



Aspen: Scottish agroforestry's unsung star

Aspen makes the ideal species for silvopastoral agroforestry, as Peter Livingstone explains.

Eadha Enterprises (*eadha* is the old Gaelic name for aspen) is the UK's leading aspen conservation charity, based in Renfrewshire. Eadha's main focus has been developing a native aspen conservation project and researching, promoting and trialling the use of aspen in productive forestry, and reclamation, rewilding and community woodlands. Eadha is conducting a number of field trials and demonstration projects including

agroforestry. Eadha is also working in partnership with a number of landowners to develop innovative aspen agroforestry systems.

There has been renewed interest in agroforestry generally, in the farming sector, with benefits being recognised of increased sustainability and productivity. Whilst agroforestry falls into two categories—silvopastoral and silvoarable—we recognise silvopastoral systems as the most appropriate for aspen especially in an upland setting. Aspen is so well suited because it:

- Is one of the fastest growing native species;
- Casts a light shade compared to other species;
- Has soil regeneration properties;
- Can be used to stabilise slopes with extensive lateral root system, and remediate soil erosion and slippage;
- Supports more biodiversity than all other native species, including rare and threatened species;
- Is one of the most palatable and nutrient dense tree species;
- It has a suckering mechanism that enhances productivity and potentially provides additional forage.

Mature aspen stand in autumnal colours growing in open pasture at Mar Lodge Estate. Photo: Mark Hamblin, scotlandbigpicture.com



Aspen is Scotland's only native poplar tree. It is tolerant of a wide range of site conditions, able to grow on thin and nutrient poor soils. Indeed it does not require the ectomycorrhizal fungi associations to be present in the soil for successful establishment and can therefore be planted on long since deforested and depleted soils. It

has a wide altitudinal range, growing from shoreline to 550 metres above sea level. It is salt tolerant and able to grow in relatively acid conditions, where it can help to neutralise such soils over time.

Aspen is nationally rare and of conservation concern. It rarely sets seed and historically there has been very limited planting stock of local provenance available. Eadha has been addressing this by taking a clonal forestry approach to tree production and has built up a nationally important collection of aspen clones from a wide geographical and topographical range across Scotland. Each clone has evolved as a genetically unique specimen with unique growth characteristics and tolerances to different physical conditions. Eadha is developing field trials in different environments and under different conditions, to test the clones in a range of applications and identify those with superior qualities. However, in clonal forestry it is crucial to create plantings with a sufficiently diverse genetic range and the clone collection enables us to establish resilient and sustainable systems.

Aspen agroforestry

It is recommended that aspen is planted to mimic how it is found growing in the wild. Either single trees or stands of single clones planted in discrete blocks would be appropriate and this will also allow a comparison of clonal performance for each particular site. There can be significant genetic variation between different clones which dictates everything from growth rates, form and timing of spring flush to timber properties. However, for the future survival

of this species in Scotland, sexual reproduction needs to occur and new clones created. Surviving clones in the wild are typically isolated (especially in the south of Scotland) and are therefore not given the opportunity to cross-pollinate. Planting an agroforestry scheme with a range of male and female clones randomly mixed, will provide suitable conditions for future seed production.

Although there have been some agroforestry trials in Scotland over the last couple of decades, notably by the James Hutton Institute at Glensaugh, this practice has never been taken up widely by individual farmers and landowners. While there is no historical precedence for the use of aspen in agroforestry in Scotland, there are examples of it being used in Norway and we can also take cues from poplar systems on the continent. Old British etchings illustrate that aspen was once pollarded here suggesting sustainable harvesting and its possible selection as a wood pasture species. However, even if aspen was part of such a system, it would be unlikely that any trees would have survived given that aspen is short lived and any suckers would have been grazed out.

Eadha has planted its first aspen agroforestry trial and demonstration site at Craigengillan Estate in East Ayrshire. The seven hectare site was planted in autumn 2020 thanks to funding from the Woodland Trust and Future Trees Trust. The site showcases the thirty-four clones in our Galloway Collection, laid out with fenced field enclosures protecting discrete groups of five trees for each clone, planted at 1.5 metre spacing. These groups are scattered evenly across the site at a spacing of around 20 metres. Each group is enclosed within a 3.5- by 3.5-metre stock fence and in addition protected from deer grazing by 1.2m tubes and stakes. The field enclosures comprise of rylock netting with an additional two timber rails. This is sufficiently robust for cattle and horses as well as sheep.

New woodland

An alternative to the traditional low-density wood pasture system would be to establish aspen woodland and



Left: Aspen growing in abandoned part of a community called Duart, near the hamlet of Nedd in Assynt. Photo: Chris Puddephatt.



shelterbelts at typical densities for native woodland creation (1,600 trees per hectare). However, it would be 15 years before stock could gain access to the woodland for grazing. The optimum management prescription for aspen woodland for conservation objectives would also be consistent with the requirements of agroforestry. A coppice with standards system could be adopted, with selective thinning at 15 years. This will provide the first crop and an initial income stream, and stimulate suckering within the open areas.

Given aspen's light shade, a rich herb layer will have likely developed over the establishment period. This combined with the addition of suckers and their supplementary nutrition will provide high-quality forage for livestock. To allow sufficient sucker growth for forage, a further two to four years should be left after thinning before allowing livestock access. Small coupes could be established with temporary fencing using rotational and/or mob grazing. Such a system

will create a wide range of age classes which will enable regular harvesting as well as maximising habitat quality.

Biodiversity

Aspen trees or more importantly larger stands provide a habitat for a wide range of rare or nationally important species including flies, moths, beetles, fungi, lichens and mosses. At least 100 species of fungi and 130 species of lichens have been recorded on aspen in Scotland. This includes five UK priority species which depend exclusively upon aspen stands for their habitats including the aspen bract fungus, the aspen hoverfly and the aspen bristle-moss.

A wood pasture will provide a transition between enclosed woodland and open farmland/hedgerows, providing ecological connectivity. Agroforestry generally, whether open wood pasture or planted woodland, can also allow the diversion of livestock away from grazing in valuable ancient woodlands which can destroy the sensitive ground

flora. The value of wood pasture itself is increasingly being recognised for its ecological value and it is one of the Priority Habitats in the UK Biodiversity Action Plan. In ancient wood pasture, stable grazing-maintained plant communities are likely to have evolved with elements of both woodland and open vegetation communities present.

Establishment of an aspen agroforestry scheme would also be appropriate adjacent to a moorland habitat where there are sensitive ecological issues, such as the conservation of ground nesting birds and waders which may have precluded the establishment of woodland. An agroforestry system is compatible with these ecological concerns as it would not create increased cover for predators such as foxes or nesting sites for crows if managed accordingly.

The open nature of a wood pasture system together with the beauty of native aspen (especially in autumn!) and the variation provided by different clones will deliver a stunning landscape feature which can mitigate flooding, store carbon and remineralise soils. What are we waiting for?

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Peter Livingstone is CEO of Eadha Enterprises.

Top left: Aspen hoverfly. Photo: Iain MacGowan, NatureScot.

Top right: Aspen bristle-moss, New Kinord, Muir of Dinnet Sept 2023. Photo: NatureScot.

Left: Planting the Craigengillan site. Photo: Peter Livingstone.

