

## DUNADD ARCHIVE

### SECTION 3: ANALYSIS AND SPECIALIST REPORTS

#### *3.5 Pollen and macroplant remains*

*By R Cole*

Waterlogged material was collected during the excavation of the fissure/water tank on the summit of Site 1 (context 45B, sample 2136) and subjected to flotation for the extraction of charred plant remains. The residue (referred to here as D2) was retained and bagged separately from the floated fraction (referred to here as D1). Each of these was examined for macro-remains and subsample D2 was prepared for pollen analysis.

#### **Macrofossil evidence**

10 cubic centimetre samples were taken from both D1 and D2, volumetrically (i.e. by displacement in water). The samples were soaked for 16 hours in a solution of 5 percent sodium hydroxide and then sieved through a 180 µm mesh. The residues were suspended in water and examined under a lower power binocular microscope.

The results are given in Table 1. The actual numbers of seeds in each sample are given but charcoal and wood fragments are expressed on a relative abundance scale of rare, occasional, frequent and abundant. No attempt was made to identify the seeds of *Juncus* and *Hordeum* to species.

**Table 1: Macroplant remains from Site 1(45)**

#### **D1**

<i>Urtica dioica</i> (stinging nettle)	8
<i>Juncus sp.</i> (rush)	2
<i>Hordeum sp.</i> (barley)	1
Charcoal	abundant (2 oak? fragments)
Wood	occasional (1 oak? fragments)

#### **D2**

<i>Urtica dioica</i>	2
<i>Juncus sp.</i>	6
<i>Ranunculus flammula</i> (lesser spearwort)	1
<i>Samolus valerandi</i> (brookweed)	1
Charcoal	abundant

Both samples had a high inorganic component (although this was not quantified), consisting mainly of quartz with the occasional fragment of mica-schist. The fragments were not particularly rounded and poorly sorted, suggesting that they had not travelled very far. No insect remains were found in the macrofossil analysis but a single beetle wing case was found amongst the residue from sieving in the pollen preparation of D2.

Taken together the results are not particularly informative. The presence of *Juncus sp.*, *Ranunculus flammula*, and *Samolus valerandi*, indicate wet conditions. The latter grows mostly near the sea and the seed of *Ranunculus flammula* may belong to the subspecies *scoticus* whose general habitat is gravelly lake margins in north England, Scotland and Ireland. The presence of *Urtica dioica* may be taken as an indicator of disturbed and nutrient- (in this case phosphorus) enriched soils. Its seeds may have been washed in or reached the deposit by artificial means. The latter is suggested by the presence of charcoal (two fragments tentatively identified as oak) and the *Hordeum* seed, which indicate that the deposit has an allochthonous component (i.e. one transported from elsewhere) and this component may be of human origin. The single wood fragment tentatively identified as oak is another probably allochthonous species. It is possible that *Urtica* was growing in response to a piece of wet ground, possibly a wet channel or flush, being used as a dump for waste material from a settlement.

### Pollen analysis

A few grams of the D2 material was prepared for pollen analysis. A standard preparation technique was used. Due to the high mineral component the sample required treatment with hydrofluoric acid. The sample was treated with cold hydrofluoric acid for 15 hours, but since mineral matter remained, the sample was further subjected to a treatment with hot hydrofluoric acid for 2 hours. Identification was based upon the key produced by Moore and Webb (1978) and 500 'dry land' pollen grains (D.L.P.) were counted.

The results are given in Table 2. They are expressed as the actual number of grains/spores of each type counted, and as a percentage of total dry land pollen. A plus sign in the results indicates that the type was found in scanning a slide but has not been included in the total counted. The different types identified have been classified as trees, shrubs, herbs, and cryptogams but within each group the order given is simply taxonomic.

In any case, caution is required in the interpretation of pollen data, and in this particular case I do not think that a detailed interpretation of the results can be sustained for several reasons. Firstly, it is a single sample and that from a general collection of material from the base of the waterlogged deposit which may have been disturbed and which formed in an unknown period of time. Secondly, flotation of the sample is likely to have resulted in a loss of pollen. However, the fairly high pollen concentration and reasonable preservation encountered would suggest that a securely stratified vertical sequence could be usefully sampled in the future.

Bearing in mind the above a few general points can be made. With the exception of alder, which may have been growing locally, tree pollen is low, suggesting an open landscape and grazing pressure is one factor which would have prevented forest regeneration. Types such as *Plantago lanceolata* and *Pteridium aquitinum* suggest pastoral agriculture but these could have been growing on waste land or on the uncultivated borders of arable fields, and are in any case present in very small quantities. Cereal type pollen is present suggesting arable agriculture in the area but it is possible that the pollen was carried to the sedimentation site by humans and its presence may not, therefore, be taken as proof of local cultivation. Types such as *Artemisia* and *Sinapsis* are often quoted as arable indicators but may have been growing on disturbed land that had not been tilled.

The presence of *Fagus* pollen suggests a late date for the deposits. The distribution maps produced by Godwin (1956) for sites where *Fagus* pollen has been found, show only one site in Scotland where the pollen is from a zone VIIa horizon, and that where the pollen was only found in scanning a slide. In zone VIIb, there are several sites where *Fagus* pollen occurred during scanning and with a frequency of up to 2 per cent. There is a further increase in the number of sites in zone VIII, with one having *Fagus* pollen with a frequency of 2-5 per cent. The Dunadd deposit therefore probably belongs to a time period later than the beginning of zone VIIb (1010 ± 80 b.p., Hibbert and Switzer, 1976) and is most likely to belong to zone VIII.

**Table 2: pollen from Site 1(45)**

<b><u>Identification</u></b>	<b>Number</b>	<b>% D.L.P.</b>
<b>Trees</b>		
<i>Pinus sylvestris</i> (Scots pine)	+	-
<i>Betula</i> (birch)	10	2
<i>Alnus</i> (alder)	123	24.6
<i>Fagus sylvatica</i> (beech)	2	0.4
<i>Quercus</i> (oak)	20	4
<i>Fraxinus excelsior</i> (ash)	1	0.2
<b>Total Tree Pollen</b>	<b>156</b>	<b>31.2</b>
<b>Shrubs</b>		
<i>Corylus avellana</i> (hazel)	69	13.8
<i>Salix</i> (willow)	1	0.2
<i>Calluna vulgaris</i> (ling)	75	15
<b>Total Shrub pollen</b>	<b>145</b>	<b>29</b>
<b>Herbs</b>		
<i>Ranunculus</i> type (buttercup type)	3	0.6
<i>Sinapsis</i> type (charlock type)	+	-
<i>Trifolium</i> type (clover type)	1	0.2
<i>Lotus</i> type (trefoil type)	3	0.6
<i>Astragalus</i> type (milk-vetch type)	2	0.4
<i>Vicia cracca</i> type (tufted vetch type)	1	0.2
<i>Filipendula</i> (meadowsweet)	4	0.8
<i>Rosaceae</i> (rose family)	1	0.2
<i>Sedum</i> (stonecrop)	1	0.2
<i>Rumex acetosa</i> (common sorrel)	4	0.8
<i>Digitalis purpurea</i> (foxglove)	+	-
<i>Stachys</i> type (woundwort type)	5	1
<i>Plantago media/major</i> (hoary/great plantain)	1	0.2
<i>Rubiaceae</i> (bedstraw family)	1	0.2
<i>Artemisia</i> (mugwort)	2	0.4
<i>Compositae, Luguliflorae</i> (dandelion group)	1	0.2
<i>Allium</i> type (garlic type)	+	-
<i>Cyperaceae</i> (sedge family)	15	3
<i>Gramineae</i> (grass family)	149	29.8
<i>Cerealia</i> type (cereal type)	4	0.8
<b>Total Herb Pollen</b>	<b>199</b>	<b>39.8</b>
<b>Cryptogams</b>		
<i>Pteridium aquilinum</i> (bracken)	1	0.2
<i>Polypodium vulgare</i> (polypody)	1	0.2
<i>Filicales</i> (ferns)	11	2.2
<i>Sphagnum</i>	+	-