

EUCALYPTUS IN IRELAND

By

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(With 4 Figures)

HISTORY.

The first introduction of Eucalyptus into Ireland probably took place about the middle of the 19th Century. Elwes and Henry (1906-13) refer to planting of *E. coccifera*† in 1840, *E. gunnii* in 1841, and *E. globulus* in 1852. There is still one tree of that era alive, an *E. globulus* at Garron Tower, Co. Antrim. This was planted in 1857 (Wilson 1949), probably from seed of South African origin, by the second wife of the third Marquess of Londonderry who succeeded to the property and died about 1860.

Most of the present large trees date from the second period of planting (1870-1910) when owners of large estates planted specimen trees as objects of curiosity. It is the survival of such trees in the British Isles which has given most of the information on frost hardiness in the genus. [Martin (1948) Wood (1957).]

The success of these specimen trees led to the first official trial for forestry purposes. In 1908 the then Director of Forestry in Ireland procured from the Government of Tasmania small packets of seed of:—

- E. subcrenulata* (then called *E. muelleri*);
- E. urnigera*;
- E. coccifera*;
- E. ovata* (then called *E. gunnii* under the mistaken idea that the former was a lowland form of the latter).

Forestry in Tasmania was at that time an appendage of the Department of Lands and seed was collected from the handiest places, Mt. Wellington, and no attempt was made to get seed of the hardiest or best growth form strains. Later, seed of the commercial timber species *E. gigantea* and *E. regnans* was imported.

These were planted at the Forestry Station at Avondale, Co. Wicklow, and did so well that in 1934, 1935 and 1937 much bigger plots were set out at the State Forest at Ballymanus, Co. Wicklow, using seed from local Irish trees and seed from New Zealand. The species included *E. amygdalina*, *E. dalrympleana*, *E. gigantea*, *E. johnstoni*, *E. subcrenulata* (as *E. muelleri*), *E. radiata*, *E. urnigera*, *E. viminalis*, (mountain and coastal). Another small planting of *E. subcrenulata* (as *E. muelleri*) and *E. viminalis* was made at Delgany Forest.

The reason for using seed of New Zealand rather than Tasmanian origin could not be ascertained. Also the provenance of the mountain and coastal forms of *E. viminalis* is unknown. They must have been from mild habitats for both were soon killed, as were *E. regnans* and *E. globulus*.

In 1942 a further small quarter-acre plot of *E. subcrenulata* (as *E. muelleri*) and *E. urnigera* mixed with a few *E. viminalis* and *E. ovata* (genuine *E. ovata* not *E. gunnii*) was planted at Avondale.

In 1948 a much bigger experiment was planned; seed of 18 species was obtained from the Forestry Commission of N.S.W. and planted out at Avondale in 1950.

These were:

<i>E. bicostata</i>	<i>E. dives</i>	<i>E. mannifera</i>
<i>E. blakelyi</i>	<i>E. elaeophora</i>	<i>E. obliqua</i>
<i>E. cinerea</i>	<i>E. fastigata</i>	<i>E. pauciflora</i>
<i>E. cordieri</i>	<i>E. fraxinoides</i>	<i>E. phellandra</i>
<i>E. dalrympleana</i>	<i>E. gigantea</i>	<i>E. rubida</i>
<i>E. dealbata</i>	<i>E. goniocalyx</i>	
	<i>E. huberiana</i>	

By 1953 only a few trees of *E. mannifera*, *E. rubida*, *E. bicostata* and *E. phellandra* survived, but the mortality was thought to have been due to causes other than climate. The trial was repeated at Killarney Forest, Co. Kerry, which was milder than Co. Wicklow, with the same species except for *E. goniocalyx*, *E. elaeophora*, *E. dealbata*, *E. pauciflora*, and *E. fastigata* which were omitted. The seedlings received very great care and were put out in moss balls and lined out under light shade in September, 1955. The losses mounted and all were finally killed by a severe frost in January, 1956.

This unfortunate result may have been due as much to the over careful nursery practice, in which the seedlings were weakened by rapid growth and inadequate light, as to the use of seed of N.S.W. origin of lower potential frost resistance and probably higher light requirement. These failures were in marked contrast to the earlier and simpler plantings at Avondale and Ballymanus which were predominantly of Tasmanian species.

O'Beirne (1945) reported that the 1909 plantings at Avondale had grown as indicated in Table I.

TABLE I

	Average Height feet	Q.G.B.H. inches
<i>E. subcrenulata</i> (as <i>E. muelleri</i>)	108	13½
<i>E. urnigera</i>	108	12½
<i>E. coccifera</i>	73	11½
<i>E. ovata</i>	107	12½

* Lecture given to the Royal Society of Tasmania on 7th April, 1959.

† No authorities are quoted for botanical names because of frequent lack of opportunities for critical identification and the great variability of certain species.

Only *E. ovata* had been damaged by frost. Of the later plantings, *E. gigantea*, *E. subcrenulata* (as *E. muelleri*) and *E. urnigera* were growing vigorously.

Of the Ballymanus plantings, O'Sullivan (1957) reported the dimensions shown in Table II.

Planted	Species	Average Height 1954 feet	Q.G.B.H. inches
1934—			
	<i>E. subcrenulata</i> (as <i>E. muelleri</i>)	56	6½
	<i>E. radiata</i>	51	5
	<i>E. urnigera</i>	55	5¾
	<i>E. dalrympleana</i>	48	6
	<i>(E. viminalis</i> had been practically exterminated)		
1935—			
	<i>E. urnigera</i>	51	5¾
	<i>E. subcrenulata</i> (as <i>E. muelleri</i>)	59	4¾
	<i>E. gigantea</i>	46	5¾
	<i>E. johnstoni</i>	48	6¾
	<i>(E. viminalis</i> and <i>E. amygdalina</i> also killed out).		
1937—			
	<i>E. subcrenulata</i> (as <i>E. muelleri</i>)	61	6½
	<i>E. urnigera</i>	59	5½

The Ministry for Agriculture in Northern Ireland has recently commenced experiments with Eucalyptus at Gosford, Castleward and Tollymore Park. The behaviour of specimen trees at Castlewellan, Rowallane, Newcastle, Rostrevor, Narrow Water, Bangor and Mt. Stewart suggest that even moderately hardy species may be useful in Co. Down at least.

The first comprehensive list of Eucalyptus species in Ireland was that of Fitzpatrick (1933) and the following is an attempt to bring this up to date and to include records of all trees which have survived for the past 20 years. This period includes two very severe winters 1939 and 1947. The fate of those trees recorded by Fitzpatrick is indicated by [Fitz. (+) alive 1957; (—) not surviving], followed by new records. These do not claim to be exhaustive, but are as complete as a short visit to most centres in 1957 and correspondence have permitted.

<i>E. amygdalina</i>	[Fitz. Shelton Abbey (—)]. Ballymanus, Co. Wicklow.
<i>E. coccifera</i>	[Fitz. Kilmacurragh (—); Mt. Usher (+); Rossdohan (+); Fota Is. (+); Rowallane (—); Daisy Hill (—); Rostrevor (+ 1948); Old Conna Hill (+); Avondale (+)]. Slingsers Newcastle, Co. Down.
<i>E. cordata</i>	[Fitz. Narrow Water (+); Castlewellan (+); Kilmacurragh (+ recorded as <i>E. pulverulenta</i>); Rostrevor (1948) (also another form resembling <i>E. biangularis</i>)]. Fota Is., Co. Cork.

E. dalrympleana
E. gigantea
E. globulus

Ballymanus.
[Fitz. Mt. Usher (+)].
Ballymanus; Avondale.
[Fitz. Dinas Island (+); Dereen (+); Rossdohan (+); Garretstown (+?); Glenstal (—); Clonmannon (+); Bangor Castle (+); Rostrevor (+); Tollymore Park (—); Shelton Abbey (—)].

Glen of Downs, Co. Wicklow; Ballywater Park, Co. Down; Mt. Stewart, Co. Down; Garron Tower, Co. Antrim; Laughlinstown, Malahide Castle, Co. Dublin; Kenmare, Co. Kerry; Kinsale, Cobh, Glengariff, Fota Is., Co. Cork.
(Note: Two forms exist in Ireland, a highly glaucous type (G) absent from Britain, and a non-glaucous type (N.G.) similar to that planted widely in Britain).

E. gunnii

[Fitz. Kilmacurragh (—); Narrow Water (—); Daisy Hill (—); Rostrevor (+ 1948)].
Glenstal Abbey, Co. Limerick (N.G.); Glasnevin, Co. Dublin (G. and N.G.); Brook Hall, Co. Londonderry (N.G.); Garinish Is., Co. Cork (G. and N.G.); Mt. Stewart, Co. Down; Fota Is., Co. Cork; Castlewella, Co. Down (N.G.).

(Note: This has been called *E. gunnii*, lowland form, or *E. acervula* or *E. stuartiana*, the latter sometimes corrupted to *E. stuartina*).

[Fitz. Narrow Water (—)].
Avondale, Co. Wicklow; Slingsers, Newcastle, Co. Down; Fota Is. (?).

E. linearis

Rowallane; Mt. Stewart, Co. Down; Rossdohan, Co. Kerry.

E. pauciflora

[Fitz. Rostrevor (+ 1948); Rossdohan (—)].

E. regnans

[Fitz. Mt. Usher (+) seedling from original tree killed].

E. pulverulenta

[Fitz. Mt. Usher (+); Kilmacurragh (—)].

Fota Is.

Ballymanus.

E. radiata

E. subcrenulata (as *E. muelleri*)

[Fitz. Direen (+); Mt. Usher (+); Avondale (+ 1945); Rostrevor (+ 1948)].

E. johnstoni

Fota Is.; Ballymanus; Delgany. Mt. Usher; Ballymanus.

E. urnigera

(Note: The non-glaucous type only, none of the glaucous type has been found anywhere in Ireland).

[Fitz. Mt. Usher (+); Avondale (+); Rowallane (+); Castlewellan (+); Rostrevor (+ 1948)].

- E. viminalis* Fitz. Mt. Usher (+); Avondale (—); Rosdohan (—); Rostrevor (—).
E. vernicosa Rostrevor (1948).

There is a tree at Mt. Usher named *E. beau-champiana* by A. Henry who later corrected it to *E. stuartiana**. E. M. Davey in 1948, using Blakely's key, considered it was more likely *E. viminalis*. He raised seedlings which proved to be variable. Leaves of the three types were supplied by Sir Edward Salisbury to R. G. Brett who considered that the parent tree might be of a *rubida-viminalis* swarm.

Material collected in 1957 showed that though the capsule is not similar to the normal *viminalis* type and it does resemble that of *E. stuartiana* in its spherical-truncate shape and widely protruding valves but, unlike that species, the buds are in threes and the habit of the tree and its progeny now growing at Mt. Usher are very like *E. viminalis*.

The original seed was sent from Tasmania to Rostrevor, Co. Down, for Sir John Ross of Bladensburg in 1901 and later sent to Mt. Usher from there. This species has since died out at Rostrevor. As *E. stuartiana* does not occur in Tasmania this specimen must be an *E. viminalis* product.

CLIMATIC COMPARISON

It will be seen from the above record that it is predominantly the Tasmanian Eucalyptus which have been successful in Ireland, and this may be linked with the similarities of climate. In both islands it is maritime with a very wet West coast and a drier East coast. In water regimen, the differences lie in evaporation rather than in precipitation. As a whole, Ireland receives 50 inches annually (with very little having less than 30 inches), and has an evaporation of only 15 inches, while Tasmania has a similar average precipitation, 48 inches for the whole State (with about one-quarter having less than 30 inches) but roughly twice the evaporation (30 inches) for most of the State falling to 20 inches in the high rainfall areas of the west. Sunshine in Ireland is approximately two-thirds that of Tasmania.

This reduced evaporation naturally produces large areas of bog quite unsuited to Eucalyptus, which require well aerated soil, but the drier parts of Ireland provide conditions comparable with the moderately wet parts of Tasmania and the two islands have large areas with a common water regimen and potentially common habitats for the more moisture tolerant species. One half of Tasmania and all of Ireland have a mean annual 9 a.m. humidity of above 75%. This is not a satisfactory basis for comparison but does suggest similarity of humidity for certain areas.

Apart from drainage, the chief factor limiting the survival of Eucalyptus is the absolute minimum temperature. The length of time a particular species will survive is dependent on the chances that a killing frost for that species will occur.

The history of the cultivation of Eucalyptus in Britain and Ireland is of successful growth for a number of years terminated suddenly by an unusually severe frost. The number of frosts is of less importance though a series of milder frosts can be as fatal as a single severe one.

As a result of a series of such meteorological calamities one can divide the Tasmanian Eucalypts into four groups according to the minimum temperature they can survive as adults.

- 0-5°F. *E. gunnii*; *E. vernicosa*.
 5-10°F. *E. coccifera*; *E. urnigera*; *E. subcrenulata* (as *E. muelleri*); *E. simmondsii* (high altitude); *E. pauciflora* (high altitude).
 10-15°F. *E. gigantea* (high altitude); *E. rubida*; *E. dalrympleana*; *E. ovata* (high altitude); *E. aggregata*; *E. cordata*; *E. amygdalina* (high altitude); *E. viminalis* (high altitude); *E. johnstoni*.
 15-20°F. *E. globulus*; *E. obliqua*; *E. regnans*; *E. linearis*; *E. perriniana*; *E. steberiana*.
 20-25°F. *E. risdoni*; *E. tasmanica*; *E. morrisbyi*.

An attempt has been made to compare the temperature regimen of Ireland and Tasmania in the following diagrams which have been prepared from the Climatological Atlas of the British Isles (1952) and the limited data available for Tasmania from the Bureau of Meteorology, Hobart*.

(1) Absolute minimum Temperature

In comparing the two maps it can be seen that for a 40-year period no place in Ireland had a frost below 5°F. and except for the central region temperatures have not fallen below 10°F. and for a wide belt round the coast 15°F. is the minimum. Tasmania has many similarities. On the northern coasts the area of 20°F. min. is wider for Tasmania and the central area with a possible frost below 10°F. probably smaller, but in both islands there are large areas between the 10° and 20°F. lines. Oatlands has the lowest recorded temperature of 9°F. but the big freeze of 1835 which killed large areas of Eucalyptus in the Upper Derwent Valley may have been of the order of 5°F.

(2) Average Frequency of Frost

The islands have areas of similarity, but Ireland has more frost near the coasts.

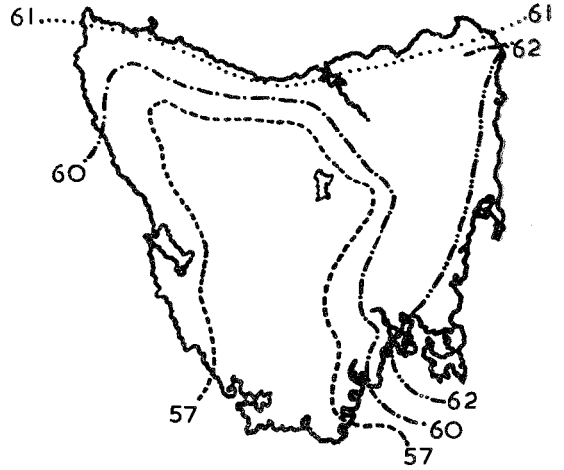
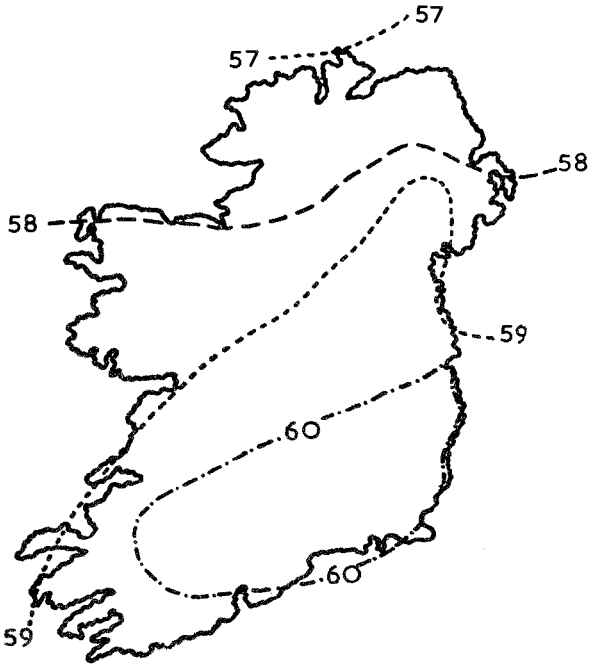
(3) Average Daily Mean Temperature, Midsummer and Midwinter

Again there are areas of similarity, nearly all of Ireland and two-thirds of Tasmania have a midwinter daily mean below 45°F. and one of Ireland but one-third of Tasmania a midsummer daily mean below 57°F. In fact the climate of the Tasmanian S.W. and West Coast are probably very similar to those of Kerry and Connemara. The interior of Ireland has probably a similar climate to that of Waratah or Gormanston, Tasmania.

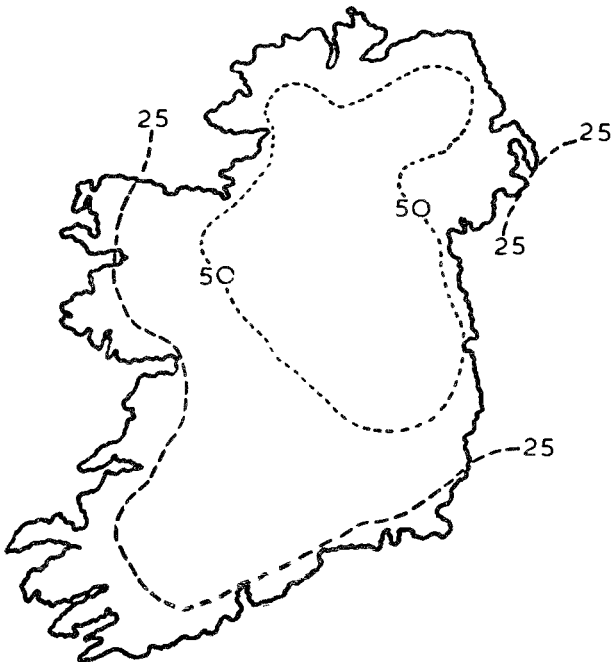
* The author desires to emphasise that these diagrams are his own interpretation of probable conditions in Tasmania for the purpose of demonstrating probable similarities; they do not pretend to be authoritative.

* *E. stuartiana* = *E. bridgesiana*.

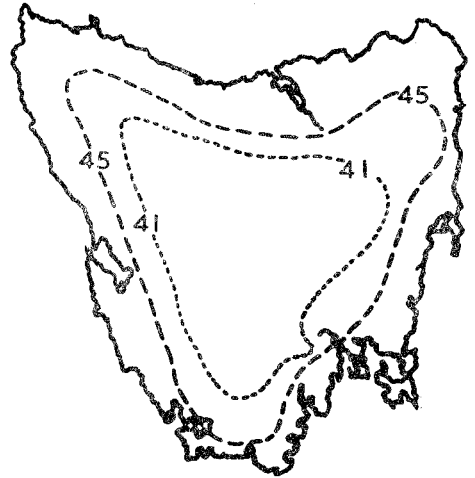
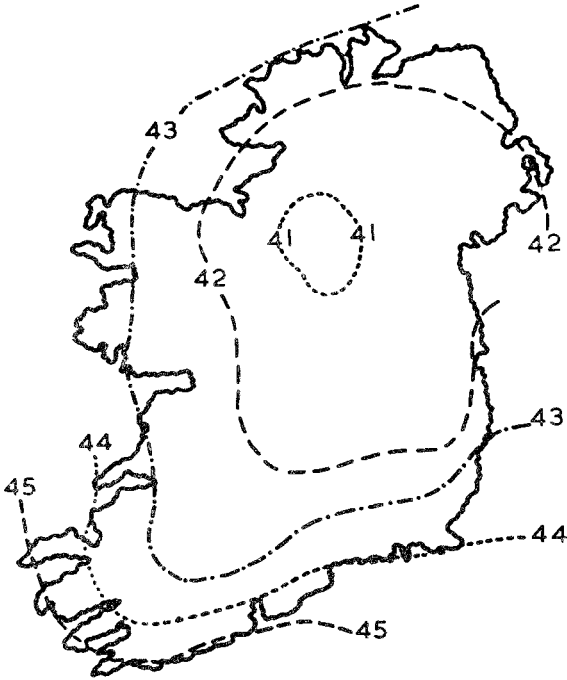
AVERAGE DAILY MEAN TEMPERATURE , MID - SUMMER



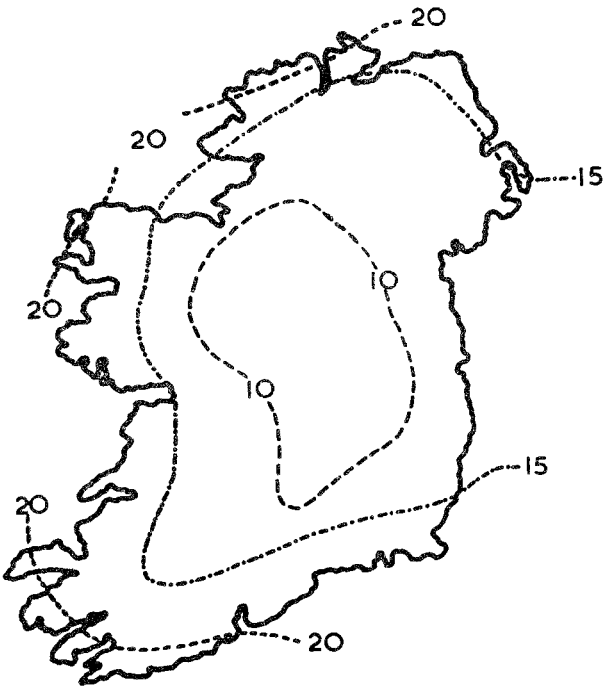
AVERAGE ANNUAL NUMBER OF DAYS WITH 32°F OR LESS



AVERAGE DAILY MEAN TEMPERATURE, MID-WINTER



ABSOLUTE MINIMUM TEMPERATURE



Gormanston in Co. Wicklow Ireland, has certainly a less unpleasant climate than its namesake in Tasmania.

These similarities are confirmed by the survival of Eucalyptus. The relatively tender species *E. globulus* may be found as quite old trees at many places round the coast from N.E. to S.W., and the hardy species *E. gunii*, *E. urnigera*, *E. coccifera* and *E. subcrenulata* (as *E. muelleri*) over the area between the 10° and 15°F. lines of Fig. 1 *E. cordata*, *E. gigantea*, *E. pauciflora*, *E. johnstoni*, *E. ovata* and *E. linearis* also survive in this region.

No evidence could be found that the genus had been tried within the 10°F. lines.

Private cultivation has suffered from the decline of the large country mansion, but the collection of Mr. E. H. Walpole of Mt. Usher is still maintained and presents a magnificent sight with trees of *E. urnigera*, *E. johnstoni*, *E. gigantea* and *E. stuartiana* towering 100-150 ft. (Plate 1).

Further experiments will be made in Southern Ireland and there is no reason why carefully selected provenances of *E. gigantea*, *E. coccifera*, *E. urnigera* and *E. subcrenulata* (as *E. muelleri*)

should not provide a useful contribution to forestry over quite a wide area in the East and South for strong structural timber and poles. *E. simmondsi* might find a useful place even on the West Coast.

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