

## Findhorn Hinterland bryophyte survey

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### Summary

The survey recorded 51 bryophyte taxa on the site, (39 mosses and 12 liverworts, listed in Annex 1) which is a respectable total for a small lowland site on the eastern side of Scotland with a limited range of habitat. Almost all of the species are very common in the area and the flora is very similar to parts of Culbin Forest just across the bay. There are attractive swards of *Rhytidiadelphus triquetrus* in the woodland and interesting species in the dune heath including *Tetraplodon mnioides* and *Scapania compacta*, both with few records in lowland north-east Scotland

### Bryophyte habitat on the site

The site is relatively small and there are a limited number of habitats for bryophytes. Much of the site is either plantation woodland, both conifers and broadleaves, the latter mostly quite recent, or gorse scrub. The open areas running through the gorse on the seaward side of the woodland have linear patches of dune heath with *Calluna vulgaris* and *Erica cinerea*. There is a limited amount of grassland, heavily grazed in the 'horse paddock' and rough elsewhere. There are numerous paths and tracks running through the area, well used by walkers, and the more open ground on these provides a habitat for some bryophytes and there are also some overgrown excavated ponds.

### Description of the bryophyte flora

**Woodland.** There is a considerable bryophyte biomass on the floor in both the coniferous and broadleaf woodland but diversity is limited. By far the two most abundant species are

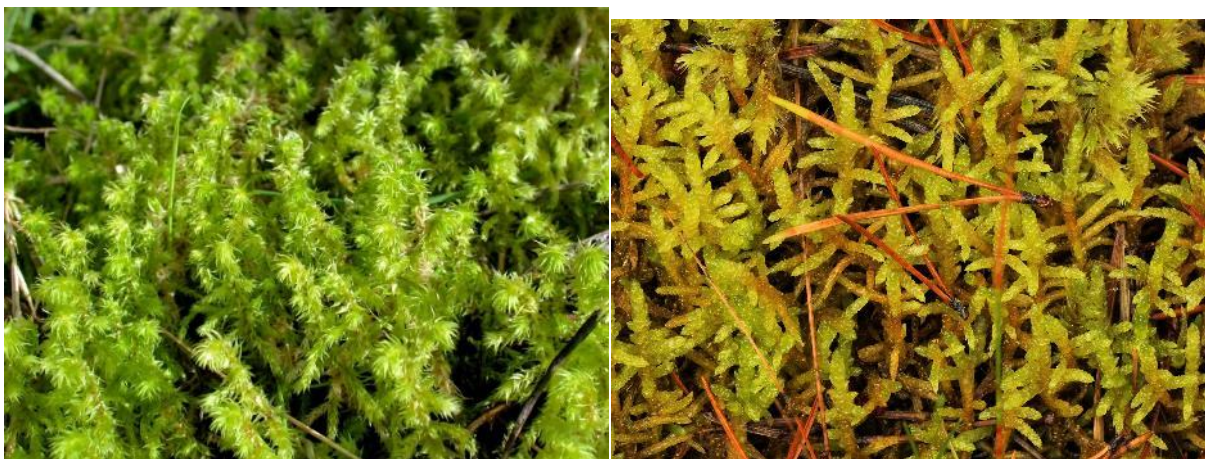


Figure 1. *Rhytidiadelphus triquetrus* (GPR) and *Pseudoscleropodium purum* (AWF)

*Rhytidiadelphus triquetrus* and *Pseudoscleropodium purum* (Figure 1), often forming pure swards or dense patches in amongst the sparse grasses. Very locally there are small amounts of *Kindbergia praelonga* and *Lophocolea bidentata* and on open and firmer ground, *Dicranum scoparium*.

Along the seaward edge of the woodland the trees are lower and there is more fallen wood giving a much more sheltered and humid habitat. *Rhytidiadelphus triquetrus* and *Pseudoscleropodium purum* still prevail here but there is also frequent *Plagiothecium undulatum*, some *Lepidozia reptans* and *Lophozia ventricosa* and in one place *Sphagnum rubellum*, the only place *Sphagnum* was seen on the site. The bryophyte flora on the dead wood and stumps is disappointing with many logs completely bare but *Hypnum cupressiforme* var. *cupressiforme* is relatively frequent as is *Lophocolea bidentata* and *Nowellia curvifolia* occurs on at least one log. On the frequent root-plates where there is some organic soil, the invasive *Campylopus introflexus* (Figure 2) is abundant and often dominant along with some *Polytrichastrum formosum*, *Campylopus flexuosus* and *Ceratodon purpureus*.



**Figure 2. *Campylopus introflexus* (AWF)**

The epiphytic flora is also rather limited. It is best developed on the scattering of mature elders (Figure 3) on the site where the nutrient-rich bark gives a productive substrate for an abundance of *Orthotrichum affine* which often covers most of the branches. There are smaller amounts of *Orthotrichum diaphanum* and *Orthotrichum pulchellum* and very locally *Brachythecium velutinum*. Older birches have some *Hypnum cupressiforme* var. *cupressiforme* and may have *Brachythecium rutabulum* at the base and rarely *Ulota bruchii* and *Zygodon viridissimus*.

The gorse scrub has very limited bryophyte interest.

**Grassland.** The rough grassland is often so coarse that it has no bryophytes but in more open swards there is frequent *Rhytidiadelphus squarrosus* and further stands of both *Pseudoscleropodium purum* and *Rhytidiadelphus triquetrus*. The heavily grazed grassland in the paddock has a good bryophyte cover in the open patches but the grazing pressure and the eutrophication again means that diversity is limited to an abundance of *Ceratodon purpureus* and *Campylopus pyriformis* with occasional patches of *Brachythecium rutabulum* and stems of *Polytrichastrum formosum* and *Polytrichum juniperinum*. The created ponds in the eastern part of the site are also mostly grassed over but one remains wet enough for a good stand of *Calliergonella cuspidata*.





**Figure 3. Old elders covered in bryophytes (GPR)**

**Dune Heath.** The dune heath is acidic and below the shrub layer the moss carpet is dominated by *Hylocomium splendens* and, less frequently, *Pleurozium schreberi*. The more open patches of the heath next to the paths and tracks have a more diverse flora,



**Figure 4. Dune heath amongst the gorse (GPR).**

particularly on the firmer and steeper banks. Here dense patches of the liverwort *Scapania compacta* (Figure 5) usually with perianths, are common at the edge of the heath along most of the tracks. Often with this are looser patches of another liverwort, *Barbilophozia hatcheri* (Figure 7) often with red gemmae at the apex of the stems. Less frequent and easily



overlooked are small patches of *Lophozia bicrenata* and *Lophozia excisa* and again both of these liverworts may have red gemmae.



**Figure 5. *Scapania compacta* (GPR) and *Tetraplodon minioides* (GPR)**

The popularity of the site with local dog-walkers means that there is an abundance of suitable habitat for perhaps the most interesting species on the site, *Tetraplodon mnioides* (Figure 5). This is usually a species growing on fox scats and carrion up in the hills but here occurs on dog poo in at least two places. This moss is a member of an interesting group of montane and arctic species with fruiting bodies that release pheromones that attract flies and uniquely have sticky spores which adhere to the flies and so are transferred to other suitable substrates.



**Figure 6. *Brachythecium albicans* (GPR) and *Racomitrium ericoides* (GPR).**

The more open sand dunes and the bare sand and gravel in open areas amongst the gorse have large patches of *Racomitrium ericoides* (Figure 6), a whitish-green turning grey when dry, a typical coloniser of acidic sands and gravel on tracks. On the firmer sand towards the east of the site there are frequent patches of another typical species of open dunes in *Brachythecium albicans* (Figure 6).

### Evaluation of the bryophyte interest

The survey recorded 51 taxa on the site, (39 mosses and 12 liverworts, listed in Annex 1) which is a respectable total for a small lowland site on the eastern side of Scotland with a limited range of habitat. Almost all of the species are very common in the area and the flora is very similar to parts of Culbin Forest just across the bay. The most unexpected species is *Tetraplodon mnioides* but the dog-walkers make sure that there is no shortage of suitable habitat. The abundance of *Scapania compacta* was also unexpected and there are few records for this species in lowland Grampian. Much the same is true of *Lophozia bicrenata* and *Lophozia excisa* and to a lesser extent, *Barbilophozia hatcheri*; lack of suitable habitat plays its part but the low level of bryological recording in the area is also significant. The poor flora on the dead wood was disappointing but this may improve as the broadleaf woodland develops and humidity levels increase. Some removal of the dense gorse scrub would substantially increase the area available to bryophytes and presumably also the important lichen flora.



Figure 7. *Barbilophozia hatcheri* (AWF)



**Annex 1: Bryophyte species list for Findhorn Hinterland**

**Mosses (39 taxa)**

Amblystegium serpens  
Barbula convoluta var. convoluta  
Brachytheciastrum velutinum  
Brachythecium albicans  
Brachythecium rutabulum  
Bryum capillare  
Calliergonella cuspidata  
Campylopus flexuosus  
Campylopus introflexus  
Campylopus pyriformis  
Ceratodon purpureus  
Dicranum scoparium  
Didymodon insulanus  
Hylocomium splendens  
Hypnum cupressiforme var. cupressiforme  
Hypnum cupressiforme var. resupinatum  
Hypnum jutlandicum  
Hypnum lacunosum  
Kindbergia praelonga  
Orthotrichum affine  
Orthotrichum diaphanum  
Orthotrichum pulchellum  
Plagiothecium undulatum  
Pleurozium schreberi  
Pohlia nutans  
Polytrichastrum formosum  
Polytrichum commune

Polytrichum juniperinum  
Polytrichum piliferum  
Pseudoscleropodium purum  
Racomitrium ericoides  
Rhytidiadelphus squarrosus  
Rhytidiadelphus triquetrus  
Sciuro-hypnum populeum  
Sphagnum capillifolium s.l.  
Tetraplodon mnioides  
Thuidium tamariscinum  
Ulota bruchii  
Zygodon viridissimus var. viridissimus

**Liverworts (12 taxa)**

Barbilophozia hatcheri  
Cephalozia bicuspidata  
Cephaloziella divaricata  
Frullania dilatata  
Lepidozia reptans  
Lophocolea bidentata  
Lophozia bicrenata  
Lophozia excisa  
Lophozia ventricosa  
Nardia scalaris  
Nowellia curvifolia  
Scapania compacta