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# Lochan an Druim

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## Highlights

The pollen and plant macro-fossils preserved in the sediments which infill the basin at Lochan an Druim provide an important record of vegetational history and environmental changes during the Lateglacial and Holocene in the extreme north-west of Scotland.

## Introduction

Lochan an Druim [NC 435 568] is a small lochan at an altitude of 25 m OD in the shallow valley between the A838 road and the ridge of An Druim that runs northwards from Eriboll. It contains an important Lateglacial vegetational sequence and it has a Holocene vegetational history that is unique to the extreme north-west Scottish Highlands (Birks, 1977, 1980).

The local bedrock is Durness Limestone and, where it crops out to the east of the lochan, there are botanically interesting *Dryas octopetala* heaths, with associated arctic–alpine plants such as *Carex capillaris*, *C. rupestris*, *Polygonum viviparum* and *Saxifraga aizoides*. A pollen diagram for the site was included in Birks (1980), and Birks (1984) gives full details of the site and its environmental setting.

## Description

An 8.9 m long core collected from the west side of the lochan showed a succession of silty sand, silty mud, clay and detritus mud sediments (Figure 6.18). Eleven radiocarbon dates (SRR–776 to SRR–785, SRR–866) provide a chronology for the observed pollen stratigraphy (Figure 6.18), although some or all of the dates may be subject to hard-water errors owing to the incorporation of <sup>14</sup>C-deficient carbon from the surrounding limestone and calcareous drift. The vegetational history of the site has been studied in detail by Birks (1984 and unpublished data; pollen diagram in Birks, 1980).

## Interpretation

The Lateglacial part of the sequence (7.85–8.91 m) has been studied by Birks (1984) for both its pollen and spore assemblages and its plant macrofossils. The sequence begins at about 12,500 BP, implying that deglaciation of the area had occurred by that time. An open, pioneer vegetation of grasses and sedges with *Salix*, *Empetrum nigrum*, *Dryas octopetala* and *Saxifraga* spp. was initially present. During the Lateglacial Interstadial a vegetation dominated by dwarf-shrubs, such as *Empetrum nigrum*, *Dryas octopetala* and *Salix herbacea*, with some juniper was widespread. Leaves of the obligate snow-bed moss *Polytrichum sexangulare* are present, indicating that areas of late snow-lie persisted at low altitudes near the lochan, even in interstadial times.

Inwashing of mineral material occurred during the Loch Lomond Stadial, suggesting unstable soils and discontinuous vegetational cover. The vegetation contained an abundance of open ground, arctic–alpine herbs, such as *Artemisia norvegica*, *Astragalus alpinus*, *Arenaria norvegica*, *Cherleria sedoides*, *Minuartia rubella*, *Saxifraga oppositifolia* and *S. cespitosa*. This assemblage is suggestive of present-day, high-arctic vegetation, with scattered plants forming a sparse cover on open mineral soils, and with long-lasting snow beds and associated meltwater runnels. At this time small corrie glaciers reformed on the higher mountains in north-west Scotland (Sissons, 1977a).

The opening of the Holocene is clearly marked by the expansion initially of dwarf-shrub heaths, dominated by *Empetrum* and *Juniperus*, followed by the development of open birch woods with *Populus tremula* and *Salix* spp. *Corylus avellana*

expanded rapidly at about 9800 BP along with *Sorbus aucuparia*. By 9500 BP the landscape around the lochan would have been a mosaic of birch and hazel woods with aspen, rowan and willows, and with an abundance of ferns and tall herbs. Small treeless areas may have persisted where soils were shallow, and where there were natural rock outcrops.

At about 7200 BP *Ulmus* arrived in the area, but it never became an important component of the local forest vegetation. There is no evidence from the pollen stratigraphy at this site to suggest that pine or oak ever grew this far north (Birks, 1977, 1989), even though pine stumps occur locally in the Eriboll area. The natural woodland cover of this part of Scotland appears to have been primarily birch and hazel woods. At about 5800 BP *Alnus* migrated into the area (Birks, 1989; Bennett and Birks, 1990) and expanded locally in wet sites near the lochan.

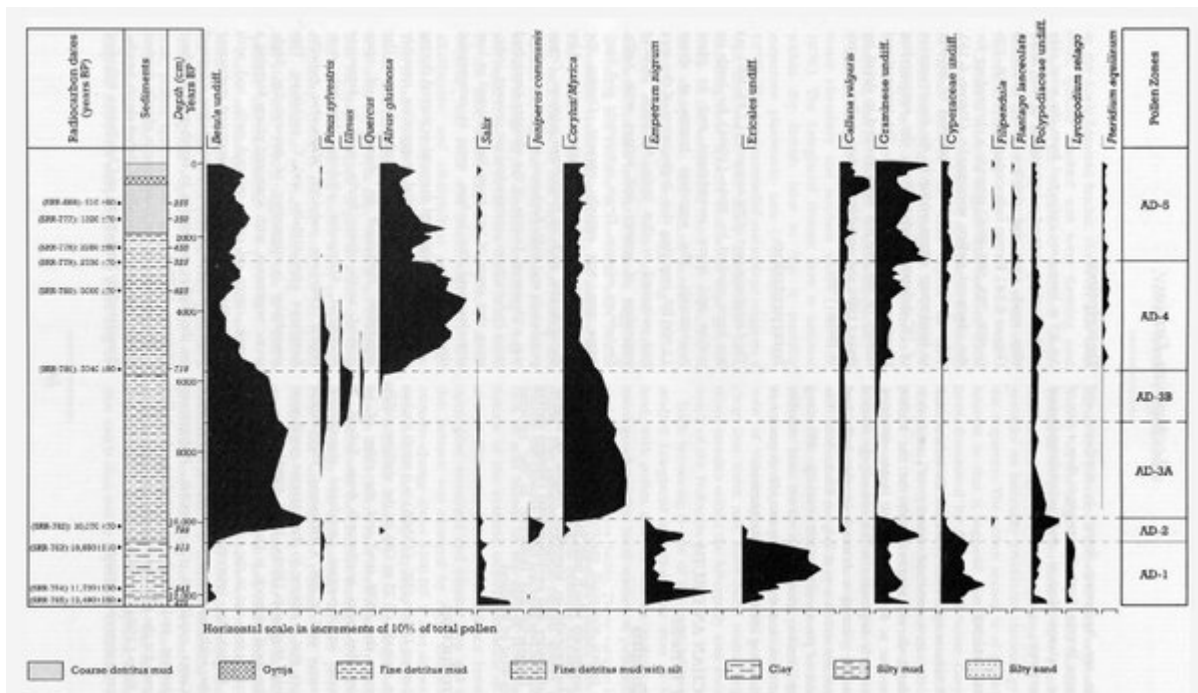
Destruction of the birch and hazel woods began at about 5000 BP, resulting in the expansion of grasslands and, to a lesser extent, of heathland. There is palynological evidence for arable cultivation, presumably on the fertile limestone soils, from about 2500 BP. By this time extensive forest clearance had occurred, resulting in the virtually treeless landscape of the Loch Eriboll area today.

The site is of national importance because of its detailed and well-dated Lateglacial and Holocene pollen stratigraphy and for the coordinated study of pollen and plant macrofossils in the Lateglacial. These palaeoecological data provide important insights into the Lateglacial environment at low altitudes in the extreme north-west of Scotland; there is no other site that has been studied in such detail from this part of Scotland. These insights are as follows: (1) Even during the Lateglacial Interstadial, snow beds occurred at or near the site, thereby providing an interesting British parallel for the extremely open, chinophilous vegetation of south-west Norway during the Lateglacial (H.H. Birks, unpublished). (2) Major north–south and west–east floristic contrasts existed during the Lateglacial of northern Scotland and south-western Norway, as revealed by plant macrofossil studies (Birks, 1984; Birks and Mathewes, 1978; H. H. Birks, unpublished). (3) Lateglacial flora and vegetation at this far north-western site were similar to low- or mid-alpine situations today in western Norway, suggesting a considerably cooler climate than at contemporaneous sites further south in western Scotland. (4) The Holocene vegetational history from Lochan an Druim is particularly important because of the apparent lack of pine and oak. Its pollen record is thus intermediate between sites further south in western Scotland (Birks, 1980) and sites further west on Skye (Birks and Williams, 1983) and the Outer Hebrides (Bennett *et al.*, 1990). Lochan an Druim thus represents a uniquely important site for the reconstruction of Quaternary vegetational history and past environments.

## Conclusion

Pollen and plant remains in the sediments from Lochan an Druim provide a record of the environmental history of the far north-west of Scotland during the Lateglacial and Holocene (approximately the last 12,500 years). They show that conditions remained extreme even during the relative climatic warming in the Lateglacial Interstadial. Later, during the Holocene, birch and hazel woodland developed, but oak did not extend this far north and pine was probably only locally present. Lochan an Druim provides valuable comparisons with other areas and is important as part of the network of sites that show the wider geographical variations in the patterns of vegetation development since the end of the last ice age.

## [References](#)



(Figure 6.18) Lochan an Druim: relative pollen diagram, showing selected taxa as percentages of total pollen (from Birks, 1980). Note that the data are plotted against a radiocarbon time-scale.