11 Palynological Analyses *by P Milburn*

11.1 Introduction

A series of horizontal bands of sediment, identified in the field as burnt peat, were sampled using two 250-mm monolith tins (Section 10.1). Four sub-samples of these bands were prepared for pollen analysis (see below) with the aim of determining the composition and origins of the deposits.

11.2 Methodology

11.2.1 Pollen preparation and counts

Samples selected for pollen analysis were processed using standard chemical methods (Moore *et al.* 1991) stained with Safranin and mounted in silicon oil. Pollen counts were undertaken using an Olympus BX40 series research microscope at 400× magnification, with critical features examined at 1000× under oil and by linear traverses across the slide, in order to avoid biases created by uneven pollen distribution (Brooks & Thomas 1967). Where possible, a total of 300 land pollen grains was counted per sample. Samples with pollen densities too low for counting to an acceptable sum [a total land pollen (TLP) concentration of less than 600 grains per cm^{-3}] were for the purposes of this report defined as non-polleniferous.

Identifications were based primarily on type reference material, with further reference to standard keys (Moore & Webb 1978; Andrew 1984; Faegri & Iverson 1989, Moore *et al.* 1991). Cereal-type pollen grains were categorized (Anderson 1978). Because of the difficulties of differentiating between the pollen of *Corylus avellana* and *Myrica gale*, a general Coryloid category was used. Other identifications follow the conventions outlined in *The Present and Past Vegetaion of the Isle of Skye: a Paleoecological Study* (Birks 1973). The state of preservation of all pollen grains was assessed and the grains placed in non-hierarchical categories (cf Cushing 1967).

Fragments of microscopic charcoal were also counted. A minimum fragment size of 10 µm diameter based on graticule estimates was employed. Charcoal counts are expressed as a percentage of charcoal fragments per 300 land pollen. Values in Table 17 are expressed as a percentage of TLP and for non-terrestrial taxa as a percentage of total land pollen plus group/taxon count. Botanical nomenclature follows *Flora of the British Isles* (Clapham *et al.* 1989).

11.3 Results

Percentage pollen and spore data are presented in Table 17. An absence of exotic *Lycopodium* in sample 1 prevented an accurate assessment of the paucity of pollen. However, the examination of three slides (24 × 40 mm), 150 traverses, located only two pollen grains and therefore this sample was considered non-polleniferous. On the basis of the applied criteria (see above), only sample 2 contained sufficient pollen to be classified as polleniferous. In sample 2, 52% of TLP showed some degree of mechanical or chemical damage, suggesting that pollen may have undergone secondary transportation and been exposed to aerobic conditions prior to burial.

The pollen assemblage from sample 2 is dominated by Gramineae and Ericaceae, forming up to 82% TLP, and a range of herbaceous pollen taxa associated with open environments, such as *Rumex acetosa / sella, Plantago lanceolata* and *Potentilla*.

11.4 Discussion

The absence of significant amounts of pollen and/or other microscopic organic remains and the differing amounts of microscopic charcoal recorded in pollen samples 1, 3 and 4 accord with the results of the thin-section analysis. The presence of organic residues in pollen sample 2 corresponds to the presence of significant amounts of relatively well preserved pollen (Table 17; Table 18).

Evidence of horizontal banding in sediment layer 3 (pollen sample 2) led Carter to suggest that this layer had been deposited in a fresh condition and decomposed *in situ* (Section 10). Although the exact source of the material forming pollen sample 2 cannot be

Table 17 Layers sampled for pollen from monolith samples (see Section 10.2)

Pollen sample	Sediment layer	Sediment description (Section 10)
1	2	Ash with very few carbonized fragments. No organic materials survive
2	3	Highly humified, but not burnt, organic residues
3	4	Ash with frequent fragments of carbonized peat. No organic materials
4	6	Natural soil. A purely mineral sediment

Table 18 Palynological data for four samples from the cairn

Sample no	Counts	% TLP
Sample 1		
Alnus	1 (Co)	
Ericaceae undiff.	1 (De)	
Exotic *Lycopodium*	0	
Charcoal 10–25 µm	8	
Charcoal 26–50 µm	21	
Charcoal 51–100 µm	11	
Charcoal 101+ µm	2	
Sample 2		
Coryloid	1	< 1
Ericaceae	109	35
Gramineae	148	47
Cereal type (*Hordeum*)	2	1
Cyperaceae	2	1
Ranunculus type	4	1
Rosaceae undiff.	2	1
Potentilla	7	2
Umbelliferae undiff.	3	1
Rumex acetosa / sella	13	4
Plantago lanceolata	19	6
Compositae lig.	2	1
Filicales undiff.	1	< 1
Pteridium	1	< 1
Sphagnum	3	1
Exotic *Lycopodium*	165	
Charcoal 10–25 µm	36	10
Charcoal 26–50 µm	49	13
Charcoal 51–100 µm	16	5
Charcoal 101+ µm	3	1
Sample 3		
Coryloid	1 (Cr)	
Ericaceae	1 (Cr)	
Gramineae	8 (2 N, 6 Cr)	
Plantgo undiff.	1 (N)	
Filipendula	1 (N)	
Filicales undiff.	1 (N)	
Exotic *Lycopodium*	301	
Charcoal 10–25 µm	59	
Charcoal 26–50 µm	125	
Charcoal 51–100 µm	55	
Charcoal 101+ µ	28	
Sample 4		
Gramineae	2 (1 N, 1 Co)	
Filicales undiff.	1 (N)	
Exotic *Lycopodium*	300	
Charcoal 10–25 µm	1	
Charcoal 26–50 µm	2	
Charcoal 51–100 µm	1	
Charcoal 101+ µm	0	
Preservation data sample 2		
Normal	153	48
Corroded	33	11
Degraded	5	2
Crumpled	106	33
Split	17	6

Preservation key: N, normal; Co, corroded; De, degraded; Cr, crumpled; Sp, split.
Glossary: *Alnus*, alder; Ericaceae, heathers; Cyperaceae, sedge family; Rosaceae, rose family; Umbelliferae, wild carrot family; Plantaginaceae, plantain; *Filipendula*, meadowsweet; Filicales, ferns; Coryloid, hazel/bog myrtle; *Gramineae*, grasses; *Ranunculus*, buttercup; *Potentilla*, cinquefoil; *Rumex acetosella / tosa*, sorrel/dock; Plantaginaceae, plantain; *Plantago lanceolata*, ribwort plantain; Compositae, daisy family; *Pteridium*, bracken.

determined, the environment inferred is open, probably a mixture of damp grassland and heather. It is suggested on the basis of the available data that a likely source for this material would have been an open area of peaty ground.

The presence of two grains of cereal-type pollen in sample 2 may indicate that cereal cultivation was occurring close to the original site of the deposit. However, both of the cereal-type grains identified (after Anderson 1978) fell within the *Hordeum*-type category. A number of wetland grasses also fall within this size category. It is considered likely that the cereal-type pollen recorded may have come from a naturally occurring wetland grass.

The occurrence of microscopic charcoal in sample 2 may reflect the occurrence of fires in the vicinity of the source area of this deposit. Alternatively, the charcoal could have become incorporated into the sample during the construction of the cairn.