

Freezing Date Probabilities

This factsheet provides information for estimating probable freezing dates for 114 locations in Alberta. Average dates of frost occurrence have often been used for this purpose. However, averages have limited value because they denote the 50 per cent risk level or the probable occurrence of untimely frost in, for example, five out of ten years. This may well be too much risk for economic viability in the long run.

On the other hand, trying to avoid all frost damage by sticking to a limited number of hardy, short-season crops may not be profitable either. The indirect costs of lost opportunities could be very high. For planning purposes, it may be better to use an intermediate risk level, such as 25 per cent, where the advantages of growing a particular crop outweigh the risks of occasional frost damage.

Estimating Probable Freezing Dates

To estimate probable freezing dates:

1. Determine the average dates (50 per cent risk level) for the last spring frost and the first fall frost for a selected location from the table on the next page.
Freezing dates are based on a recorded minimum air temperature of 0°C or less in standard instrument shelters which are about 150 cm above the ground. Temperatures in a crop are typically lower than the standard values. However grain crops generally freeze at several degrees below 0°C. Thus a standard reading of 0°C is a suitable indicator of damaging frost. Actual damage depends on the temperature, crop type and crop condition.
2. Next, use the appropriate curve, either Spring or Fall, on the figure to estimate the *freezing date adjustment factor* for the desired risk level.

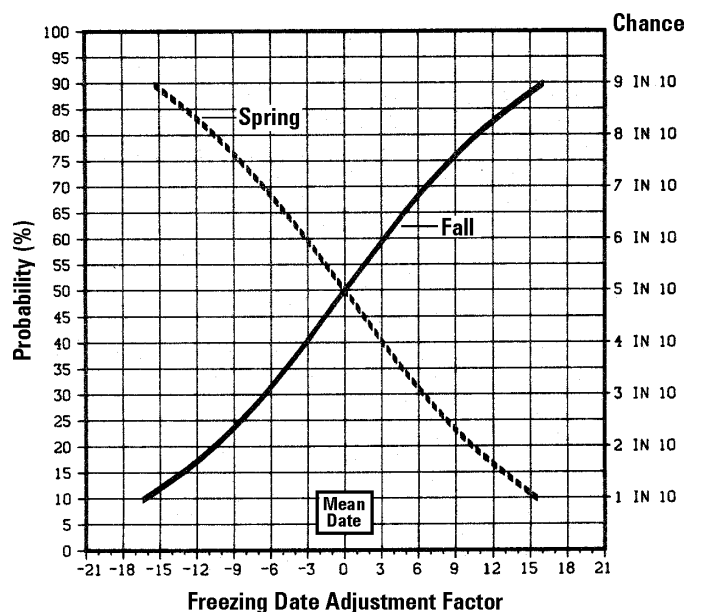
The Spring curve indicates the probability of the last spring frost occurring after a certain date. The Fall curve indicates the probability of the first fall frost occurring before a certain date. The two curves are derived from long-term minimum temperature records

at stations representing the major agricultural regions in Alberta. Estimates from the curves are generally accurate within one or two days for the 15 per cent to 85 per cent probability range.

3. Add the freezing date adjustment factor to the average date for the probable frost date at that risk level.

Example: Estimate spring and fall freezing dates at Vermilion for the 25 per cent risk level

The weather station closest to Vermilion is located at the Vermilion Airport. From the table on the following page, the average date for the last spring frost at the Vermilion Airport is May 25. Using the Spring curve on the figure and the 25 per cent risk level, the adjustment factor is +9 days. Nine days after May 25 is June 3. Similarly, the average date for the first fall frost at the Vermilion Airport is September 9, and the freezing date adjustment factor from the Fall curve is -9 days. Nine days before September 9 is August 31.



Curves for estimating freezing date adjustment factors

More Information

More information on these and other aspects of frost risk can be found at <http://www.agric.gov.ab.ca/climate/index.html> on Alberta Agriculture's Internet site.

Prepared by Peter Dzikowski, Conservation and Development Branch

Freezing Dates for Alberta Locations¹

Station location	Average date of last spring frost	Average date of first fall frost
Acme CDA Exp. Farm	May 29	Sep. 11
Aden	May 12	Sep. 27
Alliance	May 22	Sep. 13
Altawan	May 28	Sep. 9
Andrew	May 22	Sep. 17
Athabasca 2	May 23	Sep. 12
Beaverlodge CDA	May 25	Sep. 8
Bow Island Rivers Dev.	May 16	Sep. 20
Breton	May 24	Sep. 29
Brightview	May 19	Sep. 14
Brooks AHRC	May 21	Sep. 14
Brownfield	June 1	Sep. 2
Caldwell	June 1	Sep. 11
Calgary International Airport	May 22	Sep. 16
Calmar	May 22	Sep. 15
Campsie	June 5	Aug. 25
Camrose	May 15	Sep. 17
Cardston	May 25	Sep. 15
Carway	June 12	Sep. 5
Claresholm Waterworks	May 27	Sep. 9
Cold Lake Airport	May 22	Sep. 13
Coronation Airport	May 20	Sep. 14
Cowley	June 7	Sep. 3
Craigmyle	May 29	Sep. 8
Crossfield	June 2	Sep. 2
Dakota West	May 31	Aug. 30
Drumheller City	May 19	Sep. 17
Duchess	May 8	Sep. 18
Eckville South	June 1	Sep. 6
Edmonton International Airport	May 24	Sep. 10
Edmonton/Namao Airport	May 12	Sep. 21
Edmonton/Stony Plain	May 10	Sep. 21
Edson Airport	June 13	Aug. 29
Elk Point	June 1	Sep. 1

Station location	Average date of last spring frost	Average date of first fall frost
Ellerslie	May 25	Sep. 11
Empress	May 19	Sep. 15
Fabyan	May 25	Sep. 7
Fairview	May 16	Sep. 17
Falher	May 24	Sep. 11
Foremost	May 15	Sep. 22
Forestburg Plant Site	May 9	Sep. 25
Fort Chipewyan Airport	June 4	Sep. 2
Fort Macleod	May 19	Sep. 18
Fort McMurray Airport	June 2	Sep. 4
Fort Saskatchewan	May 16	Sep. 14
Fort Vermilion CDA	May 25	Sep. 4
Gleichen	May 21	Sep. 14
Glenevis	May 26	Sep. 14
Grande Prairie Airport	May 17	Sep. 14
Gwynne	June 4	Sep. 8
Hanna	May 10	Sep. 18
Herronton East	May 19	Sep. 14
High Level Airport	June 2	Aug. 29
High Prairie	May 30	Sep. 6
High River	June 10	Aug. 30
Hinton	June 9	Aug. 25
Horseshoe Lake	May 13	Sep. 14
Hughenden	May 25	Sep. 3
Kinsella Ranch	May 18	Sep. 13
Kitscoty	May 18	Sep. 19
Lac La Biche (automatic)	May 25	Sep. 11
Lacombe CDA	May 28	Sep. 8
Lethbridge Airport	May 16	Sep. 19
Madden	May 26	Sep. 17
Manyberries CDA	May 16	Sep. 16
Marwayne	June 6	Aug. 29
Medicine Hat Airport	May 15	Sep. 23
Milk River	May 17	Sep. 21
Millarville	June 28	Aug. 20
Newbrook	June 14	Aug. 22
Olds	May 23	Sep. 13
Oliver Tree Nursery	May 23	Sep. 13
Oyen Cappon	May 16	Sep. 20
Paradise Valley	May 25	Sep. 9
Peace River Airport	May 25	Sep. 4
Pincher Creek	May 29	Sep. 11
Pine Lake	June 9	Aug. 28

Station location	Average date of last spring frost	Average date of first fall frost
Pollockville	May 24	Sep. 5
Prairie Creek Ranger Station	July 9	July 28
Queenstown	May 19	Sep. 22
Rainier	May 24	Sep. 15
Ranfurlly	May 24	Sep. 5
Raymond	May 17	Sep. 14
Red Deer Airport	May 25	Sep. 10
Rimbey	May 25	Sep. 13
Rocky Mountain House	May 18	Sep. 12
Scotfield	June 1	Aug. 31
Sedalia East	May 21	Sep. 18
Sedgewick	May 27	Aug. 30
Sibbald	May 28	Sep. 7
Sion	May 23	Sep. 12
St. Lina	June 5	Aug. 24
Stettler	May 16	Sep. 14
Strathmore East	May 22	Sep. 11
Suffield Airport	May 17	Sep. 19
Sundre Ranger Station	June 18	Aug. 26
Taber	May 14	Sep. 22
Three Hills	June 3	Aug. 23
Tofield North	May 24	Sep. 14
Trochu Equity	May 22	Sep. 14
Tulliby Lake	May 24	Sep. 5
Turner Valley	June 4	Sep. 3
Vauxhall CDA	May 24	Sep. 13
Vegreville CDA	June 5	Aug. 29
Vermilion Airport	May 25	Sep. 9
Viking	May 18	Sep. 13
Vulcan	May 19	Sep. 19
Wainwright Heath	May 22	Sep. 2
Warwick	June 5	Aug. 27
Wastina Hemaruka	June 7	Sep. 6
Watino	May 16	Sep. 18
Wetaskiwin	May 17	Sep. 13
Whitecourt Airport	May 24	Sep. 4
Winfield	June 1	Sep. 1

Data analysis by the Conservation and Development Branch of Alberta Agriculture, Food and Rural Development; climate data obtained from Environment Canada

1. Stations used in this table have data for 13 or more years during the period from 1961 to 1990.