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# Contribution to the knowledge of the *Hieracium rohacsense* group in the Carpathians

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ABSTRACT: Two species of the *Hieracium rohacsense* group are included in the present paper. *H. rohacsense* KIT. is a tetraploid apomictic taxon confined to the subalpine belt of the West Carpathians (Slovakia and Poland). Morphologically next to *H. rohacsense* is *H. cernaeglavae* (HRUBY & ZAHN) MRÁZ, which is considered to be an endemic of the high mountain ranges of the East Carpathians (Ukraine and Romania). The previously reported tetraploid chromosome number (2n=36) of *H. cernaeglavae* has been confirmed in the population from the Svydovets' Mts (Ukraine). The taxa differ in the density of simple eglandular, stellate and glandular trichomes on the involucre. *H. rohacsense* has the first two types of trichomes denser than *H. cernaeglavae*, while the glandular ones are rare. Apart from morphology, both taxa could be distinguished also by isozyme pattern, quantity of some flavonoid glycosides, substrate preference and by resistance to the rust fungus – *Puccinia hieracii*. Although the mode of reproduction in *H. cernaeglavae* was observed to be apomictic, the morphological variation seems to be higher than in *H. rohacsense*. Detailed morphological descriptions, nomenclature, chorological data and notes on the ecology of both taxa are given as well. The other taxa included in this group by ZAHN are briefly discussed. One new combination is published; one neotype and several lectotypes are chosen.

KEYWORDS: breeding system, chromosome numbers, *Hieracium*, Poland, *Puccinia*, Slovakia, Romania, Ukraine.

## Introduction

The genus *Hieracium* s.str. is one of the most intricate genera. It is well known as the genus in which the apomictic (asexual) formation of the seeds is widespread. The apomictic breeding system, connected probably with an extensive hybridization in the past (or at present in some regions where sexual diploid taxa occur), gave rise to a very large number of variants that have been described as species or infraspecific units. The grouping of taxa in, as much as possible natural, phylogenetic units within the genus (as the species groups, collective species, or sections) is very difficult, and in many cases impossible due to a reticulate pattern of variation. Although ZAHN's system of basic and intermediate collective species[1] is logical (at least because this system comprises the idea that the taxa could have arisen in a process of hybridization), he often grouped taxa mechanically, on the base of presence of particular morphological characters, which could be more likely the result of convergent evolution than of close relationship. Moreover ZAHN did not know well the real situation in the field (at least in some regions, e.g. the Carpathians). He has described most of taxa at various taxonomic ranks (probably a few thousands) on the base of a few or even single herbarium specimens. The present situation in the taxonomy (including nomenclature) of this genus can be characterized by the words of one of the best European experts of *Hieracium*, FRANZ SCHUHWERK, as "rather desolated" (SCHUHWERK 1997).

The *Hieracium rohacsense* group[2] occupies, after SELL & WEST (1976), an intermediate position between the *H. alpinum* and *H. bifidum* groups, being shifted more to the proximity of the *H. bifidum* group (*H. alpinum* < *H. bifidum*, see also ZAHN 1936). The *Hieracium rohacsense* group belongs to the *Hieracium* sect. *Alpina* (GRISEB.) GREMLI (for recent infrageneric division see STACE 1998).

### Systematic position and delimitation of the groups

The *H. rohacsense* group is easily distinguishable from the *H. alpinum* group in having a usually more headed stem, oblong to narrowly elliptic basal leaves with dentate margins, and stellate trichomes on the involucres. From the *H. bifidum* group *H. rohacsense* group differs by its longer involucres, by a higher density of longer simple eglandular trichomes on the peduncles and involucres, by presence of very short simple eglandular trichomes on the ligule teeth, and by the presence of short yellowish glandular trichomes on the leaves. The *Hieracium rohacsense* group is a parallel species group (or intermediate collective species sensu ZAHN 1936) to the *H. pietroszense* group (MRÁZ 2002).

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[1] After ZAHN (1922–1939) basic collective species (species principales collectivae; Hauptarten) are morphologically well characterized taxa, each having some unique characters; while intermediate collective species (species intermediae collectivae; Zwischenarten) have characters combined from two or more basic species.

[2] Species group is informal taxonomic unit adopted by SELL and WEST (1976). Generally it corresponds with ZAHN's basic or intermadiate collective species.

The taxa of the *H. rohacsense* group differ in having usually oblong to narrowly elliptic basal leaves with an attenuate base and they usually occupy subalpine meadows on acid ground, unlike the members of the *H. pietroszense* group, which have broadly elliptic, ovate or ovate-lanceolate basal leaves with truncate to cuneate base and prefer more relict – rocky biotopes with alkaline soil reaction. Like the *H. pietroszense* group, the *H. rohacsense* group is not distinctly separated from the *H. atratum* group. Probably only a higher density of glandular trichomes on peduncles and involucres, and complete or almost complete absence of stellate trichomes on the involucres in some taxa of the *H. atratum* group can be used to distinguish them from the *H. rohacsense* group. Typical representatives of the *H. atratum* group usually also have clearly petiolate, ovate to broadly elliptic basal leaves, more or less truncate or cuneate at base, while the taxa of the *H. rohacsense* group have usually oblong to narrowly elliptic basal leaves, attenuate at base and with shorter petiole. Some taxa from other species groups, e.g. the *H. nigrescens*, *H. fritzei* and *H. tephrosoma* groups, occurring in the territory of the West Carpathians morphologically resemble *H. rohacsense* s.str. (for details see the account of *H. rohacsense* below and MRÁZ 2001b).

## Taxonomic history of the *Hieracium rohacsense* group

ZAHN (1936), in his last taxonomic treatment of collective intermediate species *H. rohacsense*, recognised 43 subspecies within and some tens of taxa at the rank of variety and form in the territory of the Central Europe. However, some names that he used are invalid mainly because of their solely German diagnosis. Out of these Central European subspecies, fourteen (nominate including) have been described from the Carpathians: *H. rohacsense* KIT. subsp. *rohacsense*, *H. rohacsense* subsp. *maculifrons* (DEGEN & ZAHN) JÁV., *H. rohacsense* subsp. *cernaeglavae* (HRUBY & ZAHN) ZAHN, *H. rohacsense* subsp. *glandulosodentatiforme* (RECH.f. & ZAHN) ZAHN, *H. rohacsense* subsp. *schermanianum* (ZAHN) ZAHN, *H. rohacsense* subsp. *subatropaniculatum* (LENGYEL & ZAHN) ZAHN, *H. rohacsense* subsp. *farinifloccum* (DEGEN & ZAHN) JÁV., *H. rohacsense* subsp. *ciceuense* ZAHN, nom. inval., *H. rohacsense* subsp. *bukschoiense* (BORNM. & ZAHN) ZAHN, *H. rohacsense* subsp. *borsanum* ZAHN, nom. inval., *H. rohacsense* subsp. *pseudobifidellum* (RECH.f. & ZAHN) ZAHN, *H. rohacsense* subsp. *heterodontobifidum* NYÁR. & ZAHN, *H. rohacsense* subsp. *neobifidellum* NYÁR. & ZAHN., *H. rohacsense* subsp. *acromeres* (ZAHN) JÁV. This classification is based mainly on studies of ZAHN (ZAHN 1927, 1929a, 1929b, 1933, 1934) or ZAHN with co-author G. LENGYEL (LENGYEL & ZAHN 1930, 1932). Besides these subspecies many taxa have been described at lower taxonomic levels (variety or form). The most important account of the *H. rohacsense* group after ZAHN (1936) has been prepared in the frame of the project "Flora Reipublici Populare Romîne" [Flora of Romania]. NYÁRADY (1965) adopted here a wide species concept similar to ZAHN, but all the previously published ZAHN's subspecies and varieties reported from Romania were shifted to the ranks of variety or form respectively (NYÁRÁDY in BORZA 1947). MRÁZ (2001a) published new chromosome counts for three

Carpathian taxa from the *H. rohacsense* group, and raised the name *H. rohacsense* var. *ratezaticum* NYÁR. & ZAHN to the species level.

In the present paper detailed attention is paid only to two taxa – *H. rohacsense* KIT. and *H. cernaeglavae* (HRUBY & ZAHN) MRÁZ. Both species were studied in nature and the experimental field. Some other described taxa from the territory of the Carpathians are mentioned only in notes because no living material was available. For *H. rauzense* subsp. *farinifloccum* DEGEN & ZAHN neotype, and for *H. rauzense* subsp. *ciceuense* NYÁR., *H. rauzense* subsp. *maculifrons* DEGEN & ZAHN, *H. rauzense* subsp. *pseudobifidellum* RECH. f. & ZAHN, *H. rohacsense* subsp. *neobifidellum* NYÁR. & ZAHN lectotypes are chosen as well. For some names I have not found any original material which could be considered for lectotypification (e.g. *H. rohacsense* subsp. *schermanianum*, *H. rohacsense* subsp. *subatropaniculatum*, *H. rohacsense* subsp. *acromeres* or *H. rohacsense* subsp. *bukchoiense*), and the interpretation of these names is impossible without neotypification.

The aim of the present study is to contribute to the solution of some taxonomic, nomenclatural and chorological problems within this species group.

Particular attention (cf. MRÁZ 2001a, ŠVEHLÍKOVÁ & al. 2002) has been paid also to *Hieracium ratezaticum* and *H. pseudocaesium* DEGEN & ZAHN, auct. non SCHUR from Munții Retezatului. However, in my opinion they should not be included in the *H. rohacsense* group and thus they are not a subject of the present paper. ZAHN (1936) put both taxa what is in the context of this paper considered to be the the *H. rohacsense* group (= ZAHN's intermediate collective species) or in its proximity; *H. pseudocaesium* is considered as an intermediate type between *H. rohacsense* and *H. sparsum*. With high probability the above mentioned taxa have a different evolutionary history from that of *H. rohacsense* and *H. cernaeglavae*. The Munții Retezatului Mts are known as one of the richest regions in Europe for *Hieracium* taxa, where several migration roads of different morphological types (sections) of the genus meet. Probably here is the "highest" concentration of taxa standing morphologically between the typically Balkan species *H. sparsum* FRIV. and the arctic-alpine taxon *H. alpinum*. Within both taxa diploid sexual plants have been found (CHRTEK 1997, MRÁZ 2001a, VLADIMIROV & SZELĄG 2001)[3]. It seems likely that *H. sparsum* s. l. participated in the microevolutionary history of both taxa, especially of *H. pseudocaesium*.

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[3] The diploid chromosome number has been reported on Bulgarian material of *H. sparsum* s. str. by VLADIMIROV & SZELĄG (2001). Several representatives of *Hieracium sparsum* group from Romanian South Carpathians are tri- or tetraploids (MRÁZ & SZELĄG unpubl.). *H. alpinum* has been proved to be diploid in the Ukrainian East Carpathians (CHRTEK 1997, MRÁZ 2001a). Recently counted populations of *H. alpinum* from different mountains of Romanian East and South Carpathians (Munții Retezatului Mts including) revealed diploid chromosome number (MRÁZ unpubl.)

## Materials and methods

The results are based on the study of wild populations, plants cultivated in the experimental fields at the Institute of Botany, Bratislava (1997–1998), in the Botanical Garden, P.J. Šafárik University, Košice (1998–2001), and on the examination of herbarium specimens deposited in the following institutions (acronyms according to HOLMGREN et al. 1990, VASSER 1995, VOZÁROVÁ & SUTORÝ 2001): B, BM, BZB, BP, BRA, BRNM, BRNU, BUC, BUCA, BZB, CL, GJO, GRM, GZU, H, KL, KRA, KRAM, LAU, LW, LWE, LWS, M, PR, PRA, PRC, SAV, SB, SLO, TNP, W, WRSL, WU, ZV and the private collection of Dr. W. GUTERMANN (Wien, Austria).

Nomenclatural (≡) and taxonomic (=) synonyms, as well as invalid names or misidentifications (–) are presented for the taxa studied. The information concerning the locality cited in the protologue is given after Ind. loc. Beneath the type headings the data from the label of type specimen are presented. Chromosome numbers for each studied taxon are provided, and a new count from one locality of *H. cernaeglavae* is reported. They are followed by data on mode of reproduction, pollen shape, ecology and distribution. Besides the taxa treated in the present study, notes on other taxa recognised by ZAHN are added.

### Karyological investigations and studies of reproductive system and pollen grains

The plants were collected in 1996–1999 from natural habitats, then transferred to experimental fields in Bratislava (Institute of Botany) and Košice (Botanical Garden of P.J. Šafárik University).

Chromosome counts were made on the pot-grown plants. Root tip cuttings were pre-treated with 0.1% solution of colchicine for 1.5–2 hours at room temperature. Subsequently fixative (absolute ethanol and glacial acetic acid, 3:1) replaced colchicine. Roots were stored in 70% ethanol and hydrolysed for 10 minutes in 1N HCl at 60 °C. The squash and smear method with cellophane replacing the glass covers followed MURÍN (1960). Giemsa solution in phosphate buffer was used as a stain. Voucher specimens are deposited in SAV and in the Herbarium P. MRÁZ.

The mode of reproduction was determined by emasculation experiments (for details see RICHARDS 1997, or MRÁZ 2001a).

The pollen (its shape and size) was observed using light microscope. After previous acetolysis following ERDTMAN (1960) the pollen grains from wild and cultivated plants were mounted in glycerol jelly or put directly into the distilled water.

## Results

### 1. *Hieracium rohacsense* KIT. (Fig.1., 11., 12.)

*H. rohacsense* KIT. in KANITZ, Linnea 23: 422, 1863.
Ind. loc.: "In Alpe Rohács Cottus Arvensis. Augusto".
Lectotypus (MRÁZ & MARHOLD 1999): "In Alpe Arvensi Rohács, Aug." [1804?] [coll. P. KITAIBEL] (BP, herb. KITAIBEL, fasc. XXVI, no. 170).

= *H. rauzense* subsp. *glandulosodentatiforme* RECH.f. & ZAHN in ZAHN, Magyar Bot. Lapok 25 (1926): 373, 1927.
Ind. loc.: "Hohe Tatra: Kleines Kohlbachtal [Malá Studená dolina valley] 1600 m; Grosses Kohlbachtal [Veľká Studená dolina valley] 1650 m auf Granit (RECHINGER f.)".
Lectotypus (**hoc loco designatus**): "Tatra Magna, Kleines Kolbachtal [correctly Kohlbachtal, Malá Studená dolina valley], solo granitico, 1600 m, coll. K.H. RECHINGER f. 17.VII.1925", det. K.H. ZAHN (W 1950/3397). Isolectotypus: (BP 192420).
≡ *H. rohacsense* subsp. *glandulosodentatiforme* (RECH.f. & ZAHN) ZAHN in RECH.f. & SCHEFFER, Feddes Repert. 31: 356, 1933.

– *H. caesium* subsp. *galbanum* auct. (p.p.), non (DAHLST.) DAHLST., Kungl. Sv. Vet.-Akad. Handl. 26,3: 27, 1894 [*non vidi*, sec. SCHLYAKOV 1989]: LENGYEL & ZAHN, Magyar Bot. Lapok 28 (1929): 22–23, 1930 (ut f. *normale*); ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII (2), Lief. 5: 679–680, 1935.
– *H. conspurcans* auct., non NORRL., Acta Soc. Fauna Fl. Fenn. 4: 98, 1888: ZLATNÍK in POLÍVKA, DOMIN & PODPĚRA, Klíč k Úplné Květ. Repub. Českoslov.: 604, 1928; SZAFER, KULCZYŃSKI & PAWŁOWSKI, Rośliny Polskie (1. ed.): 762, 1953; SZAFER, KULCZYŃSKI & PAWŁOWSKI, Rośliny Polskie 2 (6. ed.): 762, 1988.
– *H. conspurcans* subsp. *rauzense* auct. (p.p.), non (MURR) ZAHN in ENGLER (ed.), Pflanzenreich: 702, 1921: ZAHN in ENGLER (ed.), Pflanzenreich: 702, 1921.
– *H. rauzense* auct., non MURR, Deut. Bot. Monat. 15: 281, 1897: LENGYEL & ZAHN, Magyar Bot. Lapok 31 (1932): 6, 1933 (ut *H. rauzense* ssp. *eurauzense* α *genuinum*); ZAHN (p.p.) in HEGI (ed.), Illus. Fl. Mitteleuropa, VI/6: 1314, 1929 (ut *H. rauzense* subsp. *rauzense*).
– *H. rauzense* subsp. *glandulosodentatiforme* f. *normale* ZAHN in LENGYEL & ZAHN, Magyar Bot. Lapok 28 (1929): 28, 1930, nom. inval. [Art. 24.3].
– *H. revucanum* NYÁR. & ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 3: 400–401, 1937, nom. inval. [Art. 36.1, diag. germ.].
Ind. loc.: "Fátragebirge: Krizsna ob Revuca 1575m! – Bl. August."
Specimen: "In monte Krizsna supra pagum Revuca, alt. 1575 m, calc.!, coll. E.I. NYÁRÁDY, 8.VIII.1924", det. K.H. ZAHN 1927 ut *H. revucanum* (= *stygium–caesium*) (SB 119664).

- *H. rohacsense* subsp. *eu-rohacsense* (KIT.) ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 2: 210, 1936, nom. inval. [Art. 24.3].
- *H. rohacense* [*eurohačense*] subsp. *eurohacsense* var. *genuinum* f. *arvanum* ZAHN in RECH.f. & SCHEFFER, Feddes Repert. 31: 356, 1933, nom. inval. [nom. nud.].
- *H. rohacsense* subsp. *eu-rohacsense* var. *genuinum* f. *arvanum* ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 2: 210, 1936, nom. inval. [Art. 36.1, diag. germ.].
- *H. rohacsense* subsp. *eu-rohacsense* var. *genuinum* f. *normale* ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl Band XII(3), Lief. 2: 210, 1936, nom. inval. [Art. 24.3.].
- *H. rohacsense* subsp. *glandulosodentatiforme* f. *normale* (ZAHN) ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 2: 210, 1936, nom. inval. [Art. 24.3.].
- *H. rohacense* [*eurohačense*] subsp. *eurohacense* [*eurohačense*] var. *calvescens* f. *maioriceps* ZAHN in RECH.f. & SCHEFFER, Feddes Repert. 31: 356, 1933, nom. inval. [nom. nud.].
- *H. rohacsense* subsp. *eu-rohacsense* var. *calvescens* f. *minoriceps* ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 2: 211, 1936, nom. inval. [Art. 36.1., diag. germ.].
- *H. rohacense* [*eurohačense*] subsp. *eurohacense* [*eurohačense*] var. *calvescens* f. *minoriceps* ZAHN in RECH.f. & SCHEFFER, Feddes Repert. 31: 356, 1933, nom. inval. [nom. nud.].
- *H. rohacense* [*eurohačense*] subsp. *eurohacense* [*eurohačense*] var. *calvescens* f. *sinuosifrons* ZAHN in RECH.f. & SCHEFFER, Feddes Repert. 31: 356, 1933, nom. inval. [nom. nud.].
- *H. rohacsense* subsp. *eu-rohacsense* var. *calvescens* f. *subsinuosifrons* ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 2: 211, 1936, nom. inval. [Art. 36.1., diag. germ.]
- *H. rohacense* [*eurohačense*] subsp. *eurohacense* [*eurohačense*] var. *calvescens* f. *subsinuosifrons* ZAHN in RECH.f. & SCHEFFER, Feddes Repert. 31: 356, 1933, nom. inval. [nom. nud.].
- *H. rohacsense* subsp. *eu-rohacsense* var. *calvescens* f. *verum* ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 2: 211, 1936, nom. inval. [Art. 24.3.].
- *H. rohacense* [*eurohačense*] subsp. *eurohacense* [*eurohačense*] var. *calvescens* f. *verum* ZAHN in RECH.f. & SCHEFFER, Feddes Repert. 31: 356, 1933, nom. inval. [nom. nud.].

**Icones:** JÁVORKA & CSAPODY, Iconographia Fl. Austr.-orient. Europ. Central.: 571, fig. 4158, 1975; MRÁZ, Preslia 73: 343, 2001.

**Note:** The photo allegedly of *H. rohacsense* KIT. in GOTTSCHLICH (2000: 566) represents another taxon.

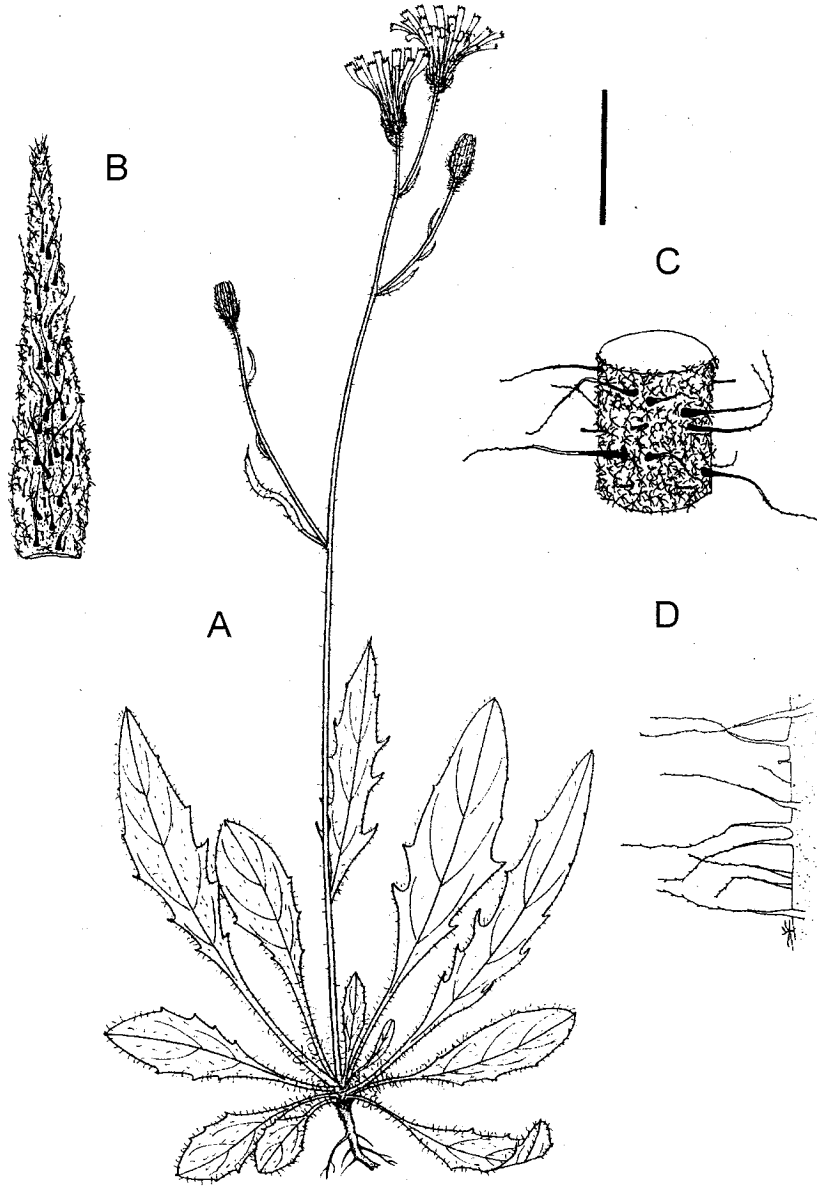


Fig. 1. *Hieracium rohacsense*. – A whole plant (del. Z. KOMÁROVÁ), B involucral bract, C peduncle, D leaf margin. – Scale bar = A: 3 cm, B: 4 mm, C: 2 mm, D: 1 mm

**Description:** Phyllopodous. Stem (20–)25–38(–60) cm high, usually (1–)3–4(–5) single headed branches (in the upper part of stem), [the plants growing on shadow places (e. g. in the alliance *Calamagrostion villosae*) can have the 1–2(–4) lateral branches from cauline leaf axils (in the middle or lower part of stem), every lateral branch with usually more than one head], slender to robust, at the base with scattered eglandular trichomes, 2–5(–6) mm long, pale, towards to the top of stem dark-based 1.0–2.5 mm long, with scattered stellate trichomes numerous to dense towards to the top, on the upper part of stem rare to scattered dark glandular trichomes. Leaves on the margins with scattered, on the abaxial side on midrib and on petioles numerous pale, eglandular trichomes, with few, mainly on the margins, short yellowish glandular trichomes, and with rare to scattered stellate trichomes on abaxial side on the midrib. Basal leaves (2–)3–6(–11) at the time of flowering, primordial ones oblong to elliptic, acute at apex, cuneate to attenuate at base, shortly petiolate, remaining ones oblong to elliptic, (7–)10–15(–20) × (0.8–)1.5–3.5(–5.0) cm (including petiole), obtuse to acute and shortly mucronate at apex, cuneate at base or with shortly winged petioles, dentate, teeth 1–5(–10) mm long, the apex of the teeth shortly mucronate. Proper cauline leaves usually 1–2(–4), the lowest one or two similar to inner basal leaves, oblong to elliptic, dentate, shortly petiolate, the upper ones lanceolate to linear, mucronate-denticulate to subentire, sessile, the uppermost 1–2 leaves bract-like. Heads often 3–5, sometimes up to 16 (in the case of stems with few lateral branches from the axils of cauline leaves on the lower part of stem), peduncles slightly curved or straight, with scattered up to 2–2.5 mm long simple eglandular trichomes with base dark up to 1/3 or to 1/2 their length, rare to scattered long dark glandular trichomes, and dense stellate trichomes. Involucres (10–)13–14(–15) mm long, involucral bracts black-greyish, linear-lanceolate, with numerous up to 2.0(–2.5) mm long simple eglandular trichomes, and with rare to scattered black glandular trichomes and numerous stellate trichomes. Ligules yellow with rare and very short eglandular trichomes at apex (apex ciliate), and with longer ones on outer surface in lower part. Styles black, or dark brown with black scales at anthesis. Achenes 3.50–4.25 mm long. Flowering from the first half of July to the end of August.

**Chromosome number:** 2n=36, tetraploid (counted on 25 plants from 9 populations, MRÁZ 2001a).

**Breeding system:** apomictic (MRÁZ 2001a).

**Pollen grains:** Plants usually do not produce normally developed pollen, but only a small number of degenerated pollen grains of irregular shape with sporopollenin remnants (Fig. 7.). However, in some cases (e.g. some plants coming from the Veľká Fatra Mts and Mt. Pilsko) a low amount of pollen grains of heterogeneous size with normal echinolophate exine structure has been observed.

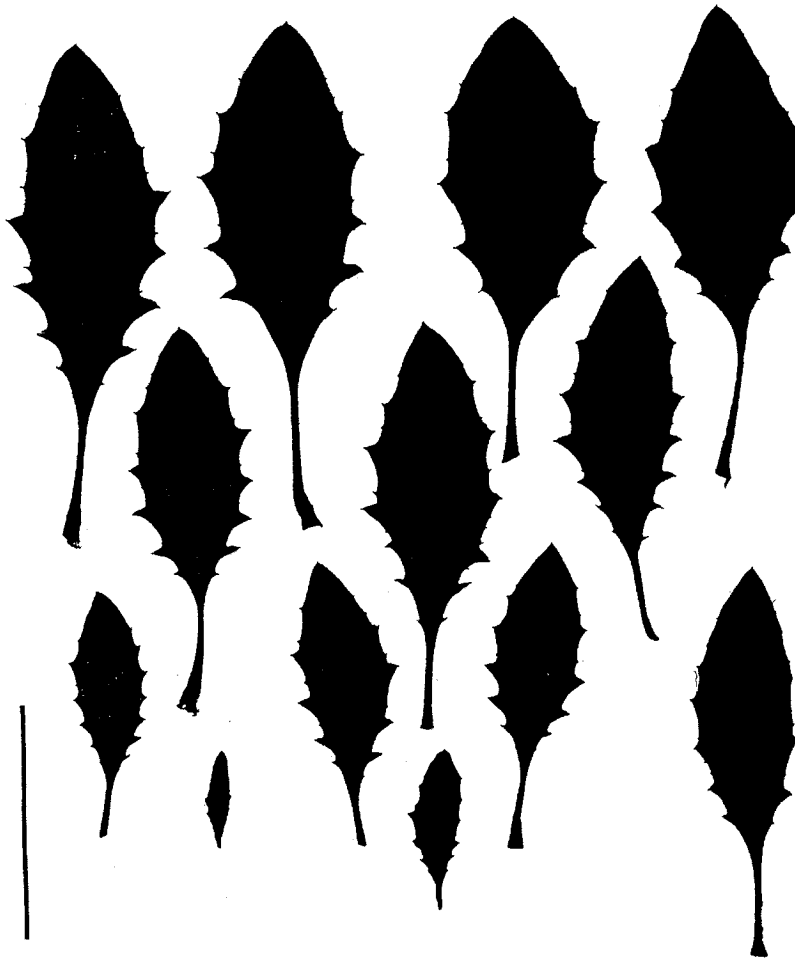

**Fig. 2. *Hieracium rohacsense* – leaf spectrum of rosette leaves (cultivated plant no. 115). Scale bar = 5 cm**

**Distribution:** Endemic to the West Carpathians (Slovakia, Poland). The centre of distribution is concentrated in the Západné Tatry Mts (both Slovak and Polish part). In Poland it is known only from the Tatry Zachodnie Mts (=Západné Tatry Mts). Scattered to dense distribution was recorded in the western part of the Nízke Tatry Mts, and in the southern part of the Veľká Fatra Mts. It is rare to scattered in the Vysoké Tatry Mts. One isolated, but recently unconfirmed locality is known from Mt. Pilsko (Západné Beskydy Mts). Detailed distribution with all revised herbarium specimens was published by MRÁZ (2001b).

Additional data, not given in my previous work (MRÁZ 2001b) are as follows: – [Slovakia, Nízke Tatry Mts.] In m. Csertovica [Čertovica] ad Jarabó, coll. G. LENGYEL, 3.VIII.1927, det. K.H. ZAHN ut *H. caesium* subsp. *galbanum* f. *normale* (BP 192566). – [Slovakia, Nízke Tatry Mts.] In jugo Csertovica, ca 1200 m, coll. G. LENGYEL, 3.VIII.1927, det. K.H. ZAHN ut *H. caesium* subsp. *galbanum* f. *normale* (BP 192337).

Although *H. rohacsense* has been reported from other mountains (Sudeten Mts, Alps, East and South Carpathians; cf. MRÁZ & MARHOLD 1999; MRÁZ 2001b), all these records should be considered, on the base of herbarium revision, as misidentifications of other microspecies.

**Maps of distribution:** MRÁZ (2001b) – whole range (West Carpathians) and a detailed map of the Vysoké and Západné Tatry Mts; SZELĄG (2001) – Polish part of the area of distribution, but there are incorrectly included localities from the Sudeten Mts (Mt. Králický Sněžník and the Krkonoše Mts.), outside of the West Carpathians.

**Ecology:** *H. rohacsense* inhabits mainly secondary or primary grassland clearings in the dwarf-pine thickets (*Pinus mugo*) (alliances – *Pinion mughi* PAWŁOWSKI in PAWŁOWSKI & al. 1928, *Calamagrostion villosae* PAWŁOWSKI & al. 1928, *Nardion strictae* BR.-BL. 1926) from 1400 to 1900 m a. s. l. It also occurs in secondary mountain meadows, and rarely in the grass margins along the tourist paths in the spruce belt (*Piceion excelsae* PAWŁOWSKI in PAWŁOWSKI & al. 1928), but always only in the mountain ranges where the subalpine belt is developed. *H. rohacsense* prefers southern or south-western exposure, on soils with a low content of calcium (for further details on ecology and biology see MRÁZ 2001b).

**Note:** *Hieracium rohacsense* resemble some other taxa according to ZAHN (1936) belonging to other collective species (= species groups).

*Hieracium tephrosoma* subsp. *pseudoglandulosodentatum* RECH.f. & ZAHN is a taxon closely related to *H. rohacsense*. They can be distinguished by slightly different shape of rosette leaves (in *H. tephrosoma* subsp. *pseudoglandulosodentatum* narrower and more dentate than in *H. rohacsense*); by density of glandular and stellate trichomes on the involucre (the former are denser, the latter rarer in *H. tephrosoma* subsp. *pseudoglandulosodentatum* than in *H. rohacsense*). Moreover, one analyzed plant of *H. tephrosoma* subsp. *pseudoglandulosodentatum* had different allozyme patterns in a few loci, from some tens individuals of *H. rohacsense* (MRÁZ & al. unpubl.).

*Hieracium rohacsense* differs from *H. nigrescens* subsp. *koprovanum* RECH.f. & ZAHN mainly in having a slightly different shape of rosette and stem leaves (see MRÁZ 2001b), in the density of simple eglandular trichomes on the leaves (denser in *H. rohacsense*), and in the density of black glandular and stellate trichomes on the involucre (the former type of trichomes is rare or scattered in *H. rohacsense*; the glandular trichomes are subnumerous in *H. nigrescens* subsp. *koprovanum*, while the stellate trichomes are usually numerous in *H. rohacsense* and rare or scattered in *H. nigrescens* subsp. *koprovanum*). ZAHN (1927) also

noted that *H. nigrescens* subsp. *koprovanum* is "verosimiliter *bifidum-alpinum*". Both taxa can be distinguished also by isozyme pattern (MRÁZ & al. unpubl.).

*Hieracium krivanense* (WOŁ. & ZAHN) SCHLJAK. and *H. nigrescens* subsp. *brachytrichellum* var. *vapenicanum* LENGYEL & ZAHN, usually given in the *H. fritzei* group (cf. CHRTEK 1997) or *H. nigrescens* group (CHRTEK in prep.), also resemble *H. rohacsense*. They both usually have fewer capitula (1–4 in *H. krivanense*, 1–2 in *H. nigrescens* subsp. *brachytrichellum* var. *vapenicanum*), and denser glandular trichomes on the involucres and peduncles than in *H. rohacsense*. The stellate trichomes are almost absent on the involucres.

In 1999 I found small population of a probably undescribed taxon related to the *H. rohacsense* group in Jamnícka dolina valley (Západné Tatry Mts). From this population four living plants were collected and transferred to the experimental field. The tetraploid chromosome number (2n=36) was ascertained for these plants (MRÁZ unpubl.). This distinct morphological type is not taxonomically evaluated here because of the small number of individual plants which are at my disposal.

**2. *Hieracium cernaeglavae* (HRUBY & ZAHN) MRÁZ, comb. et stat. nov.** (Fig. 2.)

≡ *H. rauzense* subsp. *cernaeglavae* HRUBY & ZAHN in ZAHN, Magyar Bot. Lapok 25 (1926): 372–373, 1927.
Ind. loc.: "Tatra: inter lacum Csorbaensem et Popradensem [Hruby]. Etiam in Carpathibus: Cernaglava [Chorna Kl'ova] montium Marmarosensium, in mughetis [Hruby]".
Lectotypus (**hoc loco designatus**): "Marmarošer Zupa: Innerhalb das *Pinus montana* – Facies auf dem Černa-glava – Züh[?]g[?]ad, coll. K. HRUBY, VII.1921", det. K.H. ZAHN ut *Hieracium rauzense* ssp. *cernaeglavae* (BRNU 66263)".

≡ *H. rohacsense* subsp. *cernaeglavae* (HRUBY & ZAHN) ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 2: 209–210, 1936.

– *H. rohacsense* auct., non KIT. in KANITZ (ed.), Linnea 23: 422, 1863: ZAHN (p.p.) in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 2: 210, 1936; YUKSIP [ÜKSIP] in SHISHKIN & BOBROV (eds), Fl. SSSR 30: 196, 1960; CHOPYK (ed.), Vyznachnyk Roslyn Ukraïns'kych Karpat: 331, 1977; PROKUDIN (ed.), Opredelitel' Vysshikh Rasteniĭ Ukrainy: 387, 1987; MOSYAKIN (ed.), Vasc. Plants of Ukraine, a Nomenclatural Checklist: 119, 1999.
– *H. rohacsense* s.l.: MRÁZ 2001a.
– *H.* population "Pop Ivan": MRÁZ et al. 2001.

**Note:** The other specimen belonging to the original material originating from the West Carpathians, namely from the Vysoké Tatry Mts [Hohe Tatra: Czorbersee – Poppersee, im *Vaccinietum*, coll. K. HRUBY, VIII.1921, ut *H. rauzense*; rev. K.H. ZAHN, ut *H. rauzense* subsp. *cernaeglavae* (BP 493751)] represents another taxon probably conspecific with the West Carpathian endemic *H. nigrescens* subsp. *koprovanum* RECH. f. & ZAHN (cf. MRÁZ 2001b).

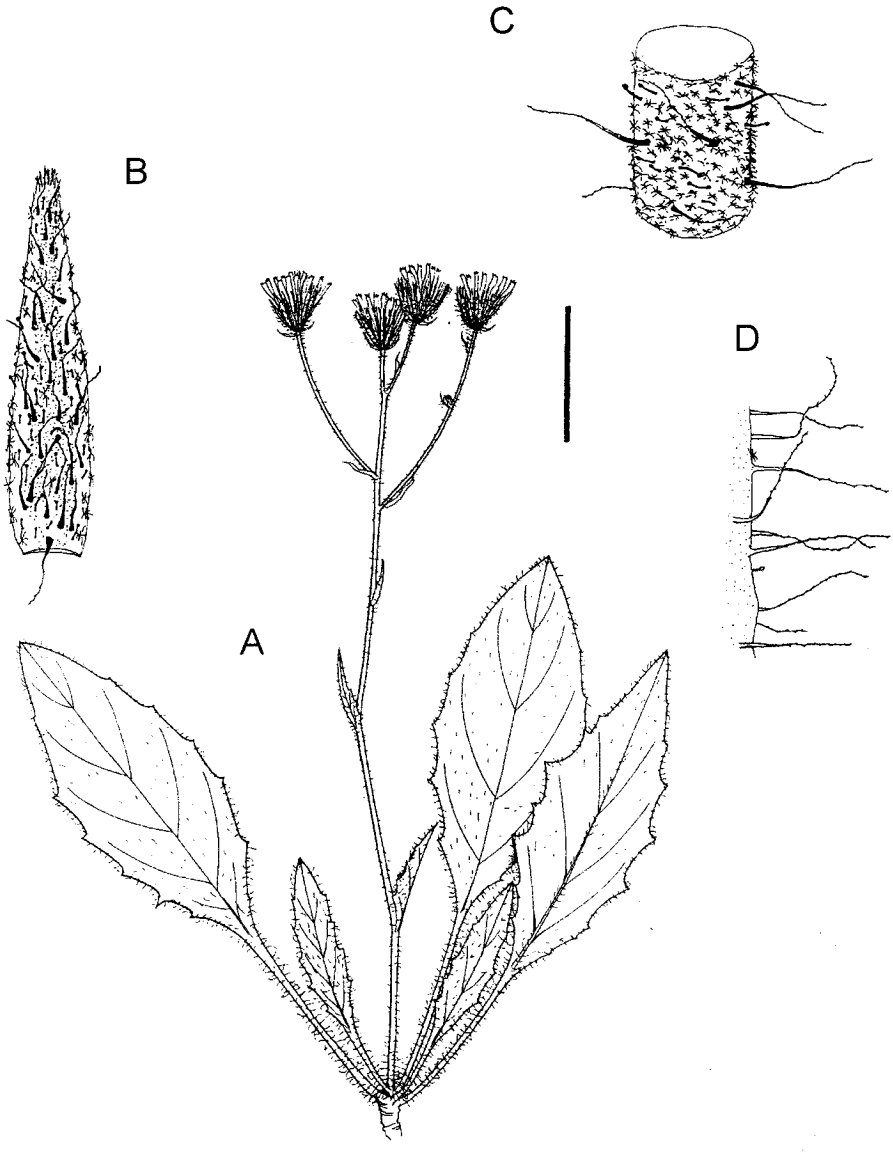


Fig. 3. *Hieracium cernaeglavae*. – A whole plant (del. Z. KOMÁROVÁ), B involucral bract, C peduncle, D leaf margin. – Scale bar = A: 3 cm, B: 4 mm, C: 2 mm, D: 1 mm

Although Zahn put *H. nigrescens* subsp. *koprovanum* into the collective species *H. nigrescens*, it seems that this taxon is related also to the *H. rohacsense* group, and represents a taxon probably intermediate between the *H. rohacsense* and *H. nigrescens* groups.

**Description:** Phyllopodous. Stem (15–)20–40(–50) cm high, (1–)2–4 single headed branches (in the upper part of stem), [the plants growing on shadow places (e. g. in the alliance *Calamagrostion villosae*) can have one lateral branch from cauline leaf axil (in the middle or lower part of stem), with usually more than one head], slender to robust, on the base with scattered to numerous pale up to 4 mm long and towards the top of stem numerous dark-based, 1–2.5 mm long simple eglandular trichomes, with scattered stellate trichomes, dense towards the top, and with scattered to numerous dark glandular trichomes. Leaves with scattered to numerous [on the margin, on the abaxial (lower) side on midrib and on petioles] simple eglandular trichomes, with rare to scattered short yellowish glandular trichomes and with scattered to numerous (on the abaxial side) stellate trichomes. Basal leaves usually 3–6 at the time of flowering, primordial ones oblong to broadly elliptic, acute at apex, cuneate to attenuate at base, shortly petiolate, remaining ones (elongated) oblong to elliptic, leaf lamina 5–10(–12) × 1.5–2.5 cm (the width of the leaves in cultivated plants up to 4.0 cm), acute to elongated attenuate and mucronate at apex, cuneate to elongated attenuate at base, in the upper part subentire, at the lower part of leaf lamina dentate, teeth sometimes very long up to 10 mm, triangular or falcate, petiole 1–6 cm long. Proper cauline leaves usually 1–2, the lowest one similar to inner basal leaves, oblong to elliptic, shortly petiolate, attenuate at base, acute-mucronate at apex, dentate on the basal part of leaf lamina, the length of teeth up to 10 mm, subentire at the apical part, the upper leaf lanceolate to linear, mucronate to denticulate or to subentire, sessile, the uppermost 1–3 leaves bract-like. Heads often 2–4, sometimes more (up to 8), peduncles with scattered to numerous simple eglandular trichomes up 2 mm long, with scattered black glandular trichomes and with numerous to dense stellate trichomes. Involucre (10–)11–13(–15) mm long, green-blackish; involucral bracts linear lanceolate, in the basal part with numerous simple eglandular trichomes, 1.5–2.0 mm long; with scattered black glandular trichomes; with scattered stellate trichomes (mainly on the margins); the apical part of bract more glabrous. Ligule yellow, with short pale eglandular trichomes at the apex (apex ciliate) and longer ones on outer (adaxial) surface. Styles dark brown with black scales at anthesis. Achenes dark brown to blackish (2.5–)3.5–4 mm long. Flowering from the first half of July to the end of August.

**Chromosome number:** 2n=36 [previously published count (as *Hieracium rohacsense* s.l., population "Pop Ivan", MRÁZ 2001a) 2n=36, on 6 living cultivated plants and on the seed progeny from the isolated head of one cultivated plant].

New counts: 2n=36. Locality: Ukraine, Svydovets' Mts, Gereshas'ka glacial cirque, below Mt. Dogyas'ka (1761 m a.s.l.) [=Todiaska, Dodiaska], ca 1700–

1750 m a.s.l., 48°18' N, 24°10' E, P. MRÁZ & V. JURKOVIČOVÁ, 8.VIII.1999 (3 plants; 698 – an approximate count, 711, 712 – an approximate count).

**Pollen grains:** Plants produce pollen grains of heterogeneous size with normal echinolophate structure of exine; a small amount of pollen is degenerated (Fig. 8.).

**Breeding system:** An apomictic formation of seeds has been proved previously on the plants from Mt. Pip Ivan (MRÁZ 2001a; ut *H. rohacsense* s.l.). The apomictic mode of reproduction was confirmed also for the plants from the Gereshas'ka glacial cirque (2 heads from the plants cultivated under no. 704 and 710).

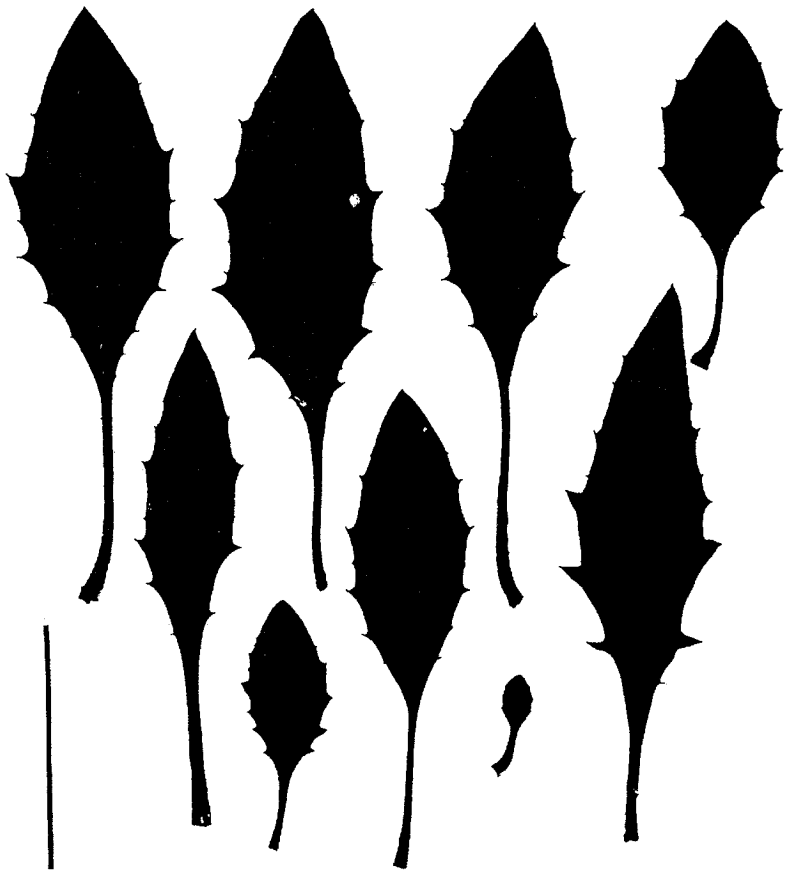

**Fig. 4. *Hieracium cernaeglavae* – leaf spectrum of rosette leaves (from several cultivated plants). Scale bar = 5 cm**

**Variability:** This taxon is variable in the density of simple eglandular, glandular and stellate trichomes on the peduncles and basal part of involucres. Apart from plants with typical indument I found the plants with less numerous (and usually shorter) simple eglandular and stellate trichomes, and with denser glandular trichomes in the populations from Mt. Pip Ivan and Gereshas'ka glacial cirque. It should be noted that in the Gereshas'ka glacial cirque typical *H. cernaeglavae* prefers the sites with deeper soil, without stronger influence of substrate (limestone), while "less hairy and slightly more glandular" plants grow mainly on more rocky places. These less typical individuals are preliminarily included within *H. cernaeglavae*. Molecular methods could solve the definitive inclusion or exclusion of the above-mentioned plants. An intrapopulation variability at isozyme level was observed in the population from Mt. Pip Ivan, where three isozyme phenotypes among 16 analysed plants (as population "Pop Ivan"; MRÁZ & al. 2001) were found.

**Note:** A morphologically closely related taxon co-occurs with *H. cernaeglavae* in a few localities (e.g. in the Massif of Pip Ivan or Berlebashka). It is characterized by a higher density of glandular trichomes on the peduncles and involucres, while simple eglandular trichomes are scattered. Generally, the involucre looks black and glabrous. Small differences have been observed in the shape of the basal and cauline leaves in the plants from cultivation. Moreover both taxa differ also in isozyme pattern (MRÁZ & al., unpubl.). The name *H. chlorocephalum* subsp. *stygiellum* WOŁ. & ZAHN (described from Romanian East Carpathians) could probably be applied to this morphologically closely related taxon, but the type material was not found in any visited herbaria.

Beside *Hieracium* cf. *chlorocephalum* subsp. *stygiellum*, there are other morphological types more or less similar to *H. cernaeglavae*. The gatherings of BŁOCKI from Mt. Pozhyzhevska (In pascuo subalpino "Pożyvzewska" Carpathorum orientalium Galiciae, prope alpem Hoverla, ca. 1450 m, 19.VII. 1906"; altogether 4 sheets stored in LWS) are morphologically slightly closer to the *H. sparsum* group (character of indumentum).

DEYL'S collections (PR P4S417/9457; P4S417/9451) from the Massif of Pip Ivan ("Marmaroš, in graminosis et saxosis kotae 1553 inter Pop Ivan et Pietroš prope vicum Trebušany, in declivi orientali, solo calcareo, VIII. 1933") have obviously denser and longer patent simple eglandular trichomes in the peduncles and involucres [2.0–2.5(–3.0)] mm and lower density of stellate trichomes on the involucre. But the other characters (shape of the leaves) are as in *Hieracium cernaeglavae*. This is a transition type between the *H. nigrescens* group and *H. cernaeglavae*.

It seems that greater morphological variability of *H. cernaeglavae* and the existence of some intermediate types closely related to *H. cernaeglavae* can be a result of hybridization events in the past (or present?). Some taxa might have arisen through more than one independent process (polytopic origin) and, moreover, introgression could be involved. The situation in the East Carpathians is complicated by the fact, that sexual diploid taxa are present there (CHRTEK 1996, 1997). Gene flow might occur between diploid taxa (MRÁZ unpubl.) or from

the polyploid plants serving as pollen donors, to diploid ones in the role of seed mothers.

**Distribution:** *Hieracium cernaeglavae* is an endemic of the East Carpathians (both Ukrainian and Romanian part). Up to now all known localities (see below) are concentrated to the following mountain ranges: Svydovets' Mts, Chornohora Mts, Marmarosh Mts. Mt. Chorna kl'ova [Chorna hlava], the *locus classicus*, is situated in the east mountain range of the Horhany Mts, which is called also Chorna polonyna. Only one locality is known from Romanian part of Mții Maramureşului Mts [= Marmarosh Mts] (see below). The collections from the Mții Rodnei Mts with high probability belong to *H. cernaeglavae* too.

Ukraine:

Horhany Mts.: Innerhalb das *Pinus montana* – Facies auf dem Černa-glava [Chorna kl'ova] – Züh[?]g[?]ad, coll. K. HRUBY, VII. 1921, det. K.H. ZAHN ut *Hieracium rauzense* ssp. *cernaeglavae* (BRNU 66263)".

Svydovets' Mts: – In valle glaciali montis Gerešaska prope Todiaska, solo calcareo, 1750 m, coll. M. DEYL, VII.1935 (PR P4S 417/9550, 417/9551, 417/9548). – In valle glaciali montis Gerešaska prope Todiaska, solo calcareo, 1700 m, coll. M. DEYL, VII.1935 (PR P4S 417/9399). – In valle glaciali sub cota 1766 prope montis Trojaska, solo calcareo, 1700 m, coll. M. DEYL, VII.1935 (PR P4S 417/9400 [one plant A. ZLATNÍK identified as "*farinifloccum*"], 417/9404, 417/9536, 417/9537, 417/9538). – Gereshas'ka glacial cirque, below Mt. Dogyas'ka (1761 m a.s.l.) [=Todiaska, Dodiaska], ca 1700–1750 m a.s.l., 48°18' N, 24°10' E, P. MRÁZ & V. JURKOVIČOVÁ, 8., 9.VIII.1999 (SAV, Herbarium P. MRÁZ). – In valle glaciali montis Dragobrat prope Bliznica, solo calcareo, 1750 m, coll. M. DEYL VII.1935 (PR P4S 417/9555).

Chornohora Mts: – In alpe "Kukul" Carpathorum orientalium Galiciae (circa Kolomyjcaius), 1888 coll. WOŁOSZCZAK, ut *H. stygium* (LWS) (2 plants on the left hand, one on the right – "less hairy" plant). – Pasmo Czarnohory, coll. G. KOZIĬ, s.d. (LWS). – Ulogi na skhydnomu skhilu V. KIZLU, coll. K. MALINOVSKIĬ, 25.VIII.1960 (LWS).

Marmarosh Mts: – In graminosis saxosis kotae 1553 inter Pop Ivan et Pietroš prope vicum Trebušany, in declivi orientali, solo calcareo, coll. M. DEYL, VIII.1933 (PRC P4S417/9534). – In saxosis graniticis alp. Pop Iván Marmaros, ca 1800 m, coll. A. MARGITTAI, 14.VII.1936, det. H. SCHACK ut *H. rohacsense* ssp. *eubifidellum* var. *genuinum* b. *nigrobifidum* (B) (ad mixtum cf. *H. chlorocephalum* subsp. *stygiellum*). – Mt. Pop Ivan [Pip Ivan], slopes of main glacial cirque, E exposition, 1850–1900 m, 47°56′ N, 24°20′E, coll. P. MRÁZ et al., 30.VII.1996 (SAV, Herb. P. MRÁZ). – Kar N des Pop Ivan, ca 1850 m, 47°55.8′ N, 24°19.8′E, Felsflur (Gneis) mit einigen kalziphilen Arten, coll. S. BRÄUTIGAM & J. CHRTEK jun., 30.VII.1996 (GLM 153255, dupl. in PR).

Romania:

Mții Maramureşului Mts (= Marmarosh Mts): – Poienile de sub Mŭntele Farkaŭ (Paltin), exp. Esticû, Inhalt 1808 m, coll. A. KOMAN, 31.VII.1938, ut *H. pietroszense* (CL 589314).

Mții Rodnei Mts: – Radna, Korongyis [Corongiş] keleti oldalan, coll. CRETZ, VIII.1859, det. ut *H. lachenalii*, rev. [?NYÁRÁDY] ut *H. vagneri* (CL 21154). – Radna, la volya tyeruluj, coll. CRETZ, VI.1859, det. ut *H. lachenalii*, rev. [?NYÁRÁDY] ut *H. vagneri* (CL 21157).

**Ecology:** *H. cernaeglavae* usually grows in open-canopy grasslands in subalpine areas, very rarely in the alpine belt. It often prefers sheer slopes with extended rocks (e.g. the slopes in the glacial cirques) on schists (Mt. Pip Ivan[4]) or on limestone. It is found in communities of the alliances *Calamagrostion villosae*, *Pinion mughi*, and often in species-rich communities with dominating *Carex sempervirens*.

**Note:** *H. cernaeglavae* is closely related to *H. rohacsense*. On the basis of cultivation experiments, these two species could be distinguished by the higher density of stellate and simple eglandular trichomes on the involucres, and by a lower density of glandular trichomes on the peduncles and involucres of *H. rohacsense* in comparison with *H. cernaeglavae* (Fig. 5., 6.). Generally, the involucre of *H. rohacsense* looks very greyish (black-greyish), while the colour of involucre of *H. cernaeglavae* is black-greenish (Fig. 9., 10.). It is noteworthy that the cultivated plants of *H. rohacsense* are infected very strongly by autoecious rust fungus *Puccinia hieracii* MART. (det. K. BACIGÁLOVÁ & R. BERNDT) early in vegetative phase period, usually in May (Fig. 13). On the other hand, the plants of *H. cernaeglavae* from Mt. Pip Ivan are much more resistant to *Puccinia hieracii*. The first rust spots usually appear at the end of the vegetative period and moreover, in very small number. This phenomenon has been observed since 1996, the year of the beginning of cultivation of both taxa. Although these species are cultivated literally side by side in the experimental field and there is no barrier defending the transfer of fungi spores, the differences in the resistance against the rust between *H. rohacsense* and *H. cernaeglavae* have always remained the same. Both taxa can be separated also in the quantity of flavonoid glucosides, especially of luteolin 7-glucosid (ŠVEHLÍKOVÁ & al. 2002), and in the isozyme pattern, especially in the locus *Pgm-1* (MRÁZ & al. 2001).

**Notes on some other taxa belonging, after ZAHN (1936), to the *H. rohacsense* group:**

**1. *H. rohacsense* subsp. *maculifrons* (DEGEN & ZAHN) JÁV., Magyar Fl. 2: 1257, 1925[5]**

≡ *H. rauzense* subsp. *maculifrons* DEGEN & ZAHN in ZAHN, Magyar Bot. Lapok 5: 72–73, 1906.

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[4] For more information about vegetation soil and climatic conditions of Mt. Pip Ivan see DEYL (1940).

[5] ZAHN (1936) overlooked that JÁVORKA (1925) published valid combinations of some names at subspecies level within *Hieracium rohacsense* (see also HOLUB 1984).

Ind. loc.: "Berg Öcsém Teteje [Ecem] bei Balánbánya [Bălan], Com. Csik v. D. [ = VON DEGEN]".
Lectotypus (**hoc loco designatus**): "Com Csik. Ad cacumine montis "Öcsém Teteje" [Ecem] pr. Balánbánya [Bălan], coll. A. DEGEN, 18.VI.1901", det. K.H. ZAHN 1905 ut *H. Degenianum* = *alpinum* – *bifidum*! (BP 192736).

≡ *H. rohacsense* var. *maculifrons* (DEGEN & ZAHN) NYÁR. in BORZA, Consp. Fl. Rom.: 324, 1947.

**Icones:** NYÁRÁDY (ed.), Fl. Rep. Pop. Rom., planşa 111, fig. 5, 5a, p. 573.

Although ZAHN labelled specimen BP 192736, designated here as a lectotype of the name *Hieracium rohacsense* subsp. *maculifrons*, as *H. degenianum*, he never used this name for the formal description of this taxon (ZAHN 1906). The most likely explanation is that he found the earlier name for the taxon morphologically standing between *H. alpinum* and *H. bifidum*, namely *H. rauzense* MURR. Consequently, he described a new taxon at the subspecies level belonging to *Hieracium rauzense* and at same time he changed the epithet from *degenianum* to *maculifrons*. ZAHN (1927) used the epithet *degenianum* twenty years later for a new taxon belonging to a completely different species group [*Hieracium sommerfeltii* subsp. *degenianum* (cf. ZAHN 1927: 310–311) described from different locality, "Berseghegy ad Szentendre" near the city of Budapest]. S. JÁVORKA, preparing the work Magyar Flóra (JÁVORKA 1925), noted directly by pencil on the sheet of the above-mentioned lectotype specimen (BP 192736): "= *rohácsense* ssp. *maculifrons* DEG. et ZAHN ex ZAHN". The specimen, indeed, corresponds well with the protologue of *H. rauzense* subsp. *maculifrons* (ZAHN 1906) except for violaceous colour on the leaves stated in the protologue as "folia ... supra violaceo-submaculata". Such colour could, however, have disappeared because of the age of the specimen.

**2. *H. rohacsense* var. *ciceuense* (NYÁR.) NYÁR. in BORZA, Consp. Fl. Rom.: 324, 1947**

≡ *H. rauzense* subsp. *ciceuense* NYÁR. in BORZA (ed.), Bull. Grăd. Bot. Univ. Cluj 8 (1928): 151, 1929 (nom. alternativum).
Ind. loc.: "In graminosis saxosisque cacuminis "Csicsói Hargitha" (Hargitha ciceuensis) ) [Hargitha Ciceu] frequens, alt. cca. 1700 m.s.m., solo andesitico, coll. E.I. NYÁRÁDY, 9.VI.1928".
Lectotypus (**hoc loco designatus**): "Transsilvania, distr. Ciuc. In graminosis saxosisque cacuminis "Csicsói Hargitha" (Hargitha ciceuensis) [Hargitha Ciceu] frequens. Alt. cca 1700 m s. m., solo andesitico, leg. E.I. NYÁRÁDY, 9. VII. 1928". (Fl. Rom. Exsicc. No. 876: KRA 153119).
Isolectotypi: (Fl. Rom. Exsicc. No. 876: W 14371, BM 508124, BM 508125, BRNU 189138).

≡ *H. rauzense* subsp. *farinifloccum* var. *ciceuense* NYÁR. in BORZA (ed.), Bull. Grăd. Bot. Univ. Cluj 8 (1928): 140, 1929 (nom. alternativum).

– *H. rohacsense* subsp. *ciceuense* ZAHN in GRAEBNER f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 2: 213, 1936, nom. inval. [Art. 36.1, diag. germ.]

**Icones:** NYÁRÁDY , Fl. Rep. Pop. Rom., planşa 112, fig. 2., p. 577.

ZAHN (1936) published the name *H. rohacsense* subsp. *ciceuense* as a new subspecies to science (it must be added only with German description, so this name is invalid), but he overlooked that NYÁRÁDY (in BORZA 1929) validly published name with the same epithet some years before (firstly, on page 140 as *H. rauzense* subsp. *farinifloccum* var. *ciceuense*, and secondly as *H. rauzense* subsp. *ciceuense* on page 151, in "Schedae emendandae") as a part of Romanian exsiccate centurias.

**3. *H. rohacsense* subsp. *farinifloccum* (DEGEN & ZAHN) JÁV., Magyar Fl. 2: 1257, 1925.**

≡ *H. rauzense* subsp. *farinifloccum* DEGEN & ZAHN in ZAHN, Magyar. Bot. Lapok 5: 73, 1906.
Ind. loc.: "Berg Öcsém Teteje [Ecem] bei Balánbánya [Bălan], Com. Csik v. D. [ = VON DEGEN]".
Neotypus (**hoc loco designatus**): "Comit. Csik. In lapidosis montis Nagy Hagymás [Hăghimaşu Mare] pr. Balánbánya [Bălan], leg. 13.VII.1911, A. DEGEN", det. K.H. ZAHN ut *H. rauzense* subsp. *farinifloccum* (BP192419).

≡ *H. rohacsense* var. *farinifloccum* (DEGEN & ZAHN) NYÁR. in BORZA Consp. Fl. Rom.: 324, 1947.

≡ *H. farinifloccum* (DEGEN & ZAHN) SCHLYAK.[6] in TSVELEV (ed). Flora Evropeĭskoĭ Chasti SSSR 8: 296.

No original material has been found in any of the relevant herbaria. Only one specimen, collected in the Haghimas Mts and labelled by ZAHN as *H. rauzense* subsp. *farinifloccum*, is at one's disposal. Because the specimen has been collected by DEGEN in 1911, five years after the publishing of the protologue, it does not belong to the original material and consequently is selected here as neotype. The plants on this sheet, indeed, correspond well with the protologue of *H. rauzense* subsp. *farinifloccum* .

The grey green colour of the leaves of these two subspecies of *H. rohacsense* (*maculifrons*, *farinifloccum*) and one variety (*ciceuense*) is important, and it is by no means typical for the *H. rohacsense* group. This character shifts these three taxa to the proximity of the *Hieracium caesium* or *H. vagneri* groups. There are slight differences in the indumentum of peduncles and involucres among three subspecies. It is noteworthy that the Hargitha Mts (*locus classicus* for *H. rohacsense* var. *ciceuense*) and the Haghimas Mts (*loci classici* for both subspecies – subsp. *farinifloccum* and *maculifrons*) are the neighbouring

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[6] Although SCHLYAKOV (1989) published a new combination with an incorrectly cited epithet and basionym (as *farinifloccosum*), the combination should be considered as validly published (cf. Art. 33.4 of ICBN, GREUTER et al. 2000).

mountain ranges. The specimens conspecific with var. *ciceuense* come from the Munții Călimani Mts (specimens: "M. Kelemen hegység [Mții Călimani]. In saxosis andesiticis sub cacumine m. Dregus, alt. 1740 m, supra pag. [?] Palotalva, [?] Palotafalva, 14.VII.1941, coll. S. JÁVORKA ut *H. rohácsense* ssp. nova ?" BP 193257. – "M. Kelemen hegység Transsilvaniae. In lapidosii andesiticis secus vallem verus "Dregusi vadászház", alt. ca 1500 m, 17.VII.1941, coll. S. JÁVORKA" BP 192486).

**4. *H. rohacsense* subsp. *pseudobifidellum* (RECH.f. & ZAHN) ZAHN in GRAEBNER. f. (ed.), Syn. Mitteleurop. Fl. Band XII(3), Lief. 2: 219, 1936**

≡ *H. rauzense* subsp. *pseudobifidellum* RECH.f. & ZAHN in ZAHN, Magyar Bot. Lapok 25 (1926): 373–374, 1927.
Ind. loc.: "Tatra: Im Kleinen und Grossen Kohlbachtal [Malá and Veľká Studená dolina valley], 1600–1650 m auf Granit (RECHINGER fil)".
Lectotypus (**hoc loco designatus**): "Tatra Magna, Comit. Cepusiensis [correctly Scepusiensis], Kleines Kolbachtal [correctly Kohlbachtal, Malá Studená dolina valley], solo granitico, 1600 m s. m., coll. K.H.RECHINGER f., 17.VII.1925", det. K.H. ZAHN (W 1950/3397).

This taxon belongs to the sect. *Vulgata*. Other original material: Tatra Magna, Comit. Cepusiensis [correctly Scepusiensis], Grosses Kolbachtal [correctly Kohlbachtal, Veľká Studená dolina valley], solo granitico, alt. ca 1650 m. s. m., coll. K.H. RECHINGER f., 18.VII.1925 (BP 192421).

**5. *H. rohacsense* subsp. *neobifidellum* NYÁR. & ZAHN in ZAHN, Bull. Grăd. Bot. Univ. Cluj 8 (1933): 61, 1934.**

Ind. loc.: "In declivibus saxosis mtis Dealu-negru supra vallem Râu-mare adversus montes Retezat, ca. 1900 m."
Lectotypus (hoc loco designatus): "Berg Dealu negru, 1900 m, am Retyezát, ab Val Riu mare, coll. E.I. NYÁRÁDY, 1932", det. K.H. ZAHN ut *H. rohacsense* subsp. *neobifidellum* (B)

≡ *H. rohacsense* var. *neobifidellum* (NYÁR. & ZAHN) NYÁR. in BORZA Consp. Fl. Rom.: 324, 1947.

The single plant on the type sheet resembles *H. ratezaticum*, but it has denser glandular trichomes on the peduncles and towards the stem base.

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Figs. 5-13 on p. 133-135.

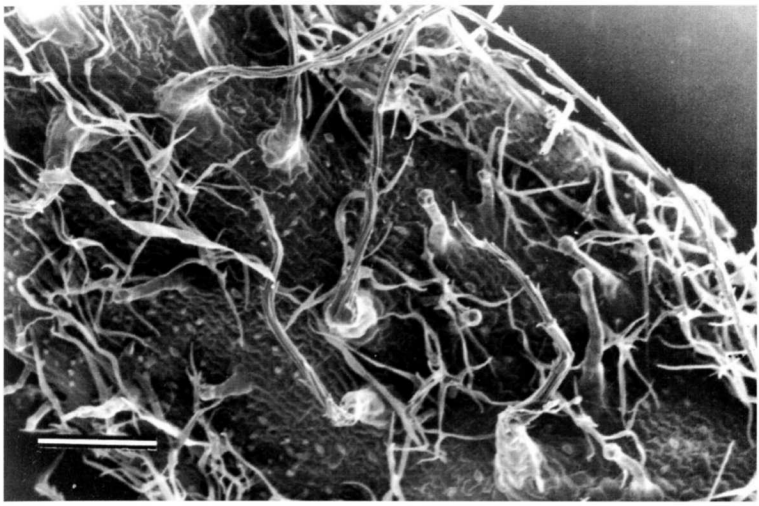

Fig. 5. *Hieracium rohacsense* – indumentum of involucral bract.
Scale bar = 50 μm

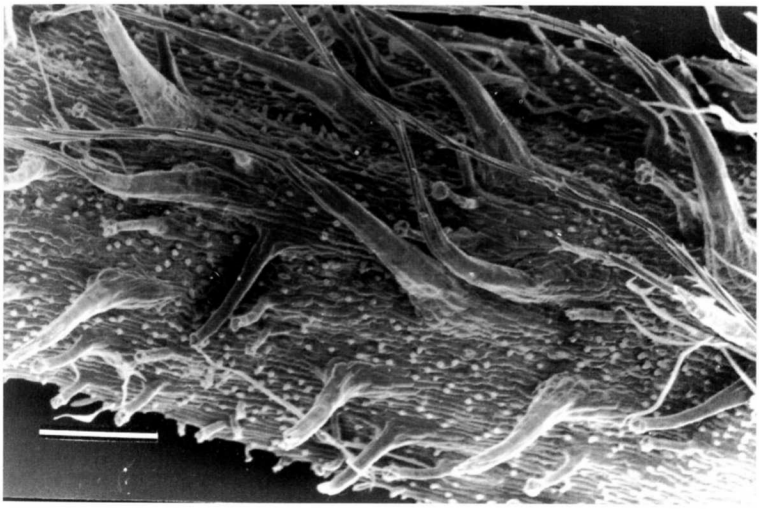

Fig. 6. *Hieracium cernaeglavae* – indumentum of involucral bract.
Scale bar = 50 μm

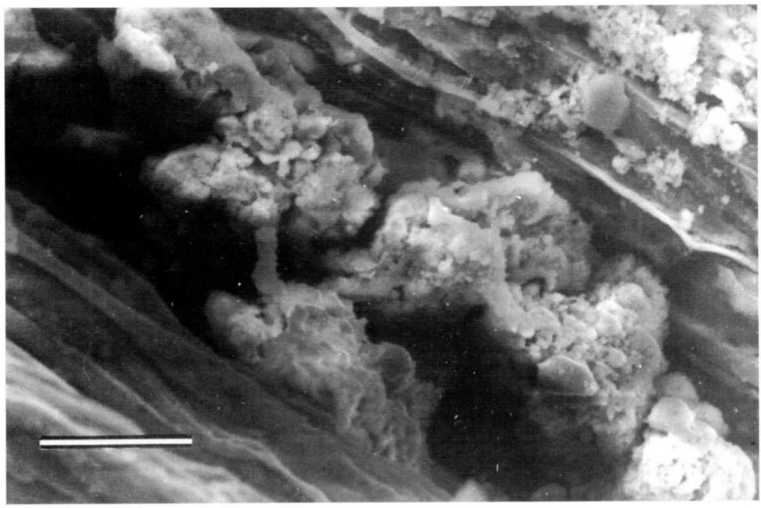

Fig. 7. *Hieracium rohacsense* – sporopolenin remnants in the anthers, without pollen. Scale bar = 20 μm

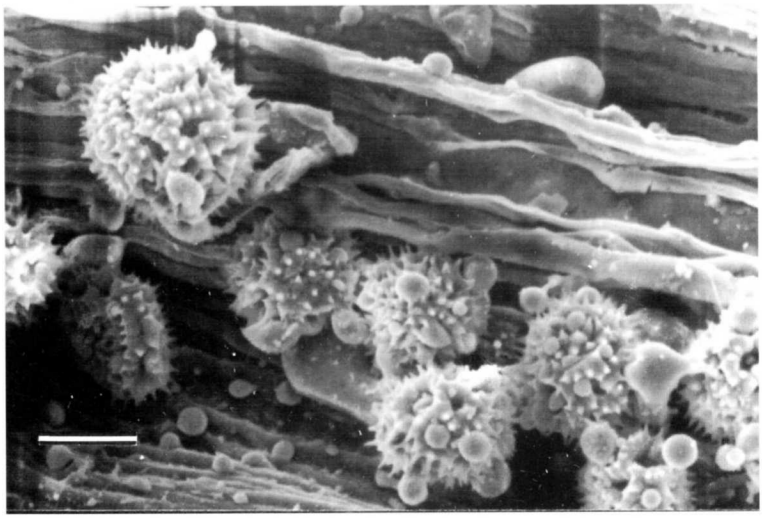

Fig. 8. *Hieracium cernaeglavae* – pollen grains of heterogenous size in the anthers. Scale bar = 20 μm

| | |
|---|---|
| 9 | 10 |
| 11 | 12 |
| | 13 |

Fig. 9. *Hieracium cernaeglavae* – black-greenish colour of involucres.
Fig. 10. *Hieracium rohacsense* – black-greyish colour of involucres.
Figs. 11.–12. *Hieracium rohacsense* in the Račkova dolina valley (Západné Tatry Mts, Slovakia).
Fig. 13. *Hieracium rohacsense* – rosette leaves infected by *Puccinia hieracii* (plant cultivated in experimental field).