



AGROMETEOROLOGICAL BULLETIN

The Weather of February 1989

Summary

1st-18th: Very unsettled, mild and wet, strong southwest winds.

19th - end: Cold and frosty with wintry showers and variable or northwest winds.

Month: Very wet and dull in the west, much drier and brighter in the east, and very mild everywhere.

Meteorological Situation

Active Atlantic depressions mainly moving towards Iceland or north of Scotland dominated weather conditions to 22nd. The airflow over Ireland was strong or very strong southwest, but west at times. Frontal troughs frequently affected the country and these were most active in western areas. Occasional rising pressure gave quieter periods and post frontal west to northwest winds gave squally showers. Temperature generally declined from 19th. With the arrival of a depression centre to south of Ireland on 22nd, the country came under the influence of a complex area of low pressure. Frost became widespread, and spells of sleet and snow occurred subsequently, especially from the 26th as the northwest airflow freshened.

Precipitation

There was considerable west to east contrast in precipitation amounts. Values varied from 223% of normal at Glenties to 84% of normal at Dublin Airport. In the midlands Mullingar recorded 168%. Apart from the east (with only 10 wetdays), rainfall was spread fairly evenly through the month (20 to 25 wetdays). Wettest days were 4th, 9th, 11th, 13th, 15th, 17-19th, 21st.

Temperature

Monthly mean air temperature was well above normal. Values varied from 2.0°C above normal at Shannon Airport to 1.1°C above at Cork Airport. Both the daily minimum values and particularly the maximum values tended to be high (see fig.) However there was also a general tendency for temperatures to decline as the month progressed. Frosts were severest during the spell 21st to 25th.

Sunshine and Radiation

Again there was a wide regional variation in sunshine hours. These were well below normal in the west and above normal elsewhere. Values varied from 74% of normal at Belmullet and Claremorris, to 131% at Casement. The first 8 days were generally dullest. Global radiation varied from 92% of normal at Valentia to 126% of normal at Dublin Airport.

Wind

Winds were generally strong during the month particularly on 3rd, 9th, 11th, 13th (windiest day, with gusts of 45 to 60 knots), 15th, 17th, 22nd, and 26th to 28th.

NOTE: The data contained in this bulletin are provisional. Some of the material in Table 1 will be published in its final form in the Monthly Weather Report; final values of Global Radiation at stations in Table 2 will be published in the annual Solar Radiation Observations.

TABLE 1

FEBRUARY 1989

STATION	PERIOD	RAINFALL (mm)				TEMPERATURE (°C)														BRIGHT SUNSHINE		WIND					
		AMOUNT	% OF AVERAGE	RAIN DAYS	WET DAYS	AIR							GROUND			SOIL (10cm)		TOTAL NO. OF HOURS	% OF AVERAGE	MEAN SPEED (ms ⁻¹)	DAYS WITH GALE GUSTS	P.E. (PENMAN) (mm)					
						MEAN MAX.	MEAN MIN.	MEAN DAILY	DIFFERENCE FROM AVERAGE	LOWEST MIN.	DATE	DAYS WITH AIR FROST	DEGREE DAYS ABOVE 4.4°C	% OF AVERAGE	DEGREE DAYS ABOVE 10.0°C	% OF AVERAGE	LOWEST "GRASS-MIN"						DATE	DAYS WITH GROUND FROST	MEAN DAILY	DIFFERENCE FROM AVERAGE	
Carlow (Oak Park) Co. Carlow	1-10	19.0	-	5	4	11.4	5.7	8.5	-	-1.4	10	1	44	-	5	-	-5.0	10	1	-	-	4.9	-	3.5	-	-	
	11-20	23.9	-	7	6	9.9	2.6	6.2	-	-0.5	11	1	23	-	2	-	-2.5	11	4	-	-	19.5	-	9.4	-	-	
	21-END	16.6	-	6	4	6.6	-0.5	3.1	-	-2.8	25	5	5	-	0	-	-6.6	25	6	-	-	22.1	-	5.8	-	-	
	MONTH	59.5	103	18	14	9.5	2.8	6.2	-	-2.8	25	7	72	-	6	-	-6.6	25	11	-	-	52.5	-	6.3	-	21	
Shannon Airport Co. Clare	1-10	20.2	-	8	4	12.0	6.8	9.4	-	2.8	10	0	50	-	7	-	-0.9	10	1	8.3	-	14.2	-	5.4	7	-	
	11-20	44.8	-	10	8	10.4	4.4	7.4	-	2.2	16	0	32	-	2	-	-2.0	16	4	6.9	-	24.7	-	6.0	8	-	
	21-END	29.6	-	8	7	7.8	1.0	4.4	-	-1.9	24	1	9	-	0	-	-5.9	24	7	4.4	-	23.2	-	5.9	6	-	
	MONTH	94.6	150	26	19	10.2	4.3	7.3	+2.0	-1.9	24	1	90	125	9	-	-5.9	24	12	6.7	+1.7	62.1	85	5.8	21	22	
Cork Airport Co. Cork	1-10	24.4	-	6	4	10.5	5.9	8.2	-	0.1	10	0	39	-	2	-	-3.1	10	1	7.9	-	13.4	-	7.7	7	-	
	11-20	54.3	-	9	9	9.7	3.5	6.6	-	1.0	20	0	26	-	1	-	-2.7	11	4	6.4	-	26.8	-	7.9	7	-	
	21-END	35.5	-	7	7	5.4	-0.1	2.6	-	-1.0	23	5	3	-	0	-	-4.6	21	6	3.6	-	24.3	-	6.5	6	-	
	MONTH	114.2	108	22	20	8.8	3.3	6.0	+1.1	-1.0	23	5	68	121	3	-	-4.6	21	11	6.2	+1.5	64.5	92	7.4	20	15	
Fermoy (Coolnakilla) Co. Cork	1-10	43.7	-	8	7	9.6	5.8	7.7	-	0.3	10	0	34	-	1	-	-0.8	10	2	-	-	14.8	-	N/A	-	-	
	11-20	37.5	-	10	8	9.0	2.7	5.8	-	0.5	20	0	20	-	1	-	-1.2	11	3	-	-	26.2	-	N/A	-	-	
	21-END	34.5	-	8	7	5.5	-0.9	2.3	-	-5.3	26	4	2	-	0	-	-2.6	21	6	-	-	19.1	-	N/A	-	-	
	MONTH	115.7	-	26	22	8.2	2.8	5.5	-	-5.3	26	4	56	-	2	-	-2.6	21	11	-	-	60.1	-	N/A	-	N/A	
Fermoy (Moore Park) Co. Cork	1-10	19.1	-	7	4	11.2	6.2	8.7	-	-3.9	10	1	46	-	5	-	-6.5	10	2	-	-	15.3	-	3.9	-	-	
	11-20	23.7	-	9	7	10.5	1.4	5.9	-	-2.4	16	5	25	-	3	-	-5.6	20	5	-	-	29.4	-	4.1	-	-	
	21-END	34.7	-	8	8	7.0	-0.2	3.4	-	-3.4	21	3	6	-	0	-	-7.5	21	6	-	-	28.7	-	3.5	-	-	
	MONTH	77.5	98	24	19	9.8	2.6	6.2	-	-3.9	10	9	77	-	7	-	-7.5	21	13	-	-	73.4	-	3.9	-	14	
Roches Point Co. Cork	1-10	17.7	-	5	3	11.0	7.5	9.2	-	2.1	10	0	49	-	4	-	-0.6	10	1	8.7	-	15.9	-	7.8	7	-	
	11-20	34.1	-	9	8	10.3	5.3	7.8	-	2.5	16	0	35	-	2	-	-0.6	11	2	7.5	-	25.3	-	8.7	8	-	
	21-END	33.1	-	8	7	7.3	1.8	4.6	-	0.9	23	0	8	-	0	-	-2.8	21	4	4.8	-	29.0	-	28.6	7	-	
	MONTH	84.9	106	22	18	9.7	5.1	7.4	+1.3	0.9	23	0	91	117	5	-	-2.8	21	7	7.1	+1.2	70.2	95	14.1	22	31	
Glencolumbkille Co. Donegal	1-10	N/A	-	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	-	N/A	-	N/A	N/A	N/A	-	-	N/A	-	N/A	-	N/A	-	-
	11-20	N/A	-	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	-	N/A	-	N/A	N/A	N/A	-	-	N/A	-	N/A	-	N/A	-	-
	21-END	N/A	-	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	-	N/A	-	N/A	N/A	N/A	-	-	N/A	-	N/A	-	N/A	-	-
	MONTH	N/A	-	N/A	N/A	N/A	N/A	N/A	-	N/A	N/A	N/A	-	N/A	-	N/A	N/A	N/A	-	-	N/A	-	N/A	-	N/A	-	N/A

TABLE 1 (CONTINUED)

FEBRUARY 1989

STATION	PERIOD	RAINFALL (mm)				TEMPERATURE (°C)														BRIGHT SUNSHINE		WIND													
		AMOUNT	% OF AVERAGE	RAIN DAYS	WET DAYS	AIR							GROUND				SOIL (10cm)			TOTAL NO. OF HOURS	% OF AVERAGE	MEAN SPEED (ms ⁻¹)	DAYS WITH GALE GUSTS	P.E. (PENMAN) (mm)											
						MEAN MAX.	MEAN MIN.	MEAN DAILY	DIFFERENCE FROM AVERAGE	LOWEST MIN.	DATE	DAYS WITH AIR FROST	DEGREE DAYS ABOVE 4.4°C	% OF AVERAGE	DEGREE DAYS ABOVE 10.0°C	% OF AVERAGE	LOWEST °GRASS-MIN"	DATE	DAYS WITH GROUND FROST						MEAN DAILY	DIFFERENCE FROM AVERAGE									
Glenties Co. Donegal	1-10	110.5	-	10	9	9.5	4.7	7.1	-	-0.2	8	1	30	-	1	-	-2.6	10	4	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	11-20	74.8	-	10	10	8.7	2.2	5.5	-	-0.3	16	1	18	-	1	-	-4.1	16	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	21-END	55.5	-	8	8	6.4	-0.2	3.1	-	-3.4	25	2	4	-	0	-	-7.2	25	8	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	
	MONTH	240.8	223	28	27	8.3	2.4	5.4	-	-3.4	25	4	51	-	2	-	-7.2	25	20	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Malin Head Co. Donegal	1-10	42.9	-	8	7	11.0	5.2	8.1	-	0.9	8	0	39	-	4	-	-2.2	8	1	7.1	-	10.4	-	11.0	9	-	-	-	-	-	-	-	-	-	
	11-20	48.2	-	10	10	9.7	3.2	6.4	-	1.6	20	0	24	-	2	-	-2.3	11	2	5.2	-	26.3	-	13.3	10	-	-	-	-	-	-	-	-	-	-
	21-END	45.8	-	8	7	7.1	2.1	4.6	-	0.5	26	0	7	-	0	-	-2.5	26	4	4.0	-	29.0	-	10.8	6	-	-	-	-	-	-	-	-	-	-
	MONTH	136.9	183	26	24	9.4	3.6	6.5	+1.4	0.5	26	0	70	127	5	-	-2.5	26	7	5.5	+1.1	65.7	103	11.8	25	35	-	-	-	-	-	-	-	-	-
Casement Aerodrome Co. Dublin	1-10	14.7	-	5	3	11.5	5.7	8.6	-	0.7	10	0	43	-	5	-	-1.2	10	1	7.1	-	24.7	-	10.0	8	-	-	-	-	-	-	-	-	-	-
	11-20	30.1	-	9	8	9.7	2.0	5.8	-	-0.2	16	1	22	-	1	-	-4.9	17	5	5.4	-	34.1	-	10.1	8	-	-	-	-	-	-	-	-	-	-
	21-END	6.4	-	6	3	6.3	-0.2	3.1	-	-3.0	25	4	4	-	0	-	-5.3	25	7	3.5	-	36.4	-	8.4	6	-	-	-	-	-	-	-	-	-	-
	MONTH	51.2	100	20	14	9.3	2.7	6.0	+1.6	-3.0	25	5	69	130	7	-	-5.3	25	13	5.5	-	95.2	131	9.6	22	26	-	-	-	-	-	-	-	-	-
Dublin Airport Co. Dublin	1-10	14.2	-	3	3	11.5	6.2	8.8	-	0.9	10	0	45	-	6	-	-1.2	10	1	7.6	-	18.5	-	7.3	6	-	-	-	-	-	-	-	-	-	-
	11-20	25.5	-	9	8	10.2	2.8	6.5	-	0.2	16	0	26	-	2	-	-2.0	11	5	5.7	-	35.7	-	8.0	7	-	-	-	-	-	-	-	-	-	-
	21-END	2.9	-	5	1	7.1	0.4	3.8	-	-1.5	25	2	6	-	0	-	-5.5	25	7	3.6	-	41.0	-	6.9	6	-	-	-	-	-	-	-	-	-	-
	MONTH	42.6	84	17	12	9.8	3.3	6.5	+1.7	-1.5	25	2	77	135	8	-	-5.5	25	13	5.8	+1.5	95.2	128	7.4	19	30	-	-	-	-	-	-	-	-	
Kinsealy Co. Dublin	1-10	15.8	-	3	3	11.9	6.4	9.1	-	0.8	10	0	48	-	8	-	-4.3	10	4	-	-	N/A	-	5.1	-	-	-	-	-	-	-	-	-	-	-
	11-20	25.7	-	7	5	10.7	2.6	6.6	-	-0.4	16	1	28	-	3	-	-6.0	12	7	-	-	N/A	-	5.6	-	-	-	-	-	-	-	-	-	-	-
	21-END	3.0	-	3	1	7.5	0.2	3.8	-	-2.5	25	3	7	-	0	-	-7.2	21	8	-	-	N/A	-	5.0	-	-	-	-	-	-	-	-	-	-	-
	MONTH	44.5	89	13	9	10.2	3.3	6.7	-	-2.5	25	4	83	-	11	-	-7.2	21	19	-	-	N/A	-	5.3	-	N/A	-	-	-	-	-	-	-	-	-
Galway Co. Galway	1-10	33.5	-	8	8				-					-		-																			
	11-20	62.9	-	9	9				-					-		-																			
	21-END	32.3	-	7	7				-					-		-																			
	MONTH	128.7	172	24	24				-							-																			
Killarney (Muckross House) Co. Kerry	1-10	46.3	-	9	9	11.3	7.2	9.2	-	-0.2	10	1	49	-	6	-	-3.3	10	1	-	-	12.7	-	-	-	-	-	-	-	-	-	-	-	-	-
	11-20	79.3	-	10	9	10.8	5.3	8.0	-	1.9	16	0	38	-	3	-	-1.8	11	4	-	-	13.0	-	-	-	-	-	-	-	-	-	-	-	-	-
	21-END	78.4	-	8	8	6.6	1.1	3.8	-	-0.2	26	3	6	-	0	-	-3.7	25	5	-	-	11.0	-	-	-	-	-	-	-	-	-	-	-	-	-
	MONTH	204.0	149	27	26	9.8	4.8	7.3	-	-0.2	26	4	93	-	9	-	-3.7	25	10	-	-	36.7	-	-	-	-	-	-	-	-	-	-	-	-	-

NOTES ON THE TABLES IN JANUARY ISSUE

TABLE 2 GLOBAL RADIATION

STATION	PERIOD	AMOUNT MJ/m ²
Malin Head Co. Donegal	1-10	23.49
	11-20	49.93
	21-end	51.74
	Month	121.16
Dublin Airport Co. Dublin	1-10	31.08
	11-20	51.57
	21-end	60.36
	Month	143.01
Cahirciveen (Valentia Obs.) Co. Kerry	1-10	31.04
	11-20	46.83
	21-end	44.96
	Month	122.83
Kilkenny Co. Kilkenny	1-10	34.07
	11-20	53.01
	21-end	63.35
	Month	150.43
Belmullet Co. Mayo	1-10	25.95
	11-20	40.05
	21-end	38.55
	Month	104.55
Clones Co. Monaghan	1-10	22.26
	11-20	44.30
	21-end	53.12
	Month	119.68
Birr Co. Offaly	1-10	30.26
	11-20	50.46
	21-end	53.96
	Month	134.67

Notes on the tables in January issue

TABLE 3 POTENTIAL EVAPOTRANSPIRATION (P.E.) AND SOIL MOISTURE

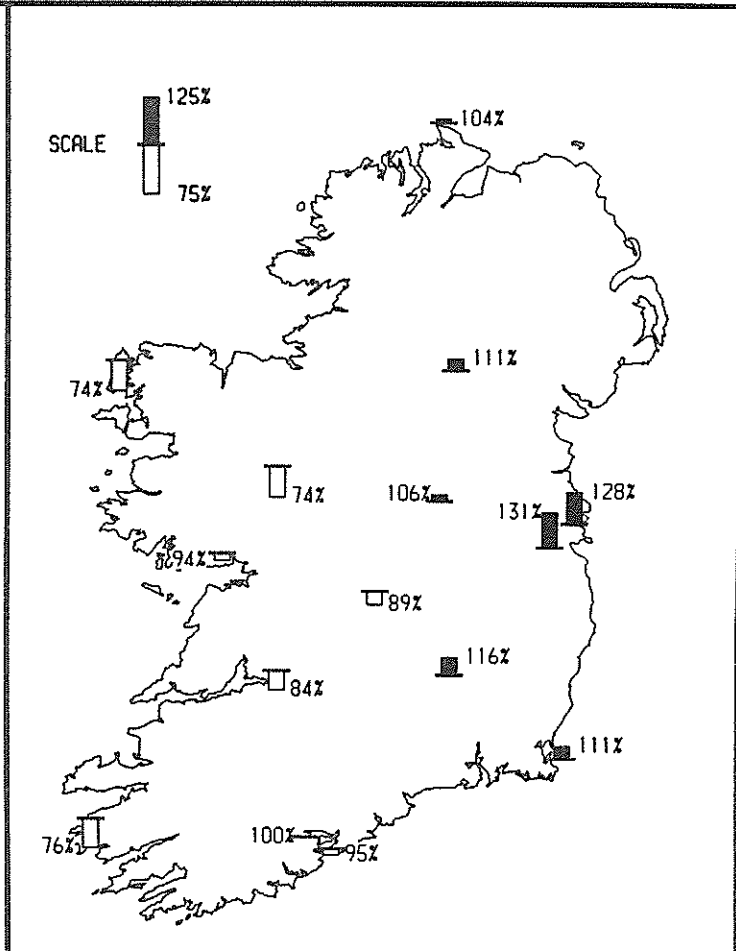
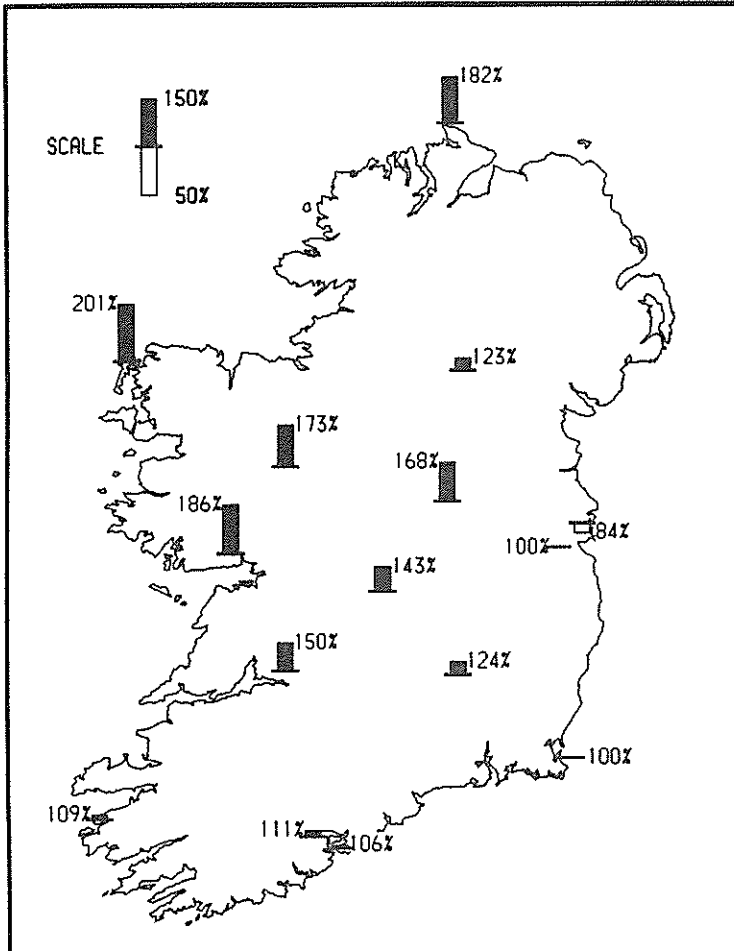
STATION	PERIOD	SOIL MOISTURE (mm)			
		P.E. (mm)	Deficit	Accumulated Deficit	Surplus
Carlow (Oak Park) Co. Carlow	1-10	5.8	-	0	13
	11-20	3.3	-	0	21
	21-end	3.3	-	0	11
	Month	12.4	-	-	-
Kinsealy Co. Dublin	1-10	5.9	-	0	9
	11-20	8.3	-	0	17
	21-end	3.1	-	0	0
	Month	17.3	-	-	-
Cahirciveen (Valentia Obs.) Co. Kerry	1-10	8.1	-	0	25
	11-20	0.0	-	0	55
	21-end	2.3	-	0	35
	Month	10.4	-	-	-
Ballinamore Co. Leitrim	1-10	6.3	-	0	27
	11-20	14.8	-	0	32
	21-end	(-1.8)	-	-	41
	Month	-	-	-	-
Glenamoy Co. Mayo	1-10	N/A	N/A	N/A	N/A
	11-20	N/A	N/A	N/A	N/A
	21-end	N/A	N/A	N/A	N/A
	Month	N/A	N/A	N/A	N/A
Johnstown Castle Co. Wexford	1-10	5.7	-	0	13
	11-20	7.0	-	0	17
	21-end	6.8	-	0	26
	Month	19.5	-	-	-

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TABLE 4 SOIL CLIMATE (MULLINGAR)

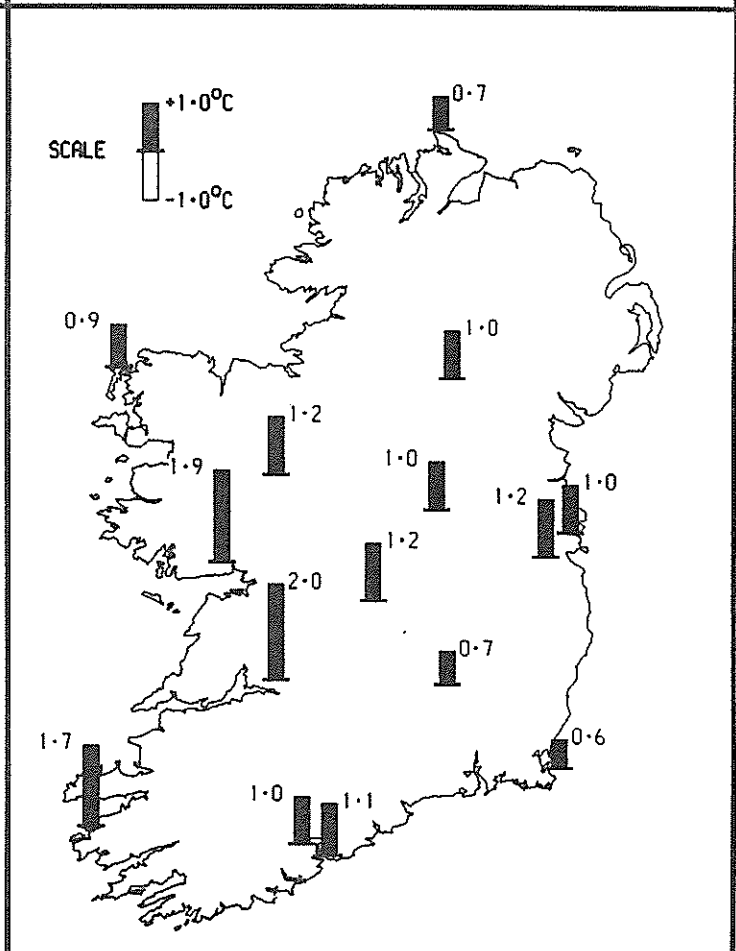
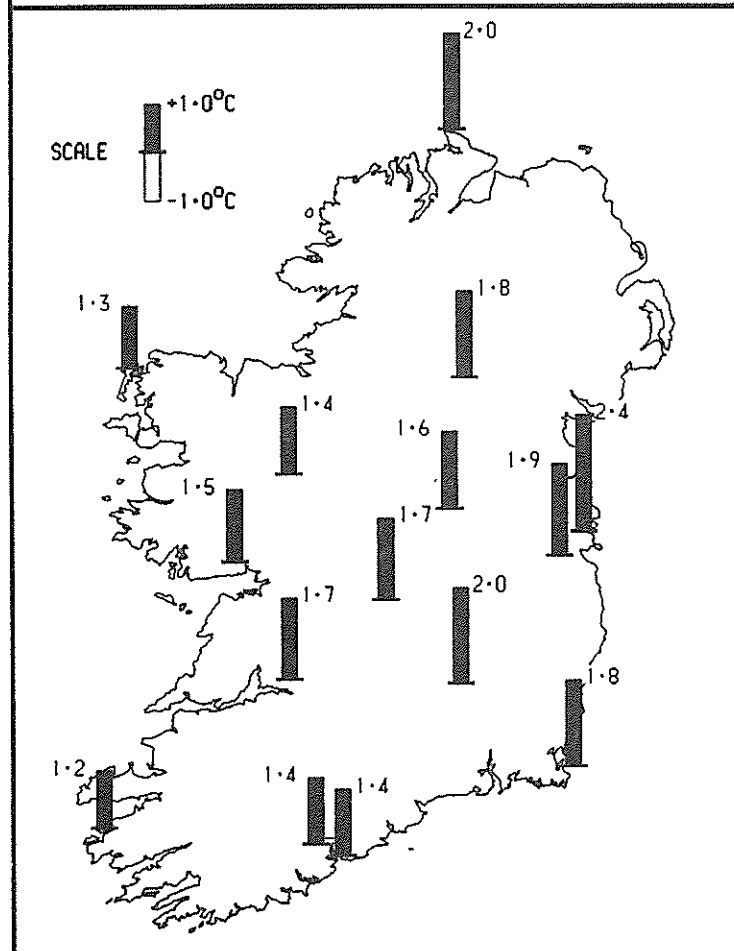
BARE SOIL TYPE	PERIOD	MEAN TEMPERATURE (°C at 100mm)			TEMPERATURE GRADIENT (to 200mm)	SOIL WATER POTENTIAL (hPa) (at depths)	
		Max.	Daily	Min.		75mm	200mm
		Peat	1-10	8.2	7.3	6.0	0.16
	11-20	6.7	5.5	3.7	1.03	53.8	56.2
	21-end	4.1	3.3	2.5	1.27	56.6	56.1
Mineral	1-10	8.4	7.0	5.7	0.04	58.9	58.2
	11-20	7.2	5.4	3.1	0.24	46.5	47.5
	21-end	4.7	3.4	1.6	0.55	39.5	42.4

Differences from average



RAINFALL (Percentage of 1951-1980 normals)

SUNSHINE (Percentage of 1951-1980 normals)



MEAN MAX. TEMPERATURE (Deviation from 1951-1980 normals)

MEAN MIN. TEMPERATURE (Deviation from 1951-1980 normals)

PRECIPITATION VALUES FOR February 1989

MARKREE (CO. SLIGO)					LETTERKENNY (CO. DONEGAL)			
PERIOD	AMOUNT	% OF AVERAGE	RAIN DAYS NO.	WET DAYS NO.	AMOUNT	% OF AVERAGE	RAIN DAYS NO.	WET DAYS NO.
1 - 10	40.4		8	9	38.7		7	8
11 - 20	50.8		10	10	59.9		10	10
21 - END	55.6		8	8	45.0		6	8
MONTH	146.8	158	26	27	144.0	190	23	26

Outlook for March 14th - 23rd

A strong westerly airflow will dominate, although pressure should generally be higher than recently. The weather will be changable; mild wet conditions followed by colder weather with blustery showers and improved drying . Overall rainfall and sunshine will be near normal.

Crop Modelling

T.Keane Meteorological Service.

Meteorological factors are important determinants to crop growth. Growth and development depend not only on the onset of the growing season but also on the sequence of weather events within the season and on climatic interaction with the growing processes. Models are required for (a) operational purposes - to predict date of certain stage of development and of maturity; (b) management awareness - to be able to interpret the influence of certain meteorological factors on crop development, disease progress, and the quality of food crops; and (c) crop testing - to estimate reaction of new hybrids to certain meteorological factors. Many models involve only temperature relationships even though the response of crop growth to temperature is not always linear, simple models use the linear relationship. Some take account of temperature and radiation as well as water stress. Such detailed models have been developed in Ireland for a number of field crops.

Growth Models

Brereton (1981) gave the growth rates of grass based on the model $QY = eRx$ where Y = harvestable yield (DM kg ha⁻¹), Q = heat of formation of plant material ($16.72 * 10^6$ J kg⁻¹), R = radiation (J ha⁻¹), e = efficiency of radiation use and x represents the physiological factor depending on whether the sward is vegetative or reproductive . The value of e depends on temperature and on soil moisture. This model is used as the basis of the weekly Johnstown Castle Grass Watch Report.

Crop modelling for winter wheat and sugar beat has been undertaken at Oak Park (Burke ,1988). The conceptual basis of the model is as follows $G = E_c (A_g - R_m W)$ where G is daily rate of increase in structural dry weight in kg ha⁻¹d⁻¹, E_c is conversion efficiency (kg,kg⁻¹), A_g gross assimilation rate , R_m is relative maintenance respiration, and W is the total dry weight of the living part of the crop. A_g and R_m are functions of temperature and radiation and other relevant weather variables. Daily values of maximum,minimum, sunshine and rainfall are used as driving functions for the model.

Disease and Pests

A considerable effort has been put into modelling plant diseases mostly in other countries. These are generally of two types (a) predictive models whose objective is to forecast the appearance of risk periods for crops and to give warnings, and (b) quantitative models aimed at estimating the magnitude of these risks as a guide to good management. The simple systems are intended to give generalised regional warnings for purposes of treatment and to delineate zones with greatest risk of disease. The more frequently used elements in disease models are temperature and leaf wetness parameters such as relative humidity and rainfall. Air temperature is the meteorological variable most used in disease and pest management. Moisture is an essential element of most plant disease and pest prediction schemes e.g. relative humidity , rainfall duration and amount , surface wetness duration. Certain diseases respond directly to relative humidity

Relative humidity in itself, however is not a sufficiently good indicator of surface wetness duration and its use cause serious error. Onset of rain is often used to mark the beginning of surface wetness, and duration of rain or 90 per cent relative humidity gives the lower limit of duration of wetness.

Wind near the surface influences short distance dispersal of spores as well as being an important factor in the dispersion of sprays.

Model based forecasts are not intended to be used in isolation but in conjunction with field monitoring. In this way detailed background to nationwide and regional disease assessments may be obtained.

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