

Field Visit Report

During the afternoon, the delegates were shown round a new organic apple orchard of approximately 1 ha area (600 trees) established on the Falkland Estate by David Atkinson (Director of Falkland Farms, Falkland Rural Enterprises Ltd.). Apples have historically been grown in the area, and in Falkland Palace (built by James IV and James V between 1450 and 1541) there are very old apple trees still growing in the gardens.

The apple trees have been planted into an existing ryegrass/bent grass/clover pasture in east-west rows, with the intention that in a few years (when the trees have grown to about 4.5 metres) it can be grazed by sheep. The orientation of the rows was chosen because of the shape of the field). The apple varieties (Discovery, James Grieve, Rajka and Red Windsor) were selected because they have a short growing season and flower late (after the last frosts, hopefully). They have been grafted on to the vigorous MM106 rootstock, to help them withstand sheep grazing. There are no growers of organic apple stock in Scotland, so the trees were sourced from a supplier in East Anglia, and had to be planted out in the wet soil (under plastic covers along the rows) during the bad conditions of April 2012. However, despite the poor conditions establishment seems to have been high.



The organic apple orchard on the Falkland estate.

The trees are grown with minimum support, with fence posts installed along the rows at intervals and a wire strung between the posts at chest height. The leading shoot of each tree is loosely attached to the wire. The trees are protected by plastic spiral guards. The site is not fenced with deer fencing, due to its cost, so there has been some grazing damage.



David Atkinson showing the delegates the apple trees.

The delegates then visited Brackmont Farm and Forestry at the St Fort Estate, Fife, DD6 8RE, by kind invitation of the owners, Andrew and Hilary Mylius.

The estate comprises 1,500 acres (607 ha), two thirds arable land, split equally between grass and arable fields, and one third woodland.

The farm keeps pedigree sucklers, one herd of 85 pedigree Aberdeen Angus and one herd of pedigree Lincoln Reds. The latter, in particular, were selected for their good liveweight gain, the excellent beef quality and their docility. The arable areas produce cereals for the livestock.

When the Lincoln Red herd was established in the 1960s there were no trees on the estate, except round the farm, and it was very exposed in winter. There was loss of soil in the spring due to wind erosion. The first shelter belt was established in 1972. During the 1980s, when cereal prices were low, set-aside commenced and the herd size was restricted by quota. Therefore, introduction of the Farm Woodland Premium Scheme was of interest to the estate, who initiated further tree planting (Scots pine and some sitka spruce) in

1989 into fertile pasture. Tree planting was designed to give shelter to the steading. There was a large amount of grass growth between the trees, but the trees were planted at a slightly larger spacing than the official recommendation so that a tractor and flail could get between the rows. The trees have not yet been thinned, but a thinning licence has just been applied for.



Andrew Mylius (back to camera) discussing the tree planting with the delegates.

In 1994, further tree planting was carried out as cereal prices were low. Some of the lighter land was planted, with the aim of providing further shelter but with the emphasis on amenity plantations (for landscape and shooting) rather than production plantations. As well as Scots pine and sitka spruce, the hardwoods ash, cherry, oak, silver birch and sycamore have been planted. Drought in 1995 and 1996 meant that many trees had to be replanted in one of the woods, especially on higher parts of its area.

Environmental benefits were seen very early on, as grass grew up over the tree seedlings providing good shelter for voles, which in turn provided food for short-eared owls (which were encouraged on to the estate by the owners putting up poles for them to perch on).

The hardwood species were planted with tree guards for protection. In 2009 the hardwood blocks (and some of the better conifer blocks) were fenced off, so that the cattle could be introduced without damaging the trees. The hardwood trees are now of such a height that the fencing could possibly be removed. Some removal of the lower branches of the conifers would be helpful, as the lower trunks would then provide rubbing posts for the cattle. Cows and calves are moved in and out of the wooded areas as weather

dictates, with the trees giving good shelter. The grazing (ryegrass/bent grass, with some cocksfoot, plantains, black medic, clover and vetch) is productive. The ambience and sporting use of the estate has improved, and the suckler herd has been expanded without new sheds being required. The Scots pine are expected to yield saw logs in the future.



Aberdeen Angus cows and calves in one of the wooded areas. Keystone the bull is behind the cows.

On 14th June the delegates visited Glensaugh, part of the James Hutton Institute.

The site is part of the **UK Silvopastoral Network** (with other sites a lowland site at Bangor in North Wales, two sites in Northern Ireland (one upland site at Broughshane, DANI, and one lowland site at Loughgall, DANI), one site in the Brecon Beacons in south Wales (Bronydd Mawr, IGER) and a lowland site in Devon (North Wyke, Rothamsted Research).

The delegates were given an overview of the work at Glensaugh by the Farm Manager, Donald Barry, and were then shown the agroforestry plots by Dr Alan Sibbald. Details of the experimental results that Alan described can be found in the following two publications:

Sibbald, A.R. (1999). Agroforestry principles – sustainable productivity? *Scottish Forestry* 53(1): 18-23.

Sibbald, A.R. (2006). Silvopastoral agroforestry: a land use for the future. *Scottish Forestry* 60(1): 4-7.

Overview of the Glensaugh site.

The experimental station sits astride the Highland Boundary Fault, and comprises 1000 ha of land (900 ha acid moorland and 100 ha productive area). There has been a research station on the site since 1943, when it was recognised that marginal land has the potential to produce more food. The station has been under the ownership of the North of Scotland College of Agriculture, later the Scottish Agricultural College, the Hill Farm Research Organisation, the Macaulay Land Use Research Institute and now the James Hutton Institute.

The station is currently run primarily as a sheep farm, with 400 blackface ewes hefted on to the acid moorland and with 500 cross-bred ewes on the more productive areas. The cross-bred ewes require more inputs than the blackface ewes. There are also 50 suckler cows, although this herd is not profitable and will be reduced in size. Some red deer are kept on the blanket bog, and require very little input.

The focus of the farm is on providing high quality grazing around the steading, although there is also management of the moorland by regular burning of small patches to give new heather shoots for grazing every year. The burning pattern follows a 10- to 12-year rotation.

There was some woodland planting on the site in the 1870s to 1880s. In the 1914-1918 war some of the trees were taken for timber, but in the 1980s re-establishment of wooded areas commenced. The Scottish Rural Development Programme gave an impetus for more planting, and further areas have been planted in 2010, 2011, 2012 and 2013, with more planting planned for 2014. The planted areas now skirt the side of the valley, giving shelter to the steading. A small biomass boiler has been installed at Glensaugh Lodge, providing an outlet for the brash and felled timber, and there are plans to purchase a 200 kW biomass boiler for the site.

The agroforestry experiments were planted in 1987, and they have been managed on a care and maintenance basis since 2001. Some research on the soils have been carried out since that time, but the plots are used as part of the grazing of the farm. The trees provide valuable shelter for the livestock, with some of the woodland blocks acting effectively as a 'living shed' in winter.

Agroforestry experiments

The main tree species present is sycamore (*Acer pseudoplatanus*), chosen as a reference species for all of the sites in the silvopastoral network because of its perceived suitability for all of their locations. At Glensaugh we also saw Scots pine (*Pinus sylvestris*) and hybrid larch (*Larix x marschlinsii*). The sycamore and hybrid larch were planted in the agroforestry experiment at 100, 200 and 400 stems ha^{-1} and the Scots pine at 400 stems ha^{-1} in three replicate blocks. Elsewhere in the newly planted areas on the farm there are ash, oaks and beech. The grass between the agroforestry blocks and between the trees within the blocks has been grazed by cross-bred ewes from the start, although now the trees have grown there is not any grazing within the blocks of trees at the closest density. Originally grazing potential was kept high by supply of nitrogen fertilizer to the grass, but nowadays the policy of the farm is not to use N fertiliser and the areas between the blocks and between the wide-spaced trees are grazed by blackface ewes. Sheep numbers are adjusted to keep the sward at 3.5 cm, which should give maximum stock carrying capacity. There has been some loss of palatability below the trees, probably due to shading decreasing soluble sugar levels in the grass.



The agroforestry plots at Glensaugh (Scots pine front left, sycamore front right).

The tree rows were planted north/south, although research has indicated that for future plantings at this latitude a south west/north east orientation would be better because maximum temperatures occur in the early afternoon, not at midday, and better shade cover would be given. The trees were planted into a 1 x 1 metre weed-free spot, and were protected with plastic tree shelters. Larch and

Scots pine in particular were wind-damaged when they grew out of the top of the shelters, which were subsequently replaced by net guards to give protection from the grazing sheep. These have mostly been removed since 2001. Trees were pruned to give 50% trunk, 50% canopy, until 2006. The denser blocks of hybrid larch have had complete canopy closure for the past 10 years, showing over 90% survival in the 400 stem ha^{-1} blocks.



Alan Sibbald presenting some of the research findings.

From the farming perspective, because of the labour involved in protecting and pruning the trees the most useful density of tree planting is the 400 stems ha^{-1} blocks. In any future plantings these could be protected by fencing until the trees were sufficiently large, and then the fencing would be removed and they would give some grazing initially, but more importantly would give shelter to livestock in winter. The grassland areas between the blocks would be sheltered from the wind, and would have warmer temperatures as a result (as noted by the delegates when standing in such sheltered grassland areas). This higher temperature would give better sward production, and would also mean that livestock would expend less energy on keeping warm so would gain more nutritional value from the grazing.



Sheep under the sycamores.

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