**Aspen**

*Populus tremula*



**Aspen branch (www.scottishaspen.org.uk)**

Aspen is a beautiful and distinctive tree with shimmering summer foliage. Although widely distributed across the northern hemisphere, in Scotland it is increasingly scarce and occurs in mostly small and isolated populations. It is estimated that only 160 ha of Aspen woodland remain in Scotland and of this only about 25 ha receive any statutory protection[[1]](#footnote-1).

Aspen supports a wide range of animal and plant species, some very rare and many only found associated with Aspen. Action is required now to halt further fragmentation of Scottish Aspen and to link isolated populations. Without this, those species that are dependent on Aspen face extinction in Scotland.

Description

Aspen can reach a height of 20 metres, but in most Scottish locations it rarely grows more than ten metres. The bark is grey and sometimes pitted with diamond-shaped lenticels. On old, mature trees the bark is often covered with a dark-coloured lichen (*Collema nigrescens*), which gives the trunk a black appearance.

Aspen leaves are round, with irregular blunt teeth on their margins. The leaf stalks are flattened (on most trees they are round in cross-section) and very flexible near the leaf blade. This gives rise to the characteristic fluttering of its leaves in the slightest breeze. When the leaves first open in spring, they are a distinctive coppery colour, before turning green. In autumn, the leaves turn brilliant yellows, or sometimes red.

**Aspen bark (www.scottishaspen.org.uk)**

Distribution

European Aspen is one of the most widely distributed trees in the world, with a natural range that stretches from the Arctic Circle in Scandinavia to North Africa, and from Britain across most of Europe and north Asia to China and Japan. Aspen is found on a wide range of sites from sea-level to the tree-line. It occurs in most types of woodland, but most commonly associates with birch. It is often found in sites inaccessible to grazing animals, such as crags and riparian woodlands. In Britain it is generally scarce, and most common in the Scottish Highlands. However, even here it survives mainly as very small, widely scattered and unmanaged remnants[[2]](#footnote-2).



Distribution of Aspen in the UK (From NBN Gateway: accessed 20/08/13)

Ecology[[3]](#footnote-3)

Aspen is dioecious, with individual trees either male or female (in contrast to most trees, where male and female flowers occur on the same tree). Trees flower in March and April, before the leaves appear, with both the male and female trees producing catkins. Pollinated female catkins ripen in early summer and release tiny seeds, which are dispersed by wind.

However, throughout most of its range Aspen's main method of reproduction is vegetative, with new suckers, or ramets, growing off the roots of mature trees. Because of their access to nutrients through the parent tree's root system, Aspen ramets can grow very quickly - up to a metre per year for the first few years. The ramets remain joined through their roots, and all the interconnected trees are a clone of the parent. Therefore they are all same sexed and exhibit synchronous behaviour, for example, coming into leaf at the same time in the spring. Some of the smaller stands in Scotland are probably a single clone, with a parent tree and variable aged suckers and young trees.

Throughout its range, Aspen is valued for its positive effect on woodland biodiversity. In Scotland, Aspen supports a diverse flora and fauna including fungi, lichens, mosses, flies, beetles and moths, many of which have Red Data Book status. Five UK Biodiversity Action Plan (BAP) Priority Species depend on Aspen.

Some of these Aspen-dependent species have very particular requirements. The larvae of the Dark-bordered beauty moth for example, only feed on the leaves of young Aspen suckers, whereas Aspen hoverfly requires fallen Aspen deadwood. It is also an important tree for the Eurasian beaver (*Castor fiber*), which feeds extensively on Aspen, particularly in winter. Aspen is a short-lived species with few individuals surviving beyond 100 years, partly because its soft, white wood is not resistant to rot fungi.

Threats

* **Overgrazing -** Aspen bark and leaves are readily eaten by both domestic (sheep and cattle) and wild (deer, rabbit and hare) animals. This is believed to be the main factor preventing natural regeneration in existing stands of Aspen and probably explains why many Aspen stands are in areas inaccessible to grazing animals.
* **Habitat fragmentation -** Aspen woodland occurs in isolated fragments. Although sexual reproduction of Aspen occurs relatively infrequently in Scotland, when flowers are produced successful pollination is less likely to occur if male and female trees are too far apart. Fragmentation also impacts on biodiversity; many species dependant on Aspen require a minimum area of woodland to complete lifecycles and if populations become isolated from each other they become more vulnerable to local extinction.
* **Failure to incorporate Aspen into current woodland management -** There has been a failure to include Aspen, in sufficient quantities, in new plantations of broadleaved woodlands. In addition there is a shortage of suitable planting stock, especially stock of local provenance, to support new woodland plantings.

Management

* **Control grazing** - Reduce grazing levels to allow suckers to establish.
* **New planting** - In core Aspen areas, new plantings should be sited to enhance functional connectivity between stands, and help develop networks of Aspen habitat. New stock of appropriate provenance needs to be raised to provide sufficient material for this.
* **Managing for dependent species** - Some stands may be managed for particular Aspen-dependent species. Creating a continuous supply of Aspen deadwood may help the Aspen hoverfly, for instance.
* **Research -** More research into the ecology, management and regeneration of Aspen is required. In addition there is a shortage of skilled field lichenologists and bryologists to enable informed management decisions.

Current work

**The Aspen 2020 Project[[4]](#footnote-4) -** In partnership with others, Coille Alba is leading a project "Aspen 2020" to restore Aspen in the Scottish landscape. The Project’s main objectives are: to improve our knowledge of Aspen distribution and status; to help gather and share knowledge on Aspen ecology and management; to restore and expand Aspen woodlands; to improve the availability of local origin Aspen for planting.

**Trees for Life[[5]](#footnote-5)** - An Aspen project was initiated in 1991 as part of their work to help restore the Caledonian Forest in Glen Affric and the surrounding areas. The project has four main elements to it: surveying and mapping of existing stands; protection of ramets or suckers at existing stands to facilitate natural regeneration; propagation and planting of young Aspens; and research into the ecology of Aspen.

**Scottish Wildlife Trust’s** nursery at Lochinver will propagate Aspen seedlings.

**The Highland Aspen Group** (HAG) is a membership organisation of enthusiasts, both academic and practical, who are keen to improve the future for Aspen in the Scottish Highlands. The work covers gathering information about Aspen stands and their associated plants and animals across the area, and developing thinking about their management and history. A nursery has been set up to propagate local provenance native woody plants, in particular different Aspen clones to ensure the availability of this material for planting in the Cairngorm National Park and adjacent areas.

Wider context

There has been a recent upsurge in interest in Aspen after years of neglect. Apart from its aesthetic values, Aspen is a species on which may other, often rare, species depend. There is no UK species action plan for Aspen nor is there a habitat action plan for Aspen woodland. However it is a preferred food for Eurasian beaver, and management plans for Aspen and associated riparian woodland habitats could be linked with the research and management that is being undertaken for the reintroduction of Beaver to the UK.

Quick facts

* Aspen is important in woodland biodiversity. In Europe, Aspen has more species that rely on it than any other boreal tree.
* Aspen bark is more basic and nutrient rich than other native species and is host to many interesting and rare lichens and mosses.
* Five UK priority species depend upon Aspen stands for their habitats: 3 invertebrates (*Hammerschmidtia ferruginea, Byctiscus populi, Epione vespertaria*) and 2 bryophytes (*Orthotrichium gymnostomum* and *O. obtusifolium*).
* A new species of fly (*Ectaetia christiei*) which associates with dead Aspen trees was discovered in Scotland in 1997.
* Aspen roots can persist underground for many years after the death of the parent tree. This leads to the appearance of Aspen ramets (suckers) in areas where there are no mature trees (e.g. on the north shore of Loch Beinn a'Mheadhion in Glen Affric).
* One Aspen clone in Utah contains over 47,000 individual stems and covers an area of 43 hectares. With an estimated weight of over 6,000 tonnes, this is reputed to be the world's largest known organism.
* The place name Crianlarich is derived from the Gaelic name for Aspen, critheann
* In ancient times, Aspen was a tree of heroes, giving its bearers power not only to visit the Underworld, but also to return safely.
* The Celts favoured lightweight Aspen wood for making shields and believed these shields gave additional protective qualities to shield the bearer from harm.
* In Scotland its quivering leaves were interpreted as gossiping – the tree was known as ‘old wives tongues’.
* Aspen wood is lightweight and very buoyant when dried, making it a popular choice for oars and paddles. Its lightness also made it useful for surgical splints and wagon bottoms.
* The most common commercial use for Aspen wood nowadays is matchsticks. It has long straight fibres and a low flammability.

# ***Note about photos:***

John Parrot from Scottish Aspen ([www.scottishaspen.org.uk](http://www.scottishaspen.org.uk)) has allowed use of photos from their website, and can supply higher resolution versions if needed.

# Selected References

[**www.scottishAspen.org.uk/**](http://www.scottishAspen.org.uk/) Accessed 20/08/13

This website provides a forum for gathering and sharing information on Aspen in Scotland. In particular, it offers an online facility to view and record the location of Aspen stands throughout Scotland. It also features news about publications, activities, events and volunteering opportunities, and links to related websites.

**Cosgrove, P., and Amphlett, A. (eds.) (2002). *The Biodiversity and Management of Aspen Woodlands: Proceedings of a one-day conference held in Kingussie, Scotland, 25th May 2001, pp 41-44*. The Cairngorms Biodiversity Action Plan, Grantown-on-Spey, UK.**

This contains a variety of papers concerning Aspen ecology and conservation in Scotland. Although published in 2001 and so no longer up to date, it contains background information on Aspen in Scotland and many justifications and suggestions for its conservation. A few papers are outlined below:

**Batty, D. (2002). Beavers: Aspen heaven or hell?** In: Cosgrove, P., and Amphlett, A. (eds) *The Biodiversity and Management of Aspen Woodlands: Proceedings of a one-day conference held in Kingussie, Scotland, 25th May 2001, pp 41-44*. The Cairngorms Biodiversity Action Plan, Grantown-on-Spey, UK.

This paper covers the potential impact of Beavers on Scottish woodland, with particular reference to Aspen. Beavers show a preference for Aspen wood. It is suggested that in areas where beavers and Aspen are likely to coincide, Aspen trees can be fenced off to prevent Beaver damage. When considering suitable areas for future Beaver reintroductions, sites with important stands of Aspen could be avoided. Alternatively Beavers could be used as a flagship species for Aspen and landowners encouraged to plant more Aspen so that if/when beavers are introduced more widely in Scotland there will be sufficient trees to support the beavers’ needs. In this way Aspen conservation could be helped by taking advantage of its association with the higher-profile Beaver.

**Mason, W. & Easton, E. & Ennos, R. (2002).** **Variation in Aspen in Scotland: genetics and silviculture.** In: Cosgrove, P. and Amphlett, A. eds. The biodiversity & management of Aspen woodlands. Proceedings of a one-day conference held in Kingussie, Scotland, on 25 May 2001. The Cairngorms Local Biodiversity Action Plan, Grantown. pp 45-55.

This paper examines the genetic origins and current diversity of Aspen populations in Scotland. They give preliminary recommendations of methods and potential for developing an expanded Aspen resource in Scotland, both as a component of native woodland and of restructured plantation forests e.g. planting stands of Aspen within commercial Sitka plantations.

**Street, L. & Street, S. (2002).** **The importance of Aspen for lichens**. In: The biodiversity and management of Aspen woodlands (Cosgrove, P. and Amphlett, A., eds), pp. 16-22. The Cairngorms Local Biodiversity Action Plan, Grantown-on-Spey.

The Streets provide a species inventory and analysis for six Aspen stands in Strathspey. Their reports included the discovery of species new to Britain (e.g. *Arthonia patellulata, Bacidia igniarii* and *Caloplaca ahtii*), the rediscovery of a species previously thought extinct (i.e*. Lecanora populicola*, last recorded from East Norfolk over 150 years ago), and viable populations of species that are rare and/or threatened in the British Isles (e.g. *Bacidia vermifera, Biatoridium delitescens, Catinaria neuschildii* and *Fuscopannaria ignobilis*).

**Parrot, J. and Mackenzie, N. (eds.) (2009). Aspen in Scotland: Biodiversity and management. Highland Aspen Group** www.scottishAspen.org.uk/uploads/attachments/HAGlow.09.pdf accessed 20/08/13

*Presentations included:*

* Aspen and forest biodiversity in North European boreal forests. Jari Kouki
* Composition and diversity of lichen epiphytes on Aspen. Chris Ellis
* Ecology and conservation of the Aspen Hoverﬂy. Ellen Rotheray
* Aspen bristle moss in Scotland. Gordon Rotheray
* Factors aﬀecting lichen community structure on Aspen. Chantel Davies
* Developments in the study of the Dark Bordered Beauty moth. Tom Prescott
* Beavers and Aspen: looking to the future. Dan Puplett
* Managing dead wood in Aspen stands. Iain MacGowan
* Distribution of Aspen in Strathspey. John Parrott
* Inducing ﬂowering and ﬁne root growth in Scottish Aspen. Tytti Vanhala & Jason Hubert
* Not merely a habitat: utilisation of Aspen. David Jardine
* Aspen growth trials : showing the species’ potential in Scotland. Alan Harrison
* Insects associated with Highland Aspen. Iain MacGowan
* Scottish Lepidoptera associated with Aspen. Tom Prescott
* The distribution and ecology of Phellinus tremulae in Scotland. David Jardine& Ern Emmett
* Using aerial imagery to survey Aspen. John Parrott
* Using BEETLE to plan Aspen habitat networks. Mike Smith
* Trees for Life Aspen Project. Dan Puplett
* Aspen at Carrifran Wildwood. Philip Ashmole & Hugh Chalmers
* BULB Aspen project. Peter Livingstone
* Ecology, conservation and management of Aspen – a literature review. Neil MacKenzie
* The future of Aspen in Scotland - a 2020 Vision. Carol Robertson, Victor Clements & John Parrott
* Is snow important to high-altitude scrub? Diana Gilbert, Alison Hester & Colin Legg

**Cosgrove, P., Amphlett, A., Elliot, A., Ellis, C., Emmett, E., Prescott, T. & Watson Featherstone, A. (2005). Aspen: Britain’s missing link with the boreal forest. British Wildlife 17 (2), 107-115.**

A review of status and research on Aspen.

**MacGowan, I. (1997). The entomological value of Aspen in the Scottish Highlands. Report No. 1. The Malloch Society.** www.mallochsociety.org.uk/value-of-aspen/ Accessed 2/11/13

This paper provides information about Aspen distribution and status in Scotland (still useful, but no longer up to date) and describes insects that are associated with the tree.

**Mackenzie, N.A. (2010). Ecology, conservation and management of Aspen. A literature review. Scottish Native Woods, Aberfeldy.**

www.scottishAspen.org.uk/uploads/attachments/Aspen%20Review%202010-98169.pdf, accessed 20/08/13

A review of the literature relating to Aspen, including information on the ecology, biology, threats, biodiversity, propagation and management. There is a general lack of research that relates specifically to European Aspen in Scotland and so the author draws information from research in Scandanavia as well as the closely related Quaking Aspen (*Populus tremuloides*) of North America.

**Worrell, R. (1995a). European Aspen (Populus tremula L.): a review with particular reference to Scotland 1. Distribution, ecology and genetic variation. Forestry 68 (2), 93-105.**

**Worrell, R. (1995b). European Aspen (Populus tremula L.): a review with particular reference to Scotland 2. Values, silviculture and utilisation. Forestry 68 (3), 231-243.**

**Worrell, R., Gordon, A.G., Lee, R.S. & McInroy, A. (1999). Flowering and seed production of Aspen in Scotland during a heavy seed year. Forestry 72 (1), 27-34.**

**Coppins, B.J., Street, S. & Street, L. (2001). Lichens of Aspen woods in Strathspey. Unpublished Report.**

**Jones, K., Gilvear, D., Willby, N. and Gaywood, M. (2009). Willow (Salix spp.) and aspen (Populus tremula) regrowth after felling by the Eurasian beaver (Castor fiber): implications for riparian woodland conservation in Scotland. *Aquatic Conservation:* *Marine and Freshwater Ecosystems*, 19: 75–87.**

Data collected suggest that rapid regeneration of Willow and Aspen will occur in riparian woodlands in the event of major felling activity by Eurasian beaver, even in the presence of low to moderate levels of roe deer browsing, and that the conservation status of both these trees or the wider habitats that they form would not be threatened by a well planned and managed reintroduction of beavers to Scotland.

**MacGowan, I. and Rotheray, G.E. (1993). The significance of Aspen in Scotland. Native Woodlands Discussion Group Newsletter 18: 40-41.**

Brief review of the importance of Aspen in Scotland, with particular reference to the dependence of other species on the tree.

1. MacGowan, I. (1997). The entomological value of Aspen in the Scottish Highlands. Report No. 1. The Malloch Society. [↑](#footnote-ref-1)
2. [www.scottishaspen.org.uk/map/map](http://www.scottishaspen.org.uk/map/map) Accessed 2/11/13 [↑](#footnote-ref-2)
3. Alan Watson Featherstone. Trees for Life species Profile: Aspen. www.treesforlife.org.uk/tfl.Aspen.html accessed 20/08/13 [↑](#footnote-ref-3)
4. [www.scottishaspen.org.uk/project](http://www.scottishaspen.org.uk/project) accessed 20/08/13 [↑](#footnote-ref-4)
5. www.treesforlife.org.uk/tfl.Aspen\_project\_updates.html accessed 20/08/13 [↑](#footnote-ref-5)