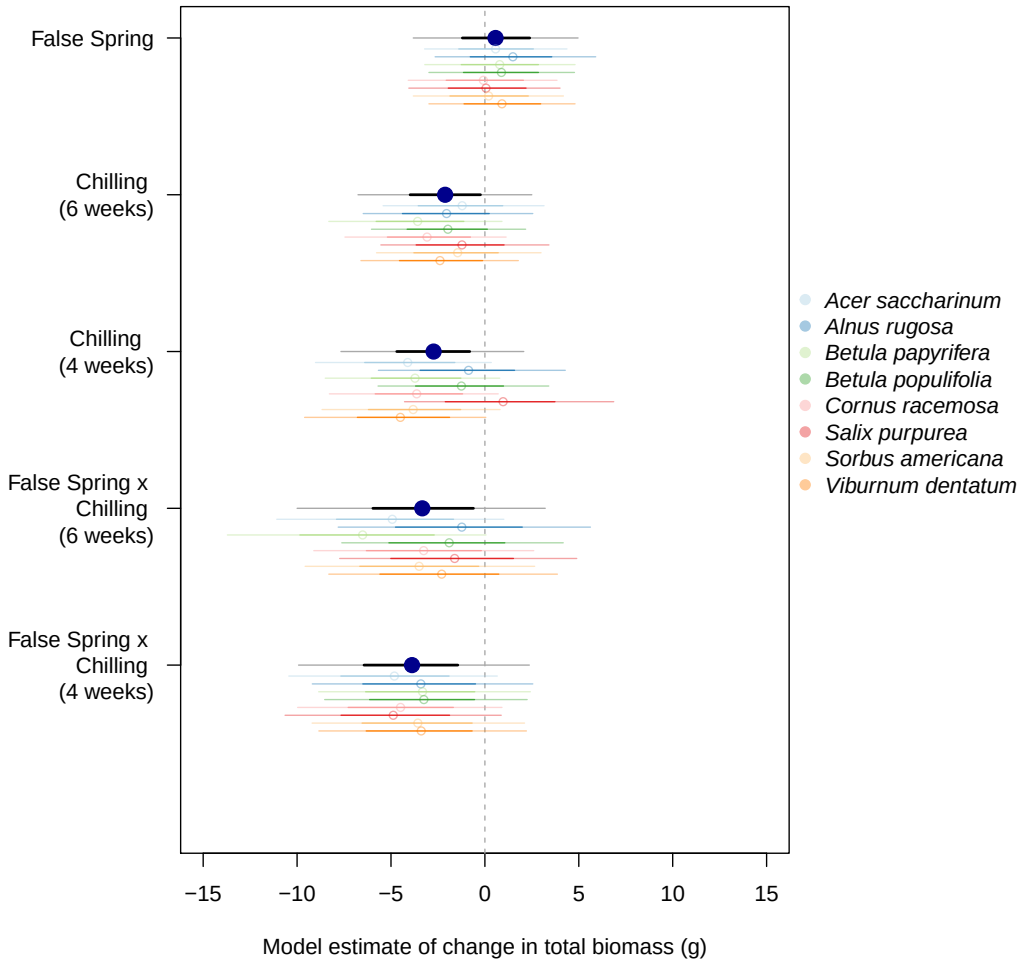

Figure S1: Effects of false spring treatment (Tx), six weeks of chilling and eight weeks of chilling on total aboveground and belowground biomass (g). Larger, blue dots represent overall estimates across all species, while smaller dots are estimates for each species. Dots and thin lines show means and 90% uncertainty intervals and thicker lines show 50% uncertainty intervals.

Table S8: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on leaf toughness.

	mean	2%	10%	25%	75%	90%	98%
Intercept	0.38	0.19	0.27	0.34	0.42	0.48	0.54
Tx	-0.03	-0.07	-0.06	-0.04	-0.01	0.01	0.02
Chill 6 Wks	-0.01	-0.05	-0.04	-0.02	0.00	0.02	0.03
Chill 4 Wks	0.05	-0.00	0.02	0.04	0.07	0.09	0.11
Tx:Chill 6 Wks	-0.00	-0.06	-0.04	-0.02	0.02	0.04	0.06
Tx:Chill 4 Wks	-0.02	-0.09	-0.07	-0.04	-0.01	0.02	0.04
Intercept	0.37	0.20	0.27	0.34	0.41	0.48	0.53
Acer saccharinum,Intercept	-0.03	-0.20	-0.14	-0.08	0.01	0.08	0.15
Alnus incana rugosa,Intercept	-0.06	-0.23	-0.17	-0.11	-0.02	0.05	0.13
Betula papyrifera,Intercept	-0.12	-0.29	-0.23	-0.17	-0.08	-0.01	0.06
Betula populifolia,Intercept	-0.11	-0.27	-0.22	-0.15	-0.07	0.00	0.07
Cornus racemosa,Intercept	-0.05	-0.22	-0.17	-0.10	-0.01	0.06	0.13
Salix purpurea,Intercept	0.17	0.01	0.06	0.13	0.21	0.28	0.36
Sorbus americana,Intercept	-0.03	-0.19	-0.14	-0.07	0.01	0.08	0.15
Viburnum dendatum,Intercept	0.27	0.11	0.16	0.22	0.31	0.38	0.46
Acer saccharinum,Tx	0.00	-0.05	-0.03	-0.01	0.01	0.03	0.05
Alnus incana rugosa,Tx	0.01	-0.04	-0.02	-0.00	0.02	0.05	0.07
Betula papyrifera,Tx	0.00	-0.05	-0.03	-0.01	0.01	0.03	0.05
Betula populifolia,Tx	0.00	-0.05	-0.03	-0.01	0.01	0.03	0.05
Cornus racemosa,Tx	0.02	-0.02	-0.01	0.00	0.03	0.06	0.08
Salix purpurea,Tx	-0.01	-0.07	-0.05	-0.02	0.00	0.02	0.03
Sorbus americana,Tx	-0.01	-0.08	-0.05	-0.02	0.00	0.02	0.03
Viburnum dendatum,Tx	-0.01	-0.08	-0.05	-0.02	0.00	0.02	0.03
Acer saccharinum,Chill 6 Wks	0.00	-0.04	-0.02	-0.00	0.01	0.03	0.04
Alnus incana rugosa,Chill 6 Wks	0.00	-0.04	-0.02	-0.01	0.01	0.02	0.04
Betula papyrifera,Chill 6 Wks	0.00	-0.03	-0.02	-0.00	0.01	0.03	0.05
Betula populifolia,Chill 6 Wks	0.00	-0.03	-0.02	-0.00	0.01	0.03	0.05
Cornus racemosa,Chill 6 Wks	-0.00	-0.05	-0.03	-0.01	0.00	0.02	0.03
Salix purpurea,Chill 6 Wks	-0.00	-0.05	-0.03	-0.01	0.00	0.02	0.04
Sorbus americana,Chill 6 Wks	0.00	-0.04	-0.02	-0.01	0.01	0.03	0.04
Viburnum dendatum,Chill 6 Wks	-0.00	-0.05	-0.03	-0.01	0.00	0.02	0.04
Acer saccharinum,Chill 4 Wks	-0.03	-0.12	-0.09	-0.05	-0.01	0.01	0.02
Alnus incana rugosa,Chill 4 Wks	0.02	-0.05	-0.02	-0.00	0.03	0.06	0.09
Betula papyrifera,Chill 4 Wks	0.01	-0.06	-0.03	-0.01	0.02	0.05	0.08
Betula populifolia,Chill 4 Wks	0.01	-0.05	-0.03	-0.00	0.02	0.05	0.08
Cornus racemosa,Chill 4 Wks	0.01	-0.06	-0.03	-0.01	0.02	0.05	0.08
Salix purpurea,Chill 4 Wks	-0.02	-0.09	-0.07	-0.03	0.00	0.02	0.05
Sorbus americana,Chill 4 Wks	0.03	-0.02	-0.01	0.01	0.05	0.09	0.13
Viburnum dendatum,Chill 4 Wks	-0.02	-0.10	-0.07	-0.04	-0.00	0.02	0.05
Acer saccharinum,Tx:Chill 6 Wks	-0.00	-0.06	-0.03	-0.01	0.01	0.03	0.05
Alnus incana rugosa,Tx:Chill 6 Wks	0.00	-0.06	-0.03	-0.01	0.01	0.03	0.06
Betula papyrifera,Tx:Chill 6 Wks	0.00	-0.06	-0.03	-0.01	0.01	0.03	0.05
Betula populifolia,Tx:Chill 6 Wks	0.01	-0.03	-0.02	-0.00	0.02	0.05	0.08
Cornus racemosa,Tx:Chill 6 Wks	0.01	-0.04	-0.02	-0.00	0.01	0.04	0.08
Salix purpurea,Tx:Chill 6 Wks	-0.00	-0.06	-0.04	-0.01	0.01	0.03	0.06
Sorbus americana,Tx:Chill 6 Wks	-0.01	-0.08	-0.05	-0.02	0.00	0.02	0.04
Viburnum dendatum,Tx:Chill 6 Wks	-0.01	-0.08	-0.05	-0.02	0.00	0.03	0.05
Acer saccharinum,Tx:Chill 4 Wks	-0.01	-0.10	-0.07	-0.02	0.00	0.03	0.05

Table S8: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on leaf toughness.

	mean	2%	10%	25%	75%	90%	98%
Alnus incana rugosa,Tx:Chill 4 Wks	0.02	-0.04	-0.02	-0.00	0.03	0.07	0.11
Betula papyrifera,Tx:Chill 4 Wks	0.01	-0.05	-0.02	-0.00	0.03	0.07	0.10
Betula populifolia,Tx:Chill 4 Wks	-0.00	-0.08	-0.04	-0.01	0.01	0.04	0.07
Cornus racemosa,Tx:Chill 4 Wks	0.01	-0.05	-0.02	-0.00	0.03	0.07	0.10
Salix purpurea,Tx:Chill 4 Wks	-0.01	-0.10	-0.07	-0.03	0.00	0.03	0.06
Sorbus americana,Tx:Chill 4 Wks	0.00	-0.08	-0.05	-0.01	0.01	0.05	0.08

Table S9: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on leaf chlorophyll content.

	mean	2%	10%	25%	75%	90%	98%
Intercept	30.96	24.38	26.36	29.21	32.74	35.50	37.89
Tx	-0.35	-2.16	-1.61	-0.88	0.15	0.92	1.48
Chill 6 Wks	-0.06	-2.07	-1.42	-0.62	0.49	1.30	1.92
Chill 4 Wks	0.43	-1.97	-1.03	-0.12	1.04	1.86	2.58
Tx:Chill 6 Wks	-1.04	-3.76	-2.90	-1.81	-0.26	0.84	1.68
Tx:Chill 4 Wks	-2.11	-4.74	-3.88	-2.81	-1.40	-0.36	0.31
Acer saccharinum,Intercept	-5.84	-12.65	-10.48	-7.66	-4.06	-1.25	1.08
Alnus incana rugosa,Intercept	5.66	-1.33	0.96	3.81	7.48	10.35	12.40
Betula papyrifera,Intercept	-2.33	-9.20	-6.98	-4.13	-0.48	2.29	4.50
Betula populifolia,Intercept	0.68	-6.50	-3.99	-1.12	2.48	5.33	7.54
Cornus racemosa,Intercept	0.96	-5.84	-3.68	-0.88	2.81	5.61	7.89
Salix purpurea,Intercept	12.24	5.25	7.55	10.37	14.05	16.89	19.14
Sorbus americana,Intercept	-7.21	-14.06	-11.90	-9.05	-5.38	-2.60	-0.50
Viburnum dendatum,Intercept	-4.83	-11.98	-9.46	-6.66	-2.98	-0.20	2.01
Acer saccharinum,Tx	0.04	-1.77	-0.90	-0.22	0.30	1.03	1.81
Alnus incana rugosa,Tx	-0.02	-1.91	-1.10	-0.30	0.26	1.13	1.91
Betula papyrifera,Tx	-0.19	-2.44	-1.40	-0.44	0.13	0.69	1.34
Betula populifolia,Tx	-0.10	-1.99	-1.22	-0.36	0.18	0.88	1.54
Cornus racemosa,Tx	0.07	-1.68	-0.91	-0.21	0.34	1.18	2.03
Salix purpurea,Tx	-0.45	-3.06	-2.09	-0.85	0.03	0.58	1.28
Sorbus americana,Tx	0.31	-1.33	-0.65	-0.07	0.63	1.70	2.48
Viburnum dendatum,Tx	0.30	-1.22	-0.58	-0.06	0.59	1.62	2.55
Acer saccharinum,Chill 6 Wks	0.35	-1.81	-0.97	-0.11	0.80	1.98	3.05
Alnus incana rugosa,Chill 6 Wks	-0.60	-3.81	-2.54	-1.09	0.02	0.68	1.35
Betula papyrifera,Chill 6 Wks	0.61	-1.21	-0.56	-0.01	1.09	2.48	3.62
Betula populifolia,Chill 6 Wks	0.31	-1.76	-0.97	-0.17	0.70	2.02	3.23
Cornus racemosa,Chill 6 Wks	-0.38	-3.37	-2.16	-0.81	0.12	0.95	1.75
Salix purpurea,Chill 6 Wks	-0.73	-3.84	-2.76	-1.33	-0.01	0.67	1.52
Sorbus americana,Chill 6 Wks	0.11	-2.52	-1.41	-0.33	0.58	1.65	2.77
Viburnum dendatum,Chill 6 Wks	0.33	-1.91	-0.98	-0.14	0.79	1.94	2.95
Acer saccharinum,Chill 4 Wks	0.04	-2.46	-1.51	-0.43	0.47	1.61	2.85
Alnus incana rugosa,Chill 4 Wks	0.33	-2.20	-1.18	-0.21	0.85	2.15	3.31
Betula papyrifera,Chill 4 Wks	0.18	-2.29	-1.36	-0.31	0.65	1.86	3.04
Betula populifolia,Chill 4 Wks	0.10	-2.41	-1.42	-0.38	0.56	1.74	2.94
Cornus racemosa,Chill 4 Wks	1.12	-0.75	-0.27	0.15	1.82	3.46	4.88
Salix purpurea,Chill 4 Wks	-0.31	-3.49	-2.24	-0.88	0.29	1.35	2.23
Sorbus americana,Chill 4 Wks	-0.67	-3.89	-2.68	-1.24	0.01	0.73	1.60
Viburnum dendatum,Chill 4 Wks	-0.71	-3.86	-2.78	-1.29	0.00	0.60	1.34
Acer saccharinum,Tx:Chill 6 Wks	0.15	-2.87	-1.64	-0.38	0.70	2.05	3.36
Alnus incana rugosa,Tx:Chill 6 Wks	0.20	-2.75	-1.60	-0.42	0.72	2.38	3.96
Betula papyrifera,Tx:Chill 6 Wks	0.08	-3.05	-1.80	-0.44	0.61	1.97	3.09
Betula populifolia,Tx:Chill 6 Wks	-0.78	-4.76	-3.31	-1.38	0.02	0.77	1.55
Cornus racemosa,Tx:Chill 6 Wks	0.27	-2.46	-1.46	-0.29	0.78	2.32	3.82
Salix purpurea,Tx:Chill 6 Wks	-1.15	-5.53	-3.86	-2.00	-0.07	0.73	1.76
Sorbus americana,Tx:Chill 6 Wks	0.96	-1.46	-0.68	0.02	1.65	3.49	5.08
Viburnum dendatum,Tx:Chill 6 Wks	0.37	-2.58	-1.32	-0.20	0.93	2.40	3.58
Acer saccharinum,Tx:Chill 4 Wks	0.06	-2.13	-1.13	-0.25	0.35	1.38	2.47
Alnus incana rugosa,Tx:Chill 4 Wks	0.06	-2.25	-1.22	-0.29	0.36	1.48	2.59

Table S9: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on leaf chlorophyll content.

	mean	2%	10%	25%	75%	90%	98%
Betula papyrifera,Tx:Chill 4 Wks	0.04	-2.22	-1.20	-0.26	0.32	1.31	2.41
Betula populifolia,Tx:Chill 4 Wks	-0.06	-2.28	-1.37	-0.35	0.23	1.11	1.82
Cornus racemosa,Tx:Chill 4 Wks	-0.01	-2.46	-1.27	-0.32	0.29	1.30	2.40
Salix purpurea,Tx:Chill 4 Wks	-0.24	-3.31	-2.01	-0.62	0.20	1.13	2.13
Sorbus americana,Tx:Chill 4 Wks	0.05	-2.33	-1.30	-0.27	0.39	1.44	2.54
Viburnum dendatum,Tx:Chill 4 Wks	0.11	-2.08	-1.12	-0.22	0.42	1.51	2.74

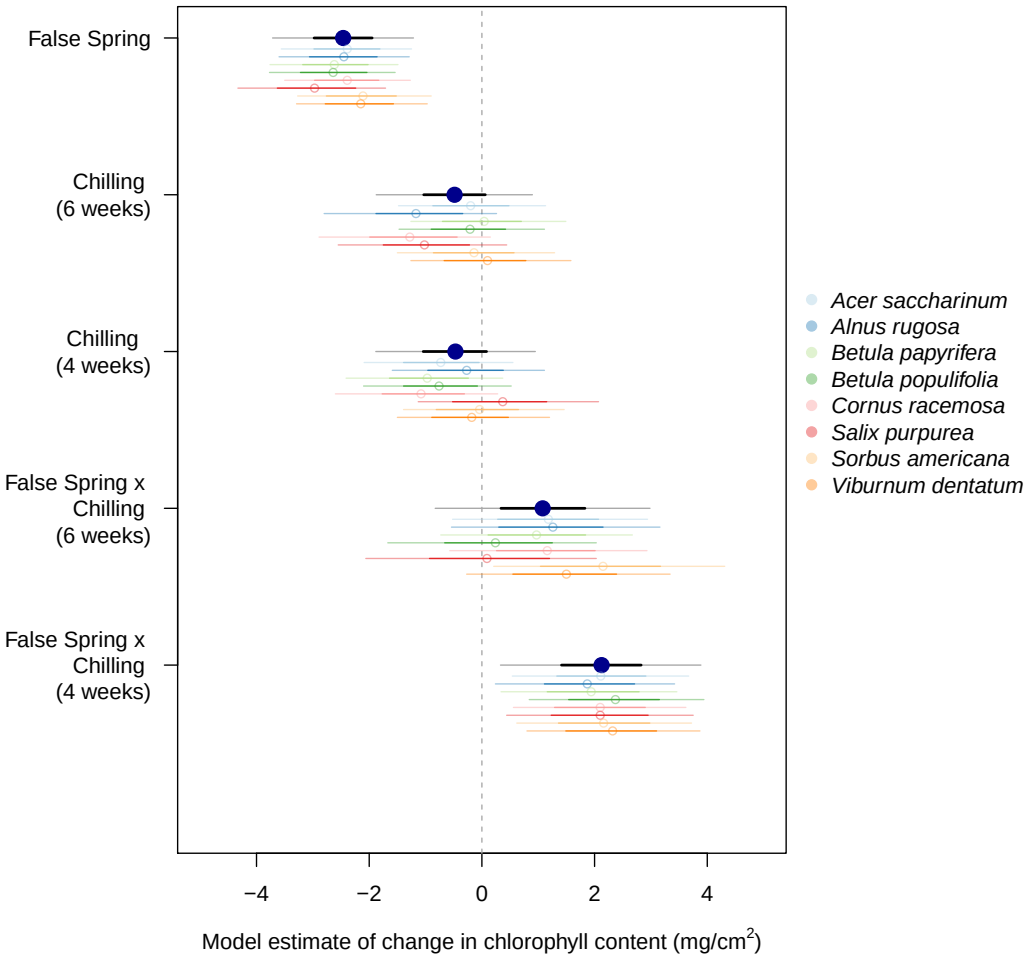

Figure S2: Effects of false spring treatment, six weeks of chilling and eight weeks of chilling on chlorophyll content. Larger, blue dots represent overall estimates across all species, while smaller dots are estimates for each species. Dots and thin lines show means and 90% uncertainty intervals and thicker lines show 50% uncertainty intervals.

Table S10: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on leaf thickness.

	mean	2%	10%	25%	75%	90%	98%
Intercept	133.73	114.66	120.60	128.70	138.61	147.21	154.83
Tx	-7.35	-16.61	-13.81	-9.88	-4.80	-1.11	1.73
Chill 6 Wks	15.44	-4.06	2.94	10.72	20.19	27.80	34.07
Chill 4 Wks	8.18	-10.41	-3.98	3.60	12.84	20.08	26.23
Tx:Chill 6 Wks	-3.17	-16.01	-12.07	-6.69	0.41	5.77	9.58
Tx:Chill 4 Wks	-1.56	-14.76	-10.46	-5.20	2.07	7.48	11.76
Intercept	137.18	117.08	123.10	131.90	142.43	151.18	159.19
Acer saccharinum,Intercept	-27.41	-51.57	-42.46	-33.01	-21.66	-13.20	-7.01
Alnus incana rugosa,Intercept	7.37	-15.14	-7.24	1.62	13.11	22.03	29.34
Betula papyrifera,Intercept	26.61	4.54	12.22	20.83	32.35	41.23	48.17
Betula populifolia,Intercept	-7.96	-31.68	-22.68	-13.62	-2.21	6.82	13.54
Cornus racemosa,Intercept	-10.85	-34.61	-25.96	-16.31	-5.17	3.35	10.01
Salix purpurea,Intercept	14.72	-7.67	0.50	9.13	20.36	29.46	36.92
Sorbus americana,Intercept	-10.10	-32.83	-24.84	-15.70	-4.36	4.27	11.27
Viburnum dendatum,Intercept	7.35	-14.93	-7.17	1.88	13.11	21.80	28.99
Acer saccharinum,Tx	1.00	-7.00	-3.99	-0.70	2.38	7.75	12.23
Alnus incana rugosa,Tx	-1.81	-14.31	-9.18	-3.24	0.23	2.54	5.08
Betula papyrifera,Tx	0.78	-6.86	-3.94	-0.82	2.10	7.02	11.40
Betula populifolia,Tx	-0.41	-9.98	-6.02	-1.83	1.01	4.62	8.96
Cornus racemosa,Tx	-0.32	-9.67	-5.84	-1.59	1.04	4.69	8.93
Salix purpurea,Tx	-0.64	-10.52	-6.23	-1.87	0.75	3.99	7.19
Sorbus americana,Tx	1.23	-6.92	-3.44	-0.52	2.72	7.84	12.05
Viburnum dendatum,Tx	0.32	-8.90	-4.63	-0.94	1.58	5.71	9.45
Acer saccharinum,Chill 6 Wks	-14.35	-37.93	-29.93	-20.20	-8.15	0.73	6.78
Alnus incana rugosa,Chill 6 Wks	5.58	-17.30	-9.92	-0.51	11.58	21.15	29.88
Betula papyrifera,Chill 6 Wks	7.05	-14.91	-7.41	1.14	12.80	22.35	30.08
Betula populifolia,Chill 6 Wks	15.75	-5.19	1.17	9.48	21.69	31.57	40.55
Cornus racemosa,Chill 6 Wks	19.03	-2.12	4.26	12.67	24.95	35.13	43.97
Salix purpurea,Chill 6 Wks	-11.32	-35.50	-27.19	-17.15	-5.27	3.26	10.73
Sorbus americana,Chill 6 Wks	-7.37	-30.13	-22.39	-13.16	-1.33	7.13	14.13
Viburnum dendatum,Chill 6 Wks	-13.53	-37.93	-29.45	-19.40	-7.36	1.23	8.05
Acer saccharinum,Chill 4 Wks	-4.04	-26.53	-18.95	-10.16	1.84	11.22	19.05
Alnus incana rugosa,Chill 4 Wks	12.62	-8.28	-1.90	6.20	18.47	28.47	36.93
Betula papyrifera,Chill 4 Wks	6.01	-15.86	-8.67	0.05	11.98	20.75	29.28
Betula populifolia,Chill 4 Wks	18.53	-1.95	3.78	12.20	24.53	34.74	42.88
Cornus racemosa,Chill 4 Wks	-0.48	-22.22	-15.01	-6.37	5.27	14.36	21.36
Salix purpurea,Chill 4 Wks	3.38	-17.70	-11.44	-2.22	8.99	17.95	25.15
Sorbus americana,Chill 4 Wks	-22.39	-46.24	-38.36	-28.54	-15.85	-7.33	-1.34
Viburnum dendatum,Chill 4 Wks	-12.54	-36.66	-27.72	-18.20	-6.41	1.79	8.51
Acer saccharinum,Tx:Chill 6 Wks	0.78	-12.53	-7.19	-1.38	2.80	9.88	16.34
Alnus incana rugosa,Tx:Chill 6 Wks	-0.51	-15.23	-8.63	-2.29	1.32	6.96	12.52
Betula papyrifera,Tx:Chill 6 Wks	0.62	-12.34	-6.55	-1.49	2.46	8.74	15.36
Betula populifolia,Tx:Chill 6 Wks	-0.43	-14.08	-8.37	-2.31	1.44	6.77	13.56
Cornus racemosa,Tx:Chill 6 Wks	-2.25	-19.12	-12.23	-4.28	0.44	3.89	8.53
Salix purpurea,Tx:Chill 6 Wks	0.13	-13.13	-7.46	-1.62	1.88	7.93	13.30
Sorbus americana,Tx:Chill 6 Wks	0.03	-14.11	-7.67	-1.82	1.98	7.83	13.74
Viburnum dendatum,Tx:Chill 6 Wks	1.52	-10.14	-4.81	-0.79	3.36	10.66	16.93
Acer saccharinum,Tx:Chill 4 Wks	-0.30	-16.31	-9.67	-2.63	2.07	8.92	15.11

Table S10: Summary of model with the effects of false spring treatment (Tx) and chilling duration across species on leaf thickness.

	mean	2%	10%	25%	75%	90%	98%
Alnus incana rugosa,Tx:Chill 4 Wks	-3.61	-26.18	-16.49	-6.00	0.16	3.28	7.20
Betula papyrifera,Tx:Chill 4 Wks	1.33	-11.53	-6.32	-1.29	3.48	11.33	18.71
Betula populifolia,Tx:Chill 4 Wks	0.89	-12.07	-7.09	-1.53	3.03	10.41	17.41
Cornus racemosa,Tx:Chill 4 Wks	1.25	-12.53	-6.37	-1.20	3.43	10.90	17.69
Salix purpurea,Tx:Chill 4 Wks	0.06	-14.61	-7.76	-2.09	2.12	8.19	14.55
Sorbus americana,Tx:Chill 4 Wks	0.86	-13.57	-7.40	-1.58	3.11	10.36	17.78

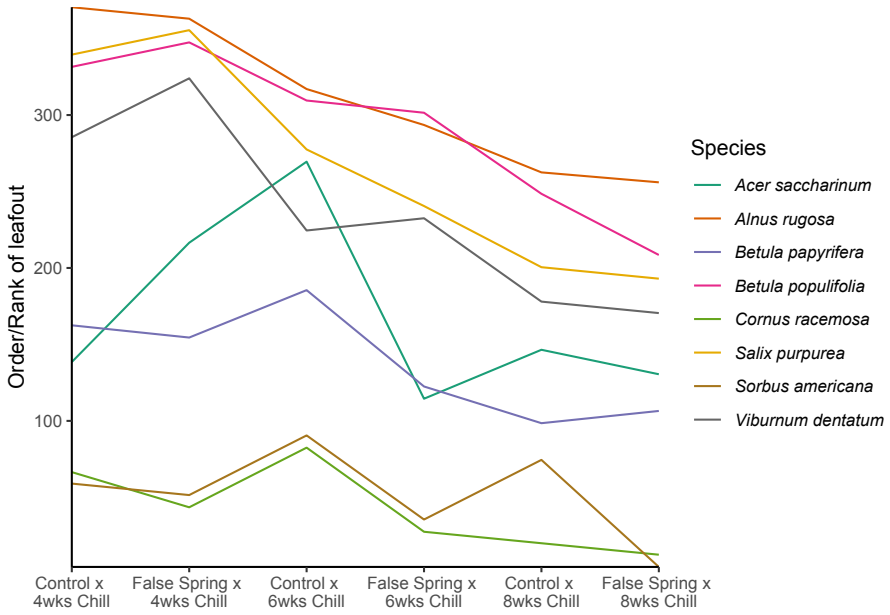

Figure S3: Rank order of leafout across all species using mean trends.