

Markstakes Common: monitoring restoration of glades in Compartments 10 (the Mire) and southern end of 2 (The Birch Glade)

Introduction

One of the aims of management of Markstakes Common is to restore glades to improve the habitat for invertebrates in the areas that appear to be relict wood-pasture.

While several glades have been created in Compartment 6, the establishment of ground vegetation of only one (Birch Glade) is being monitored currently. An area of dense young birch and bracken in Compartment 6 was cleared of birch between 28 October 2008 and 28 January 2009. Birch stumps were treated with herbicide, and bramble and bracken were cleared by hand at intervals throughout the summer of 2009. Some straggly adult specimens of heather were revealed at the north-western end but the ground vegetation otherwise consisted almost entirely of bramble and bracken.

The Mire in Compartment 10 was almost inaccessible, having dense vegetation of birch, willow, bramble and bracken. It was cleared during 2008/09 and 2009/10, with birch and willow being felled and treated with herbicide and bracken and bramble being cleared by hand at intervals throughout the summer. The clearance revealed tussocks of derelict *Molinia caerulea* plus a small area where the *Molinia* was healthy and harboured a small patch of *Sphagnum* sp.

Monitoring Methods

Transects

Given time constraints, the most efficient and feasible method of monitoring vegetation in the newly created glades was to establish some permanent transects and record the vegetation as percentage ground cover per species in consecutive 1-m square quadrats. Given more time and resources, it would have been better to record the vegetation in a number of randomly positioned permanent quadrats but positioning these, marking them permanently and relocating them each year would be too time-consuming.

Transects were located as described below.

Birch Glade

Transect A: Starts at oak just 5 m north of finger post to young hornbeam at 22.7 m under oak in wood edge. Recording starts at 2 m and then at consecutive metres to 13 m, placing the 1 sq m quadrats to the left hand side of the tape.

Transect B: Runs NW 310° from oak south of the path to young hornbeam at 29.9 m It starts at 4 m and runs to 27 m, with 1 sqm quadrats placed to the north side of the tape.

Mire

Transect A: Runs from large spreading oak in centre to intersection at 17m30 with transect B. Recording starts at 0 m and runs to 17 m, placing the 1 sq m quadrats to the left of the tape.

Transect B: Runs from small oak near entrance to mire to willow stump. Recording starts at 4m and runs to 18 m, placing 1 sq m quadrats to the right of the tape

In each sq-m quadrat percentage cover of each species was estimated by eye. This is subjective but relatively fast and gives a good enough idea of changes from year to year. Any species that did not make a cover value of at least 5% was given an arbitrary value of 4%. The Birch Glade was surveyed on 21 September 2009 and 20 September 2010; the Mire was surveyed on 14 September 2009 and 13 and 17 September 2010.

Species lists

Species lists were compiled for each area and occasional searches made to record any new species.

Results

Birch Glade

Tables 1 and 2 compare the percentage cover of species in years 2009 and 2010 on Transects A and B in the Birch Glade. Some species identification uncertainties made it wise to group some species together.

Table 1 Mean percentage cover of ground flora per m² in 2009 and 2010 in the Birch Glade on Transect A

Species	21-09-2009	20-09-2010	Comments
<i>Agrostis canina</i> , velvet bent/ <i>A. capillaris</i> , common bent	0.5	0.5	No change
<i>Betula pendula</i> , silver birch seedlings	3.3	3.7	Slight increase
<i>Calluna vulgaris</i> , heather seedlings	1.8	2.9	Increase
<i>Calluna vulgaris</i> , mature heather	1	0	Mature heather died
<i>Carex</i> sp., a sedge	0	8.7	Identity to be checked
<i>Dicranium scoparium</i> , a moss	0.4	0.7	
<i>Juncus</i> sp., a rush	0.4	0.7	<i>Juncus effusus</i> ?
<i>Luzula</i> sp., a woodrush	3.6	0.5	Apparent decrease but identity to be checked
<i>Molinia caerulea</i> , purple moor-grass	2.5	2.7	Little change but heavily grazed by rabbits
Moss, several unidentified species	3.8	5.8	Slight increase
<i>Potentilla erecta</i> , tormentil	0.7	1.1	Slight increase
<i>Pteridium aquilinum</i> , bracken	22.7	4.8	Considerable decrease
<i>Quercus robur</i> , pedunculate oak seedling	0.4	0	Seedling removed in 2009
<i>Rubus fruticosus</i> , bramble	7.1	3.5	Decrease.
<i>Salix</i> sp., willow seedlings	1.1	0	Seedlings removed in 2009
<i>Viola</i> sp., violet seedling	0.4	0	
Total cover	49.7	35.6	

Table 2 Mean percentage cover per m² in 2009 and 2010 in the Birch Glade on Transect B

Species	21-09-2009	20-09-2010	Comments
<i>Agrostis canina</i> , velvet bent/ <i>A. capillaris</i> , common bent	1	2.4	Increase
<i>Betula pendula</i> , silver birch seedlings	4.7	3.1	Slight decrease
<i>Calluna vulgaris</i> , heather seedlings	1.6	1.4	Little change
<i>Carex</i> sp., a sedge	0	9	Identity to be checked
<i>Galium saxatile</i> , heath bedstraw	0.7	0.7	No change
<i>Luzula</i> sp., a woodrush	4.2	0.9	Apparent decrease but identity to be checked

<i>Molinia caerulea</i> , purple moor-grass	1.8	1.6	Little change but heavily grazed by rabbits
Moss, several unidentified species	4.4	23.6	Noticeable increase
<i>Potentilla erecta</i> , tormentil	0.7	0.7	No change
<i>Pteridium aquilinum</i> , bracken	28.4	2.7	Considerable decrease
<i>Rubus fruticosus</i> , bramble	16.2	2.9	Decrease.
<i>Salix</i> sp., willow seedlings	0.7	0	Seedlings removed in 2009
<i>Teucrium scorodonia</i> , wood sage	0.2	0.3	Little change
<i>Veronica officinalis</i>	0	0.2	New addition
Total cover	64.6	49.5	

Bramble and bracken species declined most markedly on both transects, which can be explained by their selective removal by hand weeding between the two survey dates. Willow seedlings and birch seedlings were also selectively removed but while willow did not reappear, birch seedlings continued to establish. There were far fewer willow seedlings to start with whereas birch seedlings were numerous and there was an ample seed source nearby.

Moss increased more noticeably on transect B. Other species appeared after clearance in 2009, presumably from the soil seed bank. These, such as heather, the bent grasses, heath bedstraw, tormentil and wood sage – showed little change or increased only slightly in 2010. This could be due to the intrinsic slow growth rate of these species or a poor growing season. Spring was late in 2010 followed by a very dry summer. Purple moor grass showed signs of heavy grazing, presumably by rabbits as evidence by the presence of their droppings. Heath speedwell appeared for the first time in 2010 in one quadrat on transect B.

The apparent decline of woodrush and appearance of *Carex* in 2010 may be due to difficulties with identification and this should be clarified as the plants mature.

The mature heather seen in 2009 as the site was being cleared had disappeared by 2010. Both specimens on the transect had been heavily shaded for some time, were straggly and dead in parts and presumably did not survive the exposure and particularly harsh winter of 2009/2010.

Additional species seen near the transects were trailing St-John's-wort, *Hypericum humifusum* and lesser skullcap *Scutellaria minor*, which had not been recorded on the site previously.

Mire transect

Tables 3 and 4 compare the percentage cover of species in years 2009 and 2010 on Transects A and B in the Mire. Some species identification uncertainties made it necessary to group some species together.

Table 3 Mean percentage cover per m² in 2009 and 2010 in the Mire on Transect A

Species	21-09-2009	17-09-2010	Comments
<i>Agrostis canina/capillaris</i> , velvet/common bent	1.2	8.1	Noticeable increase
<i>Ajuga reptans</i> , bugle	0.8	2.4	Increase
<i>Betula pendula</i> , silver birch seedlings	1.5	3.3	Increase
<i>Carex</i> sp., a sedge	0	0.9	Identity to be checked
<i>Cerastium</i> sp.	0	0.7	New to transect
<i>Cirsium arvense</i> , creeping thistle	0.2	0	Perhaps wrongly identified
<i>Cirsium palustre</i> , marsh thistle	25.8	9.1	Noticeable decrease
<i>Deschampsia caespitosa</i> , tufted hair-grass	0	3	Heavily grazed
<i>Epilobium obscurum</i> , short-fruited willowherb	0	0.7	New to transect
<i>Galium saxatile</i> , heath bedstraw	0.2	0	Disappeared from the one

			quadrat where it was recorded in 2009
<i>Holcus lanatus</i> , Yorkshire fog	4.8	10.8	Increase
<i>Juncus articulatus</i> , jointed rush	3.2	4.3	Slight increase
<i>Juncus effusus</i> , soft rush	0.8	2.2	Increase
<i>Juncus</i> sp., unidentified rush	0.7	0	Individuals easier to identify to species in 2010
<i>Lonicera periclymenum</i> , honeysuckle	0.2	0.2	No change in the only quadrat where recorded
<i>Lotus corniculatus/pedunculatus</i> , common/greater bird's-foot trefoil	0.9	2	Increase
<i>Molinia caerulea</i> , purple moor-grass	10.6	10.9	Little change but grazed
Moss, several unidentified species	10.6	13.9	increase
<i>Plantago major</i> , greater plantain	0	0.2	Unexpected addition
<i>Polygonum</i> sp.	0.7	0	Disappearance
<i>Potentilla erecta/mixta</i> , tormentil/hybrid cinquefoil	1.2	1.6	Little change
<i>Quercus robur</i> , oak seedling	0	0.5	Increase
<i>Ranunculus flammula</i> , lesser spearwort	1.2	3.2	Increase
<i>Ranunculus repens</i>	0.2	0	Disappearance
<i>Rosa canina</i> , dog rose	1.1	0.7	Little change
<i>Rubus fruticosus</i> , bramble	34.0	10.3	Noticeable decrease
<i>Salix</i> sp., willow seedlings	1.6	2.1	Little change
<i>Sambucus nigra</i> , elder seedlings	0.9	0.2	Little change
<i>Scutellaria minor</i> , lesser skullcap	0.5	1.0	Slight increase
<i>Senecio jacobaeae</i> , ragwort	0.5	0.7	Little change
<i>Sphagnum</i> sp.	0.5	0.5	No change
<i>Stellaria alsine</i> , bog stitchwort	0	1.7	New to transect
<i>Veronica serpyllifolia</i> , thyme-leaved speedwell	0	0.2	New to transect
<i>Viola</i> sp. violet	0	0.5	New to transect
Total cover	103.9	95.72	

Table 4 Mean percentage cover per m² in 2009 and 2010 in the Mire on Transect B

Species	21-09-2009	13-09-2010	Comments
<i>Agrostis canina</i> , velevet bent	5.1	13.5	Noticeable increase
<i>Ajuga reptans</i> , bugle	2	3.8	Increase
<i>Betula pendula</i> , silver birch seedlings	0.6	2	Increase
<i>Carex</i> sp., a sedge	0	0.2	Identity to be checked
<i>Cerastium</i> sp.	0	0.7	New to transect
<i>Cirsium vulgare</i> , spear thistle	0	1.7	Identity needs checking
<i>Cirsium palustre</i> , marsh thistle	16.6	17.8	Slight decrease
<i>Deschampsia caespitosa</i> , tufted hair-grass	0.9	2.9	Increase
<i>Epilobium obscurum</i> , short-fruited willowherb	0	0.7	New to transect
<i>Galium saxatile</i> , heath bedstraw	0.6	1.3	Slight increase
<i>Holcus lanatus</i> , Yorkshire fog	4.4	10.2	Increase
<i>Juncus articulatus</i> , jointed rush	3.2	5.6	Increase
<i>Juncus effusus</i> , soft rush	0.6	1.2	Increase
<i>Lotus pedunculatus</i> , greater bird's-foot trefoil	0.3	2.7	Increase
<i>Molinia caerulea</i> , purple moor-grass	14.4	11.2	Decrease but grazed
Moss, several unidentified species	1.2	3.4	Increase
<i>Potentilla erecta</i> , tormentil	0	0.5	New to transect
<i>Pteridium aquilinum</i> , bracken	1	0.6	Little change
<i>Quercus robur</i> , oak seedling	0	0.5	Increase

<i>Ranunculus flammula</i> , lesser spearwort	2.1	6.4	Increase
<i>Ranunculus repens</i>	0	0.5	New to transect
<i>Roda canina</i> , dog rose	1.1	0.7	Little change
<i>Rubus fruticosus</i> , bramble	54.0	18.7	Noticeable decrease
<i>Salix</i> sp., willow seedlings	0.9	4.2	Increase
<i>Scutellaria minor</i> , lesser skullcap	0.9	1.8	Increase
<i>Senecio jacobaeae</i> , ragwort	1.4	0.6	Slight decrease
<i>Sonchus asper</i> , prickly sow-thistle?	0	0.7	Identify needs checking
<i>Succisa pratensis</i> , devil's-bit scabious	1.6	1.42	Little change
<i>Total cover</i>	112.9	115.52	

Eleven additional species were recorded on both transects in 2010 compared with 2009: *Carex* sp. (A & B), *Cerastium* sp. (A), *Cirsium vulgare* (B), *Epilobium obscurum* (A & B), *Ranunculus repens* (B), *Rumex acetosa* (A), *Sonchus asper* (B), *Plantago major* (A), *Stellaria alsine* (A), *Viola* sp. (A), *Veronica serpyllifolia* (A).

There was not much change in the cover of some species between the years: *Molinia caerulea* and *Sphagnum* sp. But the summer of 2010 was unusually dry and both these species require moist conditions.

The most noticeable decline was in bramble, which was due to its removal by hand between the two survey dates.

It was encouraging to see noticeable increasing cover of unidentified mosses, Yorkshire fog and bent grasses as well as slight increases in the cover of the 'desirable' forbs such as tormentil, lesser spearwort and lesser skullcap.

Conclusion

Overall the vegetation cover in the mire and the birch glade transects had not changed much in the year between the two survey dates. The percentage cover exceeded 100% in some cases but this is due partly to species overlapping and partly due to the subjective assessment of percentage cover.

Grazing may have resulted in declines in cover of some species, such as the grasses *Molinia caerulea* and *Agrostis* sp., between the two survey dates. On the more there was evidence of deer grazing *Juncus* spp.

Species richness increased in both the mire, with 11 additional vascular plant species recorded and in the birch glade, with one, possible two, additional vascular plant species recorded.

The decline of bramble in both areas and of bracken in the birch glade was due to removal by regular slashing and hand pulling in the months between the two survey dates.

In future surveys, percentage cover of bare ground as well as species will be assessed on all transects.

Consideration should be given to erecting experimental enclosures in both areas to investigate the effects of deer and rabbit grazing on the vegetation.

Jacqui Hutson, 15 March 2011