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GROWING DEGREE-DAYS AND CROP PRODUCTION IN CANADA

TABLE FREQUENCY CLASSES AND 30-YEAR AVERAGES OF DEGREE DAYS ABOVE 10°C

CLASS FREQUENCY AND BOUNDARY							
RECORD	LOW MB	B	NORMAL	A	MA	RECORD	DAILY
						HIGH	MEAN
630.4	0	0	0	0	1	7	1
C212	0	0	0	1	4	10	1
P 1635	0	0	0	2	2	34	3
1977	1	1	2	6	12	36	6
(1989 prtn)	1	2	8	10	17	39	0
c.3	4	6	12	21	32	49	19
	7	14	23	35	54	62	31
	11	27	39	54	67	87	48
	15	52	69	81	99	126	73
	34	75	91	104	137	164	102
	77	103	120	136	177	206	134
	107	139	156	180	228	267	175
	145	181	211	233	266	316	223
	218	233	271	288	321	375	279
	271	287	319	346	390	440	335

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FOREWORD

In 1959, the Canada Department of Agriculture released the publication entitled *Heat Units and Crop Growth*, which proved to be extremely popular and was reprinted several times.

The authors, R. M. Holmes and G. W. Robertson, reviewed the concept of "heat units" or "degree-days" and introduced a generalized formula for computing normal degree-days based on mean monthly temperatures. The publication included several practical applications of degree-days, showing how long-term climatic data can be used in day-to-day agricultural operations. Many of these applications have been included in the revised text, because they so aptly demonstrate the degree-day concept.

The theory that a direct relationship exists between temperature and the rate at which a plant grows and develops is not new, but it remains viable. So do the methods for defining this relationship quantitatively. For this reason, the decision was made to update the original publication using the climatic records for the current 30-year period. Another purpose is to introduce the Celsius temperature scale in the calculation and application of degree-days. We hope that the revised presentation proves to be as useful as the original, and equally applicable to the present-day agricultural scene in Canada.

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GROWING DEGREE-DAYS AND CROP PRODUCTION IN CANADA

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INTRODUCTION

Plants require energy to grow and develop, and some of this energy is in the form of heat. The heat required is expressed as degrees of temperature. Many meteorological elements influence the well-being of a plant, but temperature is the single most important factor contributing to plant response. Because of this fact, and because information on air temperatures is readily available, many attempts have been made to link plant response to some function of temperature.

Thus the concept of degree-days or heat units has evolved, and it is now widely accepted as a means to relate plant growth, development, and maturity to temperature. The concept assumes that each plant has its own particular base or threshold temperature below which growth does not occur. The amount of heat accumulated during the day, as obtained by subtracting the plant's base temperature from the mean temperature for the day, is termed the degree-day accumulation. Degree-days may be accumulated for a week, for a month, or until plant maturity is reached.

TEMPERATURE

Most agricultural crops grow in conditions where the temperature fluctuates widely. Cool nights and warm days are usually favorable to crops. For example, certain varieties of tomatoes set fruit only when the night temperature is near 18°C. Consequently, these tomatoes are not grown commercially in the tropics where

¹ Retired 1988. Contact Mr. A. Bootsma for further information.

nights are usually warmer, or in the field in northern areas where night temperatures are too cool. Tomato yields are reliable in areas where maritime-type conditions keep temperatures consistently in a favorable range during the growing season. In other areas, production may be very variable.

Peas do best when daytime temperatures stay below 27°C; above 30°C, growth is markedly poorer.

Onions flower only under low night temperatures, but higher temperatures are required for other growth processes.

Potatoes set tubers best when temperatures during the night fall to between 10° and 14°C. Therefore, more northern regions like the Maritimes, northern portions of the United States, and Ireland are best suited to potato production.

Temperature regulates many of the physical and chemical processes within a plant, which in turn control the rate of growth and development toward maturity. Certain temperatures are considered critical to the well-being of the plant and these include minimum, maximum, and optimum values. The maximum temperature for plant life is about 54°C and the minimum temperature for growth is about 5°C. However, these values vary according to the particular cultivar, the stage of growth, and the conditioning of the plant. In plants of the temperate zone, the optimum temperature for seed germination is usually less than the temperature most suitable for growth, which in turn is often lower than the temperature most suitable for flowering and fruiting.

It may be difficult to see how any relationship could be formulated to express the overall growth of a plant from planting to maturity. However, chemical and physical processes, such as the chemical reactions that increase their rate as the temperature increases, are subject to the same laws whether they take place within a plant or elsewhere.

OTHER ENVIRONMENTAL FACTORS

Several other environmental factors influence the growing degree-day relationship and may cause variation within a crop. They are described below.

Soil fertility level

Low soil fertility causes slow growth. A high nitrogen level supports heavy stem growth and thus delays maturity. A high phosphorus level tends to hasten maturity.

Plant population

A low plant population matures slightly earlier than a denser population, provided weeds do not make up the difference.

Soil type

Sandy soils warm up earlier than clay soils. Other factors such as the fertility status and moisture characteristics are associated with soil type.

Soil temperature

During the spring warm-up, soil temperature lags appreciably behind air temperature. Hence, if degree-days are accumulated on the basis of air temperature, the resulting totals may be too high. Soil temperature readings can be used instead, until plant emergence. Southern slopes warm up sooner in spring than northern slopes. Seeds planted deep are cooler and usually emerge later than those planted shallow, provided moisture is not lacking.

Soil moisture

Poorly drained soils are cold and also give rise to a variety of nutritional problems. If moisture is lacking at seeding time or during early growth, maturity is delayed even though the number of degree-days has been building up. Drought during the latter part of the life span of plants usually hastens maturity, or the plants may even die before they reach maturity.

Photoperiod

Regional variation in a particular crop is usually attributed to variation in the length of photoperiod (day length). Longer periods of daylight reduce the heat requirement of many crops, particularly those that thrive in cool weather. However, degree-day accumulations seem to provide fairly accurate guidelines without adjustment for photoperiod at any one location, because daylight hours do not vary much during the life span of most crops in the temperate zone. In other zones or fringe areas in the north, the duration of daylight may have to be considered. Some plants mature more rapidly in the north where days are long in the summer than would be expected from temperature accumulation alone.

USES OF THE DEGREE-DAY CONCEPT

Despite limitations, the growing degree-day concept is effective and is often used by growers and processors to schedule planting and subsequent harvesting of many cash crops, particularly peas, beans, and sweet corn. The concept provides a reliable index of the progress of these crops. Information on degree-days can be used to predict the yield and oil quality of soybeans and other legumes. It helps to identify the limits of geographical areas suitable for production of various crops, particularly corn, and to evaluate areas agriculturally suitable for new or non-native plants. Other

applications of degree-days include the prediction of bloom date, tree fruit development, and insect activity related to agriculture and forestry.

Because we are adapting the metric system of measurement in Canada, all data values, tabulations, and graphs are based on the Celsius temperature scale. Previously calculated Fahrenheit degree-day accumulations could be converted by multiplying them by 5/9, but it would not be helpful to do so. The old and new data series cannot be directly compared because they are not exactly equivalent. For instance, 5°C has replaced 42°F (5.556°C) as a base value. Therefore, it is better to recompute growing degree-days from the original observational data.

COMPUTATION OF GROWING DEGREE-DAYS

Temperature affects plant processes mainly by controlling the rate of growth. It may prevent growth from taking place at all. There are certain minimum temperatures below which plants do not grow, and the actual minimum depends on the particular plant involved. For general plant growth, a base or threshold temperature of 5°C is probably most valid; however, many crops have been assigned their own base or threshold values. The values have been determined by experiments and field trials; some average values are given in Table 1.

TABLE 1. AVERAGE BASE TEMPERATURE VALUES FOR SELECTED CROPS

Crop	Base temperature °C
Spinach	2.2
Lettuce	4.4
General plant growth	5.0
Peas	5.5
Asparagus	5.5
Corn	10.0
Beans	10.0
Pumpkins	13.0
Tomatoes	13.0

In practice, the concept of growing degree-days assumes that plant growth is related directly to the average daily temperature. It ignores soil temperature, difference in the pattern of night and day temperatures, and other variations caused by the stage of

growth. The degree-days for each day are added together, or accumulated, throughout the growing season. To compute growing degree-days for a particular crop on a particular day, you first calculate the daily mean temperature by averaging the maximum (highest) and the minimum (lowest) temperatures for the day. Then you subtract the specific base temperature for the crop or plant in question from the mean temperature. This gives the number of growing degree-days for the 24-hr period.

Example:

$$\begin{aligned} \text{Maximum temperature } (^{\circ}\text{C}) &: 30 \\ \text{Minimum temperature } (^{\circ}\text{C}) &: 18 \\ \text{Mean temperature } (^{\circ}\text{C}) &= \frac{\text{Max.} + \text{Min.}}{2} = 24 \end{aligned}$$

$$\text{Growing degree-days at base } 0^{\circ}\text{C} = 24 - 0 = 24$$

$$\text{Growing degree-days at base } 5^{\circ}\text{C} = 24 - 5 = 19$$

$$\text{Growing degree-days at base } 13^{\circ}\text{C} = 24 - 13 = 11$$

If the daily mean temperature is equal to or less than the base temperature, the degree-day value is zero. Negative values are not used in the calculation, because little or no growth takes place on days when the average temperature is less than the base temperature for the crop.

The number of degree-days a crop normally takes to mature depends largely on the plant and the variety being grown. A particular plant or variety may have a rather specific requirement for total heat accumulated through the growing season to reach maturity. This amount is called the heat maturity constant (HMC); it is also referred to as the summation constant, the varietal index, or the remainder index. The corn hybrids frequently grown today need from 800 to 1800 degree-days (their maturity constants) to produce 30% kernel moisture at maturity.

Although the concept is not without problems, the accumulation of growing degree-days is a more precise way of predicting crop maturity than simply counting the passing days. If you have a week of mean temperatures below the base value, your crop is not growing, and so it is not a week nearer to maturity. Similarly, on days when temperatures exceed the maximum growth value, transpiration becomes too high and the resulting moisture stress to the plants delays their growth.

Data on degree-days or their seasonal accumulations are often difficult to obtain, so researchers have used long-term climatological records to work out relationships between mean temperatures and degree-days. The relationships can be universally used to calculate degree-days above any base temperature. One such

formula provides an estimate of the normal number of degree-days accumulated for any one month; the equation is as follows:

$$DD = N [(t - b) + L \sigma_v / N]$$

where DD is the normal degree-days for the month, N is the number of calendar days in the month, t is the monthly mean temperature, b is the base temperature, σ_v is the standard deviation of the monthly mean temperature, and L is the proportionality coefficient. The standard deviation expresses the probable variation of the monthly mean temperature from the long-term normal value.

Although DD is a monthly value, daily values can be obtained by plotting the calculated monthly values at the midpoint of each month, and joining these points. The daily values can then be read off the graph. For this method, both the monthly mean temperature and the standard deviation of the mean are required for the calculations. Ordinarily, this type of information can be readily obtained from published climatological data. The values for the proportionality coefficient L are obtained from the table given in Appendix I.

Several variations of the growing degree-day concept have evolved over the years, each one attempting to calendarize crop growth and development. One of the most widely used in Canada is the corn heat unit (CHU). A physiological type of index, it accumulates heat units or degree-days from the average date in the spring when a mean temperature of 12.8°C occurs to the date when there is a 10% chance of a 0°C freeze in the fall. The index itself uses the following equation for calculating the heat or degree-day units:

$$\text{CHU} = 1.80 (T_{MN} - 4.4) + 3.33 (T_{MX} - 10.0) - 0.084 (T_{MX} - 10.0)^2$$

where the values for T_{MN} and T_{MX} are the average minimum and maximum temperatures for the day.

DISCUSSION AND APPLICATION OF GROWING DEGREE-DAYS

Long-term temperature records can be used to estimate heat accumulation so that the probable date of maturity of a crop can be predicted. On a graph, the curve for normal growing degree-day (GDD) accumulation based on these records is a gradual one; it is nearly flat in the spring during cool weather and rises more sharply during the summer when heat is rapidly accumulated (as illustrated by the graphs in this publication).

To predict the harvest date of an individual crop, the normal GDD accumulation curve is used starting from the day of planting. The expected harvest date may have to be adjusted as the season

progresses, if the temperature through the growing season varies from normality. In that case, the actual daily temperatures are used to compute the heat accumulation up to the day when the calculation is being done, and the normal curve is then used for the remainder of the season. A surplus or deficiency of degree-days either hastens or delays the harvest from its predicted date.

For example, suppose you plant a cash crop in the Ottawa area on May 15 (Fig. 1). The crop planted has a base temperature of 10°C and requires 1050 GDD to reach maturity. On the graph

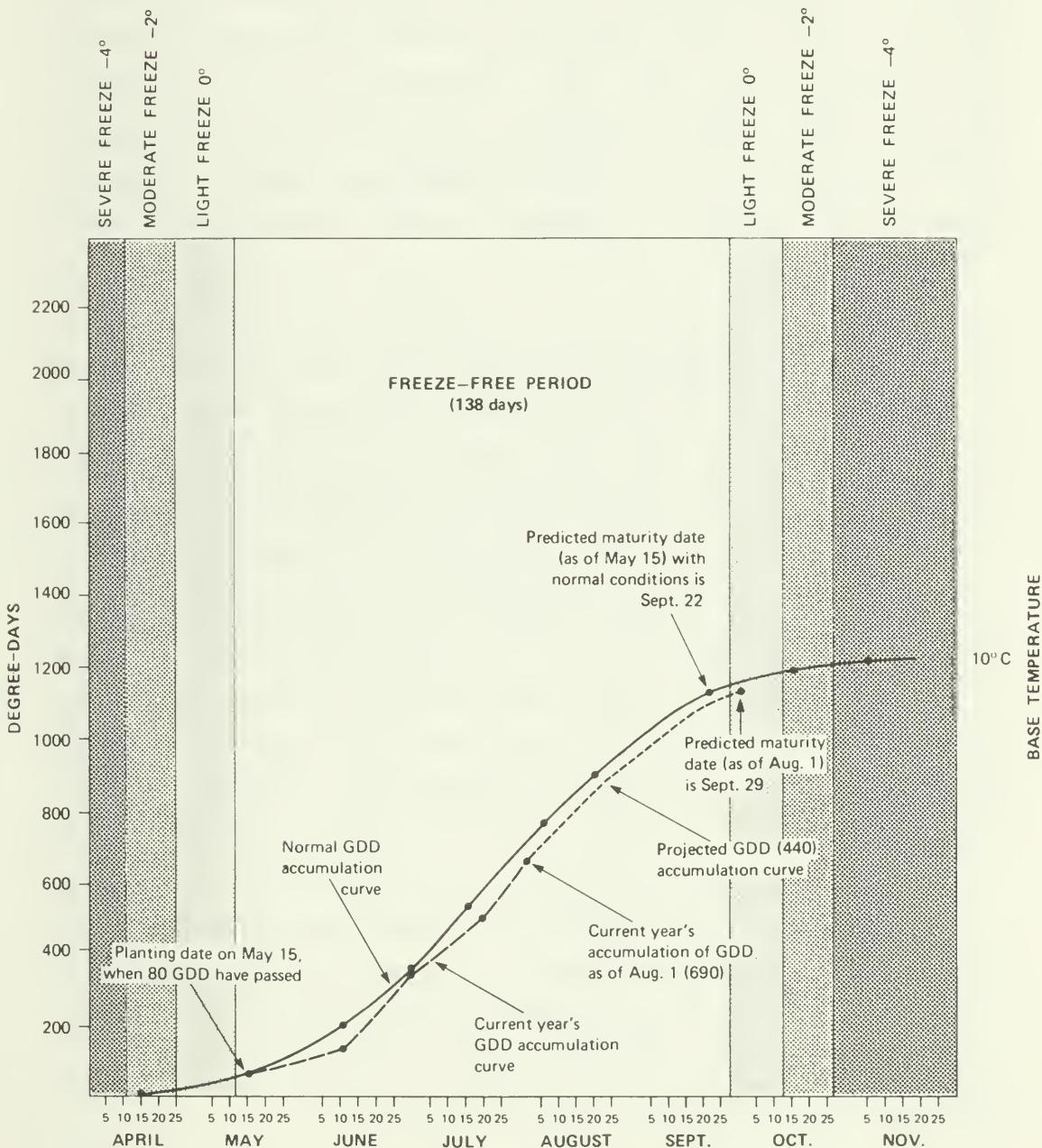


Fig. 1. Application of average seasonal growing degree-day accumulations (10°C base temperature) and average freeze dates of a given severity for Ottawa.

for the Ottawa area you follow the curve for the 10°C base temperature starting at May 15, when 80 GDD have elapsed, for a further 1050 GDD (to the point on the curve at 1130 GDD). This brings you to a predicted maturity date of September 22 if conditions are normal. However, if at midseason, say August 1, you wish to verify your original estimate, you must total the number of growing degree-days actually accumulated to August 1 from the planting time of May 15. In our example (Fig. 1) this value, 660 GDD, is slightly below the normal for August 1, which is 720 GDD. Starting at 660 GDD on August 1, you draw a line parallel to the normal seasonal accumulation curve, continuing for a further 390 GDD to reach the required 1050 GDD from the time of planting. (The point on the graph is again 1130 GDD, because of the 80 GDD elapsed before planting). This brings you to a new maturity date of September 29. The new date is 7 days later than originally predicted, and conditions are now becoming hazardous to the crop because there is a 50% chance of a freeze on or after September 28 in the Ottawa area.

It is difficult to plant a series of fields so that the whole crop does not mature at the same time. However, if planting is done in proportion to degree-day accumulation, a fairly orderly harvest can be arranged. If the normal daily heat accumulation at harvest is 20 GDD, and the capacity of the cannery at harvest is 24 ha/day, then the ratio of heat accumulated at harvest to the number of hectares harvested a day is 20:24, or 1:1.2. (*For calculations in acres, if the cannery capacity is 60 ac/day, the ratio is 20:60 or 1:3.*) Therefore, after the accumulation of each degree-day at planting time, 1.2 ha (3 ac) should be planted; after 10 degree-days have accumulated, 12 ha (30 ac) may be planted. Strict adherence to this ratio, however, might result in serious delays in planting during a cool spring. In that case, more fields would have to be planted than warranted by the heat accumulated. The method would forecast the time when a heavy influx of crops would occur at the cannery.

If several fields scattered over an area were planted with peas on the same day, they would not all mature at the same time. Experience has shown that harvest would normally be spread over 2 or 3 days because of the environmental factors previously mentioned. Therefore, it is common practice to plant two or three times as many hectares on the first day as would normally be done according to the degree-day accumulation.

Let us suppose four varieties of peas are to be planted; each covers a different area and has a different heat maturity constant, as follows:

Variety	Area ha (ac)	HMC (°C)
Alaska	160 (400)	680–710
Sweets	80 (200)	720–750
Perfection	120 (300)	830–860
Superior	120 (300)	890–920

Assume that the normal daily heat accumulation at harvest time is 20 degree-days and that the cannery has the capacity to process 16 ha (40 ac) of crop a day. The planting ratio is 16 ha (40 ac) for every 20 degree-days accumulated, or 0.8:1 (2:1). Because 160 ha (400 ac) of Alaska peas are desired, the planting would normally be spread over 200 degree-days. However, the heat maturity constant varies between different fields, so three times the normal area should be planted during the first 20 degree-days accumulated. Thus, 48 ha (120 ac) of Alaska peas are planted during the first 20 degree-days and 112 ha (280 ac) during the next 140 degree-days. The last 112 ha (280 ac) are planted according to the normal planting ratio.

After the accumulation of 680 degree-days, the first Alaska peas enter the cannery and the crop continues to come in for 10 days, because the crop is on 160 ha (400 ac) and the capacity of the cannery is 16 ha (40 ac) a day. Two hundred degree-days normally accumulate during the 10-day harvest. The total degree-day accumulation from the first plantings to the last harvest of Alaska peas then is $680+200=880$.

At this time, early Sweets peas must be ready for harvesting. They require 720 degree-days to mature, so planting must begin $880-720=160$ degree-days after the first Alaska planting. Because 80 ha (200 ac) are required and the planting ratio is 0.8:1 (2:1), planting is distributed over $80/0.8 (200/2)=100$ degree-days. The time required for processing is determined by the variation in degree-days to maturity of the peas, rather than cannery capacity. Late Sweets peas require 750 degree-days to mature, so the processing time of Sweets from earliest to latest is extended by $750-720=30$ degree-days. Therefore, total heat accumulation from first planting of Alaska peas to the last processing date of Sweets is $880+100+30=1010$ degree-days.

At this time Perfection peas must be ready for processing. The same calculations as for Sweets peas are performed to obtain the planting and processing times for Perfection peas, and again for Superior peas.

After some experimenting and adjustment for local peculiarities, the degree-day theory can be a reliable tool for both farmers

and processors. This theory is not meant to replace any practice already in use in field operations. It is rather an attempt to express mathematically the influence of temperature on crop growth. Many commercial canners have found this method of scheduling plantings very useful.

The heat maturity constant (HMC) (the number of growing degree-days from planting to harvest) is often difficult to find out for specific crop varieties. It is hoped eventually that all companies will put the HMC value on the seed tag or package. This practice is common for hybrid corn varieties.

Growing degree-day data for 11 stations across Canada are presented in both tabulated and graphic forms, in Tables 2-32 and Figures 2-12. The tabulated data have a particular format that requires some explanation. Data collected over 30 years, 1941 to 1970 inclusive, have been arranged in a frequency table. The tables consist of six columns that indicate ranges or "octiles" and one column that gives the average or mean value for the week ending on the date specified. The first column, designated by Record low, gives the lowest number of degree-days ever recorded during the 30-year period; similarly, the sixth column gives the highest number of degree-days ever recorded.

Columns 2, 3, 4, and 5 are referred to as the first, third, fifth, and seventh octile. This means that if similar conditions prevail in the future, one could expect values below the first octile to occur one-eighth of the time, values below the third octile, three-eighths of the time, and so on.

Other information can be derived from the tables. Each interval between two columns (the spaces under the headings MB, B, Normal, A, and MA) gives a range of degree-day values. The first range is designated MB, for much below normal; it is followed by range B, for below normal; range Normal; range A, for above normal; and range MA, for much above normal. All ranges except MB and MA each contain one-quarter of the total range of values; ranges MB and MA each contain one-eighth. Such a system enables the grower or farmer to compare the current growing season with a normal season and determine just how late or early are the present growing conditions.

For example, the following information was taken from Table 23 for Ottawa and shows the normal distribution of degree-days for the week ending August 5. The base temperature is 5°C.

Record low	MB	B	Normal	A	MA	Record high	Mean
1055	1162	1227	1300	1374	1502	1266	
	(1st octile)	(3rd octile)	(5th octile)	(7th octile)			
Range	Range	Range	Range	Range	Range		
MB	B	Normal	A	MA			
(much below normal)	(below normal)		(above normal)	(much above normal)			

Thus, if the accumulated growing degree-days for August 5 are said to be a record high, or another such designation, then the meaning, in terms of degree-days and likelihood of occurrence, is as follows:

- Record high — the value is equal to or greater than 1502
- MA (Much above normal) — the value is greater than 1374 but less than 1502, and should occur one-eighth of the time
- A (Above normal) — the value is greater than 1300 but equal to or less than 1374, and should occur one-quarter of the time
- N (Normal) — the value is equal to or between 1227 and 1300, and should occur one-quarter of the time
- B (Below normal) — the value is less than 1227 but equal to or greater than 1162, and should occur one-quarter of the time
- MB (Much below normal) — the value is less than 1162 but greater than 1055, and should occur one-eighth of the time
- Record low — the value is equal to or less than 1055
- Mean — the value is the average or arithmetic mean for the 30-year period

Although a few growing degree-days accumulate before the month of April, no direct contribution is made to the beginning of growth in early spring. Consequently, the tabulated accumulations are given only for those months normally considered to be part of

the growing season in Canada. This period extends from April through to the end of October.

In the graphic presentation of accumulated growing degree-days, curves are shown for three of the most commonly used base temperatures, 5, 10, and 13°C. By plotting the growing degree-days for the current season, as derived from local temperature data, you can evaluate the current season's progress in relation to the normal or expected temperature pattern. Similarly, comparisons can be made between geographical areas that may each be characteristic of a particular climate in a certain region of Canada. Such climates may reflect, individually or in combination, the modifying effects of large areas of land or water and latitude. For example, Harrow, Ont., and Beaverlodge, Alta., exhibit quite different climates. Although the difference is mainly a result of latitude, the proximity of water, the air drainage pattern, and the soil type also influence the particular temperature regime and this in turn determines the availability of growing degree-days.

In addition to the availability of growing degree-days, the length of the freeze-free period influences the crop production of a region. This period is defined as the number of calendar days from the average date of the last freeze (0°C) in the spring to the average date of the first freeze (0°C) in the fall. The days of the last spring freeze and the first fall freeze are not included in the total freeze-free period because they are days with a freezing temperature.

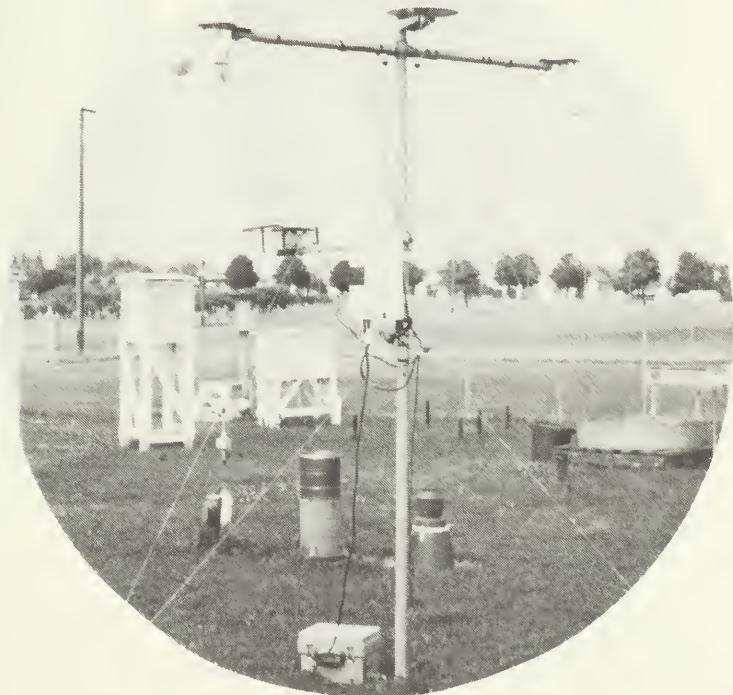
The average dates of the last spring freeze and the first fall freeze at three levels of severity, light (0°), moderate (-2°), and severe (-4°C), are also given on the graphs of accumulated growing degree-days for each of the 11 stations. These dates provide the user with additional insight concerning the risk of a freeze in the particular region.

A large difference exists between the freeze-free periods at the various stations; for instance, Sidney, B.C., has an average freeze-free season of 230 days whereas Beaverlodge, Alta., has only 108 days. It should be noted that although the freeze-free season may be longer, the accumulation of growing degree-days is not always correspondingly higher. Ottawa, Ont., has a short season of 138 days compared with Sidney, B.C., which has a 230-day season. However, the accumulated growing degree-days (base 5°C) in Ottawa are seasonally more than 2000, whereas at Sidney they are seasonally less than 1900. This explains why a "heat-loving" crop such as corn does not produce grain particularly well in a maritime type of climate such as that found in the coastal region of British Columbia.

Although the growing season is usually assumed to be the same length as the freeze-free period, the true growing season can be defined as the number of days in a year in which a crop can grow. In general, plant growth begins and ends at a threshold temperature of 5°C, so the growing season can be defined as the number of days between the first time that a mean daily temperature of 5°C occurs in the spring and the last time a mean daily temperature of 5°C occurs in the fall. The direct measurement of the length of the growing season is extremely difficult because of biological factors; such matters as the type of cultivar, stage of development, and resistance to low temperature must be considered. Therefore, a purely meteorological definition of the growing season is incomplete and should be used with caution in agroclimatic descriptions.

ACKNOWLEDGMENTS

This work is based on the climatological records compiled by the Atmospheric Environment Service, Department of the Environment. A special thanks to those weather observers who diligently observe and record the daily weather. Without such long-term observations, publications of this nature are impossible.



APPENDIX I

THE FACTORS H AND L FOR USE IN COMPUTING DEGREE-DAYS

H	L	H	L	H	L	H	L
-0.70	0.70	-0.32	0.39	0.05	0.17	0.42	0.05
-0.69	0.70	-0.31	0.38	0.06	0.17	0.43	0.05
-0.68	0.69	-0.30	0.38	0.07	0.16	0.44	0.04
-0.67	0.68	-0.29	0.37	0.08	0.16	0.45	0.04
-0.66	0.67	-0.28	0.36	0.09	0.15	0.46	0.04
-0.65	0.66	-0.27	0.36	0.10	0.15	0.47	0.04
-0.64	0.65	-0.26	0.35	0.11	0.14	0.48	0.04
-0.63	0.64	-0.25	0.34	0.12	0.14	0.49	0.03
-0.62	0.63	-0.24	0.34	0.13	0.13	0.50	0.03
-0.61	0.62	-0.23	0.33	0.14	0.13	0.51	0.03
-0.60	0.61	-0.22	0.32	0.15	0.13	0.52	0.03
-0.59	0.60	-0.21	0.32	0.16	0.12	0.53	0.03
-0.58	0.59	-0.20	0.31	0.17	0.12	0.54	0.03
-0.57	0.58	-0.19	0.30	0.18	0.11	0.55	0.03
-0.56	0.58	-0.18	0.30	0.19	0.11	0.56	0.02
-0.55	0.57	-0.17	0.29	0.20	0.11	0.57	0.02
-0.54	0.56	-0.16	0.29	0.21	0.10	0.58	0.02
-0.53	0.55	-0.15	0.28	0.22	0.10	0.59	0.02
-0.52	0.54	-0.14	0.27	0.23	0.10	0.60	0.02
-0.51	0.53	-0.13	0.27	0.24	0.09	0.61	0.02
-0.50	0.53	-0.12	0.26	0.25	0.09	0.62	0.02
-0.49	0.52	-0.11	0.25	0.26	0.09	0.63	0.02
-0.48	0.51	-0.10	0.25	0.27	0.08	0.64	0.02
-0.47	0.50	-0.09	0.24	0.28	0.08	0.65	0.01
-0.46	0.50	-0.08	0.24	0.29	0.08	0.66	0.01
-0.45	0.49	-0.07	0.23	0.30	0.07	0.67	0.01
-0.44	0.48	-0.06	0.23	0.31	0.07	0.68	0.01
-0.43	0.47	-0.05	0.22	0.32	0.07	0.69	0.01
-0.42	0.47	-0.04	0.22	0.33	0.07	0.70	0.01
-0.41	0.46	-0.03	0.21	0.34	0.06	0.71	0.01
-0.40	0.45	-0.02	0.20	0.35	0.06	0.72	0.01
-0.39	0.44	-0.01	0.20	0.36	0.06	0.73	0.01
-0.38	0.44	-0.00	0.19	0.37	0.06	0.74	0.01
-0.37	0.43	0.01	0.19	0.38	0.06	0.75	0.01
-0.36	0.42	0.02	0.18	0.39	0.05	0.76	0.01
-0.35	0.41	0.03	0.18	0.40	0.05	0.77	0.01
-0.34	0.41	0.04	0.17	0.41	0.05	0.78	0.00
-0.33	0.40						

For $H \leq 0.78$, $L = 0$.

For $H \geq -0.70$, $L = -H$.

To obtain a value for L , use the following equation to calculate H :

$$H = \frac{(t - b)}{\sigma\sqrt{N}}$$

where t =monthly mean temperature

b =base temperature

σ =standard deviation of the monthly mean temperature

N =number of days in the month

Reference: Thom, H.C.S. 1954. The rational relationship between heating degree-days and temperature. Monthly Weather Review 82 (9):1-6.

TABLE 2

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE-DAYS ABOVE 50°C FROM JANUARY 1

SIDNEY, B.C.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD LOW	MB	B	NORMAL	A	RECORD MA	HIGH	DAILY MEAN
APR.	1 39	59	87	107	160	224	224	105
	8 55	72	105	129	182	254	254	125
	15 67	92	136	149	204	284	284	150
	22 80	123	160	175	228	321	321	177
	29 92	141	187	209	268	375	375	206
MAY	6 122	173	226	250	302	416	416	243
	13 144	222	280	296	354	471	471	286
	20 184	275	325	347	408	510	510	336
	27 217	319	372	407	470	577	577	392
JUNE	3 252	372	427	470	528	630	630	450
	10 330	448	489	534	587	696	696	515
	17 381	514	550	599	667	779	779	580
	24 446	577	614	664	737	878	878	649
JULY	1 495	644	676	744	805	948	948	719
	8 551	718	758	822	886	1050	1050	796
	15 628	799	836	895	974	1145	1145	877
	22 698	873	924	972	1062	1240	1240	961
	29 762	946	1012	1056	1147	1356	1356	1043
AUG.	5 829	1024	1089	1136	1239	1449	1449	1123
	12 904	1100	1174	1216	1326	1543	1543	1206
	19 983	1175	1247	1287	1401	1636	1636	1287
	26 1049	1260	1331	1368	1485	1735	1735	1364
SEP.	2 1125	1334	1398	1446	1559	1805	1805	1437
	9 1210	1396	1473	1518	1630	1885	1885	1509
	16 1261	1461	1530	1582	1698	1961	1961	1574
	23 1306	1516	1592	1649	1768	2012	2012	1632
OCT.	30 1352	1565	1642	1721	1817	2064	2064	1687
	7 1391	1616	1698	1759	1872	2118	2118	1734
	14 1418	1664	1736	1805	1922	2159	2159	1775
	21 1449	1688	1762	1833	1965	2197	2197	1806
	28 1478	1710	1789	1862	1991	2224	2224	1835

TABLE 3

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE-DAYS ABOVE 10°C FROM JANUARY 1

SIDNEY, B.C.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD					RECORD		DAILY MEAN
	LOW	MB	B	NORMAL	A	MA	HIGH	
APR. 1	0		1	2	5	14	29	6
8	1		2	4	9	17	33	9
15	3		4	10	16	24	38	13
22	3		6	13	19	32	49	18
29	4		10	20	27	39	70	25
MAY 6	10		16	28	37	58	81	35
13	12		26	43	54	73	106	49
20	22		41	58	80	93	114	68
27	30		62	76	103	129	153	92
JUNE 3	37		81	101	122	165	190	117
10	81		108	132	153	197	240	148
17	100		136	157	180	234	288	179
24	130		164	200	225	268	352	213
JULY 1	145		196	233	260	306	388	248
8	167		234	266	306	350	455	291
15	209		280	314	356	398	514	337
22	244		320	362	403	453	575	385
29	273		363	414	450	494	656	432
AUG. 5	305		402	464	486	546	714	478
12	346		452	505	533	597	773	526
19	390		492	545	576	653	830	572
26	421		541	589	624	705	895	614
SEP. 2	463		574	629	661	745	929	652
9	509		605	667	704	779	975	689
16	530		632	692	729	811	1015	720
23	544		656	710	759	839	1035	745
30	558		671	738	788	861	1055	767
OCT. 7	568		688	750	796	882	1075	783
14	572		699	761	802	898	1086	794
21	577		708	765	806	909	1093	800
28	581		715	769	813	914	1098	805

TABLE 4

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 13°C FROM JANUARY 1

SIDNEY, B.C.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD					RECORD			DAILY MEAN
	LOW	MB	B	NORMAL	A	MA	HIGH		
APR.	1	0	0	0	0	2	6	1	
	8	0	0	0	1	3	6	1	
	15	0	0	1	2	5	8	2	
	22	0	0	1	3	9	10	3	
	29	0	0	2	5	12	18	5	
MAY	6	1	1	5	9	17	20	8	
	13	1	3	10	17	23	32	13	
	20	3	7	16	26	35	44	21	
	27	5	13	23	32	54	71	31	
	JUNE 3	5	24	32	43	67	88	42	
JULY	10	22	35	45	62	84	117	57	
	17	34	46	56	78	99	146	72	
	24	47	56	74	95	117	189	89	
	1	54	72	98	111	139	206	107	
	8	61	89	119	139	162	252	131	
AUG.	15	83	112	141	165	199	290	157	
	22	100	133	173	197	234	331	186	
	29	111	160	198	226	259	391	214	
	5	126	182	229	248	293	428	240	
	12	148	209	253	279	330	467	268	
SEP.	19	172	230	278	302	368	504	294	
	26	185	259	300	326	396	547	316	
	2	205	273	311	344	417	563	336	
	9	216	291	331	360	433	590	356	
	16	226	299	349	369	441	611	370	
OCT.	23	236	306	360	381	452	617	380	
	30	243	312	367	391	458	624	389	
	7	244	321	374	399	461	631	394	
	14	245	324	375	399	467	632	396	
	21	247	325	376	399	469	633	397	
	28	247	327	376	400	469	633	398	

TABLE 5

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 5°C FROM JANUARY 1

SUMMERLAND, B.C.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD					RECORD	DAILY MEAN
	LOW	MB	B	NORMAL	A	HIGH	
APR. 1	15	32	43	56	86	119	54
8	39	49	66	81	112	150	79
15	63	79	101	112	137	195	109
22	81	113	132	149	171	243	143
29	92	134	171	186	206	312	178
MAY 6	130	177	211	235	260	365	223
13	162	228	261	296	323	424	279
20	215	283	317	363	395	483	344
27	256	345	396	438	484	563	416
JUNE 3	304	423	472	506	559	633	493
10	394	491	557	584	672	709	577
17	489	590	643	675	778	809	663
24	581	686	726	765	867	952	757
JULY 1	644	784	817	851	950	1046	846
8	720	874	926	966	1055	1165	951
15	847	983	1045	1087	1169	1286	1066
22	969	1099	1147	1193	1294	1437	1180
29	1066	1211	1265	1316	1400	1574	1295
AUG. 5	1159	1325	1377	1432	1510	1694	1408
12	1273	1422	1489	1546	1628	1826	1521
19	1383	1512	1585	1664	1735	1958	1627
26	1472	1597	1689	1770	1829	2103	1726
SEP. 2	1572	1680	1789	1860	1925	2196	1816
9	1648	1749	1879	1940	2020	2290	1901
16	1718	1822	1965	2010	2099	2372	1977
23	1787	1885	2020	2079	2186	2424	2042
30	1848	1928	2081	2147	2237	2469	2102
OCT. 7	1869	1962	2118	2205	2281	2533	2148
14	1911	1988	2155	2237	2318	2560	2186
21	1949	2014	2165	2262	2347	2590	2214
28	1957	2033	2186	2291	2367	2603	2232

TABLE 6

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 10°C FROM JANUARY 1

SUMMERLAND, B.C.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD						RECORD	DAILY MEAN
	LOW	MB	B	NORMAL	A	MA	HIGH	
APR.	1	0	2	4	7	15	26	7
	8	2	5	8	15	23	45	14
	15	8	12	18	25	38	51	23
	22	9	18	24	40	52	73	35
	29	12	27	38	51	68	110	47
MAY	6	30	39	54	76	88	132	66
	13	42	54	79	102	130	161	92
	20	64	87	107	140	165	194	125
	27	78	119	142	171	229	246	165
	JUNE 3	97	165	188	210	270	294	209
JULY	10	153	201	237	267	334	361	258
	17	214	250	284	329	378	435	310
	24	272	305	334	383	433	535	369
	JULY 1	302	361	407	438	482	593	424
	8	344	422	482	512	558	678	495
AUG.	15	436	496	554	587	654	764	574
	22	519	569	630	670	747	880	653
	29	579	657	709	752	816	981	733
	5	643	721	781	835	902	1067	812
	12	715	788	857	912	984	1163	889
SEP.	19	776	847	921	1001	1056	1261	960
	26	817	917	986	1068	1126	1371	1025
	2	871	957	1054	1127	1198	1428	1080
	9	912	1004	1103	1166	1246	1488	1131
	16	947	1036	1147	1208	1268	1536	1173
OCT.	23	982	1064	1176	1248	1291	1555	1205
	30	1012	1082	1205	1281	1321	1572	1234
	7	1017	1092	1225	1297	1345	1603	1252
	14	1036	1096	1243	1313	1364	1609	1265
	21	1047	1102	1244	1318	1377	1616	1271
	28	1047	1106	1248	1319	1383	1617	1275

TABLE 7

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 13°C FROM JANUARY 1

SUMMERLAND, B.C.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD	CLASS FREQUENCY AND BOUNDARY						RECORD	DAILY MEAN
		LOW	MB	B	NORMAL	A	MA		
APR.	1	0		0	0	1	3	8	2
	8	0		0	1	4	9	18	4
	15	1		2	4	7	14	18	7
	22	1		4	7	15	23	27	12
	29	1		7	13	19	30	49	17
	MAY 6	9		11	19	31	40	57	27
JUNE	13	13		16	34	47	67	80	41
	20	23		35	46	68	85	112	59
	27	28		51	66	86	115	153	83
	JULY 3	38		78	98	115	155	182	110
AUG.	10	75		101	123	151	196	229	141
	17	111		124	151	190	215	285	175
	24	152		161	189	225	267	361	215
	JULY 1	170		196	233	260	293	399	251
	8	194		235	287	318	350	462	301
SEP.	15	263		290	349	372	431	527	361
	22	311		338	396	430	499	623	419
	29	352		406	452	487	561	703	479
	AUG. 5	400		446	513	550	612	768	536
OCT.	12	448		493	570	613	681	843	593
	19	488		532	609	676	736	919	644
	26	510		581	648	726	790	1008	688
	SEP. 2	545		612	694	767	837	1045	725
	9	568		649	718	794	852	1087	758
NOV.	16	585		671	747	824	862	1114	783
	23	604		687	762	842	874	1121	800
	30	619		698	778	854	890	1128	815
	NOV. 7	621		700	786	864	901	1144	823
DEC.	14	629		701	788	867	909	1145	827
	21	631		703	788	871	914	1146	829
	28	631		704	789	871	914	1147	830

TABLE 8

FREQUENCY CLASSES AND 30-YEAR AVERAGES
 OF DEGREE DAYS ABOVE 5°C FROM JANUARY 1
 LETHBRIDGE, ALTA.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD	LOW	MB	B	NORMAL	A	RECORD	DAILY MEAN
							MA	HIGH
APR. 1	10	17	28	47	68	91	40	
8	11	31	40	60	84	98	54	
15	17	40	58	80	109	124	73	
22	40	53	76	110	140	157	93	
29	40	65	96	131	161	203	115	
MAY 6	43	90	120	169	187	232	144	
13	52	116	157	203	243	272	179	
20	107	157	203	249	292	311	224	
27	160	202	255	298	342	360	276	
JUNE 3	204	252	311	357	408	416	333	
10	256	299	375	427	469	500	395	
17	329	369	445	489	537	564	461	
24	390	434	512	574	609	666	532	
JULY 1	480	494	588	639	683	757	603	
8	546	577	681	720	769	862	691	
15	643	683	774	819	852	961	784	
22	746	773	857	917	947	1063	880	
29	844	872	947	1013	1054	1146	974	
AUG. 5	930	960	1046	1103	1152	1256	1068	
12	1024	1041	1127	1200	1240	1347	1158	
19	1104	1123	1207	1285	1336	1446	1243	
26	1163	1195	1287	1349	1428	1555	1323	
SEP. 2	1189	1282	1343	1424	1495	1636	1391	
9	1251	1352	1402	1480	1568	1690	1453	
16	1302	1397	1458	1533	1626	1727	1507	
23	1336	1432	1506	1583	1674	1750	1551	
30	1353	1455	1569	1644	1712	1771	1594	
OCT. 7	1393	1491	1614	1676	1765	1822	1631	
14	1439	1520	1653	1702	1789	1880	1663	
21	1439	1543	1676	1722	1824	1923	1689	
28	1444	1566	1691	1733	1850	1946	1709	

TABLE 9

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 10°C FROM JANUARY 1

LETHBRIDGE, ALTA.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD	LOW	MB	B	NORMAL	A	RECORD	DAILY
							MA	MEAN
APR.	1	0		1	3	9	13	7
	8	0		3	9	12	20	11
	15	1		5	14	23	30	17
	22	4		9	16	30	41	24
	29	4		14	24	41	58	33
							72	
MAY	6	5		21	32	54	70	44
	13	6		31	40	69	92	59
	20	33		47	74	81	110	79
	27	44		67	94	115	140	104
JUNE	3	61		87	120	144	173	132
	10	85		109	148	177	210	163
	17	116		139	183	217	248	197
	24	163		178	222	258	294	235
JULY	1	197		210	258	292	321	273
	8	237		256	318	340	372	327
	15	295		323	371	401	426	386
	22	357		384	430	465	503	447
	29	413		443	483	522	576	506
AUG.	5	466		495	542	575	643	566
	12	525		549	596	639	701	622
	19	575		590	652	684	761	673
	26	604		634	690	730	808	719
SEP.	2	606		677	725	769	832	756
	9	637		711	750	800	873	789
	16	658		736	781	834	908	816
	23	674		747	792	860	935	836
OCT.	30	680		761	818	878	965	857
	7	692		777	833	887	990	873
	14	712		795	856	901	1014	886
	21	712		803	872	908	1027	896
	28	713		816	878	909	1028	903

TABLE 10

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 13°C FROM JANUARY 1

LETHBRIDGE, ALTA.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD	LOW	MB	B	NORMAL	A	RECORD	DAILY MEAN
							MA	HIGH
APR. 1	0	0	0	0	2	4	10	2
8	0	0	0	3	4	6	11	3
15	0	1	5	8	12	13	13	6
22	0	2	5	11	18	26	26	9
29	0	4	9	16	28	35	35	14
MAY 6	0	6	14	22	34	38	38	19
13	0	10	19	32	44	62	62	27
20	15	18	32	41	52	77	77	37
27	17	31	44	56	70	90	90	51
JUNE 3	24	43	57	73	96	107	107	66
10	37	51	72	89	126	136	136	84
17	50	69	93	111	142	175	175	104
24	76	86	110	135	167	220	220	127
JULY 1	95	107	136	162	180	259	259	149
8	118	136	176	190	215	310	310	185
15	159	184	214	235	252	354	354	225
22	201	223	250	275	317	401	401	267
29	241	257	291	316	362	432	432	308
AUG. 5	276	296	328	361	402	486	486	348
12	316	329	365	394	449	526	526	386
19	340	352	405	424	487	570	570	420
26	354	382	429	450	519	624	624	449
SEP. 2	361	400	454	478	536	654	654	472
9	379	414	468	497	564	667	667	492
16	388	437	477	518	587	676	676	508
23	397	442	493	533	599	681	681	519
30	400	456	505	540	609	695	695	531
OCT. 7	403	464	515	546	626	712	712	539
14	415	480	522	553	635	712	712	546
21	415	485	524	553	644	719	719	550
28	415	491	528	555	647	719	719	554

TABLE 11

FREQUENCY CLASSES AND 30-YEAR AVERAGES
 OF DEGREE DAYS ABOVE 5°C FROM JANUARY 1
 BEAVERLODGE, ALTA.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD	CLASS FREQUENCY AND BOUNDARY						RECORD	DAILY MEAN
		LOW	MB	B	NORMAL	A	MA		
APR.	1	0		1	5	8	16	18	7
	8	0		2	7	14	22	40	12
	15	1		5	14	19	32	59	20
	22	1		12	19	31	49	85	30
	29	4		16	35	43	74	137	45
MAY	6	17		37	54	64	97	173	66
	13	25		55	83	105	139	195	95
	20	67		91	113	142	177	228	134
	27	106		133	158	192	227	275	179
JUNE	3	164		177	203	252	285	333	229
	10	210		230	253	310	356	402	286
	17	256		286	317	351	424	458	344
	24	312		335	376	416	496	527	404
JULY	1	380		396	434	482	557	610	465
	8	446		463	500	556	632	698	537
	15	517		545	574	620	711	789	613
	22	579		612	646	690	805	906	691
	29	640		677	720	761	877	986	762
AUG.	5	711		739	806	838	965	1044	838
	12	770		804	872	925	1044	1124	911
	19	817		866	934	994	1119	1204	976
	26	880		914	985	1067	1191	1279	1037
SEP.	2	927		972	1043	1114	1245	1308	1088
	9	946		1003	1084	1165	1293	1348	1133
	16	973		1048	1131	1204	1337	1402	1175
	23	996		1080	1159	1259	1361	1428	1208
OCT.	30	1011		1104	1188	1283	1378	1452	1237
	7	1043		1117	1207	1303	1401	1486	1260
	14	1059		1131	1218	1332	1410	1535	1279
	21	1066		1147	1228	1342	1433	1566	1293
	28	1077		1155	1249	1343	1438	1590	1301

TABLE 12

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 10°C FROM JANUARY 1
BEAVERLODGE, ALTA.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD					RECORD	DAILY MEAN
	LOW	MR	B	NORMAL	A	MA	HIGH
APR.	1	0	0	0	0	1	2
	8	0	0	0	1	4	9
	15	0	0	0	2	6	13
	22	0	0	2	5	9	20
	29	0	1	5	7	17	45
MAY	6	2	4	8	15	25	57
	13	3	9	17	30	42	63
	20	16	20	35	47	64	83
	27	27	35	51	70	90	103
	JUNE 3	39	58	67	89	124	137
JUNE	10	50	79	93	116	156	186
	17	66	101	125	141	181	228
	24	93	123	150	168	219	269
	JULY 1	126	155	175	201	265	306
	8	173	191	209	241	312	333
JULY	15	210	230	247	285	357	387
	22	241	264	293	324	417	460
	29	270	292	326	361	458	506
	AUG. 5	306	327	379	414	511	531
	12	335	357	405	458	552	575
AUG.	19	352	385	443	494	601	622
	26	385	406	461	534	619	676
	SEP. 2	395	435	489	556	636	697
	9	399	458	509	587	672	704
	16	408	472	527	615	682	726
SEP.	23	413	483	532	634	690	728
	30	414	487	546	648	715	731
	OCT. 7	427	492	564	654	721	744
	14	440	494	567	656	724	757
	21	440	496	569	657	728	769
OCT.	28	442	497	572	657	729	776
							609

TABLE 13

FREQUENCY CLASSES AND 30 -YEAR AVERAGES
OF DEGREE DAYS ABOVE 13° C FROM JANUARY 1

BEAVERLODGE, ALTA.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD					RECORD	DAILY MEAN
	LOW	MB	B	NORMAL	A	MA	HIGH
APR. 1	0	0	0	0	0	0	0
8	0	0	0	0	1	3	0
15	0	0	0	0	2	4	1
22	0	0	0	1	4	7	1
29	0	0	1	2	5	20	3
MAY 6	0	1	2	6	10	25	6
13	0	2	5	13	21	27	10
20	4	6	14	22	29	38	18
27	7	13	22	32	47	56	29
JUNE 3	11	22	29	44	63	85	41
10	15	34	44	59	83	117	55
17	21	44	59	72	98	142	70
24	33	54	72	90	115	164	86
JULY 1	50	73	85	104	146	184	102
8	80	90	104	129	177	197	125
15	102	112	125	154	206	236	150
22	120	129	149	179	246	275	178
29	135	148	170	203	268	302	200
AUG. 5	147	170	211	233	302	329	226
12	165	179	223	262	329	356	249
19	174	191	246	287	361	387	268
26	183	206	253	309	370	424	285
SEP. 2	185	214	263	322	375	434	297
9	187	224	278	343	393	435	307
16	191	234	285	356	398	447	316
23	191	242	288	361	407	447	322
30	191	247	288	368	418	448	328
OCT. 7	198	248	299	370	420	453	330
14	204	249	303	371	425	461	333
21	206	250	304	374	427	464	334
28	207	250	304	374	427	464	334

TABLE 14

FREQUENCY CLASSES AND 30-YEAR AVERAGES
 OF DEGREE DAYS ABOVE 50° C FROM JANUARY 1
 SWIFT CURRENT, SASK.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD					RECORD	DAILY MEAN
	LOW	MB	B	NORMAL	A	MA	HIGH
APR.	1	0	1	4	11	30	40
	8	0	3	11	30	40	45
	15	3	8	25	45	62	77
	22	7	17	44	65	93	112
	29	14	38	62	85	123	162
MAY	6	22	55	90	116	153	204
	13	32	82	129	156	192	281
	20	78	126	175	206	245	332
	27	148	166	225	271	295	375
	JUNE	3	196	222	288	322	446
JULY	10	239	271	350	402	431	547
	17	302	340	429	467	507	606
	24	367	408	488	536	576	679
	1	432	484	565	615	672	749
	8	532	565	658	704	776	842
AUG.	15	630	658	759	801	872	942
	22	737	757	840	901	968	1042
	29	826	863	934	994	1062	1150
	5	903	968	1038	1099	1175	1263
	12	987	1051	1142	1201	1256	1374
SEP.	19	1052	1145	1216	1293	1354	1473
	26	1104	1244	1287	1380	1436	1582
	2	1185	1316	1373	1458	1531	1668
	9	1262	1383	1440	1520	1612	1727
	16	1278	1420	1492	1562	1683	1768
OCT.	23	1344	1430	1538	1610	1741	1797
	30	1366	1445	1574	1657	1779	1823
	7	1391	1490	1619	1689	1814	1880
	14	1421	1518	1660	1699	1844	1942
	21	1427	1540	1686	1725	1858	1992
	28	1443	1566	1697	1735	1868	2021
							1708

TABLE 15

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 10°C FROM JANUARY 1

SWIFT CURRENT, SASK.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD					RECORD	DAILY MEAN
	LOW	MB	B	NORMAL	A	HIGH	
APR.	1	0	0	0	2	6	2
	8	0	0	2	4	9	4
	15	0	1	5	11	15	9
	22	1	3	10	15	31	16
	29	2	6	16	25	49	25
MAY	6	2	13	27	42	61	37
	13	5	21	42	55	83	52
	20	26	38	59	75	107	72
	27	49	59	83	112	138	99
JUNE	3	62	84	113	147	173	130
	10	75	103	152	181	221	166
	17	105	146	194	220	253	204
	24	140	181	225	261	306	243
JULY	1	174	223	260	297	353	287
	8	239	277	317	361	429	344
	15	302	329	375	425	490	408
	22	376	392	428	489	545	472
AUG.	29	430	459	498	560	602	536
	5	472	517	572	629	671	602
	12	522	562	630	695	725	662
	19	562	613	685	755	788	719
SEP.	26	596	678	725	795	845	770
	2	644	705	771	841	913	809
	9	667	736	808	882	950	843
	16	681	768	826	912	997	870
OCT.	23	700	783	846	918	1022	889
	30	713	801	873	936	1047	906
	7	719	822	889	946	1058	920
	14	728	825	911	960	1062	932
	21	747	827	919	966	1067	941
	28	747	837	924	967	1070	945

TABLE 16

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 13°C FROM JANUARY 1

SWIFT CURRENT, SASK.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD					RECORD	DAILY MEAN
	LOW	MB	B	NORMAL	A	HIGH	
APR.	1	0	0	0	2	5	1
	8	0	0	0	3	5	1
	15	0	0	2	6	13	3
	22	0	1	3	15	22	6
	29	0	1	6	24	40	11
MAY	6	0	4	10	31	48	17
	13	1	8	18	46	76	25
	20	12	17	28	60	95	36
	27	20	28	39	79	107	52
JUNE	3	27	41	59	102	130	71
	10	32	51	76	134	177	92
	17	47	74	107	158	199	115
	24	69	96	119	187	236	139
JULY	1	87	117	141	214	285	166
	8	134	154	181	271	350	205
	15	178	195	219	314	396	249
	22	217	236	268	350	438	294
	29	256	279	318	391	480	339
AUG.	5	290	312	364	443	547	386
	12	321	350	400	484	592	428
	19	344	382	435	521	649	466
	26	363	411	477	566	712	501
SEP.	2	394	426	498	551	750	525
	9	405	444	507	628	768	546
	16	411	461	527	657	777	562
	23	421	467	533	676	783	572
	30	428	488	549	690	785	582
OCT.	7	432	494	558	694	797	589
	14	436	499	563	695	803	596
	21	446	502	568	697	814	599
	28	446	506	571	700	814	602

TABLE 17

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 5°C FROM JANUARY 1

WINNIPEG, MAN.

CLASS FREQUENCY AND BOUNDARY

WEEK ENDING	RECORD		B	NORMAL	A	RECORD	DAILY MEAN
	LOW	MB				HIGH	
APR.	1	0	0	0	1	19	5
	8	0	0	1	6	24	8
	15	0	1	9	17	43	20
	22	2	5	25	35	73	35
	29	4	23	33	70	105	58
MAY	6	7	37	75	107	155	93
	13	29	49	97	141	199	125
	20	60	80	149	186	255	168
	27	119	135	200	248	311	224
JUNE	3	159	180	254	316	382	287
	10	225	246	335	396	447	361
	17	288	327	421	470	521	441
	24	391	412	505	545	609	524
JULY	1	464	496	596	643	711	617
	8	542	589	677	747	825	715
	15	619	700	784	848	928	818
	22	730	809	895	963	1040	925
	29	840	911	996	1074	1165	1031
AUG.	5	939	1004	1099	1170	1269	1136
	12	1032	1089	1191	1270	1375	1237
	19	1108	1175	1277	1366	1487	1330
	26	1163	1264	1380	1467	1575	1424
SEP.	2	1256	1350	1469	1535	1671	1507
	9	1328	1424	1540	1611	1732	1577
	16	1382	1461	1586	1679	1796	1634
	23	1436	1496	1636	1729	1831	1681
OCT.	30	1476	1533	1664	1757	1903	1718
	7	1507	1546	1699	1788	1934	1753
	14	1521	1576	1751	1796	1953	1782
	21	1550	1589	1781	1827	1969	1807
	28	1567	1596	1782	1839	1977	1818

TABLE 18

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 10°C FROM JANUARY 1

WINNIPEG, MAN.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	DAILY
							MA	MEAN
APR.	1	0		0	0	0	2	1
	8	0		0	0	0	6	1
	15	0		0	1	4	12	5
	22	0		0	5	9	24	10
	29	0		4	9	26	36	20
MAY	6	0		7	24	38	71	36
	13	6		11	32	59	91	50
	20	15		19	55	71	114	70
	27	42		51	82	111	148	98
	3	51		73	113	156	191	132
JUNE	10	82		108	154	193	226	173
	17	113		148	220	238	280	220
	24	182		204	258	284	331	270
	1	221		247	314	347	409	329
	8	262		310	374	413	489	392
JULY	15	309		384	435	489	547	461
	22	394		451	510	560	628	533
	29	466		500	571	630	709	604
	5	533		558	647	708	781	674
	12	589		621	720	777	861	740
AUG.	19	610		683	778	828	939	799
	26	645		747	833	890	1001	859
	2	686		798	888	927	1046	909
	9	702		836	908	984	1080	947
	16	767		849	923	1010	1105	975
SEP.	23	797		858	950	1022	1123	995
	30	813		871	968	1031	1162	1011
	7	816		875	978	1049	1191	1026
	14	824		882	994	1055	1197	1037
	21	825		894	1013	1076	1201	1046
OCT.	28	825		895	1013	1076	1207	1049

TABLE 19

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 13°C FROM JANUARY 1

WINNIPEG, MAN.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	MA	HIGH	DAILY
										MEAN
APR.	1	0		0	0	0	0	3		0
	8	0		0	0	0	2	3		0
	15	0		0	0	1	5	12		2
	22	0		0	1	4	9	25		4
	29	0		1	3	12	18	66		9
MAY	6	0		2	9	19	41	99		19
	13	2		4	14	28	52	104		26
	20	5		7	27	38	65	110		37
	27	19		25	42	59	85	136		54
JUNE	3	21		38	61	89	113	143		74
	10	38		57	84	114	139	183		100
	17	55		82	124	145	168	227		130
	24	100		119	146	172	213	259		162
JULY	1	114		141	186	212	256	290		202
	8	135		184	220	268	316	341		246
	15	183		231	269	320	366	390		294
	22	238		273	322	372	418	452		346
	29	278		309	375	423	484	506		397
AUG.	5	328		355	420	481	541	571		447
	12	355		397	468	514	603	627		493
	19	363		450	510	547	657	694		534
	26	380		491	554	602	698	747		575
SEP.	2	405		516	582	632	725	797		607
	9	410		532	594	664	746	823		630
	16	455		540	605	674	760	840		646
	23	469		544	618	688	768	851		656
OCT.	30	478		551	629	689	785	853		665
	7	479		552	637	699	800	855		672
	14	483		560	643	705	801	872		678
	21	483		562	649	709	802	889		683
	28	483		563	649	709	803	901		684

TABLE 20

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 5°C FROM JANUARY 1

HARROW, ONT.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	MA	HIGH	RECORD	DAILY
										MEAN
APR.	1	4		12	28	43	66	157		41
	8	12		26	39	61	84	199		59
	15	25		43	58	82	127	272		83
	22	49		63	90	125	181	311		118
	29	81		107	137	161	232	333		160
MAY	6	105		155	185	220	304	358		215
	13	163		204	242	275	355	399		268
	20	205		265	315	333	429	447		336
	27	273		335	385	421	504	536		410
JUNE	3	342		408	472	508	595	619		494
	10	427		516	569	609	690	736		591
	17	553		593	675	714	792	836		695
	24	637		689	781	834	912	942		804
	1	754		812	892	958	1045	1088		927
JULY	8	854		918	994	1072	1165	1239		1043
	15	969		1036	1106	1189	1291	1353		1161
	22	1098		1156	1225	1323	1421	1488		1283
	29	1229		1276	1355	1450	1554	1639		1409
	5	1342		1393	1477	1573	1692	1753		1529
AUG.	12	1459		1507	1593	1684	1812	1895		1646
	19	1565		1629	1711	1794	1911	2014		1761
	26	1656		1737	1826	1912	2023	2120		1870
	2	1758		1837	1932	2044	2136	2226		1985
SEP.	9	1857		1944	2031	2169	2250	2313		2090
	16	1941		2040	2124	2252	2359	2407		2181
	23	2008		2110	2224	2319	2456	2512		2268
	30	2067		2168	2287	2404	2514	2586		2337
	7	2128		2218	2340	2482	2593	2673		2404
OCT.	14	2180		2268	2381	2534	2678	2717		2461
	21	2252		2304	2422	2564	2723	2763		2511
	28	2295		2326	2476	2593	2768	2799		2547

TABLE 21

 FREQUENCY CLASSES AND 30-YEAR AVERAGES
 OF DEGREE DAYS ABOVE 10°C FROM JANUARY 1

HARROW, ONT.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MR	B	NORMAL	A	RECORD	MA	HIGH	DAILY	MEAN
APR.	1	0		0	5	8	18		72		10
	8	2		4	8	13	28		89		15
	15	4		8	13	24	45		132		24
	22	11		13	26	42	67		145		39
MAY	29	19		22	48	68	90		150		57
	6	24		48	65	89	131		161		85
	13	42		67	101	125	155		189		110
	20	72		91	135	151	206		239		146
JUNE	27	105		133	161	205	259		289		188
	3	148		166	213	253	306		354		238
	10	198		242	280	315	368		430		301
	17	276		294	356	373	451		499		370
JULY	24	325		365	431	455	546		579		444
	1	407		451	506	551	640		668		532
	8	472		532	578	628	730		784		613
	15	552		610	659	712	815		863		697
AUG.	22	641		682	734	819	907		963		784
	29	726		767	827	905	1013		1079		875
	5	795		841	901	983	1094		1158		959
	12	883		924	993	1055	1179		1266		1042
SEP.	19	948		1012	1054	1128	1267		1349		1122
	26	1004		1084	1144	1228	1343		1421		1196
	2	1072		1152	1205	1310	1424		1497		1276
	9	1136		1221	1273	1393	1485		1567		1346
OCT.	16	1187		1271	1329	1459	1565		1629		1404
	23	1230		1312	1407	1501	1616		1700		1457
	30	1277		1345	1449	1547	1653		1743		1495
	7	1290		1381	1479	1577	1696		1796		1531
	14	1323		1397	1510	1616	1730		1811		1559
	21	1351		1409	1529	1629	1744		1829		1582
	28	1362		1416	1539	1638	1775		1846		1596

TABLE 22

FREQUENCY CLASSES AND 30 -YEAR AVERAGES
OF DEGREE DAYS ABOVE 13° C FROM JANUARY 1

HARROW, ONT.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	DAILY
							MA	MEAN
							HIGH	
APR.	1	0		0	1	2	8	4
	8	0		1	2	5	10	6
	15	1		2	4	10	21	10
	22	2		4	10	20	28	17
	29	3		8	20	30	45	27
MAY	6	9		20	31	45	79	43
	13	15		31	46	60	90	58
	20	33		43	71	80	119	79
	27	54		65	83	108	152	105
	3	77		84	117	143	194	137
JUNE	10	116		133	158	188	235	181
	17	161		170	210	237	300	230
	24	188		220	262	296	373	285
	1	242		288	330	364	451	352
	8	299		334	387	422	513	412
JULY	15	364		395	442	482	576	475
	22	413		453	498	562	644	541
	29	477		516	570	625	726	611
	5	526		582	636	690	794	675
	12	592		644	696	738	855	736
AUG.	19	637		704	741	807	921	796
	26	673		749	791	871	977	850
	2	721		808	855	931	1035	909
	9	765		841	895	987	1082	960
	16	799		876	949	1033	1143	999
SEP.	23	823		902	992	1063	1172	1035
	30	852		920	1013	1095	1199	1057
	7	858		944	1029	1111	1221	1079
	14	877		950	1034	1140	1237	1095
	21	892		958	1056	1145	1253	1107
OCT.	28	896		964	1060	1150	1274	1113

TABLE 23

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 5°C FROM JANUARY 1

OTTAWA, ONT.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	HIGH	DAILY
							MA		MEAN
APR.	1	0		0	1	6	19	56	9
	8	0		2	6	10	38	73	14
	15	1		9	14	30	54	131	29
	22	5		19	38	54	84	147	51
	29	29		34	68	81	122	162	78
MAY	6	45		74	111	128	172	185	119
	13	78		99	147	178	218	237	162
	20	111		146	210	235	276	296	217
	27	145		214	274	302	350	377	281
JUNE	3	224		291	335	374	428	444	352
	10	294		364	420	453	512	537	433
	17	377		447	496	552	603	635	523
	24	472		529	593	649	691	741	618
JULY	1	586		627	701	761	798	852	727
	8	681		708	804	861	908	982	827
	15	784		818	919	976	1013	1106	937
	22	874		935	1013	1092	1137	1242	1047
	29	969		1056	1121	1201	1264	1358	1161
AUG.	5	1055		1162	1227	1300	1374	1502	1266
	12	1171		1272	1324	1405	1503	1615	1371
	19	1275		1374	1426	1496	1589	1750	1471
	26	1345		1476	1516	1584	1700	1866	1565
SEP.	2	1426		1555	1607	1685	1800	1962	1658
	9	1505		1627	1708	1774	1871	2036	1743
	16	1563		1685	1784	1850	1943	2096	1813
	23	1590		1751	1843	1916	2006	2172	1876
OCT.	30	1624		1792	1882	1967	2047	2225	1924
	7	1663		1844	1925	1999	2095	2268	1968
	14	1693		1885	1960	2036	2156	2330	2006
	21	1740		1905	1989	2070	2195	2353	2038
	28	1765		1912	2013	2089	2206	2365	2057

TABLE 24

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 10°C FROM JANUARY 1

OTTAWA, ONT.

CLASS FREQUENCY AND BOUNDARY

	RECORD					MA	HIGH	DAILY MEAN
	LOW	MB	B	NORMAL	A			
APR.	1	0	0	0	0	3	19	2
	8	0	0	0	1	8	24	3
	15	0	0	2	4	17	56	7
	22	0	2	7	13	28	60	14
	29	2	7	16	23	54	61	24
MAY	6	4	16	33	46	66	92	41
	13	19	29	47	71	97	111	60
	20	32	48	75	98	123	145	86
	27	45	76	102	133	169	186	120
	3	85	118	141	171	212	235	159
JUNE	10	119	154	178	223	270	283	206
	17	168	210	239	283	327	346	262
	24	217	257	306	342	385	417	322
	1	280	320	379	407	461	494	396
	8	339	375	443	475	536	588	461
JULY	15	414	457	524	559	606	677	536
	22	467	530	587	633	690	778	611
	29	552	606	666	708	789	859	690
	5	608	675	729	777	867	968	760
	12	689	754	788	845	948	1046	831
AUG.	19	746	806	864	909	1014	1146	895
	26	794	865	932	960	1090	1227	955
	2	841	914	983	1024	1149	1289	1014
	9	888	951	1037	1075	1188	1331	1065
	16	918	983	1080	1114	1227	1361	1104
SEP.	23	923	1031	1119	1157	1258	1407	1137
	30	934	1054	1131	1181	1272	1431	1158
	7	947	1081	1144	1207	1291	1447	1176
	14	958	1096	1161	1213	1323	1476	1191
	21	979	1102	1169	1218	1335	1478	1203
OCT.	28	987	1102	1178	1221	1343	1481	1208

TABLE 25

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 13°C FROM JANUARY 1

OTTAWA, ONT.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	DAILY
							MA	MEAN
APR.	1	0		0	0	0	1	1
	8	0		0	0	3	10	1
	15	0		0	1	8	31	3
	22	0		2	5	13	32	6
	29	0		1	10	29	32	11
MAY	6	1		5	13	22	34	20
	13	5		11	20	37	50	30
	20	16		19	33	51	69	43
	27	22		31	51	72	95	63
JUNE	3	34		60	70	93	125	86
	10	54		75	102	128	165	116
	17	82		112	137	162	199	153
	24	108		139	179	213	246	194
JULY	1	151		194	232	261	307	247
	8	190		227	277	305	366	293
	15	244		283	331	359	415	347
	22	279		332	386	421	475	402
	29	342		390	437	475	546	460
AUG.	5	392		437	482	523	611	510
	12	446		492	523	563	660	560
	19	478		528	573	609	715	605
	26	508		569	615	644	771	646
SEP.	2	543		597	662	694	814	686
	9	567		617	691	725	839	719
	16	590		638	723	745	862	742
	23	594		668	743	769	877	762
OCT.	30	598		680	751	781	883	772
	7	603		698	758	792	891	782
	14	609		704	759	794	908	789
	21	619		707	768	802	918	794
	28	622		707	774	802	921	796

TABLE 26

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 5°C FROM JANUARY 1

FREDERICTON, N.B.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	DAILY
							MA	MEAN
APR.	1	1		2	5	8	16	8
	8	2		4	6	12	28	13
	15	4		8	12	19	37	21
	22	9		14	28	36	51	34
	29	17		27	42	59	68	51
MAY	6	32		41	70	82	106	75
	13	48		70	98	122	141	109
	20	67		112	141	165	187	150
	27	86		168	193	222	244	203
JUNE	3	130		221	250	276	312	262
	10	222		282	308	339	373	324
	17	288		341	381	415	461	398
	24	359		425	464	492	533	479
JULY	1	467		509	561	591	628	571
	8	561		593	642	678	727	661
	15	655		693	740	771	833	761
	22	743		803	845	871	937	861
	29	834		906	941	980	1035	962
AUG.	5	911		1005	1043	1082	1133	1060
	12	1009		1100	1130	1174	1239	1156
	19	1098		1184	1228	1255	1348	1251
	26	1159		1269	1315	1340	1432	1334
SEP.	2	1229		1347	1385	1429	1532	1418
	9	1307		1422	1458	1513	1609	1492
	16	1362		1467	1513	1583	1669	1554
	23	1389		1519	1582	1640	1720	1610
OCT.	30	1411		1557	1634	1695	1769	1656
	7	1438		1593	1664	1734	1801	1693
	14	1455		1620	1689	1774	1853	1726
	21	1497		1667	1724	1793	1869	1753
	28	1520		1678	1737	1806	1880	1770

TABLE 27

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 10°C FROM JANUARY 1

FREDERICTON, N.B.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	MA	HIGH	DAILY
										MEAN
APR.	1	0		0	0	0	1		7	1
	8	0		0	0	1	4		10	1
	15	0		0	0	2	6		34	3
	22	0		1	2	6	12		36	6
	29	1		2	8	10	17		39	10
MAY	6	4		6	12	21	32		49	19
	13	7		14	23	35	54		62	31
	20	11		27	39	54	67		87	48
	27	15		52	69	81	99		126	73
JUNE	3	34		75	91	104	137		164	102
	10	77		103	120	136	177		206	134
	17	107		139	156	180	228		267	175
	24	145		181	211	233	266		316	223
	1	218		233	271	288	321		375	279
JULY	8	271		287	319	346	390		440	335
	15	335		364	383	411	458		494	400
	22	380		425	452	468	525		549	465
	29	425		486	517	542	586		625	532
	5	477		549	576	604	664		692	595
AUG.	12	524		599	648	664	722		767	656
	19	577		647	699	726	796		839	716
	26	619		693	750	774	851		887	766
	2	671		744	794	830	908		946	815
SEP.	9	714		779	828	877	947		984	856
	16	742		798	856	923	986		1029	888
	23	748		817	899	947	1007		1065	915
	30	756		837	918	970	1028		1077	935
	7	760		847	926	985	1040		1106	949
OCT.	14	763		865	932	1001	1066		1111	960
	21	781		879	950	1011	1076		1111	969
	28	788		880	952	1014	1078		1114	973

TABLE 28

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 13°C FROM JANUARY 1

FREDERICTON, N.B.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MR	B	NORMAL	A	RECORD	MA	HIGH	DAILY
										MEAN
APR.	1	0		0	0	0		2		0
	8	0		0	0	0		4		0
	15	0		0	0	0		18		1
	22	0		0	0	1		19		2
MAY	29	0		0	2	3		19		4
	6	0		1	3	8		26		7
	13	1		4	8	14		31		13
	20	2		10	17	26		46		21
JUNE	27	3		22	29	41		55		36
	3	14		31	43	55		77		52
	10	31		48	60	74		103		70
	17	48		72	82	103		135		95
JULY	24	72		94	117	131		158		126
	1	104		133	156	168		196		163
	8	135		164	185	208		245		200
	15	187		213	233	252		292		245
AUG.	22	220		253	282	295		335		290
	29	247		292	325	351		377		337
	5	279		335	368	389		427		380
	12	306		364	418	432		470		422
SEP.	19	340		394	448	478		530		462
	26	364		421	480	504		568		493
	2	407		453	506	542		595		525
	9	424		471	521	578		619		549
OCT.	16	437		480	537	597		639		567
	23	440		487	564	616		661		582
	30	443		500	567	627		668		591
	7	450		502	574	635		674		598
	14	450		508	579	639		686		602
	21	453		514	584	640		687		606
	28	453		514	584	642		689		607

TABLE 29

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 5°C FROM JANUARY 1

KENTVILLE, N.S.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	DAILY
							MA	MEAN
APR.	1	1	3	10	16	31	51	16
	8	1	6	16	22	42	76	23
	15	3	11	22	33	53	95	31
	22	10	18	38	53	69	111	45
	29	16	25	51	69	95	121	61
MAY	6	28	50	74	92	126	149	85
	13	51	71	108	128	168	206	118
	20	77	104	143	172	210	242	157
	27	96	168	197	223	266	281	210
JUNE	3	135	235	259	282	312	350	266
	10	225	283	317	338	370	429	327
	17	301	344	388	409	444	500	398
	24	382	409	467	480	539	586	477
	31	471	501	559	583	626	697	567
JULY	8	555	578	647	673	721	790	658
	15	666	688	750	774	814	891	759
	22	750	779	852	874	926	991	860
	29	843	883	951	978	1033	1091	962
	5	914	986	1052	1081	1129	1203	1062
AUG.	12	1006	1074	1151	1187	1234	1295	1160
	19	1098	1161	1240	1286	1347	1402	1257
	26	1170	1248	1324	1360	1440	1501	1343
	2	1244	1332	1404	1467	1520	1605	1428
SEP.	9	1325	1399	1475	1540	1600	1687	1504
	16	1389	1461	1540	1614	1676	1769	1574
	23	1429	1515	1610	1673	1762	1824	1635
	30	1454	1563	1656	1739	1801	1882	1689
	7	1492	1611	1694	1781	1841	1915	1732
OCT.	14	1519	1640	1737	1811	1895	1936	1772
	21	1554	1681	1776	1854	1933	1968	1805
	28	1580	1697	1805	1870	1962	1984	1829

TABLE 30

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 10°C FROM JANUARY 1

KENTVILLE, N.S.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	MA	HIGH	DAILY	MEAN
APR.	1	0		0	0	2	5		8		2
	8	0		0	1	2	7		15		3
	15	0		0	2	5	8		35		5
	22	0		1	4	9	15		39		9
	29	1		3	9	15	18		40		12
MAY	6	3		6	16	20	37		47		20
	13	7		13	25	34	54		72		32
	20	12		21	43	52	70		92		47
	27	16		45	68	78	93		116		71
JUNE	3	32		74	90	104	123		157		97
	10	87		104	117	135	155		203		128
	17	113		134	154	169	200		241		167
	24	158		179	199	212	257		294		212
JULY	1	200		232	249	277	306		370		268
	8	245		280	310	337	363		428		324
	15	322		345	378	401	430		494		390
	22	371		396	446	470	509		559		457
	29	425		458	514	536	580		624		524
AUG.	5	488		526	570	602	660		700		589
	12	545		574	637	678	732		762		653
	19	604		624	685	744	812		830		715
	26	643		675	735	787	866		894		767
SEP.	2	683		728	782	845	911		963		818
	9	732		764	818	893	963		1011		861
	16	766		795	863	937	1002		1059		899
	23	779		816	902	965	1043		1083		930
OCT.	30	785		842	931	992	1072		1110		955
	7	796		856	947	1009	1085		1118		972
	14	806		861	960	1031	1110		1121		988
	21	819		879	973	1033	1119		1147		1000
	28	829		883	981	1035	1125		1158		1007

TABLE 31

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 13°C FROM JANUARY 1

KENTVILLE, N.S.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	MA	HIGH	DAILY
										MEAN
APR.	1	0		0	0	0	1		3	0
	8	0		0	0	0	2		6	1
	15	0		0	0	1	2		17	1
	22	0		0	1	2	6		19	3
	29	0		0	3	3	8		19	4
MAY	6	0		1	4	7	16		24	7
	13	1		2	8	17	24		39	13
	20	2		5	16	23	29		47	19
	27	3		15	29	37	46		60	32
	JUNE	3	11	30	41	50	61		85	46
JULY	10	41		47	56	67	81		114	64
	17	52		64	75	92	114		137	87
	24	74		91	104	117	146		170	115
	1	97		123	141	161	183		225	151
	8	125		157	178	197	226		263	189
AUG.	15	179		203	225	244	272		308	235
	22	209		239	268	294	324		353	282
	29	243		280	317	337	374		399	329
	5	288		317	359	383	432		458	374
	12	323		346	401	437	485		520	418
SEP.	19	364		377	428	485	543		561	461
	26	389		406	463	510	578		600	493
	2	424		443	497	545	615		636	527
	9	450		463	527	576	648		667	552
	16	468		479	544	602	673		714	575
OCT.	23	474		487	568	625	694		725	593
	30	475		500	583	641	710		726	606
	7	482		505	595	655	715		739	613
	14	487		506	596	658	720		746	620
	21	491		515	603	659	725		765	625
	28	491		515	605	662	726		770	628

TABLE 32

FREQUENCY CLASSES AND 30-YEAR AVERAGES
 OF DEGREE DAYS ABOVE 5°C FROM JANUARY 1
 CHARLOTTETOWN, P.E.I.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	MA	HIGH	DAILY MEAN
APR.	1	0		1	2	4	12	18		5
	8	0		1	3	7	16	31		8
	15	1		2	6	10	27	56		12
	22	2		5	11	21	38	71		20
	29	3		11	23	32	62	75		31
MAY	6	8		24	34	53	81	98		48
	13	23		38	61	81	114	128		73
	20	41		67	89	117	146	175		105
	27	55		105	135	162	195	242		150
	JUNE 3	79		155	188	203	255	285		198
JULY	10	169		214	232	258	303	355		252
	17	228		271	288	326	374	435		318
	24	301		336	369	401	447	516		394
	JULY 1	390		415	463	490	543	616		478
	8	453		497	558	582	635	729		568
AUG.	15	519		599	639	687	737	827		668
	22	597		704	742	792	832	922		769
	29	678		805	835	896	936	1021		871
	AUG. 5	775		905	943	1005	1044	1116		971
	12	866		992	1045	1105	1155	1214		1071
SEP.	19	956		1073	1150	1215	1262	1329		1169
	26	1029		1145	1238	1294	1347	1429		1256
	SEP. 2	1128		1223	1322	1376	1437	1539		1342
	9	1193		1289	1401	1453	1521	1621		1420
	16	1260		1353	1463	1521	1621	1705		1489
OCT.	23	1303		1403	1525	1577	1677	1758		1551
	30	1347		1448	1569	1635	1724	1819		1604
	OCT. 7	1396		1485	1612	1685	1787	1861		1648
	14	1419		1506	1650	1724	1824	1902		1685
	21	1448		1542	1692	1748	1853	1917		1716
	28	1461		1568	1702	1774	1883	1965		1737

TABLE 33

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 10°C FROM JANUARY 1

CHARLOTTETOWN, P.E.I.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MB	B	NORMAL	A	RECORD	MA	HIGH	DAILY
										MEAN
APR.	1	0		0	0	0	1		2	0
	8	0		0	0	0	2		3	0
	15	0		0	0	0	2		17	1
	22	0		0	0	3	6		20	3
	29	0		0	1	5	9		21	5
MAY	6	0		2	5	9	20		37	10
	13	2		3	13	19	33		47	17
	20	4		9	22	29	43		73	27
	27	6		23	41	52	68		106	46
JUNE	3	15		39	59	70	98		124	66
	10	52		64	76	92	127		161	89
	17	67		93	105	122	170		204	123
	24	116		127	147	175	208		251	165
JULY	1	143		174	195	220	257		315	215
	8	185		220	253	281	313		393	270
	15	216		289	320	351	377		457	335
	22	260		350	390	410	448		516	400
AUG.	29	306		415	450	490	525		580	467
	5	368		476	514	556	606		644	533
	12	423		518	579	619	677		708	598
	19	479		580	634	684	759		788	661
SEP.	26	518		625	696	746	810		853	713
	2	582		661	746	792	857		928	764
	9	613		699	794	836	913		975	808
	16	644		722	820	875	970		1024	845
OCT.	23	659		754	847	902	1003		1044	874
	30	672		768	862	951	1015		1074	898
	7	691		781	872	969	1039		1085	913
	14	695		789	893	976	1050		1096	926
	21	701		805	900	987	1068		1098	936
	28	702		816	901	995	1076		1116	941

TABLE 34

FREQUENCY CLASSES AND 30-YEAR AVERAGES
OF DEGREE DAYS ABOVE 15°C FROM JANUARY 1

CHARLOTTETOWN, P.E.I.

CLASS FREQUENCY AND BOUNDARY

	RECORD	LOW	MR	B	NORMAL	A	RECORD	MA	HIGH	DAILY
										MEAN
APR.	1	0		0	0	0		0		0
	8	0		0	0	0		0		0
	15	0		0	0	0		8		0
	22	0		0	0	2		8		1
	29	0		0	1	2		9		1
MAY	6	0		0	1	2	9	20		3
	13	0		0	2	6	14	24		6
	20	0		2	7	11	19	36		10
	27	0		8	18	20	32	52		19
JUNE	3	5		13	25	30	50	66		29
	10	19		23	34	42	66	87		41
	17	27		39	49	60	98	114		59
	24	45		61	73	90	120	136		84
	1	58		88	102	117	147	185		115
JULY	8	93		112	138	157	186	237		150
	15	106		159	182	203	235	279		195
	22	131		200	230	248	285	318		240
	29	157		241	273	302	332	362		286
	5	199		285	315	346	392	411		331
AUG.	12	233		311	363	388	441	472		375
	19	269		353	403	433	498	528		418
	26	290		379	435	465	541	559		451
	2	333		397	466	500	576	613		483
SEP.	9	348		416	490	521	599	641		508
	16	360		426	506	553	621	672		528
	23	365		445	518	568	656	682		544
	30	368		454	521	596	668	692		555
	7	375		459	522	601	676	695		561
OCT.	14	376		461	531	603	680	700		566
	21	376		468	532	608	680	710		569
	28	376		470	533	610	687	713		571

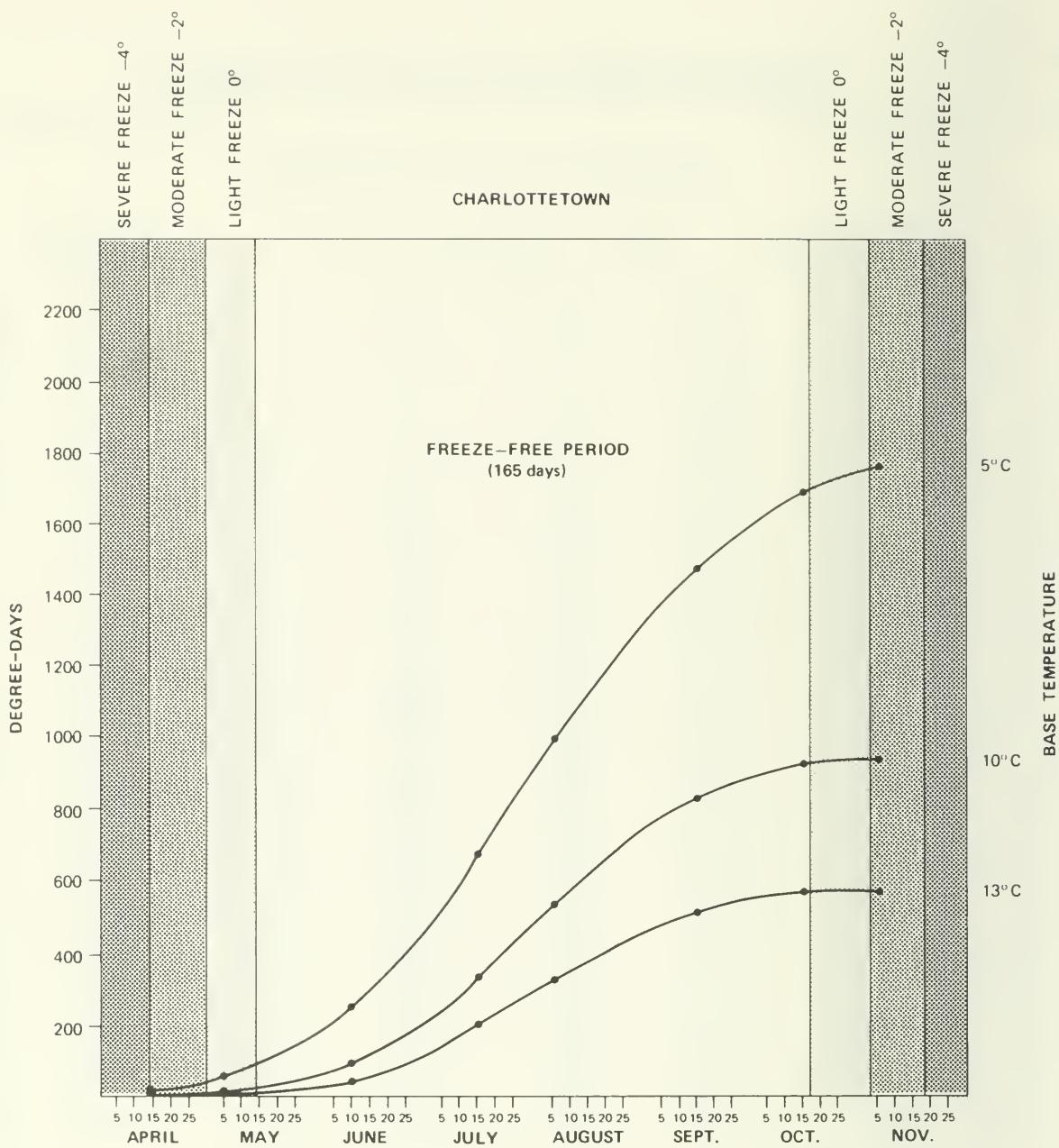


Fig. 2. Average seasonal growing degree-day accumulations ($5, 10, 13^{\circ}\text{C}$) and average freeze dates of a given severity at Charlottetown, P.E.I.

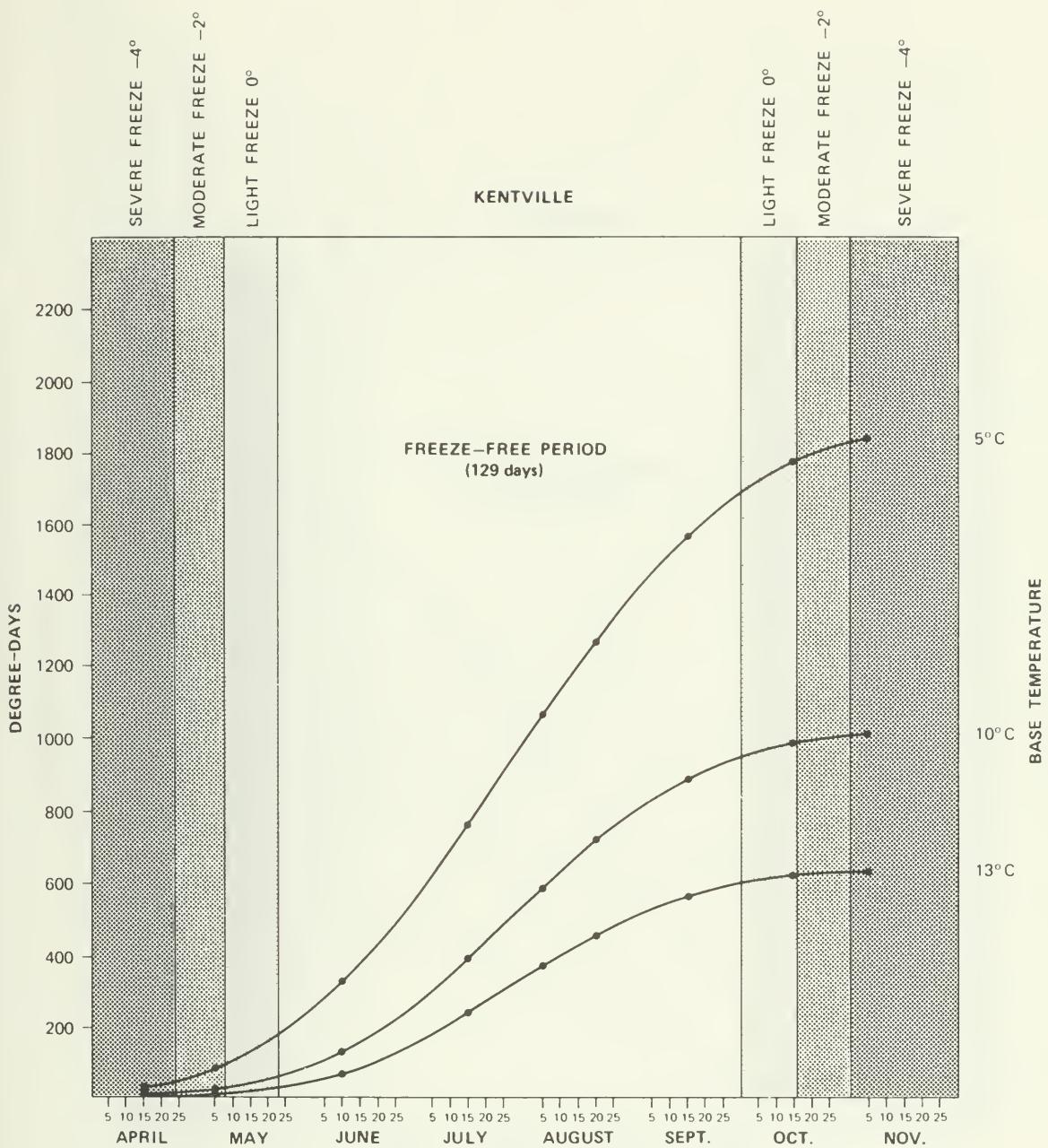


Fig. 3. Average seasonal growing degree-day accumulations ($5, 10, 13^{\circ}\text{C}$) and average freeze dates of a given severity at Kentville, N.S.

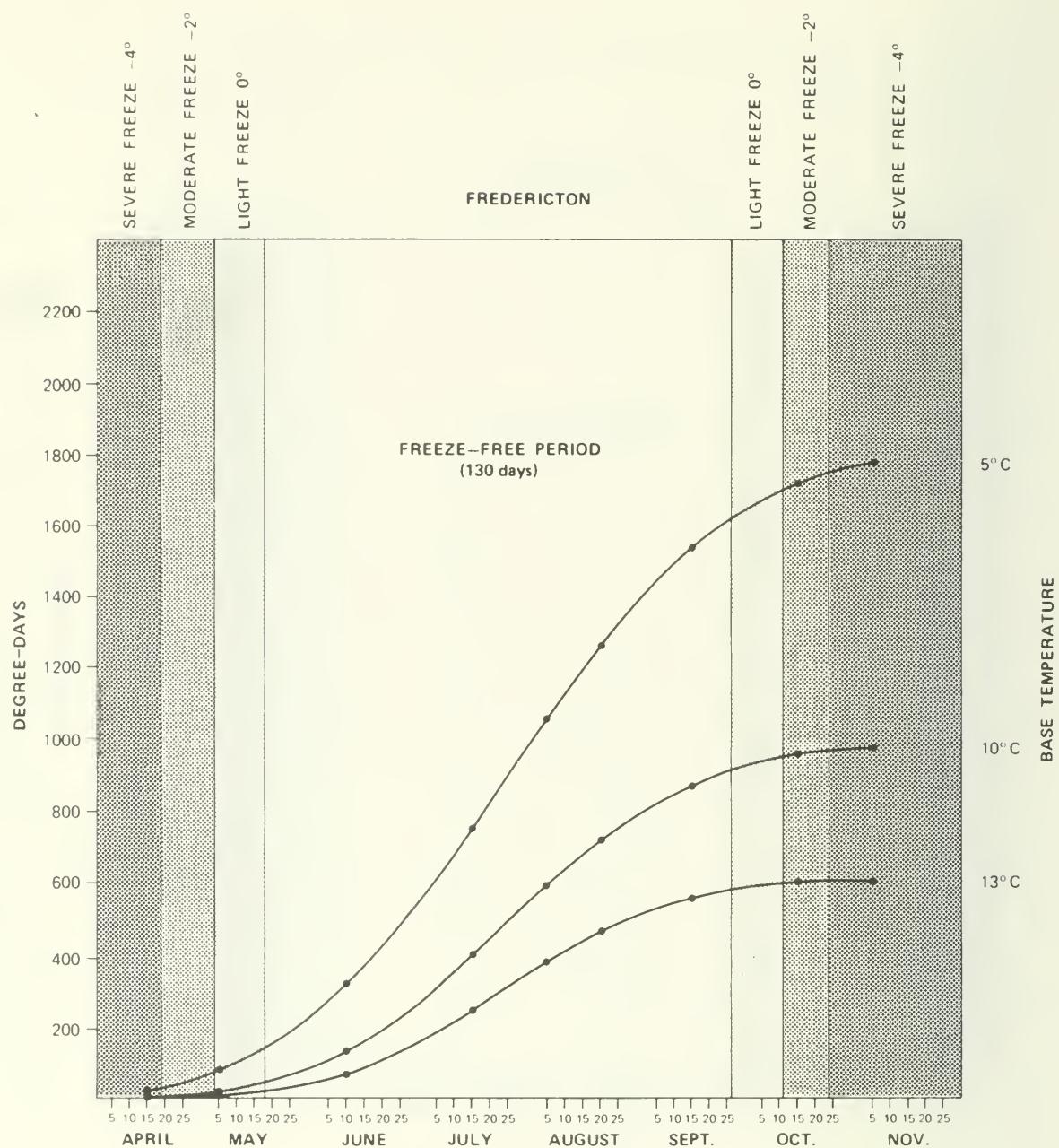


Fig. 4. Average seasonal growing degree-day accumulations (5, 10, 13°C) and average freeze dates of a given severity at Fredericton, N.B.

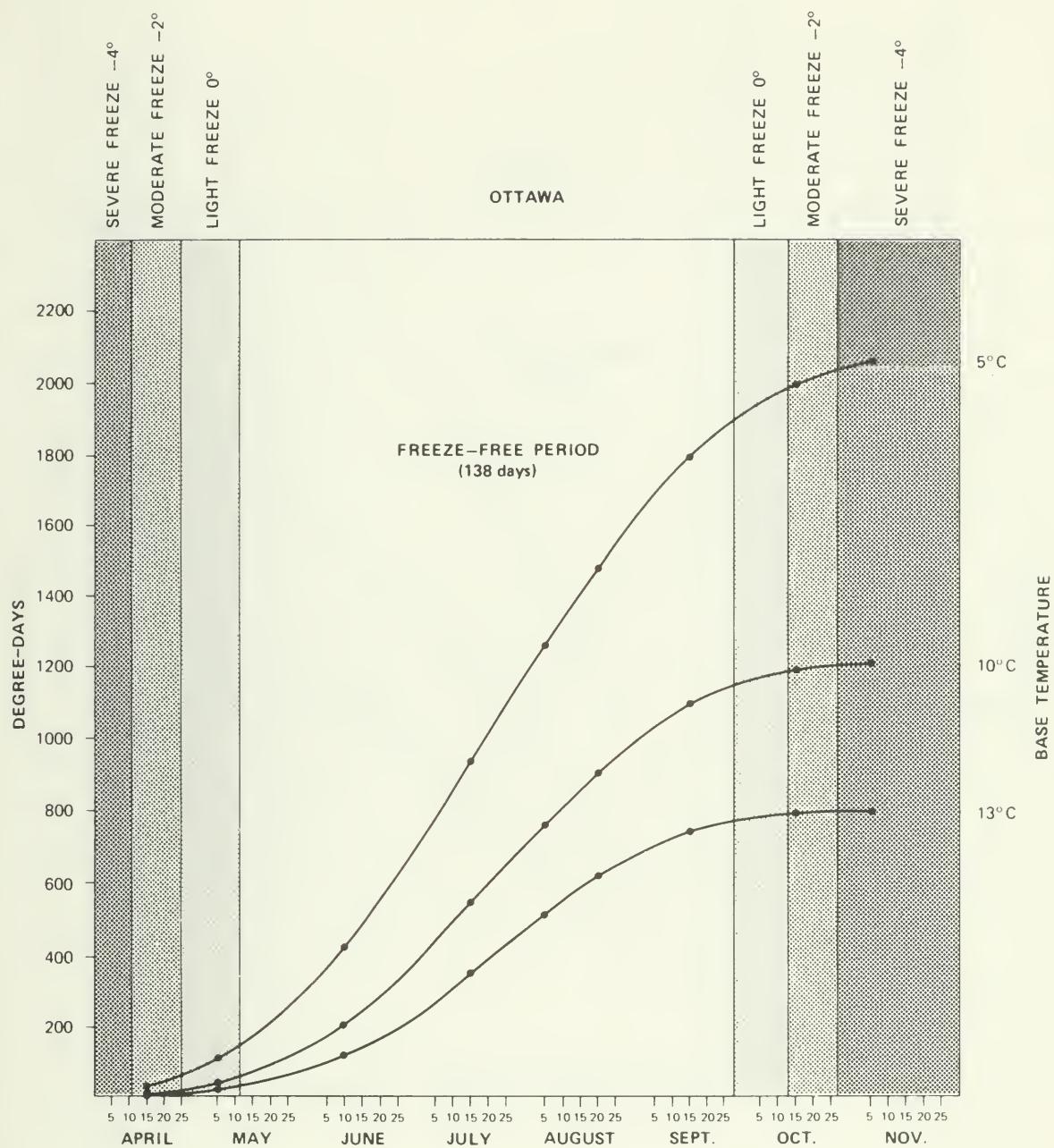


Fig. 5. Average seasonal growing degree-day accumulations (5, 10, 13°C) and average freeze dates of a given severity at Ottawa, Ont.

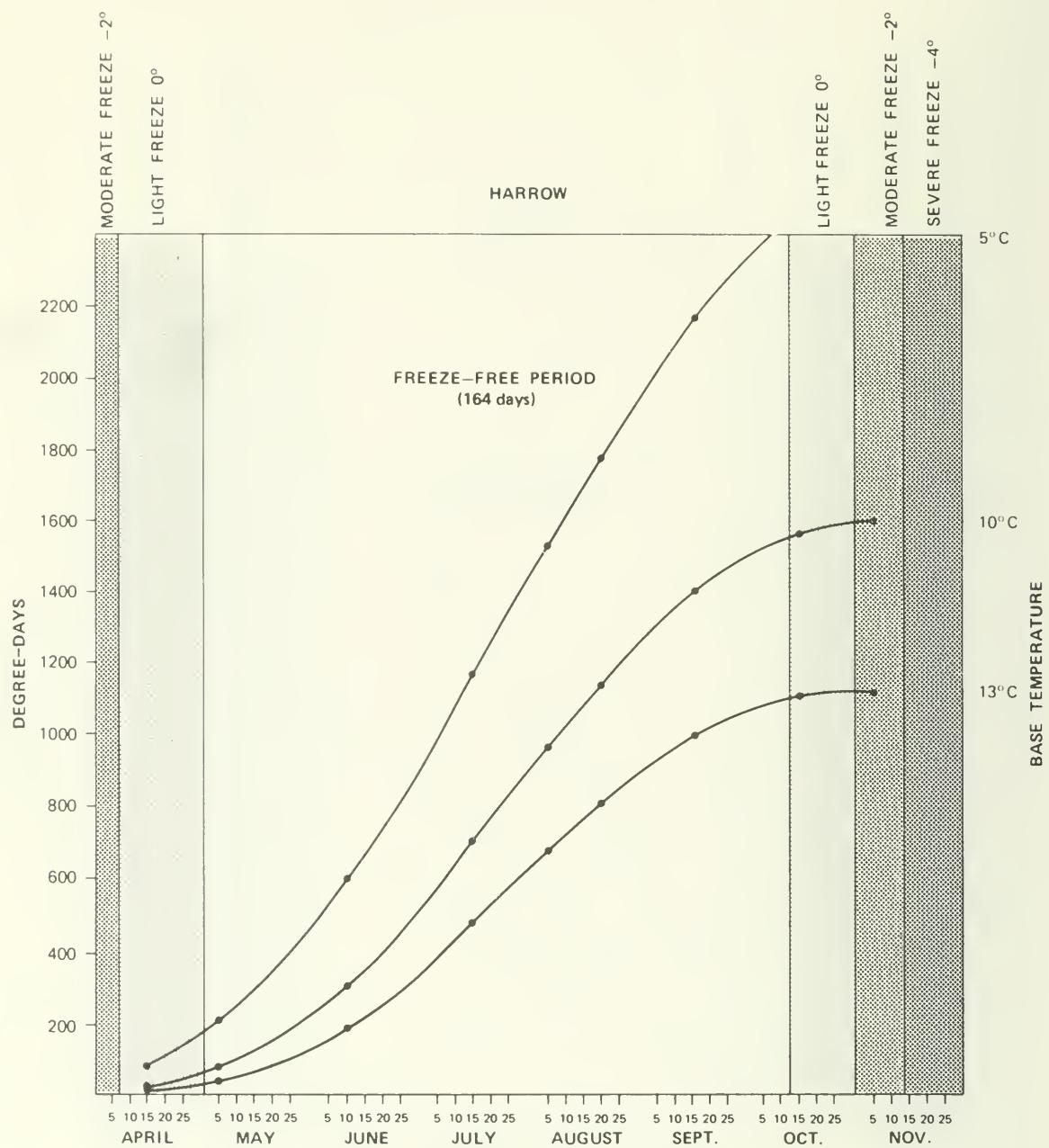


Fig. 6. Average seasonal growing degree-day accumulations (5, 10, 13°C) and average freeze dates of a given severity at Harrow, Ont.

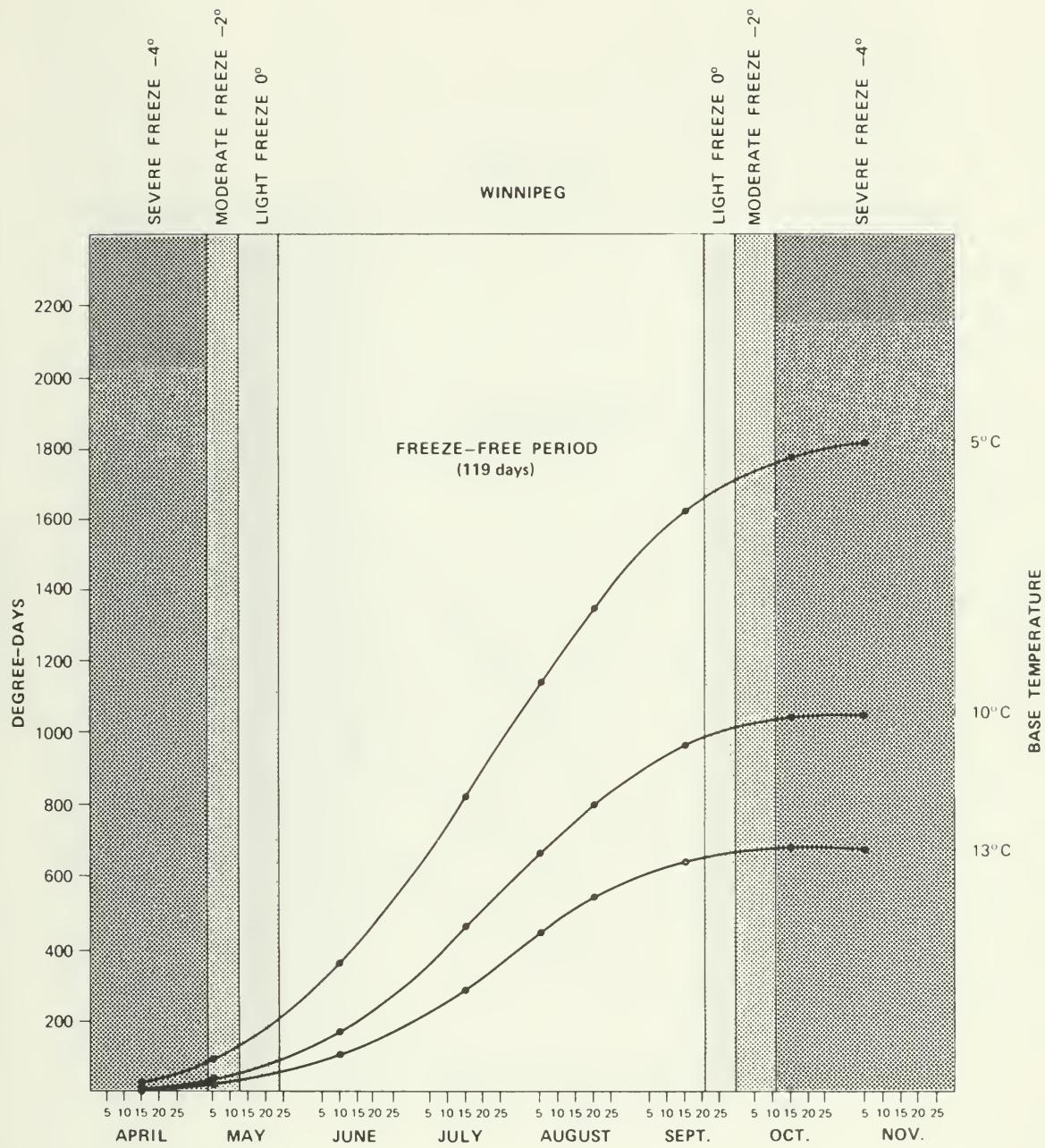


Fig. 7. Average seasonal growing degree-day accumulations ($5, 10, 13^{\circ}\text{C}$) and average freeze dates of a given severity at Winnipeg, Man.

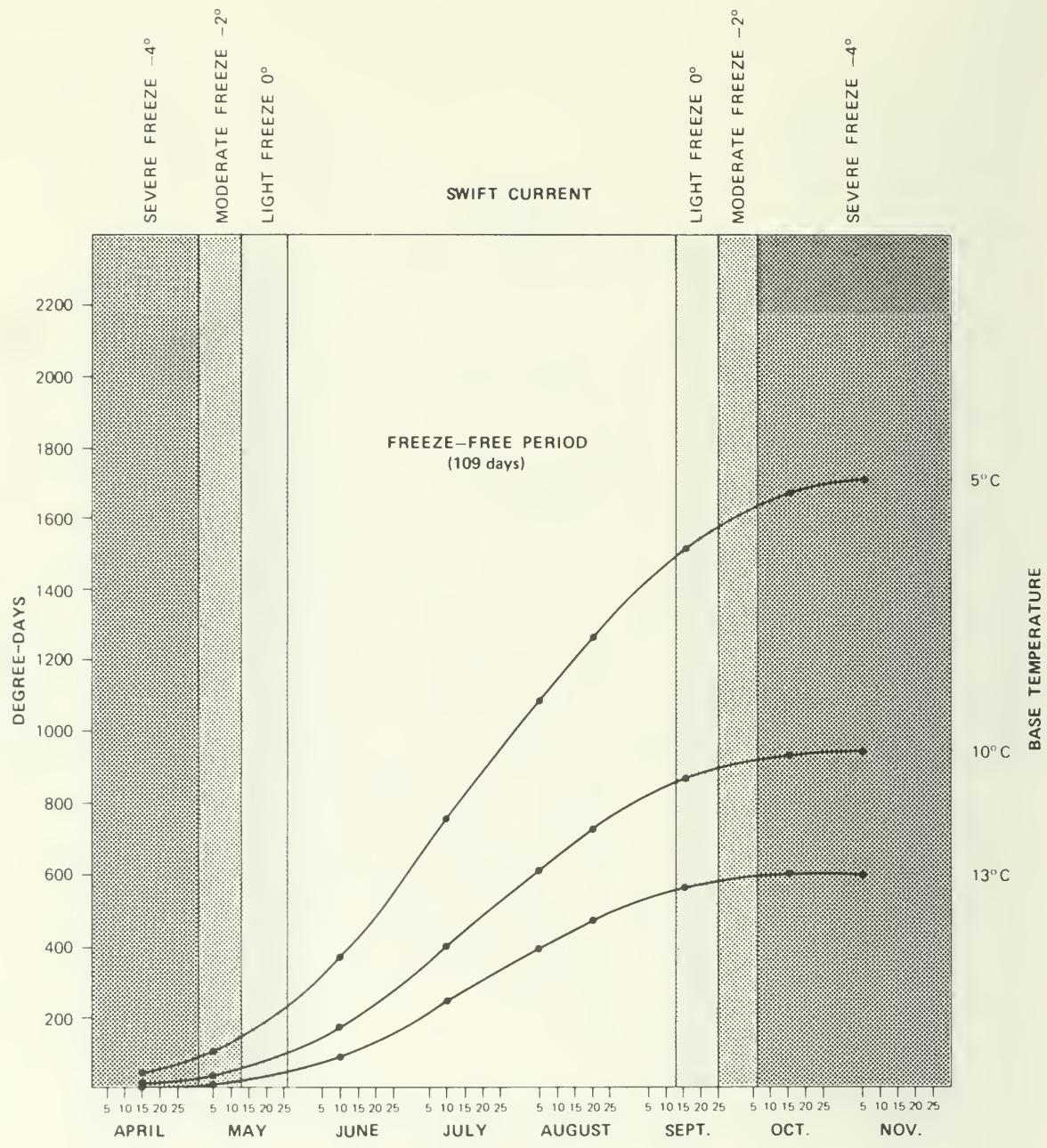


Fig. 8. Average seasonal growing degree-day accumulations (5, 10, 13°C) and average freeze dates of a given severity at Swift Current, Sask.

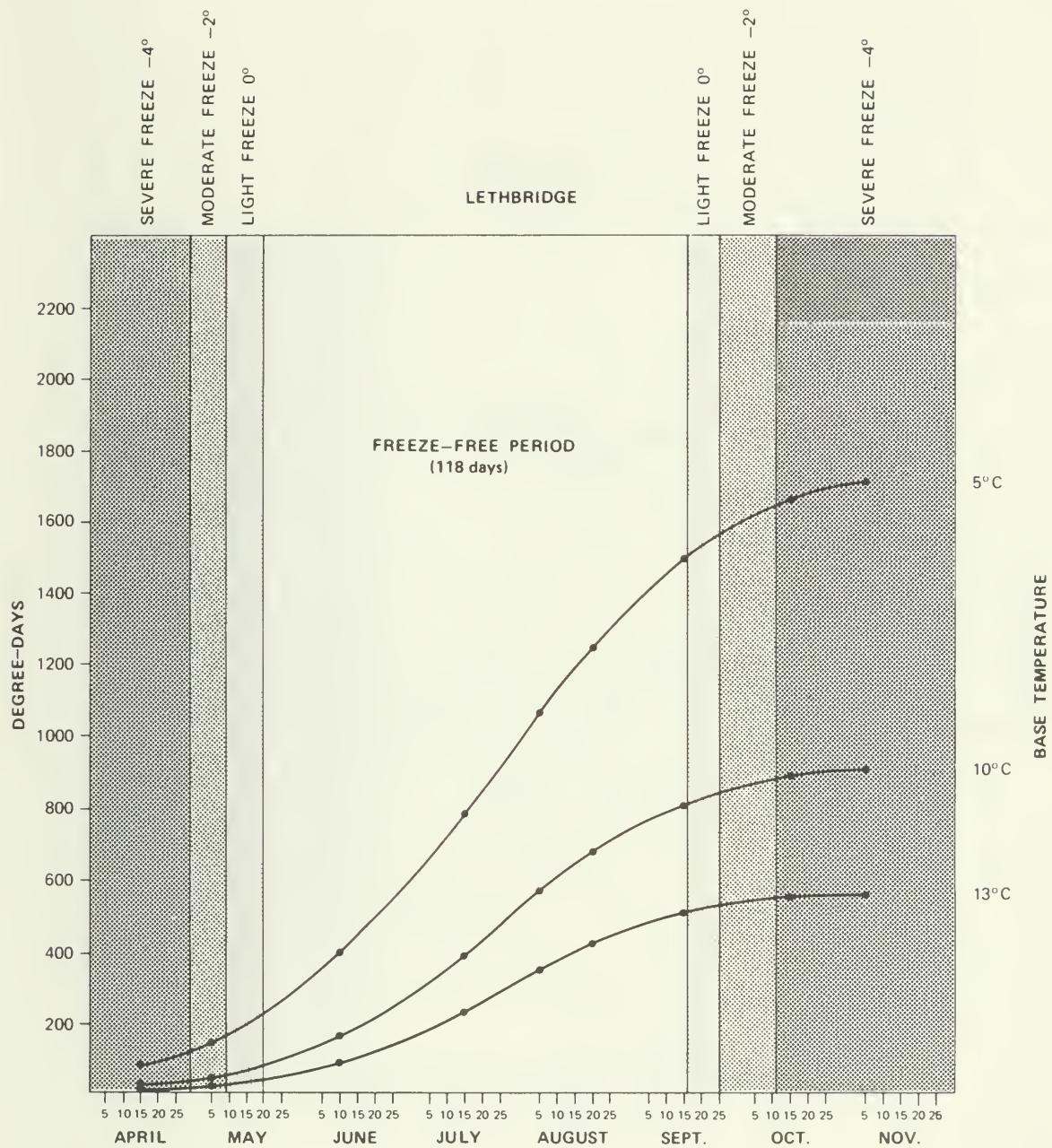


Fig. 9. Average seasonal growing degree-day accumulations ($5, 10, 13^{\circ}\text{C}$) and average freeze dates of a given severity at Lethbridge, Alta.

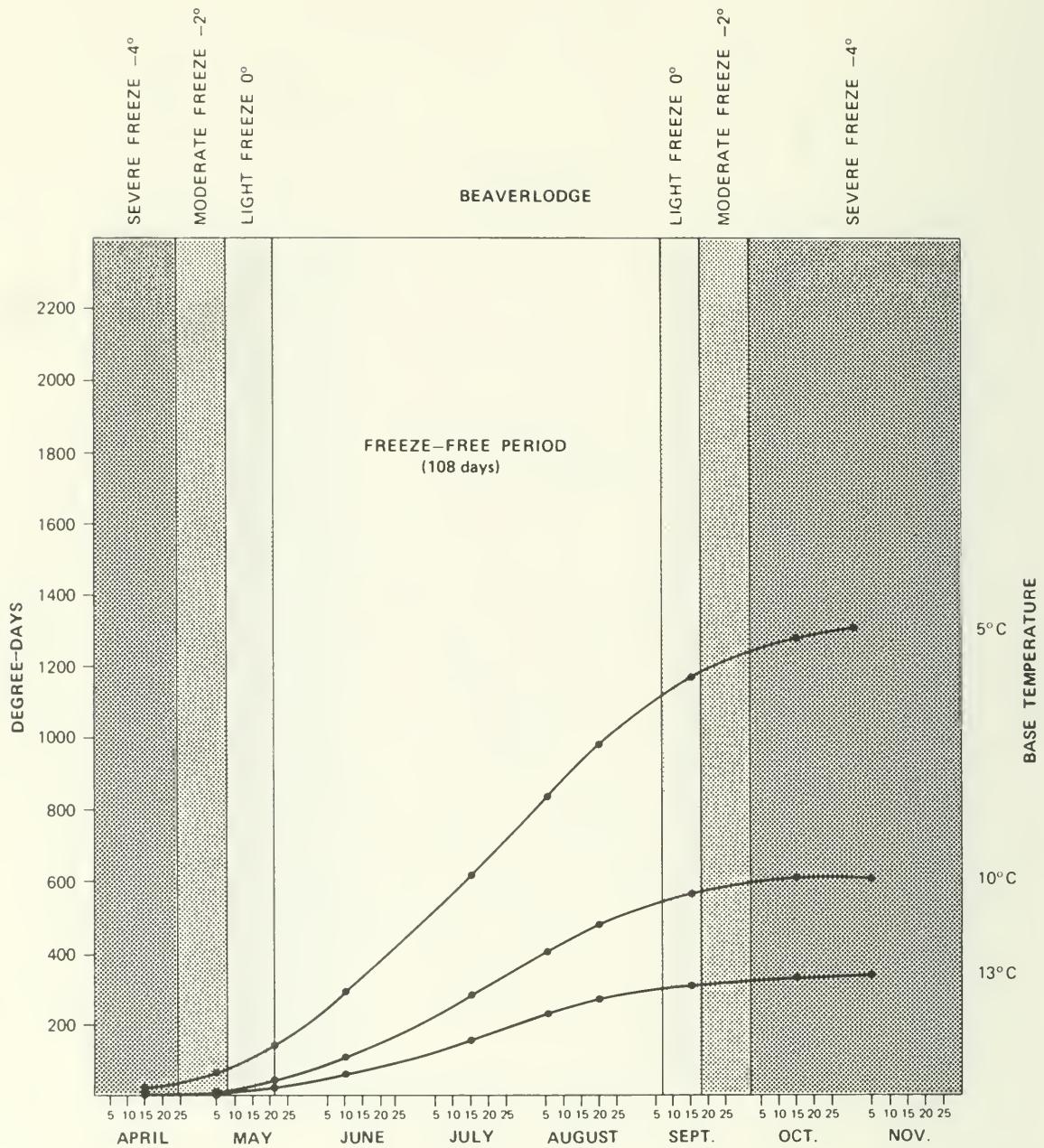


Fig. 10. Average seasonal growing degree-day accumulations (5, 10, 13°C) and average freeze dates of a given severity at Beaverlodge, Alta.

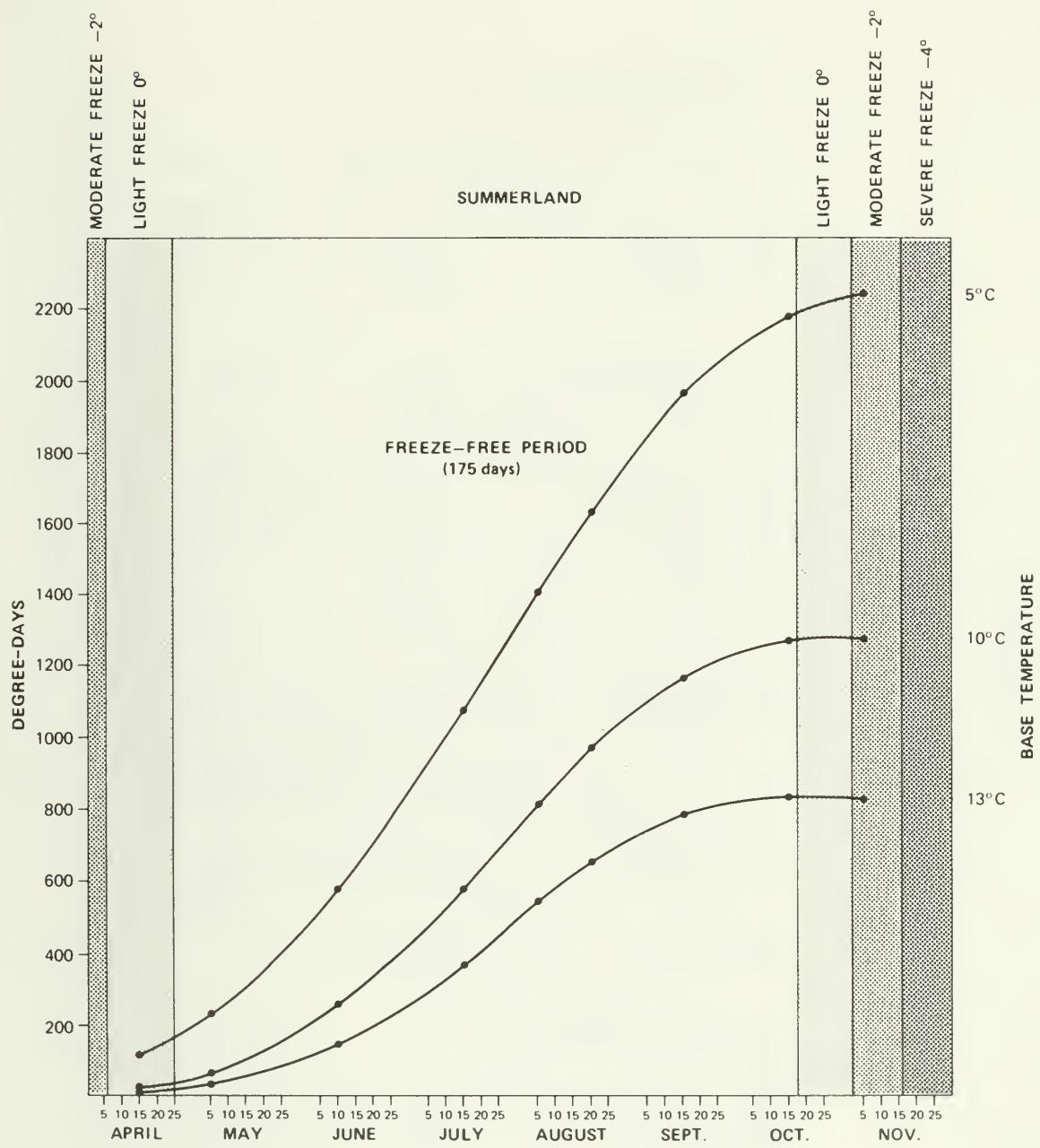


Fig. 11. Average seasonal growing degree-day accumulations (5, 10, 13°C) and average freeze dates of a given severity at Summerland, B.C.

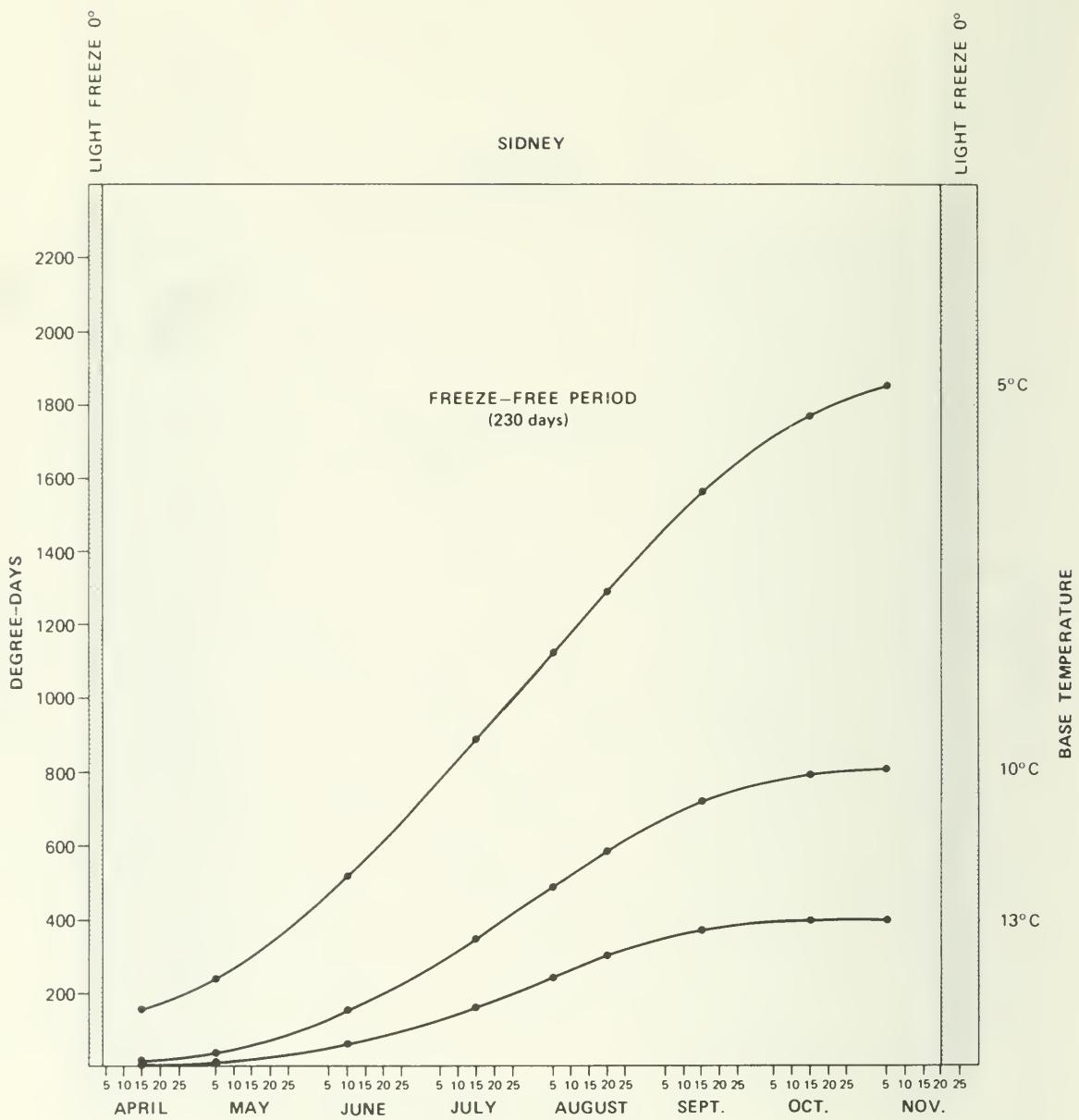


Fig. 12. Average seasonal growing degree-day accumulations (5, 10, 13°C) and average freeze dates of a given severity at Sidney, B.C.



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CONVERSION FACTORS FOR METRIC SYSTEM

Imperial units	Approximate conversion factor	Results in:
LINEAR		
inch	x 25	millimetre (mm)
foot	x 30	centimetre (cm)
yard	x 0.9	metre (m)
mile	x 1.6	kilometre (km)
AREA		
square inch	x 6.5	square centimetre (cm^2)
square foot	x 0.09	square metre (m^2)
acre	x 0.40	hectare (ha)
VOLUME		
cubic inch	x 16	cubic centimetre (cm^3)
cubic foot	x 28	cubic decimetre (dm^3)
cubic yard	x 0.8	cubic metre (m^3)
fluid ounce	x 28	millilitre (mL)
pint	x 0.57	litre (L)
quart	x 1.1	litre (L)
gallon	x 4.5	litre (L)
WEIGHT		
ounce	x 28	gram (g)
pound	x 0.45	kilogram (kg)
short ton (2000 lb)	x 0.9	tonne (t)
TEMPERATURE		
degrees Fahrenheit	$(^{\circ}\text{F}-32) \times 0.56$ or $(^{\circ}\text{F}-32) \times 5/9$	degrees Celsius ($^{\circ}\text{C}$)
PRESSURE		
pounds per square inch	x 6.9	kilopascal (kPa)
POWER		
horsepower	x 746 x 0.75	watt (W) kilowatt (kW)
SPEED		
feet per second	x 0.30	metres per second (m/s)
miles per hour	x 1.6	kilometres per hour (km/h)
AGRICULTURE		
gallons per acre	x 11.23	litres per hectare (L/ha)
quarts per acre	x 2.8	litres per hectare (L/ha)
pints per acre	x 1.4	litres per hectare (L/ha)
fluid ounces per acre	x 70	millilitres per hectare (mL/ha)
tons per acre	x 2.24	tonnes per hectare (t/ha)
pounds per acre	x 1.12	kilograms per hectare (kg/ha)
ounces per acre	x 70	grams per hectare (g/ha)
plants per acre	x 2.47	plants per hectare (plants/ha)

Canadä