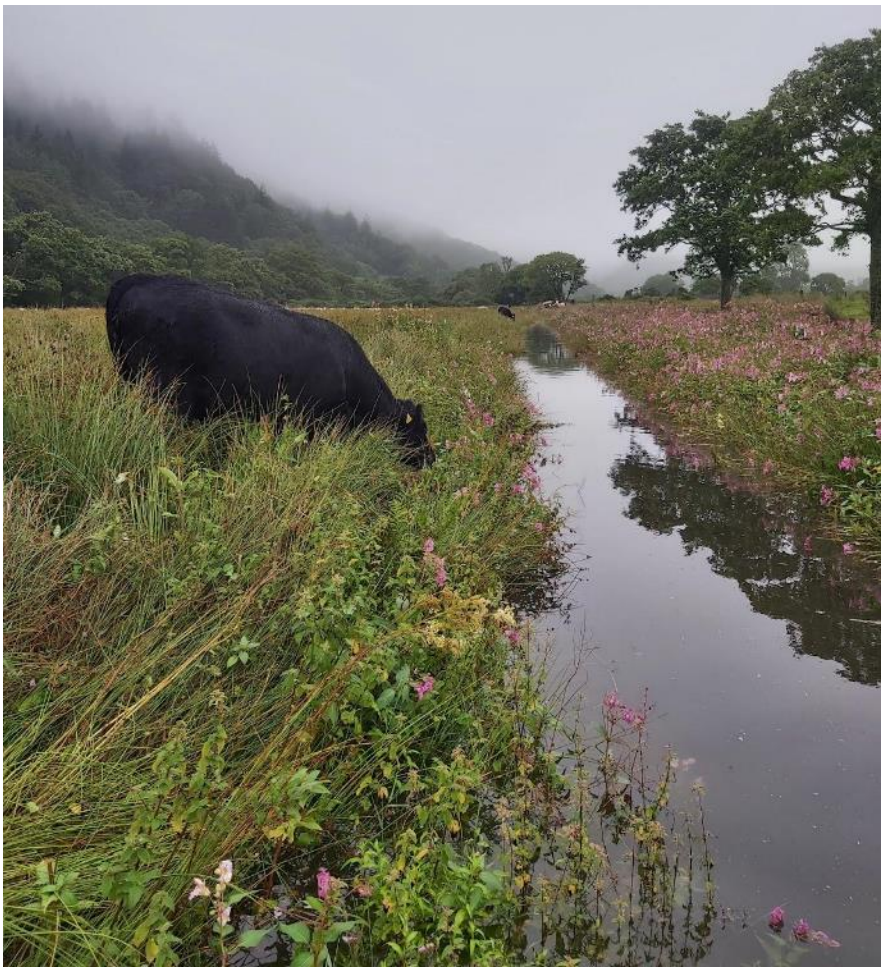

Photo:Ned Feesey

CASE STUDY: Grazing to control Himalayan Balsam *Impatiens glandulifera* at Hafod y Llyn, Eryri

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Introduction

Hafod y Llyn is a National Trust owned lowland farm situated along the Afon Glaslyn near Beddgelert, Eryri. Parts of the Afon Glaslyn riverbank form part of the Meirionnydd Oakwoods and Bat Sites Special Area of Conservation (SAC) due to the presence of habitats 91A0 (Old sessile oak woods with *Ilex* and *Blechnum* in the British Isles), 91E0 (Alluvial forests with *Alnus glutinosa* and *Fraxinus excelsior*), and 91D0 (Bog woodland).

Since 2011, the local National Trust agriculture and conservation team have used cattle and sheep to graze an invasive alien species, Himalayan balsam *Impatiens glandulifera* (HB), along sections of this notable riparian corridor. Some of the riverbanks were grazed nearly year-round, while others were only subjected to a heavier pulse early in the growing season, which is from May to October.

In 2020, Teleri Fielden and Ned Feesey won the tenancy for Hafod y Llyn and immediately expanded on the idea of HB grazing: from a practice limited to the Glaslyn's riverbanks, they also started targeting the farm's internal drainage ditches which flow into the Glaslyn. Because many of these ditches are open to adjacent fields, Teleri and Ned have started to erect temporary electric fences which hold a higher density of livestock on smaller parcels. This method called "mob grazing," encourages animals to thoroughly graze and trample a site in a short period of time before they are moved on. In this way, even less palatable plants are targeted.

This report summarises the practicalities and effectiveness of HB grazing at Hafod y Llyn using both extensive and mob grazing techniques. Teleri and Ned have proven that these methods can reduce the spread of HB and should be considered as complimentary approaches to traditional HB control of hand pulling and strimming.

Extensive grazing to control Himalayan balsam

Both sheep and cattle graze HB, particularly when it is very small and mixed with grasses and herbs to which the animals are accustomed. In this way, under heavy grazing, especially during the early growing season, it is possible to suppress HB entirely. The problem occurs when the rate of growth surpasses grazing demand, at which point a shift to more familiar or palatable forage occurs, leaving the HB to shoot up. For the same reason it also appears that livestock do not target HB if put into a compartment later in the season when it has grown taller than the surrounding forage. Addressing this requires very high livestock numbers, particularly of cattle, which is nearly impossible to accommodate during the winter months.

Figure 1: A view of Afon Glaslyn, with Hafod y Llyn on the left. This part of the farm is grazed much of the year, resulting in a sward devoid of HB as well as any other flowering plants apart from grasses and soft rush (*Juncus effusus)*. Across the river is a separate parcel which is never grazed. There, HB was strimmed or pulled annually between 2019-2021. Without a contract of work in 2022, the land has been recolonized by HB to its original pre-2019 state (outlined in red).

Mob grazing to control Himalayan balsam

Although sheep and cattle avoid mature HB in an extensive system, mob grazing trials at Hafod y Llyn in 2021 and 2022 have proven that it can be utilised later in the season. As with all farming practices, the method is adjusted annually according to ever-changing factors such as the weather and livestock numbers. However, the general format of mob grazing on this farm follows below:

- Temporary enclosures of 0.5ha - 1.5ha are erected at the end of spring lambing and calving (May - June). In 2023, enclosures of 0.25ha will be trialled.
    - Each enclosure includes varying amounts of HB.
    - Enclosures often include part of the internal drainage ditches.
    - No enclosures are erected along the main Glaslyn river because of difficulty in keeping livestock out of the water as well as a high risk of flash-flooding.

- All of the farm animals (100 sheep, 16 cows/heifers plus followers) are placed in one compartment for three to four days.
    - The animals are moved out of an enclosure once they have “grazed a third, trampled a third, and left a third standing.”
    - In 2023, more cattle in smaller (0.25ha) enclosures will be trialled to trample a half. This is to expedite soil creation.

- Animals will return to the same compartment once they have mob-grazed all of the other plots.
    - Rotation times vary. With a dry and hot summer in 2022, vegetation grew slowly and animals only returned to a plot after 1.5 months.

  - Ideal growing conditions would allow for a 1 month rotation, however a minimum of 40 days is advised in order to supress parasite cycling.

- Plots located in designated hay meadows were closed off after the first grazing session.

  - Strimming and hand-pulling of HB on the margins of these meadows was used instead.

Figures 2 and 3: A stretch of internal drainage ditch within one of the mob grazing plots at Hafod y Llyn, before and after two rotations of mob grazing with 100 sheep, 80 lambs, and 16 cattle.

Impact on livestock

Grazing palatability: Himalayan balsam contributes to a nutritious forage crop. At Hafod y Llyn in 2021 and 2022, livestock maintained condition while grazing HB, including lambs and calves who all gained weight satisfactorily.

Grazing animal type: Sheep are less likely to select HB over many other herbs and grasses. It is possible that they will always need to be pushed on to this plant, but they might learn to graze it more readily with time. In contrast, the larger and rougher grazing cattle naturally eat a wider variety and bigger plants than sheep. Interestingly, cattle started to select tall HB over other plants late in the 2022 grazing season, suggesting that this might in part be a learnt behaviour, or newly developed taste.

Livestock welfare: At Hafod y Llyn, mob grazing is not used along the Afon Glaslyn because of high risks of flash floods and sinking sand. In contrast, livestock are relatively safe even when grazing along the steep-sided drainage ditches. The risk of falling into these is managed by keeping the animals calm, moving them onto the next plot before they get too hungry, and by maintain flock/herd continuity over the years: as with all grazing in hazardous conditions, young lambs and calves are at highest risk until they learn how to graze safely.

Impact on Himalayan balsam and other vegetation

- Extensive grazing can effectively suppress HB especially under high grazing pressure.
- Both extensive and mob grazing must be started early in the summer when the HB is shorter or equal in height to the surrounding vegetation.
- Only cattle will graze tall HB later in the season, although both animal types will trample it especially in hot weather.
- To avoid later flushes of HB, extensive and/or mob grazing must be maintained throughout the growing season (May - October). This is difficult at Hafod y Llyn, because fields also need to be set aside to grow grass for the winter.
- Where grazing cannot be maintained, for example in hay and silage fields, use strimming or hand-pulling.

The effectiveness of heavy grazing, particularly mob grazing is clear, but it must be repeated every year until HB is eradicated upstream and from all surrounding land. Grazing also suppresses other plants such as flowering herbs and young trees. In summary, control of HB should be organised strategically across a catchment, starting at the top, and should be completed over a limited period of years to protect overall biodiversity.

Discussion and Recommendations

Grazing is a successful method of controlling HB but the following risks and limitations need to be considered before adopting this strategy:

- Time requirement of rotational/pulse grazing:
    - As opposed to long-term/extensive grazing, mob grazing allows for recovery of other plants and can be timed to allow some herbs and grasses to flower later in the season.
    - HB can grow back and start to set seed within 2-4 week after control, so mob grazing should ideally follow a similar rotation if eradication of HB is desired.
    - Mob grazing requires more input from the farmer.
    - Benefits to livestock from rotational and mob grazing are well documented and worth exploring on many farms regardless of HB presence.

- Animal welfare concerns relating to steep banks next to water bodies:
    - Some sites might be too steep or overgrown to safely put animals at the water's edge. Regardless, daily checks necessary.

- Impact on other flowering species:
    - Unless completely dominant, HB is often found growing with other wet pasture species of interest such as sneezewort, forget-me-not, and loosestrife. In species-rich pastures it is ideal to allow one or two months without any grazing during the summer-autumn season. This will allow other plants to flower and set seed.

  - Change when this break happens every year to favour different species, although heavy grazing during the early summer is essential if controlling HB.
- Impact on woodland regeneration:
  - Seedlings and saplings will not survive at the required grazing pressure. Ideally, eradicate HB from the surrounding area and all land upstream over a limited period of time (e.g. 5 - 10 years) before considering woodland regeneration initiatives.
- Impact on potential water vole populations:
  - Water voles normally dig burrows in soft banks along streams and ditches, but they have also been recorded to tunnel above ground under dense grass such as rush and *Molinia*. Heavy trampling by livestock could damage burrows. Always check for signs of water voles before considering pulse grazing.
- Impact on ground nesting birds:
  - Some birds nest in dense riverside vegetation and are at risk of trampling. These include reed bunting, grasshopper warbler, sedge warbler, stonechat, and willow warbler, amongst others. Always check for signs of breeding birds if pulse grazing to occur between March-September.

By assessing each site using the risks outlined above, grazing with livestock has the potential to offer a time and cost effective approach to HB control, especially in combination with other methods such as strimming and hand-pulling. Unfortunately, no method will successfully eradicate HB unless all contaminated land nearby and upstream is cleared at the same time. Furthermore, because of the suppressing impact of livestock on other flowering plants and tree regeneration, intensive grazing should only be used as a medium-term solution in areas of high biodiversity.

Acknowledgements

Thank you to Arwyn Owen and Dave Smith who pioneered grazing of HB on the National Trust estate in Eryri and Llyn, particularly at Hafod y Llyn. Special thanks to Teleri Fielden and Ned Feesey, who have invested their personal time and ingenuity in refining this technique on the farm and sharing their findings with Eryri National Park. This work was funded in part by the LIFE Celtic Rainforest Project (LIFE17 NAT/UK/000020).