Long-term research in uneven-aged silviculture at Glentress Forest, Scotland

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Summary

The Glentress Trial was initiated in 1952 to gain experience in transforming plantations to uneven-aged, irregular structure forests. It continues today as one the longest-running silviculture research trials in Britain.

Background

The Glentress Trial is one of four research forests established in Scotland, in 1952, by Professor Mark L. Anderson, Professor of Forestry at the University of Edinburgh (Figure 1). At that time, the majority of woodlands in Scotland were being managed as even-aged plantations. Prof. Anderson was interested in knowing if it was possible to replicate some of the mixed-species, irregular structure woodlands he had seen in Europe (Anderson 1951, 1955, 1960). His hypothesis was that these would prove to be more sustainable and resilient in the long term, and that greater experience should be gained in a wider range of silvicultural systems that might be applied to upland forest sites in Scotland (Anderson 1953).

The four trial areas were established at Glentress, Faskally, Corrour and Cawdor (Figure 2). Of these, the trial at Glentress has been managed most consistently, and is currently (after over 60 years) the longest running silvicultural trial of its type (Kerr et al 2010). The trial area was set out (with six blocks) in a large commercial plantation on an exposed, upland site (240-560 m) (Table 1 and Figure 3) . It is representative of many planted forests in southern Scotland.

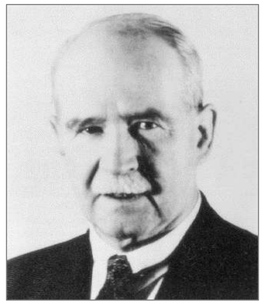

Image: © University of Edinburgh

Figure 1. Mark Louden Anderson, MC, MA, DSc, FRSE (1895-1961). Professor of Forestry (1951-1961), The University of Edinburgh.

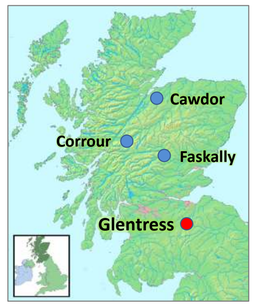

Figure 2. Map of Scotland showing location of the four trial areas established in 1952 by Professor M. L. Anderson.

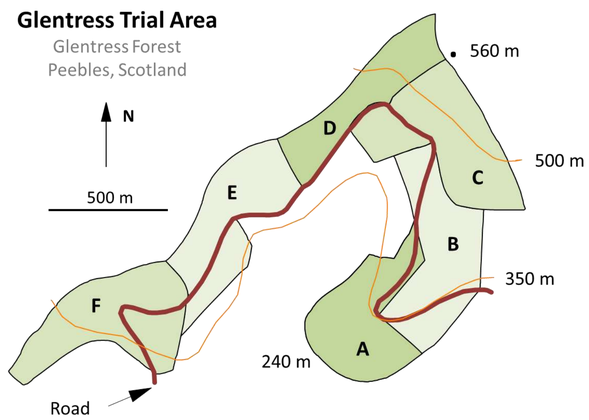

Figure 3. Map of the Glentress Trial area. The trial is laid out with six blocks, each approximately 20 ha. This was designed to facilitate a 6-yr management cycle.

Table 1. Number of survey plots in each block at the time of the 2008 inventory. Block areas in ha.

Block	Plots (No.)	Area (ha)
A	39	17.8
B	32	20.5
C	38	18.7
D	30	14.2
E	40	20.1
F	31	22.1
Total	**210**	**113.4**

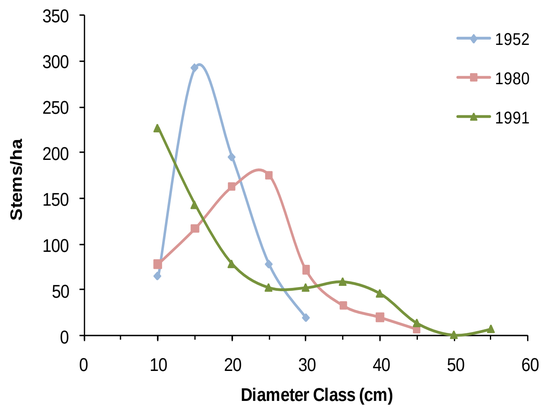

Figure 4. Stem frequency distribution by size class (dbh) for Block A at the Glentress trial area on three dates: 1952, 1980 and 1991 (Wilson et al 1999). This demonstrates the transformation from a regular, even-aged structure to a more-or-less irregular structure over 40 years.

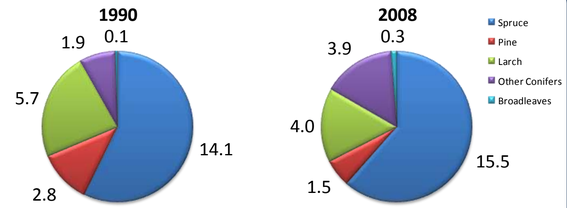

Figure 5. Change in basal area (m^3 ha^{-1}) between 1990 and 2008, by species group (Macintosh et al 2013).

Figure 6. Groups of between 0.1 and 0.2 ha have been made; approx. 1 (left) and 20 yrs (right) after harvest.

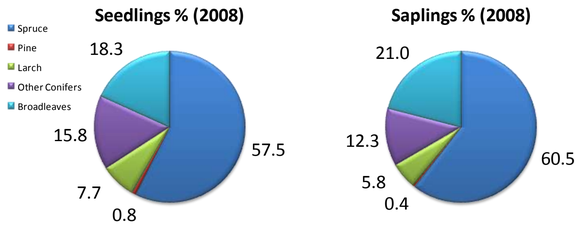

Figure 7. Species composition (%) of seedlings and saplings from the 2008 Inventory (Macintosh et al 2013). A significant proportion of the seedlings and saplings are broadleaf species, adding to the diversity of the forest.

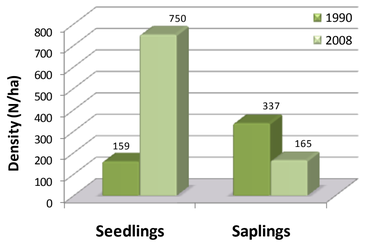

Figure 8. Seedling and sapling density across the trial area, 1990 and 2008 (Macintosh et al 2013). Deer browse is thought to have a major impact on current sapling density.

Figure 9. Glentress trial area (Block E) in 2012. Note the diversity of species and size classes. Also, the mountain bike trail, created as part of the plan for public use and access to the forest.

Site and Silviculture

Inventories of the trial area have been undertaken in 1952, 1980, 1991 and 2008 (Wilson et al 1999, Kerr et al 2010). Results demonstrate the gradual transformation to an irregular structure (Figure 4). The dominant species include Sitka spruce, European larch, Scots pine and Douglas fir (Figure 5). The most important silvicultural system that has been applied is group selection, with group sizes varying from 0.1 to 0.2 ha (Figure 6). Groups have been restocked by planting and natural regeneration (Figures 7 and 8).

Conclusion

The trial has been important for primary research (e.g., Kerr and Macintosh 2012), and for gaining operational experience in uneven-aged silviculture. Over the decades since its initiation, the objectives of forestry in Britain have evolved and changed. Today the Glentress Trial has a new relevance as we recognise the importance of uneven-aged forests for their ecological resilience and potential to deliver a range of ecosystem services (Figure 9).

Literature Cited

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