

NOTES ON BRITISH HIERACIA. II. THE SPECIES OF THE ORKNEY ISLANDS

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During the period 1920 to 1933 more than a dozen new species and varieties of *Hieracium* from the Orkneys were described by H. Dahlstedt, based on specimens sent to him for identification by the late H. H. Johnston. Many of these have been 'lumped' by H. W. Pugsley (1948). We have made a special study of the hawkweeds of this area in an attempt to discover how far there was justification for Dahlstedt's new species and for their treatment by Pugsley.

All the specimens on which these new species were founded are in the collections made by H. H. Johnston and J. Sinclair. We are grateful to Mr. Sinclair for allowing us to examine the specimens in his private herbarium, and to the Regius Keeper of the Royal Botanic Garden, Edinburgh, for the loan of Johnston's material. A few specimens from other collections have also been examined.

As a result of a careful examination of all the available material we have found that we are in general agreement with Pugsley that many of Dahlstedt's species can be matched with species already described. It is well known that certain species of *Hieracium* are extremely variable and not easily distinguishable from one another, especially when poorly grown or late-flowering. Johnston often sent Dahlstedt few specimens of inadequate, late-flowering material. This and the fact that Dahlstedt was not well acquainted with the British Hieracia may account for the large number of names he applied to Johnston's plants.

We recognise in all twelve species of *Hieracium* from the Orkney Isles. Ten of these species belong to the Subgenus *Hieracium*, namely *H. anglicum* Fries and *H. iricum* Fries (Sect. *Cerinthoidea* Fries); *H. argenteum* Fries, *H. orimeles* Hanb. ex W. R. Linton and *H. scoticum* Hanb. (Sect. *Oreadea* Fries); *H. sarcophylloides* Dahlst. (Sect. *Suboreadea* Pugsley); *H. euprepes* Hanb. and *H. caledonicum* Hanb. (Sect. *Vulgata* Fries); and *H. latobrigorum* (Zahn) Roffey and *H. maritimum* (Hanb.) Hanb. (Sect. *Foliosa* Fries). The other two species, *H. pilosella* L. and *H. aurantiacum* L. *sensu stricto*, belong to the subgenus *Pilosella* Tausch.

Of these twelve species *H. aurantiacum* and *H. pilosella* present no difficulty. *H. aurantiacum* is a garden escape of central European origin, easily recognised by its reddish-orange ligules. *H. pilosella* is widespread in the British Isles and continental Europe but is absent from the Shetlands, Faeroes and Iceland. Its stoloniferous, scapigerous habit makes it a plant easy to identify.

H. latobrigorum and *H. maritimum* differ from the rest by their very leafy stems. *H. maritimum* shows little variation in form, and elsewhere occurs only in a few places in N. Scotland, the Shetlands (as *H. obesifolium* Pugsl.), Ireland and Scandinavia. *H. latobrigorum*, on the other hand, is a very variable plant to which several names have been applied. It is widely distributed in northern Britain, north-eastern Ireland and central Europe.

H. anglicum and *H. iricum* can usually be separated from the remainder by their semi-amplexicaul cauline leaves, very pilose-tipped ligules and furcate inflorescence of large heads. They may however be difficult to distinguish from each other, and their differences can only be fully appreciated by examination of a series of authentic herbarium sheets. *H. iricum* normally has more numerous stem leaves, and is more shaggy in appearance, but plants of *H. anglicum* occur (var. *amplexicaule* Backh.) that superficially

resemble it. In fact, among the specimens we examined there were several of *H. anglicum* which had been labelled *H. iricum*. *H. anglicum* is not uncommon in northern Britain and Ireland, but is extremely rare in Wales. It occurs in the Faeroes (as *H. perampliforme* Dahlst.) and in Iceland (as the variety *vestmannaense* Omang). It is absent from the Shetland Isles and the Continent. *H. iricum* occurs in Scotland, northern England, Ireland and the Faeroes (as *H. peramplum* Dahlst.), but is not recorded from the Shetlands, Iceland or continental Europe.

The remaining six species are variable and are not easy to distinguish from one another, especially when poorly grown or late flowering.

H. argenteum Fries is most readily distinguishable by the characteristic leaden colour of its leaves. *H. pseudomicrodon* Dahlst., which was founded on exsiccatae from Hoy, is, as Pugsley (1948) rightly pointed out, identical with this species. *H. argenteum* is widely spread throughout Scotland, northern England, and Scandinavia, and is of local occurrence in Ireland, Wales and Iceland (as *H. microdon* Dahlst.). It has not been found in the Shetlands or in the Faeroes.

H. orimeles Hanb. ex W. R. Linton, which is abundant in the Shetlands (as *H. beebyanum* Pugsley) and local in western Scotland, northern England and Wales, is known only from a single locality in the Orkneys. This species closely resembles *H. argenteum*, both having narrowly ovate to lanceolate basal leaves, 1-3 usually spreading cauline leaves, and narrow acute phyllaries. It can however be distinguished from *H. argenteum* by the colour and clothing of its leaves.

H. sarcophylloides Dahlst. which was originally described from the Faeroes, is identical with *H. dasypodum* Dahlst. from the Orkneys. *H. sarcophylloides* is the older name. It is a variable species, which in its typical form can be separated from the other Orcadian species by its rather broadly ovate, truncate-based leaves. The type material of *H. sinclairii* Dahlst. matches *H. sarcophylloides* so closely that it is not easy to understand why Pugsley claimed, even with some reservation, that it was closely allied to *H. oistophyllum* Pugsley. *H. pycnodon* var. *acutidens* Dahlst. is based on specimens of *H. sarcophylloides* with leaf bases which are less truncate than usual. The Scandinavian *H. pycnodon* Dahlst. may also be referable here, but the material we have seen is insufficient to enable us to arrive at a definite opinion. *H. sarcophylloides* also occurs in Sutherland, Argyll and the Faeroes.

Although *H. euprepes* is so variable that it is not easy to pick out any definite distinguishing characters, the general facies of a well-grown plant with its elliptical, dark green leaves, tall wiry stem with 1-3 rather narrow stem-leaves, and rather condensed inflorescence of narrow, often geminate heads, is characteristic. We agree with Pugsley (1948) in placing a number of Dahlstedt's species under *H. orcadense*, but we consider that species to be indistinguishable from *H. euprepes*. The type specimen of *H. sagittatum* subsp. *sagittatum* var. *abrasum* Dahlst., which was considered by Pugsley to be a variety of *H. oistophyllum*, bears little resemblance to that species. It is without doubt *H. euprepes*. *H. euprepes* is not uncommon in Scotland and Wales, and has a local distribution in north-east Ireland and the Faeroes (as *H. ardisodon* Dahlst.). It has not been recorded from the Shetlands, Iceland or the Continent.

In Wales, northern England, northern Ireland, and the greater part of Scotland, *H. caledonicum* can be recognised by its thick, ovate, caesious leaves and broad, truncate-tipped phyllaries, but in the extreme north of Scotland, the Orkneys and the Faeroes (as *H. subrubicundum* Dahlst., *H. perintegrum* Dahlst., *H. cordifrons* Dahlst., *H. leniscotum* Omang, *H. subcordifrons* (Zahn) Omang) it shows many modifications of form. A variety (var. *austroislandicum* Omang) of *H. perintegrum* Dahlst. has been described from Iceland, but we have seen no specimens of it. *H. caledonicum* is not known from the Shetlands or the Continent.

H. scoticum can usually be distinguished by its numerous (2-7) dark green stem-leaves and long deflexed hairs on the base of the stem. It is of local occurrence in Wales, northern England, Scotland, north-west Ireland and the Faeroes (as *H. scoticiforme* Dahlst.), but is not recorded from Iceland, the Shetlands or the Continent.

In the Orkney Isles the Hieracia are mainly distributed along the south coast of the Mainland and on the island of Hoy, usually occurring on rocks, banks of streams or low sea cliffs, where there is a high humidity and good drainage, and where they are protected from the depredations of grazing animals, particularly sheep.

If the distribution of the Orkney species of the Subgenus *Hieracium* is considered, it will be seen from Table 1 that all the species occur on the Scottish mainland while many are to be found in Ireland, Wales and the north of England. They are completely absent from central and southern England. Perhaps the most striking feature is that the only species represented in the Shetlands are *H. orimeles* and *H. maritimum*.

When considering the European distribution of the group we have attempted to assign to what we consider to be their proper place certain specific and varietal names created by Dahlstedt and Omang from material gathered in the Faeroes and in Iceland. The Orcadian species are well represented in the Faeroes whereas only two or possibly three have been recorded from Iceland. They are very poorly represented in Continental Europe, only *H. argenteum*, *H. maritimum* and possibly *H. sarcophylloides* occurring in Scandinavia, and only *H. latobrigorum* in central Europe.

Not a single species of the Sect. *Alpestris* has been found in the Orkneys, in spite of the fact that numerous species of this section are common in the Shetlands, Faeroes, Iceland and Scandinavia. *H. sparsifolium* Lindeb. (*H. stictophyllum* Dahlst. ex W. R. Linton) of the Section *Tridentata* Fries is common in the Shetlands (as *H. pseudo-protractum* Pugsl. non Notø.), the Faeroes (as *H. faeroense* Dahlst. and *H. epileucoides* Dahlst.), Iceland and Scandinavia, but is absent from the Orkneys.

The following key may help visitors to the Orkneys to identify the species of *Hieracium* which are known to occur there. Identifications should always be confirmed by comparison with authentic specimens. Early to mid-July is probably the time to see most species at their best, but *H. pilosella* and *H. aurantiacum* usually flower about a month earlier while *H. latobrigorum* and *H. maritimum* may not flower until late July or early August. After the key the full synonymy of each species and a list of all the Orkney specimens we have examined are given. The National Grid References are only given as a guide to the locality and may not denote the exact spot where the plant was found.

ARTIFICIAL KEY TO THE SPECIES OF *HIERACIUM* RECORDED IN THE ORKNEYS

- | | |
|---------------------------------------------------------------------------------------------------------------------------------------|---------------------------|
| 1. Ligules orange-red | <i>H. aurantiacum</i> |
| Ligules yellow (sometimes with red stripe on back) | 2 |
| 2. Plant stoloniferous; ligules usually with red stripe on back | <i>H. pilosella</i> |
| Plant not stoloniferous; ligules concolorous | 3 |
| 3. Cauline leaves usually more than 12 | 4 |
| Cauline leaves usually less than 7 | 5 |
| 4. Leaves mostly ovate to elliptic-lanceolate; phyllaries with many microglands, a number of very small glands and a few simple hairs | <i>H. latobrigorum</i> |
| Leaves narrowly oblong; phyllaries with very few, very small glands, and/or an occasional simple hair, or glabrous | <i>H. maritimum</i> |
| 5. Ligules strongly pilose-tipped; cauline leaves semi-amplexicaul | 6 |
| Ligules glabrous; cauline leaves not amplexicaul | 7 |
| 6. Large cauline leaves rarely more than 2, hairs of stem long but not shaggy | <i>H. anglicum</i> |
| Large cauline leaves usually more than 3; hairs of stem long and shaggy | <i>H. iricum</i> |
| 7. Phyllaries narrow and \pm acute | 8 |
| Phyllaries broader and \pm obtuse | 10 |
| 8. Leaves yellowish-green, rather broadly ovate, often with a truncate base, cauline usually 0, rarely 1 | <i>H. sarcophylloides</i> |
| Leaves rather glaucous (leadens) or light green, narrowly ovate or lanceolate, \pm cuncate-based, cauline 1-3 | 9 |
| 9. Leaves rather glaucous (leadens), almost glabrous above | <i>H. argenteum</i> |
| Leaves light green, densely short-setose above | <i>H. orimeles</i> |

10. Leaves rather dark green, \pm elliptic, base cuneate or attenuate, cauline 0-3; phyllaries c. 10 mm. long, linear-lanceolate *H. euprepes*
 Leaves caesious, \pm ovate or elliptic, base rounded or cuneate, cauline 0-3; phyllaries 10-12 mm. long, broad linear-lanceolate, truncate-tipped *H. caledonicum*
 Leaves rather dark green, \pm ovate or occasionally elliptic, base cuneate, cauline 2-7; phyllaries 11-12 mm. long, linear-lanceolate *H. scoticum*

Subgenus HIERACIUM

Section CERINTHOIDEA Fries

- HIERACIUM ANGLICUM Fries (1848) 93; Fortescue (1882) 370; W. R. Linton (1887) 154; E. S. Marshall (1901) 269; Spence (1914) 43; Johnston (1914) 209; Pugsley (1948) 68. [*H. iricum sensu* Spence (1914) 41 *pro parte*.]
H. anglicum var. *cerinthiforme* Backh., Bennett (1915) 55.
H. mougeotii subsp. *anglicum* var. *cerinthiforme* (Hanb.) Zahn, Johnston (1928) 12.
H. mougeotii subsp. *anglicum* forma *acutifolium* (Backh.) Zahn, Johnston (1928) 12.
H. patens Dahlst. in Johnston (1934) 473 (Lectotype: west side of Nowt Bield, Ward Hill, Hoy, 10 July 1933, H. H. Johnston No. 4742 (E)).

Southwest side of Berriedale, Hoy, 30/1901, 8 August 1927, H. H. Johnston nos. 3651 and 3655A (E). Near the Kame, Hoy, 30/1904, 9 August 1886, H. H. Johnston (E). Ward Hill, Rousay, 12 August 1880, H. H. Johnston (E); 28 August 1883, H. H. Johnston (E); 10 August 1886, W. R. Linton (BM); 23 July 1907, M. Spence (E); 30 August 1916, H. H. Johnston no. 426 (E); 26 July 1927, J. Sinclair no. 436 (herb. Sinclair); 31 July 1928, J. Sinclair no. 591 (herb. Sinclair & E). Valley Burn, Hoy, 12 July 1928, J. Sinclair no. 571 (herb. Sinclair) and H. H. Johnston nos. 4006 and 4008 (E). Burn of Segal, Hoy, 30/2002, 11 July 1933, H. H. Johnston no. 4749 (E). Lenders Fea, Skecking Gill, Hoy, 30/2004, 25 July 1925, J. Sinclair no. 155 (herb. Sinclair), H. H. Johnston no. 3120 (BM). Braebuster Burn, Hoy, 30/2105, 7 July 1928, J. Sinclair no. 568 (herb. Sinclair) and H. H. Johnston no. 3990 (E). Glen of Gair (Greor), Ward Hill, Hoy, 30/2203, 20 August 1885, H. H. Johnston (BM). West side of Sel Wick, Hoy, 30/2205, 7 July 1928, J. Sinclair no. 566 (herb. Sinclair), H. H. Johnston no. 3987 (E). Trowie Glen, Hoy, 30/2300, 28 July 1925, H. H. Johnston no. 3138 (E, BM); 5 August 1927, H. H. Johnston no. 3644B (E). Nowt Bield, 30/2301, 5 August 1927, H. H. Johnston no. 3646 (E); 2 August 1932, H. H. Johnston no. 4340 (E); 10 July 1933, J. Sinclair no. 954 (herb. Sinclair) and H. H. Johnston nos. 4740, 4741 and 4742 (E); 1953, C. West (CGE). Junction of the burn of the Nowt Bield and the Trowie Glen, Hoy, 30/2300, 16 July 1928, H. H. Johnston no. 4046 (E). Burn of Quoys, Hoy, 30/2402, 1 August 1927, H. H. Johnston no. 3616 (herb. Sinclair) and no. 3616A (E); 5 August 1927, J. Sinclair no. 457 (herb. Sinclair); 6 July 1928, J. Sinclair no. 637 (herb. Sinclair). Dwarfie Hamars, July 1953, C. West (CGE). Red Glen, between Burandie and Dwarfie Hamars, Hoy, 30/2500, 10 August 1886, H. H. Johnston (E). Bring Head, Hoy, 30/2701, 15 August 1937, J. Sinclair no. 481 (herb. Sinclair). Scapa, August 1875, J. Boswell-Syme (BM). Westerow, Rackwick, Hoy, 39/2098, 14 July 1928, J. Sinclair nos. 578 and 639 (herb. Sinclair), H. H. Johnston nos. 4025 and 4025A (E). South Burn, Hoy, 39/2099, 14 July 1928, H. H. Johnston no. 4039 (E); 20 July 1932, H. H. Johnston no. 4515 (E). Pegal Bay, 39/3097, August 1880, J. B. Fortescue (CGE, BM); 22 August 1894, H. H. Johnston (E); 16 July 1912, H. H. Johnston (E); 3 August 1927, J. Sinclair no. 453 (herb. Sinclair & E); 7 July 1933, H. H. Johnston nos. 4727 and 4728 (E).

- HIERACIUM IRICUM Fries (1848) 60; Spence (1914) 41 *pro parte*; Pugsley (1948) 80.

Burn of the Nowt Bield, Hoy, 30/2300, 2 August 1932, H. H. Johnston no. 4540A (E). Dwarfie Hamars, Hoy, 30/2400, 10 August 1886, H. H. Johnston (E, BM). Burn of Quoys, Hoy, 30/2402, 3 July 1926, J. Sinclair no. 328 (herb. Sinclair); 1 August 1927, H. H. Johnston no. 3616 (E); 6 July 1928, J. Sinclair no. 634 (herb. Sinclair); 1953, C. West (CGE).

Section OREADEA Fries

- HIERACIUM ARGENTEUM Fries (1848) 99; Pugsley (1948) 92. [*H. rivale* var. *dasythrix sensu* Johnston (1920) 32.]
H. pseudomicrodon Dahlst. in Johnston (1929a) 5 (Lectotype: Grassy rocky crags at

burnside in a ravine on the southwest side of Berrie Dale, below a waterfall, Hoy, alt. 280 ft., 8 July 1927, H. H. Johnston, no. 3657 (E); Johnston & Sinclair (1930) 24. [*H. saxifragum sensu* Dahlst. in Johnston (1933a) 3; *sensu* Johnston (1933b) 23, *sensu* Johnston (1934) 472.]

Southeast side of Enegars, Kame, Hoy, 30/1904, 19 August 1932, J. Sinclair no. 770 (herb. Sinclair & E); 8 July 1933, H. H. Johnston no. 4731 (E, BM). Berrie Dale, Hoy, 30/2001, 7 September 1914, H. H. Johnston no. 362 (E); 8 July 1927, H. H. Johnston no. 3657 (E); 8 August 1927, J. Sinclair no. 471 (herb. Sinclair); 26 August 1928, H. H. Johnston and J. Sinclair (herb. Sinclair & E); 1 August 1932, J. Sinclair no. 760 (herb. Sinclair & E).

HIERACIUM SCOTICUM Hanb. (1888) 206; Spence (1914) 42 and 130; Johnston (1914) 220; Johnston (1925) 6; Pugsley (1948) 98.

[*H. gothicum sensu* Johnston (1882) 370.]

[*H. rubicundum sensu* Johnston (1914) 210 (*quoad loc.* Malsetter).]

H. scoticum var. *submaculatum* Dahlst. in Johnston (1929b) 5 and (1930) 24 (Lectotype: Heathery rocky ravine at burnside, Roonie (? = Runcie) Gill, Hoy, 210 ft. alt., 15 August 1929, H. H. Johnston no. 4241 (E)).

Berrie Dale, 30/2001, 22 August 1929, H. H. Johnston no. 4280 (herb. Sinclair & E). Burn of Sowa Dee, Sandwick, 30/2314, 26 August 1912, H. H. Johnston (E); 15 July 1913, H. H. Johnston (E); 23 July 1925, H. H. Johnston no. 3107 (E, CGE); 30 June 1928, J. Sinclair no. 645 (herb. Sinclair); 1954, N. D. Simpson no. 54/153 (herb. Simpson). Hangarback, Gyre, Orphir, 30/3403, 18 August 1885, H. H. Johnston (E). North Hill, Westray, 30/4048, 15 July 1883, H. H. Johnston (E); 28 August 1913, H. H. Johnston (E). Roonie (? = Runcie) Gill, Hoy, 39/2299, 15 August 1929, H. H. Johnston no. 4241 (E). Malsetter, Waas, Hoy, 39/2789, 11 August 1913, H. H. Johnston (E). North-east side of Aith Hope, South Walls, Hoy, 39/2989, 21 July 1913, H. H. Johnston (E); 25 July 1913, H. H. Johnston (E); 4 August 1913, H. H. Johnston (E); 9 August 1928, J. Sinclair no. 597 (herb. Sinclair & E); 2 August 1929, J. Sinclair no. 663 (herb. Sinclair & E); 20 August 1929, H. H. Johnston no. 4259 (E). West side of Fara, South Isles, 39/3195, 30 July 1924, H. H. Johnston no. 2669 (E).

HIERACIUM ORIMELES Hanb. ex W. R. Linton (1901) 106; Pugsley (1948) 102.

Waulkmill Bay, 30/3806, July 1953, C. West (CGE).

Sect. SUBOREADEA Pugsley

HIERACIUM SARCOPHYLLOIDES Dahlst. in Warmittg (1903) 629 (Holotype: Osteró, Kodlen ad Eide at 400 m., 17 July 1895, H. G. Simmons in Herb. Copenhagen).

[*H. pallidum sensu* Johnston (1882) 370.]

[*H. silvaticum* var. *tricolor sensu* Spence (1914) 131; *sensu* Johnston (1914) 211.]

[*H. caesium sensu* Spence (1914) 43.]

[*H. murorum sensu* Spence (1914) 43.]

[*H. britannicum sensu* Spence (1914) 42; *sensu* Johnston (1925) 6.]

[*H. sarcophyllum* var. *expallidiforme sensu* Bennett (1915) 55; *sensu* Johnston (1920) 32.]

[*H. rubicundum* var. *boswellii sensu* Johnston (1920) 31.]

H. dasypodum Dahlst. in Johnston (1929a) 5 (Lectotype: Heathery crags on hillside between Grut Fea and the Glen of Button, Hoy, 12 July 1928, H. H. Johnston no. 4012 (E)); Johnston (1929b) 3; Johnston & Sinclair (1930) 24; Pugsley (1948) 115.

H. pycnodon var. *acutidens* Dahlst. in Johnston (1929a) 4 (Lectotype: Grassy, rocky banks of burn, White Glen, Ward Hill, Hoy, 16 August 1928, J. Sinclair no. 602 (E)); Johnston (1929b) 3; Sinclair (1930) 25.

H. sinclairii Dahlst. in Johnston (1932) 5 (Lectotype: Moist mossy soil on sandstone cliffs, Dwarfie Hamars, Hoy, 24 July 1931, J. Sinclair no. 706 (E)).

Between Grut Fea and the Glen of Button, Hoy, 30/1901, 12 July 1928, J. Sinclair no. 575 (herb. Sinclair) and H. H. Johnston no. 4012 (E, BM). South of the meadow of the Kame, Hoy, at 750 ft., 39/1904, 11 September 1914, H. H. Johnston no. 373 (E) and Enegars, south-east of Kame, 880 ft., 30/1904,

8 July 1933, H. H. Johnston no. 4735 (E). Ward Hill, Hoy, 30/2301, 31 July 1928, J. Sinclair no. 590 (herb. Sinclair & E); 16 August 1928, J. Sinclair no. 602 (herb. Sinclair & E); 22 August 1929, H. H. Johnston no. 4274 (E); 14 August 1938, J. Sinclair no. 1234 (herb. Sinclair); July 1953, C. West (CGE). Dwarfie Hamars, 30/2400, 28 August 1883, H. H. Johnston (E); 14 July 1900, E. S. Marshall no. 2328 (BM) and as Linton Set no. 178 (BM, CGE); 22 July 1912, H. H. Johnston (E); 24 July 1925, J. Sinclair no. 147 (herb. Sinclair); 26 July 1929, J. Sinclair no. 661 (herb. Sinclair & BM); 24 July 1931, J. Sinclair no. 716 (E, BM) and no. 715 (herb. Sinclair & E); 2 August 1932, H. H. Johnston nos. 4534 and 4535 (E); July 1953, C. West (CGE). Bring Head, Hoy, 30/2702, 4 July 1877, H. H. Johnston (E); 7 July 1933, H. H. Johnston no. 4726 (E) and J. Sinclair no. 952 (herb. Sinclair).

Sect. VULGATA Fries

- HIERACIUM EUPREPES Hanb. (1892) 206 (Lectotype: Craig Dulyn, Caernarvon, 28 July 1891, F. J. Hanbury (BM)); Pugsley (1948) 166.
 [*H. vulgatum sensu* Fortescue (1882) 370, *sensu* Johnston (1882) 370; *sensu* Spence (1914) 42.]
H. orcadense W. R. Linton (1893) 196; Johnston in Cryer (1913) 264; Johnston (1914) 211; Spence (1914) 41 and 131; Pugsley (1948) 168.
 [*H. orarium* var. *fulvum sensu* Marshall in Marshall & White (1901) 638.]
 [*H. ? caesium sensu* Spence (1914) 43.]
 [*H. buglossoides sensu* Spence (1914) 130; *sensu* Johnston (1914) 211.]
 [*H. schmidtii* var. *crinigerum sensu* Spence (1914) 41; *sensu* Johnston (1925) 6.]
 [*H. ? orarium sensu* Bennett (1915) 55.]
 [*H. silvaticum* var. *subtemue sensu* Johnston (1926) 300.]
 [*H. holopleurum sensu* Dahlst. in Johnston (1928) 11; *sensu* Johnston (1929b) 3; *sensu* Johnston (1929c) 619.]
H. sagittatum subsp. *sagittatum* var. *abrasum* Dahlst. in Johnston (1929a) 6 (Lectotype: Heathery, sandy banks of Valley Burn, Hoy, 50 ft. alt., 12 July 1928, H. H. Johnston no. 4007 (E)); Johnston & Sinclair (1930) 35.
H. subalpestrifrons Dahlst. in Johnston (1929a) 7 (Lectotype: Grassy, heathery banks of the Burn of Quoys, Hoy, 6 July 1928, J. Sinclair no. 565 in herb. Sinclair); Johnston (1929b) 4; Johnston and Sinclair (1930) 25.
H. paraliaeforme Dahlst. in Johnston (1932) 7 (Lectotype: Moist mossy soil on sandstone cliffs, Dwarfie Hamars, Hoy, 24 July 1931, J. Sinclair no. 717 in herb. Sinclair).
H. kalsoense subsp. *burnense* Druce & Zahn in Druce (1932 for 1931) 559 (Holotype: South Burn near Rackwick, Hoy, August 1931, G. C. Druce (OXF)).
H. sagitticeps Dahlst. in Johnston (1932) 4 (Holotype: Heathery banks of the Burn of Segal, Hoy, 8 August 1931, H. H. Johnston no. 4425 (E)).
H. subexpallescens Dahlst. in Johnston (1933 a) 3 (Lectotype: Heathery freestone sea-cliffs, Enegras, Craig Gate, southeast of Rackwick, Hoy, 1 August 1932, H. H. Johnston no. 4532 (E)); Johnston (1933 b) 23.
H. oistophyllum var. *abrasum* (Dahlst.) Pugsl. (1948) 159.

North Geo, between Bre Brough and The Sow, 30/1802, 13 August 1929, J. Sinclair no. 671 (herb. Sinclair). Grut Fea, Hoy, 30/1901, 7 August 1938, J. Sinclair no. 1233 (herb. Sinclair). Enegras, south-east of the Meadow of the Kame, Hoy, 30/1904, 8 July 1933, J. Sinclair (herb. Sinclair) and H. H. Johnston no. 4734 (BM). South-west side of Berriedale, Hoy, 30/2001, 26 August 1928, J. Sinclair no. 699 (herb. Sinclair). Burn of Segal, Hoy, 30/2001, 8 August 1931, H. H. Johnston no. 4425 (E); 1 August 1932, J. Sinclair no. 761 (herb. Sinclair) and H. H. Johnston no. 4533 (BM). Trowie Glen, Hoy, 30/2300, 5 August 1927, J. Sinclair no. 462 (herb. Sinclair). West side of Nowt Bield, Ward Hill, 30/2301, 8 July 1929, J. Sinclair no. 660 (herb. Sinclair). Dwarfie Hamars, 30/2400, 14 July 1905, E. S. Marshall and W. A. Shoobred as Linton Set no. 142 (BM, CGE); 1921, G. C. Druce (BM); 24 July 1931, J. Sinclair no. 717 (herb. Sinclair & BM); 2 August 1932, H. H. Johnston no. 4536 (E). Burn of Quoys, Hoy, 30/2402, 31 July 1894, F. J. Hanbury (BM); 6 July 1928, J. Sinclair no. 565 (herb. Sinclair). West side of Waulkmill Bay, Orphir, Mainland, 30/3706, 15 August 1881, H. H. Johnston (E); 17 July 1900, E. S. Marshall no. 2331 (CGE); 20 July 1912, H. H. Johnston (BM, CGE); 9 August 1933, J. Sinclair no. 959 (herb. Sinclair); July 1953, C. West (CGE); 1954, N. D. Simpson no. 54/084 (herb. Simpson). Enegras, Craig Gate, south-east of Rackwick, 39/1998,

1 August 1932, J. Sinclair no. 759 (herb. Sinclair) and H. H. Johnston no. 4532 (BM, E). South Burn, Hoy, 39/2099, 12 June 1929, H. H. Johnston no. 715 (BM); 23 August 1927, J. Sinclair no. 486 (herb. Sinclair); 14 July 1928, H. H. Johnston no. 4038 (BM). Roonie (? = Runcie) Gill, 39/2299, 26 July 1929, J. Sinclair no. 662 (herb. Sinclair); 15 August 1929, H. H. Johnston nos. 4241A (E) and 4245 (BM); 21 August 1938, J. Sinclair no. 1235 (herb. Sinclair). Valley Burn, Hoy, 12 July 1928, J. Sinclair no. 572 (herb. Sinclair) and H. H. Johnston no. 4007 (BM, E).

HIERACIUM CALEDONICUM Hanb. (1889) 75; E. F. & W. R. Linton (1893) 178; W. R. Linton (1905) 26; Johnston (1913) 263; Spence (1914) 130; Johnston (1914) 210; Pugsley (1948) 106.

H. rubicundum Hanb. (1892) 208; E. F. & W. R. Linton (1893) 178; Johnston in Cryer (1913) 262; Johnston (1914) 210 *pro maximo parte*; Spence (1914) 130.

H. boswellii E. F. Linton (1893) 178.

[*H. pulchellum sensu* Spence (1914) 43.]

[*H. ? murorum sensu* Spence (1914) 43.]

H. rubicundiforme (Zahn) Roffey (1925) 26 no. 1028.

Grut Fea, Hoy, 30/1901, 8 August 1927, H. H. Johnston no. 2659 (herb. Sinclair). South-east of Enegars, Kame, Hoy, 880 ft. 30/1904, 19 August 1932, J. Sinclair no. 769 (herb. Sinclair). Berriedale, Hoy, 30/2001, 7 September 1914, H. H. Johnston no. 360 (E); 8 August 1927, J. Sinclair no. 470 (herb. Sinclair) and H. H. Johnston no. 3655 (E). West side of Waulkmill Bay, Orphir, 30/3706, 19 and 20 July 1912, H. H. Johnston (E, CGE); 3 August 1924, R. J. Burdon (CGE); July 1953, C. West (CGE); 1954, N. D. Simpson nos. 54/085, 54/088 and 54/339 (herb. Simpson). Ward Hill, Rousay, 30/3829, 30 August 1916, H. H. Johnston no. 422 (E); 23 July 1917, M. Spence (E). Fitty Hill, Westray, 30/4244; 3 August 1934, H. H. Johnston no. 4948 (herb. Sinclair & E). Sea-cliff, Scapa, St. Ola, Mainland, 30/4308, 5 July 1912, H. H. Johnston (E, CGE); 1953, C. West (CGE). Scapa Pier, 30/4408, 18 July 1894, F. J. Hanbury (CGE); 17 July 1900, E. S. Marshall and W. A. Shoolbred as Linton Set no. 131 (CGE).

Sect. FOLIOSA Fries

HIERACIUM LATOBRIGORUM (Zahn) Roffey (1925) 29 no. 1230; Pugsley (1948) 272.

[*H. strictum sensu* Johnston (1882) 370; *sensu* Fortescue (1882) 370; *sensu* Bennett (1915) 55.]

H. strictum var. *amplidentatum* Hanb. *pro parte* (1894) 232 (*quoad loc.* Pegal Burn); *sensu* Spence (1914) 42.

[*H. corymbosum* var. *salicifolium sensu* Spence (1914) 42; *sensu* Johnston (1920) 43 and (1925) 6.]

[*H. auratum sensu* Spence (1914) 42; *sensu* Johnston (1925) 7.]

H. inuloides subsp. *striatum* var. *pseudauratum* Zahn (1921) 901; Johnston (1927) 411.

[*H. inuloides* subsp. *strictum* var. *amplidentatum sensu* Johnston (1929a) 8.]

[*H. crocatum* var. *normale sensu* Druce (1932 for 1931) 561.]

H. aestivum subsp. *hemitrachys* Druce & Zahn in Druce (1932 for 1931) 561 (Holotype: Pegal Bay, Hoy, August 1931, G. C. Druce (OXF)).

H. johnstonii Dahlst. in Johnston (1932) 8 (Lectotype: north side of Pegal Head, 13 August 1931, H. H. Johnston no. 4461 (E)).

H. polyphyllum Dahlst. in Johnston (1933a) 2 & 5 (Lectotype: Grassy sea cliffs between Lee Craig and Stanger Head, Hoxa Sound, Flotta, 15 August 1932, H. H. Johnston no. 4560 (E)); Johnston (1933b) 24; non Willd., Enum. hort. Berol., Suppl., 54 (1813).

H. subpolyphyllum Pugsl. (1946) 347 and (1948) 279 (Lectotype: that of *H. polyphyllum* Dahlst. non Willd.).

Hobbister Rocks, Orphir, 30/3805, August 1873, J. B. Syme (BM, E) and 1874 and 1879 (BM); August 1880, J. B. T. Fortescue (BM); July 1953, C. West (CGE); 1954, N. D. Simpson no. 54/098 (herb. Simpson). Pegal Bay, North Walls, Hoy, 39/3098, August 1880, J. B. T. Fortescue (CGE, OXF); 22 August 1894, H. H. Johnston (E, CGE, OXF); 9 August 1926, H. H. Johnston, no. 3484 (E); 20 August 1929, J. Sinclair no. 678 (herb. Sinclair); 13 August 1931, H. H. Johnston no. 4461 (E) and J. Sinclair no. 724 (herb. Sinclair); August 1931, G. C. Druce (OXF). Between Lee Craig and Stanger Head, Hoxa Sound, Flotta, 39/3793, 26 September 1924, H. H. Johnston no. 2847 (E); 15 August 1932, J. Sinclair no. 763 (herb. Sinclair) and H. H. Johnston no. 4560 (E, BM).

HIERACIUM MARITIMUM Hanb. (1904) 267; Pugsley (1948) 289.
 [*H. inuloides* subsp. *strictum* forma *angustifolium* sensu Dahlst. in Johnston (1929a) 8;
sensu Johnston & Sinclair (1930) 26; *sensu* Johnston (1934) 472.]

Aith Hope, South Walls, Hoy, 39/2989, 9 August 1928, J. Sinclair no. 596 (herb. Sinclair); 20 August 1929, H. H. Johnston no. 4258 (E, CGE).

Subgen. PILOSELLA Tausch

Sect. PILOSELLINA Fries

HIERACIUM PILOSELLA L. (1753) 800; Fortescue (1882) 370; Spence (1914) 41; Pugsley (1948) 314.

Bu Farm, Hoy, 30/2304, 5 July 1926, J. Sinclair no. 330 (herb. Sinclair). Swanbister, 30/3405, July 1849, J. T. Syme (BM). St. Andrews, Rousay in Spence (1914). Not uncommon on Mainland and Hoy according to J. T. Syme in Fortescue (1882).

var. TRICHOSCAPUM (Naeg. & Peter) Pugsley (1948) 315.

Near Maeshow, Mainland, 30/3112, August 1880, J. B. Syme (BM).

Sect. COLLININA Naeg. & Peter

HIERACIUM AURANTIACUM L. (1753) 801, *sensu stricto*; Johnston (1927) 415.

Top of a stone wall, 90ft. alt., near the garden of Holland House, Papa Westray, 30/4851, 22 June 1926, H. H. Johnston no. 3330 (E).

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A STUDY OF VARIATION *EUPHRASIA* BY MEANS OF OUTDOOR CULTIVATION

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ABSTRACT

Samples of *Euphrasia* from populations at six localities on chalk or limestone in the Midlands and south-east of England were cultivated in the garden in order to compare them without interference from environmental effects. The variation between populations in the wild and in cultivation is described. It was concluded that five samples were more or less normal *E. nemorosa*, differing only slightly from one another; also that one of them was mixed with, and apparently hybridising with, *E. stricta* (not previously known in Britain, and possibly an alien introduction). One population appeared to represent a slightly divergent ecotype of *E. nemorosa* and another an extreme ecotype of the same species. A hybrid between the latter and *E. pseudokernerii* appeared among the plants cultivated. Four more samples were grown a year later and it was concluded that these comprised three normal forms of *E. nemorosa* and a form of *E. confusa*.

Two forms of *E. anglica* showed fairly marked differences although growing only three-quarters of a mile apart. The differences may have been caused by hybridisation at one of the localities.

The cultures provided instructive information on interspecific and intraspecific variation in a taxonomic group in which the most closely related species are very similar to one another and in which variation within species is considerable.

INTRODUCTION

Owing to the fact that the species of *Euphrasia* are annual and semi-parasitic plants they show great variations in vigour. These may be seen within populations, but overall differences of vigour occur between populations as well. Ignorance of the effects of this variation on morphology suggested that the sampling of wild populations for morphological study would be unreliable. A large-scale garden trial cultivation was therefore undertaken to investigate variation in *E. nemorosa*. A small trial of *E. anglica* was carried out at the same time, and further populations of *E. nemorosa* were later compared by the same method.

The species of *Euphrasia* are variable, ill-defined, and subject to hybridisation, though each has several characters by which it normally differs from its nearest relatives (Yeo, 1955). In spite of the difficulty of recognizing even species on the basis of small and relatively inconstant characters, *E. nemorosa* was subdivided by Pugsley (1930) into five varieties, and Warburg (1952) stated that three of them were distinct ecologically and might prove to be worthy of treatment as subspecies. It was thought that the cultures might help in the understanding of some of these varieties, especially of var. *calcareo* Pugsl., since most of the samples of this species were collected from chalk or limestone.

COMPARISON OF SEVEN *EUPHRASIA* SAMPLES GROWN IN THE GARDEN

Description of experiment

The 'whalehide pot' method of cultivation was used in this experiment, which was carried out at Leicester in 1953. Each bituminized paper pot was planted in March with one seedling of *Euphrasia* and one of *Plantago lanceolata*; the pots were then embedded in the garden; *Euphrasia* and host plants that died during the few days occupied by this process were replaced at once. The aim of the experiment was to compare the offspring

*Most of the work here described was done during the tenure of a Research Scholarship at the then University College of Leicester.

TABLE 1. The Distribution in Europe of the species of *Hieracium* which occur in the Orkneys

| Species | Mainland of Scotland | Northern half of England | Southern half of England | Wales | Ireland | Shetland Isles | Faeroes | Iceland | Scandinavia | Continental Europe |
|-------------------------------------|----------------------|--------------------------|--------------------------|-------|---------|------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------------------------------------------------------|---------------------------------|--------------------|
| <i>H. anglicum</i> | + | + | — | + R | + | — | as <i>H. perampliforme</i> Dahlst. ⁺ | + as var. <i>vestmannaense</i> Omang | — | — |
| <i>H. iricum</i> | + | + | — | — | + | — | as <i>H. peramplum</i> Dahlst. ⁺ | — | — | — |
| <i>H. argenteum</i> | + | + | — | + | + | — | — | as <i>H. microdon</i> Dahlst. ⁺ | + | — |
| <i>H. scoticum</i> | + | + R | — | + R | + | — | as <i>H. scoticiforme</i> Dahlst. ⁺ | — | — | — |
| <i>H. orimeles</i> | + | + R | — | + | + | + | — | — | — | — |
| <i>H. sarcophylloides</i> | + R | — | — | — | — | — | + | — | ? as <i>H. pycnodon</i> Dahlst. | — |
| <i>H. euprepes</i> | + | — | — | + | + | — | as <i>H. ardisodon</i> Dahlst. ⁺ | — | — | — |
| <i>H. caledonicum</i> | + | + | — | + | + | — | + as { <i>H. subrubicundum</i> Dahlst. <i>H. perintegrum</i> Dahlst. <i>H. cordifrons</i> Dahlst. <i>H. leniscotum</i> Omang <i>H. subcordifrons</i> (Zahn) Omang | ? as <i>H. perintegrum</i> var. <i>austroislandicum</i> Omang | — | — |
| <i>H. latobrigorum</i> | + | + | — | — | + | — | — | — | — | + |
| <i>H. maritimum</i> | + R | — | — | — | + R | as <i>H. obesifolium</i> Pugsl. ^{+ R} | — | — | + R | — |
| <i>H. pilosella</i> * | + | + | + | + | + | — | — | — | + | + |
| <i>H. aurantiacum, sensu lato</i> † | + N | + N | + N | + N | + N | — | — | — | + N | + |

+ = present

— = absent

R = rare

N = naturalised

**H. pilosella* also occurs in Asia Minor and Siberia.

†*H. aurantiacum, sensu lato*, occurs as a naturalised plant in North America.

