
Allt na Feithe Sheilich

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Highlights

Stream sections eroded in blanket peat by the Allt na Feithe Sheilich have provided an important pollen and plant macro-fossil record, supported by radiocarbon dating, of vegetational history during the Holocene. This record is particularly significant for understanding the development of blanket bog and pine forest.

Introduction

This site [NH 850 260] is located on the Monadhliath Plateau at an altitude of about 600 m near the summit of Carn nam Bain-tighearna and comprises a large area of blanket bog that is presently being eroded by the headwaters of the Allt na Feithe Sheilich. The site contains radiocarbon-dated pine stumps and birch-wood layers buried within the peat and is of considerable importance in understanding the local and regional Holocene vegetational history of the eastern Highlands of Scotland. The peat sequence is one of the oldest blanket-peat profiles in the British Isles, as it extends almost to the Late Devensian/Holocene boundary. The site was first described by Lewis (1906) (his Spey–Findhorn watershed site) in his study of buried tree-layers in Scottish peats, and subsequently by Samuelsson (1910). The stratigraphy, palaeobotany, and palaeoecology of the sequence have since been studied in detail by Birks (1975).

Description

Lewis (1906) recorded two layers of pine stumps with birch wood below in two sections, and one layer of pine stumps with birch wood below in a third section. Samuelsson (1910) reinvestigated the site and found only one layer of pine. Birks (1975) similarly found only one layer of stumps underlain by peat rich in birch-wood remains, but overlain by peat with an upper indistinct birch-wood horizon.

Birks (1975) prepared a detailed pollen diagram from a 3.25 m deep peat profile (Figure 9.13). The profile contained large pine stumps overlying 1.3 m of humified peat with frequent fragments of birch and willow wood. The pine stumps are overlain by 1.8 m of humified *Sphagnum* peat containing an indistinct layer of birch and *Calluna* twigs at 1.5 m depth. One pine stump yielded a radiocarbon date of 6960 ± 130 BP (K–1419) and the upper birch-wood layer is dated to 4425 ± 100 BP (Q–886). The profile is divided into eight local pollen zones that are correlated with the four, radiocarbon-dated, Holocene regional pollen-assemblage zones established for the Cairngorm area by Birks (1970) (see also Birks and Mathewes, 1978) (Figure 9.13).

Interpretation

The record of regional vegetational history preserved in the Allt na Feithe Sheilich deposits suggests that before 9400 BP open birch–willow–juniper scrub with a wide variety of herbs was widespread. From 9400 BP to 7500 BP birch woodland with some hazel and willow was predominant. At about 7500 BP pine migrated into this area of Scotland (Birks, 1977) and became the co-dominant tree of the region along with birch. The pollen assemblage of the top 0.5 m of the succession reflects the regional clearance of these pine and birch woods and the extensive development of *Calluna* moor.

The local vegetational history of the site suggests that wet mesotrophic birch–willow woods with abundant *Sphagnum* and *Empetrum* and some *Calluna vulgaris* developed in poorly drained hollows on the Cam nam Bain-tighearna plateau at about 9400 BP. By 9000 BP the field-layer composition of these woods changed to an abundance of grasses, sedges, and *Melampyrum* and a variety of fen herbs. Such communities may have resembled modern 'lagg' communities of bogs in central Sweden. This type of community is extremely rare in the British Isles today, owing to Man's drainage activities

or, as at Allt na Feithe Sheilich, to subsequent natural burial by the growth of blanket peat, leaving little trace of these communities except for the wood of birch and willow at and near the base of many blanket peat profiles.

By 7500 BP the local vegetation changed to a drier, more acid *Calluna–Empetrum* bog with some birch, into which pine was able to establish itself, forming an open pine–birch bog with abundant dwarf shrubs. At 6900 BP the bog became wetter, leading to the death of the trees and the development of a *Sphagnum–Calluna* bog. At about 4400 BP the bog became drier again, allowing the local growth of birch, as reflected by the upper layer of birch and *Calluna* remains rich in carbonized fragments. Thereafter, *Eriophorum vaginatum* became dominant to form the characteristic ombrotrophic *Eriophorum–Calluna* blanket-bog community of plateau sites in the eastern Highlands today.

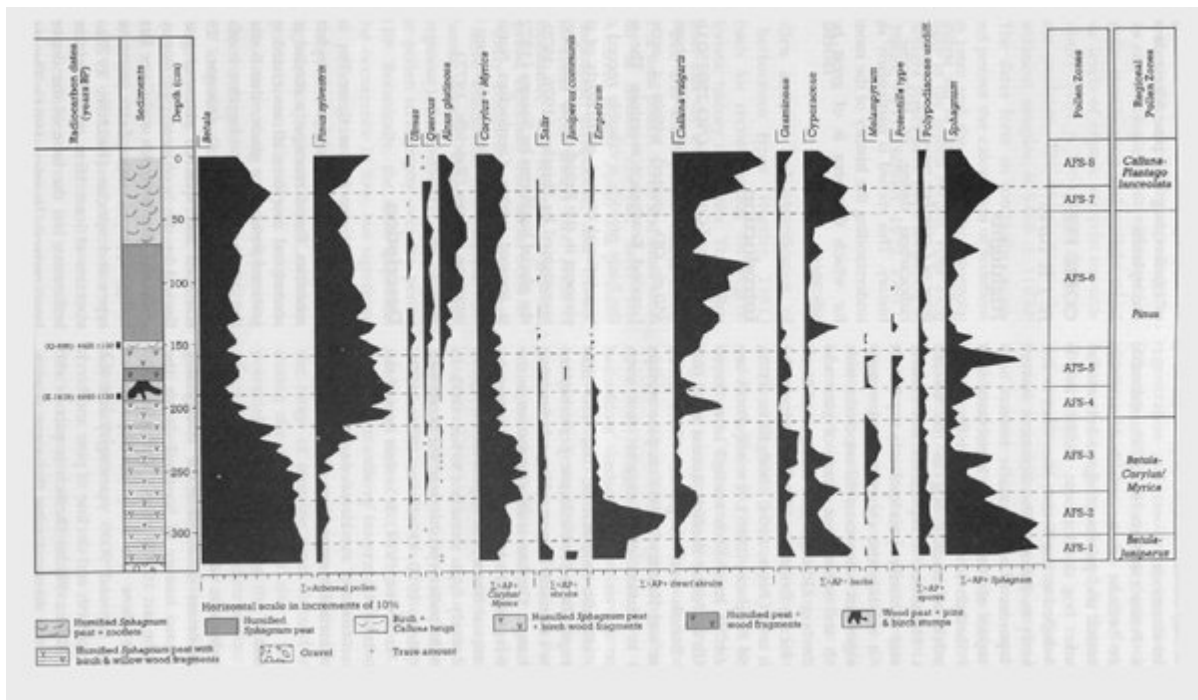
The local vegetational history of the site is of considerable importance because it records the earliest development of blanket bog in the British Isles and the establishment and subsequent demise of pine on the bog. Although Lewis (1906) assumed that buried wood layers in peats of different parts of Scotland were the same age, work by Birks (1975) clearly shows that pine stumps within an area such as the Cairngorms yield different radiocarbon ages. This asynchronicity of woodland development and the varied causes of death of the trees suggest that there were no simple, overriding, regional climatic factors controlling tree growth on peat here or in any other areas of Scotland (Bridge *et al*, 1990). Tree establishment, growth, and death on blanket peat may have been controlled by small climatic fluctuations to which the vegetation at one site may have been sensitive at a particular time, whereas at other sites it was not, depending on local vegetational succession, aspect, altitude, hydrology and topography. Pine stumps in the Cairngorm area invariably occur at a level just after the peat became acid, but before the establishment of *Calluna–Eriophorum vaginatum* dominated ombrotrophic bog, a habitat which is unsuitable for pine regeneration today. The death of the pines seems to be due to various causes, the most common, as at Allt na Feithe Sheilich, being some increase in wetness of the peat surface. However, such an increase need not be due to any large regional climatic change because McVean (1963a) has shown that a single wet season may be sufficient to kill pines growing in marginal situations.

Allt na Feithe Sheilich is of considerable importance because of the wealth of available palaeobotanical and palaeoecological information about blanket bog development. Blanket bog is better developed in the British Isles than in any other country in Europe. The Holocene history and development of representative blanket bogs are thus topics of considerable importance. Allt na Feithe Sheilich is a well-studied site that is representative of blanket bog in the eastern Highlands. Moreover, it represents the earliest development of blanket peat known in the British Isles and it records the complex local vegetational changes that have occurred associated with the growth and subsequent death of pine and birch on the bog. Although pine stumps and birch wood are locally frequent in blanket peats in the Cairngorm area (Pears, 1964, 1968; Birks, 1970; Dubois and Ferguson, 1985), few sequences are as complete or have been studied in as much detail as Allt na Feithe Sheilich. Recent work (for example, Dubois and Ferguson, 1985; Birks, 1988; Gear and Huntley, 1991) on pine stumps preserved in blanket peat, suggests that such stumps are not only an important 'archive' of Holocene climatic information, but also may reflect abrupt, short-lived climatic perturbations that may be extremely important in understanding climatic change. The site is also important in the context of regional Holocene pollen stratigraphy and vegetational history, as it provides a record from a relatively high altitude (595 m OD), in contrast to the pollen records from the Strathspey lowlands (Birks, 1970; O'Sullivan, 1974a, 1976; Birks and Mathewes, 1978). It is thus one of the most important blanket-peat profiles in Scotland for the elucidation of the Holocene vegetational and environmental history of an upland area.

Conclusion

The peat deposits at Allt na Feithe Sheilich provide important information for interpreting the vegetational history of Scotland during the Holocene (the last 10,000 years). The pollen and tree remains show the early development of blanket bog (around 9000 years ago) and the subsequent growth and decline of pine and birch woodland. Allt na Feithe Sheilich is part of the network of sites demonstrating Holocene vegetational and environmental change and is particularly significant for understanding the history of blanket bog and pine forest development in the uplands.

[References](#)



(Figure 9.13) Allt na Feithe Sheilich: relative pollen diagram showing selected taxa as percentages of the pollen sums indicated (from Birks, 1975).