Taraxacum nigricans, *T. alpestre* and allies in the *Taraxacum* sect. *Alpestria*: taxonomy, geography and conservation status

***Taraxacum nigricans*, *T. alpestre* a příbuzné druhy z *Taraxacum* sect. *Alpestria*: taxonomie, rozšíření a stupeň ohrožení**

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A long-standing problem with the taxonomic status and synonymy of the names *Taraxacum nigricans* (Kit.) Reichenb. and *T. alpestre* (Tausch) DC. is resolved. These two names, the oldest ones referable to high mountain dandelions in Central Europe, are typified, and a detailed comparison of these species' morphology, genotype make-up, karyotypes and distribution is provided, together with a discussion of other cases of similar and probably closely related agamospermous taxa of *Taraxacum* and *Hieracium*. *Taraxacum nigricans* (2n = 32) and *T. alpestre* (2n = 32) are endemic to the Nízke Tatry Mts, Slovakia, and the Krkonoše/Karkonosze Mts, Czech Republic/Poland, respectively. These are shown to differ in a series of minor but constant morphological, allozyme and karyotype features, and their treatment as separate agamospermous species is supported. A detailed analysis of cultivated and wild material from the Carpathians revealed the existence of a sexual taxon very close to the above two species and endemic to the region of the Bucegi Mts, Romania. It is described as a new species, *T. carpaticum* Štěpánek et Kirschner. Two new agamospermous species, apparently allied to *T. nigricans*, are described: *T. rupicaprae* Štěpánek et Kirschner, a species characterized by orange-ochraceous achenes and confined to the High Tatra Mts, and *T. elegantissimum* Štěpánek et Kirschner (2n = 24), which has substantially broader outer bracts and is known from the Rodna, Retezat and Fagaras Mts, Romania. Another three species are described that are morphological similar to *T. carpaticum*: *T. pastorum* (the Fagaras Mts, Romania), *T. iucundum* (the Retezat Mts, Romania) and *T. pseudoalpestre* (the Fagaras Mts, Romania).

K e y w o r d s: taxonomy, *Asteraceae*, *Crepidinae*, *Taraxacum*, agamospermy, sexual reproduction, typification, geographical parthenogenesis, Czech Republic, Poland, Slovakia, Romania

Introduction

Among the *Taraxacum* names published to cover the diversity of high mountain taxa in Europe, which includes the oldest dandelion binomials, there are two names that incidentally refer to closely related and quite similar taxa, *Taraxacum nigricans* (Kit.) Rchb. and *T. alpestre* (Tausch) DC., which occur in the Western Carpathians and Giant Mts (the Krkonoše), respectively. Because of their relatedness they are often considered as synonyms (Reichenbach 1831–1832, Handel-Mazzetti 1907, Domin 1936, Dostál 1950, Schischkin & Tzvelev 1964, Tacik 1980). In Flora Europaea (Richards & Sell 1976) the name *T. alpestre* is totally omitted. During our detailed study of *T. nigricans* and *T. alpestre*, it turned out that

the two names not only do not represent synonyms but also that there are other similar and presumably related agamospermous taxa belonging to the same group. Moreover, a closely related sexual taxon was found in the Bucegi Mts, Romania. On the other hand, in the enormous amount of the Alpine material of the section *Alpestria* we studied there were no plants belonging to this narrower group. In what follows, the whole *T. nigricans* and *T. alpestre* alliance is revised and the two early described relatives are compared in detail to show the nature of the differences between close agamospermous taxa.

Material

Most of the plant material used in the present study comes from the cultivation of plants at Experimental Gardens of the Institute of Botany, Průhonice, Czech Republic. Methods of mass cultivation follow those described in Kirschner & Štěpánek (1993). All the voucher specimens from our collections and cultivations are deposited in the herbarium PRA. A number of other herbarium collections were studied and the material there used in this study: B, BP, BP-KIT, BPU, BRNU, BRNM, FR, G, JE, L, OLM, PR, PRC, S, W, WRSL, WU, Z, ZT (see http://sciweb.nybg.org/science2/IndexHerbariorum.asp).

Material for isozyme and karyotype analyses of *T. alpestre* comes from a series of ten plants collected at five microlocalities along a line transect from the summit area of Mt. Sněžka, in the Krkonoše Mts towards the former Obří bouda (chalet). Material of *T. nigricans* comes from a single locality in the broader vicinity of Štefánikova chata (alpine chalet) below the massif of Mt. Ďumbier, in the Nízke Tatry Mts (five plants).

Methods

Isozyme analysis

Isozyme analyses were performed using fresh young leaves of cultivated specimens. Extraction: approximately 60–70 mg of plant tissue was used for extraction. The tissue was ground in a cooled mortar in a small quantity of sand in 0.6 ml of cooled extraction buffer. 100 ml of buffer contained 0.1 M Tris-HCl pH 8.0, 70 mM 2-Mercaptoethanol, 26 mM sodium metabisulfite, 11 mM L-ascorbic acid, 4% soluble PVP (m. w. ca 4000); before grinding a pinch of Dowex was added. The homogenates were centrifuged at 10000 R in a cooled centrifuge. The enzyme systems (6PGD, MDH, GOT, IDH, PGM, LAP, SHD, α-EST, CAT and AAT) were investigated using electrophoresis and polyacrylamide gels (8% acrylamide, discontinuous Tris-glycine buffer, pH 8.9). The staining procedures mostly followed Vallejos (1983), with minor quantitative modifications and the PGM staining Shaw & Prasad (1970). Enzyme systems missing from the former sources were stained according to Weeden & Wendel (1989). All the procedures are described in detail in Kirschner et al. (1994). Gels and pattern interpretations are preserved at the Laboratory of isozyme analysis, Institute of Botany, Academy of Sciences, Czech Republic.

Karyotype analysis

Meristems for karyotype study were obtained from root tips of cultivated plants and from germinating achenes. Rootlets were pre-treated with a saturated water solution of

p-dichlorobenzene for two hours and then stored in a mixture of ethanol and acetic acid (3:1). After maceration in a mixture of hydrochloric acid and ethanol (1:1), a squash was stained with lacto-propionic orceine. The slides were examined under a NfPK Zeiss microscope and images made using Opton Zeiss imaging device. For each taxon, eleven metaphases were measured, chromosomes paired according to the r-index (Levan et al. 1964), specific markers and the overall chromosome length.

The *Taraxacum nigricans* and *T. alpestre* group and the section *Alpestria*

Characterization of the group

Our basic material for the present study consists of samples of dandelions from populations in the localities from where the types of *T. nigricans* and *T. alpestre* were collected in the Krkonoše Mts, the Eastern and Southern Carpathians. Analysis of the diversity of the whole section *Alpestria* shows that plants similar to the original material of the above two species form a relatively distinct group within this section. The group is characterized as follows: Plants medium-sized to tall, leaves light green to bright green, not spotted, with a big, conspicuous terminal segment, outer bracts conspicuously short, usually lanceolate to linear-lanceolate to triangular-lanceolate (rarely to ovate-lanceolate), not tightly appressed, usually loosely appressed at the base and arcuate in the upper part or arcuate-patent, abaxially blackish green, unbordered or nearly so, ligules deep to golden yellow, with blackish apical teeth, achenes usually minutely squamulose above, with a short conical to subconical cone 0.8 mm long.

Position in the section Alpestria

The group undoubtedly belongs to the section *Alpestria* as circumscribed rather broadly by Soest (1966, 1969). This section is comprised of a number of invariably agamospermous species in the Alps and other high mountain ranges of Europe. These species form several morphologically coherent groups, a typical example of which is the group consisting of *T. nigricans* and *T. alpestre*. This group should not be equated with the very heterogenous "*T. nigricans* group" in Richards & Sell (1976: 337).

The northern limit of the geographical range of the section *Alpestria* is situated in the Krkonoše Mts and in the W. Carpathians. The occurrence of this section in the area of the summit of Mt. Brocken in the Harz Mts (Uhlemann 2003) is, in all likelihood, a consequence of mass introduction of Alpine plants into the famous garden at this locality (the tradition of the alpine garden on Brocken dates back to 1890 when it was founded by A. Peter of Göttingen and the assortment of plants cultivated there was between 1400-1800 species, Schmidt & Korsch 1998).

As regards the sectional nomenclature, the sectional name is to be cited as a combination: *T.* sect. *Alpestria* (Soest) Soest, Proc. Koninkl. Nederl. Akad. Wetensch., ser. C, 69: 459 (1966); basionym: *Taraxacum* subgroup *Alpestria* van Soest, Acta Bot. Neerl. 15: 35 (1966); type: *T. reophilum* Soest (as "*reopliclum*"). The type species belongs to the group showing certain relationships with the section *Fontana* Soest, i. e., quite distant from the aggregate of *T. nigricans* and *T. alpestre*.

The ample material of mountain dandelion groups from the European mountain ranges (particularly from the Alps, Pyrenees, Carpathians, Balkans and central Apennines) makes it possible to conclude that plants closely similar to *T. nigricans* and *T. alpestre* are confined to the Carpathians and Krkonoše Mts (Giant Mountains, Karkonosze); they are absent from the E Alps and mountains in the Balkans. For the phytogeography of the West Carpathians and the Sudeten (ranges in NW Moravia and N Bohemia and the adjacent regions of Poland), see Hendrych (1985); these two regions are linked by a number of plant migrants.

Ecology and distribution

All the taxa in the *T. nigricans* and *T. alpestre* group are inhabitants of the subalpine belt, preferably slightly disturbed sites, game and human path margins, margins of scree and vicinity of mountain chalets. They prefer habitats slightly enriched by nutriens but are not synanthropic and their spread is restricted to natural sites above the timberline.

Most of the members of this group are stenoendemics restricted to a single mountain range (*T. nigricans* – the Nízke Tatry Mts, Slovakia, *T. alpestre* – the Krkonoše Mts, Czech Republic and Poland, *T. rupicaprae* – the Vysoké Tatry Mts, Slovakia, *T. carpaticum* – the Bucegi Mts and Piatra Craiului Mts, Romania, *T. pastorum* – the Fagaras Mts, Romania, *T. iucundum* – the Retezat Mts, Romania and *T. pseudoalpestre* – the Fagaras Mts, Romania. The only species widely distributed in the southeastern parts of the Carpathians is *T. elegantissimum*.

Reproduction and relationships

Sexuality of *T. carpaticum* is an extreme feature in the section *Alpestria* and other sections of high mountain species in Central Europe. Not even in the Alps, in spite of the enormous sectional and species diversity of dandelions there, were we able to detect sexual taxa. In South European peninsulas, sexuality in sections of mountain species is not rare, particularly outside the sect. *Alpestria*. As the group studied, the *T. nigricans* and *T. alpestre* group, is morphologically very homogenous, we can hypothesize that *T. carpaticum* is the ancestral taxon of the group and the other members evolved by hybridizing with unknown agamospermous dandelions. The distribution of the taxa in this group has all the features pointing to the phenomenon known as geographical parthenogenesis (Hörandl 2006): the sexual member is confined to a small southern geographical range while agamospermous derivatives migrated or evolved northwards.

A comparable pattern of geographical parthenogenesis is found in the group of *Hieracium alpinum* L. Chrtek (1997) and Mráz (2003) report diploid sexuals of this predominantly triploid agamospermous species occurring in the eastern Ukrainian Carpathians and southern Romanian Carpathians (the Fagaras Mts). Westwards, only triploid agamospermous *H. alpinum* is known to occur, accompanied by a number of closely related apomictic polyploids.

A comparison of *Taraxacum nigricans* and *T. alpestre*

Closely related agamospermous species

There are a few papers dealing with the differentiation between pairs (or within groups) of oligoclonal agamospermous dandelions. The most important early works (Solbrig & Simpson 1974, 1977) report substantial ecobiological differences among several agamospermous dandelion clones of the section *Taraxacum* (*T. officinale* Wigg.). Similar relationships are recorded between *T. lacistophyllum* (Dahlst.) Raunk. and *T. rubicundum* (Dahlst.) Dahlst., similar and related agamosperms of the sect. *Erythrosperma* (H. Lindb.) Dahlst., by Ford (1985). In both cases, seemingly extremely close clones exhibit strikingly different behaviour under various selection pressures. Molecular spectra of closely related *Taraxacum* species usually reveal a substantial and consistent difference between each pair of hybrid polyploid apomicts compared (e.g. Van Oostrum et al. 1985, Battjes et al. 1992). Many similar examples are known from the genus *Hieracium* L. Ronikier & Szeląg (2008) show that there is a substantial degree of AFLP differentiation between *Hieracium silesiacum* E. Krause (the High Tatra and the Jeseníky Mts) and the newly described *H. austrotatricum* Szeląg, which occurs in the Nízke Tatry Mts; the two taxa are obviously closely related and very similar to one another. Comparable results are presented in Mráz et al. (2001) for the *H. rohacsense* group. Thus, when there is a regional absence of sexuality in a given group and restricted high mountain geographical ranges, both resulting in uniclonality or oligoclonality in a polyploid agamosperm, such taxa, however close to each other morphologically, consistently differ in a number of ecological, molecular and ecogeographic attributes (for a review, see Kirschner & Štěpánek 1994 or Widén et al. 1994). Let us see what the situation is between *Taraxacum nigricans* and *T. alpestre*.

Morphological differences

The most important morphological differences between *T. nigricans* and *T. alpestre* are briefly summarized in the key below. Most of them can be characterized as inconspicuous but consistent (leaf colour, petiole, terminal lobe shape and indentation, achene characters), other features (outer bract width, upper interlobe indentation) are of a quantitative nature. As an example we give photographic details of the achenes of the relevant taxa. The character of spinulosity shows minor but discernible attributes that distinguish achenes of *T. nigricans* and *T. alpestre*: the latter has bigger squamules that relatively sparsely cover the upper part of the body of an achene, while that of the former is quite densely covered with numerous minute squamules. The two taxa can with experience be distinguished by a series of morphological differences.

Results of karyotype analysis

Taraxacum nigricans and *T. alpestre* have similar karyotypes: the same chromosome number, highly symmetric karyotype (Fig. 1), with an absolute predominance of chromosomes with a median centromere and a pair of satellites most often on chromosome no. 5. The differences, as shown below and in Table 1, are minor but distinct: the number of *sm* chromosomes, overall length of spiralized genome and the satellite statistics.

T. nigricans: 2n = 32 = 26m + 6sm, chromosome size 2.24–3.68 μ, overall genome length 86.32 μm; satellites: two satellites (a single case), three (eight cases) and four (two

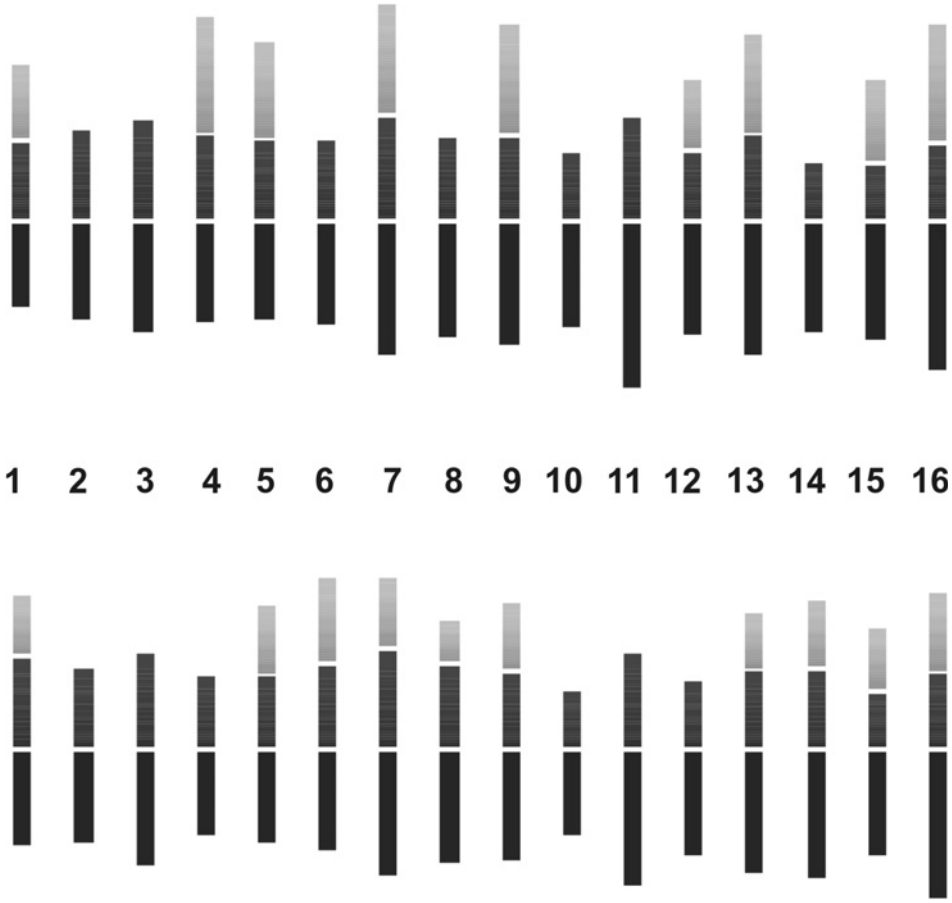

Fig. 1. – Karyograms of *Taraxacum nigricans* (above) and *T. alpestre* (below). Chromosome numbering as in Table 1.

cases). Longest/shortest chromosome pair length ratio: 1.64. A regular occurrence of a chromosome pair with paired satellites (ten cases on chromosome pair no. 5, one case on chromosome pair no. 13, with a single satellite); the other satellites are solitary and with a variable position.

T. alpestre: 2n = 32 = 28m + 4sm, chromosome size 1.94–3.19 μ, overall genome length 82.40 μm; satellites: three satellites (five cases) and four (six cases). Longest/shortest chromosome pair length ratio: 1.50. A regular occurrence of a chromosome pair with paired satellites (eight cases on chromosome pair no. 5, one case on chromosome pairs no. 10, 14 and 16; on pair no. 5, in two cases only one satellite is present and in one no satellites); the other non-paired satellites are associated with chromosomes with a high r-index.

Results of isozyme analysis

Ten enzyme systems were analyzed in a selection of samples of *T. alpestre* (five microlocalities) and *T. nigricans* (one microlocality). These enzyme systems represent 11

Table 1. – Karyotype statistics of *Taraxacum nigricans* and *T. alpestre* (characterization of individual chromosome pairs, r-indices and satellite properties).

	Pair	Short arm [s]	Long arm [l]	s+l	r = l/s	Relative length [%]	SAT incidence	SAT length
Taraxacum alpestre	1	1.22	1.32	2.54	1.08	6.18	2	0.80
2n = 32 = 28m + 4sm	2	1.30	1.56	2.86	1.20	6.95		
	3	0.96	1.17	2.13	1.21	5.17		
	4	1.10	1.26	2.35	1.15	5.72		
	5	1.13	1.39	2.53	1.23	6.13	1	1.13
	6	0.97	1.25	2.22	1.29	5.39	18	0.95
	7	1.34	1.72	3.06	1.28	7.43	1	0.95
	8	1.12	1.56	2.68	1.39	6.50	2	0.57
	9	0.77	1.18	1.94	1.54	4.72		
	10	1.30	1.89	3.19	1.45	7.74		
	11	1.03	1.50	2.52	1.46	6.13	2	0.90
	12	0.90	1.44	2.34	1.60	5.68		
	13	1.04	1.70	2.74	1.64	6.65	1	0.76
	14	1.06	1.77	2.82	1.67	6.85	5	0.93
	15	0.75	1.46	2.21	1.93	5.36	2	0.85
	16	1.01	2.03	3.04	2.01	7.39	6	1.07
		17.01	24.17	41.18				
Taraxacum nigricans	1	1.23	1.32	2.55	1.07	5.91		
2n = 32 = 26m + 6sm	2	1.06	1.18	2.24	1.11	5.19	2	1.04
	3	1.16	1.36	2.52	1.17	5.84	1	1.61
	4	1.36	1.51	2.87	1.11	6.65		
	5	1.09	1.33	2.42	1.22	5.61	21	1.30
	6	1.11	1.40	2.50	1.26	5.80		
	7	1.43	1.82	3.25	1.27	7.52	1	1.51
	8	1.15	1.59	2.74	1.38	6.36		
	9	1.15	1.68	2.84	1.45	6.57	2	1.51
	10	1.40	2.28	3.68	1.62	8.52		
	11	0.94	1.44	2.38	1.53	5.50		
	12	0.95	1.54	2.49	1.63	5.76	1	0.95
	13	1.17	1.82	2.99	1.56	6.93	3	1.36
	14	0.79	1.50	2.30	1.90	5.32		
	15	0.74	1.60	2.34	2.15	5.42	2	1.13
	16	1.03	2.03	3.06	1.98	7.09	1	1.61
		17.77	25.39	43.16				

scorable isozyme loci. Four loci showed identical isozyme phenotypes in the two species. The remaining seven were different (*Lap-1* showing only quantitative difference in dosage), six with qualitative difference in the presence of allelic product. *Taraxacum alpestre* differs in five specific alleles (in the loci *6Pgd-1*, *Mdh*, *Idh*, *Sdh*, *Cat*), while *T. nigricans* possesses four specific alleles (α-*Est* and *Cat*, two alleles each), see Table 2. *Taraxacum alpestre*, as an apomictic clonal plant, exhibits a fixed heterozygous pattern involving seven loci and in *T. nigricans* six.

Summary of the differences between the two closest taxa of the group

In spite of the relatively inconspicuous but constant nature of the morphological differences, *T. nigricans* and *T. alpestre*, which are geographically very isolated and separated

Table 2. – Presumed multilocus genotypes of *Taraxacum nigricans* and *T. alpestre* (loci identical for the two taxa are not displayed).

Locus	*T. nigricans*	*T. alpestre*
6Pgdh-1	bbbb	bbbc
Mdh	bbbb	abbb
Idh	aaaa	aabb
Lap	aaab	abbb
Shd	aaaa	aaab
α-*Est*	abcd	abbb
Cat	aabb	cccc

from one another, can be shown to differ in a number of genetically fixed structural features using other methods of comparison (isozymes and karyotypes). According to the standards of modern taraxacology, it is therefore fully justified to treat them as separate agamospermous species.

Taxonomic treatment and revision of the species

A key to the members of the *T. nigricans* and *T. alpestre* group

1a Pollen grains of regular size. Achenes (pale brown), very minutely spinulose above; cone 0.2–0.6 mm long ..... **3. *T. carpaticum***
b Pollen grain size conspicuously irregular. Achenes with medium-sized spinules above (if minutely spinulose, then achenes whitish straw-brown); cone usually 0.5–0.7 mm long 2
2a Achenes pale (orange) ochraceous brown, reddish-brown or cinnamon-coloured 3
b Achenes pale greyish straw-brown 5
3a Outer involucral bracts 6–9 (–11) ..... **6. *T. pastorum***
b Outer involucral bracts 13–19 4
4a Scapes glabrous ..... **4. *T. rupicaprae***
b Scapes densely arachnoid to flocculous ..... **7. *T. iucundum***
5a The outermost bracts ovate-lanceolate, the broadest of them more than 2.5 mm wide 6
b The outermost bracts lanceolate to linear-lanceolate, the broadest of them less than 2.5 mm wide 7
6a Stigmas discoloured, yellow-green with blackish pubescence outside; the broadest outer bracts 3.5–4.0 mm wide ..... **5. *T. elegantissimum***
b Stigmas almost yellow to slightly greenish yellow, with pale abaxial pubescence; the broadest outer bracts 3 mm wide ..... **8. *T. pseudoalpestre***
7a Stigmas yellow to slightly greenish yellow, with pale abaxial pubescence. Achenes whitish straw-brown, upper 1/6 of the achene body sparsely shortly squamulose-spinulose (or sometimes almost smooth throughout) ..... **8. *T. pseudoalpestre***
b Stigmas medium dark, yellow-green or grey-green, dark pubescence on outer surface. Achenes pale brownish to greyish straw-brown, upper 1/3–1/4 of the achene body ± densely squamulose-spinulose to squamose **8**
8a Petioles of outer leaves unwinged or indistinctly winged. Outer bracts up to 1.8 mm wide. Leaves conspicuously bright pale green. Upper 1/3 of achene body distinctly squamulose to squamose, squamules relatively big and sparse. Proximal margins of leaf terminal segment conspicuously concave or sigmoid, basal lobes of the terminal segment recurved or terminal lobe sagittate, the uppermost interlobe usually with a tooth ..... **2. *T. alpestre***
b Petioles of outer leaves broadly winged. Outer bracts up to 2.5 mm wide. Leaves usually pale mid-green. Upper 1/3–1/4 of the achene body ± densely squamulose-spinulose, squamules small and relatively numerous. Proximal margins of leaf terminal segment ± straight, basal lobes of the terminal segment usually patent to slightly downwards pointing, the uppermost interlobe usually entire ..... **1. *T. nigricans***

1. *Taraxacum nigricans* (Kit.) Reichenb., Fl. Germ. Excurs. 270 (1831–32)

Syn.:
≡ *Leontodon nigricans* Kit. in Schult., Österreichs Fl., ed. 2, 2: 405 (1814), basionym.
≡ *Taraxacum officinale* var. *nigricans* (Kit.) Sagorski et Schneider, Fl. Centralkarp. 259 (1891).
≡ *Taraxacum officinale* subsp. *nigricans* (Kit.) Hegi, Ill. Fl. Mittel-Eur. 6/2: 1093 (1928).

Type indication in the protologue: "auf den Zolieralpen und in der Liptau" [the Eastern Alps and mountains in north-central Slovakia]. – Type: [Slovakia] "*Leontodon nigricans* mihi. In alpe Kunstava et Gyumbér." (**lectotype, designated here**: BP-KIT, no XXVI/76, plantae magnae, capitulis tribus [plantae minores exclusae])

Note: The type material is not mounted and consists of eight plants with one label. Six of the plants are bigger than the others and four of them have three capitula each. The latter four plants obviously belong to a single taxon and are selected as the lectotype material. Of the remaining plants, at least one (with blackish stigmas and runcinate leaves) does not belong to *T. nigricans*.

Exsiccates: Taraxaca Exs., no. 791.

Description: Plants medium-sized to relatively tall but not robust. Leaves suberect, usually 10–15 cm long, 2.5–4.0 cm wide, glabrous or almost so, pale green to deep mid-green, not spotted, slightly shiny; leaf blade oblanceolate to subspatulate in outline, quite regularly pinnatifid to pinnatisect, with a large terminal segment, lateral lobes with ± large surface and short interlobes; terminal segment conspicuous, triangular to low triangular or helmet-shaped to elongated helmet-shaped, 2.5–4.5 cm long, 2.5–4 cm wide, acute to obtusely acute, distal margin convex to sigmoid, entire or with a single ± larger tooth, proximal margin ± straight, entire, basal lobes of the terminal segment usually patent to slightly downwards pointing; lateral leaf segments 2–3 on each side, relatively broad and short, broadly deltoid to broadly triangular, moderately recurved to obliquely pointing downwards, their distal margin usually sigmoid, entire or with one or several broad short teeth, less often regularly minutely dentate, proximal margin concave to ± straight; interlobes short to relatively long (to 1.5–2.0 cm), medium wide (0.8–1.5 cm), entire, slightly involute, indistinctly brown-purplish border near the folded margin, otherwise similarly coloured. Petiole ± short and those of the outer leaves broadly and inner leves narrowly winged, pale green, midrib pale to suffused slightly pinkish brown. Scapes equalling leaves or longer, very sparsely aranose, usually pale green, frequently with a solitary bract 1.5 cm long inserted in or below the middle part of the scape. Capitulum medium-sized, ca 4 cm diam., ± flat, golden yellow; exterior ligules ± flat, relatively broad, striped purplish grey-green outside, interior ligules canaliculate, ligule teeth black to black-purple, sometimes dark red. Stigmas medium dark, yellow-green, dark pubescent on outer surface; pollen present, of irregular size. Involucre slightly obconical at the base, dark olive blackish green. Outer involucral bracts relatively numerous (13–18), appressed at base, ± patent in the distal part, often slightly sigmoid, usually (5–) 6–8 mm long, 1.5–2.5 mm wide, dark olive green (black-green when dry), often with purplish apex, not pruinose, ± without any distinct paler border, relatively short, reaching 1/3–1/2 of the inner bract length, bracts often have a variable shape in one flower head, the 1–2 lowermost ones (often descending slightly below the capitulum on the scape) linear-lanceolate, paler and ciliate-dentate, middle (broadest) outer bracts oblong-lanceolate (to oblong-ovate), often with a broader ± subobtuse apex, the innermost, longest outer bracts narrowly lanceolate; inner involucral bracts unevenly wide, sometimes neighbouring ones coalescent.

Achenes relatively large, pale brownish to greyish straw-brown, (3.7–) 4.0–5.0 mm long, (0.9–) 1.0–1.3 mm wide, upper 1/3–1/4 of the achene body ± densely squamulose-spinulose (and marginal achenes tuberculate throughout), squamules small and relatively numerous, almost smooth below (or, mainly with the exterior achenes, tuberculate throughout), achene body gradually narrowing into a short, conical to subconical cone (0.5–) 0.6–0.8 (–0.9) mm long; rostrum 5.5–8.0 mm long; pappus ± white, 5.5–6.0 mm long. Agamospermous tetraploid (2n = 32, det. V. Jarolímová). – Fig. 2A, 3.

The material indicates that *T. nigricans* is endemic to the Nízke Tatry Mts, a mountain range in the Western Carpathians, north-central Slovakia, where it is accompanied by several agamospermous species of other groups of the sect. *Alpestria*. Although ample material was seen from other ranges in the vicinity, the High Tatra Mts in particular, no comparable plants were found. It is a distinct stenoendemic taxon of a central area of the Nízke Tatry, a region heavily exploited by the tourist industry. The need for its conservation has often been overlooked because it was mistakenly reported to occur at several other localities.

Other specimens studied: **Central Slovakia,** Liptovský Mikuláš, the Nízke Tatry Mts, slopes of Mt. Ďumbier, near the alpine chalet "Hrdinov SNP", 1800 m a.s.l., 4 Jul 1985, J. Kirschner (PRA, no. det. 19914; 19913; 19911; 19910; 19909; 19908; 19907. Mostly cultivated material.). – the Nízke Tatry Mts, Brezno nad Hronom, between alpine chalet Štefánikova chata and a place called Trangoška, in a valley between Mt. Veľký Gápeľ and Mt. Ďumbier, 1500–1700 m, 22 Jul 1990, J. Štěpánek (PRA, no. det. 19912). – the Nízke Tatry Mts, "Krakova hoľa (1751 m), u žluté značky J od vrcholu (ze sedla Javorie)", 20 Jun 2001, B. Trávníček (OL, no. det. 22707).

2. *Taraxacum alpestre* (Tausch) DC., Prodr. 7: 148 (1838)

Syn.:
≡ *Leontodon alpestris* Tausch, Flora, Regensburg, 4: 564 (1821), basionym.
≡ *Leontodon taraxacum* [var.] ß. *alpestris* (Tausch) Kosteletzky, Clavis Fl. Bohem., p. 110, 1824.
≡ *Taraxacum officinale* subsp. *alpestre* (Tausch) Čelak., Prodr. Fl. Böhm. 4: 796, 1881, nom. illeg., non *T. officinale* [Spielart] c. *alpestre* G. F. W. Meyer, Chlor. Hanover. 428, 1836.
≠ *Taraxacum alpestre* Hegetschweiler in Hegetschweiler et Heer, Fl. Schweiz 762 (Sep 1840).

Type indication in the protologue: "in faucibus summorum jugium Sudetorum (Schneegruben)" [S. Poland near the Czech border, Karkonosze, Śnieżne Kotły]. – Type: "*Leontodon alpestris* n. sp. Schneegrube 1812" [I. F. Tausch scripsit] (**lectotype, designated here**: PRC 452144, no. det. 9576, isolectotypi: PRC 452145 through 452148, no. det. 22934).

Exsiccates: Baenitz, Herb. Europ., no. 8947 (as *T. nigricans*). – Tausch, Herb. Fl. Bohem. Univ., no. 941 (as *Leontodon alpestris*). – Tausch, Pl. Select. Fl. Bohem., fasc. IV, ed. 2, sine no. (as *Leontodon alpestris*).

Description: Plants small to medium-sized, 5–20 cm tall; leaf rosettes relatively poor. Leaves erecto-patent, glabrous, bright pale green (never suffused brownish-purplish), shiny, not spotted; leaf blade narrowly elliptic to narrowly obovate in outline, not totally flat, slightly rugged and with raised interlobe margins, usually 8–17 cm long, 2.0–3.5 cm wide, runcinate-pinnatisect, terminal segment conspicuously large, most often 2.5–5.5 cm long, 2–4 cm wide, helmet-shaped to triangular, almost sagittate at base, acute to obtusely acute, distal margin convex, entire or with single tooth or shallow incision on one or both sides, proximal margin of leaf terminal segment concave or sigmoid, entire, basal lobes of the terminal segment recurved or terminal lobe sagittate, lateral leaf segments 2 (3) on each side, medium-sized, triangular to narrowly triangular, patent to recurved, distal margin slightly concave or slightly convex (then usually with 1–2 coarse teeth or entire), proximal

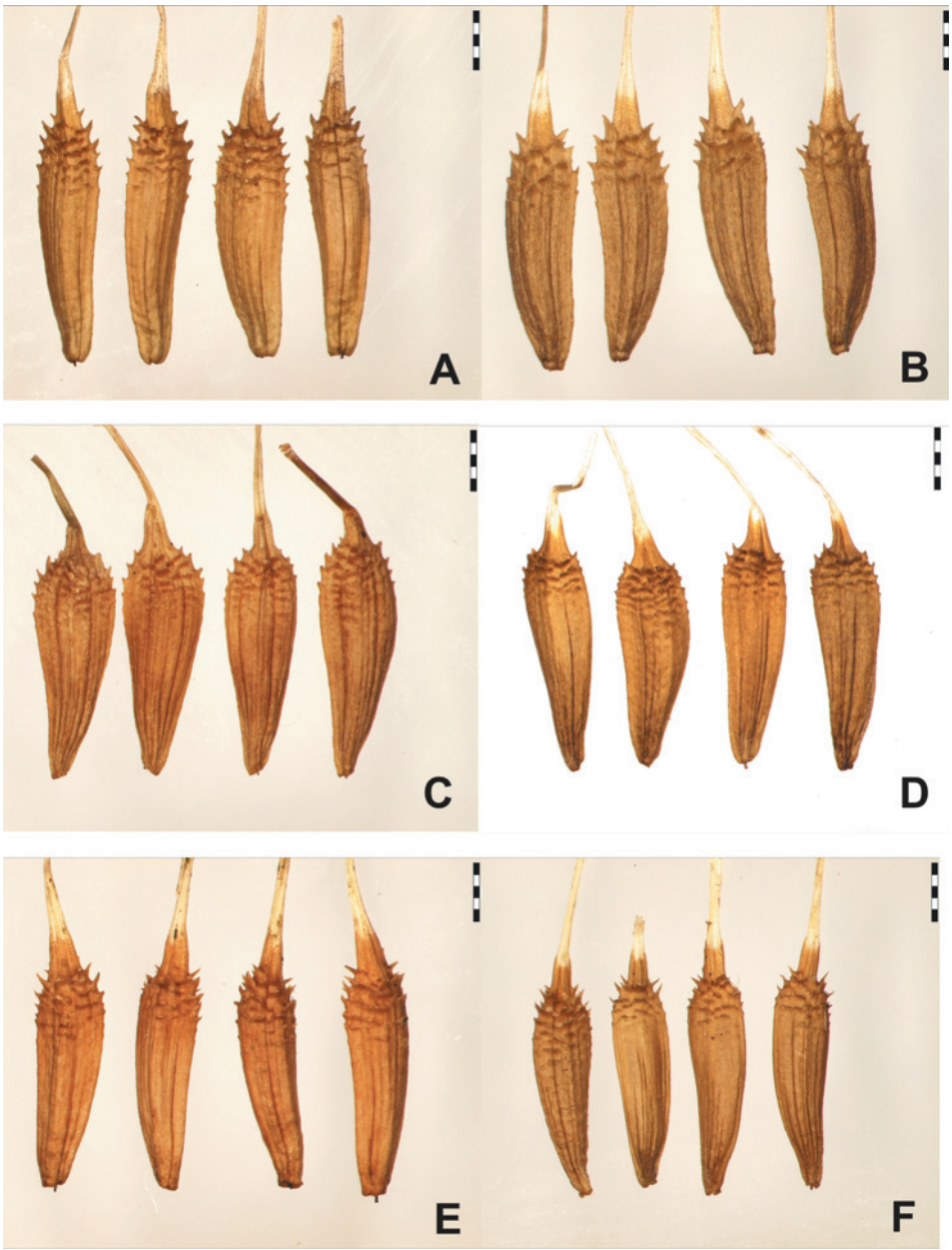

Fig. 2. – Details of the achenes of members of the *Taraxacum nigricans* and *T. alpestre* group. A, *T. nigricans* (PRA, no. det. 19907); B, *T. alpestre* (PRA, no. det. 21127); C, *T. carpaticum* (PRA, no. det. 20448); D, *T. carpaticum* (PRA, no. det. 22725); E, *T. rupicaprae* (PR, no. det. 19915); F, *T. elegantissimum* (PRA, no. det. 19918). Scale bar = 1 mm.

Fig. 3. – *Taraxacum nigricans* (PRA, no. det. 19907).

margin ± straight, entire; interlobes short to medium long and medium broad, with a slightly involute margin at the bottom of the incision, entire or with one or several remote, usually narrowly triangular teeth (the uppermost interlobe usually with a single tooth), bright pale green, not dark bordered, midrib pale green; petiole 3–7 cm long, not winged (or those of outer leaves very narrowly winged), whitish green. Capitulum medium-sized, ca 3.5 cm diam., flat, deep yellow; ligules flat, striped purplish grey-brown outside, ligule teeth black; stigmas grey-green, with black abaxial pubescence. Involucre ± light green, slightly pruinose, broadly obconic to almost rounded at base; outer involucral bracts 14–17, linear-triangular to lanceolate, 4–6 mm long, 1.2–1.8 mm wide,

Fig. 4. – *Taraxacum alpestre* (PRA, no. det. 21127b).

arcuate-patent to arcuate-recurved, abaxially evenly black-green, unbordered, flat, adaxially grey-green. Achenes pale greyish brown, 4.2–4.5 (–4.9) mm long, 1.1–1.3 mm wide, upper 1/3 of achene body distinctly squamulose to squamose, squamules pointing forward to erect, relatively big and sparse, with a minutely dentate margin, achene body otherwise ± smooth (with the exception of sparsely to densely tuberculate marginal achenes) subabruptly to subgradually narrowing into broadly conical cone 0.5–0.7 mm long; rostrum (5.5–) 7.0–7.5 mm long, pappus dirty white, 5–6 mm long. Agamospermous tetraploid (2n = 32, det. V. Jarolímová). – Fig. 2B, 4.

Taraxacum alpestre is confined to a limited area at the summit of the Krkonoše/Karkonosze Mts, in the Polish-Czech border area, mainly in the vicinity of Mały Staw and

Śnieżne Kotły on the Polish side of the range, and at the summit of Mt. Sněžka, the former Obří bouda [chalet] and Luční bouda [chalet] on the Czech side, and is the only member of the section occurring there. A detailed survey of populations for the purposes of the Czech and Slovak Red Book (Procházka & Štěpánek in Čeřovský et al. 1999: 365) indicates there has been a decline in both the number and size of the populations. On the other hand, as an endemic taxon, it receives considerable attention in conservation programmes. Thanks to its agamospermous reproduction, it may be regarded as a taxon able to overcome occasional population bottle-necks. We are of the opinion that *T. alpestre* is not seriously threatened.

Other specimens studied: **Poland,** The Karkonosze Mts, vicinity of **Mały Staw** [Lake], ca 1400 m, 29 Jul 1947, J. Šourek (BRNM, no. det. 17244; PR, no. det. 20117; 20122). – "um den Kleinen Teich", 1881, F. Pax (WRSL, no. det. 23317); 18 Jul 1882, E. Fiek (PR, no. det. 20118). – "Wiesen um den kleinen Teich", 28 Jun 1881, [E. Fiek] (WRSL, no. det. 23328). – "von Felsen bei dem Kleinen Teiche", sine dat., [I. F. Tausch], distributed as Tausch, Pl. Select., fasc. IV, ed. 2, sine no., as *Leontodon alpestris* Tau. (BP, no. det. 2946; L, no. det. 20725, 20726; PRC, no. det. 22937). – "V. Felsen b. d. klein. Teiche", sine dato, [I. F. Tausch], distributed as Tausch, Herb. Fl. Bohem. Univ., no. 941 (PRC, no. det. 22944). – "beim kleinen Teich", sine dato, J. Kablik (PRC, no. det. 22935, 22936). – "in der Nähe des Kleinen Teiches", 27 Aug 1884, E. Junger (WRSL, no. det. 23320). – The Karkonosze Mts, vicinity of alpine chalet of **Schronisko Strzecha Akademicka** [previously called Hampelbaude], 28 Jun 1880, [E. Fiek] (WRSL, no. det. 23329); Jun 1888, A. Callier (WU, no. det. 8953); 1 Jul 1888, A. Callier (JE, no. det. 17371); 1 Jul 1896, C. Baenitz [distributed as C. Baenitz, Herb. Eur., no. 8947, but in most herbarium collections received left unnumbered] (BRNU, no. det. 743; G, no. det. 22523; LE, no. det. 6008; PRC, no. det. 14894; L, no. det. 20722, 20723; S, no. det. 23476; WRSL, no. det. 23315); 1897, A. Callier (G, no. det. 22522). – "In Mauerritzen am Sockel der Hampelbaude", 30 Jun 1883, G. Schneider (WRSL, no. det. 23316). – The Karkonosze Mts, **Śnieżne Kotły**, near the station of "Stacja Przekaźnikowa", ca 1490 m, 23 Jul 1992, J. Štěpánek & J. Štěpánková (PRA, no. det. 21130). – "Wiesen unter der Alten Schlesischen Baude", 2 Jul 1887, [E. Fiek] (WRSL, no. det. 23325). – **Czech Republic,** The Krkonoše Mts, **summit area of Mt. Sněžka** [a border region Poland/Czech Republic], ca 1600 m, 24 Jul 1921, A. Zlatník (BRNM, no. det. 17235). – "Schneekoppe", 22 Aug 1881, R. Pax (WRSL, no. det. 23318); 12 Jul 1891, V. Hellmann (FR, no. det. 23635; JE, no. det. 17367); 10 Aug 1895, A. Schultz (JE, no. det. 17368; BPU, no. det. 3669; PRC, no. det. 22945); 8 Jun 1946, J. Šourek (PR, no. det. 20116, 20120, 2891, 3183); Jul 1887, R. Faustus (PR, no. det. 2893); 5 Jul 1901, K. Domin (PR, no. det. 20136); 22 Jul 1934, J. Dostál & F. A. Novák (PRC, no. det. 19877); *sine coll.*, sine dat. (PRC, no. det. 19877); 10 Jul 1928, V. Krajina (PRC, no. det. 19880); Aug 1883, J. Velenovský (PRC, no. det. 19889). – "Gipfel der Schneekoppe", 17 Aug 1876, [E. Fiek] (WRSL, no. det. 23327); 29 Jun 1879, F. Pax (WRSL, no. det. 23324). – summit of Mt. Sněžka, 1600 m, 23 Jul 1986, J. Štěpánek, cult. as JŠ 2162 (PRA, no. det. 21129). – The Krkonoše Mts, **Luční bouda** [alpine chalet, also called Wiesenbaude in the past], 15 Aug 1879, F. Pax (JE, no. det. 17369); 11 Jul 1881, [E. Fiek] (WRSL, no. det. 23326); 28 Jul 1882, E. Fiek (JE, no. det. 17370; WU, no. det. 8952); 1 Jul 1888, A. Callier (JE, no. det. 17371); 28 Jul [18]95, Bodmann (L, no. det. 20724); 28 Jul 1882, Schoepke (OLM, no. det. 21157). – about 1.5 km ENE of Luční bouda, 2 Jul 1995, O. Šída (herb. O. Šída, no. det. 10838). – The Krkonoše Mts, **the former "Obří bouda"** alpine chalet below Mt. Sněžka, ca 1450 m, 23 Jul 1986, J. Štěpánek (PRA, no. det. 21128, 21127).

3. ***Taraxacum carpaticum*** Štěpánek et Kirschner, **spec. nova**

Type: [Romania, the Bucegi Mts] K. Domin et V. Krajina: Iter romanicum 1931, no. 884. "Habitat in montibus Bucegi, in summo cacumine montis Omul, solo calcareo", 2511 m., 9 Jul 1931, V. Krajina (holotype: PRC, no. det. 20998).

Diagnosis: Plantae sexuales parvae usque mediocriter altae foliis 5–12 cm longis, pallide usque saturate viridibus, lamina in forma valde variabili lobo terminali diversissime magno, late galeiformi vel anguste triangulari usque triangulari, ad basin non raro sagittati, lobis lateralibus numero 1–4 utrobique, ± brevibus, subintegerrimis, petiolo pallido angusto usque alato, calathio ca 4 cm in diametro, ligulis dentibus apicalibus nigris ornatis, stigmatibus longis cano-viridibus usque subnigris, antheris polliniferis granis pollinum aequimagnis, acheniis pallide stramineis vel fulvis, 3.6–4.3 mm longis (pyramide incl.), 1.1–1.3 mm latis, corpore in tertia parte superiore spinulis brevibus squamulisve parvis ± dense circumtecto, deorsum ± laevi, sursum in pyramidem conicam, 0.2–0.6 mm longam ± gradatim abeunti.

D e s c r i p t i o n: Plants small to medium-sized, usually 6–18 cm tall, rarely forms leaf rosettes. Leaves most often erecto-patent, sometimes prostrate, ± thin, pale green to deep green, not spotted, glabrous to very sparsely aranose on abaxial surface (adaxially sometimes a few hairs on the midrib), 5–12 cm long; leaf blades of variable shape, subspatulate, narrowly lanceolate to linear elliptic in outline, divided in a relatively simple way; terminal leaf segment of variable size, from small to very conspicuous, broadly helmet-shaped to narrowly triangular or triangular, sometimes ± sagittate at the base, 1.5–4 cm long, 1–3 cm wide, with rounded to acute apex, distal margins convex or straight (sometimes with an incision), basal lobes of the terminal segment patent to pointing downwards, proximal margins ± straight or concave; lateral leaf segments 1–4 on each side, relatively short, triangular to triangular-deltoid, sometimes recurved-hamate, always slightly to distinctly pointing downwards, distal margins straight or convex, entire or with a single tooth or lobe (or several small teeth on some lower segments), proximal margins slightly to distinctly concave, entire or with a few small acute teeth; interlobes short to long (to 1 cm), usually narrow, entire or with a few acute teeth, often with involute (or almost undulate) margins, narrowly bordered brown-purple, sometimes slightly suffused purplish on the surface; midrib pale or pinkish brown or pinkish purple. Petioles usually short, narrow or winged, usually pale green. Scapes relatively thin, equalling or slightly overtopping leaves, glabrous to medium densely aranose (more densely just below the capitulum). Capitulum small to medium-sized (4 cm diam.), yellow, ± flat to concave; exterior ligules ± flat, relatively long and probably narrow, striped ± pale grey abaxially, interior ligules getting shorter towards capitulum centre, ± canaliculate, all ligules with black or dark grey teeth. Stigmas long exserted, medium dark to very dark (almost black when dry), grey-green, with blackish pubescence on outer surface. Pollen present, pollen size regular. Involucre slightly to distinctly obconical at the base; outer involucral bracts variable in number, shape and colour, usually 9–23, narrowly ovate, lanceolate to linear-lanceolate (with a correlation between number and shape – the more numerous the narrower), the narrowest outermost 1–2 often remote on the scape, all usually loosely appressed, often arcuate-recurved in the distal part, 4–8 mm long, 1–3 mm wide, flat, abaxial surface dark green to black-green (almost black when dry), ± evenly coloured, unbordered or with an indistinct very narrow paler border, not ciliate or sparsely so. Achenes pale brown, 3.6–4.3 mm long, 1.1–1.3 mm wide, upper 1/3 achene body relatively densely covered with minute spinules or small squamules (otherwise almost smooth), with ± gradual transition into a conical short cone (0.2–0.6 mm long); rostrum 5–6 mm long, pappus pure white, ca 6 mm long. Sexually reproducing taxon. – Fig. 2C, D, 5.

The only sexual member of the group. Probably endemic to the region of the Bucegi Mts and Piatra Craiului Mts, Romania. It is a calciphilous species. Judging from the frequency and richness of the herbarium specimens, *T. carpaticum* is a common species and not an endangered taxon.

The sexuality of *T. carpaticum* was established by indirect methods: The specimens studied have prefectly regular pollen size, cultivated sample showed a great variation among siblings in leaf shape and colour and enormous variation in the number of outer bracts (9–23), a feature confined to sexual European *Taraxacum* species. The obconical shape of involucre base is another common feature of sexual species.

Fig. 5. – *Taraxacum carpaticum*, the holotype (PRC, no. det. 20998).

Other specimens examined: **Romania, the Bucegi Mts**, northern slopes of Mt. Bucşoiu Mic, not far from Pichetu Roşu Ridge, 1600–1650 m, 11 Sep 1984, A. Plocek (PRA, no. det. 20445). – Northern slope of Mt. Bucşoiu Mare near alpine chalet of Maleaşti, 1800 m, limestone, 14 Sep 1984, A. Plocek (PRA, 20446). – "Ad cataractam Cascada Obirşia Ialomiţei, 1980–2050 m, solo calcareo", 13 Sep 1984, A. Plocek (PRA, no. det. 22725). – Bucegi, 1984, M. Šourková (PRA, no. det. 20449). – valley of Sugarile Rivulet below Mt. Obirşia, 1900–2000 m, 13 Sep 1984, A. Plocek (PRA, no. det. 20447). – "im Valea Ialomnitza der Alpe Bucsécs. Sandiges Kalk. Conglomerat", 2300 m, 3 Aug 1873, J. Freyn (BRNM, no. det. 21562). – Bucegi, Valea Alba, 10 Aug 1930, K. Pavlík (OLM, no. det. 21485). – "Transsilvaniae alpes Árpásenses: Bulsu Kelderi.[?? – almost illegible site indication] ", 1700 m, 7 Aug 1883, L. Simkowics [Simonkai] (W, no. det. 21141). – "Bergwiesen bei der Malojester Schutzhütte am Bucegiu, Siebenbürgen", 18 Jul 1908, Woloszczak (W, no. det. 21135). – "Carpathes orientales: Valea Tepilor mare, 1700 m env., massif du Bucegi", 27 Aug 1919, H. Guyot, no. 61 (G, no. det. 22508). – "Burgenländer Gebirge, Bucsecs: feuchte Felsen im Malajester Thale, Kalkconglomerat", 2100 m, 21 Aug 1896, F. Pax (WRSL, no. det. 23330). – "Burzenländer Karpathen: Bucsecs: auf dem Plateau des Coraiman",

ca 2300 m, 15 Aug 1928, O. Schwarz no. 587 (B 100276959, no. det. 22204). – "Siebenbürgen. Gebirgsstock des Bucegiul (Butschetsch) bei Kronstadt: zwischen Bucsáca und La Omu", 2400–2500 m, 17–18 Aug 1910, A. Ginzberger (WU, no. det. 21759). – "Siebenbürgen. Gebirgsstock des Bucegiul (Butschetsch) bei Kronstadt: Oberster Teil des Malajeschter Tales", 2200–2500 m, 17–18 Aug 1910, A. Ginzberger (WU, no. det. 21758). – Romania, **the Piatra Craiului Mts**, Valea Crăpăturii, in the community of *Festucetum carpaticae*, 1984, D. Fišerová, cultivated as JŠ 2160 (PRA, no. det. 20448). – Romania, Montibus Bîrsei, Monte Piatra Craiului, in lapidosis, alt. ca 1620 m s. m., 3 Aug 1979, D. Parascan & M. Danciu (S, no. det. 22966).

4. ***Taraxacum rupicaprae*** Štěpánek et Kirschner, **spec. nova**

T y p e: [Slovakia, the Vysoké Tatry Mts] "Slovacia boreal., montes Vysoké Tatry, vallis Velická dolina: locis scaturiginosis super lacu alpino Dlhé pleso", 1950 m, 49° 10' N, 20° 09' E, 6 Aug 1992, J. Štěpánek (holotype: PRA, no. det. 19917).

D i a g n o s i s: Plantae agamospermae, mediocriter altae, sed tenerae foliis laete viridibus, immaculatis, glabris, plerumque 10–15 cm longis et 2–3 cm latis, lamina conspicue runcinato-pinnatisecta lobo terminali magno, anguste triangulari vel galeiformi, 3.5–4 cm longi et 2–3 cm lati, lobis lateralibus 1–2 utrinque, petiolo angusto ad 5 cm longo, calathio 3–4 cm in diametro, denticulis apicalibus ligularum nigro-griseis usque purpupreo-griseis, bracteis involucralibus exterioribus 13–17, lanceolatis usque anguste lanceolatis, acheniis laete (aurantiaco-) ferrugineis, (3.8–) 4.2–4.6 mm longis, 1–1.2 mm latis, corpore in quarta usque tertia parte superiori squamulis dense tecto, deorsum ± tuberculato, in pyramidem subconicam 0.5–0.7 mm longam ± sensim abeunti.

D e s c r i p t i o n: Plants medium-sized, usually relatively slender. Leaves bright light green, shiny, not spotted, glabrous or very sparsely aranose (in cultivation), usually 10–15 cm long, 2–3 cm wide; leaf blade narrowly oblanceolate to oblanceolate in outline, conspicuously divided, runcinate-pinnatisect, with a large terminal segment and 1–2 pairs of lateral segments, with long narrow interlobes; terminal segment conspicuous, narrowly triangular to helmet-shaped, sometimes oblong-helmet-shaped, always with a distinctly sagittate base, 3.5–4.0 cm long, 2–3 cm wide, acute to very sharply acute, with distal margins convex, entire or ± coarsely dentate (sometimes with a distinct incision), proximal margins concave to sigmoid, basal lobes of the terminal segment obliquely to directly pointing downwards; lateral segments 1–2 on each side, usually opposite, triangular, pointing downwards, distal margin ± straight to sigmoid, entire or with 1–2 relatively large teeth, segment apex acute, proximal margin ± concave or sigmoid, entire; interlobes long, narrow, entire or with ± remote, narrowly triangular, acuminate teeth, slightly involute or raised near the upper segment; petiole narrow, unwinged, relatively long (to 5 cm), pale green or suffused light to deep pink-purple; midrib pale green or pinkish in lower half (or wholly pinkish). Scapes longer than leaves, pale green, sometimes pinkish below the capitulum, glabrous. Capitulum medium-sized, 3–4 cm diam., probably flat; exterior ligules sparse, ± flat, striped dark purplish grey-black outside, ligule teeth grey-black, grey or grey-purple. Stigmas exserted, dark, grey-green (not black when dry); pollen present, pollen grains of irregular size. Involucre subconical at the base, dark green, slightly pruinose; outer involucral bracts very short, reaching ca 1/3 of the length of inner ones, 13–17, loosely appressed at the base, arcuate-patent in the upper part, sometimes ± recurved, lanceolate to narrowly lanceolate, 5–6 mm long, ca 2 mm wide, abaxially black-green, almost black distally, black when dry, evenly coloured, sometimes with an indistinct, slightly paler narrow, dark membranous border, flat, almost not ciliate, adaxial surface paler, grey-green, sometimes suffused pink-purplish; inner involucral bracts sometimes of variable width. Achenes medium-sized, (3.8–) 4.2–4.6 mm long, 1.0–1.2 mm wide, light (orange) rusty, upper 1/4–1/3 of achene body relatively densely squamulose, otherwise ± tuberculate, ± gradually (seemingly subabruptly because of a "collar" of the uppermost

Fig. 6. – *Taraxacum rupicaprae*, the holotype (PRA, no. det. 19917).

squamules) narrowing into a subconical or subcylindrical, relatively thick cone, 0.5–0.7 mm long; rostrum ca 8 mm long (ca 6.5 mm in cultivation), pappus slightly yellowish dirty white, 5.0–5.5 mm long. – Fig. 2E, 6.

The colour of achenes is diagnostic of the *T. nigricans* and *T. alpestre* group. This species is known to occur in two parts of the Tatra Mts, i.e. the High Tatra Mts and the Belanské Tatry Mts. The distinctive colour of its achenes makes it easy to detect *T. rupicaprae* in herbarium material and we do not expect this taxon to occur much outside these limits. Although over the last 30 years we have focused our interest on the Carpathian alpine dandelion flora we found this species in the field only once. This we consider is an indication of the extraordinary rarity of *T. rupicaprae*.

Other specimens examined: **Slovakia**, the Vysoké Tatry Mts, Svišťovka, ca 1600 m, 12 Jul 1957, J. Šmarda (BRNU, no. det. 19916). – "in montibus Bielské Tatry in valle ad septentriones inter montes Ždiarska Vidla et Havran praerupta solo calc." [the Belanské Tatry Mts, between Mt. Ždiarska Vidla and Mt. Havran], ca 1550 m, 25 Jul 1928, V. Krajina (PR, no. det. 19915).

5. ***Taraxacum elegantissimum*** Štěpánek et Kirschner, **spec. nova**

Type: Romania, distr. Bistriţa-Năsăud, Munţii Rodnei Mts, ca 18.5 km SSW of Borşa town, slope S of saddle between peaks of Vf. Gropilor Mt. and Vf. Buhăescu Mare Mt., alt. 1850 m, 47° 34' 18" N, 24° 37' 32" E.", 3 Jul 2003, M. Suková & M. Tůmová, Plantae e seminibus in horto bot. in Průhonice sub no. JŠ 7854 cultae et a. 2005 lectae (holotype: PRA, no. det. 19926), isotypi (PRA, no. det. 19918, and also distributed as Taraxaca Exsiccata, no. 789).

Exsiccates: Taraxaca Exs., no. 789–790, 897–898.

Diagnosis: Plantae agamospermae parvae usque mediocriter altae, foliis numerosis, laete usque saturate viridibus, plerumque 6–15 mm longis, immaculatis, lamina pinnatisecta lobo terminali late galeiformi usque semilunati, obtusi vel acuti usque mucronati, lobis lateralibus 4–5 utrobique, divaticatis usque subhamatis margine distali persaepe insigne sigmoidei, interlobiis affatim brevibus, conspicue involutis, petiolo ± pallide roseolo angusto vel in foliis exterioribus alato, calathiis aureis ca 3.5 cm in diametro, bracteis involucralibus exterioribus 13–18, laxe adpressis ad erecto-patentibus, ovatis usque anguste lanceolatis, stigmatibus luteo-viridibus, granis pollinum magnitudine imparibus, acheniis pallidissime stramineis, 3.2–3.8 (–4.5) mm longis, corpore in quarta usque quinta parte superiori dense squamuloso, alibi laevi, sursum in pyramidem ± angustam subcylindricam, plerumque 0.5–0.6 mm longam ± subite abeunti.

Description: Plants small to medium-sized. Leaves relatively numerous, loosely appressed to the ground or prostrate just above the ground, usually 6–15 cm long, 2–4 cm wide, ± light to deep mid-green, shiny, not spotted, ± glabrous or very sparsely aranose; leaf blade usually distinctly three-dimensional (not flat), with broadly involute interlobe and adjacent part of lobe borders, the involute part of margins distinctly dentate to lobulate, blade oblanceolate, narrowly oblanceolate, subspatulate or almost elliptic in outline, conspicuously neatly runcinate-pinnatisect, lateral segments numerous, interlobes short; terminal segment broadly helmet-shaped to semi-rounded, to 2 cm long, ca 2–3.5 cm wide, ± obtuse to acute or mucronate with a narrow lingulate mucro, distal margins convex, usually entire, proximal margins ± straight, entire or with a single broad upwards curved tooth near the interlobe; basal lobes of the terminal segment acute to obtusely acute, slightly recurved to hamate (then overlapping with the next lateral segment); lateral leaf segments (3–) 4–5 (–6) on each side, triangular to ± narrowly triangular, recurved to hamate, less often (largely outer leaves or proximal part of inner leaves) patent to subpatent, sometimes having the shape of a bird's wing, distal margin conspicuously convex, sometimes sigmoid to ± straight, entire or with a broad tooth or with a few minute teeth, apex obtuse to acuminate, rarely rounded, proximal margin concave to undulate, usually with a big broad tooth or lobule near the segment base, otherwise entire; interlobes short (lateral segments approximated), 2–7 mm long, ± broad, ± entire or with a single big tooth, rarely with some minute teeth, with distinctly involute margins, bordered brown-purple, surface otherwise not coloured; petiole 2–6 cm long (longer in inner leaves), not winged to ± winged (outer leaves), pale pinkish purple (sometimes only upper 1/3 of the petiole length) or ± deep purple; midrib pale green or in lower 1/3 suffused pinkish purple (usually bright red-purple on lower surface). Scapes ± equalling leaves, medium densely aranose to floccose-aranose below the capitulum, brownish pink below the capitulum, brown-pink after anthesis. Capitulum relatively small, ca 3.5 cm diam., deep golden yel-

low, exterior ligules ± flat, striped deep purplish grey-green outside, interior ligules narrower, canaliculate, ligule teeth black to greyish; stigmas exserted, not very dark, yellow-green with blackish pubescence on outer surface. Pollen present, pollen grains of irregular size. Involucre slightly obconical at base, dark green, indistinctly pruinose; outer involucral bracts 13–18 (–20), loosely appressed or erecto-patent distally, ± (lanceolate-) ovate to narrowly lanceolate, 6–9 mm long, the broadest ones 3.5–4 mm wide, reaching half the length of the inner ones, abaxially dark olive-green, ± pruinose, sometimes slightly darker in the middle, with an inconspicuous, very narrow (usually up to 0.1 mm wide) paler membranous border, not ciliate or sparsely so, adaxially light green, the outermost ones sometimes paler, narrowly lanceolate, remotely dentate to dentate; inner involucral bracts ± unevenly broad, sometimes coalescent. Achenes medium-sized, 3.2–3.8 (–4.5) mm long, 0.8–0.9 (–1.1) mm wide, light straw-brown, sometimes more greyish or brownish, upper 1/4–1/5 of achene body quite densely covered with minute squamules, sometimes coalescent in suberect collar-like rims, achene body otherwise ± smooth, relatively subabruptly narrowing into a ± narrow, subcylindrical cone (0.4–) 0.5–0.6 (–0.8) mm long; rostrum 4.5–8 mm long, pappus ± white to dirty white, 5.5–7.5 mm long. Agamospermous triploids (2n = 24, det. J. Štěpánek sub no. 208/82 et 209/82). – Fig. 2F, 7.

Characterized by the ovate, broad outermost bracts, a feature otherwise not found in this group. This species is probably widely distributed in the Eastern and Southern Carpathians (the Rodna Mts, Retezat Mts and Fagaras Mts, Romania). This is the only member of this group with a large geographical range and apparently under no imminent threat of extinction.

Other specimens examined: **Romania, the Munţii Rodnei Mts**, district of Bistriţa-Năsăud, ca 18.5 km SSW of Borşa town, slope S of saddle between peaks of Vf. Gropilor Mt. and Vf. Buhăescu Mare Mt., alt. 1850 m, 47° 34' 18" N, 24° 37' 32" E, 3 Jul 2003, M. Suková & M. Tůmová, cult. as JŠ 7854 (PRA, no. det. 19918, isotypes). – distr. Maramureş, ca 6 km SSW of Borşa town, NW foot of ridge of Vf. Grohotu Mt. and Vf. Piatra Albă Mt., S of Staţie Meteorologică station, alt. 1740–1800 m, 47° 36' 06" N, 24° 39' 00" E, 2 Jul 2003, M. Suková, cult. as JŠ 7860 (PRA, no. det. 19919). – Valea Vinului village, E slopes NE of Mt. Vf. Corongisu (1987 m), 5 km NNW of the village, ca 1820 m, 47° 31' 37.9" N, 24° 47' 41.0" E, 4 Jul 2000, P. Kovář & P. Havlíček (PRA, no. det. 19920, 19921). – E slopes NE of Mt. Vf. Corongisu (1987 m), 5 km NNW of Valea Vinului, 47° 31' 37.9" N, 24° 47' 41.0" E, 4 Jul 2000, P. Kovář & P. Havlíček (PRA, no. det. 19921). – Zănoaga Piatra Rea, between mounts Vf. Galaţului (2048 m) and Vf. Cailor (1922 m), ca 1650–1700 m, 12 Aug 1981, J. Štěpánek (PRA, no. det. 19922). – Between valleys of Zănoaga Galaţului and Zănoaga Păltinişului, N slopes of Mt. Vf. Galaţului (2048 m), ca 1700–1800 m, 11 Aug 1981, J. Štěpánek (PRA, no. det. 19923). – Valley N of Mt. Ripa Piatra Rea, S of Borşa, ca 1500 m, 12 Aug 1981, J. Štěpánek (PRA, no. det. 19924, 19925). – **Romania, the Retezat Mts**: locis humidis ad viam supra casam alpinam Buta, alt. ca 1700–1800 m, 1984, D. Fišerová, cultivated as JŠ 1118 (PRA, no. det. 25016) and JŠ 1119 (PRA, no. det. 25017), and also distributed as Taraxaca Exs., no. 897–898. – Romania, montes Retezat: in pascuis supra casam alpinam Cabana Buta, alt. 1600–1630 m, 1984, D. Fišerová, cultivated as JŠ 2159 (PRA, no. det. 25015). – **Romania, the Mtui. Făgăraşului**, distr. Argeş, Valea Capra, exp. SE, alt. 1850–1900 m, 9 Jul 1989, Marhold & Drăgulescu (PRA, no. det. 25014).

6. ***Taraxacum pastorum*** Štěpánek et Kirschner, **spec. nova**

Type: [Romania, the Southern Carpathians, the Fagaras Mts, slopes above Avrig Lake, towards Scura, acid bedrock] Rumunsko, Jižní Karpaty, severozápadní část pohoří Fagaraš, svah nad jezerem Avrig (2011), směrem Scura, Şerbola, Negoin, s druhotně bohatou alpinskou vegetací na kyselé hornině, ca 2100 m, 15 Jul 2002, P. Kusák, cultivated in Průhonice as JK 4874 (holotype: PRA, no. det. 25018; isotypes: PRA, no. det. 25019).

Fig. 7. – *Taraxacum elegantissimum*, the holotype (PRA, no. det. 19926).

Fig. 8. – *Taraxacum pastorum*, the holotype (PRA, no. det. 25018).

D e s c r i p t i o: Plantae mediocriter magnae, 18–25 cm altae. Folia diverse diffusa usque erecto-patentia, plerumque 8–16 cm longa, 2–4.5 cm lata, cinereo-viridia, interdum exigue cuprina, subglabra, immaculata, lamina ambitu oblanceolata, pinnatisecta, lobo terminali triangulari usque anguste triangulari, fere acutissimi margine distali undulato, aliquando ± recto, integerrimo vel subinde incisura una instructo lobulis basalibus patentissimis vel divaricatis, acuminatissimis, interdum in partem apicalem angusto-lingulatam protractentibus, margine proximali recto vel subconcavo integerrimo; lobis lateralibus 4 (–6) utrobique, oppositis vel alternis, patentissimis usque divaricatis, ± anguste triangularibus, assymmetricis (forma avium pennae), e basi lata sensim vel interdum ± subite in partem terminalem anguste triangularem – anguste elongatam, ± acutissimam coartantibus, margine distali conspicue sigmoideo, nonnumquam integerrimo sed saepius incisura arguta vel dente mediocriter magno ornato, margine proximali concavo vel undulato usque recto, integerrimo; interlobiis angustis (2.0–3.5 mm) et longis (ad 1 cm), integerrimis, non raro paulum dentatis, conspicue involutis, immaculatis, subinde piceate praetextis; nervo mediano adaxialiter pallidissime roseolo vel pallido, abaxialiter crebro conspicue roseo-violaceo; petiolo alato (in foliis externis) vel anguste alato (fol. internis), pallide roseo-violaceo, saturatius in nervo mediano. Scapi foliis subaequilongi, ad basin rosacei, in tertia parte superiore cuprinescentes, sparse – dense araneosi. Calathium (3.5–) 4.0–4.5 cm diametro, ± planum, fere aureum, involucro ad basin anguste obconico, ca 8 mm in diametro, leniter pruinoso, bracteis exterioribus parum numerosis, tantum 6–9 (–11), laxe adpressis, sub apice recurvis, postea curvate patentibus – reflexis, 7–8 mm longis (in duas partes e tribus bractearum interiorum attollientibus), (2.5–) 3.5–4.5 mm latis, ovatis usque ovato-lanceolatis (interdum usque lanceolatis), atroviridibus, margine inconspicue perbreveque (ad 0.05 mm) pallidiore membranaceo-coloratis, in parte superiore paulum ciliolatis, sub apice planis; squamis interioribus 13–14 mm longis, satis latis sed mutuo ± aequilatis, laete olivaceis, in quarta parte superiora atroviridescentibus. Ligulae marginales ± planae, extus stria subobscure violaceo-grisea ornatis denticulis apicalibus purpureo-nigris; ligulae centrales fere canaliculatae denticulis nigris vel obscure griseis. Stigmata subobscura, grisee subvirido-lutea, extus ex parte atro-pilosa. Antherae polliniferae granis pollinum magnitudine imparibus. Achenia pallide cinnamomea, 4.3–4.6 mm longa (pyr. incl.), 1–1.1 mm lata, corpore in quinta parte superiore spinulis numerosis brevibus angustis squamulisve brevibus tecto, ceterum levi, in pyramidem ± conicam 0.5–0.6 mm longam ± sensim abeunti, rostro 7–8 mm longo, pappo albido, ca 7 mm longo. – Fig. 8.

A species known from the type population in the Fagaras Mts, Romania. Its diagnostic characteristics are achenes with a pale cinnamon colour and the frequent presence of narrow, recurved, attenuate proximal leaf lateral lobes.

7. ***Taraxacum iucundum*** Štěpánek et Kirschner, **spec. nova**

T y p e: Romania, pars merid. montium Retezat, massivum Culmea Piule-Pleşa: in decl. ± orient. inter casam alpinam Buta et cacuminem montis Vf. Piule (2080 m), alt. ca 1800 m s. m., solo calc., 30 Aug 1984, R. Bělohlávková & D. Fišerová; cultivated from achenes of the plant no. JŠ 1434 at Průhonice under no. JŠ 2771, collected in 1988 (holotype: PRA, no. det. 25020; isotypes: PRA, no. det. 25021).

D e s c r i p t i o: Plantae parvae usque mediocriter magnae, plerumque 12–25 cm altae. Folia sat numerosa, 8–12 cm longa, 1.5–3.5 cm lata, diverse erecto-patentia, sparsissime araneosa (densiore in nervo mediano), laete viridia ac dilute canescentia, immaculata praeter interlobia, lamina ambitu anguste oblanceolata, spathulata vel anguste elliptica, pinnatisecta in lobum terminalem vulgo magnum, lobos laterales mediocriter magnos et interlobia breviaque angusta, lobo terminali triangulari, late triangulari vel galeiformi, ad basin leniter sagittato usque hastato, plerumque 1.0–2.5 cm longo (in foliis interioribus ad 4 cm longo), (1.0–) 2.0–2.5 cm lato, acutissimo, margine distali convexo, undulato vel sigmoideo integerrimo sed non raro 1–2 incisuris interdum quin etiam utrobique instructo, lobulis basalibus acutissimis divaricatis usque patentissimis persaepe in partem terminalem angustissime triangularem – anguste elongato-lingulatam, interdum rectinatam coartantibus, margine proximali ex solito concavo integerrimo; lobis lateralibus 3–4 utrobique, saepissime 1–2 cm longis, ad basin 0.7–1.0 cm latis, ambitu triangularibus, anguste triangularibus usque hamatis, subinde forma avium pennae, divaricatis vel rectinato-reflexis, acutissimis (parte terminali interdum perangusta subflagelliformi, margine distali leniter usque conspicue sigmoideo, integerrimo vel 1–2 incisuras ornato, margine proximali cancavo – recto, integerrimo; interlobiis (1–) 2–7 mm longis, 2–7 mm latis, ad marginem atro-violaceo maculatis, ± conspicue involutis, margine undulato intergerrimo vel dente longo angusto instructo; nervo mediano fusco-roseolo, in foliis interioribus interdum pallido. Petiolum saepissime 1.5–2.0 cm longum, in foliis exterioribus late alatum, in iis interioribus anguste alatum, pallide viride, in nervo mediano nonnumquam laete purpuratum. Scapi foliis fere longiores, ± dense araneosi usque floccosi, glabrescentes, verisimiliter pallidi (etiam post anthesin?).

Calathium validum ca 4.5–5.0 cm diametro, fere planum, an aureum, involucro ad basin ± truncato, ca 9 mm diametro, squamis exterioribus creberrime 15–19, ad basin adpressis, sursum diverse recurvis, lanceolatis usque ovato-lanceolatis infimis saepe anguste lanceolatis, non raro in parte terminali breve lingulata angustaque conangustantibus, 8–9 mm longis, 2.5–3.5 mm latis, atro-viridibus, inconspicue pallide marginatis, ex parte breve ciliolatis, sub apice planis, squamis interioribus ca 14 mm longis, laete viridibus, saepe inaequilatis. Ligulae marginales ± planae extus stria griseo-olivacea denticulisve apicalibus atribus ornatae, eae centrales denticulis apicalibus griseis vel nigris. Stigmata mediocriter obscura, griseo-viridia, extus pilis de dimidia parte nigris tecta. Antherae valde polliniferae, granis pollinum magnitudine non conspicue variabilibus. Achenia pallide rufo-spadicea, 4.8–5.1 mm longa (pyr. incl.), 1.1–1.3 mm lata, corpore in tertia – quarta parte superiore sat dense squamulis latis usque cristiformibus circumtecto, deorsum tuberculato usque levi, sursum in pyramiden subconicam vel subcylindricam 0.5–0.7 mm longam subite abeunti, rostro 8–9 mm longo, pappo albo, 7–8 mm longo. – Fig. 9.

Taraxacum iucundum is characterized by numerous outer bracts and densely arachnoid scapes. The achene colour, light reddish to light reddish brown, is diagnostic in this group. *Taraxacum iucundum* is confined to the Retezat Mts, Romania, and as a geographically restricted endemic it's habitat and/or population should be protected.

Other specimens examined: **Romania**, the southern Retezat, massif of Culmea Piule-Pleşa: eastern slopes between Buta Chalet and the summit of Mt. Vf. Piule (2080 m), ca 1800 m s. m., limestone, 30 Aug 1984, R. Bělohlávková & D. Fišerová, cult. as JŠ 1434 (PRA, no. det. 25022).

8. ***Taraxacum pseudoalpestre*** Štěpánek et Kirschner, **spec. nova**

Type: [Romania, the Southern Carpathians, NE part of the Fagaras Mts, slopes above Avrig Lake, towards Scura, acid bedrock] Rumunsko, Jižní Karpaty, severozápadní část pohoří Fagaraš, svah nad jezerem Avrig (2011), směrem Scura, Şerbola, Negoin, s druhotně bohatou alpinskou vegetací na kyselé hornině, ca 2100 m, 15 Jul 2002, P. Kusák, cultivated at Průhonice as JK 4874 (holotype: PRA, no. det. 25023; isotypes: PRA, no. det. 25024).

Descriptio: Plantae parvae usque mediocriter magnae, plerumque 10–18 cm altae. Folia numerosa, diverse erecto-patentia, saepissime 7–11 cm longa et 2–3 cm lata, laete prasina, subglabra (solum in nervo mediano sparse araneosa), immaculata, lamina ambitu oblanceolata vel anguste oblanceolata, runcinato-pinnatisecta, quadammodo perplexe divisa, lobo terminali valido triangulari, galeiformi usque ovato, acuto – obtuse acuto, ad basin fere sagittato, 1.5–4.0 cm longo, 2–3 cm lato, margine distali ± recto usque insigne convexo, plerumque leniter undulato integerrimo vel rariter incisura vel dente lato assymmetrice (in una parte) praedito, lobulis basalibus aliquando (in foliis senioribus = „exterioribus") subdivaricatis usque patentissimis, sed vulgo reflexe recurvis, ± acuminatissimis, margine proximali ± conspicue concavo usque ± recto, exigue undulato, ut solet integerrimo vel prope basin uno dente ornato; lobis lateralibus 3–4 (5) utrimque, minoribus, ± anguste triangularibus, divaricatis vel saepe recurvis vel forma pennae tinnunculi, acutissime usque obtuse acuminatis, margine distali ± conspicue convexo – sigmoideo, integerrimo vel praecipue in lobulis inferioribus dente usque dentibus paucis minoribus praedito, margine proximali concavo usque ± recto, saepissime integerrimo; interlobiis sat longis (5–12 mm), angustis usque ± latis (2–7 mm), inconspicue hepatice coloratis, margine ex parte involuto dentibus lobulisve diverse magnis ornato; nervo medio pallido. Petiolus pallidus vel ad marginem ex parte rubescens, foliorum exteriorum mediocriter usque late alatus eorum interiorum angustus vel anguste alatus. Scapi sub anthesi foliis subaequilongi, sparse araneosi, glabrescentes, pallide virides, post anthesin in quarta parte superiora laete rosacei. Calathium ca 4 cm diametro, involucro ad basin late obconico, ca 7 mm diametro, non pruinoso, bracteis exterioribus numero 15–22, ad basin laxe adpressis, sursum arcuato patentibus, lanceolatis usque lineari lanceolatis, 6–7 mm longis, in tertiam – dimidiam partem bractearum interiorum erigientibus, 2–3 mm latis, in quarta parte inferiora latissimis, in apicem longam angustamque protractis, prope atro-viridibus, in quarta parte superiora interdum fusco-purpuratis, margine pallidiore perangusto paene indistincto, paulum ciliolato, sub apice plano, bracteis interioribus 13–14 mm longis, laete olivaceis, mutuo subaequilatis. Ligulae marginales angustae, subcanaliculatae, extus stria ± perpallide violaceo-grisea translucente ornatae dentibus apicalibus atris, eae centrales conspicue canaliculatae dentibus etiam atris. Stigmata pallida, lutea usque viridantia, extus pallide pilosa vel pilis obscuris exigue armatia. Antherae polliniferae granis pollinum diametro imparibus. Achenia perpallida, albide fusco-straminea, 4.3–4.8 mm longa (pyr. incl.), 1.1–1.3 mm lata, corpore in sexta parte superiora vel tantum ad ipsum verticem breve spinuloso squamulosoque, deorsum levi, interdum per tota superficie glabro, in pyramiden conicam 0.5–0.6 mm longam ± subite abeunti, rostro 7–8 mm longo, pappo albo, 5–6 mm longo. – Fig. 10.

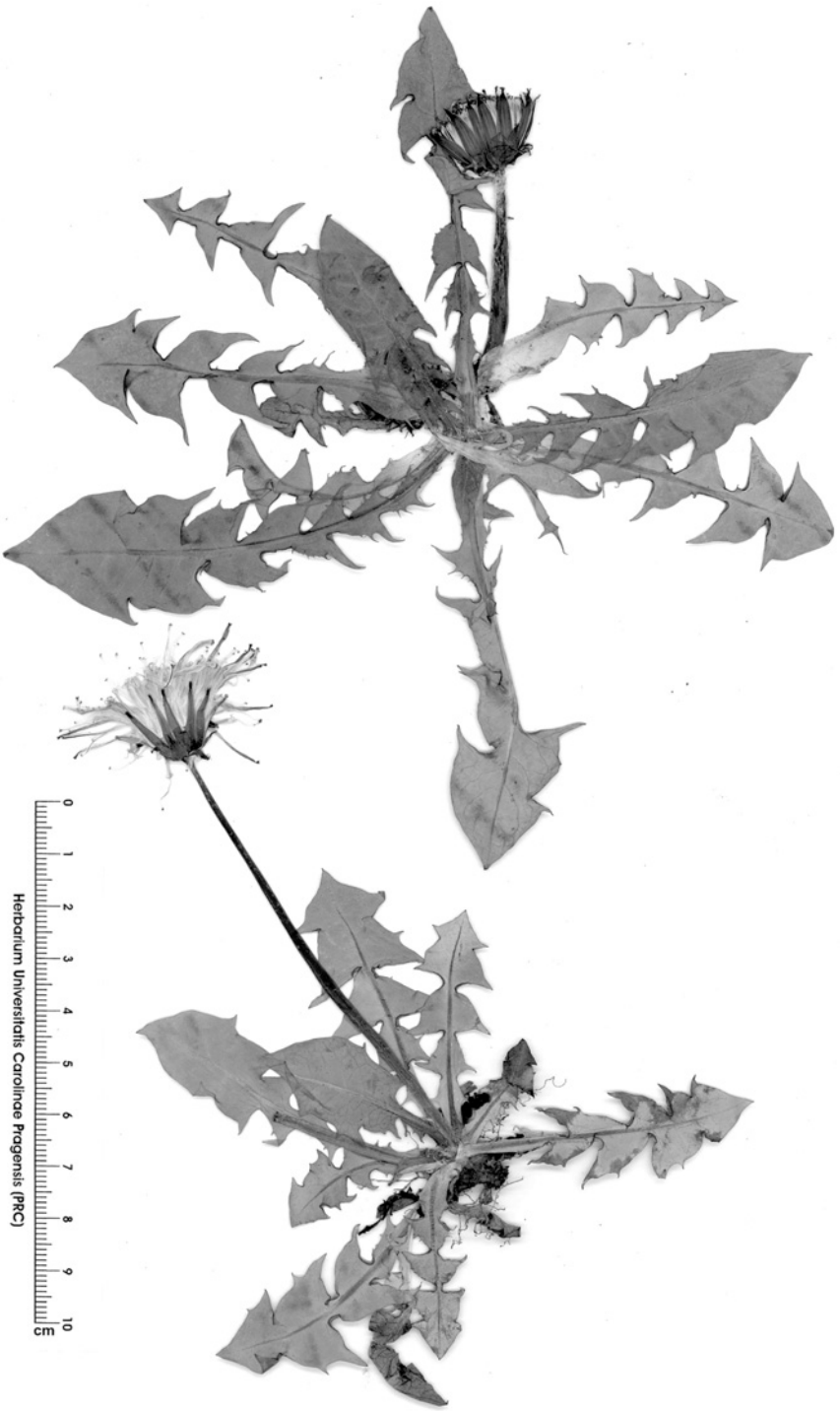

Fig. 9. – *Taraxacum iucundum*, the holotype (PRA, no. det. 25020).

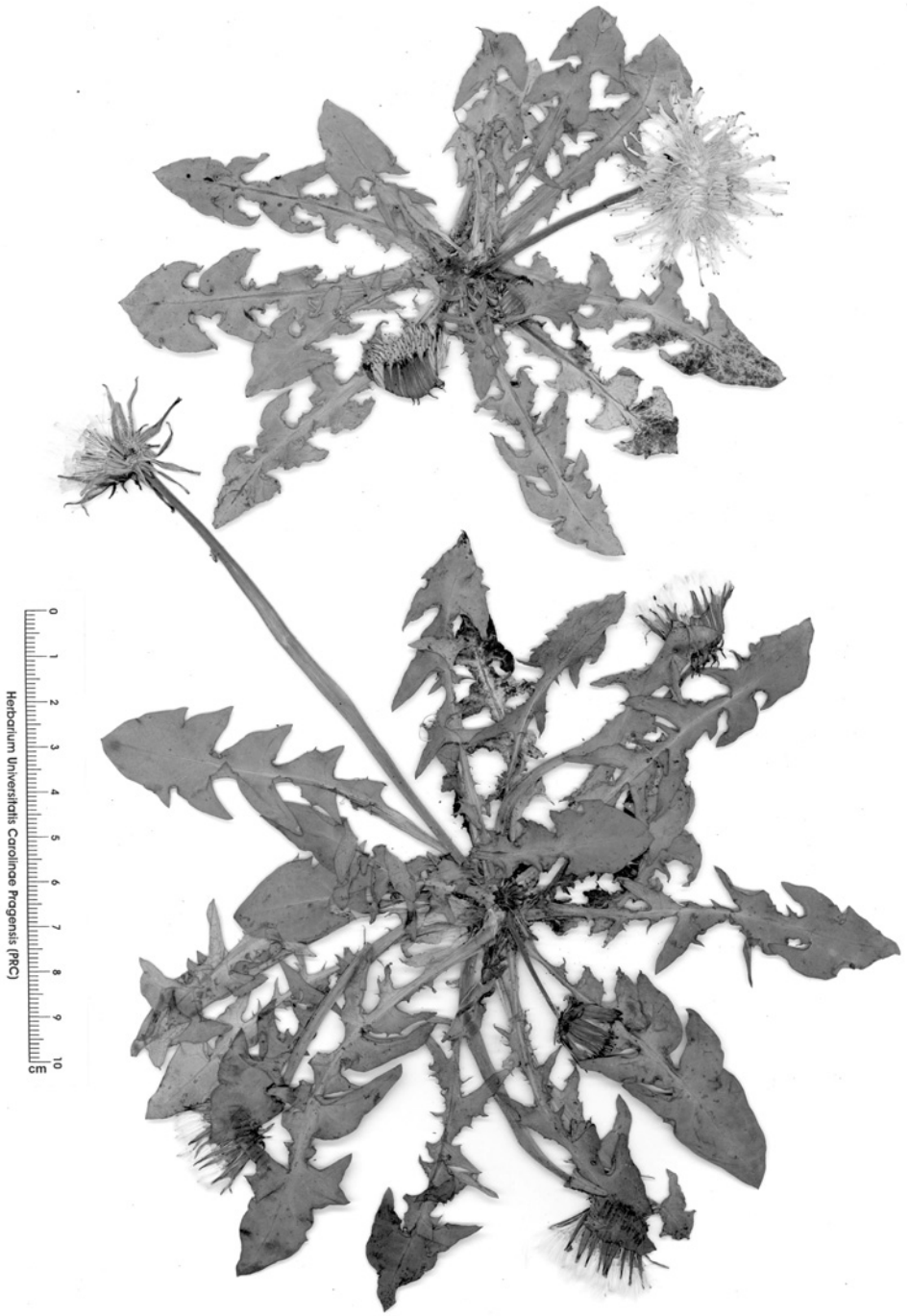

Fig. 10. – *Taraxacum pseudoalpestre*, the holotype (PRA, no. det. 25023).

Taraxacum pseudoalpestre is characterized by very pale, whitish stramineous achenes with a thick body, by pale stigmas, long attenuate outer bracts and runcinate, irregularly pinnatisect leaves. It is known from the type locality; available material indicates it is confined to the Fagaras Mts, Romania.

Other specimens examined: **Romania,** Judeţ Sibiu, Munţii Făgăraş, mountain pass N of Bâlea Lake, 1947 m. 23 Jun 2008, T. Gregor, L. Meierott & A. Peukert, no. TG 4444 (FR, no. det. 23727).

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Souhrn

Předmětem práce je taxonomické srovnání, typifikace a vyjasnění vztahů dlouho spojovaných jmen *Taraxacum nigricans* (Kit.) Reichenb. a *T. alpestre* (Tausch) DC. Údaje získané pomocí analýzy karyotypů, isozymové analýzy a podrobného srovnání morfologie rostlin z oblastí, odkud tato jména pocházejí, umožňují přesvědčivě doložit, že tato dvě jména představují podobné, pravděpodobně blízce příbuzné, ale dobře odlišené samostatné druhy. *Taraxacum nigricans* (2n = 32) je zřejmě endemitem Nízkých Tater, zatímco *T. alpestre* (2n = 32) je omezeno na vrcholové partie Krkonoš. Tyto dva druhy, spolu s dalšími karpatskými endemity tvoří samostatnou skupinu v rámci *T.* sect. *Alpestria* (Soest) Soest. Podrobná analýza kultivovaného a dalšího herbářového materiálu podobných rostlin z východních a jižních rumunských Karpat umožnila objevit a charakterizovat další příbuzné druhy z této skupiny. Zejména je to sexuálně se rozmnožující endemit Bucegi a Piatra Craiului v Rumunsku, velmi podobný těmto dvěma druhům, *T. carpaticum* Štěpánek et Kirschner. Dva další nové druhy podobné *T. nigricans* jsou popsány z Karpat: *T. rupicaprae* Štěpánek et Kirschner, charakterizovaný okrově světle oranžovými nažkami a omezený na Vysoké Tatry a *T. elegantissimum* Štěpánek et Kirschner (2n = 24), s nápadně širšími vnějšími zákrovními listeny, vyskytující s v rumunských pohořích Rodna, Retezat a Fagaraš. Další tři, poněkud méně známé druhy jsou popsány z blízkosti *T. carpaticum*, všechny známé pouze z Rumunska: *T. pastorum* (Fagaras), *T. iucundum* (Retezat) a *T. pseudoalpestre* (Fagaras).

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