

Supplementary Information

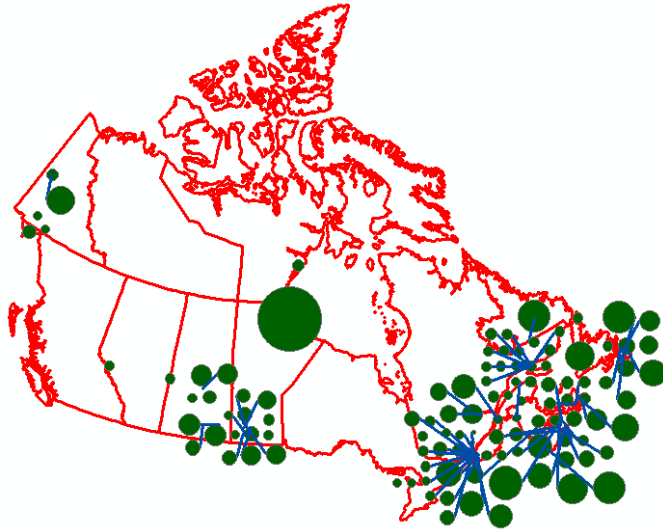
Citizen Science: linking the recent rapid advances of plant flowering in Canada with climate variability

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Supplementary Figure S1 | The distribution of first bloom day records across Canada. Symbol size indicates the number of site-year records ranging between 5 and 247. Map created in ArcMap 10 (Environmental Systems Resource Institute, ArcMap 10.0 ESRI, Redlands, California).

Supplementary Table S1 | Major Canadian flowering plant species included in the first bloom phenology study.

Common name	Scientific name	Plant form
Red Maple	<i>Acer rubrum</i>	Tree
Saskatoon	<i>Amelanchier alnifolia</i>	Shrub
Prairie Crocus	<i>Anemone patens</i>	Herb
Bearberry	<i>Arctostaphylos uva-ursi</i>	Shrub
Blue-bead Lily	<i>Clintonia borealis</i>	Herb
Bunchberry	<i>Cornus canadensis</i>	Herb
Mountain Avens	<i>Dryas integrifolia/octopetala</i>	Shrub
Mayflower	<i>Epigaea repens</i>	Shrub
Wild Strawberry	<i>Fragaria virginiana/vesca</i>	Herb
Larch	<i>Larix laricina</i>	Tree
Aspen	<i>Populus tremuloides</i>	Tree
Rhodora	<i>Rhododendron canadense</i>	Shrub
Labrador tea	<i>Rhododendron groenlandicum</i>	Shrub
Purple Saxifrage	<i>Saxifraga oppositifolia</i>	Shrub
Lilac	<i>Syringa vulgaris</i>	Shrub
Dandelion	<i>Taraxacum officinale</i>	Herb
Starflower	<i>Trientalis borealis</i>	Herb
Trillium	<i>Trillium grandiflorum</i>	Herb
Coltsfoot	<i>Tussilago farfara</i>	Herb

Supplementary Table S2. The list of flowering plant species and measurement locations. The average first bloom day (FBD) for each site is given as a mean value for measurements between 2001 and 2012 whereas for each species is given as a grand average weighted by the site-year measurements.

Species (in bold) and Location	Latitude	Longitude	Average FBD
Aspen Poplar			114.4
Beaverpond drhs	48.06	-66.39	123.6
Bishopville Rd	45.02	-64.15	109.5
Corner Brook Area near TCH	48.94	-57.87	111.2
Dykeview	45.11	-64.43	98.6
Farmland	50.34	-102.87	114.7
Hjertaas 1	49.57	-101.70	108.3
Lorette	49.73	-96.87	120.8
Mareschal	52.95	-105.46	113.3
Minnedosa	50.24	-99.83	121.5
Nisbet North	53.21	-105.74	113.8
Onanole	50.62	-99.97	123.3
Onanole, Kingdon	50.62	-99.97	115.8
Onanole, Vanderschuit	50.62	-99.97	112.0
W side Hwy 6/N. hill of Wiarton	44.76	-81.17	106.0
Whycocmagh	45.91	-61.14	110.8
Yarmouth	43.84	-66.11	114.3
Bearberry			140.4
Dawson - forest	64.06	-139.43	144.2
Fantome 2	50.22	-63.67	143.5
Fantome 4	50.22	-63.67	140.0
Jardin botanique de Montreal	45.55	-73.61	125.4
Libby's mixed forest	60.82	-137.33	136.8
Petite ile au Marteau	50.21	-63.57	147.4
Poor Farm Road	49.07	-72.44	127.0
Blue-bead Lily			161.6
Belvedere ile du Havre	50.22	-63.61	173.9
Bishopville Rd	45.02	-64.15	148.7
Bowring Park - Lower South Brook	47.53	-52.75	156.8
coin rte petit bras et cote duval	47.48	-69.80	153.4
Corner Brook Area near TCH	48.94	-57.87	171.5
Kettley Woodlot	45.28	-63.78	143.5
MUN Botanical Garden	47.55	-52.79	168.9
Neil's Pond	47.40	-52.79	161.1
Northwest River	53.54	-60.15	181.5
Old Broad Cove Road	47.58	-52.91	176.7
Radar Rd/Gannet Lane	44.50	-63.53	159.3
Salmonier Nature Park	47.29	-53.26	167.8

Union Cemetery	47.04	-67.73	138.0
Upper Gullies	47.42	-53.11	158.3
Village of Carleton	43.71	-65.31	148.2
Bunchberry			161.4
Belmont mixed forest	45.29	-63.23	155.5
Bishopville Rd	45.02	-64.15	151.7
Boise Mellon	48.37	-71.26	156.3
Boularderie Island	46.21	-60.46	140.9
Bowring Park-Captains Falls	47.52	-52.76	169.5
Coin rte petit bras et cote duval	47.48	-69.80	158.3
Corner Brook Area near TCH	48.94	-57.87	167.3
Dark Tickle Building	51.52	-55.48	178.9
Dawson - forest	64.06	-139.43	165.9
Kettley Woodlot	45.28	-63.78	146.7
MUN Botanical Garden	47.55	-52.79	162.9
Northwest River	53.54	-60.15	167.1
Onanole	50.62	-99.97	175.2
Radar Rd/Gannet Lane	44.50	-63.53	154.4
Salmonier Nature Park	47.29	-53.26	172.0
Upper Gullies	47.42	-53.11	159.4
Coltsfoot			104.1
Bishopville Rd	45.02	-64.15	99.0
Corner Brook Area near TCH	48.94	-57.87	90.3
Coxheath	46.05	-60.16	104.0
Duncans Cove Rd.	44.50	-63.53	93.2
Jardin	45.22	-73.42	103.0
Kettley Woodlot	45.28	-63.78	90.4
MUN Botanical Garden	47.55	-52.79	128.0
Old Broad Cove Road	47.58	-52.91	117.7
Sydney	46.22	-61.00	110.3
Yarmouth	43.84	-66.11	91.3
Dandelion			127.6
Arvida, rue St-Georges	48.37	-71.24	141.8
Basin St.	47.05	-67.74	118.0
Belmont Hayfield	45.28	-63.23	134.4
Bishopville Rd	45.02	-64.15	127.0
Boularderie Island	46.21	-60.46	131.4
Carbonear	47.73	-53.24	143.3
Corner Brook Area near TCH	48.94	-57.87	140.1
Cow Bay	44.67	-63.45	121.2
Coxheath	46.05	-60.16	129.5
Duncans Cove	44.50	-63.53	120.0
Dykeview	45.11	-64.43	117.2

Farmland	50.34	-102.87	125.8
Gladstone	50.22	-98.95	133.1
Hjertaas 1	49.57	-101.70	123.0
Kettley Woodlot	45.28	-63.78	127.9
Lantier	46.09	-74.30	135.2
Mareschal	52.95	-105.46	130.2
Nisbet North	53.21	-105.74	127.7
Northwest River	53.54	-60.15	156.0
Queesntown Anglican Church	45.61	-66.21	130.4
residence	45.88	-61.09	121.0
Saint-Bruno	45.53	-73.26	121.9
Stillwater	45.14	-61.97	130.2
Sydney	46.22	-61.00	131.0
Village of Carleton	43.71	-65.31	121.5
Yard, Richelieu	45.45	-73.26	120.6
Yarmouth	43.84	-66.11	103.1
Labrador tea			163.7
Belmont Bog	45.42	-63.40	159.3
boise Mellon	48.37	-71.26	157.1
Corner Brook Area near TCH	48.94	-57.87	169.8
Dawson - forest	64.06	-139.43	158.0
Duncans Cove runway	44.50	-63.53	166.0
Happy Valley-Goose Bay	53.31	-60.28	169.0
Jardin botanique de Montreal	45.55	-73.61	139.5
MUN Botanical Garden	47.55	-52.79	170.1
Northwest River	53.54	-60.15	172.0
Old Broad Cove Road	47.58	-52.91	176.2
Poor Farm Road	49.07	-72.44	150.7
Tourbiere ile du Havre 2	50.22	-63.61	173.3
Upper Gullies	47.42	-53.11	166.4
Larch			129.2
Arvida, rue St-Georges	48.37	-71.24	130.3
Bishopville Rd	45.02	-64.15	139.8
Salmonier Nature Park	47.29	-53.26	138.0
Village of Carleton	43.71	-65.31	119.0
Yarmouth	43.84	-66.11	115.3
Lilac, Common Purple			153.7
Belmont Lawn	45.37	-63.30	147.3
boul. Hebert rte 230 St-Pascal	47.53	-69.79	147.5
Boularderie Island	46.21	-60.46	162.4
Brandon	49.83	-99.95	148.7
Carbonear	47.73	-53.24	170.3
Clarendville	48.17	-53.98	163.3

Corner Brook Area near TCH	48.94	-57.87	164.0
Coxheath	46.05	-60.16	161.4
Dawson - garden	64.07	-139.43	167.9
Dora Knutson 1	52.37	-104.50	158.6
Duncans Cove	44.50	-63.53	167.6
Farmland	50.34	-102.87	146.8
Garden	53.28	-109.99	146.3
Gladstone	50.22	-98.95	150.0
Hjertaas 1	49.57	-101.70	145.6
Home	45.53	-73.58	139.5
Jardin avant	45.61	-73.44	124.9
Jardin botanique de Montreal	45.55	-73.61	137.8
Kettley Woodlot	45.28	-63.78	143.8
Mareschal	52.95	-105.46	146.2
Marigold	45.17	-72.43	140.0
Northwest River	53.54	-60.15	187.5
Ochre River	51.05	-99.77	147.9
Old Broad Cove Road	47.58	-52.91	175.0
Parc National du Mont-Saint-Bruno	45.55	-73.33	137.2
Rossendale	49.82	-98.62	143.9
Saint-Bruno	45.53	-73.26	133.3
Shannon Crescent	52.12	-106.65	140.3
Sifton, Hlady	49.64	-100.70	149.4
Victoria Ave	45.09	-64.35	138.1
Village of Carleton	43.71	-65.31	148.5
Yarmouth	43.84	-66.11	155.5
Maple, Red			120.8
Arvida, rue St-Georges	48.37	-71.24	123.2
Bishopville Rd	45.02	-64.15	120.0
Boularderie Island	46.21	-60.46	125.5
Coin rte petit bras et cote duval	47.48	-69.80	123.5
Corner Brook Area near TCH	48.94	-57.87	122.6
Kettley Woodlot	45.28	-63.78	106.4
MUN Botanical Garden	47.55	-52.79	134.6
Radar Rd/Gannet Lane	44.50	-63.53	124.4
St-Faustin (village)	46.12	-74.47	110.0
Stillwater	45.14	-61.97	125.2
Yard, Richelieu	45.45	-73.26	103.0
Yarmouth	43.84	-66.11	118.9
Mayflower			117.2
Bishopville Rd	45.02	-64.15	115.3
Boularderie Island	46.21	-60.46	117.5
coin rte petit bras et cote duval	47.48	-69.80	126.7

Duncans Cove runway	44.50	-63.53	108.0
Kettley Woodlot	45.28	-63.78	117.7
Stillwater	45.14	-61.97	122.6
Mountain Avens			173.3
CNSC- Tundra	58.74	-93.82	181.2
Dawson - forest	64.06	-139.43	151.4
Fantome 1	50.22	-63.67	148.1
Fantome 3	50.22	-63.68	148.1
Jardin botanique de Montreal	45.55	-73.61	127.6
Pointe de chasse 1	50.22	-63.66	147.0
Prairie Crocus			111.7
Annie Lake forest	60.32	-135.02	125.0
Brandon	49.83	-99.95	121.3
Dawson - low shrub	64.06	-139.43	116.6
Flying Creek Acreage	50.21	-104.91	93.0
Gladstone	50.22	-98.95	107.6
Hjertaas 1	49.57	-101.70	102.1
Libby's mixed forest	60.82	-137.33	122.2
Minnedosa	50.24	-99.83	113.5
Nisbet North	53.21	-105.74	115.2
Onanole	50.62	-99.97	108.8
Rossendale	49.82	-98.62	108.3
Shilo, Punak-Murphy	49.80	-99.64	108.4
Snaring	53.01	-118.13	108.3
Warren	50.12	-97.54	110.1
Rhodora			152.2
Belmont Bog	45.42	-63.40	147.8
Cow Bay	44.67	-63.45	152.4
Coxheath	46.05	-60.16	158.5
MUN Botanical Garden	47.55	-52.79	158.8
Neil's Pond	47.40	-52.79	154.7
Old Broad Cove Road	47.58	-52.91	173.0
Poor Farm Road	49.07	-72.44	137.5
Radar Rd/Gannet Lane	44.50	-63.53	147.6
Village of Carleton	43.71	-65.31	149.8
Yarmouth	43.84	-66.11	140.5
Saskatoon			135.0
287 Frenette St.	45.64	-73.80	126.4
boise Mellon	48.37	-71.26	138.7
Dawson - forest	64.06	-139.43	150.3
Dora Knutson 1	52.37	-104.50	144.8
Dorval backyard	45.44	-73.76	125.8
Farmland	50.34	-102.87	137.5

Flying Creek Acreage	50.21	-104.91	139.0
Gladstone	50.22	-98.95	140.4
Jardin	45.22	-73.46	113.1
Jardin botanique de Montreal	45.55	-73.61	126.7
Jardin de Mme Girard	45.57	-73.64	125.9
Mareschal	52.95	-105.46	140.5
Nisbet North	53.21	-105.74	141.7
Ochre River	51.05	-99.77	148.0
Onanole	50.62	-99.97	141.0
Parc Nature de Pointe-aux-Outardes	49.10	-68.47	154.6
Queesntown Anglican Church	45.61	-66.21	131.3
Radar Rd/Gannet Lane	44.50	-63.53	143.5
Saint-Bruno	45.53	-73.26	125.8
Saint-Lazare	45.35	-74.18	128.7
St-Faustin (village)	46.12	-74.47	130.6
Verger (L'Acadie)	48.72	-66.86	126.2
Yard, Richelieu	45.45	-73.26	126.3
Saxifrage, Purple			147.4
Area 6	62.82	-92.07	166.4
Cap Corbeau 1	50.23	-63.59	125.5
Cap Corbeau 2	50.22	-63.60	122.2
Cap Corbeau 4	50.23	-63.59	126.5
Cap Corbeau 5	50.22	-63.61	126.6
Cap Corbeau 6	50.22	-63.59	129.0
CNSC- Tundra	58.74	-93.82	153.7
Sud-Ouest Grosse ile aux marteau	50.22	-63.56	127.6
Starflower			158.6
Belmont coniferous	45.25	-63.24	147.1
Bishopville Rd	45.02	-64.15	147.5
Boularderie Island	46.21	-60.46	149.1
Bowring Park - Lower South Brook	47.53	-52.75	165.6
Bowring Park-Captains Falls	47.52	-52.76	162.1
Coin rte petit bras et cote duval	47.48	-69.80	151.0
Corner Brook Area near TCH	48.94	-57.87	170.7
Kettley Woodlot	45.28	-63.78	143.3
MUN Botanical Garden	47.55	-52.79	163.6
Northwest River	53.54	-60.15	171.8
Old Broad Cove Road	47.58	-52.91	166.7
Radar Rd/Gannet Lane	44.50	-63.53	153.0
Salmonier Nature Park	47.29	-53.26	162.6
Upper Gullies	47.42	-53.11	161.1
Village of Carleton	43.71	-65.31	151.6
Strawberry, Wild			136.9

Arvida, rue St-Georges	48.37	-71.24	142.0
Belmont Lawn	45.37	-63.30	133.3
Bishopville Rd	45.02	-64.15	123.7
Boularderie Island	46.21	-60.46	132.4
Coin rte petit bras et cote duval	47.48	-69.80	136.7
Cow Bay	44.67	-63.45	136.0
Coxheath	46.05	-60.16	139.7
Duncans Cove Rd.	44.50	-63.53	136.4
Dykeview	45.11	-64.43	123.2
Farmland	50.34	-102.87	135.1
Flying Creek Acreage	50.21	-104.91	133.4
Hjertaas 1	49.57	-101.70	141.0
Jardin botanique de Montreal	45.55	-73.61	125.6
Kettley Woodlot	45.28	-63.78	131.0
Lac Joannes	48.17	-78.67	152.7
Lantier	46.09	-74.30	134.6
Libby's grassy meadow	60.82	-137.29	150.4
Mareschal	52.95	-105.46	145.6
MUN Botanical Garden	47.55	-52.79	160.0
Neil's Pond	47.40	-52.79	152.4
Nisbet North	53.21	-105.74	146.0
Old Broad Cove Road	47.58	-52.91	143.8
Queesntown Anglican Church	45.61	-66.21	151.0
River bourgeois	45.88	-61.09	136.2
Saint-Bruno	45.53	-73.26	122.1
Sydney	46.22	-61.00	136.6
Village of Carleton	43.71	-65.31	126.3
Whycocmagh	45.91	-61.14	134.4
Wiarton sewage lagoons	44.74	-81.15	130.6
Yard, Richelieu	45.45	-73.26	126.9
Yarmouth	43.84	-66.11	130.6
Trillium			124.7
Erabliere a Saint-Alphonse de Granby	45.27	-72.86	124.5
Parc National du Mont-Saint-Bruno	45.55	-73.33	122.0
Saint-Bruno	45.53	-73.26	124.7
Saint-Lazare	45.35	-74.18	123.7
Summit Park	45.51	-73.63	128.4