

Notes on Differentiation and Determination of *Hieracium* taxa of the Allgäu Mts.

The following notes are to be regarded as very provisional. In part they are preliminary studies for the 'Flora of the Allgäu' (Dörr & Lippert), but many of them are compiled from the descriptions of Zahn (mainly 1922–1938). Measurements (from herbarium specimens) are based often on only few samples. The position of the greatest width of a leaf is given as a fraction of "distance from the base to the greatest width:length of the leaf" and analogously for the position of the undermost lateral branch on the stem. As "cauline leaves" were measured the leaves inserted between the tips of the rosette leaves and the undermost lateral branch or head or in one-headed plants the leaves in the middle third of the stem. For the complete list of taxa see the 'checklist'.

Subgenus *Pilosella*:

H. aurantiacum L.

Acladium > 10 mm, synflorescence loose: subsp. *auropurpureum*

Acladium very short, < 10 mm, synflorescence dense: subsp. *aurantiacum* s. l. (incl. e. g. subsp. *porphyranthes*, because the width of the involucre bracts is very variable within populations or in culture)

H. blyttianum Fries — Although typical plants can be found (e.g. on the mountains above Baad) the distinction between this species and *H. fuscum* very often causes problems:

H. blyttianum: glandular hairs on the stem only in the upper third; at least outer (= older) rosette leaves obtuse.

H. fuscum: glandular hairs on the stem on upper half at least; rosette leaves acute (the outermost = oldest except).

H. fuscescens (Nägeli & Peter) Zahn — The species is distinguished from *H. fuscum* by having more stellate hairs on the lower side of the leaves, shorter involucre (7–8 instead of 7–9 mm) and richer hair cover. *H. guthnickianum* is reminiscent of *H. cymosum* and can be distinguished from *H. fuscescens* by shorter involucre (6.5–7.5 mm), very rich hair cover, stellate hairs on both sides of the yellowish-green (instead of bluish-green) leaves.

H. guthnickianum Hegetschw.

Synflorescence loose, paniculate, hairs on the involucre 1–2 mm long: subsp. *algovicum* (Nägeli & Peter) Zahn

Synflorescence ± dense, umbellate, hairs on the involucre more dense, 3 mm long: subsp. *rubrisabinum* (Nägeli & Peter) Zahn

H. hoppeanum Schult.

Involucre dark-looking, involucre bracts 2–4 mm wide, all rounded on the top, dark (because of the bases of the dense black, ± robust glandular hairs) with narrow margin: subsp. *hoppeanum*

Involucre pale-looking, involucre bracts 1–2(3) mm wide, the inner pointed, pale, glandular hairs slighter: subsp. *testimoniale* Nägeli ex Peter (a plant of the forelands, rare in the Alps: south of Füssen west slopes of Säuling and Dürrenberg, 1600–1700 m)

H. lactucella Wallr. — This predominantly sexual species is highly variable also within the region. Plants with dark and somewhat hairy involucre bracts (e.g. "ssp. *amauroleimena*", "ssp. *magnauricula*") seem to prevail in Alpine habitats.

H. sphaerocephalum Froel. — The species is very heterogeneous in habit, shape of leaves and indumentum. The greatest difficulties in the delimitation to *H. viridifolium* are due to the presence of intermediate forms with more glabrous, more obtuse to spatulate leaves and broader, less hairy involucre bracts with broad indumentum-free margins, which can be summarized in the likewise very heterogeneous *H. sphaerocephalum* subsp. *malacodes* (Nägeli & Peter) Zahn.

recorded taxa: subsp. *flocciferum* (Nägeli & Peter) Zahn subsp. *furcatum* (Hoppe) Zahn subsp. *malacodes* (Nägeli & Peter) Zahn

Subgenus *Hieracium*

H. alpinum L.

(subsp. *alpinum* and) subsp. *halleri* (Vill.) Gaudin — This widespread taxon, comprising usually rather vigorous plants with basal leaves dentate throughout, is characterised by the presence of dense, long glandular hairs (up to 0.6 mm on leaf margins, 0.7–1.2 mm on the peduncles; missing in subsp. *alpinum*) in addition to short ones (≤ 0.25 and ≤ 0.7 mm, respectively)

H. ammobium P. D. Sell & C. West [*H. psammogenes* (Zahn) Zahn non Omang] — Basal leaves hairy on

the upper side, involucre with numerous (the involucre bracts or the stellate hairs not or scarcely visible through the covering) long crispate hairs.

***H. amplexicaule* L.**

mature achenes blackish, leaves yellowish green: subsp. ***amplexicaule***

mature achenes reddish or brownish yellow, leaves bluish green, plants more delicate: subsp. ***berardianum*** (Arv.-Touv.) Zahn

***H. bifidum*-group** — for determination of the species see table 1

***H. bifidum*-group** — see also *H. ammobium*, *H. obscurisquamum*, *H. pseudodollineri*, *H. subcaesium*

***H. bocconeii* Griseb.**

recorded taxa: subsp. ***bocconeii*** — In all gatherings individual plants or heads can be found with small or moderate trimming of stellate hairs at the involucre. Of the very uniform plants from the crest of Söller the specimens from the Höfats uniformly exhibit involucre with longer glandular hairs, black up to the point, hairs at the peduncles, and more strongly haired stem leaves with more slender, often towards the apex curved teeth, as well as the lower surface of the upper cauline leaves rich in stellate hairs.

***H. bupleuroides* C.C.Gmel.** — The subspecies distinguished by Nägeli & Peter and Zahn are rather weakly delimited and additionally linked by numerous transitional forms.

***H. chlorifolium* Arv.-Touv.**

recorded taxa: subsp. ***pulchriforme*** Murr & Zahn, for determination see *H. chondrillifolium* subsp. *megalocladum*

***H. chondrillifolium* Fries** — Only the three subspecies described shortly below are (well) distinguishable and have ± clear distribution areas in the Northern and Central Alps:

subsp. ***comolepium*** (Nägeli & Peter) Zahn — Plants 10–20–30 cm tall, with 1–2[2.2]–3(4) cauline leaves, middle cauline leaves about 2.7–3.3–4 x as long as wide, greatest width above the basal third [0.36], without stellate hairs beneath; if present, lowest peduncles 8–12.5–16 cm above the ground, in the upper third of the stem [0.65], shorter than 10 cm, bracts on the peduncles 1–3, subulate to narrow lanceolate, 5–8–13 mm long, 0.5–1–2 mm wide. Involucre bracts on the margins with sparse to many stellate hairs.

subsp. ***subspeciosum*** (Nägeli & Peter) Zahn — Plants 20–30.5–40 cm tall, with (1)2–3[2.8]–4(5) cauline leaves, middle stem leaves about 4–4.6–5-times as long as wide, greatest width near the leaf-base [0.22], on the lower side with stellate hairs (rays short); if present, lowest peduncles 20–23–30 cm above the ground, in the upper third of the stem [0.7], shorter than 10 cm; bracts on the peduncles 1–3, subulate, 3–5–10 mm long, 0.5 mm wide. Involucre mostly with scattered to dense stellate hairs on the margins of the involucre bracts. Until now only one locality; main distribution area in the Karwendel and its adjacent mountain ranges.

subsp. ***megalocladum*** (Nägeli & Peter) Zahn — Plants 35–42–55 cm tall, with 2–4–7 cauline leaves, middle stem leaves about 3.5–4.5–5.5-times long as wide, greatest width near the middle [0.46], without stellate hairs beneath; lowest peduncles 15–20–27 cm above the ground, in the middle of the stem [0.5], over 10 cm long, bracts on the peduncles 2–4, ovate-lanceolate, about 10–13–16 mm long and 1.5–2.5–3 mm wide. Involucre without or only with sparse stellate hairs on the margins of the involucre bracts.

The very similar *H. chlorifolium* ssp. *pulchriforme* differs only by broadly sessile instead of cuneate narrowed cauline leaves, by winged petioles in the basal leaves and usually dense hair cover.

***H. richenii* Murr** [*chlorifolium* - *bifidum*], in the habit similar to *grex boissieri* of *H. chondrillifolium* [few mostly rapidly diminishing narrow stem leaves, synflorescence like *H. bifidum*, heads 1–3, like *H. scorzonrifolium*], occurs according to Zahn (1931: 188) "similarly on the Untergemstelalp" ; vouchers for it were not in M.

***H. cochlearioides* Zahn**

Leaves without glandular hairs, 2–3 on the stem, stem above with copious glandular hairs, flowers often tubulate, style dark: subsp. ***pseudalpinum*** (Nägeli & Peter) Zahn

Leaves with glandular hairs, 1–2 small on the stem, stem sparsely to scattered glandular, flowers ligulate, style yellow: subsp. ***cochlearioides***

further recorded taxa: subsp. ***piliferitropum*** Harz & Zahn subsp. ***pseudoglanduliferum*** Zahn

***H. dasytrichum* Arv.-Touv.** — We tentatively propose an infraspecific classification (deviating from the Nägeli-Peter's and Zahn's tradition) into just subsp. *dasytrichum* and subsp. *subpiliferum*

Upper stems, peduncles and involucre with some glandular hairs, style dark: ssp. ***dasytrichum***

Upper stems, peduncles and involucre without glandular hairs [only microglands on the tops of the involucre bracts], style yellow: ssp. ***subpiliferum*** (Arv.-Touv.) Zahn

further recorded taxa: subsp. ***capnoides*** Kern.

***H. glabratum* Hoppe**

subsp. ***glabratum*** — Leaves (almost) hairless, narrow lanceolate, almost edentate; all basal leaves very pointed; cauline leaves linear lanceolate, all with cuneate narrowed base. Involucre 12–14(16) mm; all involucre bracts pointed. Style dark.

subsp. ***nudum*** (Kern.) Nägeli & Peter — Leaves glabrous or on the margin and the rib of the lower side sparsely

hairy; outer basal leaves spatulate obtuse, scarcely toothed, the most lanceolate and narrow lanceolate to almost linear lanceolate, ± pointed, entire or indistinctly toothed. Cauline leaves 3–4, moderately rapidly diminishing, lower ± petiolate or sessile with narrowed base, upper with rounded base, on the margins rather hairy. Involucre 11–14 mm. Style (at first) yellowish.

H. glanduliferum Hoppe

Pappus clear white, on the stem glandular hairs abundant, simple hairs lacking to scattered: subsp. *glanduliferum*
Pappus greyish (dirty white), on the stem glandular hairs very sparse or scattered, simple hairs abundant:
subsp. *piliferum* NÄGELI & PETER [glandular hairs (nearly) lacking, in the here included subsp. *multiglandulum* glandular hairs more frequent to scattered]

H. glaucum All. — Within this polymorphous complex only subsp. *isaricum* (with some stellate short-rayed hairs on the lower side of the tendentious broader leaves) can be distinguished so far.

recorded taxa: subsp. *amauroides* Nägeli & Peter subsp. *isaricum* (Prantl) Nägeli & Peter subsp. *nipholepium* Nägeli & Peter subsp. *pseudobadense* Tout. subsp. *willdenowii* (Monn.) Nägeli & Peter

H. humile Jacq.

subsp. *humile* Peduncles and upper stem without stellate hairs.

subsp. *pseudocottetii* Z. Peduncles of the heads and upper stem (sometimes only sparsely) with stellate hairs; probably to place better to subsp. *humile*.

H. jurassicum* / *juranum Fr.

subsp. *cichoriaceum* (Arv.-Touv.) Zahn : Plants phyllopod with emphasised basal part, cauline leaves few, lanceolate without stressed convex margin, broadly amplexicaul to auriculate, denticulate à la *Crepis paludosa*, involucre bracts blackly glandular, usually (at the edge) with stellate hairs.

subsp. *hemiplecum* (Arv.-Touv.) Zahn: Plants phyllopod to hypophyllopod with more emphasised middle part, middle cauline leaves broadly amplexicaul to auriculate, broadly ovate, involucre bracts pale, at least with broad green edge, glandular hairs paler (not purely black), involucre hardly with stellate hairs.

subsp. *elegantissimum* Zahn: Upper to middle cauline leaves on lower surfaces moderately coated with stellate hairs; otherwise as for subsp. *hemiplecum* and subsp. *juranum*; involucre always with stellate hairs.

subsp. *juranum*: Plants phyllopod to hypophyllopod with more stressed middle part, middle cauline leaves amplexant, without stressed convex margin, involucre bracts dark, often with stellate hairs, glandular hairs black.

further recorded taxa: subsp. *pseudohemiplecum* (Z.), subsp. *pseudojuranum* AT., subsp. *subperfoliatum* (AT.), subsp. *tephroprenanthes* (Z.), subsp. *urezzae* (Z.)

H. nigrescens Willd.

subsp. *heterocalathium* Bornm. & Zahn: scape with 2–5 heads; acladium 10–15 mm; leaves coarsely dentate; cauline leaves 2–4; flowers ligulate, partly narrow or almost tubulate; style dark, blackish.

subsp. *cochleare* (Huter) Zahn: scape mostly with 1 head; leaves ovate to lanceolate and cochleate, small and weakly denticulate or with 1–2 coarse teeth at the base; cauline leaves 1–2; flowers ligulate; style at first yellow.

subsp. *subpumilum* Zahn: mostly only 1 scape; scape nearly always with 1 head; leaves denticulate or on the base longer and more coarsely dentate; cauline leaves 0–2; flowers ligulate; style dark, blackish.

subsp. *pseudorhaeticum* Zahn: scape nearly always with 1 head, if furcate with 2(3) heads, acladium 25–50 mm; leaves coarsely multi-dentate like *H. alpinum halleri*; cauline leaves 1–2; flowers mostly tubulate; style dark, blackish.

subsp. *pseudohalleri* Zahn: plants with 1–4 scapes, the lateral often furcate; scape nearly almost with 1 head; leaves very coarsely irregularly dentate; cauline leaves 2–3; flowers ligulate, sometimes nearly tubulate; style dark, blackish.

H. obscurisquamum (Zahn) ad interim — Under this name we provisionally unite those dark-headed plants of Zahn's grex *psammogenes* and grex *subcaesium* which are characterised by involucre bracts blackish (except the marginal parts), with black eglandular (uncoloured in the upper regions) and glandular hairs, but only few stellate hairs; the eglandular hairs are rather stiff and straight (never crispate though sometimes slightly bent apically). Some taxa of Zahn's *H. murorum* may also belong to this group.

H. bifidum subsp. *basicuneatifolium* (Touton) Zahn — Differs from the following by (at least the internal, youngest) narrower leaves with long tapering point and cuneate narrowed base, which are basally often strongly toothed. The involucre are more frequently of somewhat lighter type and usually somewhat covered with stellate hairs.

H. psammogenes subsp. *obscurisquamum* (Zahn) Tout. — Leaves broadly oval with truncate to cordate base, weakly to briefly dentate with broad teeth, or basally strongly dentate with long, narrow teeth.

H. pallescens Waldst. & Kit. — Only a few taxa can be recognised rather clearly and are verified by vouchers; these are briefly characterised below.

subsp. *subdentatiforme* (Hayek & Zahn) — Plants sparsely hairy, like *H. dentatum* in habit, with 1 (2) well developed, broadly lanceolate cauline leaves, basal leaves broadly lanceolate, very slowly attenuate at base.

subsp. *oxyodontiforme* (Zahn) — Plants similar to subsp. *subdentatiforme*, but with narrower and more strongly

dentate leaves.

subsp. *gemstelinum* (Zahn) — Slender plants with usually a single capitulum, basal leaves lanceolate, acute, gradually attenuate at base.

subsp. *suboreites* (Murr & Zahn) — Plants similar to subsp. *gemstelinum*, but basal leaves broader, ovate, more rapidly attenuate at base.

subsp. *murrianum* AT. — Slender plants with often only a single capitulum, basal leaves ovate, rounded, gradually attenuate at base.

subsp. *ovale* Z. — Vigorous plants, like *H. bifidum* in habit, with 1–5 capitula, basal leaves broadly ovate, truncate to cordate at base, in the lower half (or on the base only) distinctly toothed.

subsp. *incisum* Hoppe [incl. subsp. *subgaudinii* Zahn] — Plants like *H. bifidum* in habit, basal leaves ovate, obtuse to subacute, ± gradually attenuate at base; capitula large (>13 mm).

further recorded taxa: subsp. *bellimontis* K. Müll & Zahn (nom. inv.), subsp. *cirritirimum* (Tout.), subsp. *hemilissum* (Zahn), subsp. *hittense* (Murr), subsp. *humiliforme* (Murr), subsp. *meizolobum* (Feurst. & Zahn, nom. inv.), subsp. *melanocinereum* Z., subsp. *muroriforme* Z., subsp. *naevulatum* (Z.) subsp. *niphogeton* Z., subsp. *pachysphaericum* Z., subsp. *pseudohittense* Z., subsp. *pseudomurrianum* Z., subsp. *subgaudinii* Z., subsp. *trachselianoides* Z., subsp. *trachselianum* Christen.

H. picroides Vill. — *H. stenoplecum* differs by its habit of a vigorous grandifolious *H. prenanthoides*, but with involucre and peduncles densely covered with long glandular hairs as in *H. picroides*.

subsp. *intermixtum* (Zahn) Zahn — leaves ± broad-lanceolate; involucre sparsely to moderately hairy.

subsp. *pseudosieberi* Vetter & Zahn — leaves ± narrow oblong-lanceolate; peduncles with moderate to many stellate hairs; involucre sparsely to moderately hairy, with moderate to many stellate hairs.

subsp. *picroides* — leaves obovate to narrow lanceolate; peduncles rich with stellate hairs to greyish floccose; involucre without, rarely with, isolated hairs; involucral bracts moderately to plentifully covered with stellate hairs.

subsp. *sieberi* (Tausch) Zahn — leaves deeply green, on the upper side slightly blueish green, broad- to obovate lanceolate; peduncles blackish, but with moderate stellate indumentum; involucre without, rarely with, isolated hairs; involucral bracts mostly without stellate hairs

subsp. *trichopicris* (Zahn) Zahn — leaves broadly obovate lanceolate, light-green; peduncles with stellate hairs; involucre with many long hairs and some to moderate stellate indumentum.

H. pilosum Froel. — The taxa briefly described below greatly require clarification.

subsp. *comatulium* (Nägeli & Peter) Zahn — Growth form of *H. bupleuroides*, i.e. tall growing with several narrow, slowly diminishing cauline leaves; plants above all on the base sparsely hairy to glabrescent.

cf. subsp. *sericotrichum* (Nägeli & Peter) Zahn — Plants phyllopod, basal leaves petiolate, lanceolate, pointed, cauline leaves rapidly diminishing, likewise acute.

ssp. *villosifolium* (Nägeli & Peter) Zahn — Plants are reminiscent of *H. valdepilosum* in habit with many, slowly diminishing cauline leaves.

cf. ssp. *schleicheri* (Nägeli & Peter) Zahn — Plants phyllopod, cauline leaves rapidly diminishing, leaves nearly entire; involucre and upper stem long and strongly hairy (similar to *H. piliferum*).

subsp. *villosiceps* (Nägeli & Peter) — Plants phyllopod with rather rapidly diminishing cauline leaves; leaves ± denticulate.

H. porrectum Fries — As a "parallel species" to *H. dentatum* the distinction between these both collective species is difficult: According to the diagnosis of Fries and Nägeli & Peter *H. porrectum* has semi-amplexicaul cauline leaves or the middle cauline leaves are towards the base cuneate as in *H. prenanthoides* and the upper leaves are broadly amplexicaul. Plants with an involucre as in *H. valdepilosum* belong also to *H. porrectum*.

H. prenanthoides Vill.

subsp. *perfoliatum* (Froel.) Fries — Auricles of the leaf base touching each other, leaves broadly ovate to ovate lanceolate, up to twice as long as wide.

subsp. *bupleurifolium* (Tausch) Zahn — Auricles of the leaf base not touching each other, leaves darker green as in *perfoliatum*, up to 2.5 x long as wide.

subsp. *bupleurifolioides* Zahn — Auricles of the leaf base not touching each other, leaves grass-green.

subsp. *strictissimum* (Froel.) Simk. — Leaves ± ovate lanceolate, up to 3 x as wide, with deeply cordate base, stem on the base without hairs, sparsely to rather densely hairy towards the top, involucre sparsely hairy or hairless. The similar subsp. *praeruptorum* (Godr.) Nyman is sparsely hairy along the whole stem and has acute, copious dentate leaves.

subsp. *hoegeri* Zahn — Leaves broadly to narrowly lanceolate, 3–6 x long as wide, the lower with petiole-like cuneate base, peduncles and involucre without hairs, only with copious long glandular hairs.

subsp. *lanceolatum* (Vill.) Zahn — Leaves broadly to narrowly lanceolate, 3–6 x long as wide, the lower with petiole-like cuneate base, peduncles and involucre with glandular hairs and sparse to numerous simple hairs.

H. pseudodollineri (Murr & Zahn) — Plants occasionally deeply furcate (in habit approaching *H. dollineri*), basal

leaves lanceolate, usually strongly toothed (teeth narrow, often as free teeth at the lamina-near petiole), often spotted. Involucral bracts with many stellate hairs similar to the 'glauroid' type (many of them nearly sessile and quite multi-rayed), but eglandular hairs rather short and sparse; singular glandular hairs occasionally on the peduncles (rarely at the lower involucral bracts).

recorded taxa: *H. bifidum* subsp. *eriopodoides* (Zahn) Zahn, *H. bifidum* subsp. *toutonii* Zahn, *H. bifidum* subsp. *pseudopsammogenes* Touton, *H. bifidum* subsp. *pseudodollineri* (Murr & Zahn) Zahn

H. sparsiramum Nägeli & Peter see *H. subglaberrimum*

H. subglaberrimum (Nägeli & Peter) Zahn — Discrimination from similar species:

H. subglaberrimum — In habit reminiscent of smaller plants of *H. bupleuroides*; stem furnished with stellate hairs nearly to the base; leaves 20–32.5–40 mm long, 6–8.5–10 mm wide, [2.4–3.1–4.5 × as long as wide], greatest width in the basal third [0.25–0.31–0.35]; outer phyllaries of the head distinctly spreading during anthesis; involucre very sparsely hairy, hairs whitish with a very short darker base, only few singular long hairs (up to 5 mm), though the long-acuminate tips of the phyllaries are usually bearded or at least extended by a single hair (of 0.5–1.5 mm), without glandular hairs. Crown of minute hairs around the achene apex just below the pappus rays.

H. bupleuroides — Stellate hairs only in the upper 2–4 cm of the stem/peduncles; phyllaries not distinctly spreading during anthesis; involucre hairless, sparsely or densely hairy, hairs distinctly blackish from the base up to the middle. Sometimes crown of minute hairs around the achene apex just below the pappus rays.

H. sparsiramum subsp. *sparsiramum* — Habit of *H. glabratum*, stellate hairs only in the upper 2–4 cm of the stem/peduncles; leaves 20–43.3–70 mm long, 2–3.9–6.5 mm wide [7.4–11.3–14 × as long as wide], greatest width in the middle [0.50]; indumentum of the involucre 'villosoid'; phyllaries less pointed, but rarely ending in a hair (of at most 0.5 mm), and usually provided with some glandular hairs. Achene apex without minute hairs.

H. sparsiramum subsp. *halense* — Habit of a broad-leaved *H. glabratum*, stellate hairs only in the upper 2–4 cm of the stem/peduncles; cauline leaves 13–25.2–30 mm long, (4)6–6.8–10 mm wide [3.0–3.5–4.3 × as long as wide], greatest width in the basal third [0.23–0.3–0.37]; indumentum of the involucre 'villosoid'; phyllaries less pointed, but rarely ending in a hair (of at most 0.5 mm), and usually provided with some glandular hairs. Achene apex without minute hairs.

H. glabratum — Stem in the upper two thirds with stellate hairs; indumentum of the involucre 'villosoid', phyllaries less pointed, but rarely ending in a hair (of at most 0.5 mm). Achene apex without minute hairs.

H. umbrosum Jord.

subsp. *crepidifolium* (Arv.-Touv.) Zahn — Plants hypophyllopod, rarely phyllopod, in the habit like *Crepis paludosa*; cauline leaves 2–6.

subsp. *subexilentum* (Zahn) Zahn — Plants phyllopod, very rarely hypophyllopod; cauline leaves 2–3, all have stellate hairs on the lower side.

subsp. *suboleicolor* Zahn — Plants phyllopod, very rarely hypophyllopod; stem glabrescent; cauline leaves 2–3, without or only the upper leaves with some stellate hairs on the lower side.

subsp. *umbrosum* — Plants phyllopod, very rarely hypophyllopod; stem downwards richly hairy; cauline leaves 2–3, without or only the upper leaves with some stellate hairs on the lower side.

H. valdepilosum Vill. — Those taxa that can be delimited with some confidence (and are verified by vouchers) are shortly characterised below.

subsp. *elongatum* (Nägeli & Peter) — Plants often hypo- or aphylllopod; in the middle of the stem at least two leaves with parallel or slightly concave margins, upper leaves ovate, (2.2) 2.4 (2.7) × as long as wide, heads usually large (involucre c. 15 mm).

subsp. *oligophyllum* (Nägeli & Peter) — Plants phyllopod, middle stem leaves broadly lanceolate with convex margins, at most only one with parallel margins, upper stem leaves ovate, (1.5)–1.9–(2.4) × as long as wide, heads moderately large (involucre 11–14 mm).

subsp. *raphiolepium* (Nägeli & Peter) — Plants phyllopod, rather slender, middle and upper stem leaves ± convolute, heads rather small (involucre 9–11 mm), involucral bracts distinctly acute.

subsp. *subsinnuatum* (Nägeli & Peter) — Plants vigorous, often phyllopod, basal leaves slightly toothed, upper stem leaves broadly triangulate with distinctly toothed margins, heads large (involucre 14–18 mm).

further recorded taxa: subsp. *christeneri* (Nägeli & Peter), subsp. *pseudelongatum* (Nägeli & Peter), subsp. *subvaldepilosum* Zahn

H. villosum Jacq. — Those taxa that can be delimited with some confidence (and are verified by vouchers) are shortly characterised below.

subsp. *calvifolium* Nägeli & Peter — Plants glabrescent, at least lower stem leaves glabrous on the surface.

subsp. *eurybasis* Nägeli & Peter — Plants intermediate to *H. valdepilosum*: tall with many (around 6), oblong stem leaves; style dark.

subsp. *glaucifrons* Nägeli & Peter — Plants of "pyramidal growth form" with several long basal leaves and rapidly diminishing stem leaves; style pale.

- subsp. *undulifolium* Nägeli & Peter — Plants with rather rapidly diminishing cauline leaves with strongly undulate, slightly toothed margins; style a little darker.
- subsp. *villosissimum* (Nägeli) Nägeli & Peter — The 'most typical *villosum*': very densely and long hairy; involucre 20–23 mm long with 3–8 leaf-like outer bracts.
- subsp. *villosum* — Style dark. [The value of this character should be proven; rather often plants can be found matching subsp. *villosum*, but with bright styles]

Franz Schuhwerk, Walter Gutermann

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