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PROBABILITIES OF FREEZING TEMPERATURES

at Fredericton, N. B., Charlottetown, P. E. I., Kentville, N. S., and Nappan, N. S.

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PROBABILITIES OF FREEZING TEMPERATURES AT FREDERICTON, N.B., CHARLOTTETOWN, P.E.I., KENTVILLE, N.S. and NAPPAN, N.S.

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In the spring and fall, frost damages crops in small areas on some nights and over wide areas on others. The damage in small areas usually occurs on a clear, calm, and relatively dry night when the temperature of the air near the ground drops below the freezing point for the tender parts of a tree or plant. On such a night heat is lost rapidly to the open sky from the soil, branches, leaves, flowers, and fruits. Damage is greatest in places with poor air-drainage, that is, low-lying areas.

Damage occurs over a wide area on those nights when a mass of freezing air moves into a region. A general freeze of this kind is usually accompanied by strong winds.

With either a local frost or a general freeze we know that crops may be damaged when the air temperature falls below the freezing point of water, 32 degrees Fahrenheit. Frost may also cause damage when leaves, blossoms or fruits become colder than 32 degrees even though the measured air temperature is above 32 degrees. This condition occurs fairly often for reasons explained below.

In the Maritime Provinces the weather one year may be very different from that in the corresponding week or month of the next year. In one year, for example, the last cold spell may occur in April; the next year, crops may be frozen in June. If careful weather records are kept for a number of years they are useful as a guide in planning.

Toward that end this publication shows the percentage probabilities, or the numbers of chances in 100, of freezing temperatures from early spring to late fall at four experimental farms in the Maritime Provinces. Weather records for 33 years were used to estimate the number of years out of 100 that a particular temperature is likely to occur on or about a given date.

This knowledge is especially useful because of the interest being shown in growing tobacco in the Maritime Provinces. Furthermore, a large part of the apple crop in the Annapolis Valley was destroyed by a heavy freeze in late October of 1959; this suggests that growers are not aware of the risk involved in leaving fruit on the trees so long.

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[1] Meteorologist-in-Charge

Tables 1 and 2 indicate the chances of freezing temperatures at Fredericton; Tables 3 and 4, the chances at Charlottetown; Tables 5 and 6, the chances at Kentville; and Tables 7 and 8, the chances at Nappan. The chances shown are based on daily minimum temperatures recorded from 1924 to 1956. The thermometers were read at weather stations of the Meteorological Branch at the experimental farms, in official shelters 4 feet above the ground. The period 1924 to 1956 was also used in a similar publication (Canada Department of Agriculture Publication 1047) for the Ottawa area.

The tables range all the way from 40 to 20 degrees. We need information on temperatures as high as 40 degrees because the air temperature a few inches above the ground may be 6 to 8 degrees lower than that 4 feet above the ground. In other words, the leaves of low plants, and the blossoms or fruit, may be damaged when the minimum air temperatures on which the tables are based are as high as 40 degrees. We need information on temperatures as low as 20 degrees because all crops do not react in the same way. For example, apple tissue freezes when the core temperature reaches about 27 degrees. The fruit, though, cools more slowly than the air around it. Evidence shows that permanent damage to the apple does not occur until the air temperature drops to 23 degrees and stays there for one or two hours.

The information given in the tables helps to show the risk of frost damage for each of the four localities. You need to know the temperature that each crop can tolerate, and also the length of the growing season that the crop needs to mature. You may consider it profitable to grow a crop if you are sure that it will not be damaged by frost in more than one year out of five. The tables suggest the dates of planting and harvesting for which the risk at the experimental farms where the records were compiled is of this, or any other, degree.

Unfortunately, temperatures differ greatly from place to place. Even in one field the temperature in the early morning may often be several degrees lower in a hollow than on a nearby knoll. This is because, on a clear, calm night, the cooled surface air drains away to lower levels. Also, a farm near a seacoast is usually warmer on a fall morning than one farther inland. In this case the relatively warm sea water radiates heat to the land nearby. Through experience, though, you can relate the temperature patterns on your farm to that at the nearest experimental farm. This is especially true if you keep your own temperature records for some years. Suggestions on how to use the tables are given in the sections that follow.

SPRING FROSTS

Tables 1, 3, 5 and 7 show the chances you would take in exposing tender plants on various dates in the spring at the four stations.

We know that a 32-degree temperature kills young tobacco plants. Table 3 shows that at Charlottetown on May 18 the plants have a 20 per cent chance, or 1 in 5, of being subjected to an air temperature of 32 degrees. On May 10 the chances are 50 per cent; another way of looking at the 50 per cent date is to say that it is the *average* date of the last spring frost. It is unlikely though, that you

would want to take that great a gamble. Looking at the extremes, you can see that every year the air temperature is likely to be as low as 32 degrees as late as April 29. If you want to avoid *any* risk of a 32-degree temperature you have to wait until June 8.

You may use the table in another way. We have seen that up to April 29 temperatures as low as 32 degrees are almost certain. However, there are crops that can stand somewhat lower temperatures; let us see how they would fare. On or after April 29 the chances of a 30-degree reading are 75 per cent, or 3 out of 4, the chances of a 28-degree reading are 2 out of 5, and the chances of a 26-degree reading only 1 out of 5. The lowest temperature recorded on April 29 in the 33 years was 20 degrees. Similar information is given for each of the other three stations.

The tables for the four stations show some remarkable differences. You may expect an air temperature of 32 degrees in one year out of two at Charlottetown on or after May 10, at Fredericton on or after May 16, at Kentville on or after May 22, and at Nappan on or after May 24. It may be profitable to gamble on loss from frost in one year out of five. You may expect a 32-degree air temperature in one year out of five at Nappan on or after June 1, at Kentville on or after May 31, at Fredericton on or after May 23, and at Charlottetown on or after May 18. This shows that Charlottetown has an advantage of about two weeks over the Nova Scotian localities even though it is farther north. The nearby sea surface at Charlottetown more than balances its more northerly location. This local effect shows how important it is for you to know the temperature history on your own farm.

FALL FROSTS

Tables 2, 4, 6 and 8 show the chances you would take in exposing crops *until* various dates in the fall at the four stations. You should harvest tobacco, for example, before it is subjected to an air temperature of 32 degrees. At Charlottetown (Table 4) the earliest date on which this temperature was recorded in the 33 years was September 29, and the date on or before which it is likely to occur in 1 year out of 5 is October 7. By October 15 the chances are 1 out of 2, and by November 8 it is almost certain that the air temperature will fall to 32 degrees.

For harvesting late varieties of apples you need to know when the fruit may be subjected to an air temperature of 24 degrees. At Kentville (Table 6) the earliest date on which this temperature was recorded in the 33 years was October 11. The chances are 1 out of 5 by October 18 and 1 out of 2 by October 29, and it is almost certain that a 24-degree temperature will occur by November 16.

The differences among the four localities are even greater in the fall than in the spring. The chances of an air temperature of 32 degrees are 1 out of 2 at Nappan by September 18, at Kentville by September 26, at Fredericton by September 27 and at Charlottetown by October 15. This gives Charlottetown an edge of three weeks over Kentville and almost a full month over Nappan.

TABLE 1. – PROBABILITIES OF FREEZING TEMPERATURES IN THE SPRING AT FREDERICTON, N.B.

(Percentage probabilities – numbers of times out of 100 – that the last spring temperature of a given value will occur *on* or *after* a certain date. Based on data[1] from 1924 to 1956 taken at the Experimental Farm.)

		Temperature										
		20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	40°
Earliest[2]		March 9	March 21	March 22	March 29	April 17	April 23	April 25	May 3	May 17	May 18	May 18
	90	March 26	April 1	April 4	April 13	April 23	May 2	May 5	May 11	May 20	May 25	May 31
	85	March 28	April 3	April 7	April 16	April 26	May 4	May 7	May 13	May 22	May 27	June 3
	80	March 30	April 5	April 8	April 17	April 27	May 6	May 9	May 15	May 24	May 29	June 4
	75	April 1	April 7	April 10	April 19	April 29	May 7	May 10	May 17	May 25	May 31	June 6
	70	April 3	April 8	April 12	April 20	April 30	May 9	May 12	May 18	May 26	June 1	June 7
	65	April 4	April 9	April 13	April 21	May 2	May 10	May 13	May 19	May 27	June 2	June 8
	60	April 6	April 11	April 14	April 23	May 3	May 11	May 14	May 20	May 29	June 4	June 10
Percentage	55	April 7	April 12	April 15	April 24	May 4	May 12	May 15	May 22	May 30	June 5	June 11
	50	April 8	April 13	April 16	April 25	May 5	May 14	May 16	May 23	May 31	June 6	June 12
Probability	45	April 10	April 14	April 17	April 26	May 6	May 15	May 17	May 24	June 1	June 7	June 13
	40	April 11	April 15	April 19	April 27	May 8	May 16	May 18	May 25	June 2	June 8	June 14
	35	April 13	April 17	April 20	April 29	May 9	May 17	May 19	May 26	June 3	June 9	June 15
	30	April 14	April 18	April 21	April 30	May 10	May 18	May 21	May 27	June 4	June 10	June 17
	25	April 15	April 19	April 23	May 1	May 11	May 20	May 22	May 29	June 6	June 12	June 18
	20	April 17	April 21	April 24	May 3	May 13	May 21	May 23	May 30	June 7	June 13	June 19
	15	April 19	April 23	April 26	May 5	May 15	May 23	May 25	June 1	June 9	June 15	June 21
	10	April 22	April 25	April 28	May 7	May 17	May 25	May 27	June 3	June 11	June 17	June 23
Latest[2]		April 30	May 8	May 15	May 19	May 20	June 3	June 4	June 21	June 25	July 3	July 3

[1]Based on daily minimum temperatures taken in an official shelter approximately 4 feet above ground.

[2]Recorded during the period 1924-56.

TABLE 2. - PROBABILITIES OF FREEZING TEMPERATURES IN THE AUTUMN AT FREDERICTON, N.B.

(Percentage probabilities – number of times out of 100 – that the first autumn temperature of a given value will occur *on* or *before* a certain date. Based on data[1] from 1924 to 1956 taken at the Experimental Farm.)

		Temperature										
		40°	38°	36°	34°	32°	30°	28°	26°	24°	22°	20°
Earliest[2]		Aug. 13	Aug. 13	Sept. 6	Sept. 8	Sept. 11	Sept. 21	Sept. 22	Sept. 22	Oct. 11	Oct. 14	Oct. 19
	10	Aug. 23	Aug. 30	Sept. 6	Sept. 10	Sept. 15	Sept. 21	Sept. 27	Oct. 4	Oct. 13	Oct. 18	Oct. 26
	15	Aug. 26	Sept. 1	Sept. 8	Sept. 12	Sept. 17	Sept. 23	Sept. 30	Oct. 6	Oct. 16	Oct. 20	Oct. 29
	20	Aug. 28	Sept. 3	Sept. 10	Sept. 14	Sept. 19	Sept. 25	Oct. 1	Oct. 8	Oct. 17	Oct. 22	Oct. 31
	25	Aug. 29	Sept. 4	Sept. 12	Sept. 15	Sept. 21	Sept. 26	Oct. 3	Oct. 10	Oct. 19	Oct. 24	Nov. 1
	30	Aug. 31	Sept. 5	Sept. 13	Sept. 17	Sept. 22	Sept. 28	Oct. 4	Oct. 11	Oct. 20	Oct. 25	Nov. 3
	35	Sept. 1	Sept. 7	Sept. 14	Sept. 18	Sept. 23	Sept. 29	Oct. 6	Oct. 13	Oct. 21	Oct. 27	Nov. 4
	40	Sept. 2	Sept. 8	Sept. 16	Sept. 19	Sept. 24	Sept. 30	Oct. 7	Oct. 14	Oct. 22	Oct. 28	Nov. 6
Percentage	45	Sept. 4	Sept. 9	Sept. 17	Sept. 21	Sept. 26	Oct. 1	Oct. 8	Oct. 15	Oct. 23	Oct. 29	Nov. 7
	50	Sept. 5	Sept. 10	Sept. 18	Sept. 22	Sept. 27	Oct. 2	Oct. 9	Oct. 16	Oct. 24	Oct. 30	Nov. 8
Probability	55	Sept. 6	Sept. 11	Sept. 19	Sept. 23	Sept. 28	Oct. 3	Oct. 10	Oct. 18	Oct. 26	Nov. 1	Nov. 9
	60	Sept. 7	Sept. 12	Sept. 20	Sept. 24	Sept. 29	Oct. 5	Oct. 11	Oct. 19	Oct. 27	Nov. 2	Nov. 10
	65	Sept. 9	Sept. 13	Sept. 21	Sept. 25	Sept. 30	Oct. 6	Oct. 12	Oct. 20	Oct. 28	Nov. 3	Nov. 12
	70	Sept. 10	Sept. 14	Sept. 23	Sept. 26	Oct. 1	Oct. 7	Oct. 14	Oct. 22	Oct. 29	Nov. 4	Nov. 13
	75	Sept. 11	Sept. 16	Sept. 24	Sept. 28	Oct. 3	Oct. 9	Oct. 15	Oct. 23	Oct. 30	Nov. 6	Nov. 14
	80	Sept. 13	Sept. 17	Sept. 25	Sept. 29	Oct. 4	Oct. 10	Oct. 17	Oct. 25	Nov. 1	Nov. 8	Nov. 16
	85	Sept. 15	Sept. 19	Sept. 27	Oct. 1	Oct. 6	Oct. 12	Oct. 18	Oct. 27	Nov. 2	Nov. 9	Nov. 18
	90	Sept. 17	Sept. 21	Sept. 29	Oct. 3	Oct. 8	Oct. 14	Oct. 21	Oct. 29	Nov. 4	Nov. 12	Nov. 20
Latest[2]		Sept. 18	Sept. 29	Oct. 7	Oct. 7	Oct. 19	Oct. 20	Oct. 31	Nov. 6	Nov. 9	Nov. 21	Nov. 23

[1] Based on daily minimum temperatures taken in an official shelter approximately 4 feet above ground.

[2] Recorded during the period 1924-56.

TABLE 3. – PROBABILITIES OF FREEZING TEMPERATURES IN THE SPRING AT CHARLOTTETOWN, P.E.I.

(Percentage probabilities - numbers of times out of 100 - that the last spring temperature of a given value will occur *on* or *after* a certain date. Based on data[1] from 1924 to 1956 taken at the Experimental Farm.)

		Temperature										
		20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	40°
Earliest[2]		March 14	March 15	March 21	March 28	April 15	April 17	April 29	April 30	May 15	May 15	May 18
	90	March 23	March 26	April 1	April 11	April 17	April 24	April 29	May 10	May 15	May 20	May 24
	85	March 25	March 29	April 3	April 13	April 19	April 26	May 1	May 12	May 18	May 22	May 27
	80	March 26	March 30	April 5	April 15	April 20	April 28	May 3	May 14	May 19	May 24	May 28
	75	March 28	April 1	April 7	April 16	April 22	April 29	May 4	May 15	May 21	May 25	May 30
	70	March 29	April 2	April 8	April 17	April 23	April 30	May 6	May 16	May 22	May 27	May 31
	65	March 30	April 3	April 9	April 19	April 24	May 2	May 7	May 18	May 23	May 28	June 1
	60	March 31	April 5	April 10	April 20	April 25	May 3	May 8	May 19	May 24	May 29	June 2
Percentage	55	April 1	April 6	April 11	April 21	April 26	May 4	May 9	May 20	May 26	May 30	June 4
	50	April 2	April 7	April 12	April 22	April 27	May 5	May 10	May 21	May 27	May 31	June 5
Probability	45	April 3	April 8	April 14	April 23	April 28	May 6	May 12	May 22	May 28	June 1	June 6
	40	April 4	April 9	April 15	April 24	April 29	May 7	May 13	May 23	May 29	June 2	June 7
	35	April 5	April 10	April 16	April 25	May 1	May 8	May 14	May 25	May 30	June 4	June 8
	30	April 7	April 12	April 17	April 26	May 2	May 9	May 15	May 26	May 31	June 5	June 9
	25	April 8	April 13	April 18	April 28	May 3	May 10	May 17	May 27	June 2	June 6	June 11
	20	April 9	April 14	April 20	April 29	May 4	May 12	May 18	May 29	June 3	June 8	June 12
	15	April 11	April 16	April 21	May 1	May 6	May 13	May 20	May 30	June 5	June 9	June 14
	10	April 13	April 18	April 24	May 2	May 8	May 15	May 22	June 2	June 7	June 12	June 16
Latest[2]		April 29	April 29	April 29	May 10	May 18	May 25	June 8	June 13	June 15	June 21	June 21

[1] Based on daily minimum temperatures taken in an official shelter approximately 4 feet above ground.

[2] Recorded during the period 1924-56.

TABLE 4. – PROBABILITIES OF FREEZING TEMPERATURES IN THE AUTUMN AT CHARLOTTETOWN, P.E.I.

(Percentage probabilities - numbers of times out of 100 - that the first autumn temperature of a given value will occur *on* or *before* a certain date. Based on data[1] from 1924 to 1956 taken at the Experimental Farm.)

		Temperature										
		40°	38°	36°	34°	32°	30°	28°	26°	24°	22°	20°
Earliest[2]		Sept. 10	Sept. 15	Sept. 20	Sept. 20	Sept. 29	Oct. 8	Oct. 10	Oct. 15	Oct. 27	Nov. 6	Nov. 6
	10	Sept. 11	Sept. 19	Sept. 24	Sept. 29	Oct. 3	Oct. 12	Oct. 24	Oct. 28	Nov. 6	Nov. 9	Nov. 14
	15	Sept. 13	Sept. 21	Sept. 26	Oct. 1	Oct. 5	Oct. 15	Oct. 26	Oct. 31	Nov. 8	Nov. 12	Nov. 16
	20	Sept. 15	Sept. 23	Sept. 28	Oct. 3	Oct. 7	Oct. 17	Oct. 28	Nov. 2	Nov. 10	Nov. 14	Nov. 18
	25	Sept. 16	Sept. 24	Sept. 30	Oct. 4	Oct. 9	Oct. 18	Oct. 30	Nov. 4	Nov. 12	Nov. 15	Nov. 20
	30	Sept. 17	Sept. 26	Oct. 1	Oct. 5	Oct. 10	Oct. 20	Oct. 31	Nov. 5	Nov. 13	Nov. 17	Nov. 21
	35	Sept. 19	Sept. 27	Oct. 2	Oct. 6	Oct. 11	Oct. 21	Nov. 2	Nov. 7	Nov. 15	Nov. 18	Nov. 23
	40	Sept. 20	Sept. 28	Oct. 3	Oct. 7	Oct. 12	Oct. 22	Nov. 3	Nov. 8	Nov. 16	Nov. 20	Nov. 24
Percentage	45	Sept. 21	Sept. 30	Oct. 4	Oct. 9	Oct. 14	Oct. 24	Nov. 4	Nov. 9	Nov. 17	Nov. 21	Nov. 25
	50	Sept. 22	Oct. 1	Oct. 5	Oct. 10	Oct. 15	Oct. 25	Nov. 5	Nov. 10	Nov. 18	Nov. 22	Nov. 27
Probability	55	Sept. 23	Oct. 2	Oct. 7	Oct. 11	Oct. 16	Oct. 26	Nov. 7	Nov. 12	Nov. 19	Nov. 24	Nov. 28
	60	Sept. 25	Oct. 3	Oct. 8	Oct. 12	Oct. 17	Oct. 27	Nov. 8	Nov. 13	Nov. 21	Nov. 25	Nov. 29
	65	Sept. 26	Oct. 4	Oct. 9	Oct. 13	Oct. 18	Oct. 29	Nov. 9	Nov. 14	Nov. 22	Nov. 26	Nov. 30
	70	Sept. 27	Oct. 6	Oct. 10	Oct. 14	Oct. 19	Oct. 30	Nov. 11	Nov. 16	Nov. 23	Nov. 28	Dec. 2
	75	Sept. 28	Oct. 7	Oct. 11	Oct. 15	Oct. 21	Oct. 31	Nov. 12	Nov. 17	Nov. 25	Nov. 29	Dec. 3
	80	Sept. 30	Oct. 9	Oct. 13	Oct. 17	Oct. 22	Nov. 2	Nov. 14	Nov. 19	Nov. 26	Dec. 1	Dec. 5
	85	Oct. 1	Oct. 11	Oct. 15	Oct. 18	Oct. 24	Nov. 4	Nov. 16	Nov. 21	Nov. 28	Dec. 3	Dec. 7
	90	Oct. 4	Oct. 13	Oct. 17	Oct. 20	Oct. 26	Nov. 6	Nov. 18	Nov. 24	Nov. 30	Dec. 6	Dec. 9
Latest[2]		Oct. 16	Oct. 25	Oct. 28	Oct. 31	Nov. 8	Nov. 9	Dec. 4	Dec. 11	Dec. 12	Dec. 19	Dec. 20

[1] Based on daily minimum temperatures taken in an official shelter approximately 4 feet above ground.
[2] Recorded during the period 1924-56.

TABLE 5. – PROBABILITIES OF FREEZING TEMPERATURES IN THE SPRING AT KENTVILLE, N.S.

(Percentage probabilities - numbers of times out of 100 - that the last spring temperature of a given value will occur *on* or *after* a certain date. Based on data[1] from 1924 to 1956 taken at the Experimental Farm.)

		Temperature										
		20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	40°
Earliest[2]		March 9	March 9	March 9	April 5	April 22	April 24	May 3	May 3	May 15	May 22	May 23
	90	March 25	March 29	April 7	April 16	April 26	May 6	May 8	May 17	May 24	June 2	June 9
	85	March 28	March 31	April 10	April 19	April 29	May 8	May 11	May 19	May 26	June 4	June 12
	80	March 30	April 3	April 12	April 21	April 30	May 10	May 13	May 21	May 28	June 6	June 14
	75	April 1	April 5	April 14	April 23	May 2	May 12	May 15	May 23	May 30	June 7	June 15
	70	April 3	April 7	April 16	April 25	May 3	May 13	May 17	May 25	May 31	June 8	June 17
	65	April 5	April 8	April 17	April 26	May 5	May 15	May 18	May 26	June 1	June 10	June 18
	60	April 7	April 10	April 19	April 27	May 6	May 16	May 19	May 28	June 3	June 11	June 19
Percentage	55	April 8	April 12	April 20	April 29	May 7	May 17	May 21	May 29	June 4	June 12	June 21
	50	April 10	April 13	April 22	April 30	May 8	May 19	May 22	May 30	June 5	June 13	June 22
Probability	45	April 12	April 15	April 24	May 1	May 10	May 20	May 24	June 1	June 7	June 14	June 23
	40	April 13	April 16	April 25	May 3	May 11	May 21	May 25	Juhe 2	June 8	June 15	June 24
	35	April 15	April 18	April 27	May 4	May 12	May 22	May 26	June 3	June 9	June 16	June 25
	30	April 16	April 19	April 28	May 6	May 14	May 24	May 28	June 5	June 11	June 17	June 27
	25	April 18	April 21	April 30	May 8	May 15	May 25	May 29	June 7	June 12	June 19	June 28
	20	April 20	April 23	May 2	May 9	May 17	May 27	May 31	June 8	June 14	June 20	June 30
	15	April 23	April 25	May 4	May 12	May 18	May 29	June 2	June 10	June 16	June 22	July 2
	10	April 26	April 28	May 7	May 14	May 21	May 31	June 5	June 13	June 18	June 24	July 4
Latest[2]		May 15	May 15	May 18	May 25	May 28	June 8	June 15	June 19	June 22	June 29	July 13

[1] Based on daily minimum temperatures taken in an official shelter approximately 4 feet above ground.

[2] Recorded during the period 1924-56.

TABLE 6. – PROBABILITIES OF FREEZING TEMPERATURES IN THE AUTUMN AT KENTVILLE, N.S.

(Percentage probabilities - numbers of times out of 100 - that the first autumn temperature of a given value will occur *on* or *before* a certain date. Based on data [1] from 1924 to 1956 taken at the Experimental Farm.)

		Temperature										
		40°	38°	36°	34°	32°	30°	28°	26°	24°	22°	20°
Earliest [2]		July 16	Aug. 13	Aug. 21	Sept. 5	Sept. 9	Sept. 9	Sept 27	Oct. 2	Oct. 11	Oct. 11	Oct. 21
	10	Aug. 12	Aug. 26	Sept. 2	Sept. 6	Sept. 14	Sept. 22	Oct. 1	Oct. 8	Oct. 13	Oct. 21	Oct. 29
	15	Aug. 15	Aug. 28	Sept. 4	Sept. 8	Sept. 16	Sept. 24	Oct. 3	Oct. 11	Oct. 16	Oct. 24	Nov. 1
	20	Aug. 18	Aug. 30	Sept. 5	Sept. 10	Sept. 18	Sept. 26	Oct. 4	Oct. 13	Oct. 18	Oct. 26	Nov. 3
	25	Aug. 20	Aug. 31	Sept. 7	Sept. 11	Sept. 20	Sept. 27	Oct. 5	Oct. 14	Oct. 20	Oct. 28	Nov. 5
	30	Aug. 22	Sept. 2	Sept. 8	Sept. 13	Sept. 21	Sept. 29	Oct. 6	Oct. 16	Oct. 22	Oct. 30	Nov. 7
	35	Aug. 24	Sept. 3	Sept. 9	Sept. 14	Sept. 22	Sept. 30	Oct. 7	Oct. 17	Oct. 24	Oct. 31	Nov. 9
	40	Aug. 26	Sept. 4	Sept. 10	Sept. 15	Sept. 24	Oct. 1	Oct. 8	Oct. 18	Oct. 26	Nov. 2	Nov. 11
Percentage	45	Aug. 27	Sept. 5	Sept. 11	Sept. 17	Sept. 25	Oct. 2	Oct. 9	Oct. 20	Oct. 27	Nov. 3	Nov. 12
	50	Aug. 29	Sept. 6	Sept. 12	Sept. 18	Sept. 26	Oct. 3	Oct. 10	Oct. 21	Oct. 29	Nov. 4	Nov. 14
Probability	55	Aug. 31	Sept. 7	Sept. 13	Sept. 19	Sept. 27	Oct. 4	Oct. 11	Oct. 22	Oct. 31	Nov. 6	Nov. 15
	60	Sept. 1	Sept. 9	Sept. 14	Sept. 20	Sept. 29	Oct. 5	Oct. 12	Oct. 23	Nov. 1	Nov. 7	Nov. 16
	65	Sept. 3	Sept. 10	Sept. 15	Sept. 21	Sept. 30	Oct. 6	Oct. 13	Oct. 25	Nov. 3	Nov. 9	Nov. 18
	70	Sept. 4	Sept. 11	Sept. 16	Sept. 23	Oct. 1	Oct. 7	Oct. 14	Oct. 26	Nov. 5	Nov. 11	Nov. 20
	75	Sept. 6	Sept. 12	Sept. 17	Sept. 24	Oct. 3	Oct. 8	Oct. 15	Oct. 28	Nov. 7	Nov. 12	Nov. 22
	80	Sept. 9	Sept. 14	Sept. 18	Sept. 26	Oct. 4	Oct. 9	Oct. 17	Oct. 29	Nov. 9	Nov. 14	Nov. 24
	85	Sept. 11	Sept. 16	Sept. 19	Sept. 27	Oct. 6	Oct. 11	Oct. 18	Oct. 31	Nov. 11	Nov. 16	Nov. 26
	90	Sept. 14	Sept. 18	Sept. 21	Sept. 30	Oct. 9	Oct. 13	Oct. 20	Nov. 3	Nov. 14	Nov. 19	Nov. 29
Latest [2]		Sept. 17	Sept. 20	Sept. 27	Oct. 5	Oct. 20	Nov. 9	Nov. 9	Nov. 14	Nov. 16	Dec. 5	Dec. 5

[1] Based on daily minimum temperatures taken in an official shelter approximately 4 feet above ground.

[2] Recorded during the period 1924-56.

TABLE 7. – PROBABILITIES OF FREEZING TEMPERATURES IN THE SPRING AT NAPPAN, N.S.

(Percentage probabilities - numbers of times out of 100 - that the last spring temperature of a given value will occur *on* or *after* a certain date. Based on data [1] from 1924 to 1956 taken at the Experimental Farm.)

		Temperature										
		20°	22°	24°	26°	28°	30°	32°	34°	36°	38°	40°
Earliest [2]		March 10	March 10	March 21	April 16	April 19	May 2	May 6	May 14	May 20	May 22	June 3
	90	March 25	March 30	April 8	April 20	April 25	May 7	May 11	May 17	May 23	June 3	June 11
	85	March 27	April 2	April 11	April 22	April 28	May 10	May 13	May 20	May 25	June 6	June 14
	80	March 29	April 4	April 13	April 24	April 30	May 11	May 15	May 22	May 28	June 8	June 15
	75	March 31	April 6	April 15	April 26	May 2	May 13	May 17	May 24	May 30	June 9	June 17
	70	April 2	April 8	April 16	April 27	May 4	May 14	May 18	May 26	June 1	June 11	June 18
	65	April 3	April 10	April 17	April 28	May 5	May 15	May 20	May 28	June 2	June 12	June 19
	60	April 4	April 11	April 19	April 30	May 6	May 17	May 21	May 29	June 3	June 13	June 21
Percentage	55	April 6	April 13	April 20	May 1	May 8	May 18	May 22	May 31	June 5	June 14	June 22
	50	April 7	April 14	April 21	May 2	May 9	May 19	May 24	June 1	June 6	June 16	June 23
Probability	45	April 8	April 16	April 23	May 3	May 10	May 20	May 25	June 3	June 8	June 17	June 24
	40	April 10	April 17	April 24	May 4	May 12	May 21	May 26	June 4	June 9	June 18	June 25
	35	April 11	April 18	April 25	May 6	May 13	May 22	May 28	June 6	June 11	June 19	June 27
	30	April 12	April 20	April 27	May 7	May 15	May 23	May 29	June 7	June 12	June 21	June 28
	25	April 14	April 22	April 28	May 8	May 16	May 25	May 30	June 9	June 14	June 22	June 29
	20	April 16	April 24	April 30	May 10	May 18	May 26	June 1	June 11	June 16	June 24	July 1
	15	April 18	April 26	May 2	May 12	May 20	May 28	June 3	June 13	June 18	June 25	July 3
	10	April 20	April 29	May 4	May 14	May 23	May 30	June 6	June 16	June 21	June 28	July 5
Latest [2]		April 30	May 15	May 15	May 25	May 27	June 4	June 18	June 25	June 25	July 10	July 13

[1] Based on daily minimum temperatures taken in an official shelter approximately 4 feet above ground.
[2] Recorded during the period 1924-56.

TABLE 8. – PROBABILITIES OF FREEZING TEMPERATURES IN THE AUTUMN AT NAPPAN, N.S.

(Percentage probabilities - numbers of times out of 100 - that the first autumn temperature of a given value will occur *on* or *before* a certain date. Based on data [1] from 1924 to 1956 taken at the Experimental Farm.)

		Temperature										
		40°	38°	36°	34°	32°	30°	28°	26°	24°	22°	20°
Earliest [2]		July 16	July 16	July 16	Aug. 21	Aug. 27	Sept. 9	Sept. 18	Sept. 27	Oct. 1	Oct. 10	Oct. 10
	10	Aug. 6	Aug. 11	Aug. 21	Aug. 27	Sept. 6	Sept. 15	Sept. 21	Sept. 27	Oct. 5	Oct. 19	Oct. 24
	15	Aug. 9	Aug. 14	Aug. 24	Aug. 30	Sept. 8	Sept. 17	Sept. 24	Sept. 30	Oct. 9	Oct. 22	Oct. 27
	20	Aug. 12	Aug. 17	Aug. 27	Sept. 2	Sept. 10	Sept. 19	Sept. 26	Oct. 2	Oct. 11	Oct. 24	Oct. 29
	25	Aug. 14	Aug. 20	Aug. 29	Sept. 4	Sept. 11	Sept. 21	Sept. 28	Oct. 4	Oct. 13	Oct. 26	Oct. 31
	30	Aug. 16	Aug. 22	Aug. 30	Sept. 6	Sept. 13	Sept. 22	Sept. 30	Oct. 6	Oct. 15	Oct. 28	Nov. 2
	35	Aug. 18	Aug. 24	Sept. 1	Sept. 7	Sept. 14	Sept. 24	Oct. 2	Oct. 8	Oct. 17	Oct. 30	Nov. 4
	40	Aug. 20	Aug. 25	Sept. 3	Sept. 9	Sept. 15	Sept. 25	Oct. 4	Oct. 9	Oct. 19	Oct. 31	Nov. 6
Percentage	45	Aug. 21	Aug. 27	Sept. 4	Sept. 11	Sept. 17	Sept. 27	Oct. 5	Oct. 11	Oct. 20	Nov. 2	Nov. 7
	50	Aug. 23	Aug. 29	Sept. 6	Sept. 12	Sept. 18	Sept. 28	Oct. 7	Oct. 12	Oct. 22	Nov. 4	Nov. 9
Probability	55	Aug. 25	Aug. 31	Sept. 8	Sept. 14	Sept. 19	Sept. 29	Oct. 8	Oct. 14	Oct. 24	Nov. 5	Nov. 10
	60	Aug. 26	Sept. 1	Sept. 9	Sept. 15	Sept. 20	Sept. 30	Oct. 10	Oct. 16	Oct. 25	Nov. 7	Nov. 12
	65	Aug. 28	Sept. 3	Sept. 11	Sept. 17	Sept. 21	Oct. 2	Oct. 12	Oct. 17	Oct. 27	Nov. 8	Nov. 13
	70	Aug. 30	Sept. 5	Sept. 13	Sept. 18	Sept. 23	Oct. 3	Oct. 13	Oct. 19	Oct. 29	Nov. 10	Nov. 15
	75	Sept. 1	Sept. 7	Sept. 15	Sept. 20	Sept. 24	Oct. 5	Oct. 15	Oct. 21	Oct. 31	Nov. 12	Nov. 17
	80	Sept. 3	Sept. 10	Sept. 17	Sept. 23	Sept. 26	Oct. 6	Oct. 17	Oct. 23	Nov. 2	Nov. 14	Nov. 19
	85	Sept. 6	Sept. 12	Sept. 19	Sept. 25	Sept. 28	Oct. 8	Oct. 20	Oct. 25	Nov. 5	Nov. 17	Nov. 21
	90	Sept. 9	Sept. 16	Sept. 22	Sept. 28	Sept. 30	Oct. 11	Oct. 23	Oct. 28	Nov. 8	Nov. 19	Nov. 24
Latest [2]		Sept. 13	Sept. 25	Sept. 28	Oct. 3	Oct. 16	Oct. 19	Nov. 9	Nov. 16	Nov. 20	Dec. 4	Dec. 4

[1] Based on daily minimum temperatures taken in an official shelter approximately 4 feet above ground.

[2] Recorded during the period 1924-56.

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