

Observations on the disappearance of *Saxifraga hirculus* (Yellow Marsh Saxifrage)

Whilst working on the effects of excluding sheep grazing on the Moor House National Nature Reserve in the northern Pennines under the late Michael Rawes I first became aware of the importance grazing and trampling plays in retaining the diversity of species in some of the richer high level flushes of the NVC type MG38, many of which contain the rare and internationally protected species *Saxifraga hirculus*. Different upland vegetation types had exclosures erected in the late 1950's and early 1960's with control plots alongside to monitor the effects of the removal of grazing and these are still monitored by CEH staff today.

An exclosure was erected over Johnny's Flush, up Moss Burn to the south-west of the Moor House Field Station, a flush with a good population of *Saxifraga hirculus*. Outside the exclosure the top and bottom of the flush open to grazing remained the same but within 3 years the enclosed flush had been overwhelmed mainly by the vigorous growth of *Geum rivale* (Water Avens) and *Filipendula ulmaria* (Meadow-sweet) the Saxifrage had been shaded out and had totally disappeared. This situation was still the same when the flush was visited again by myself in 2010. This was mentioned in the paper by Welch, D. & Rawes, M. (1964) The Early effects of excluding sheep from high-level grasslands in the North Pennines., *Journal of Applied Ecology*, 1, 281-300. Also mentioned was the resultant build up of litter in the exclosures and an 8% drop in the species diversity over the first 10 years clearly indicating how important grazing and trampling are. (Note – in 2013 flush visited again by LR and Chris McCarty, Warden MHNRR, the exclosure now open to sheep and *Sax hirculus* inside the exclosure, apparently recolonizing from the lower edge where plants are present outside, just 1 flower apparent about 8 inches in from fence !)

Saxifraga hirculus can withstand phenomenally high grazing pressures, whilst recording for the Flora of Cumbria around 1995 (when grazing levels were ridiculously high) I came across a heavily grazed tufa flush below the Bulman Hills, it was almost completely devoid of vegetation, just gravelly tufa granules and shoots of *Saxifraga hirculus* still managing to produce flowers. Visiting this flush again in 2005 it was completely recovered and re-vegetated still with a good amount of *Saxifraga hirculus*, mainly due to the lowering of sheep numbers after foot and mouth in 2001.

In 1999 one of the twin *Saxifraga hirculus* flushes in Knock Ore Gill was fenced off. The following year I assisted the late Peter Kelly with the monitoring (point quadrats) on both flushes. In the following decade the resulting growth and apparent demise of the Saxifrage inside the exclosure was giving me cause for concern so in 2009 I repeated the mapping of the extent of the *Saxifraga hirculus* flushes again, done originally by Peter before the fence was up in 1997. The flush in the exclosure had been reduced by shading out by almost 75% (it would probably have been nearer 100% if not for the parasitizing effects of a patch of *Pedicularis palustris* (Marsh Lousewort) which seemed to be affecting the rest of the vegetation but not the Saxifrage) but the grazed flush outside was the same as it had been in 1997. Unfortunately one of the best *Saxifraga hirculus* flushes in the Pennines on the southern slopes of Burnhope Seat has also been fenced off.

Later in 2001 when we were allowed back on the fells after foot and mouth I did some repeat point quadrats on the Knock Ore Gill site, every morning the only 17 sheep left on the fells (they had missed being gathered the previous autumn so when all the other fell sheep down on the farms were culled during the foot and mouth outbreak they escaped) would be grazing the unfenced flush and the other MG38 flushes further up the fell, they would retire to a safe distance whilst I worked then when I left would head back to the flushes. I think sheep graze these flushes for the nutrient rich associates of *Saxifraga hirculus* but don't seem to find the Saxifrage itself particularly palatable, they will pull up shoots and flowering stems but then discard them, leaving them lying around, which will reduce the numbers of flowers and seeds but keeps the sward open for the shorter vegetative basal shoots.

I remember looking for *Saxifraga hirculus* flushes on the side of Meldon Fell with Rod. Corner in 2003, whilst trying to locate them we noted that where the sheep were concentrated in the flush zone we would find the Saxifrage, again with heads and odd shoots pulled up and discarded.

Because I was concerned with what was happening to these flushes I visited Great Shunner Fell where the late Derek Ratcliffe found *Saxifraga hirculus* in the 1950's. I had been told it had not been grazed for the last ten years or so as part of the Black Grouse Recovery project. I visited for the first time in 2007 and was a bit alarmed at the state of the small flush, the depth of the bryophyte cushions and growth of the *Saxifraga hypnoides* (Mossy Saxifrage) had virtually swamped the *Saxifraga hirculus* which in the centre of the flush was producing just flower stalks with no sign of any basal shoots, they had been completely shaded out. When I visited the next year all of these plants had gone, just a few patches remained in the shorter *Juncus* area to the south edge of the flush. The larger, mainly *Juncus* with lower sward height, flush appeared to be in quite good condition with plenty of basal shoots present.

I had assumed that these two flushes were all that there had been so when Jeremy Roberts sent details of Derek Ratcliffes original grid references, Len Livermore's grid references for his survey in 1977 and Peter Kelly's grid references in 1999 it became apparent that we were missing 2 flushes to the north of the ones monitored. In 2011 armed with these grid references the two flushes were located. One was the overgrown *Carex rostrata* (Bottle Sedge) flush (same type as the Sally Grain flush on Burnhope Moor, Durham) near the fence line from the summit and the other was the flush with the *Alopecurus borealis* (Alpine Foxtail) and *Epilobium x fachinii* (a rare Hybrid Willowherb) discovered in 2007. The litter levels were measured and in both flushes ranged from 8 inches up to 18 inches in depth and there was no sign of any *Saxifraga hirculus*, it had been shaded out before 2007. The large flush to the south had been recorded by Peter Kelly in 1999 as having 10's of thousands of flowers, monitoring in 2008 we only counted 2933. These flushes urgently need grazing again before we lose them altogether. Even the *Alopecurus* flush has given cause for concern since 2007 when around 200 flowering heads were counted, this has gone down to around 20 or so in 2011.

There are other outcrops of the marine band which tops Great Shunner Fell around, one place it outcrops is near Rogan's Seat. I visited this area hoping for similar flushes in 2011 but unfortunately this too had obviously been ungrazed for a while

and the flushes were well overgrown and full of litter so if the Saxifrage had been present here and hitherto undiscovered it would now be gone.

Finally in the National Vegetation Classification Field Guide to Mires and Heaths it mentions in the description of MG38 (flush community containing *Saxifraga hirculus*) the following: ‘*Although the harsh climatic and edaphic conditions exert a strong influence on the structure and composition of the vegetation, heavy grazing plays a major part in maintaining the distinctive richness of the community, and it is this trampling and cropping by sheep and deer which is responsible for the most obvious floristic differences between this community and M37.*’

Other reasons for the demise of *Saxifraga hirculus*

In 2005. Paul Maurice and myself went up to Dufton Fell to look at Rod Corner’s discovery of *Carex vaginata* (Sheathed Sedge), on route we dropped down to look at the flushes near Knock Coal Shop and found a previously unknown small flush with *Alopecurus borealis* and *Saxifraga hirculus*, the top 10 metres or so were intact but at that point a moor grip had been dug, probably sometime in the 1960’s diagonally across the flush taking the enriched flush water rapidly away down the hill, from that point on, the rest of the flush had reverted back to acid moorland.

In 2009 I went up Baldersdale to try and locate the *Saxifraga hirculus* flushes up there which had not been seen since the late 1950’s/early 1960’s. After 3 days searching and with Dr. Margaret Bradshaw’s help I eventually located the site of the Aygill Bogs Flush, no Saxifrage left but a good patch of associates still present, unfortunately a moor grip had been dug right across the top of the flush which had altered the pH enough to cause the demise of the Saxifrage but a small amount of enrichment still persisted keeping some of the associates going. It would be interesting to get this grip blocked and see if the Saxifrage reappears from the seed bank or it perhaps could be reintroduced if nothing materialises. Interestingly I mentioned this to Jeremy Roberts who had visited the site in the early 1960’s, he remembers the tractor/digger type machines used for moor gripping being there at the time and he didn’t find the Saxifrage that day but he might not have been in quite the right place*.

In 2011 I visited Hunder Rigg, the Cotherstone Moor site for the Saxifrage, again I found almost suitable flushes around the 300-400m contour but moor gripping had interfered with them - but the area is worth another look sometime in the future

* Not true, Jeremy informs me that the site is the same, and there were just 4 small plants of the Saxifrage left, it was 9 Aug 1975 – LR 2013.

