

Further Notes on the Origin of Scots Pine

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Seed Origins of Scots pine

This paper reviews a variety of reports on the importation of Scots pine seed into Britain originating from Central Europe, and with particular reference to its growth and survival in Scotland. The interest centres on the so called 'German pine', about which much has been debated.

The first reference to German pine appears about 1860 when it was said that there were large importations of Scots pine seed from the Continent due to the succession of unfavourable seasons which occasioned a great scarcity of Scots pine in Scotland. According to Grigor (1868) the resultant plants were "utterly worthless except in the most favourable situations and though height growth was rapid the girth was less than our native species and had a tall slender appearance even with ample space, and regards the nursery growth survival is poor and browning much in evidence".

A factor in this influx of seed may have been economics as it was reported that Scots pine seed was imported from the Continent at less than half the price of native seed (Grigor, 1868; Anderson, 1967). Matthews (1949) quotes from a meeting with Darnaway forester Mr Feaks "that the trees of German origin brought in to satisfy the huge demands of planting schedules were of rough, dark bark the whole way up the stem, and the timber was knotty and of poor quality".

Steven (1920) compares the native Scots pine to those found in England and Scotland and he writes 'It is fairly certain that many of the latter have been grown from foreign seed of not too good a type'. Murray (1920), in his paper on variation in Scots pine, makes some very interesting observations regarding variants in which he quotes "Some of these may be of great value under our conditions, while others are likely to be practically useless". Hampden (1914) stressed the importance of using the most suitable provenance of Scots pine and quotes "Beyond doubt the results of using foreign seed have been disastrous".

It appears most probable from information and records available, that most of the continental Scots pine seed came from the forests of Haguenau, Bas Rhin (*Pinus sylvestris* var. *Haguenensis* Loudon) and from South Karlsruhe (Grigor, 1868; Hutchison, 1878). A study of the more recent imports of Scots pine seed by the Forestry Commission during the years 1920 to 1956 (Anon, 1965) shows that very little seed came from Europe:

Latvia	265 lb;
Sweden	6 lb 1ozs;
Hungary	11 lb 13 ozs;
Norway	3 lb 1 ozs;
Finland	11 lb 8 ozs;
Germany	2 lb;
Scandinavia	11 lb 8 ozs;
Czechoslovakia	1 lb;
Russia	11 lb 3ozs;
Spain	13ozs
France	10 lb;
Italy	5 ozs

Apart from the 265 lbs of seed from Latvia, most, if not all, of these seed lots were destined for provenance trials and not for field planting. Thus, when compared to the total Scots pine seed collected in Britain during the same period 1920-1956, which was 70,000 lbs, the total imported is small. However, that could have a profound effect on genetic structure by gene flow into adjacent woodlands from pollen dispersal under favourable conditions (G I Forrest. *Pers. Comm.*). Based on the results of provenance trials most of

these lots would, it seems likely, have had a poor survival, both in the nursery and in the field.

It was also believed that the large amounts of Scots pine seed collected from the overgrown hedges in the Thetford area which amounted to approximately 28,000 lbs during 1920-1956, was originally of German origin. However, there is reason to believe that the origin is Speyside (G I Forest, *unpubl.* 1980).

There has been little reliable evidence as to the performance of the early reported imports of continental Scots pine as indicated by Grigor (1868), Feaks in Matthews (1949). It is only in more recent times that provenance trials have provided a somewhat clearer assessment of performance (Lines and Mitchell, 1964; Worrell, 1992) which confirm the superiority of home collected Scots pine seed lots in Scotland, the growth rates being superior to those of continental provenances in over 90% of cases (Lines *et al.*, 1959; Worrell, 1992).

It would appear very unlikely that many continental provenances of Scots pine would have been planted out with provenance trials during the years 1920 to 1956 due to the small amounts of seed imported. However, in any event the evidence suggests that survival was poor.

The earlier and large imports of the 1880s, according to reports available, are once again unlikely to have had a good survival rate, either in the nursery or in the field, and those that did survive were said to be of poor form and therefore a target for thinning. These observations refer mainly to Scotland, whereas in the south of England some of the continental origins performed better.

A large 19 ha Scots pine provenance experiment at Findon in the Black Isle. Inverness was established in 1934. This experiment shows considerable differences between a wide range of European and Scottish origins (Phillips, 1995; Lines *et al.*, 1959). The future of the trial is currently under consideration for demonstration and study purposes and could be the subject of further reports.

Acknowledgements

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UNCOVERING SCOTTISH PINE FORESTS

by
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Some 30 years ago a number of pine stumps were cut from an eroded peat hag at Elchies Forest above Archieston in Moray by the Author. A sample from one of the stumps has recently been dated using radio carbon analysis ^{14}C by Dr. Gordon Cook at the Scottish Universities Research and Reactor Centre East Kilbride (Phillips, undated). The Radiocarbon Age BP of the sample is 6110 ± 60 years as shown on the Dating Certificate.

This suggests that most of the Elchies Hill land (250-308 m) was originally native pine forest. At the extreme eastern edge of Elchies Forest small groups of Scots pine were sampled for Monoterpene analysis by the Author in 1979 on behalf of Dr. Iain Forrest of the Forestry Commission Genetics Research Branch, Northern Research Station, Roslin, Midlothian (Forrest, 1980). Three trees were core sampled in 1999 and gave an average age of 107 years.

In his paper Dr. Forrest states: *Two stands of doubtful authenticity, at Meallmore and Elchies, were sampled, these had almost certainly arisen by natural regeneration from a native stand or from a planted stand of local origin* (page 102). He goes on to say in his Discussion (p.127): *The analysis of trees from the two unauthentic sites at Meallmore and Elchies showed that the likely origins of the stands were Eastern - + Glentamar and the Glen Avon areas respectively.*

Professor J. D. Dickson of the University of Glasgow was contacted on the advice of Dr. Cook regarding his thoughts pertaining to the Elchies project, he states, *The vast majority of such stumps that have been found more or less all over Scotland in peat bogs are more than 4000 radiocarbon years old. I take it that all you would do is to get a radiocarbon date. You would not be having any palaeoecological analysis of the peat to reveal the conditions under which the trees grew. If that is the case, then much less interest accrues.*" (Dickson, 2000). It is to be hoped that the very basic 'observational' research undertaken at Elchies, the in-depth scientific studies undertaken by Dr. Forrest (Forrest, 1980) and culminating in the radiocarbon dating analysis by Dr. Cook (Cook, 2000) will lead to further studies of our ancient pine forests, their ecological habitat and as Prof. Dickson suggests palaeoecological analysis of the peat.

It is postulated that the groups of 107 year old trees could be descendants of the forest which covered the area 6000 years ago as part of the forest of Caledon extending even further north east to the Ancient Forest of Enzie (Phillips, 2000). Bennett (1995) included a mpa which confirms Holocene macrofossil remains of pine in the 10km square in which Elchies is situated.

Photos: I. Old stumps
II. 107 year old Scots Pine.

Acknowledgements: Thanks to Philip Whitfield, for permission to take

core samples and carry out the research. To Graham Tuley for valued advice and assistance.

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RADIOCARBON DATING CERTIFICATE

22 August 2000

Sample	GU-9020
Submitter	Michael T. T. Phillips Forest Tree Seed Consultancy Greenacres, Newton Elgin Moray IV30 8XW
Material	Wood : <i>Pinus silvestris</i>
Sample Reference	Elchies Forest, Moray
Delta ^{13}C rel. PDB	-26.1‰
Radiocarbon Age BP	6110 $\pm$ 60
Calibrated Age Ranges	1 σ cal BC 5205-4861, cal BP 7155-6811 2 σ cal BC 5257-4810, cal BP 7207-6760

N.B. 1. The above ^{14}C ages are quoted in conventional years BP (before 1950 AD). The errors are expressed at the one sigma level of confidence.

2. The calibrated age ranges are determined from the University of Washington, Quaternary Isotope Laboratory, Radiocarbon Dating Program, Rev. 4.0 1998. The decadal atmospheric calibration curve is used throughout and the calendar age ranges, obtained from the intercepts (Method A), are expressed at both the one and two sigma levels of confidence. In the case of marine shell samples derived from around the U.K. coastline, an apparent age (reservoir effect) of 405 ± 40 years (Harkness, 1983) is subtracted from the conventional ^{14}C age prior to calibration using the decadal atmospheric curve.

3. Samples with an AA coding are measured at the University of Arizona AMS Facility and should be quoted as such in any reports within the scientific literature. Any questions directed to SURRC should also quote the GU coding that is given in parentheses after the AA code.

Reference

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Conventional age and calibration age ranges calculated by :- R. Anderson Date :- 22-8-00

Checked and signed off by :-

Gordon S Cook

Date :- 23-8-2000