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Conservation of Britain's biodiversity: rediscovery of the extinct Lake District endemic *Hieracium fissuricola*, Fisherplace Gill Hawkweed (Asteraceae)

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Abstract
Hieracium fissuricola P.D. Sell, Fisherplace Gill Hawkweed, is a rare Lake District endemic. It had not been refound at the original 1954 locality at Fisherplace Gill and was regarded as extinct. A new site was discovered on the nearby Glenridding Estate in 2021 which comprised a tiny colony of six plants. It is IUCN (2001) Threat Status 'Critically Endangered'. Seed has been deposited in the Millennium Seed Bank.

Keywords: critically endangered; England; Fisher Ghyll Hawkweed; IUCN threat status

Introduction

Hieracium fissuricola P.D. Sell was described by Peter Sell based on one 1954 collection from Fisherplace Gill, Helvellyn, v.c.70. Sell & Murrell (2006) gave it the common name as 'Fisher Ghyll' based on the original locality but the spelling of 'Fisherplace Gill' is consistently used on Ordnance Survey maps so is adopted here.

Hieracium fissuricola is a member of section *Subalpina* Pugsley, and is one of five section *Subalpina* species recorded in England. It is characterised in the type description (Sell & Murrell, 2006) by the basal rosette leaves being mostly elliptic to oblong-lanceolate, rounded to cuneate at the base and more or less untoothed, glabrous or with scattered simple hairs above and numerous simple hairs and scattered stellate hairs beneath, the single stem leaf reduced or absent, the bracts obtuse with numerous simple hairs, few to numerous glandular hairs and some stellate hairs, the ligules shortly hairy and the styles yellowish to discoloured.

In 2013, Natural England commissioned me to search Fisherplace Gill for *H. fissuricola*, but I was unable to refind it (Rich, 2013) and as Brian Burrow had also been unsuccessful in refinding it on 29 June 2009 (pers. comm. 2013), McCosh & Rich (2018) listed it as extinct. On 13 July 2021, whilst looking for seeds of *H. lakelandicum* and *H. angustatum* (Lindeb.) Lindeb. on the nearby Glenridding Estate, v.c.69, I found a small, dark-headed hawkweed I did not recognise and collected a specimen which I was astonished to find keyed out to *H. fissuricola*. The specimen was sent for verification by the two hawkweed experts: David McCosh accepted it as *H. fissuricola* and Brian Burrow (pers. comm. 2022) pointed out it differed from the description of *H. fissuricola* in lacking simple hairs on the peduncles, having short to very short glandular hairs on the involucral bracts and in having glabrous ligule tips.

The aim of this paper is to present details of the new locality and discuss the differences in morphology between the type locality and the new site.

Fisherplace Gill (v.c.70)

The sole previous collection of *H. fissuricola* was from Fisherplace Gill on 8 July 1954 by J.E. Raven at *c.*430 m. [*c.*1400 feet] altitude (five sheets including the holotype in **CGE**; one sheet determined by P.D. Sell as *H. fissuricola* I have redetermined in 2023 as a section *Cerinthoidea* species; this may be *H. ampliatum* as originally suggested by J. E. Raven). There is no original grid reference available, but the altitude cited suggested it was found at *c.*NY325181, which is a relatively gently sloping section of the gill lined with small north-facing rocks and cliffs, before the gill grades out into open moorland (Fig. 1).

Figure 1. Upper part of Fisherplace Gill where H. fissuricola was previously recorded

The underlying geology of Fisherplace Gill is Birker Fell Andesite Formation, an igneous bedrock which is part of the Borrowdale Volcanic Group (BGS, 2022). These give a predominantly acidic soil and calcifuge flora, and overall Fisherplace Gill is not very diverse botanically (*Juniperus communis* is frequent, with rare *Antennaria dioica, Geranium sylvaticum* and *Rubus saxatilis*). There is a lot of suitable hawkweed habitat, and other species recorded in the gill are *H. ampliatum, H. cf. anglicum*, *H. cumbriense, H. jaculifolium, H. leyi, H. sabaudum* and *H. triviale (H. vulgatum* auct. Angl.). Other hawkweed experts who have collected in the gill include C. West in 1953 and J. N. Mills in 1968 but neither collected *H. fissuricola.*

Glenridding Estate locality (v.c.69)

In 2021, two plants were found on a north-west facing, steep 80° rocky slope at about 650 m altitude (Fig. 2), on the east side of a small gully, out of the reach of sheep, in herb-rich vegetation which seemed quite damp, with *Alchemilla alpina, Alchemilla glabra, Anthoxanthum odoratum, Calluna vulgaris, Campanula rotundifolia, Festuca vivipara, Galium saxatile, Luzula sylvatica, Sedum rosea, Solidago virgaurea, Sorbus aucuparia* saplings*, Succisa pratensis, Thalictrum minus, Thymus polytrichus* and *Vaccinium myrtillus*. The underlying geology is igneous bedrock of the Middle Dodd Dacite Formation, also part of the Borrowdale Volcanic Group. (BGS, 2022). On 15 August 2022 the colony was revisited and six plants were found; five plants were fruiting (two large and three very small plants) and one plant was vegetative.

Other hawkweed species recorded on the rockfaces nearby include *H. angustatum, H. argenteum, H. flocculosum, H. lakelandicum, H. leyi, H. saxorum* and *H. subgracilentipes.*

Figure 2. Glenridding Estate locality of *H. fissuricola*

Discussion

Comparison of Fisherplace Gill plants and Glenridding plants

In the field, the Glenridding plants stood out from other hawkweeds as being 10-25 cm tall with olive-green, ±entire, narrowly elliptic leaves, with small clustered heads on short pedicels with blackish bracts (Fig. 3).

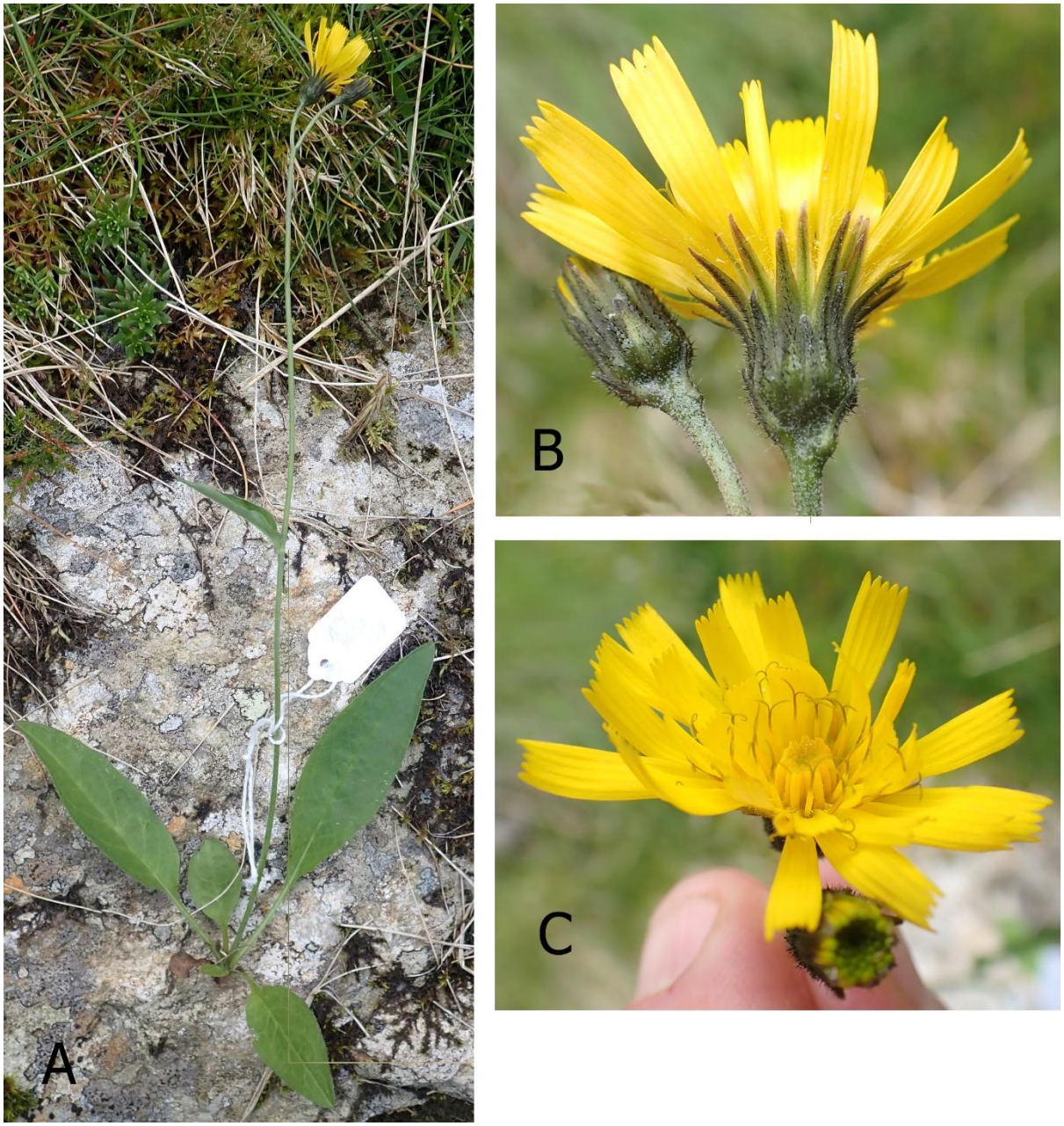

Figure 3. *Hieracium fissuricola.* A, plant collected in 2021. B, side view of capitulum. C, capitulum from above

As pointed out by Brian Burrow, the single 2021 voucher from the Glenridding locality is similar but not identical to Sell & Murrell's (2006) description of the original Fisherplace Gill plants. The holotype and the four other specimens in **CGE** were re-examined in February 2023 and compared to the Glenridding voucher collected in 2021 and the inflorescences collected in 2022.

Examination of the *H. fissuricola* specimens in **CGE** showed four had frequent simple hairs of the peduncles and two (including the holotype) had a few simple hairs, usually with more hairs on the lateral peduncles than on the acladiums. Of the five inflorescences collected from three Glenridding plants in 2022, four lacked simple hairs on the peduncles and one had a few simple hairs (numerous simple

eglandular hairs cited in the *H. fissuricola* description). Overall the Glenridding plants had fewer simple hairs on the peduncles. The *H. fissuricola* description is accurate in describing the glandular hairs on the peduncles as few to numerous, which was also observed in the Glenridding plants.

Examination of the *H. fissuricola* specimens in **CGE** showed the glandular hairs on the involucral bracts mostly varied from 0.2-0.5 mm (as measured with a graduated lens). Only short glandular hairs were cited in the description, defined as 0.3-0.7 mm long in the glossary in Sell & Murrell (2006). The Glenridding plants similarly had short to very short 0.1-0.5 mm glandular hairs on the involucral bracts, showing little difference.

Examination of the *H. fissuricola* specimens in **CGE** with mature, unopened ligules showed that two had glabrous ligule tips, and two (including the holotype) had a very few short hairs on a few of the ligules only; this variation may have been overlooked by Sell & Murrell (2006) who cited it as having very short simple eglandular hairs (the redetermined section *Cerinthoidea* specimen had markedly hairy ligule tips). The 2021 Glenridding voucher had glabrous ligule tips. The occurrence of hairy ligule tips is normally a consistent character separating *Hieracium* species but varies in other section *Subalpina* species: Sell & Murrell (2006) describe *H. clovense, H. cumbriense*, *H. dasythrix, H. hastiforme, H. kingshousense, H. octhophilum, H. petrocharis* and *H. vennicontium* as having glabrous or hairy ligule tips, *H. anfractiforme* and *H. senescens* as 'usually' hairy, and *H. callistophyllum* as hairy when young, becoming glabrous with age.

Given the only real difference between the Fisherplace Gill and Glenridding plants is the amount of simple hairs on the peduncles, I consider the variation is minor, and given the identical leaves and distance of only a few kilometres between the two sites, my assessment is the Glenridding Estate plants can be included in *H. fissuricola*. It is suggested the description of *H. fissuricola* can thus be expanded to include the variation seen in the Glenridding population.

IUCN threat status

The IUCN (2001) threat status based on the occurrence of only six plants in one site is 'Critically Endangered'. Seed was collected from three plants for the Millennium Seed Bank (MSB collecting no. TCR2022-117) to provide an ex situ collection. Full details of the Glenridding locality have been deposited with the John Muir Trust, Natural England and the Millennium Seed Bank.

The timing and cause of loss of *H. fissuricola* from Fisherplace Gill is unknown. J.E. Raven collected seven individual plants, which could have decimated a small population. The most likely cause of loss is overgrazing by sheep in the 1970s when the Helvellyn range was one of the most heavily grazed mountains in Britain. The levels of sheep grazing on the Glenridding Estate have recently been vastly reduced by the John Muir Trust and the flora on the crags is responding well.

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