

Conservation of Britain's biodiversity: status of the Welsh endemic *Hieracium subminutidens*, Llanwrytyd Hawkweed (Asteraceae)

M. SHEWRING

35 Cardiff Street, Treorchy, Rhonda-Cynon-Taff, CF42 6BG

and

T. C. G. RICH*

Department of Biodiversity and Systematic Biology, National Museum of Wales, Cardiff CF10 3NP

ABSTRACT

Hieracium subminutidens (Zahn) Pugsley (Asteraceae), Llanwrytyd Hawkweed, is a rare Welsh endemic, known from the River Irfon catchment at Llanwrytyd and Abergwesyn in v.c. 42 Brecon. Historical records indicate it occurred in at least six sites. Field surveys in July 2008 revealed four populations with 101 plants on riverside rocks. It is I.U.C.N. threat category 'Endangered'. Conservation proposals are outlined.

KEYWORDS: Brecon, I.U.C.N. Threat Criteria, Wales

INTRODUCTION

Hieracium subminutidens (Zahn) Pugsley (Asteraceae), Llanwrytyd Hawkweed, is a very rare, endemic plant, known from the River Irfon [R. Yrfon] catchment at Llanwrytyd and Abergwesyn in Powys (v.c. 42 Brecon), Wales. It is one of 79 rare hawkweeds included in the Vascular Plant Red Data Book (Wigginton 1999), but there is no recent information on its population size which can be used to determine its priority for conservation. Data were compiled on its historical records as part of a project between the National Museum of Wales and the Countryside Council for Wales in 2001–2002, showing that it had been recorded in at least six sites. In this paper the historical records are combined with the results of a field survey in 2008; full details are given in Rich (2002) and Shewring & Rich (2008).

The history of *H. subminutidens* was set out by Pugsley (1948). Plants found by A. Ley in 1896 at Llanwrytyd, Brecon were first ascribed to the Swedish species *H. adlerzii* Almq.

Williams (1901–1911) disagreed with the application of the name *H. adlerzii* to the plants, but gave no alternative. Zahn (1921) named them *H. caesium* subsp. *adlerzii* var. *subminutidens*, based on material from Llanwrytyd. Zahn's combination was raised to species status by Pugsley (1941), which remains its current rank (Pugsley 1948; Sell & Murrell 2006). It is a member of section *Vulgata* (Pugsley 1948; Sell & Murrell 2006). Sell & West (1968) suggested that *H. subminutidens* is derived from *H. diaphanum* Fr.

Hieracium subminutidens is a reasonably distinct species, but it grows in an area rich in hawkweeds. Key features of *H. subminutidens* (Pugsley 1948) are the 2–3, dark green, oval to elliptic-lanceolate basal leaves with sinuate-dentate margins (these have often withered at the time of flowering), the 5–7 large stem leaves with scattered simple eglandular hairs on both surfaces, the inflorescence with 3–20, medium-sized capitula, the dark green involucre bracts with ± numerous long and short, fine, dark glandular hairs, some simple eglandular hairs and a few stellate hairs, and the discoloured styles. Pugsley (1948) also noted that involucre bracts were correct in bud (i.e. stand erect and over-top the young flower buds), but we found this to be very variable and not reliable. The following hawkweeds have also been recorded in the Llanwrytyd–Abergwesyn area: *H. argillaceum* Jord., *H. consociatum* Jord. ex Boreau, *H. daedalolepioides* (Zahn) Roffey, *H. diaphanum*, *H. sabaudum* L., *H. scabrisetum* (Zahn) Roffey, *H. subcrocatum* (E. F. Linton) Roffey, *H. trichocaulon* (Dahlst.) Johanss., *H. uiginskyense* Pugsley and *H. umbellatum* L.

*e-mail: tim.rich@museumwales.ac.uk

TABLE 1. HERBARIUM AND LITERATURE RECORDS OF *HIERACIUM SUBMINUTIDENS*

DATE	COLLECTOR	SITE	SOURCE AND NOTES
9/8/1889	A. Ley	Abergwesyn, river gravel	CGE
17/7/1890	A. Ley	Abergwesyn, bank near	BM, CGE (some dated 1899)
22/7/1902	A. Ley	Abergwesyn, on the Irfon 2 miles above	CGE
28/6/1921	A. Ley	Abergwesyn, by the Irfon near	BM
8/7/1958	B. A. Miles	Abergwesyn and Llanwrytyd Wells	CGE
16/7/1890	A. Ley	Llanwrytyd, Blaen y Cwm, rocky mountain stream	BM, CGE
17/7/1890	A. Ley	Llanwrytyd, hedge bank	CGE
13/7/1896	A. Ley	Llanwrytyd, Blaen y Cwm	BM (type designated by Pugsley 1948), NMW
13/7/1897	A. Ley	Llanwrytyd, rocky streamside rocks	BM, CGE, NMW , Set of British <i>Hieracia</i> no. 67.
21 & 22 /7/1902	A. Ley	Llanwrytyd, hedge bank	BIRM, CGE
11/7/1904	A. Ley	Llanwrytyd	CGE
23/7/1907	A. Ley	Llanwrytyd, stream side rock, Nant Hebog	CGE
23/7/1907	H. J. Riddelsdell	Llanwrytyd, near	BM, CGE
12/6/1908	A. Ley	Llanwrytyd	CGE
4/8/1955	B. A. Miles	Llanwrytyd Wells, banks of River Irfon	CGE
8/7/1958	B. A. Miles	Llanwrytyd Wells, rocks below River Irfon bridge	CGE
9/7/1959	C. West & C. E. A. Andrews	Llanwrytyd, rocks below road bridge	BIRM, CGE
Cultivated material			
5/7/1899	A. Ley	Glen Llanwrytyd	CGE
7/7/1899	A. Ley	Abergwesyn, river gravel	CGE
1/7/1900	A. Ley	Nant Hebog, Llanwrytyd	BM, CGE, NMW (not all this material is noted at cultivated on the sheets)
26/6/1908	E. F. Linton	Llanwrytyd	BM (hort. Edmondsham)

Material in **BIRM**, **BM** and **NMW** mainly determined by D. McCosh, material in **CGE** determined by P. D. Sell.

METHODS

Historical records were compiled from herbarium material in **BIRM**, **BM**, **CGE** and **NMW** and the literature.

Field work was carried out in July 2008, using the historical records to direct searches. Plants were counted systematically as far as was practical given the access difficulties along rivers. Where available, ripe seeds were collected for ex-situ conservation in August 2008. Voucher material determined by D. McCosh has been deposited in **NMW**.

RESULTS

HISTORICAL RECORDS

The historical records traced are listed in Table 1. The total historical distribution is as described by Linton (1905), i.e. Abergwesyn, Llanwrytyd and the upper Irfon Valley, where it has been recorded in at least six (possibly seven) different sites, most recently in 1958–1959. The habitats indicated from the records are riverside rocks, river gravels and hedgebanks.

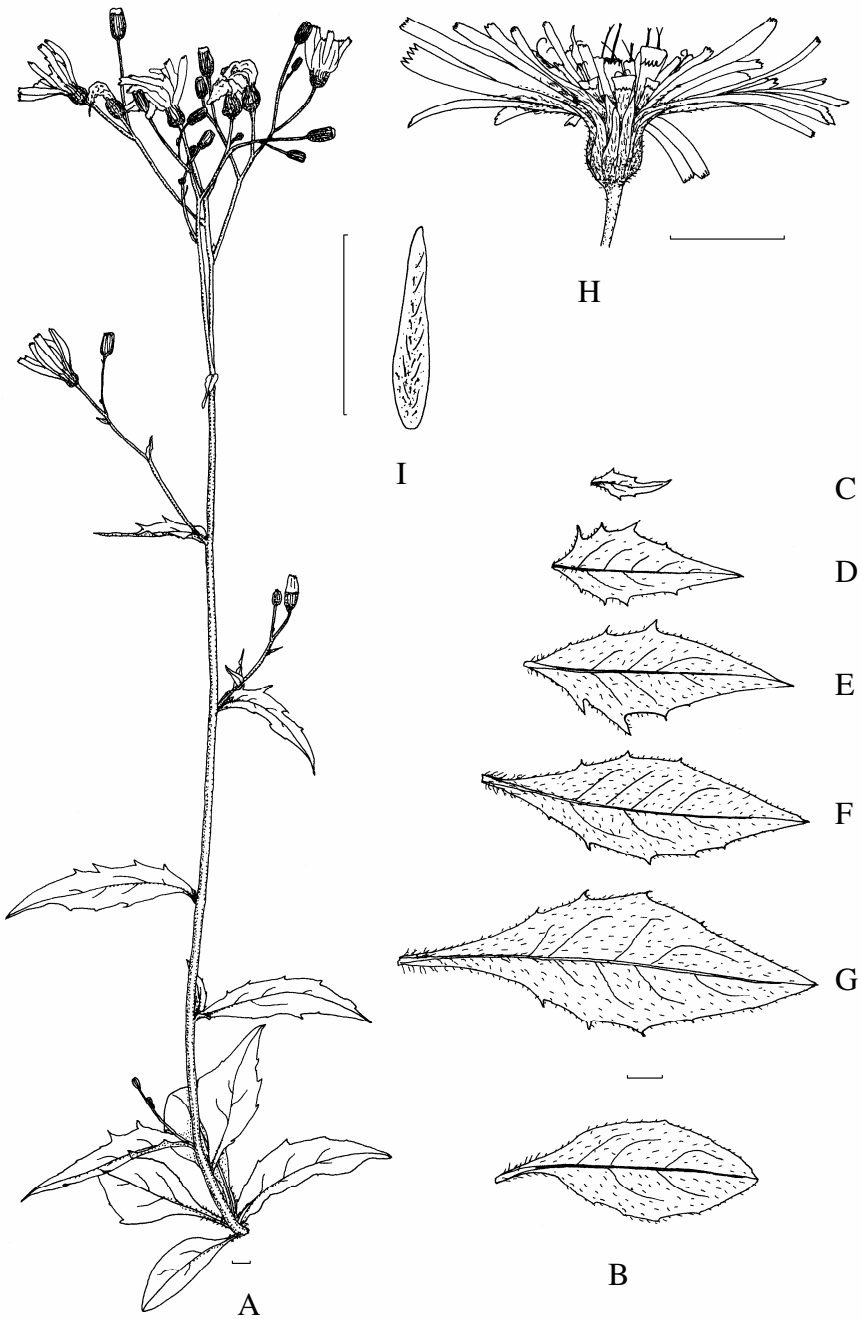


FIGURE 1. *Hieracium subminutidens*. A, plant. B, basal leaf. C-G, stem leaves. H, capitulum. I, involucre bract. Scale bars 1 cm.

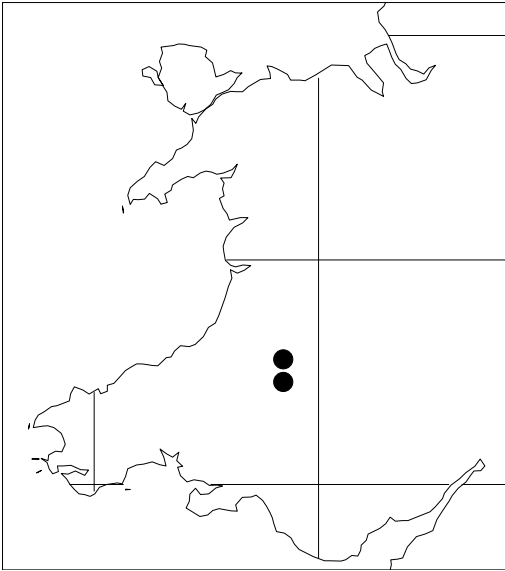


FIGURE 2. Distribution of *Hieracium subminutidens* in 2008.

FIELD SURVEY 2008

Llanwrtyd Wells, River Irfon

Hieracium subminutidens was last recorded in Llanwrtyd Wells in 1959 (Table 1). In July 2008, 35 *H. subminutidens* plants were found at SN878467, mostly on the rocks in the river above the bridge with a few plants on the stone retaining walls downstream of the bridge.

The Wash Pool (near Abergwesyn), River Irfon

No specific historical records for the Wash Pool area exist, though there are possible records for the area from 1899 to 1958. In July 2008, 13 *H. subminutidens* plants were found on partially shaded rocks opposite a small island immediately upstream of the Wash Pool (SN859500).

Nant Henog (Nant Hebog)

Hieracium subminutidens was recorded at Nant Henog between 1890 and 1907. In July 2008, 23 plants in three subpopulations were found along the stream at waterfalls and on rock exposures on the banks (c. SN847485). Much of the valley has been planted with conifers and the upland grassland which remains is heavily grazed.

Pwll Bo, River Irfon

As for the Wash Pool, there are no specific records for this exact site but some of Ley's records could refer to the area. In July 2008, 30 *H. subminutidens* plants were found on an area

of rock exposure and island approximately 100 m upstream of Pwll Bo lower car park (SN856509).

Abergwesyn valley

No *H. subminutidens* was found at Abergwesyn or two miles above (cf. Table 1), despite an abundance of seemingly suitable habitat and presence of other hawkweeds.

There is a doubtful record for Dyffryn Cwannon, v.c. 42, 21 June 1953, collected by C. E. A. Andrews (**BIRM**), but T. Rich is not convinced it is *H. subminutidens*, and failed to re-find it in 2006.

HABITAT AND ASSOCIATED SPECIES

The main habitat was riverside rocks and waterfalls above the normal summer river flow in places ungrazed by animals. The plants were typically rooted in the rock crevices with their associated river sands and gravels, or rarely directly into the mortar of walls. Associated species included riverside trees and shrubs such as *Alnus glutinosa* (L.) Gaertn. and *Salix* spp., and herbaceous plants and ferns such as *Agrostis canina* L., *Anthoxanthum odoratum* L., *Athyrium filix-femina* (L.) Roth, *Deschampsia cespitosa* (L.) P. Beauv., *Dryopteris dilatata* (Hoffm.) A. Gray, *D. filix-mas* (L.) Schott, *Festuca ovina* L., *Galium saxatile* L., *Holcus lanatus* L., *H. mollis* L., *Molinia caerulea* (L.) Moench, *Potentilla erecta* (L.) Rausch, *Rubus* spp., *Sanguisorba officinalis* L., *Solidago virgaurea* L. and *Vaccinium myrtillus* L.

DISCUSSION

Hieracium subminutidens is thus currently known from four sites (Llanwrtyd Wells, Wash Pool, Nant Henog and Pwll Bo), with a total of 101 plants. It appears to have gone from the two River Irfon sites at and above Abergwesyn, though why is not clear as there is much apparently suitable habitat still present. We also did not find any material on hedgebanks, possibly due to mowing of roadsides to maintain sight lines for traffic though other hawkweeds were seen on roadside hedgebanks. The remaining riverside sites are probably similar to where it had been recorded historically, though the lack of detailed historical information makes it difficult to judge whether these populations have also declined. The distribution is mapped in Figure 2.

Under the I.U.C.N. (2001) threat criteria, *H. subminutidens* qualifies as 'Endangered' (total population less than 250 individuals). The main habitat, riverside rocks, indicates that it is potentially under threat from flooding and changes in the river dynamics at all sites. The main population at Llanwrtyd Wells bridge is considered at significant risk from flooding, as it occurs only 20–30 cm above 'normal' summer river levels and is restricted to a single rock outcrop. The small populations at the Wash Pool and Pwll Bo are becoming quite heavily shaded by riverside trees (especially at the former) and it could be eliminated if the shade become too heavy. There are no immediate threats to its survival at Nant Henog though a lack of suitable management limits the ability of the population to spread.

To conserve *H. subminutidens* in situ, some localised management may be needed. As a plant of open acidic rocks and cliffs associated with rivers and streams, generally no management is required provided these stay open from scrub, are not subject to river erosion, and are not grazed (most hawkweeds are sensitive to grazing). Some relaxation of

grazing pressure at Nant Henog may allow suitable habitats to be colonised, though some areas show signs of scrubbing up and some targeted clearance work may also prove beneficial. Similarly, selective woodland thinning and clearance along the riversides at the Wash Pool and Pwll Bo would benefit those populations. The Wash Pool, Pwll Bo and Llanwrtyd Bridge localities are within the Afon Irfon SSSI, and *H. subminutidens* should be added to the features for which the site is designated to ensure its conservation is taken into account in the future.

Seeds collected during 2008 have been deposited at the Millennium Seed Bank for ex situ conservation.

ACKNOWLEDGMENTS

We would like to thank the Countryside Council for Wales for funding the collation of the historical records, the Keepers of the herbaria for access to collections, and David McCosh for naming plants and information from the *Hieracium* database. The map was plotted using DMAPW by Alan Morton.

REFERENCES

- I.U.C.N. (2001). *IUCN Red list categories and criteria. Version 3.1*. I.U.C.N., Gland.
- LINTON, W. R. (1905). *An account of the British Hieracia*. West, Newman & Co., London.
- PUGSLEY, H. W. (1941). New species of *Hieracium* in Britain. *Journal of Botany* **79**: 177–183 and 193–197.
- PUGSLEY, H. W. (1948). A prodromus of the British *Hieracia*. *Journal of the Linnean Society of London (Botany)* **54**: 1–356.
- SELL, P. D. & WEST, C. (1968). *Hieracium* L. In, PERRING, F. H., ed., *Critical Supplement to the Atlas of the British flora*. B.S.B.I., London.
- SHEWRING, M. & RICH, T. (2008). Distribution and status of Llanwrtyd Hawkweed, *Hieracium subminutidens* in 2008. Unpublished report, National Museum of Wales.
- RICH, T. C. G. (2002). *Collection and determination of apomictic plant taxa in Wales*. CCW contract no. FC 73-05-21. Unpublished contract report to Countryside Council for Wales, February 2002.
- WILLIAMS, F. N. (1901–1911). *Prodromus Florae Britannicae*. C. Stutter, Brentford.
- ZAHN, K. H. (1921). Compositae – *Hieracium*. In Engler, A., ed., *Das Pflanzenreich* IV. 280. Heft **76**: 450. Engelmann, Berlin.

(Accepted May 2010)