

Conservation of Britain's biodiversity: Distribution and status of the Welsh endemic *Hieracium breconicola*, Beacons Hawkweed (Asteraceae)

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Abstract

Hieracium breconicola P.D. Sell, Beacons Hawkweed, is a Welsh endemic plant confined to the Brecon Beacons. Field surveys 2009-2020 indicate only one plant survives in one of its three sites. The IUCN threat status is 'Critically Endangered'; unless conservation action is undertaken soon, this species will soon be extinct in the wild.

Keywords: IUCN threat status; Wales; critically endangered; extinction.

Introduction

Hieracium breconicola P. D. Sell, Beacons Hawkweed, is a very rare Welsh endemic (Moore, 2009; McCosh & Rich, 2018). It was first described as a new species by Sell & Murrell (2006) from plants named incorrectly as *H. scoticum* F. Hanb. or *H. gothicum* auct. var. *latifolium* Backh. (Ley 1909). It is a member of *Hieracium* section *Oreadea* (Fr.) Dahlst. It is characterised by the few basal leaves and 2-5 stem leaves which are dark green with rigid hairs on the margins, the few-flowered inflorescence, the dark green, obtuse involucral bracts with numerous simple hairs, few glandular hairs and few or no stellate hairs, and the yellow styles (Figs. 1-3).

Sell & Murrell (2006) cited *H. breconicola* from the cliffs of Fan Nedd and Llyn y Fan Fawr in Breconshire (v.c.42). An additional site was subsequently reported from Llyn y Fan Fach in Carmarthenshire (v.c.44) with a note that possible plants had been found in 2009 at Fan Nedd (Moore, 2009; McCosh & Rich, 2011). The Fan Nedd plant identification as *H. breconicola* was confirmed in 2010.

Given that only two plants were known, *H. breconicola* ranked as one of the world's rarest plants and consequently the aim of this paper is to summarise what is known about it and to provide an IUCN Threat Category as required under the Global Plant Conservation Strategy (Secretariat for the Conservation of Biodiversity, 2002).

Methods

Historical records were compiled from herbaria (**BM**, **CGE** and **NMW**), the literature and David McCosh's *Hieracium* database.



Figure 1. *Hieracium breconicola* habitat on Fan Nedd



Figure 2. *Hieracium breconicola*.



Figure 3. *Hieracium breconicola*, details of hairs on involucral bracts, stem leaf and basal rosette

Field surveys were carried out in 2009 by S. Lee (née Moore) and updated by T. Rich in 2020. The 'look-see' method (Hill *et al.* 2005) was adopted for field data collection as it was the most appropriate to survey the sites which had many inaccessible areas on cliffs, thus the number of plants is a minimum. Each site was searched as far as practicable, and the location of the plants recorded using GPS. Soil

pH was measured with a calibrated pHep2 Hanna pocket-sized pH meter in a 50:50 mixture of soil with distilled water.

Results

The historical records indicate *H. breconicola* occurs in three sites in two vice-counties (Fig. 4), and these were used to direct the field surveys.

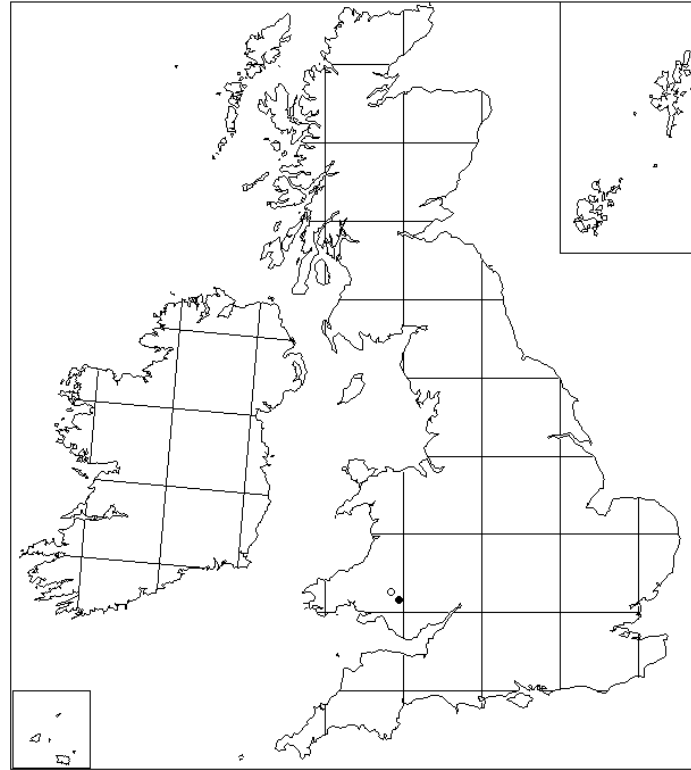


Figure 4. Distribution map of *Hieracium breconicola*. Open circle= historic sites. Closed circle = 2020

Fan Nedd (v.c.42)

Hieracium breconicola was first collected on sandstone rocks at Fan Nedd by Augustin Ley on 7 August 1906 (holotype, **CGE**) and again on 9 July 1908 (**BM, CGE**). Ley also cultivated plants and preserved one on 15 July 1910 (**CGE**).

Fan Nedd was initially surveyed on 11 August 2009. Two *H. breconicola* plants with a possible seedling were found on vertical, north-facing rocks rooted in rock crevices with a soil pH of 6.0 (Moore, 2009; **NMW**). They were associated with *Agrostis capillaris*, *Angelica sylvestris*, *Anthoxanthum odoratum*, *Calluna vulgaris*, *Campanula rotundifolia*, *Epilobium* sp., *Festuca rubra*, *Potentilla erecta*, *Potentilla sterilis*, *Solidago virgaurea*, *Viola riviniana* and the bryophytes *Amphidium mougeotii*, *Campylium stellatum*, *Fissidens osmundoides* and *Racomitrium aciculare*. The vegetation was about 3 cm high and had about 15% cover and was slightly flushed with water from the slopes above.

Further surveys have been carried out in 2010, 2012 and 2013; seed was finally collected in 2013 from one plant on the eighth visit. On two visits, the inflorescence of one of the two plants was observed to have been eaten by sheep. By 1 August 2020, only one plant remained.

Only two other species of *Hieracium* were recorded at Fan Nedd 2009-2020, *H. argillaceum* and *H. sabaudum*, both of which were frequent. Historically, *H. inspissatum*, *H. pulchrius*, *H. saxorum* and *H. sparsifolium* were also recorded from Fan Nedd and the rocks have clearly become quite degraded probably due to over-grazing (*H. sparsifolium* still occurs in the Nedd Glen to the south).

Llyn y Fan Fawr (v.c.42)

Collected once from rocks above Llyn y Fan Fawr on 2 August 1898 by Augustin Ley (CGE).

Llyn y Fan Fawr was surveyed on 10 June, 5 July and 17 August 2009 but no *H. breconicola* was found. The steep Old Red Sandstone cliffs are virtually inaccessible and are heavily grazed by sheep, and only *H. saxorum* and *H. placherophylloides* were found in small quantity.

Llyn y Fan Fach (v.c.44)

Collected once from 'Llyn Fan Fechan' on 2 August 1898 by Augustin Ley (CGE) on the same day as he visited Llyn y Fan Fawr.

This site was also surveyed on the same days in 2009 as Llyn y Fan Fawr (cf. above) and again no *H. breconicola* was found. Historically this is a very rich *Hieracium* site with 22 species recorded from it, but only six species have been recorded recently. Grazing by sheep may have eliminated it here along with many other species, but it could still occur on inaccessible rocks which we could not search safely.

Discussion

Under the IUCN (2001) threat criteria *H. breconicola* qualifies as 'Critically Endangered'. The two plants confirmed at Fan Nedd in 2010 had declined to one last plant by 2020, and it is in imminent danger of extinction. It may always have been rare; Ley (1909) indicated it (as '*H. scoticum*') was rare in Brecon and although he usually collected many *Hieracium* duplicates he did not do so with *H. breconicola*, perhaps indicating even in his time it was present only in small quantity. A short video showing the last plant is available on YouTube (Rich, 2020).

Like its relatives, *H. breconicola* is likely to be a polycarpic and apomictic but this has not been tested experimentally. One of the two plants has been known for at least 11 years, indicating that they may be relatively long-lived. It typically flowers in July and August. Seed set appears to be low and eight visits were undertaken before ripe seed was collected. As the only population occurs on relatively inaccessible cliffs, grazing must restrict it to steep areas out of the reach of sheep.

A conservation action plan is urgently required to ensure survival of this species in the wild. This should include a significant reduction in sheep grazing levels at Fan Nedd, and a reintroduction programme to increase the population. The site is not

protected or designated in any way other than being located within the Brecon Beacons National Park which confers no practical protection for such a species. Seed was collected in 2013, from which plants were grown by C. Gait and seed sent to the Millennium Seed Bank for ex situ conservation.

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