Key to Identification of Invasive and Native Hawkweeds (*Hieracium* spp.) in the Pacific Northwest

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Thanks to Cindy Roché for the illustrations rendered and portrayed in Figure 1 of this key.

Cover picture: Tall hawkweed near Revelstoke, B.C.

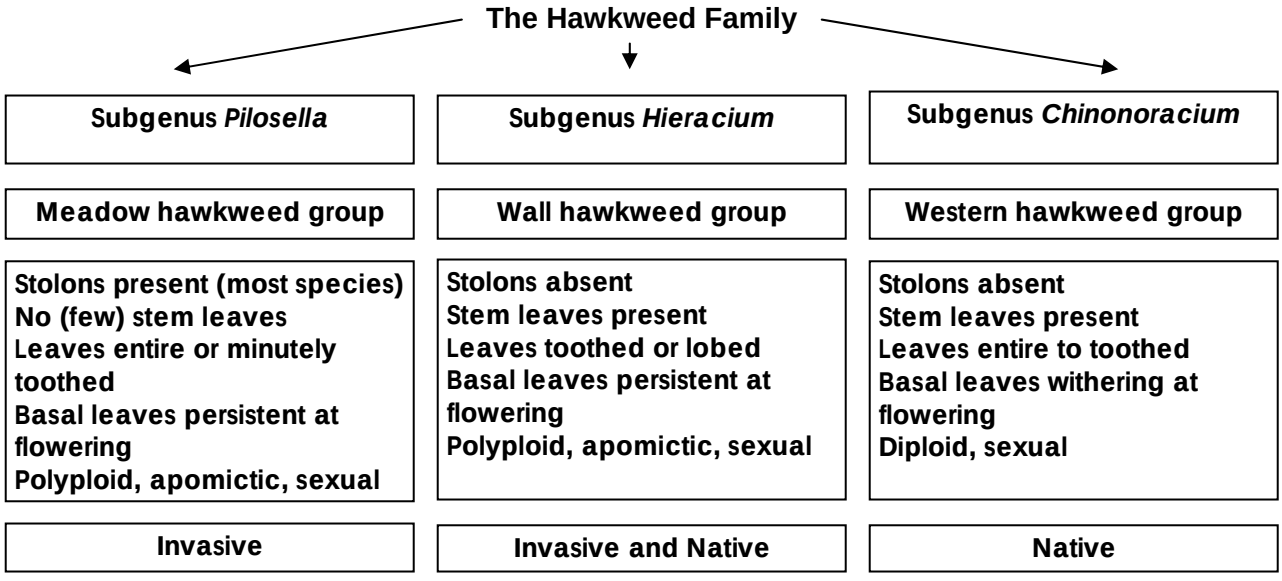
INTRODUCTION

The name *Hieracium* comes from the Greek 'hierax', meaning hawk; allegedly keen-sighted hawks of yore ate the sap of the brightly colored plants to sharpen their eyesight. In North America, invasive hawkweeds are an eyesore – and they are among the most troublesome weeds in the Pacific Northwest (PNW). The first species arrived in the region as recently as fifty years ago, probably from the western expansion of infestations from eastern Canada and the US during or shortly after the Second World War. There are now about 15 species of invasive hawkweeds in the PNW. Rapid spread of hawkweed has been possible because much of the land in British Columbia, coastal and northeastern Washington, northern Idaho, and northwestern Montana is considered susceptible to invasion by these aggressive weeds.

TAXONOMY

Hawkweeds are in the Tribe Lactuceae of the Family Asteraceae, having all strap-shaped (ligulate) flowers and a milky latex in stems and leaves. The genus *Hieracium* is divided into 3 subgenera. Subgenus *Chionoracium* (formerly subgenus *Stenotheca*) represents the ± 20 native species in North America (partial list - Table 1). Subgenus *Hieracium* occurs in both North America and Europe. Two native species occur in the PNW (Table 1); six species from central and eastern Europe also occur in the region; including smooth hawkweed, common hawkweed, European hawkweed, polar hawkweed, spotted hawkweed, and wall hawkweed (Table 2).

Subgenus *Pilosella,* entirely European in origin, represents most of the invasive species in the PNW. The nine known invasive species in subgenus *Pilosella* include meadow hawkweed, orange hawkweed, mouse-ear hawkweed, whiplash hawkweed, kingdevil hawkweed, queendevil hawkweed, and tall hawkweed (Table 2). Yellowdevil hawkweed was identified from southeastern British Columbia in 2001. This was the first report of this species in North America (Wilson et al. 2006. Can. J. Botany 84: 133–142). Pale hawkweed was identified in 2006 from a herbarium specimen collected near Vancouver, BC (UBC Herbarium).



DESCRIPTION of INVASIVE HAWKWEEDS

Hawkweeds are fibrous-rooted, perennial herbs growing from a stout rhizome. Plants reproduce by seeds and vegetatively by stolons, rhizomes, and adventitious root buds. The small, dandelion-like heads are borne singly at the top of long, hairy to hairless stems, or in compact, rounded or loose, elongated panicle-like clusters. All but one invasive species has yellow flowers (likewise, all but one native species has yellow flowers). Seed production is primarily asexual through apomixis (the production of seeds without pollen), although occasional sexual reproduction, outcrossing, and hybridization is believed to occur. Hawkweeds are distinguished largely on a few key morphological characters, including leaf, stem and phyllary (involucral bract) pubescence. Hairs, both type and abundance, are important characters used to distinguish hawkweed species. Three types of hairs are common: long simple hairs; dark, glandular hairs; and small, star-shaped (stellate) hairs. All invasive hawkweeds are polyploid (n=9) and typically asexual, compared to the entirely diploid and sexual native species.

Meadow hawkweed in northern Idaho

Invasive hawkweed commonly occur as populations of intermediate types throughout the PNW, making identification of invasive hawkweed species difficult. Abundant variation in plant characteristics due to apomixis and perhaps occasional hybridization, environmental and site influences, and natural variation (polymorphism) has resulted in the description of thousands of species, subspecies and types worldwide. The purpose of this key is to enable land managers to distinguish among the entire complex of native and invasive hawkweeds in the Pacific and Inland Northwest.

INVASION SUCCESS

Smooth hawkweed near Bellingham, WA

Hawkweeds possess many characteristics that allow a species to become invasive: perennial, apomictic, high seed production and germinability, long distance seed dispersal, spread/regenerate from root fragments, root buds, rhizomes and stolons, rapid generation time (ca. 63 days), and broad latitudinal range. In addition, several hawkweed species, particularly orange hawkweed, are popular ornamentals. They have been and continue to be spread by intentional and accidental human activities.

HABITAT PREFERENCES

Invasive hawkweeds infest similar habitats in British Columbia, Washington, Idaho, Oregon, and Montana. Found predominantly in open fields, mountain meadows and clearings in forest zones, hawkweeds also infest permanent pastures, cleared timber units, abandoned farmland, and other modified habitats where the soil is well drained, coarse-textured, and moderately low in organic matter.

Hawkweeds are preadapted to many habitats in the Pacific and Inland Northwest, and mesic habitats in the Intermountain West. Throughout most of the PNW, hawkweeds are generally found at elevations ranging from 725 m (2400 feet) to over 1700 m (5500 feet). They occur more commonly at lower elevations above 51°N latitude. None of the invasive hawkweeds are found in the natural grasslands or shrub-steppe of the PNW, and they have not proven to be invasive in the dry habitats of southcentral British Columbia and central Washington.

MANAGEMENT

Management of hawkweed-invaded sites has had mixed results. Controlling hawkweed has relied mostly on selective herbicides. Herbicides are effective in suppressing hawkweeds but reinvasion occurs unless other plant species fill the gaps left by hawkweed removal. Control and management of meadow hawkweed has been complicated by the plant's ability to persist following chemical and cultural control inputs.

Hawkweeds often invade sites in cleared forest zones which are typically low in available nutrients. Hawkweeds are thought to persist in these sites because they capture nitrogen in nutrient-poor soils, thus limiting nutrients available to competing plants. Fertilizers and soil fertility management have been used to effectively control hawkweeds in some areas, especially in new hawkweed infestations or where hawkweed density is relatively low. Long-term management of hawkweed needs to emphasize altering conditions in the plant community to favor grasses and native forbs, following initial hawkweed control efforts.

Alternative control solutions, including biological control, are being investigated. To this end, the British Columbia Ministry of Forests and Range (on behalf of the Ministries of Agriculture and Lands, Environment, and Transportation and Highways), together with the Idaho Department of Agriculture and the Montana Noxious Weed Trust Fund, are primary sponsors of the Biological Control Program in the Invasive Hawkweed Consortium.

Table 1
LIST OF NATIVE HAWKWEEDS IN WESTERN NORTH AMERICA
(including Alaska, Alberta, California, Colorado, British Columbia, Idaho, Montana, Oregon, Utah, Washington, and Wyoming)

Scientific name	Common name	Distribution
Subgenus *Chionoracium*		
Hieracium albiflorum	white hawkweed	AB, BC; AK, CA, CO, ID, MT, OR, UT, WA, WY
Hieracium argutum	southern hawkweed	CA
Hieracium bolanderi	Bolander's hawkweed	OR (serpentine soils of SW), CA
Hieracium gracile	slender hawkweed	BC; CA, CO, ID, MT, OR,WA, WY
Hieracium greenei	Green's hawkweed	OR, CA
Hieracium horridum	rough hawkweed	OR, CA
Hieracium longiberbe	long beard hawkweed	OR, WA (occurs only in Columbia River gorge)
Hieracium parryi	Parry hawkweed	OR (serpentine soils of SW), CA
Hieracium scouleri var. *albertinum*	western hawkweed	AB, BC; AK, CA, CO, ID, MT, OR, WA, WY
Hieracium scouleri var. *cynoglossoides*	houndstongue hawkweed	AB, BC; CA, ID, OR, WA
Hieracium scouleri var. *scouleri*	Scouler's hawkweed	AB, BC; CA, ID, MT, OR, WA, WY
Hieracium triste	alpine hawkweed	AB, BC, AK
Subgenus *Hieracium*		
Hieracium canadense	Canada hawkweed	BC; ID, MT, WA
Hieracium umbellatum	narrowleaf hawkweed	BC; ID, MT, OR, WA, WY

Table 2
LIST OF INVASIVE ALIEN HAWKWEEDS IN WESTERN NORTH AMERICA
(including Alaska, Alberta, British Columbia, Idaho, Montana, Oregon, Washington, and Wyoming)

Scientific name	Common name	Distribution
Subgenus *Pilosella*		
Hieracium aurantiacum	orange hawkweed	AB, BC; AK, ID, MT, OR, WA, WY
Hieracium caespitosum (= H. pratense)	meadow hawkweed	AB, BC; ID, MT, OR, WA, WY
Hieracium flagellare	whiplash hawkweed	BC; WY
Hieracium floribundum	kingdevil hawkweed	BC; ID, MT, OR, WA
Hieracium glomeratum	yellowdevil hawkweed	BC; ID, WA
Hieracium lactucella	pale hawkweed	BC
Hieracium pilosella	mouse ear hawkweed	BC; OR, WA
Hieracium piloselloides	tall hawkweed	BC; MT
Hieracium praealtum (= H. bauhini)	queendevil hawkweed	BC
Subgenus *Hieracium*		
Hieracium laevigatum	smooth hawkweed	BC; WA
Hieracium lachenalii (*= H. vulgatum*)	common hawkweed	BC; ID, WA
Hieracium sabaudum	European hawkweed	BC; WA
Hieracium atratum	polar hawkweed	WA
Hieracium maculatum	spotted hawkweed	BC; WA
Hieracium murorum	wall hawkweed	BC; AK

Identification Key to Hawkweeds (*Hieracium* spp.) in the Pacific Northwest

Linda M Wilson, March 2007

General Description: Hawkweeds are fibrous-rooted, perennial herbs growing from a short, stout rhizome, and commonly with short to long stolons (occasionally with shallow, lateral rhizomes), though sometimes stolons (rhizomes) are lacking; stems erect, ± solitary, generally unbranched (except near the top), smooth to moderately hairy, exuding a milky juice when broken. Leaves are narrowly to broadly lance-shaped, elliptical to ovate, generally tapering or rounded at the base; upper stem leaves absent or much reduced and often sessile; inflorescence ranging from one to many heads arranged in an open or compact, flat- to round-topped cluster (cyme). Flowers are yellow, orange or white; all strap-shaped (ray flowers). Leaves, stems and phyllaries (involucral bracts) range from hairless (glabrous) to strongly pubescent; pubescence ranging from soft, simple hairs to stiff bristles, star-shaped (stellate) hairs, dark glandular (gland-tipped) hairs, and/or stiff, bulbous-based (conical) hairs. Seeds (achenes) are ribbed, and the pappus is dirty white to tawny.

How to Use this Key:

This is a ***dichotomous key*** – it is based on a numerical series of choices between two contrasting statements. Each paired number (referred to as a couplet) in the key describes contrasting characteristics about the hawkweed plant (e.g., 5a and 5b). Choose one statement out of each pair that happens to be true about the hawkweed you are trying to identify. The statement you choose may directly give you the name of the hawkweed or it may take you to another pair of statements. Continue making consecutive choices until you arrive at the species.

Example: Meadow hawkweed (*H. caespitosum*)
To start, look at both statements for couplet 1, 1a and 1b. The correct choice is 1a (plants with stolons), which directs you to couplet 2. Looking at couplet 2 and examining the plant, you select 2b (flowers yellow), which directs you to couplet 3, and so on until you arrive at 7a, which describes meadow hawkweed. The sequence of couplets you would choose to identify meadow hawkweed: 1a – 2b – 3b – 4b – 6a – 7a.

It is a good idea to first become familiar with the layout of the key. Always read both choices presented at each step of the key. A ruler may be necessary for measurement. There can always be variability between plants of the same species, so it is a good idea to examine several different specimens.

Changes from Edition 1 (2006):

Two species were added to the key (see also Fig. 2): The native, woolly hawkweed (*H. triste*) and the newly identified invasive, pale hawkweed (*H. lactucella*). This species was collected in 1991 near Port Coquitlam, BC, by F. Lomer. However, it was not identified as pale hawkweed until 2006 (F. Lomer, pers. comm.). It is not known from other locations at this time. Pale hawkweed closely resembles whiplash hawkweed (*H. flagellare*), but it much taller and more robust.

Identification Key to Hawkweeds in the Pacific Northwest **Linda M Wilson, March 2007**

1a. Plants with or without stolons; stems erect, not stiff, stem leaves absent or much reduced (and only on the lower third of the stem); basal leaves lance-shaped to elliptic or egg-shaped and margins mostly entire (or minutely toothed); inflorescence solitary to an open flat- or round-topped cluster. Introduced species **.....2**

1b. Plants without stolons; stems erect, stiff, leafy; basal leaves broadly lance-shaped to egg-shaped and margins entire to strongly toothed; inflorescence an open, round-topped cluster. Native and introduced species **.....10**

2a. Flowers orange to red-orange; basal leaves with numerous simple hairs on upper surface and simple and stellate hairs on lower surface (Fig.1-A); stem and phyllaries with numerous stellate, glandular and simple hairs; heads 20-50 in an open, rounded cluster; plants 10-60 cm tall **.....ORANGE HAWKWEED *H. aurantiacum* L.**

2b. Flowers yellow, sometimes with red stripes; leaves and inflorescence various**.....3**

3a. Heads solitary (rarely 2); stems unbranched, without leaves, hairy at the base; stolons present, 10 - 25 cm long, leafy and mat-forming; basal leaves egg-shaped and narrow at the base, upper surface dark green with numerous long simple hairs; lower surface whitish from a dense mat of short, stellate hairs (Fig.1-B); phyllaries with numerous stellate, glandular and simple hairs; plants 15-30 cm tall**..... MOUSE EAR HAWKWEED *H. pilosella* L.**

3b. Heads few to many on long stalks (peduncles) in open clusters; stems branched near the top, with or without 1-3 small leaves, smooth or hairy at the base; stolons present or absent; basal leaves lance-shaped to elliptic, smooth and hairless or sparsely to abundantly hairy, but not white on lower surface; phyllaries with or without stellate, glandular and simple hairs**.....4**

4a. Heads 2-8, each branch with a solitary head, leaves mostly basal, entire, stolons present **.....5**

4b. Heads 6-30 (many), leaves not as above, pubescence variable, stolons present or absent **.....6**

5a. Heads 2-6, leaves lanceolate to spoon-shaped (spatulate) and narrow at the base; upper leaf surface dark green with few to numerous long simple hairs; lower surface with moderately dense stellate and long simple hairs; stolons long and leafy; phyllaries with numerous stellate, glandular and simple hairs; involucres 9–13 mm, plants 6-20 cm tall **.....WHIPLASH HAWKWEED *H. flagellare* Willd.**

5b. Heads 4-8, leaves slightly spoon-shaped (spatulate), narrow at the base and tapering at the apex; upper leaf surface hairless or with few to numerous short simple hairs; lower surface with sparse stellate and short simple hairs; stolons long and leafy; phyllaries with numerous stellate, glandular and simple hairs; involucres 6-8 mm, plants 15-40 cm tall **.....PALE HAWKWEED *H. lactucella* Wallr.**

6a. Leaves bright- to yellow-green; narrowly to broadly lance-shaped to elliptic and tapering to the petiole; both surfaces with ± numerous simple hairs, lower surface with numerous stellate hairs **.....7**

6b. Leaves dark green; narrowly lance-shaped to elliptical and tapering; smooth and hairless or with few simple hairs on the upper surface, on the margins and/or on the lower midrib, with or without stellate hairs on the lower surface**.....8**

7a. Stolons present (though at times short and inconspicuous); upper leaf surface with long simple hairs, and lacking (or few) stellate hairs; lower surface with moderately dense stellate and long simple hairs (Fig.1-D); lower stems with dense stellate, simple and glandular hairs; heads 20-50 in a compact, flat-topped cluster, phyllaries sparsely covered with numerous stellate, glandular and simple hairs; plants 20-70 cm tall (= *H. pratense*) **..... MEADOW HAWKWEED *H. caespitosum* Dumort.**

7b. Stolons absent; upper and lower surface of leaves with numerous stellate hairs, simple hairs short and stiff, giving the plant a rough texture (Fig.1-E); lower stems with sparse to dense stellate and short simple hairs; heads 15-25 in an open, round-topped cluster; phyllaries densely covered with stellate and glandular hairs; plants 25-90 cm tall **.....YELLOWDEVIL HAWKWEED *H. glomeratum* Froel.**

8a. Basal leaves narrowly lance-shaped; upper leaf surface and margin with sparse, long, simple hairs or hairs lacking, lower leaf surface and midrib with short, simple hairs, stellate hairs lacking (Fig 1-F); heads 15-25 in a loose, open cluster; phyllaries with numerous stellate, glandular and simple

hairs; stolons present and leafy; plants 15-50 cm tall..... **KINGDEVIL HAWKWEED *H. floribundum* Wimm & Grab.**

8b. Basal leaves narrowly elliptical; leaves hairless or with a few simple and stellate hairs; heads in an open cluster; phyllaries with numerous simple and glandular hairs but without stellate hairs; stolons present or absent **9**

9a. Plants without stolons; upper leaf surface hairless or with only a few simple hairs along margin, stellate hairs lacking, lower leaf surface smooth and hairless except for few simple or stellate hairs on the midvein (Fig.1-G); heads 11-20 in an open, round-topped cluster; plants 40-90 cm tall..... **TALL HAWKWEED *H. piloselloides* Vill.**

9b. Plants with long, leafy stolons; upper leaf surface hairless, lower surface with few to numerous stellate hairs, and with long, simple hairs only along midvein (Fig.1-H); heads 15-30 in a compact, round-topped cluster; plants 25- 80 cm tall (= *H. bauhini*)..... **QUEENDEVIL HAWKWEED *H. praealtum* Vill.**

10a. Leaf margins entire or wavy toothed; basal leaves elliptic to narrowly lance-shaped, becoming withered and lacking at flowering (deciduous); stem leaves reduced; heads 2-25, small, with sparse to copious hairs **11**

10b. Leaf margins coarsely to sharply toothed; basal leaves egg-shaped to broadly lance-shaped, well-developed and persistent at flowering; stem leaves well-developed; heads 4-30, large, with few or no hairs..... **18**

11a. Flowers white; leaves entire to wavy toothed, sparsely to moderately hairy; stem bases long-hairy, phyllaries with dark glandular hairs, stellate hairs absent; plants 30-60 cm tall; native species, widespread in dry, open woodlands..... **WHITE HAWKWEED *H. albiflorum* Hook.**

11b. Flowers yellow; leaves and inflorescences variable..... **12**

12a. Leaf margins entire **13**

12b. Leaf margins finely to coarsely toothed **16**

13a. Basal leaves ovate to spoon-shaped (spatulate), narrowing to base, smooth and ± hairless or with a few short hairs; stems unbranched, stem leaves ± absent; heads 2-6; plants 3-35 cm tall; native, subalpine species..... **14**

13b. Basal leaves slender, narrowly elliptical to lance-shaped; plants slightly to copiously hairy; stems branched or unbranched; stem leaves 2-6, reduced; heads 7 to many **15**

14a. Upper part of stem, peduncles and involucral bracts sparsely grey-hirsute, glandular hairs present; achenes red ..... **SLENDER HAWKWEED *H. gracile* Hook.**

14b. Upper part of stem, peduncles and phyllaries black-villous, without glandular hairs; achenes black..... **WOOLLY HAWKWEED *H. triste* Willd.**

15a. Basal leaves and stems with long, conspicuously shaggy hairs (hairs 3-7 mm); stems sparsely to moderately leafy; heads 7-15, plants 30-60 cm tall; native species of moist, rocky outcroppings in the Columbia River Gorge..... **LONG BEARD HAWKWEED *H. longiberbe* Howell.**

15b. Basal leaves sparsely to moderately hairy; stems moderately leafy and hairy; heads 10-20; plants 30-100 cm tall..... ***H. scouleri* Hook. complex**

b1. plants sparsely or moderately hairy ..... **var. *scouleri* SCOULER'S HAWKWEED**

b2. plants densely hairy ..... **var. *cynoglossoides* HOUNDSTONGUE HAWKWEED**

b3. plants very densely and conspicuously long-hairy on leaves, stems and heads..... **var. *albertinum* WESTERN HAWKWEED**

16a. Plants without bulbous-based, conical hairs; stems stout, with long spreading hairs, stem leaves abundant; lower stem leaves strongly toothed, ovate to broadly lanced-shaped, sometimes hairless or with stellate and simple hairs; mid-stem leaves mostly lance-shaped, entire to sparingly toothed; heads 6-20 (many) in an open, spreading cluster, phyllaries hairless or nearly so; plants 20-100 cm tall; native species..... **CANADA HAWKWEED *H. canadense* Michx.**

16b. Plants with bulbous-based, conical hairs on leaves or leaf margins; other characters variable **.....17**

17a. Stems slender; leaves ± linear, 4-12 times as long as wide, entire or only weakly toothed, narrowed to a sessile base; leaves somewhat stiff hairy, usually with stellate hairs; leaf margins rolled under (revolute) and rough from short, firm, conical hairs; stems uniformly leafy, leaves ± sessile; heads few to many (5-16) in an umbellate panicle; plants 30-80 cm tall; native species **..... .....NARROWLEAF HAWKWEED *H. umbellatum* L.**

17b. Stems robust; leaves oblong and narrowly tapered to a long petiole; leaf margins flat (not revolute) and smooth; lower leaf surfaces and lower stem with long, firm, subconic hairs; stellate hairs lacking throughout; stem leaves ± 50, crowded at the base; rapidly becoming smaller upwards; lower stem densely covered with long simple hairs; phyllaries with many glandular and numerous long simple hairs; heads few to numerous (3-12) in an open, flat-topped cluster; plants 40-130 cm tall; introduced species **.....EUROPEAN HAWKWEED *H. sabaudum* L.**

18a. Leaves purple-mottled or blotched above; plants 20-80 cm tall; introduced species **..... ..... SPOTTED HAWKWEED *H. maculatum* Sm**

18b. Leaves uniformly green **.....19**

19a. Leaf bases rounded **.....20**

19b. Leaf bases tapered and narrowing **.....21**

20a. Leaves nearly entire or slightly toothed; basal leaves broadly elliptical, heart-shaped (cordate) or somewhat flattened (truncate) at base, not tapered to petiole, hairless or with simple hairs on the upper surface or sparse stellate hairs on the lower surface; stem leaves absent or 1-2 near the base; heads 4–15, with dense stellate and dark glandular hairs; plants 20-80 cm tall; introduced species **.....WALL HAWKWEED *H. murorum* L.**

20b. Leaves strongly dentate (a few coarse teeth along the margin, with the teeth facing outward); basal leaves narrowly egg-shaped, abruptly tapering to petiole, with numerous simple hairs on upper surface and stellate hairs on lower surface; stem leaves 2-4; heads 2-10, with many dark, glandular and simple hairs and a few stellate hairs; plants 20-40 cm tall; introduced species **..... .....POLAR HAWKWEED *H. atratum* Fries.**

21a. Heads 4-12, with numerous stellate and simple hairs (sometimes with few dark, glandular hairs); stems with sparse stellate hairs and numerous glandular hairs; basal leaves grey-green, broadly elliptical to lance-shaped, strongly toothed, narrowly tapering to a petiole; stem leaves 4-7, upper leaves smaller and sessile; plants 20-80 cm tall; introduced species (= *H. vulgatum*) **..... ..... COMMON HAWKWEED *H. lachenalii* Gmel.**

21b. Heads 10-25, without stellate and simple hairs; stems with numerous stellate and glandular hairs; basal leaves green, broadly elliptical, coarsely to strongly toothed, abruptly tapering to a petiole; stem leaves 7-10; upper leaves smaller and sessile; plants 40-110 cm tall; introduced species **..... ..... SMOOTH HAWKWEED *H. laevigatum* Willd.**

Meadow hawkweed (*H. caespitosum*)

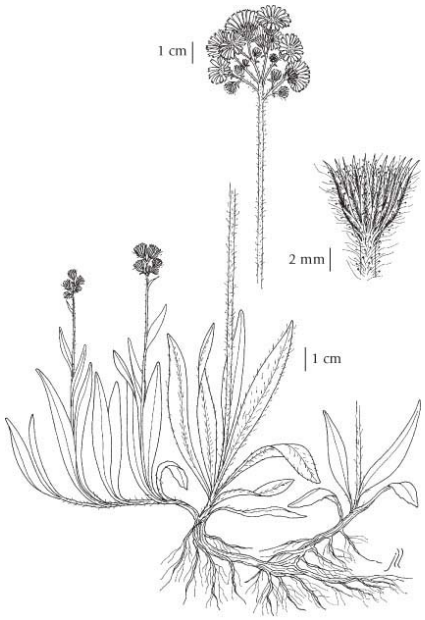
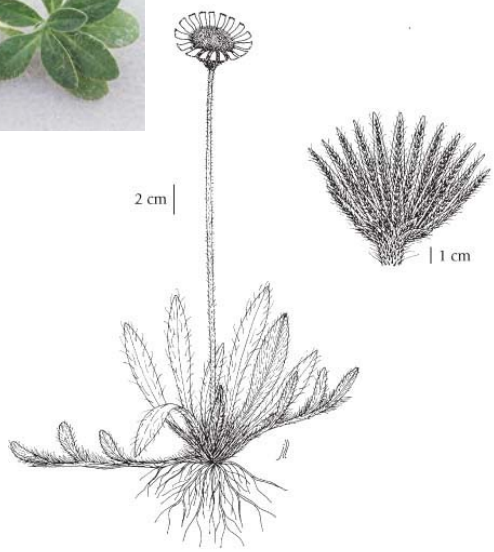


Illustration Source: The *Illustrated Flora of BC*
http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Hieracium+caespitosum

Orange hawkweed (*H. aurantiacum*)

Illustration Source: The *Illustrated Flora of BC*
http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Hieracium+aurantiacum

Mouse ear hawkweed (*H. pilosella*)



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Pale hawkweed (*H. lactucella*)

Yellowdevil hawkweed (*H. glomeratum*)

Kingdevil hawkweed (*H. floribundum*)

Queendevil hawkweed (*H. praealtum*)

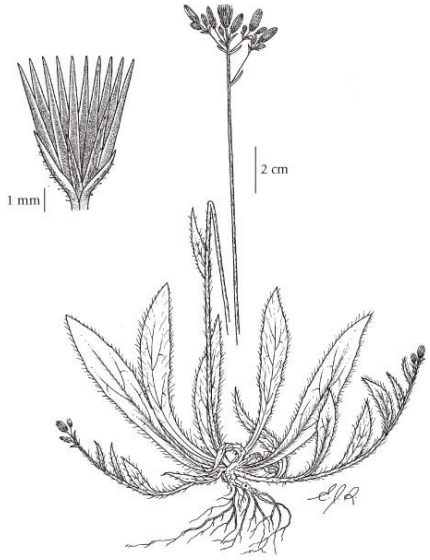

Illustration Source: The *Illustrated Flora of BC*
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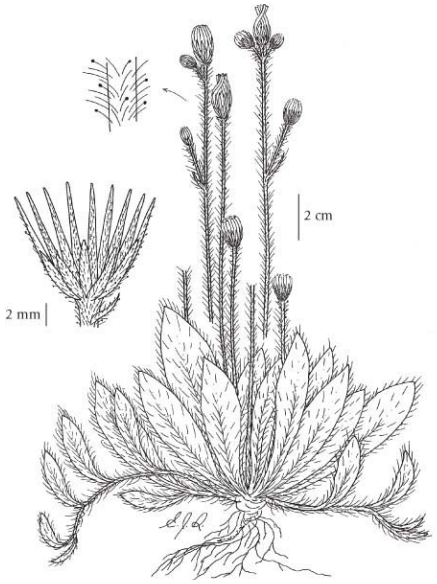
Whiplash hawkweed (*H. flagellare*)



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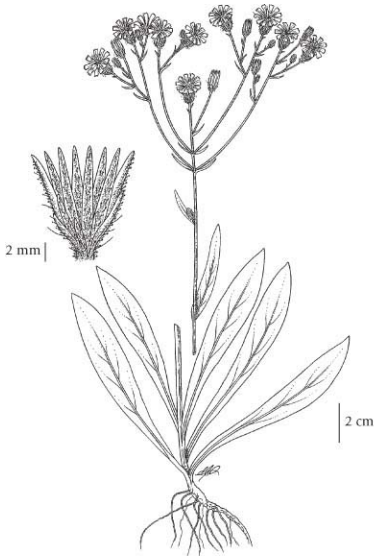
Tall hawkweed (*H. piloselloides*)

Tall hawkweed near Yoho National Park, B.C., 2004

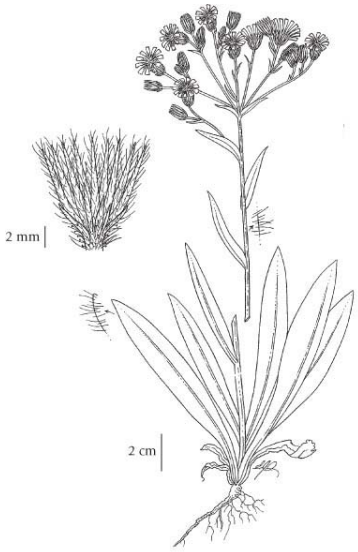
Western hawkweed (*H. scouleri)* Complex

Houndstongue hawkweed (*H. scouleri* var. *cynoglossoides*) (left)
Scouler's hawkweed (*H. scouleri* var. *scouleri*) (right)

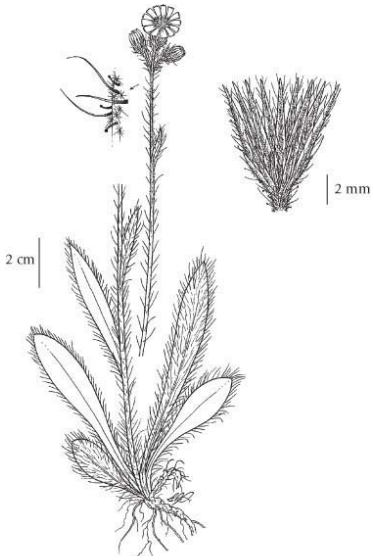
Houndstongue hawkweed (*H. scouleri* var. *cynoglossoides*) (left) Western hawkweed (*H. scouleri* var. *albertinum*) (right)



H. scouleri var. *scouleri*



H. scouleri var. *cynoglossoides*



H. scouleri var. *albertinum*

Illustration Source: The *Illustrated Flora of BC*
http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Hieracium+scouleri

White hawkweed (*H. albiflorum*)

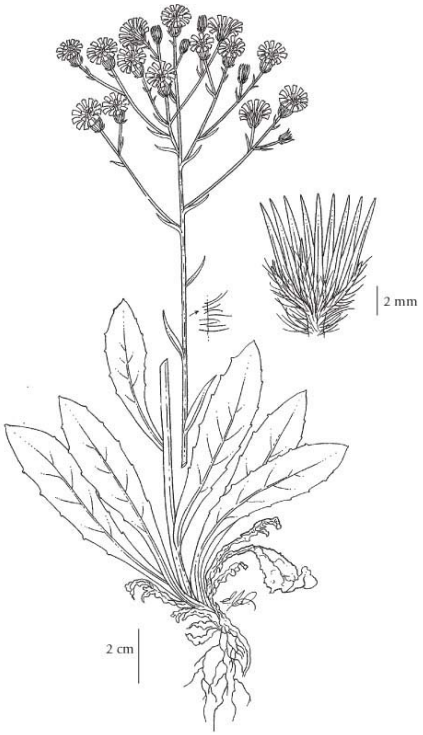


Illustration Source: The *Illustrated Flora of BC*
http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Hieracium+albiflorum

Narrowleaf hawkweed (*H. umbellatum*)

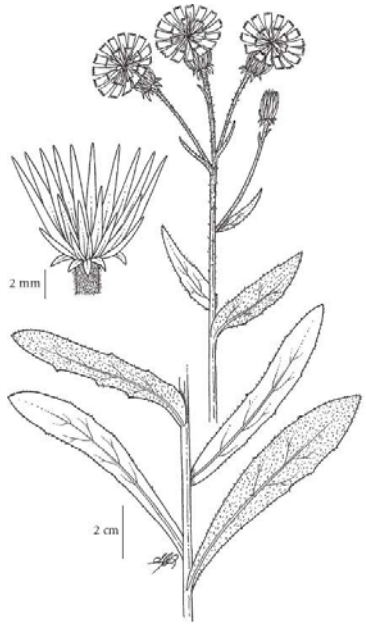


Illustration Source: The *Illustrated Flora of BC*
http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Hieracium+umbellatum

European hawkweed (*H. sabaudum*)

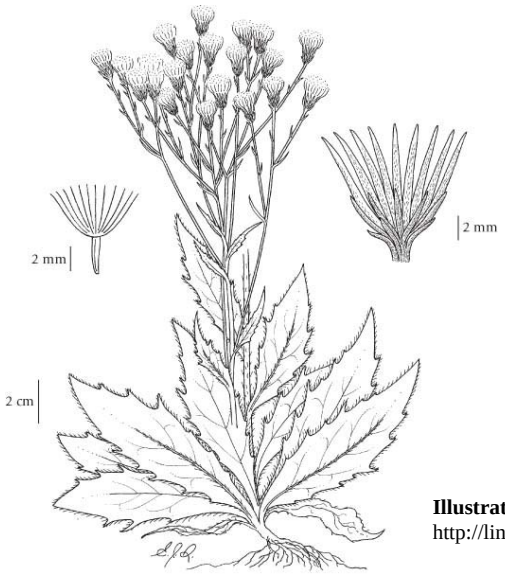


Illustration Source: The *Illustrated Flora of BC*
http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Hieracium+sabaudum

Common hawkweed (*H. lachenalii*)

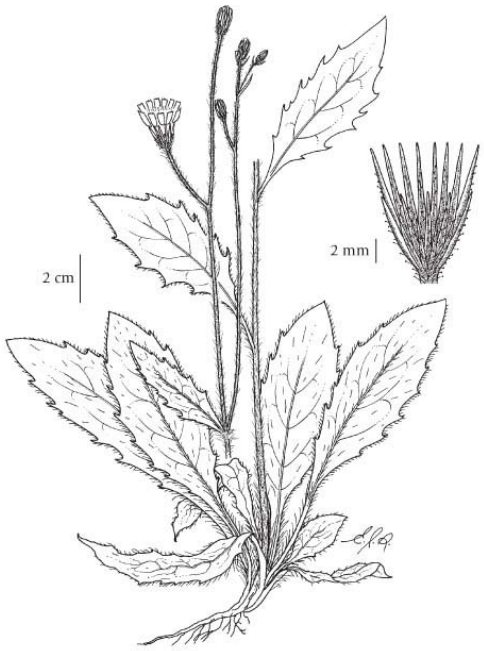


Illustration Source: The *Illustrated Flora of BC*
http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Hieracium+lachenalii

Spotted hawkweed (*H. maculatum*)

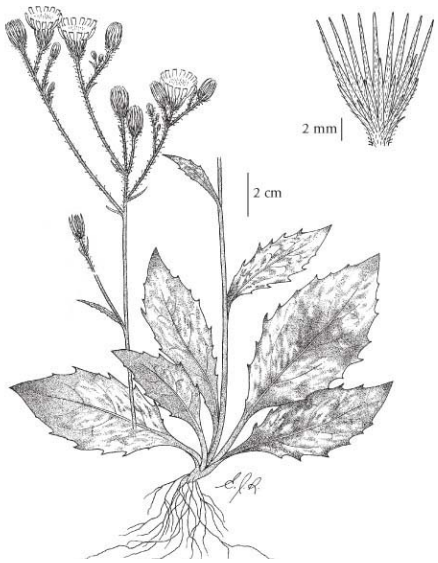


Illustration Source: The *Illustrated Flora of BC*
http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Hieracium+maculatum

Wall hawkweed (*H. murorum*)

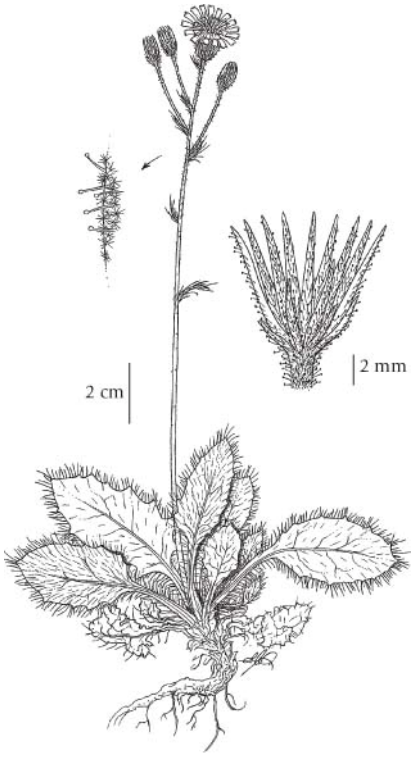
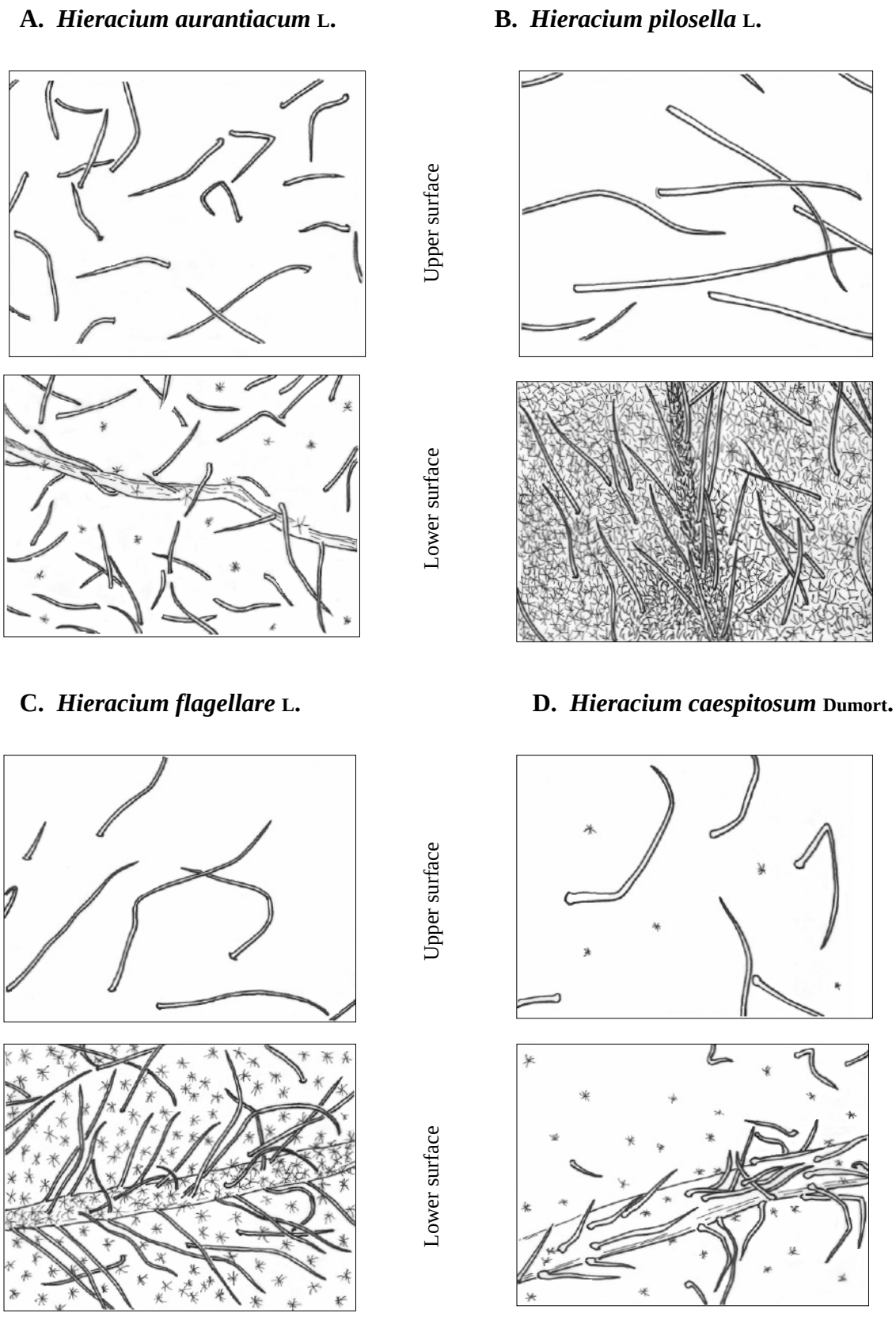


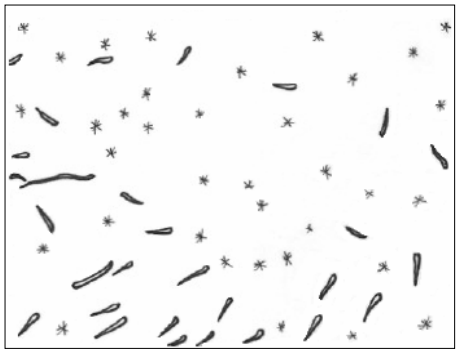
Illustration Source: The *Illustrated Flora of BC*
http://linnet.geog.ubc.ca/Atlas/Atlas.aspx?sciname=Hieracium+murorum

Smooth hawkweed (*H. laevigatum*)

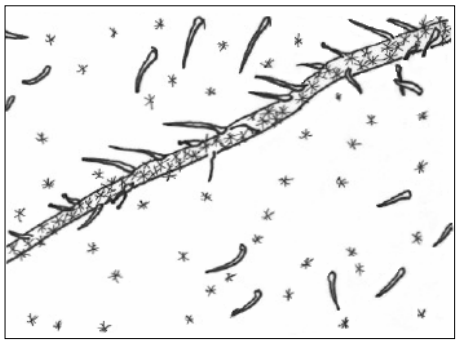
Figure 1. Leaf surface pubescence of invasive hawkweeds, subgenus *Pilosella*.



E. *Hieracium glomeratum* Froel.

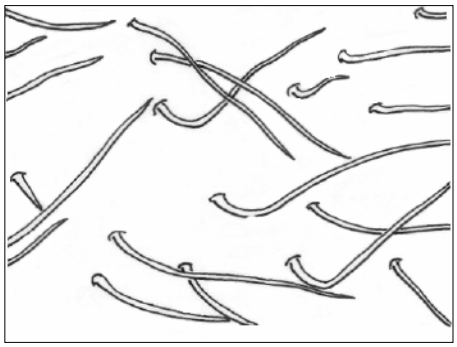


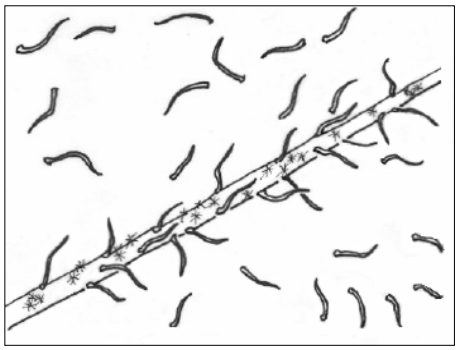
Upper surface



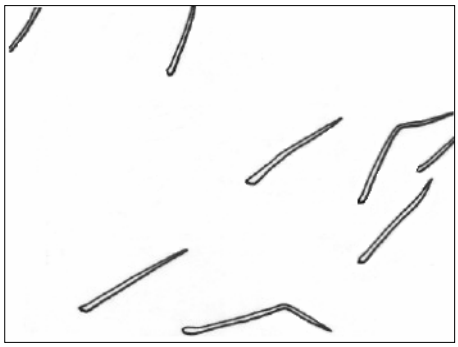
Lower surface

F. *Hieracium floribundum* Winn. & Grab.

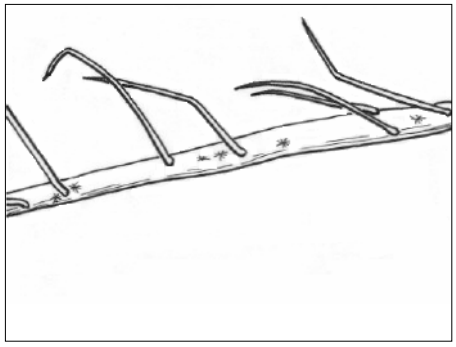




G. *Hieracium piloselloides* Vill.

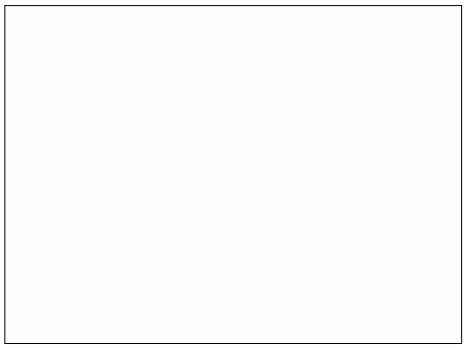


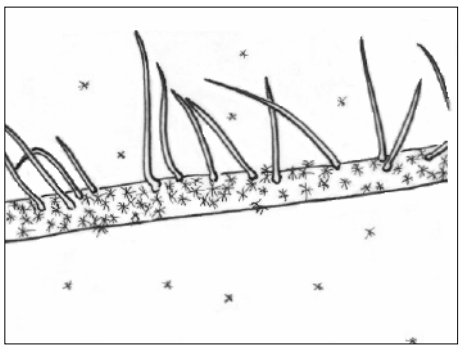
Upper surface



Lower surface

H. *Hieracium praealtum* Vill.





Line drawings by C. Roché

2 cm

Figure 2. Schematic of hawkweed species relationships (numbers refer to species' position in the key).