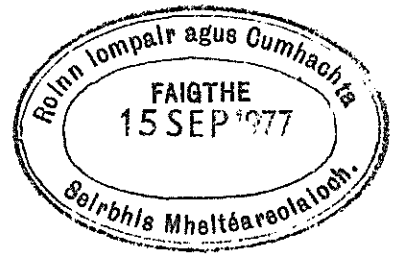


METEOROLOGICAL SERVICE



AGROMETEOROLOGICAL MEMORANDUM No. 5

THE GRASS-GROWING SEASON IN IRELAND

BY

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A P P E N D I X

Heights (A.M.S.L.) of meteorological stations and description of soils at thermometer sites:

Dublin Airport (68 metres)	: moderately well-drained loam.
Kinsealy (17 metres)	: moderately well-drained loam to clay loam.
Mullingar (108 metres)	: well-drained sandy clay loam.
Carlow (55 metres)	: well-drained sandy loam.
Kilkenny (63 metres)	: well-drained gravelly sandy loam.
Thurles (98 metres)	: free-draining sandy loam.
Johnstown Castle (46 metres)	: well-drained sandy loam.
Rosslare (23 metres)	: poorly-drained loam to clay loam.
Roche's Point (40 metres)	: well-drained gravelly loam.
Mallow (53 metres)	: free-draining sandy loam.
Valentia Observatory (9 metres)	: well-drained gravelly clay loam.
Shannon Airport (2 metres)	: poorly-drained gley of clay loam texture.
Birr (70 metres)	: sandy clay loam.
Tuam (31 metres)	: well-drained loam.
Claremorris (69 metres)	: free-draining loam.
Belmullet (9 metres)	: black humose loamy sand.
Ballinamore (80 metres)	: poorly drained gley of clay loam texture.
Clones (87 metres)	: well-drained loam.
Ballykelly (5 metres)	: no information on soil.
Moneydig (37 metres)	: no information on soil.
Aldergrove (71 metres)	: no information on soil.
Hillsborough (118 metres)	: sandy loam.

The Grass-Growing Season in Ireland

The "growing season" is usually defined as the period when the mean air temperature is consistently above a specified threshold value which approximates to the critical minimum temperature associated with the growth of a particular crop. Since different crops have different critical temperature requirements, it is clear that, to avoid ambiguity, the concept of the growing season should be used with reference to a specific crop rather than to a range of crops with varying minimum temperature thresholds. The use of air temperatures rather than soil temperatures in the definition of the growing season has, in the past, been largely a matter of expediency; because of the comparative sparsity of soil temperature data, air temperatures have generally been used although it has been recognised that temperatures in the root zone are likely to have more relevance in the early part of the growing period and, in the case of perennials, also in the later stages of growth.

In this paper, the grass-growing season is defined as the period during which the mean soil temperature at 10cm depth is consistently above 6.0°C , which is generally accepted as being the temperature below which there is no appreciable growth of grass.

Soil temperature records over the period 1954-1968 from meteorological stations throughout the country were examined and for each year the dates on which the annual curve of soil temperature, at 10cm depth, at each station crossed the 6.0°C threshold upwards and downwards were taken as being the dates of beginning and ending, respectively, of the grass-growing season. The year-to-year distributions of these dates were found to be skew and it was, therefore, considered that analysis of median* dates, rather than of the more commonly used average dates, would provide more useful information on the variation of the grass-growing season.

*If the dates of beginning (ending) of the grass-growing season in each of the fifteen years are $D_1 D_2 D_3 \dots D_{15}$ in order of earliness then D_8 is the median date of the beginning (ending) of the season.

Table 1 on page 4 gives the median dates of the beginning and ending and the median length of the grass-growing season at 22 meteorological stations. At 6 of these stations, complete records (four six-hourly readings daily) of soil temperature were available for the whole fifteen-year period, 1954-1968. At the remaining 16 sites for which soil temperature records were either incomplete or absent, median dates and lengths were derived from available soil and air temperature data using the methods described in Agrometeorological Memorandum No. 3. Values of air temperature at the four stations in Northern Ireland were extracted from Monthly Weather Reports of the British Meteorological Office.

The Maps on pages 5, 6, 7, based on the data contained in Table 1, are intended to illustrate the general variation in the grass-growing season over the country. Local deviations from the general pattern may be expected because of variations in altitude, soil type and drainage, shelter and land slope and aspect. For example, the onset and end of the grass-growing season are likely to be earlier on light sandy soils than on heavy clay soils and earlier on dry land than on wet land. On sloping sites with unshaded southern aspects, the season will be longer than on those facing north while an increase in height will cause an average reduction of about 1 day per 6 metres in the length of the season. Temperatures used in preparing the Maps were measured on level sites. Information on the heights and soils of the sites is given in the Appendix on page 9.

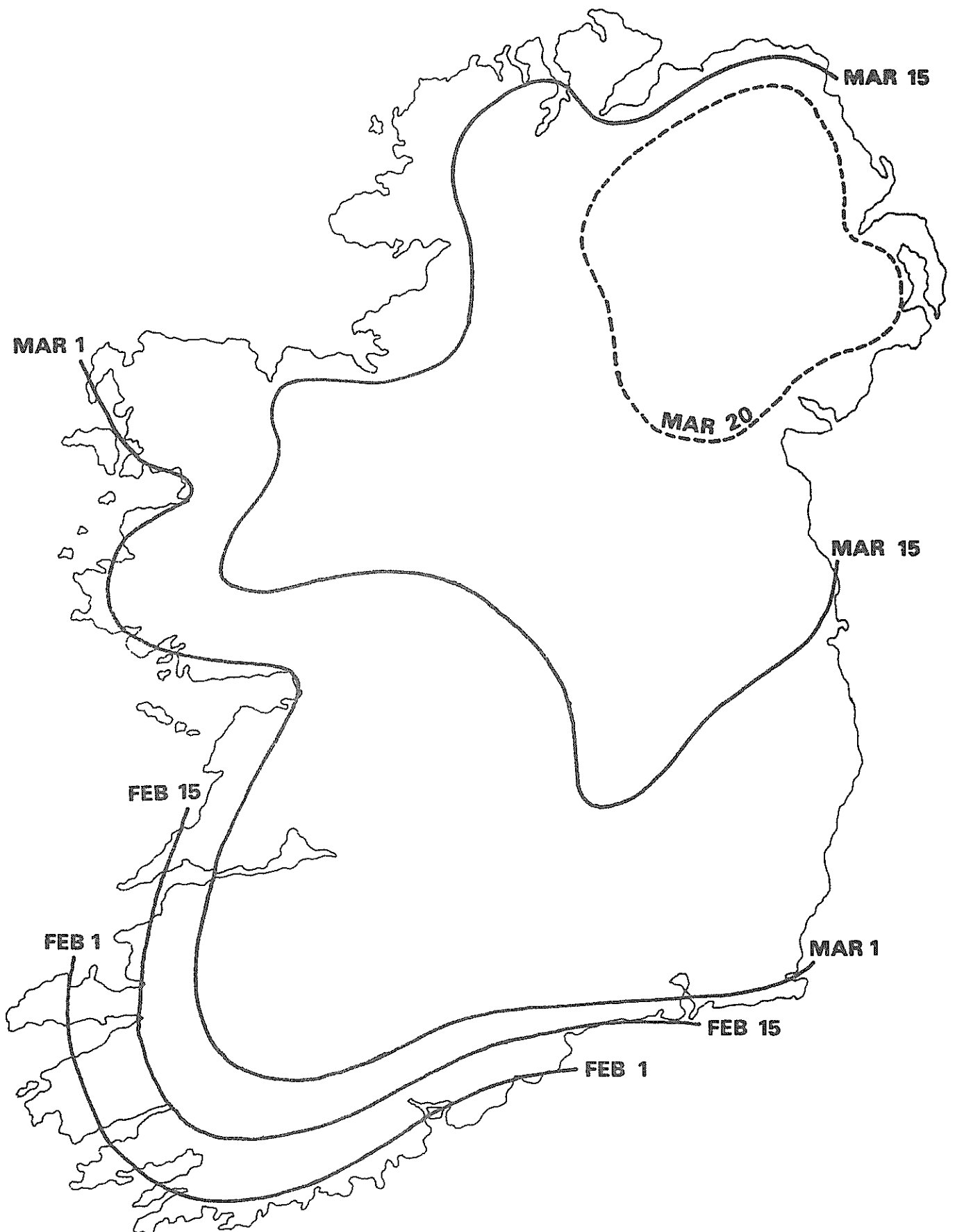
The earliness and lengthy duration of the grass-growing season in coastal districts of the South and Southwest are well known. It may be seen from the Maps that, typically, in these areas, soil temperatures are favourable for grass growth some six weeks earlier in Spring and for about five weeks later in Winter than in most parts of the Midlands. Examination of temperature records from Valentia Observatory and Roche's Point shows that in five of the fifteen years, mean soil temperatures (10 cm) at these sites did not fall below 6.0°C for any appreciable length of time during

the Winter; in only four of the remaining ten years was the grass-growing season less than 300 days. Tables 2a and 2b on page 8 give the probabilities, based on the fifteen-year records, of the timing and duration of the grass-growing season in Ireland; Table 2a refers to coastal areas of the South and Southwest, Table 2b to other parts of the country.

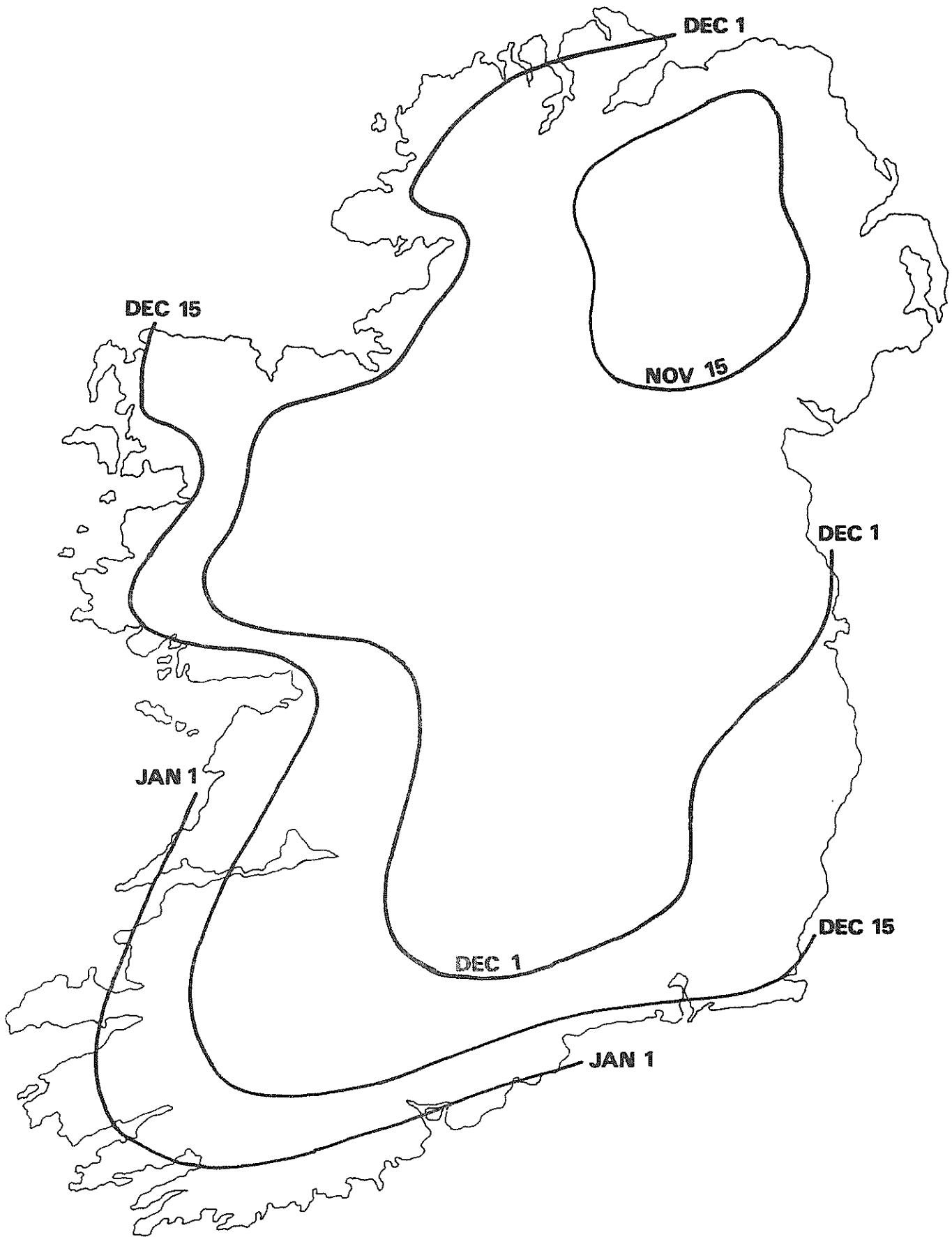
The Tables and Maps may be used to estimate the likelihood of the grass-growing season beginning and ending before given dates, bearing in mind the local variations discussed above. It should be noted that in some years, the onset and end of the season are intermittent; in early Spring, for example, mean soil temperatures sometimes rise temporarily above the 6.0°C threshold giving rise to false starts to the grass-growing season. The dates given in this Memorandum are considered to be good approximations to the dates of beginning and ending of the "true" grass-growing season.

Station/ County	Median Date of Beginning of Grass-Growing Season	Median Date of Ending of Grass-Growing Season	Median Length (days) of Grass-Growing Season
Dublin Airport, Co. Dublin	March 16	Nov. 27	258
Kinsealy, Co. Dublin	March 12	Dec. 3	269
Mullingar, Co. Westmeath	March 17	Nov. 20	250
Carlow, Co. Carlow	March 10	Dec. 1	269
Kilkenny, Co. Kilkenny	March 14	Nov. 23	258
Thurles, Co. Tipperary	March 9	Nov. 30	272
Johnstown Castle Co. Wexford	March 5	Dec. 13	286
Rosslare, Co. Wexford	Feb. 28	Dec. 19	295
Roche's Point, Co. Cork	Jan. 30	Jan. 6	329
Mallow, Co. Cork	March 3	Dec. 11	289
Valentia Obsy. Co. Kerry	Jan. 28	Jan. 9	329
Shannon Airport, Co. Clare	March 6	Dec. 8	282
Birr, Co. Offaly	March 12	Nov. 23	259
Tuam, Co. Galway	March 13	Nov. 25	263
Claremorris, Co. Mayo	March 17	Nov. 18	253
Belmullet, Co. Mayo	March 2	Dec. 16	295
Ballinamore, Co. Leitrim	March 18	Nov. 16	250
Clones, Co. Monaghan	March 20	Nov. 15	245
Ballykelly. Co. Derry	March 13	Nov. 26	264
Moneydig, Co. Derry	March 22	Nov. 14	243
Aldergrove, Co. Antrim	March 22	Nov. 17	246
Hillsborough, Co. Down	March 24	Nov. 16	243

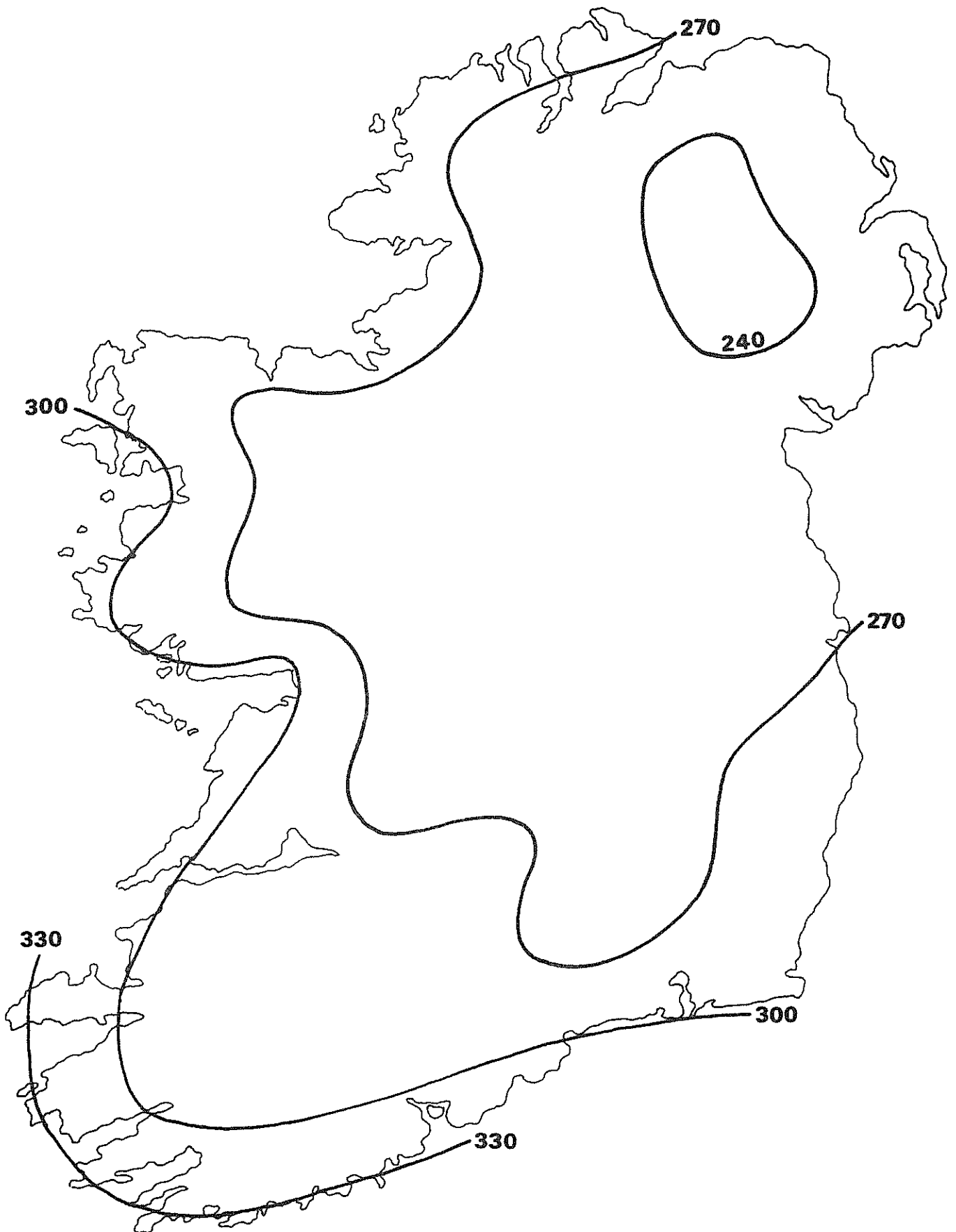
TABLE I : Median dates of beginning and ending and median lengths of
grass-growing season, 1954 - 1968.



Median date of beginning of Grass - growing Season (1954 - 1968).



Median date of ending of Grass-growing Season (1954-1968).



Median length (Days) of Grass-growing Season (1954-1968).

Probability of grass-growing season
beginning* before -

Jan. 16 : 40%
Feb. 1 50%
Feb. 15 55%
March 1 67%
March 16 95%

Probability of grass-growing season
ending* before -

Dec. 15 : 20%
Jan. 1 : 33%
Jan. 10 : 50%
Jan. 31 : 67%

Probability of duration* of grass-
growing season being less than -

270 days : 7%
300 days : 27%
330 days : 50%
350 days : 60%

* The probability of the grass-growing season continuing without check throughout the year is 33%

TABLE 2a : Probabilities of timing and duration of the grass-growing season in southern and southwestern coastal areas of Ireland.

Probability of grass-growing season
beginning before -

Median Date - 14 days : 20%
Median Date - 7 days : 33%
Median Date : 50%
Median Date + 7 days : 80%
Median Date + 14 days : 100%

Probability of grass-growing season
ending before -

Median Date - 14 days : 7%
Median Date - 7 days : 20%
Median Date : 50%
Median Date + 7 days : 75%
Median Date + 14 days : 85%

Probability of duration of grass-
growing season being less than -

Median length - 20 days : 7%
Median Length - 10 days : 27%
Median Length : 50%
Median Length + 10 days : 80%
Median Length + 20 days : 95%

TABLE 2b : Probabilities of timing and duration of the grass-growing season in Ireland (except in coastal areas of the South and Southwest).