



**Biodiversity Duty:
Bryophyte Biodiversity of
National Woollen Museum, Dre-fach**



Katherine Slade
Department of Biodiversity and Systematic Biology,
National Museum Wales
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Introduction

From 1 October 2006, all public authorities in England and Wales have a duty to have regard to the conservation of biodiversity in exercising their functions (Section 40 of the Natural Environment and Rural Communities Act 2006). As part of the Museum's response to this legislation, biodiversity audits are being carried out at a series of its sites. In this report, a bryophyte list is presented from a survey of the grounds of the National Woollen Museum in 2009.

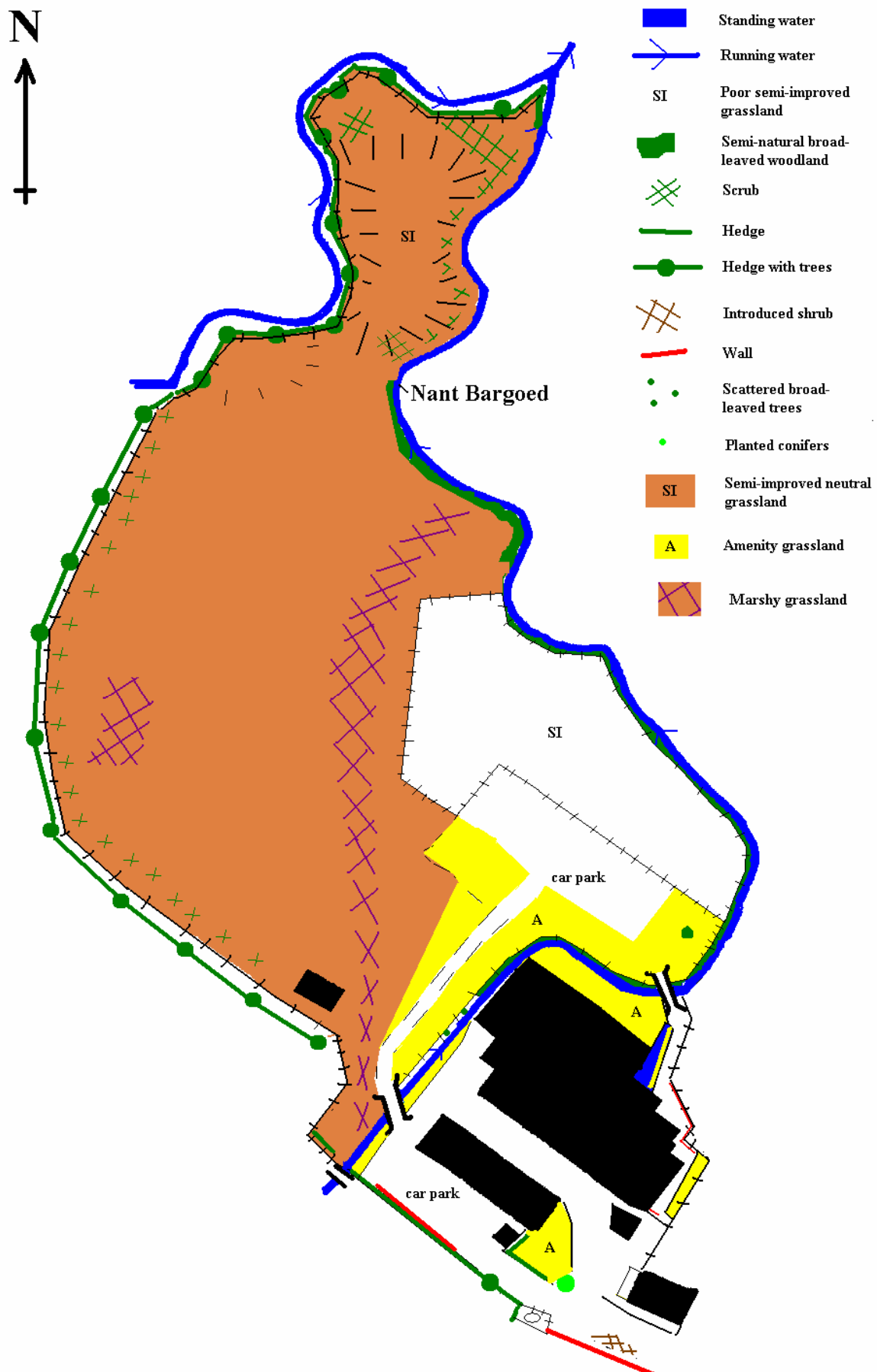
Method

One trip was made to the site on 2nd April 2009. A brief survey was done, targeting the different habitats to get a general view of the bryophyte flora. The roofs of buildings were not surveyed for bryophytes. Identifications were done using Smith (2004), Paton (1999) and the unpublished draft version of the British Bryological Society Field Guide, with determinations where needed confirmed by Alan Orange.

Results

The results of the bryophyte survey should be used in conjunction with the Phase 1 habitat survey map, figure 1, page 3.

Figure 1. Phase 1 habitat map of National Wool Museum, Drefach.



Annotated Species List

All species found were listed as common in the Mosses and Liverworts of Carmarthenshire (Bosanquet et al 2005). The species with an asterisk were recorded in this tetrad in the flora.

1. *Atrichum undulatum* – Common on shaded soil bank above the river Nant Bargoed.
2. *Barbula unguiculata* - In obvious mounds in between curb-stones by the road, one of the commonest mosses to be found in this habitat in Carmarthenshire (Bosanquet et al 2005).
3. *Brachythecium rutabulum* - Common amongst the mown and rough grass, often the dominant species. Also found on the trunk of a tree.
4. *Bryum argenteum* – Fairly common in small tufts, often fruiting abundantly, on calcareous mortar and old tarmac on the site. This is a nitrophilous species common in built up areas. Associated with *Orthotrichum cupulatum* ad *Hypnum cupressiforme*.
5. **Bryum capillare* – Common on trees, rocks and old tarmac, one of the commonest mosses in Carmarthenshire.
6. *Calliergonella cuspidata* – Some on shaded soil bank and amongst mown lawn, it is likely to be in a range of other habitats on the site.
7. *Chiloscyphus pallescens/polyanthos* – One large patch on frequently submerged tree root in Nant Bargoed river.
8. *Conocephalum conicum* - On soil bank above river, densely shaded. Dominant patch.
9. *Didymodon vinealis?* – On old tarmac and in crevices of limestone blocks along river. This is a calcicole. (In flora - rare in Wales, much more likely to be *D.rigidulus*).
10. *Fissidens taxifolius* – On bare patches of soil around car park and on Nant Bargoed river bank.
11. *Fontinalis antipyretica* var. *antipyretica* – On one submerged tree root in fast flowing river. Indicates the river is not very acidic.
12. *Frullania dilatata* - Common on branches and trunks of trees lining the river.
13. *Grimmia pulvinata* – A few scattered clumps on limestone blocks lining the river. This is one species which has increased in Carmarthenshire due to the use of cement in mortar on walls.
14. *Hygrohypnum ochraceum* - On one submerged tree root in fast flowing river. Indicates the river is not very basic.
15. *Hypnum andoi?* – Low down on the trunk of *Alnus glutinosa*.
16. *Hypnum cupressiforme?* - On twigs of oak by entrance to car park.
17. *Isoetecium myosuroides* var. *myosuroides* – Dominant patch on bole of tree and on shaded soil bank above river.
18. *Lunularia cruciata* - Fairly common on bare soil along the river bank where there is less shading. Also in the crevices of the limestone blocks alongside the river.
19. *Metzgeria furcata* – Common on branches and trunks of trees lining the river
20. *Orthotrichum affine* – On *Salix* sp. above river. The commonest *Orthotrichum* species in Carmarthenshire to grow on trees.
21. *Orthotrichum cupulatum* – On low red brick wall by the car park. *Orthotrichum anomalum* is expected as the commonest *Orthotrichum* on walls, *O.cupulatum* is noted only as occasional in Carmarthenshire (Bosanquet et al 2005).
22. *Rhizomnium punctatum* – On soil bank above river, densely shaded.
23. **Rhytidiadelphus squarrosus* – Common amongst mown and rough grass. The only bryophyte found in the damp grassy area with lots of reeds
24. *Scapania undulata* – One clump on a partly submerged metal rod in the fast flowing part of Nant Bargoed river. This may indicate the river is not eutrophic.
25. *Schistidium apocarpum* s.s. - Abundant in rounded clumps on limestone blocks.
26. *Tortula muralis* var. *muralis* – On calcareous rocks and mortar throughout the site, often the dominant species. It can also be found on the tarmac in the car park.
27. *Ulota bruchii* - Common on branches and trunks of trees lining the river.

Habitats

Soil

In the barer patches of grass directly under trees, there is a patch of *Atrichum undulatum*. *Calliergonella cuspidata* and *Fissidens taxifolius* can be found on bare soil around first car park and drive.

Tarmac

The silvery tufts of *Bryum argenteum* are found occasionally amongst other bryophytes such as *Tortula muralis*, *Didymodon unguiculata*, *Bryum capillare* and *Didymodon vinealis*(?) on breaking up tarmac on the edge of the car park.

Grass Areas

Mown grass areas including the patches between the block paving of the second car park and the amenity grassland, hold common weedy lawn species such as *Brachythecium rutabulum* sometimes in large patches becoming dominant. *Rhytidiadelphus squarrosus* is also abundant throughout the mown grass area. In the damp meadow with reeds, bryophytes are scarce, only *Rhytidiadelphus squarrosus* can be found in very occasional clumps.

Museum Buildings and Walls

Typical bryophytes of walls are found growing on the calcareous mortar in between stones of buildings and walls. On a low red brick wall *Bryum argenteum* tufts can be seen through other bryophytes growing on the mortar, including *Orthotrichum cupulatum*. On the old wall of the original(?) mill building *Tortula muralis* var. *muralis* is dominant. *Barbula unguiculata* is in obvious mounds in between curb-stones by the road leading to the first car park; it shares this habitat with small tufts of *Tortula muralis* var. *muralis*.

Trees

Almost all the trees on the site line the river. These are small trees of mainly *Salix* spp and also *Alnus glutinosa*. Due to the high humidity from the river, the trees hold a strong epiphytic bryophyte community. *Frullania dilatata*, *Metzgeria furcata* and *Ulota bruchii* are common on the branches and trunks of trees. In addition *Orthotrichum affine* can also be found on *Salix* spp and an *Alnus glutinosa* holds *Hypnum andoi* (?) low down on its trunk. *Metzgeria furcata* is abundant with some tufts of *Bryum capillare* on the dead tree trunk on the somewhat sandy bank on the bend of the river.

Away from the river are a couple of planted trees surrounding the first car park. These support mostly mosses growing at tree boles such as _____. *Hypnum* sp is growing on the acidic twigs of a *Quercus* sp by entrance to car park.

River

The river is fast flowing, and has been dammed in the section next to the museum building by large limestone blocks, creating a vertical bank about 1.5 m high. The blocks were replaced in one section recently to prevent flooding in the nearby museum buildings and therefore hold less bryophytes.

The limestone blocks that have been at the site for some time, hold a good bryophyte population. Blocks that are shaded by trees or by the museum buildings hold the most species. Fruiting *Schistidium apocarpum* is abundant in rounded clumps on the blocks. There are a few scattered clumps of *Grimmia pulvinata* with capsules. *Tortula muralis* is less common and found growing higher up on the blocks. Fruiting *Ulota bruchii/crispa* is abundant in small to large patches. Growing in the crevices of the limestone are *Lunularia cruciata*, *Tortula muralis* and some *Didymodon vinealis*(?). *Scapania undulata*, a species also usually found growing on rocks in streams is growing on a eroding metal rod, partially submerged in the river on the opposite bank to main museum building.

Scattered throughout the riverbed, there are small rocks or stones that were not stable enough for bryophytes. These hold abundant algae, indicating perhaps that the river is eutrophic, although the presence of *Scapania undulata* would indicate otherwise. The algae would almost certainly restrict bryophyte growth.

Elsewhere the river has some low silty banks and some steep, eroding soil banks. The eroding soil banks were difficult to access and eroding fast so unlikely to hold any bryophytes. Where the soil banks became more stable and there is shading from trees, bryophytes such as *Calliergonella cuspidata*, *Fissidens taxifolius* and *Atrichum undulatum* are common. There is a dominant patch of *Conocephalum conicum* on the soil bank under dense shade of birch trees above the river. *Rhizomnium punctatum* can be found in small amounts in amongst *Isoetecium myosuroides* var. *myosuroides* which forms a dominant patch directly below tree trunks on bare soil.

A frequently submerged tree root in the river, shaded by trees is covered with two species, *Fontinalis antipyretica* and *Hygrohypnum ochraceum*, the former indicating the river is not very acidic, the latter indicating it is not very basic. Higher up on this tree root, is a large patch of *Chiloscyphus pallescens/polyanthos* which presumably prefers less inundation than the other two species.

Recommendations

No previous survey has been made on the National Woollen Museum site before. In fact, the Flora of Carmarthenshire (Bosanquet et al 2008) only lists 10 species from that tetrad. This was only a brief survey to establish common bryophytes and is by no means comprehensive. Most of the habitats on the museum site are unremarkable. However, the river is the most important contributing factor to the bryophyte flora either directly by creating aquatic habitats, or by raising humidity for nearby habitats such as on the *Salix* trees lining the river and the soil banks. The recent disturbances to the riverine habitat may have meant a temporary reduction in bryophytes on the boulders lining the river, but these will no doubt re-establish in time from the area surrounding the museum, which is rich in native deciduous woodland and riverine habitats.

Although there were no significant finds amongst the bryophytes, the most valuable habitat in terms of species richness (apart from the man-made habitats) are the river banks. It would therefore be recommended that the river and trees lining it be kept to maintain the river banks.

There has been a decline in the bryophyte species growing on walls and buildings in Carmarthenshire (Bosanquet et al 2008). This is due to the increase in use of cement for building walls and buildings and the decrease in use of limestone mortar. To stop the decline in these bryophytes, it would be recommended that where possible any re-pointing of the museum building be done with limestone mortar rather than cement.

References

- Bosanquet, S D S, Graham, J and Motley, G (2005) *The Mosses and Liverworts of Carmarthenshire*.
Paton (1999) *The Liverwort Flora of the British Isles*. Harley Books.
Smith A.J.E. (2004) *The Moss Flora of Britain and Ireland*. Second Edition. Cambridge University Press.