

Conservation of Ireland's biodiversity: the status of two Irish endemic hawkweeds *Hieracium hartii* and *H. hibernicum* (Asteraceae)

T. C. G. RICH*

*Department of Biodiversity and Systematic Biology, National Museum of Wales,
Cardiff CF10 3NP, U.K.*

D. J. McCOSH

Baconsthorpe Old Rectory, Holt, Norfolk NR25 6LU, U.K.

J. SAWTSCHUK

*Université de Bretagne Occidentale – Institut de Géoarchitecture CS 93837 29238 Brest cedex 3,
France*

and

M. B. WYSE JACKSON

*National Parks and Wildlife Service, Department of the Environment, Heritage and
Local Government, 7 Ely Place, Dublin 2, Ireland*

ABSTRACT

The National Parks and Wildlife Service, Dublin commissioned a review and survey of the conservation status of *H. hartii* and *H. hibernicum* which are endemic to Ireland. *Hieracium hartii* has been regarded as extinct, but about 50 plants were rediscovered on Slieve League, Co. Donegal in its only locality; records for Ben Bulbin and the Ox Mountains, both Co. Sligo, are errors. *Hieracium hibernicum* was originally described from Co. Down, but is extinct there and in one of its two Donegal localities; 41 plants were rediscovered in the other Donegal site, the Owengarve River, which is now its only extant site. Both species are IUCN threat category 'Critically Endangered'. Lectotypes are designated.

KEYWORDS: Hart's Hawkweed, Irish Hawkweed, Ireland, endemics, lectotype, rare species.

INTRODUCTION

There are seven *Hieracium* species endemic to Ireland: *H. argentatum* (Pugsley) P. D. Sell, *H. basalticola* Pugsley, *H. hartii* (F. Hanb.) P. D.

Sell & C. West, *H. hesperium* P. D. Sell, *H. hibernicum* F. Hanb., *H. scullyi* E. F. Linton and *H. sparsifrons* P. D. Sell & C. West (Sell & Murrell 2006). As there was little recent information available about them to direct conservation priorities, in 2006 the National Parks and Wildlife Service (NPWS) of the Department of the Environment, Heritage and Local Government, Dublin commissioned a review of their status. In this paper the statuses of *H. hartii* and *H. hibernicum* are summarised; full details are given in Rich (2008), which is available to bona fide researchers from M. Wyse Jackson on request. Details of other endemics are given in Rich *et al.* (2008b, 2010), while some interim results were presented in Rich *et al.* (2008a).

HIERACIUM HARTII, HART'S HAWKWEED

Hieracium hartii (= *H. cerinthiforme* var. *hartii* F. Hanb. (basonym); *H. anglicum* var. *cerinthiforme* forma *hartii* (F. Hanb.) W. R. Linton; *H. mougeotii* subsp. *anglicum* var. *cerinthiforme* forma *hartii* (F. Hanb.) Zahn; *H. anglicum* var. *hartii* (F. Hanb.) F. N. Williams) was first found by H. C. Hart in 1883 on Slieve League, Co. Donegal (Hart 1886). In 1891, F. J. Hanbury and H. C. Hart visited the mountain

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

and found the plant in profusion and just coming into flower noting 'indeed it was *the* Hieracium of the mountain' [his italics; Hanbury 1892a]. Hanbury regarded it as an extreme form distinct from *H. cerinthiforme* F. Hanb. and *H. anglicum* Fr. and, following a comment from the Swedish *Hieracium* expert Marten Elfstrand that it looked like a good variety, Hanbury named it *H. cerinthiforme* var. *hartii* after Hart. Williams (1902–1903) transferred the variety to *H. anglicum* and Linton (1905) treated it as *H. anglicum* var. *cerinthiforme* forma *hartii*. It was finally raised to species status by Sell & West (1955). A lectotype for *H. cerinthiforme* var. *hartii* F. Hanb. was selected by Sell & West in 1957 but was unpublished, and is now hereby designated by P. D. Sell: Slieve League, Donegal, 16 July 1891, F. J. Hanbury (BM).

Hieracium hartii is a member of section *Cerinthoidea* Monnier (Sell & Murrell 2006). It is characterised by the obovate basal leaves which may be absent at flowering, the 2–5, large, ovate or obovate, acute, entire or minutely and acutely toothed, sessile or strongly amplexicaul stem leaves, and the 1.5–2.0 mm wide, rather obtuse, green, lax, softly hairy and pilose-tipped involucre bracts (Figs 1–3; Hanbury 1892a). It is most similar to *H. cerinthiforme* which differs in the narrower, 1.2–1.5 mm wide involucre bracts and 1–4, smaller stem leaves. It has been confused with *H. iricum* Fr., but that species is much more robust and hairy, often greyish, and usually has 3–6 stem leaves and involucre bracts 1.0–1.5 mm wide.

HIERACIUM HIBERNICUM, IRISH HAWKWEED

Hieracium hibernicum (= *H. norvegicum* subsp. *hibernicum* (F. Hanb.) Zahn) was first found in the Mourne Mountains, Co. Down by H. C. Hart in 1883. Hart sent material to J. Backhouse jnr, who noted 'possibly new, probably forms of *H. argenteum*, but very remarkable', and then to C. C. Babington who noted 'certainly the most remarkable form of *H. argenteum* Fr. I have ever seen' (Hart 1886). Hart (1886) also noted the similarity of the Mourne Mountains plants to material from Moynalt, near Laghy, East Donegal (v.c. H34), and with more typical *H. argenteum* from Galway. After S. A. Stewart had shown it to F. J. Hanbury at Broughnamaddy, Co. Down in 1891, *H. hibernicum* was described as a new species (Hanbury 1892b), the description covering both the Mourne Mountains and

Moynalt plants. After examining further material in **DBN**, Pugsley (1948) decided that the Donegal plants were sufficiently different to merit recognition as a distinct variety, and named them var. *vennicniorum* Pugsley, differing from the Mourne Mountains material in having the stem more hirsute below with spreading simple eglandular hairs, and the inflorescence sometimes with many (up to 22), smaller capitula with more simple eglandular hairs. Sell & Murrell (2006) do not separate the two varieties.

Hanbury (1892b) and Linton (1905) included *H. hibernicum* in section *Oreadea* (Fr.) Dahlst., but Pugsley (1948) thought it was better placed in section *Tridentata* (Fr.) Arv.-Touv., where it has been retained by Sell & Murrell (2006). It is characterised by its green colouration, the numerous, narrow stem leaves with 2–3 small, sharp teeth and semi-clasping bases, the lax, few-flowered inflorescence and discoloured styles (Figs 4–6). Sell & Murrell's (2006) description of *H. hibernicum* as having yellow styles and glaucous leaves is incorrect. A lectotype for *H. hibernicum* was selected by P. D. Sell and C. West in 1954 but is unpublished, and is hereby designated by P. D. Sell: Stream in Mourne Mountains, tributary of the Causeway Water, at about 900–1000 ft, Co. Down, 23 July 1891, F. J. Hanbury (BM). Praeger (1892) grew it in cultivation successfully.

METHODS

Historical records and information were combined from herbaria (**BEL**, **BIRM**, **BM**, **CGE**, **DBN**, **E**, **LIV**, **NMW**, **OXF**, **RNG** and **TCD**), the literature, databases, botanists and the internet. Material has been determined by H. W. Pugsley, P. D. Sell, D. McCosh or T. Rich.

Field work was carried out in 2006–2008 using the historical information to direct surveys. The main aim of the field work was to visit the historic sites to refind the endemic *Hieracia*, though the quality of the historical information did not always make this simple and we often had to use our intuition about *Hieracium* ecology to find suitable places to search. Kéry *et al.* (2006) showed at least two visits are usually required to be certain of refinding most populations of rare plants, and up to four visits for species which are hard to find.

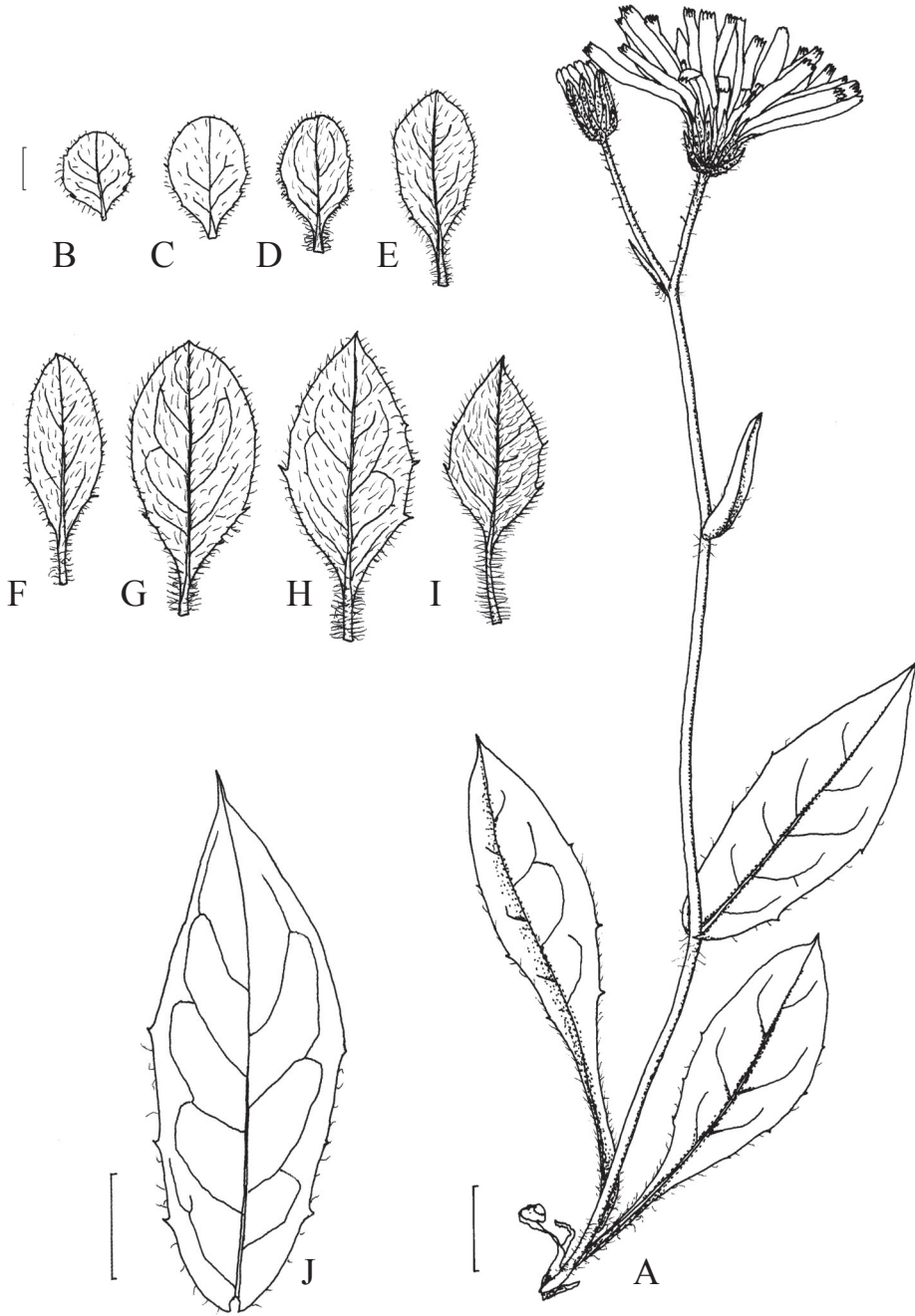


FIGURE 1. *Hieracium hartii*, Slieve League. A, plant. B–I oldest to youngest rosette leaves (cultivated material). J, middle stem leaf. Scale bars 1 cm.



FIGURE 2. *Hieracium hartii*, middle stem leaf, Slieve League.



FIGURE 3. *Hieracium hartii*, capitulum, Slieve League.

For each population found, an NPWS Rare/Threatened plant species recording form was completed with a general relevé form. Soil samples were taken from near the roots of the *Hieracia*; in the laboratory they were mixed 50:50 with distilled water and measured using a calibrated pHep2 Hanna pH meter. Voucher specimens have been placed in **DBN**.

RESULTS

HIERACIUM HARTII

Although a detailed description of *H. hartii* was given by Sell & Murrell (2006), the rosette leaves have not previously been described and are here described from material cultivated in Cardiff in 2007 (Fig. 1): Rosette leaves pale green when young, sparsely hairy above, below and on margins with long, white, simple eglandular hairs. Outermost rosette leaves \pm orbicular to obovate, rounded at apex, rounded to cuneate at base with a broadly winged petiole, with sparse, slightly twisted, forward-pointing teeth on margins. Outer rosette leaves to 70×33 mm including the broadly winged petiole, elliptic-obovate, obtuse and weakly mucronate, cuneate, with long, twisted, forward-pointing teeth. Inner rosette leaves elliptic, acuminate, cuneate, with 3–5 teeth on margin. Petioles to 20 mm, winged.

Historical records for *H. hartii* from Ben Bulbin and the Ox Mountains in Co. Sligo (v.c. H28) were mapped in Sell & West (1968) but have been rejected following field work and re-identification of the voucher specimens in **BM** and **DBN** (all are *H. iricum*). *Hieracium hartii* is now regarded as endemic to Slieve League, Co. Donegal (Fig. 7) where despite being called 'the' *Hieracium* of Slieve League by Hanbury (1892a), it had not been reported since and was presumed extinct (Sell & West 1968). On 23 July 2006, a small population of about 21 *H. hartii* plants was found on mountain cliffs associated with the rich concentration of arctic-alpines on the north side of Slieve League at G552783. The population estimate is very crude due to the mountainous terrain (a full population census would require roped access by specialist climbers); twelve certain individuals were seen flowering, and nine possible others occurred but could not be accessed safely. During a second visit on 22 July 2008 in heavy rain, more plants were flowering and the population was estimated as about 50 individuals but no precise count was undertaken due to treacherous conditions. There were many vegetative *Hieracium* rosettes

of unknown identification in the turf grazed by sheep; *H. cerinthiforme* has also been reported to occur here, and *H. anglicum* was collected nearby in 2006.

Hieracium hartii occurred on Slieve League in a small area of base-rich soils (pH 6.9) associated with metamorphic rocks on steep, rocky, broken ground at c. 350 m altitude. It grew in quite closed grasslands c. 5–8 cm high associated with *Angelica sylvestris* L., *Carex flacca* Schreb., *Dryas octopetala* L. and *Succisa pratensis* Moench, and bryophytes such as *Breutelia chrysocoma* (Hedw.) Limpr., *Ctenidium molluscum* (Hedw.) Mitt., *Ditrichum gracile* (Mitt.) Kuntze and *Leiocolea alpestris* (Schleich. ex F. Weber) Isoy. It also grew on open rocks with sparser vegetation.

HIERACIUM HIBERNICUM

Hieracium hibernicum has been recorded historically in three sites: the Mourne Mountains, Co. Down (v.c. H38), and in two glens near Laghy, Co. Donegal (v.c. H34) and above Glenties, Co. Donegal (v.c. H35). A record for Carrick in Colgan & Scully (1898) is an error for *H. argenteum*, as originally recorded by Hart (1885).

Hart's original 1883 locality was by the Causeway Water at Broughnamaddy in the Mourne Mountains. S. A. Stewart and R. L. Praeger visited the locality in 1889, and Stewart and F. J. Hanbury visited it in 1891. After another visit in 1895, Stewart wrote to W. R. Linton 'I was at Mourne Mountains this day week and was rather disappointed I could not find any *H. hibernicum* at all – not a flower or leaf to be seen. I greatly fear that it has gone. There was very little of it, but last summer I saw 3 stems in flower, and some others with root leaves only. On that occasion I did not take any as I was afraid to reduce it in any way. It now appears to me that I might just as well have taken all away. The plant grew on the rocky walls of a ravenous gorge of a mountain stream, and I fear that either the severe frost of the winter has killed the plant, or else that portions of the rocks have been swept away by the recent heavy floods, and thus this plant has been destroyed. I saw that the river banks have suffered considerable damage' (letter 10 August 1895, **BM**). P. D. Sell and C. West were unable to refind it in 1956, and P. Hackney was not able to refind it in 1986 (Hackney 1992). It was similarly not refound on a search on 18 July 2008 – indeed it was difficult to find any places where it might have occurred. *Hieracium hibernicum* must be regarded as extinct in Co. Down.



FIGURE 4. *Hieracium hibernicum* (left hand plant) by Owengarve River with *H. argenteum* (taller right hand plant).

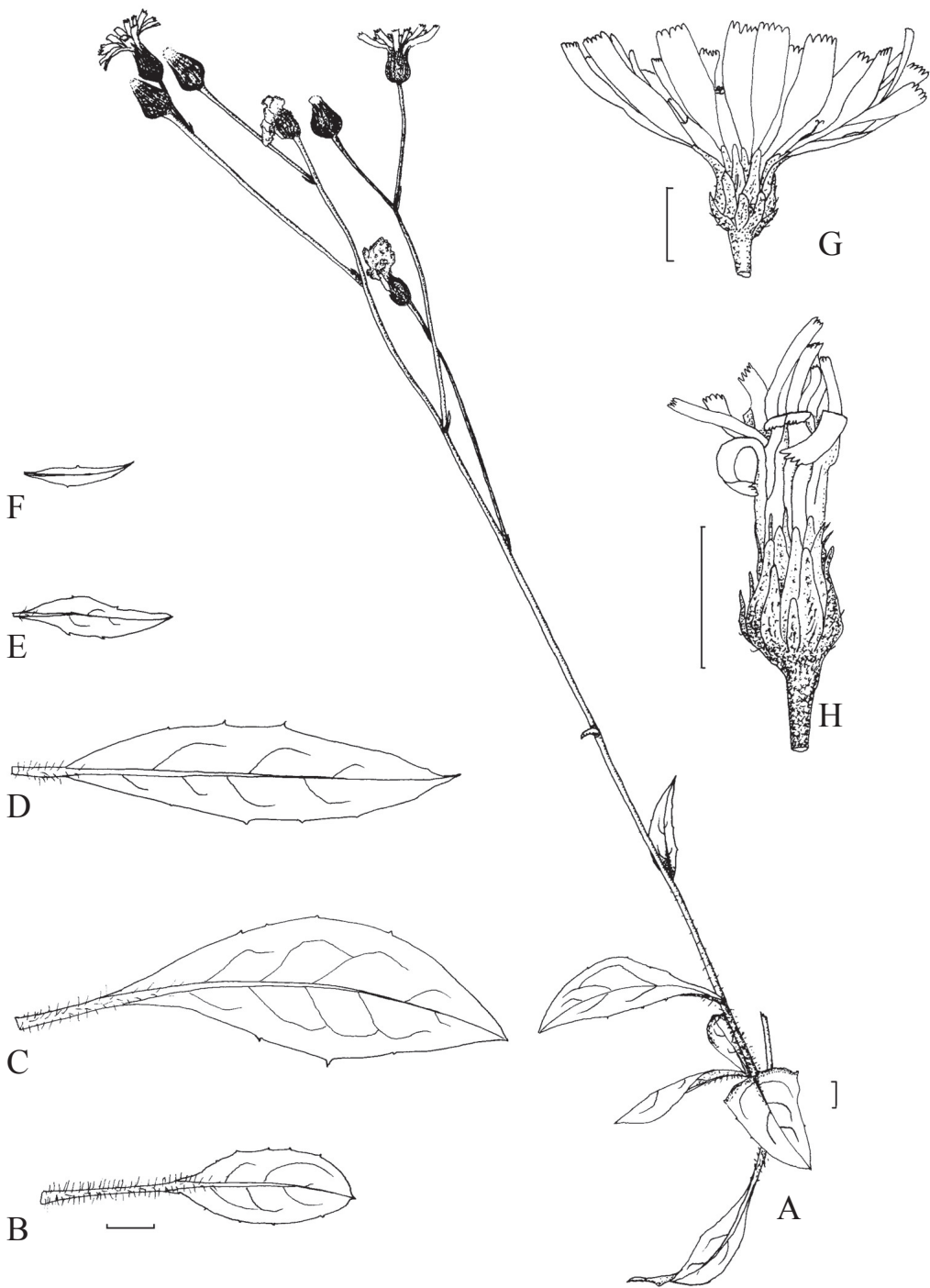


FIGURE 5. *Hieracium hibernicum*, Owengarve River. A, plant. B–F, stem leaves from lowest to upper. G, H capitula. Scale bars 1 cm.



FIGURE 6. Selection of *Hieracium hibernicum* plants showing variation in habit, Owengarve River. Not to scale.

Near Laghy, it was recorded in two glens above Moyne Bridge by H. C. Hart in 1898, and was seen again by J. E. Raven in 1954 on a steep, bushy river bank at Moynalt. The area was searched on 22 July 2006 and briefly on 16 July 2008 without success. We were unable to find any suitable places for *Hieracium* at all, and concluded that the river banks have changed significantly through increased shading by trees and shrubs. However, without knowing exactly where *H. hibernicum* had occurred originally, it is difficult to be certain of the reason for its loss.

Hieracium hibernicum was first collected on the Owengarve River above Glenties by H. C. Hart in 1894, though was not listed in his flora (Hart 1898). It was last seen there in 1955 by N. D. Simpson, but most of the details as to precisely where it occurred are decidedly vague. The river above McDevitt's Bridge was

searched on 22 July 2006, and eventually 41 plants of *H. hibernicum* were found associated mainly with rocks by waterfalls at the head of the river above G898935. The *H. hibernicum* plants on the exposed rocks by the main and upper waterfalls are smaller and stiffer than the larger plants in sheltered places lower downstream. A second visit on 16 July 2008 confirmed that the population estimate was reasonable.

Thus, *H. hibernicum* has been refound in only one of its three sites (Fig. 7). The historic and current records indicate that it is a species of rocky riverbanks, usually above the level of flood waters. It prefers open vegetation associated with other *Hieracium* species (*H. argenteum*, *H. iricum*, *H. stewartii* (F. Hanb.) Roffey), *Calluna vulgaris* (L.) Hull, *Dryopteris dilatata* (Hoffm.) A. Gray, *Erica cinerea* L., *Solidago vulgaris* L. and *Succisa pratensis*, on

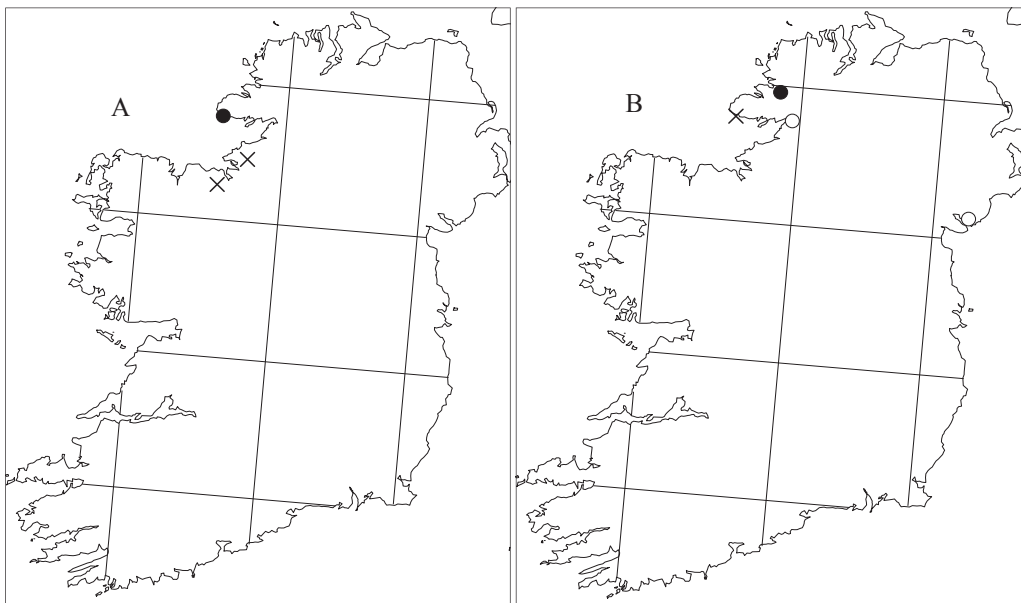


FIGURE 7. Distribution of Irish endemic *Hieracium* species. A, *H. hartii*. B, *H. hibernicum*. ● 2006–2008. ○ Not refound. × error.

acidic soils (pH 5.7). Being a tall leafy species, it is susceptible to grazing, and occurs out of the reach of sheep. The altitude range would originally have been from c. 50 m at Laghy to c. 275–305 m in the Mourne Mountains; it currently occurs at c. 200–240 m on the Owengarve River.

DISCUSSION

At the start of the Irish endemic hawkweeds project, *H. hartii* was considered to be extinct and *H. hibernicum* had not been seen for fifty years. *Hieracium hartii* had probably been overlooked due to confusion with the relatively sparsely hairy forms of *H. iricum* on Ben Bulbin which had been attributed to this species, resulting in the plants at Slieve League being attributed to *H. cerinthiforme* rather than *H. hartii*. *Hieracium hibernicum* had probably simply not been looked for due to the very limited amount of *Hieracium* work carried out in Ireland in recent years; the work that has been done was mostly by P. Hackney in Northern Ireland where *H. hibernicum* was already extinct (Hackney 1992).

Very small populations of both hawkweeds are now known in Donegal. There may also be additional sites which are as yet unknown, but it is impractical to search for them. The very small population sizes indicates that they are

both categorised as ‘Critically Endangered’ following the IUCN (2001) Red List criteria. Both hawkweeds would benefit from some relaxation of grazing pressure in their upland habitats. *Hieracium hartii* is relatively safe from grazing on its mountain rocks but a significant reduction in grazing pressure might allow it to increase and spread within its habitat. *Hieracium hibernicum* could expand along the riverbanks, but is at risk from scrub expansion which may have already resulted in losses downstream from its current site, and where it formerly occurred near Laghy.

A priority is to get secure *ex situ* collections of both species. Three plants of *H. hartii* are currently being cultivated at the National Botanic Gardens, Glasnevin. One 2006 collection of seed of *H. hibernicum* by R. Sheppard *et al.* is held in the Irish Threatened Plant Genebank at Trinity College Botanic Garden, Dublin. *Ex situ* collections would also allow further research on their biology; most British and Irish *Hieracium* species are polyploid and apomictic (Sell & Murrell 2006) which is likely to be the case for these species but this has not yet been tested experimentally.

The Slieve League site for *H. hartii* is included in a Special Area of Conservation (SAC) under the European Union Habitats Directive. The Owengarve River site for *H. hibernicum* is currently unprotected, but will be

considered for designation as a Natural Heritage Area (NHA) under the Wildlife (Amendment) Act, 2000. Both species are under consideration by the National Parks and Wildlife Service for inclusion on a revised Flora (Protection) Order under section 21 of the Wildlife Act, 1976.

Compared to other Irish endemic hawkweeds, these Donegal species are amongst the rarest. There are over 3950 plants of *H. basalticola* (Rich *et al.* 2010), at least 870 plants of *H. argentatum*, 210 plants of *H. scullyi* and 204 plants of *H. sparsifrons* (Rich *et al.* 2008b). The status of *H. hesperium* remains to be resolved.

ACKNOWLEDGMENTS

This work was funded by the National Parks and Wildlife Service, of the Department of the Environment, Heritage and Local Government, Dublin. We would like to thank Peter Sell for permission to publish his lectotypes, Paul Hackney, Rory Hodd, Pauline Hodson, Mark Jannink, Matthew Jebb, Sarah Lendrum, Alex Lockton, Serena Marner, Gina Murrell, John Parnell, Chris Preston, Mark Spencer, Ralph Sheppard, and the Keepers of the herbaria for access. Alan Orange kindly identified the bryophytes. The maps were plotted with DMAPW by Alan Morton.

REFERENCES

- COLGAN, N. & SCULLY, R. W. (1898). *Contributions towards a Cybele Hibernica*. 2nd ed. Edward Ponsonby, Dublin.
- HACKNEY, P. (1992). *Flora of the North-east of Ireland*. 3rd ed. Institute of Irish Studies, Queen's University, Belfast.
- HANBURY, F. J. (1892a). Further notes on *Hieracia* new to Britain. *Journal of Botany (London)* **30**: 165–170.
- HANBURY, F. J. (1892b). Further notes on *Hieracia* new to Britain. *Journal of Botany (London)* **30**: 258–261.
- HART, H. C. (1885). Report on the flora of south-west Donegal. *Proceedings of the Royal Irish Academy, 2nd series* **4**: 443–469.
- HART, H. C. (1886). Irish hawkweeds. *Journal of Botany (London)* **24**: 45–47.
- HART, H. C. (1898). *Flora of the County Donegal*. Sealy, Bryers & Walker, Dublin & David Nott, London.
- IUCN (2001). *IUCN Red list categories and criteria. Version 3.1*. I.U.C.N., Gland.
- KÉRY, M., SPILLMANN, J. H., TRUONG, C. & HOLDEREGGAR, R. (2006). How biased are estimates of extinction probability in revisitation studies? *Journal of Ecology* **94**: 980–986.
- LINTON, W. R. (1905). *An account of the British Hieracia*. West, Newman & Co., London.
- PRAEGER, R. L. (1892). *Hieracium hibernicum* Hanb. *Journal of Botany (London)* **30**: 808–809.
- PUGSLEY, H. W. (1948). A prodromus of the British *Hieracia*. *Journal of the Linnean Society (Botany)* **54**: 1–356.
- RICH, T. C. G. (2008). Review and survey of the conservation status of Irish endemic hawkweeds (*Hieracium*). Final Report. Unpublished report from National Museum of Wales to National Parks and Wildlife Service, Dublin.
- RICH, T. C. G., WYSE JACKSON, M. B. & FITZGERALD, R. (2008a). Wildlife reports. Plants – Ireland. *British Wildlife* **19**: 214–216.
- RICH, T. C. G., HODD, R. L. I. B., MCCOSH, D. J., MHIC DAEID, E. C., MCVEIGH, A., SAWTSCHUK, J. & WYSE JACKSON, M. B. (2008b). Conservation of Ireland's biodiversity: a survey and assessment of the current status of three Irish endemic hawkweeds from Kerry, *Hieracium argentatum*, *H. scullyi* and *H. sparsifrons* (Asteraceae). *Biology and Environment: Proceedings of the Royal Irish Academy* **108B**: 143–155.
- RICH, T. C. G., COTTON, D. C. F., HODD, R. L. I. B., HOUSTON, L., MCCOSH, D. J. & WYSE JACKSON, M. B. (2010). Conservation of Ireland's biodiversity: status of the Irish endemic *Hieracium basalticola* Pugsley, Basalt Hawkweed (Asteraceae). *Irish Naturalists' Journal* **30**: (in press).
- SELL, P. D. & MURRELL, G. (2006). *Flora of Great Britain and Ireland*. Volume 4. Cambridge University Press, Cambridge.
- SELL, P. D. & WEST, C. (1955). Notes on the British *Hieracia* – I. *Watsonia* **3**: 233–236.
- 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.
- WILLIAMS, F. N. (1902–1903). *Hieracium* in *Prodromus florae Britannicae*. Brentford.

(Accepted November 2009)