British & Irish Botany 4(3): 273-281, 2022

Conservation of Britain's biodiversity: *Hieracium breconense* (Asteraceae), Brecon Hawkweed

Timothy C.G. Rich
Cardiff, U.K.

Corresponding author: tim_rich@sky.com

This pdf constitutes the Version of Record published on 9th September 2022

Abstract
The distribution and conservation status of *Hieracium breconense* P.D. Sell (Asteraceae), Brecon Hawkweed, has been assessed. It is a rare endemic restricted to the Brecon Beacons (v.c.42), Wales. A lectotype of the basionym *H. britannicum* var. *ovale* Ley is designated. Only one population of at least 74 plants is known in Craig y Cilau National Nature Reserve, and it has not been refound at two historic sites. *H. breconense* is assessed as 'Critically Endangered' under IUCN (2001) threat criteria.

Keywords: critically endangered; endemic; IUCN threat status; lectotype; Wales

Introduction

Hieracium breconense P.D. Sell (Asteraceae), Brecon Hawkweed, is a rare endemic restricted to the Brecon Beacons in Wales (Sell & Murrell, 2006; McCosh & Rich, 2018; Rich, 2020). There have been no previous studies on its distribution and ecology, or a detailed assessment of its conservation status.

Hieracium breconense was first described as *H. britannicum* var. *ovale* Ley (Ley, 1907). Ley had first collected it in 1894 at Craig y Cilau (as Craig Cille) and, after discussing further material collected in the company of H. J. Riddelsdell in June 1904 with E.F. Linton, gave it the new varietal name *ovale* (correspondence on specimens in **BM**; Druce, 1907). Ley (1907, 1909) also cited it from Cefn Coed and from two sites in Yorkshire. The Craig y Cilau plants were mapped as *H. dicella* P.D. Sell & C. West by Sell & West (1968), but during his review of *Hieracium,* P.D. Sell split Ley's South Wales plants from *H. dicella sensu stricto* and gave them a new name, *H. breconense* P.D. Sell (Sell & Murrell, 2006). P.D. Sell selected a lectotype of the basionym *H. britannicum* var*. ovale* Ley from Ley's herbarium (**CGE**) as the sheet collected at Craig Cille by A. Ley on 9 July 1894 but he did not publish it; this specimen is hereby designated as a lectotype on P.D. Sell's behalf.

Hieracium breconense is a typical member of *Hieracium* section *Stelligera* Zahn. It is characterised by the greyish slightly glaucous and often red- or purple-flushed, ovate rosette leaves which have distinctive shallowly repand-dentate margins, acute apices and rounded to cuneate bases (sometime with small teeth at base on inner leaves), no or rarely 1 small stem leaf, the inflorescence branches held

at an angle of 20-30 degrees, acute involucral bracts to 15 mm long with numerous long simple hairs, numerous medium to short glandular hairs and numerous stellate hairs especially on the margins (Figs. 1-3). It is similar to *H. subbritannicum* (Ley) P.D. Sell & C. West which has large teeth at the leaf base and inflorescence branches held at 70-80 degrees on larger plants. *Hi. cyathis* (Ley) W.R. Linton has a very short acladium and entire leaves which are somewhat darker in leaf colour and often have spots.

Distribution

Historical records were compiled from herbaria (**BM**, **CGE**, **NMW**, **OXF**), the literature and the *Hieracium* database maintained by D.J. McCosh (October 2020 version); the records are summarised in Appendix 1. P.D. Sell cited *H. breconense* as only known only from limestone cliffs at Craig y Cilau and Dan-y-darren (Sell & Murrell, 2006), but was aware of the record from Dan-yr-Ogof. The historical records indicate it has been recorded in three sites, all in v.c.42 Breconshire, Wales (Fig. 4), which are listed from west to east below. These have been searched sporadically 2000-2022, usually whilst looking for other *Hieracium* species.

1. Dan-yr-Ogof (c.SN8316)

It was collected by A. Ley at Dan-yr-Ogof, Callwen by A. Ley on 18 June 1899 and again at Callwen on 11 June 1904 but has not been collected again.

The limestone gorge, accessible rocks within the Dan-yr-Ogof National Showcave Centre for Wales complex and open fells above (but not the cliffs directly above the public walk ways for safety reasons) were searched specifically for *H. breconense* on 29 June 2000 at the request of P.D Sell, without success. It is possible it could survive here in small quantity but the Showcaves area is much modified from Ley's time, and a full survey of all the cliffs is unlikely to be practical for public safety reasons. I have visited other adjacent areas of limestone and rocks (Cribarth, Craig y Rhiwarth, Ogof Ffynnon Du, etc.) many times 2000-2018 when looking for whitebeams and other hawkweeds but no additional sites have been found.

2. Cefn-coed-cymmer (Cefn Coed; c.SO0209)

No voucher specimen of H.J. Riddelsdell's Cefn Coed record has been traced, but the record is provisionally accepted as it was cited by Ley (1907, 1909) when he described his new species; it is possible that Riddelsdell material may yet be refound.

The limestone north of Merthyr Tydfil (Cefn Coed, Darren Fach, Darren Fawr, Coed Pen Maillard, etc.) has been visited many times 2000-2016 when looking for whitebeams and other hawkweeds but no *H. breconense* has been found.

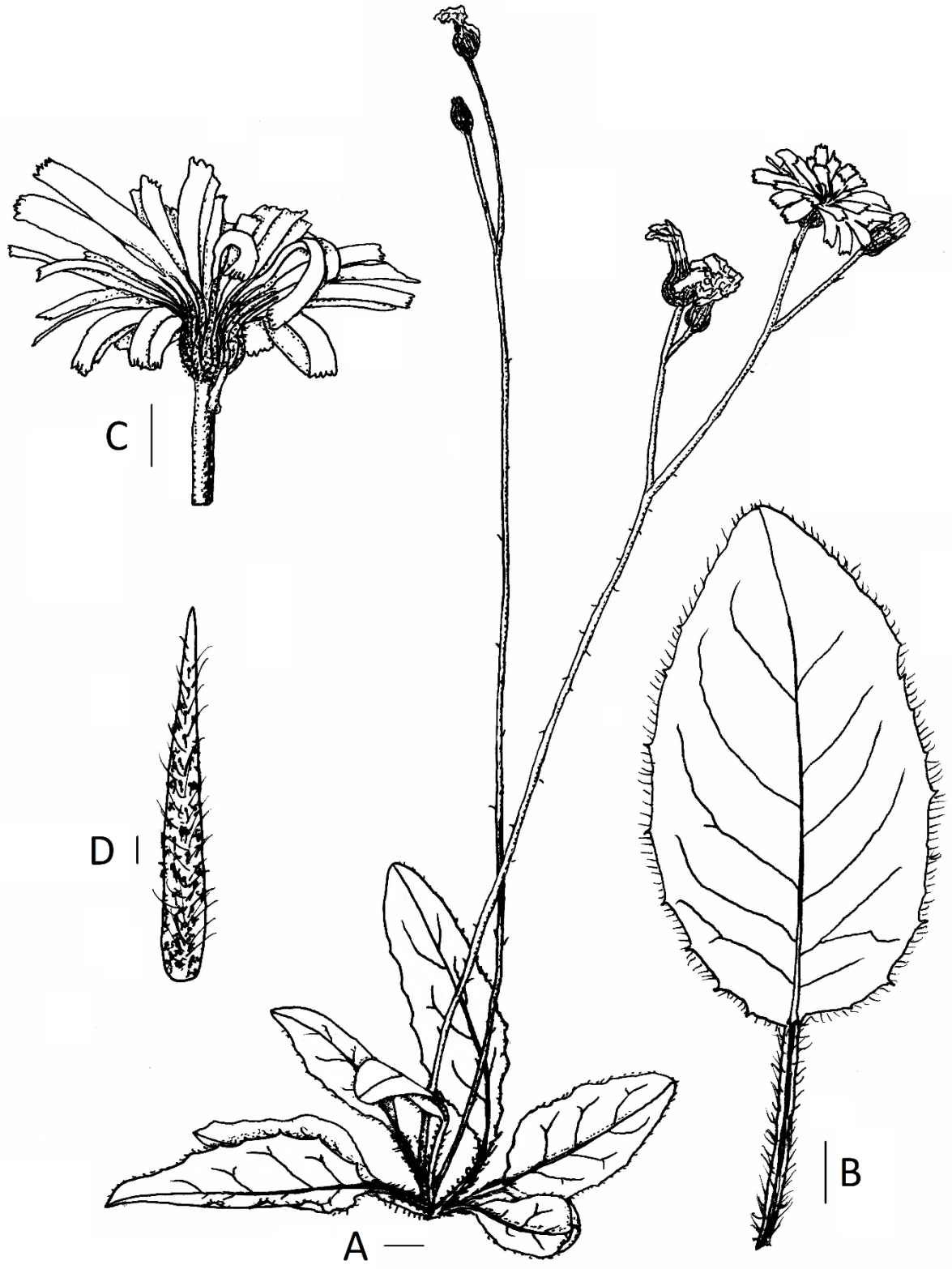

Figure 1. ***Hieracium breconense*****. A, plant. B, typical rosette leaf with shallowly repand-dentate margins. C, capitulum. D, involucral bract with numerous long simple hairs, numerous medium to short glandular hairs and numerous stellate hairs especially on the margins. Scale bars A-C= 1 cm, D = 1mm**

Figure 2. *Hieracium breconense*.

3. Craig y Cilau (Craig Cille) to Dan-y-Darren (c.SO1816-SO1915)
It was first collected in 1894 at Craig y Cilau by A. Ley, and was noted as abundant on limestone (Ley 1907, 1909). It has since been recorded many times since; judging from the many different ways the locality is cited, it has only occurred in the central area of the escarpment. During surveys of *H. cyathis, H. asteridiophyllum* and *H. cillense* in 2000 (Rich, 2002; Rich *et al.*, 2008), it was found sparsely around Craig y Cilau, mainly restricted to the central area on the main cliff and the lower tier of open rocks above and on calcareous sandstone west of Eglwys Faen.

The main cliff was surveyed in detail from below on 21 June 2016 whilst collecting seeds for the Millennium Seed Bank; 47+ plants were found (39 flowering, 8 vegetative). A second wider survey was carried out on 11 June 2022 with the help of David Gibbs and John Holt; 74 plants were found in areas where previously recorded but as many of the cliffs are large and difficult to survey accurately the population size could be at least double or triple this.

Errors and other records
I have an image of a specimen collected at Dyffryn Crawnon by V. Jones with B. Burrow on 23 June 2010 labelled as possible *H. breconense* but with notes pointing out the short 11 mm phyllaries and the narrow leaves; I suspect this is *H. sanguineum* (Ley) W.R. Linton which is frequent at this site but have been unable to check the original specimen (possibly in **herb. V. Jones** in **LES**; the record cited from Craig Cerrig-gleisiad in McCosh & Rich (2011, 2018) is my error resulting from a misunderstanding of the origin of this specimen). The record for hectad S021 in

Sell & West (1968) and McCosh & Rich (2011, 2018) is a result of the 'limestone cliffs south of Crickhowell' locality being plotted for Crickhowell rather than Craig y Cilau S011 to which it undoubtedly refers. The Yorkshire records cited by Ley (1907, 1909) are *H. dicella*.

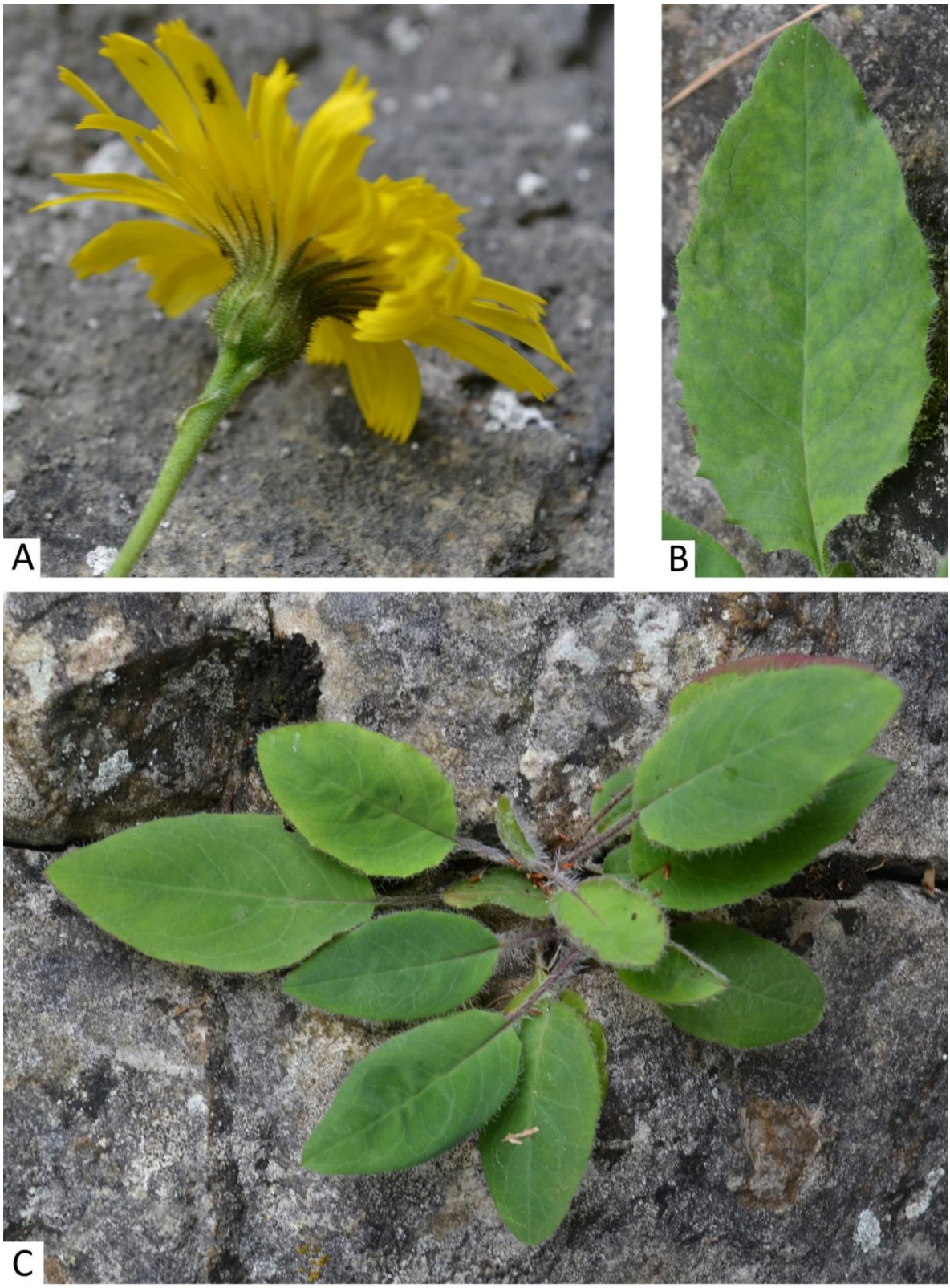

Figure 3. *Hieracium breconense.* A, capitulum. B, leaf showing toothing. C, rosette

Figure 4. Distribution map of *H. breconense.* 1 Dan-yr-Ogof. 2 Cefn Coed-cymmer. 3 Craig y Cilau. Red dot 2022. Red circle pre-1907.

Life cycle and Ecology

Hieracium breconense is a perennial which is probably quite long-lived. Some plants have been seen with the remains of the previous year's flowering stalks indicating it flowers annually once mature. The main flowering period is from (May-) early June to early July (-September). It is probably a polyploid apomict like most other British *Hieracium* species; Sell & Murrell (2006) state it is apomictic but this was not actually tested. Most seed is ripe by July and August. The seeds have a small pappus and are wind-dispersed, but as many of the sub-populations are clustered dispersal is probably limited.

At Craig y Cilau it characteristically occurs on the steep or vertical, bare Carboniferous limestone rocks or calcareous sandstone rocks, rooted directly into rock crevices with no apparent soil, or sometimes on the shattered limestone outcrops (Fig. 5). It occurs in partial shade or in the open associated with *Asplenium trichomes, Ctenidium molluscum, Festuca ovina, Hieracium acuminatum, H. asteridiophyllum, H. cyathis, H. pellucidum, H. subbritannicum, Hylocomium splendens, Melica nutans, Mycelis muralis, Rubus fruticosus* agg., *Scabiosa columbaria, Solidago virgaurea, Taraxacum* spp. and *Teucrium scorodonia*. It occurs in vegetation on the ledges and rock faces of the OV39 *Asplenium trichomanes - Asplenium ruta-muraria* community, on grassy outcrops in CG10 *Festuca ovina - Agrostis capillaris - Thymus praecox* grassland, and on the lightly wooded cliffs W9

Fraxinus excelsior – Sorbus aucuparia - Mercurialis perennis woodland (Rodwell *et al.*, 1991–2000). It also occurs in small quantity on open scree with *Calluna vulgaris, Deschampsia flexuosa, Racomitrium lanuginosum* and *Galium saxatile.* No plants have been found in the quarried areas at this site perhaps showing limited colonising ability.

Like most *Hieracium* species it is likely to be sensitive to grazing, and is not found within easy reach of sheep at Craig y Cilau. The intensive sheep grazing may have reduced its quantity since Ley's time who described it as abundant, but it is certainly not that now. On 21 June 2016, many of the seedheads had been eaten by invertebrates, and aphids were observed feeding on the stems and heads.

The altitudinal range is *c.*390-450 m at Craig y Cilau, and may have been *c.*250 m at Dan-yr-Ogof and *c.*200+ m at Cefn Coed.

Figure 5. Typical habitats of *H. breconense* at Craig y Cilau NNR

In many respects, the habitats and ecology of *H. breconense* are very similar to those of *H. asteridiophyllum* at Craig y Cilau (Rich, 2002), and they often grow together on the main cliff.

Discussion

Hieracium breconense is now restricted to Craig-y-cilau. It is assessed as 'Critically Endangered' under IUCN (2001) threat criteria based on its occurrence in one locality (the 'Endangered' status conferred by McCosh & Rich, 2018, was based on there being two recent localities, the Craig Cerrig-gleisiad locality now being known to be my error). Although it may have declined from three sites to one site, the decline appears to be historic rather than current, though admittedly there is very

little information on which to assess when the decline actually occurred. However, it has declined at Craig y Cilau since Ley described it as abundant.

Although Critically Endangered, it appears to be under little direct threat due to the occurrence on Craig y Cilau National Nature Reserve/Mynydd Llangatwg (Mynydd Llangattock) Site of Special Scientific Interest. Craig y Cilau is one of centres of diversity of *Hieracium* in South Wales supporting at least 15 species including the single-site endemics *H. asteridiophyllum* and *H. cillense* (Rich, 2002). Rare hawkweeds are noted in general in the SSSI site management statement but are not mentioned as features of interest for the SSSI (Natural Resources Wales 2020); it is recommended these should be added at the next revision. All hawkweeds would undoubtedly benefit from a reduction in grazing on this site, as they have at Craig Cerrig-gleisiad National Nature Reserve.

A small collection of seeds has been deposited in the Millennium Seed Bank (Rich, 2018).

Acknowledgements

I would like to thank the Keepers of herbaria for access to material and libraries, David McCosh for checking the identification of plants and for information from the *Hieracium* database, the Dan-yr-Ogof National Showcave Centre for Wales for access, Stephanie Miles and the Millennium Seed Bank, David Gibbs and John Holt for help with the 2022 survey, and Brian Burrow for information. The 2016 survey and seed collection were funded by the Esmée Fairbairn Foundation as part of the UK Flora Project at the Millennium Seed Bank.

References

Druce, G.C., ed. 1905. Report for 1904. *Report of the Botanical Exchange Club of the British Isles* 1:1-40.

Druce, G.C., ed. 1907. Report for 1906. *Report of the Botanical Exchange Club of the British Isles* 1:195-252.

IUCN 2001. *IUCN Red list categories and criteria*. Version 3.1. Gland: International Union for Conservation of Nature.

Ley, A. 1907. *Hieracium* notes. *Journal of Botany* 45:108-112.

Ley, A. 1909. Brecon and West Yorkshire hawkweeds. *Journal of Botany* 47: 8-16 and 47-55.

McCosh, D.J. & Rich, T.C.G. 2011. *Atlas of British and Irish Hawkweeds (Pilosella Hill and Hieracium L.)*. London: Botanical Society of the British Isles.

McCosh, D.J. & Rich, T.C.G. 2018. *Atlas of British and Irish Hawkweeds (Pilosella Hill and Hieracium L.)*. 2nd ed. Harpenden: Botanical Society of Britain and Ireland.

Natural Resources Wales. 2020. Mynydd Llangatwg (Mynydd Llangattock) Site of Special Scientific Interest. SSSI Citation and Site Management Statement. Available at: https://naturalresources.wales. Accessed 11 October 2020.

Rich, T.C.G. 2002. Conservation of Britain's biodiversity: *Hieracium asteridiophyllum* and *H. cillense* (Asteraceae). *Watsonia* 24:101–106. http://archive.bsbi.org.uk/Wats24p101.pdf

Rich, T.C.G. 2018. *Millennium Seed Bank. UK Flora Project. Seed collecting report for 2016-2017.* Unpublished report to Royal Botanic Gardens, Kew, 16 January 2018.
Rich, T.C.G. 2020. List of vascular plants endemic to Britain, Ireland and the Channel Islands 2020. *British & Irish Botany* 2:169-189. https://doi.org/10.33928/bib.2020.02.169
Rich, T.C.G., McDonnell, E.J. & Lledó, M.D. 2008. Conservation of Britain's biodiversity: the case of *Hieracium cyathis* and its relationship to other apomictic taxa. *Botanical Journal of the Linnean Society* 156:669-680.
Rodwell, J.S., ed. 1991–2000. *British Plant Communities. Volumes 1–5*. Cambridge: Cambridge University Press.
Sell, P. [D.] & Murrell, G. 2006. *Flora of Great Britain and Ireland*, volume 4. Cambridge: Cambridge University Press.
Sell, P.D. & West, C. 1968. *Hieracium* L. In: Perring, F. H. ed., *Critical Supplement to the Atlas of the British flora*. London: Botanical Society of the British Isles.

ISSN: 2632-4970

https://doi.org/10.33928/bib.2022.04.273

Appendix 1. Summary of records

Cefn-coed-cymmer (Cefn Coed): H.J. Riddelsdell (Ley 1907, 1909).

Craig-y-cilau (Craig Cille): 9 June 1894, A. Ley (**CGE**); 15 June 1904, A. Ley (**BM**, **CGE**, **OXF**; Druce 1905, as *H. britannicum*, F.J. Hanb. page 28); 15 June 1904, H.J. Riddelsdell (**BM**, **CGE**, **NMW**, **OXF**; Druce 1907, as *H. britannicum*, F.J. Hanb. page 232); August 1908, G.C. Druce (**OXF**); 15 June 1909, A. Ley (**NMW**); limestone cliff south of Crickhowell, 11 September 1932, H.G.A. Alston (**BM**); 3 July 1935, H.W. Pugsley & N.D. Simpson (**BM**); 3 July 1935, H.G.A. Alston (**BM**); above Coed Pen-twyn, local on rocks, 21 June 1939, A.J. Wilmott (**BM**); cliffs, 27 July 1957, B. A. Miles (**CGE**); Dan-y-darren: SO188159, 22 May 1963, P.D. Sell (**CGE**); central area, SO186163, 8 June 1972, P.D. Sell & J.G. Murrell (**CGE**); west of Llangattock quarries, 14 June 1974, U.K. Duncan (**CGE**); central area, SO188157, 23 June 1975, P.D. Sell & L. Farrell (**CGE**); calcareous sandstone rocks, SO184164, 29 June 2000, T.C.G. Rich (**CGE**); rare on rocks, SO1815, 7 June 2000, T.C.G. Rich (**NMW**); main cliff, shaded, SO1816, 16 June 2000, T.C.G. Rich (**NMW**); SO18341651 to SO18701597, 21 June and 15 July 2016, T.C.G. Rich (**K**).

Dan yr Ogof, Callwen: 18 June 1899, A. Ley (**BM**); Cellwen, 11 June 1904, A. Ley (**BM**; Druce 1905, as *H. stenolepis*, Lindeb. page 29)**.**