

## Effectiveness of Sheep Grazing of the Invasive Giant Hogweed at Auldtown of Netherdale, Aberdeenshire

2019 progress report - A Robinson and R Van der Wal, University of Aberdeen

### Background

The Auldtown site is located in Aberdeenshire, Scotland, on the farm Auldtown of Netherdale, 5km from of Aberchirder (Grid reference: NJ638478). It consists of a fenced-off area of around five hectares, with a burn flowing through the length of the site and into the River Deveron. Around one third of the site is a woodland area of rowan, oak and birch.

When the original trial commenced in 2013 Giant hogweed (*Heracleum mantegazzianum*) was widespread through the site with signs of spread into neighbouring arable fields, and seeds were being dispersed directly into the small burn with implications for downstream infestation. Since then black-faced sheep have grazed the site in an effort to control the Giant hogweed with monitoring ongoing since August 2014.

### Summary

Sheep have been highly effective in controlling the Giant hogweed at Auldtown, with no plants going to seed since March 2013, and a reduction in the density of Giant hogweed seedlings from 'dominant' to 'rare'. High grazing pressure (high sheep numbers and prolonged grazing) has, however, led to damage to the young woodland and a dramatic increase in the abundance of stinging nettle and thistles in the recorded vegetation composition.

### Monitoring

The purpose of the monitoring undertaken is to seek to determine the minimum number of grazing days that would allow continued control of Giant hogweed, without the associated botanical impacts of overgrazing. Table 1 shows the grazing regime and estimated grazing days from 2013 to 2019.

A new grazing regime was devised for 2019 - the plan was to divide the site in half, use the same number of sheep per ha in both areas but vary the grazing duration. One side would be grazed for four months (May-end of August) and the other for just one month (July).

However, due to delays in erecting the fencing the plan had to be altered and the result was that during 2019 just half the site was grazed by ten sheep for four months (July-Oct). The upside of this was that the lower half of the site was ungrazed and so provided a control site to observe what happened when grazing pressure was removed entirely.

Unfortunately, the sheep on the upper half of the site burrowed under the fence at the top of the site and escaped into the neighbouring field. As this went unnoticed there is no information on when and how frequently this was happening. Therefore, there is no accurate picture of number of grazing days for 2019 and so the grazing pressure in Table 1 is estimated.

Year	Start date	End date	No. of sheep put on	No. of sheep taken off	Estimated no. of grazing days
2013	31/03	21/01	23+3	24	7147
2014	07/04	01/12	18	17	4162
2015	25/03	03/12	18	15	4188
2016	28/03	29/11	17	13	3816
2017	04/05	25/09	13	12	1800
2018	24/04	Late Oct	10	10	1900
Sheep put on top half of site					
2019	04/07/2019	23/10/2019	10	9 escapees	1055

Table 1: Sheep numbers and duration of grazing

### Giant hogweed monitoring

The density and spatial distribution of Giant hogweed seedlings was recorded at one hundred (100) points on the grid spaced approximately every fifteen metres as set up by Downie (2014). Each point was relocated using GPS. A 1m<sup>2</sup> quadrat was placed at each sample point and the number of Giant hogweed seedlings recorded. Vegetation height and main vegetation type were recorded at 3 points in the plot to allow detection of change in the vegetation structure and composition.

### Results

The numbers of plots with Giant hogweed seedlings was fairly similar in May 2019 compared to April 2017. However, the total number of seedlings recorded in May 2019 is a lot lower than in April 2017.

	May 2019	April 2017
<b>Total no. of seedlings</b>	267	1027
<b>No. of plots with seedlings</b>	42	38

After 91 days of sheep being introduced to the top half of the site (2019) there were large differences between the grazed top half and the ungrazed lower half of the site. In the grazed top half there was no Giant hogweed at all apart from a few isolated large plants on stream bank (outwith any monitoring plot) as shown in the (Figure 1).

	22/05/2019 (before grazing)	03/10/2019 (after grazing)	
		Top grazed half of site (58 plots)	Lower ungrazed half of site (42 plots)
<b>Total no. of seedlings</b>	267	0	178
<b>No. of plots with seedlings</b>	42	0	21



*Figure 1: Oct 2019 – A few large Hogweed plants in the grazed area by stream*

The lower, ungrazed, half of the site was radically different to the grazed area - as shown in Figure 2. There was a high density of large Giant hogweed plants especially either side of the small stream, as well as isolated Giant hogweed plants in the wooded area. Also, in the ungrazed half, along the stream, there was a carpet of nettles and there were areas within the wooded area where nettles and thistles had established and grown significantly.



*Figure 2: October 2019 a) Large Giant hogweed plants in strip by stream in ungrazed half, b) Looking downstream from plot 51 showing carpet of nettles and isolated hogweed plants.*

### **Conclusions**

The appearance of Giant hogweed plants when grazing pressure is removed demonstrates that there remains a persistent Giant hogweed seedbank at Auldtown despite the site being grazed since 2013. Therefore, grazing should be continued in future years - even if it is thought that the Giant hogweed

is under control - to ensure the species has been eliminated from the area. It has been suggested that grazing should occur for a minimum of seven years (Andersen & Calov, 1996) and up to ten years (Buttenschøn & Nielsen, 2007). This study backs up these findings.

Although it is not known how long the sheep were on the study site in 2019 due to them escaping into the adjacent field - it would appear that they were present for a fair bit of the summer period as there were such big differences between the grazed and ungrazed areas of the site (Figure 3). However, on the last survey visit in October 2019 there was no evidence of recent droppings indicating reduced use of the site in advance of that time.

Although the sheep were introduced late in the season in 2019 large differences were detected between the grazed and ungrazed sections. This is partially due to the ungrazed area having more Giant hogweed present at the start. If this site had been designed as a control plot it would have been divided differently to ensure more even distribution in Giant hogweed density, however the original plan was for this area to also be grazed.



Figure 3: Photo along fence-line. RHS grazed area LHS ungrazed (October 2019).

### Recommendations

Due to the abundance of Giant hogweed which has grown in the lower ungrazed part of the site, there is now an ideal opportunity to observe both how the sheep will tackle these plants and how long it will take to get the Giant hogweed back under control in 2020.

It is suggested that camera traps should be positioned along the new fence to observe the sheep behaviour and grazing in 2020. One camera trap could be set to document change in the Hogweed plants by the stream, another taking pictures/videos of sheep grazing the Giant hogweed and ideally one other to record for different angles and as a backup image supply.

The grazing regime for the site should be as originally intended in 2019.

### References

Andersen, U. V. & Calov, B. (1996) Long-term effects of sheep grazing on giant hogweed (*Heracleum mantegazzianum*). *Hydrobiologia*, 340, 277-284.

Buttenschøn RM, Nielsen CH. (2007) Control of *Heracleum mantegazzianum* by grazing. Ecology and Management of giant hogweed (*Heracleum mantegazzianum*). CAB International, Wallingford. 240-54.

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