

## The status of *Hieracium arranense* and *H. sannoxense* (Asteraceae), two endemic hawkweeds from the Isle of Arran, Scotland

T. C. G. RICH\*

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

and

D. J. McCOSH

*Baconsthorpe Old Rectory, Holt, Norfolk NR25 6LU*

### ABSTRACT

*Hieracium arranense* and *H. sannoxense* are very rare Scottish endemics confined to the Isle of Arran. A review of the records and field work was carried out in 2007. There are about 225 plants of *H. arranense* in six sites; it was not refound in two sites. About 27 plants of *H. sannoxense* were found in two sites. Under the I.U.C.N. Threat Criteria, *H. arranense* is 'Endangered' and *H. sannoxense* is 'Critically Endangered'.

KEYWORDS: Arran Hawkweed, I.U.C.N. Threat Criteria, Sannox Hawkweed.

### INTRODUCTION

Sell & Murrell (2006) described two new hawkweeds endemic to the Isle of Arran (v.c. 100 Clyde Islands), Scotland: *Hieracium arranense* P. D. Sell, Arran Hawkweed and *H. sannoxense* P. D. Sell, Sannox Hawkweed (Asteraceae). The only information known about them was that cited by Sell & Murrell (2006), namely that *H. arranense* occurred in several places on the west coast of Arran and that *H. sannoxense* was only known at Sannox Bridge. To assess their needs for conservation, and to provide an I.U.C.N. Threat Category as required under the Global Plant Conservation Strategy (Secretariat for the Conservation of Biodiversity 2002), field surveys of the known sites were carried out in June 2007 and are reported in summary herein. Full details are given by Rich & McCosh (2008) and have been deposited with Scottish Natural Heritage, Scottish Wildlife Trust, the B.S.B.I. V.C. Recorder and the B.S.B.I. Threatened Plants Database.

Both species belong to *Hieracium* section *Subalpina* Pugsley, whose members typically have dark heads, often few, on long, straight peduncles, ligules often pilose-tipped and leaves often with some microglands (Sell & Murrell 2006). *Hieracium arranense* (Fig. 1) has mostly ovate, spotted or blotched or unmarked, weakly glaucous to green, entire to acuminate-toothed rosette leaves with numerous simple eglandular hairs abaxially, 0–2 reduced stem leaves with stellate hairs abaxially, involucrel bracts with numerous stellate hairs (especially on margins), frequent simple eglandular hairs and sparse glandular hairs, glabrous-tipped ligules, discoloured styles (discoloration more apparent in dried material), and reddish-black achenes (Sell & Murrell 2006). Our observation of plants in the field show it also has sparse stellate hairs on the midrib, yellow rather than discoloured styles in fresh plants, and blackish rather than reddish achenes. It varies in size and leaf tothing and coloration, possibly depending on habitat.

*Hieracium sannoxense* (Fig. 2) has ovate to elliptic, finely denticulate, unspotted, green leaves in a basal rosette, with no or with 1–2 small, reduced stem leaves; involucrel bracts acute with many, long simple eglandular hairs, some glandular hairs and a few stellate hairs; and yellow styles when fresh (discoloured with age). *Hieracium sannoxense* looks like some species of *Hieracium* section *Cerinthoidea*, and could well have originated through hybridization of a member of section *Cerinthoidea* with a species from section *Subalpina* or section *Alpina* (Sell & Murrell 2006).

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

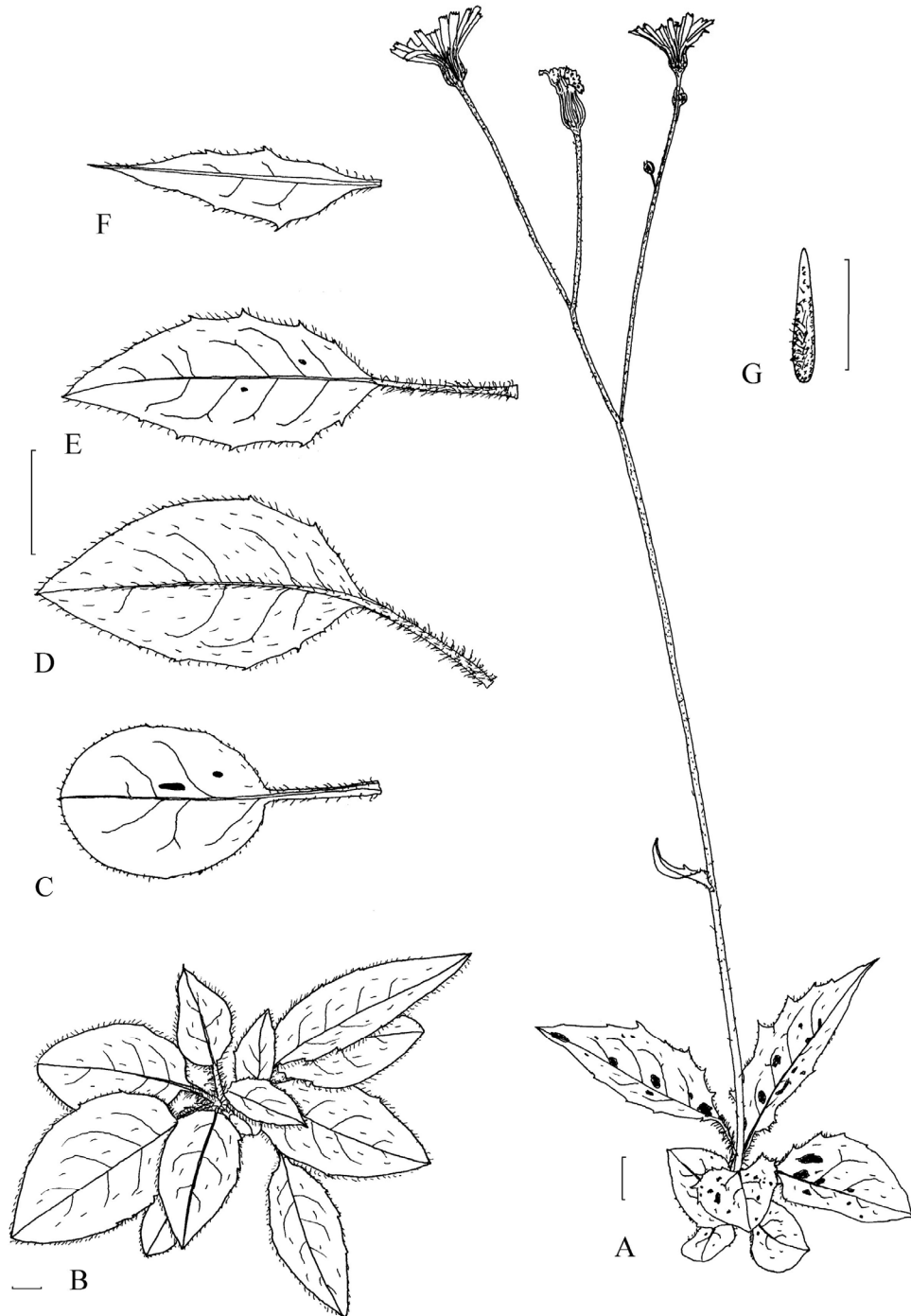


FIGURE 1. *Hieracium arranense*. A, whole plant. B, vegetative rosette. C-E, rosette leaves (upper sides C, E; lower side D). F, stem leaf, upper side. G, involucral bract. Scale bars 1 cm.

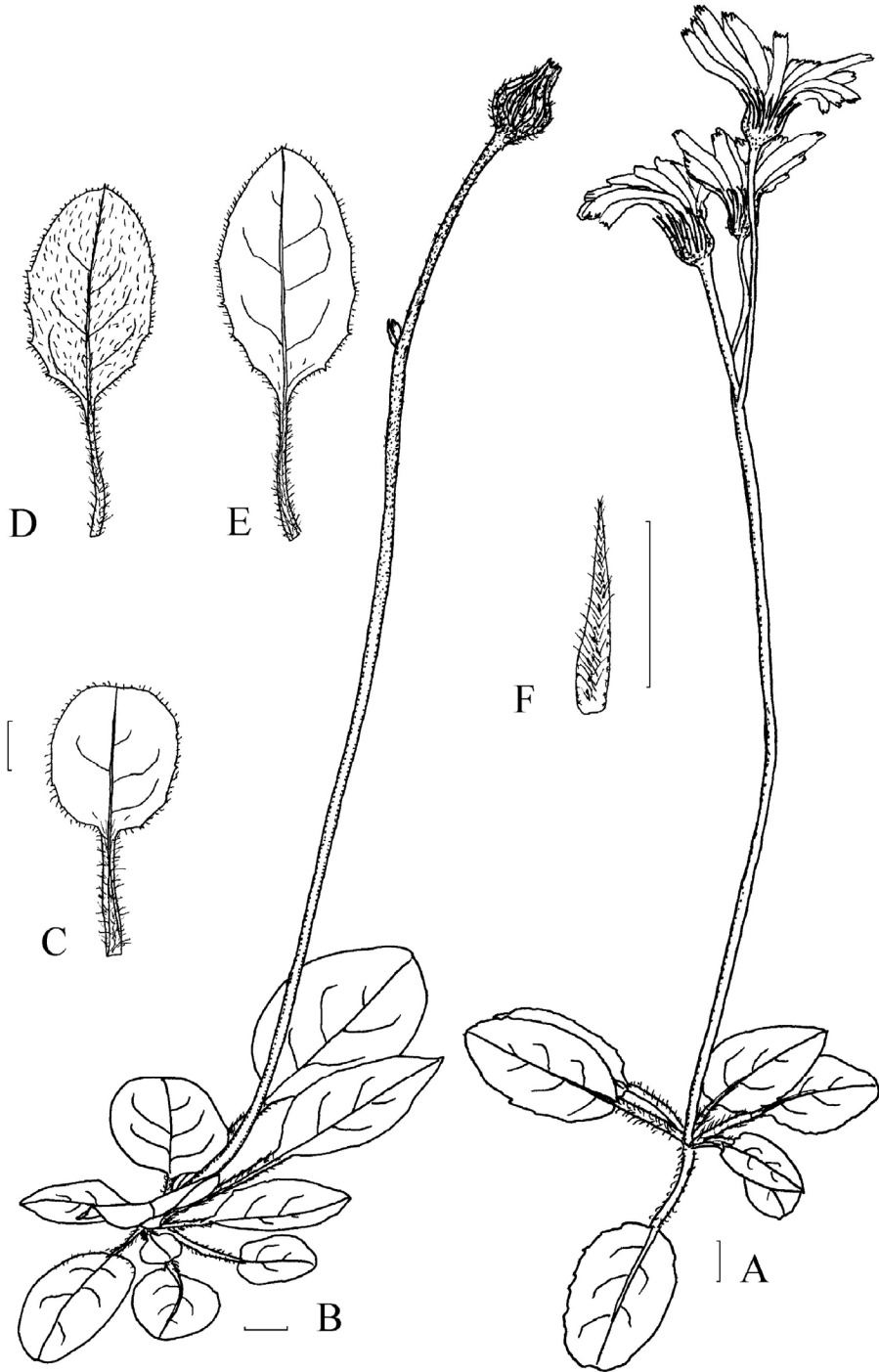


FIGURE 2. *Hieracium sannoxense*. A, flowering plant. B, plant after flowering. C–E, rosette leaves (upper sides C, E; lower side D). F, involucre bract. Scale bars 1 cm.

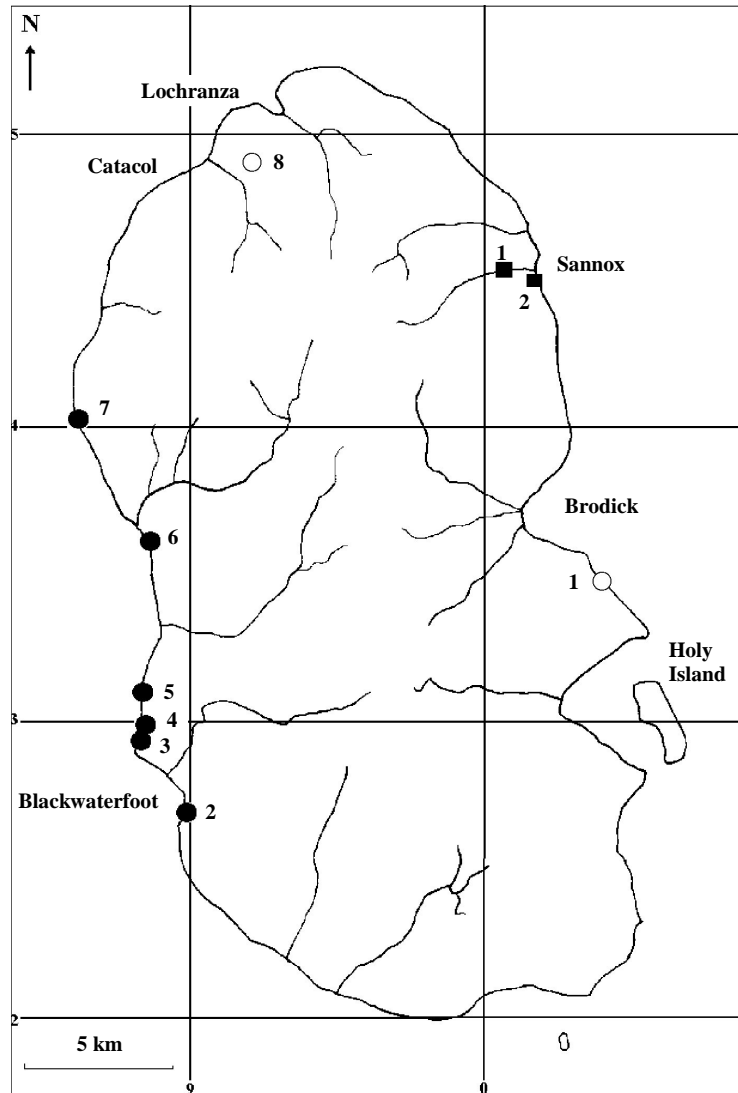


FIGURE 3. Distribution of *Hieracium arranense* (●, 2007; ○, pre-2000) and *H. sannoxense* (■, 2007) on Arran, Scotland. Sites are numbered in clockwise order around the island separately for each species.

The Isle of Arran is situated in the Firth of Clyde in South-west Scotland. It is about 32 km long by 7 km wide and has a varied geology (Geological Survey 1928). The core of the northern half of the island is dominated by mountains formed from Tertiary igneous rocks, and rises to 874 m (Goat Fell). The southern half of the island is lowland, and is formed from Devonian and Carboniferous sedimentary rocks cut by igneous intrusions. The rocks and soils in the north are generally acidic, whilst those in the south are locally more calcareous. Igneous intrusions in the form of sills and

dykes are widespread in the south and around the coast in the north, and locally may be base-rich. The climate is relatively mild due to the North Atlantic Drift, with mild, wet winters and cool, wet summers.

#### METHODS

Existing information was compiled from herbaria and D. McCosh's *Hieracium* database; this database contains about 29000 records compiled over the last 20 years from numerous British and Irish herbaria (BEL, BIRM, BM,

CGE, DBN, E, GL, HTN, LANC, LCN, LTN, MANCH, NMW and PTH) and other determinations. The only material traced in public herbaria was 5 sheets of *H. arranense* and 3 sheets of *H. sannoxense* in Cambridge (CGE), on which the original descriptions were based, and one specimen in E.

Sites were surveyed on four days between 19–26 June 2007. Plants were counted as far as practical within the time available, and binoculars were used to count plants on cliffs. Voucher specimens from selected sites have been deposited in BM, E and NMW. Soil pH was measured with a calibrated pHep2 Hanna pocket-sized pH meter in a 50:50 mixture with distilled water of dried soil samples collected from around the roots.

I.U.C.N. Threat Categories were derived using the criteria in I.U.C.N. (2001).

#### RESULTS

Figure 3 shows the sites for both *Hieracium* species on the Isle of Arran.

#### HIERACIUM ARRANENSE

##### 1. DUN FIONN, SOUTH CORRIEGILLS

*Hieracium arranense* was first recorded at this site by A. R. Church on 17 June 1988 (**herb. D. McCosh**).

The site was visited on 25 June 2007. *Hieracium caesiomurorum* Lindeb. (one plant) and *H. cyclicum* P. D. Sell (frequent) were scattered on the north-facing, basalt cliffs of the hill fort at NS046336, but *H. arranense* was not found. *Hieracium caledonikum sensu lato* has been recorded on the cliffs c. 1 km to the south.

##### 2. RUBHA GARBHARD, BROWN HEAD

This site was first recorded by A. G. Kenneth on 24 May 1974 (CGE).

One plant occurred in a rock cleft in low quartz-porphry sea cliffs at the back of a raised beach at NR/899261 on 21 June 2007, with *Festuca rubra* L., *Holcus lanatus* L., *Hypochaeris radicata* L., *Succisa pratensis* Moench and *Teucrium scorodonia* L. No other hawkweeds were seen on the cliffs, which generally appear too acid and dry for *Hieracium*.

Two populations occur at the top of the raised beach on flat, vegetated shingle. Four

plants occurred in a sward of *Pilosella officinarum* F. W. Schultz & Sch. Bip. with *Agrostis stolonifera* L., *Anthoxanthum odoratum* L., *Deschampsia flexuosa* (L.) Trin., *Galium saxatile* L. and *Sedum anglicum* Huds. at NR900263 (soil pH 6.0), and 16 plants in a more grassy sward of *Anthoxanthum odoratum* and *Festuca rubra* with *Digitalis purpurea* L. and *Senecio jacobaea* L. at NR899264. Seeds from eight plants were collected for the Millennium Seed Bank.

##### 3. THE DOON, BLACKWATERFOOT

The Doon is an impressive hill above Kilbrannan Sound capped by massive quartz-feldspar porphyry columns. The underlying horizontal beds of sandstone are exposed at the north end. This site was first recorded in 1987 by A. McG. Stirling as ‘Drumadoon’ (**herb. D. McCosh**).

Twenty seven *H. arranense* plants occurred scattered over the sandstone rocks in a small area at NR886294 with *Dactylis glomerata* L., *Festuca rubra*, *Koeleria macrantha* (Lebed.) Schult., *Plantago maritima* L., *Primula vulgaris* Huds. and *Pteridium aquilinum* (L.) Kuhn. Two probable plants of *H. arranense* occurred out of reach nearby on the otherwise very species-poor, quartz-feldspar porphyry cliffs at the north end of the hill.

##### 4. BOULDER NORTH OF THE DOON, BLACKWATERFOOT

An isolated erratic boulder of igneous origin in the middle of the broad raised beach at NR886296 was covered with 62 plants of *H. arranense*, mostly as very small rosettes rooted in the rock crevices, associated with *Armeria maritima* Willd., *Festuca ovina* L., *Hypochaeris radicata*, *Rumex acetosa* L. and *Sedum anglicum*. The soil was a blackish, organic rendzina of pH 4.4. Plants were only flowering on the sheltered eastern side. Seed from two plants was collected for the Millennium Seed Bank.

##### 5. KING’S CAVE, TORR RIGH MOR, BLACKWATERFOOT

This site was first recorded by A. Somerville on 10 July 1895 (E), and again by A. G. Kenneth and P. D. Sell on 2 June 1974 (CGE). It is the type locality.

*Hieracium arranense* was frequent on the sandstone cliffs and basalt about King’s Cave on 21 June 2007. About 50 plants occurred out of reach on the sandstone cliffs from c. 200 m south of (c. NR885307), to 30 m north of (NR884309), King’s Cave, but only a few accessible plants could be checked. 35 plants

occurred on the basalt dyke where the footpath cuts up the cliff at NR884312, associated with *Brachypodium sylvaticum* (Huds.) P. Beauv., *Calluna vulgaris* (L.) Hull, *Erica cinerea* L., *Festuca rubra*, *Luzula sylvatica* (Huds.) Gaudin, *Polypodium* sp., *Sedum anglicum* and *Teucrium scorodonia* on a blackish organic soil of pH 5.8. Plants flowered freely on the sheltered eastern side of the dyke away from the sea, where seed was collected from one plant for the Millennium Seed Bank. A small population of c. 5 plants occurred on sandstone rocks which differed from typical *H. arranense* with its weakly glaucous leaves with yellowish styles in having green foliage and discolored styles; in all other respects they are similar to *H. arranense* and are assumed to be local variants.

One large *H. arranense* plant occurred on the newly made bank of a ditch by the new footpath to the car park behind and above King's Cave at NR885307; this plant is unlikely to survive in the long term as the ditch sides colonize with vegetation.

#### 6. CNOCAN CUALLAICH CLIFFS, DOUGARIE

This site was first recorded on 24 May 1974 by A. G. Kenneth and again a week later on 1 June 1974 by A. G. Kenneth and A. McG. Stirling (CGE).

A small population of *H. arranense* occurred scattered on west-facing Devonian sandstone and conglomerate cliff outcrops above bracken behind improved pasture, though most plants were inaccessible on the cliffs. 14 plants occurred in crevices at NR890353 with *Asplenium marinum* L., *Festuca rubra*, *Plantago maritima* and *Rosa* sp. One plant occurred on a south-west-facing rock at NR891354, and six plants occurred on wet cliffs immediately south-east of the tiny graveyard, with *Agrostis stolonifera*, *Carex flacca* Schreb., *Eupatorium cannabinum* L., *Succisa pratensis* and sheets of bryophytes dripping with calcareous water; this is an unusual habitat.

#### 7. IMACHAR

Three plants were found on a basalt dyke in a field below the road, with *H. deganwyense* Pugsley (3 plants) and *H. vulgatum* Fr. (5 plants) at NR864402 on 22 June 2007.

#### 8. ABHAINN BHEAG, CATACOL

This site was first recorded on 24 May 1974 by A. G. Kenneth at NR919490 (CGE).

The ravine was searched on 22 June 2007 in rain without success, though there were a number of vegetative rosettes which could have been *H. arranense* in the area indicated by the grid reference at the bottom of the gorge, but none with spotted leaves. *Hieracium coniops* Norrl. occurred on the slate on the northern side, and *H. cyclicum* and *H. rubicundiforme* (Zahn) Roffey on the basalt dyke on the south side, and one plant of *H. eucallum* P.D. Sell & C. West was found by the lower dam. *Hieracium boswellii* E. F. Linton, *H. glandulidens* P. D. Sell & C. West and *H. argenteum* Fr. have also been recorded previously but were not refound. Above the main lower waterfall, only *H. vulgatum* agg. was seen on the shaded north bank near *Sorbus pseudofennica* E. F. Warb. Above the second main waterfall the ravine opens out and no *Hieracium* plants could be seen with binoculars.

#### HIERACIUM SANNOXENSE

##### 1. GLEN SANNOX

*Hieracium sannoxense* was first collected at Sannox Bridge by A. G. Kenneth and A. McG. Stirling on 1 June 1974 (CGE, the grid reference cited on the specimen is erroneous). It was collected again on 14 June 1976 by A. G. Kenneth (CGE).

A small population totalling 17 plants was found in Glen Sannox scattered up and down the stream on sandstone rocks around the footbridge at NS010453 on 19 June 2007 (it appears that the type locality is this footbridge and not the A841 bridge at NS016455). At NS011453, two flowering plants, one vegetative plant and two seedlings were found on low, stream-washed rocks in the river, associated with *Campanula rotundifolia* L., *Hieracium argenteum*, *Nardus stricta* L., *Solidago virgaurea* L. and *Viola riviniana* Rchb., in very open, sparse vegetation. Four flowering and four vegetative plants occurred at NS010453 on the southern river bank on bryophyte-rich rocks with *Blechnum spicant* (L.) Roth., *Sanicula europaea* L. and *Solidago virgaurea*, shaded under *Betula pubescens* Ehrh. and *Rosa canina* L. Four vegetative plants occurred in rocks in the stream at NS009450. *Hieracium argenteum* and *H. vulgatum* were both more frequent and more widely scattered along the river. The sandstone

has some mildly basic characteristics, and barytes used to be mined in this area. Downstream the burn becomes heavily shaded in the area managed by Corrie Golf Club. Upstream the woodland ceases at about the small weir at NS008452, where the glen opens out and the river only has small boulders.

#### 2. SANNOX

A new population of c. 10 *H. sannoxense* plants was found on 19 June 2007 on a large, conglomerate, erratic boulder beside the A841 road at the southern end of Sannox (NS019448), associated with *Deschampsia flexuosa*, *Festuca rubra* and *Rubus* sp. Seeds from one plant were collected for the Millennium Seed Bank.

#### OTHER SITES SEARCHED AROUND SANNOX

The A841 bridge at NS016455 had no *Hieracium* and looked unsuitable. The North Sannox Burn had *H. argenteum* and *H. vulgatum* c. 100 m below the bridge at Lag nan Sasunnach (NS013465) and *H. vulgatum/H. coniops* at North Sannox Bridge (NR993468). No *Hieracium* was seen on waterfalls for c. 1.5 km above North Sannox Bridge.

#### DISCUSSION

Our survey indicates that both Arran endemic hawkweeds are very rare. *Hieracium arranense* has about 225 plants in six sites and was not refound in two sites; it is I.U.C.N. (2001) Threat Category 'Endangered'. Further searches of the two sites where it was not refound would be worthwhile. *Hieracium sannoxense* has about 27 plants in two sites,

and is I.U.C.N. (2001) Threat Category 'Critically Endangered'. It is possible that there are other sites for both species as we could not search the whole island.

*Hieracium sannoxense* is the rarest and most threatened, and is a priority for *in situ* conservation action. The margins of the burn in Glen Sannox are heavily shaded by *Alnus glutinosa* (L.) Gaertn., *Betula pubescens*, *Fagus sylvatica* L., *Quercus petraea* (Matt.) Liebl., *Salix aurita* L. and *S. cinerea* L., and the hawkweeds would clearly benefit from opening up the canopy, and reduction of the sheep and deer grazing. The conglomerate boulder at Sannox is under threat of scrub encroachment and spread of *Rubus*. *Hieracium arranense* is less threatened, mainly occurring on open rocks kept open by their exposed situation, and probably does not require active conservation at this stage. Both species should be monitored every five years.

To judge from the records in the *Hieracium* database and our field work, in general Arran is not rich in *Hieracium* species. 23 *Hieracium* species have been recorded, though most are infrequent and very local, and include two other species of interest. *Hieracium cyclicum* is a very locally distributed species of the west coast of Scotland and a few isolated sites in Ireland; it is scattered around Arran on conglomerate and basalt rocks. *Hieracium coniops*, another uncommon species in SW Scotland (Sell & Murrell 2006), seems to be as frequent on Arran as its close relative *H. vulgatum*.

#### ACKNOWLEDGMENT

We are grateful to Gina Murrell for images of the specimens in CGE.

#### REFERENCES

- I.U.C.N. (2001). *I.U.C.N. Red list categories and criteria. Version 3.1*. International Union for Conservation of Nature, Gland.
- GEOLOGICAL SURVEY (1928). *The geology of Arran. Geological Society memoirs – Scotland*. H. M. S. O., London.
- RICH, T. C. G. & MCCOSH, D. J. (2008). *The status of Hieracium arranense and Hieracium sannoxense, two endemic hawkweeds from Arran*. Unpublished report, National Museum of Wales.
- SELL, P. D. & MURRELL, G. (2006). *Flora of Great Britain and Ireland*. Volume 4. Cambridge University Press, Cambridge.
- SECRETARIAT FOR THE CONSERVATION OF BIODIVERSITY (2002). *Global strategy for plant conservation*. Secretariat for the Conservation of Biodiversity, Montreal.

(Accepted April 2008)

