



A distinctive group of species allied to *Taraxacum danubium* (*T. sect. Erythrosperma*, Compositae-Crepidinae): a taxonomic revision

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Abstract Within *Taraxacum* section *Erythrosperma*, several relatively distinct species groups are recognized. One of them, characterized by leaves with numerous, usually patent, very narrow lateral segments, frequently with their most distal part dilated, and outer phyllaries patent or arcuate-recurved, often with tips approaching the involucre base, with narrow whitish borders, includes species similar to the Central European *Taraxacum danubium*. This group comprises nine species, the majority of them (five species) being confined to the Balkan Peninsula. Another diversity centre of the group is the southernmost Ukraine. The most widespread species is *T. persicum*, extending from Iran and the lower river Volga to Central Europe. A detailed taxonomic revision of the whole group is presented, and descriptions, illustrations and lists of specimens studied are given. Two Balkanic species are newly described, the name *T. danubium* is lectotypified, another three names are relegated to the synonymy of the accepted names, and an unclear name, *T. pineticola*, is discussed. The species concept in *Taraxacum* is briefly expounded.

Keywords Taxonomy · *Taraxacum* sect. *Erythrosperma* · Central Europe · Balkan Peninsula · Ukraine

Introduction

Taraxacum sect. *Erythrosperma* (H. Lindb.) Dahlstedt (1921) ranks among the most diverse sections in this complicated genus. More than 215 accepted names (and about 40 synonyms) are reported to belong to this section, and, in almost whole of its European and Near Eastern distribution range, its species diversity varies between ten and twenty species per medium-sized region (Štěpánek and Kirschner 2012).

The diagnostic characters of *T. sect. Erythrosperma* include low growth, usually a well developed tunic of dry remnants of old petioles, deeply divided leaves, often with narrow lateral segments, involucre with outer phyllaries patent, usually arcuate-recurved or arcuate-reflexed, sometimes subappressed or erect, short, linear-lanceolate, lanceolate to ovate-lanceolate, usually with narrow, inconspicuous borders, sometimes borders more distinct but always narrow, phyllary apex usually minutely corniculate, and achenes usually 3.2–4.0 (–4.5) mm long, of various colourations, most often reddish, brown and combinations of the two colours (but frequently also variously fulvous or light greyish stramineous-brown), body densely spinulose above, most often subabruptly but

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also subgradually to \pm abruptly narrowing into usually cylindrical cone most often 0.6–1.5 mm long.

Taraxacum sect. *Erythrosperma* is related to *T. sect. Erythrocarpa* Handel-Mazzetti (Kirschner et al. 2015; Kirschner and Štěpánek 2022b), and, on the basis of a relative similarity, also to *T. sect. Dissecta* van Soest, *T. sect. Obliqua* Dahlst., and more remotely to *T. sect. Suavia* Kirschner & Štěpánek (see also a comparison in Kirschner and Štěpánek 2022a). In terms of morphology, the latter section is easily distinguished by the almost orbicular to broadly ovate outer phyllaries and bigger fruits. The section *Erythrocarpa*, on average, has longer fruits (longer than 4.5 mm, often over 5 mm), more robust growth and longer, often appressed outer phyllaries with broader and/or more distinct paler borders. *Taraxacum* sect. *Dissecta* is very similar, but most species have much broader pale border to the outer phyllaries of a broader shape (most often broadly ovate to ovate-lanceolate), achene cones are usually more conical and shorter. The section *Obliqua* was extended recently to cover both the original couple of species (*T. obliquum* and *T. platyglossum*) and plants of the *T. pyrenaicum* group (all names and their authors follow Kirschner et al. 2008), and their most conspicuous structural difference is the growth in lax cushions (multiple root heads with a leaf rosette each); this group, nevertheless, awaits a revision. As regards the species of *T. sect. Erythrosperma* occurring in north-central and Northern Europe, there is an extremely helpful handbook with descriptions and a detailed photographic documentation of high quality (Wendt and Øllgaard 2015), covering more than 50 species.

In addition to the similar sections, there are also several species morphologically intermediate between sections, probably of hybridogenous intersectional origin. The group of *T. langeanum* Dahlst. represents a link between *T. sect. Erythrosperma* and *T. sect. Palustria* (Lindb. fil.) Dahlst., and *T. lacistophylloides* Dahlst. is intermediate between *T. sect. Taraxacum* and *T. sect. Erythrosperma*.

To understand the methods of the present taxonomic revision, it is useful to summarize the current state of knowledge of *T. sect. Erythrosperma*, and the level of exploration of major regions within its distribution range. There are substantial differences among regions in this respect. The most profoundly explored area is Scandinavia and Northwestern Europe, including the Baltic Countries, the United

Kingdom, the Netherlands and Belgium, and adjacent territories of Central Europe, mainly Germany, Switzerland, Poland, Slovakia and Czechia. The rest of the geographical range has been examined much less thoroughly, although there are areas covered by several important studies, mainly in the Mediterranean (Greece, Bulgaria, Corsica). Most of the eastern and southeastern regions are quite underexplored in this respect (European Russia, Ukraine, Turkey, Iran).

In general, the taxonomic knowledge of *T. sect. Erythrosperma* is similar to the situation in other, less complicated plant groups in the middle of the 19th century – names published in local floras are evaluated in revisions, with frequent synonymizations, a picture of interspecific relationships is being drawn, and basic features of species' geographical and ecological ranges are established.

The concept of species in *Taraxacum*

There are several major phenomena and processes controlling the variation patterns encountered in *Taraxacum* (primarily, they are coexistence of agamospermy and sexuality, fixed hybridity, and polyploidy associated with asexual reproduction). They operate both generally, at the level of taxonomic entities, and in a spatially specific manner.

The main consequence of varied modes of reproduction and variation patterns (Table 1) is that *Taraxacum* species are remarkably different when their population heterozygosity and genotype diversity are considered (after Richards 1997; Hughes and Richards 1988: 170):

Table 1 Impact of reproduction system on population features in *Taraxacum*

Reproduction	Heterozygosity	Genotype diversity
allogamous sexual	Hardy–Weinberg equilibrium	very high ²
autogamous sexual	very low	low to moderate ^{1,3}
agamospermous	very high, fixed	very low ⁴

¹ strongly depending on the population and migration histories

² in *Taraxacum*, see e.g. Zeisek et al. (2015), Kirschner et al. (2013)

³ in *Taraxacum*, see e.g. Zeisek et al. (2015), Kirschner et al. (1994), Hughes and Richards (1988, 1989)

⁴ in *Taraxacum*, see e.g. Kirschner et al. (2013, 2016); in van der Hulst et al. (2003) it is shown that a local mixture of agamospermous species ('population') exhibits a high genotype variation, relationships between diploid and triploid taxa were studied by Šuvada et al. (2012)

The three reproduction systems above roughly correspond to the ‘types’ of species. Other factors to be considered are (a) history of the population structure, (b) spatial and phylogenetic proximity of sexual and agamosperous entities, and (c) ecological differentiation among species (and sections). On this basis, we recognize allogamous, variable sexual species, such as *T. erythrospermum* Bess. s. str. or *T. serotinum* (W. & K.) Fisch., or distinctive autogamous species, such as *T. besarabicum* (Hornem.) Hand.-Mazz. or *T. aristum* Markl., or diplosporous agamosperous species (the absolute majority of polyploids in *Taraxacum*).

In *Taraxacum*, moreover, a background for the taxonomic evaluation of the above phenomena is formed by a low level of structural differentiation (in terms of morphology) and a relatively high number of entities to be considered, all of which makes the *Taraxacum* study rather complicated.

As regards the group of *T. danubium* A. J. Rich., we deal with nine, exclusively agamosperous entities treated as species. It is a noteworthy fact that *T. danubium* itself frequently coexists with diploid sexual populations of *T. erythrospermum* s. str. without losing its identity as no hybrids were observed.

Concept of *Taraxacum* species groups

Agamosperous taxa within a section are not evenly or randomly distributed in the multidimensional network based on their character states. They are apparently clustered in species groups, not always equally distinctive but usually recognizable on the basis of a certain character combination; the most conspicuous groups are recognized, although not formally, as aggregates. These aggregates serve as a practical tool for the taxonomic evaluation of populations studied and for setting up hypotheses of mutual relatedness of agamosperous taxa.

A more profound knowledge of *T. sect. Erythrosperma* makes it possible to revise whole species groups, a concept used in Štěpánek and Kirschner (2012) for the *T. purpureomarginatum* group and the *T. rubicundum* group.

One of the relatively distinct species groups of *T. sect. Erythrosperma* is the *T. danubium* group. It comprises species morphologically close to *T. danubium* A. J. Rich. distributed predominantly in

Southeastern and Central Europe. During our studies of *T. sect. Erythrosperma* we also exploited our material from expeditions to other parts of Southeastern Europe, and results of these studies are summarized in the present taxonomic paper.

Material and methods

The methods of microspecies recognition are outlined in Kirschner et al. (2016, 2020). The methods of cultivation are described in Kirschner and Štěpánek (1993) and Kirschner et al. (2020). Approaches to the identification of modes of reproduction in dandelions are given in Kirschner et al. (2006, 2020). Morphological terms follow Ge et al. (2011); achene measurements include the cone. The term ‘tunic’ is used for a collar of dry remnants of old petioles on root head at plant base. The leaf and capitulum characters are recorded at full anthesis. Only features of ripe fruits are included in the descriptions (unripe achenes may differ in paler colour, less conspicuously developed spinulosity, shorter achene body length and beak length, etc.).

The present study is based upon field studies in Central Europe, Bulgaria and Ukraine. Further material was kindly provided by B. Kuzmanov, C. E. Sonck, I. Uhlemann and R. and E. Willing, partly also cultivated at the Experimental Garden of Institute of Botany, Czech Academy of Sciences. Voucher specimens are deposited at PRA (herbarium codes according to the *Index Herbariorum* (Thiers 2014+). Relevant herbarium specimens were studied in B, BRA, BRNM, BRNU, CB, G, H, HR, JE, K, L, LE, LIT, MMI, MP, OL, OXF, PL, PR, PRA, PRC, ROZ, S, SOB, W, WRSL, WU, Z, ZT, and from private collections of K. Boublík, K. Devánová, J. Douda, M. Dudáš, V. Chán, W. Gutermann, E. Hörandl, J. W. Jongepier, Z. Kaplan, M. Král, J. Kučera, P. Lepší, J. Malíček, B. Mandák, M. Marek, R. Paulič, V. Řezáč, M. Soukup, M. Štech, I. Uhlemann, J. Zámečník and V. Žíla.

Figures were drawn by J. Štěpánek.

The conservation status of individual taxa is estimated according to the IUCN methodology and terminology (Anonymous 2012).

Results

A taxonomic summary

The *Taraxacum danubium* group includes nine agamosperous species. Two of them (*T. kuzmanovii* and *T. honestum*) are newly described. Another three names are relegated in synonymy of the accepted names. A single name belonging to this group, *T. pineticola*, remains without taxonomic interpretation because to inadequate material.

The majority of species recognized are known from the Balkan Peninsula (six species), with the highest diversity in Greece and Bulgaria (four species each), and two species are known from Crimea, Ukraine. *Taraxacum danubium* s. str. is confined to six countries of Central Europe (from southern Poland to northern Austria and northern Hungary), and a single species' (*T. persicum*) range extends from Iran and the Lower Volga region, Russia, to Central Europe.

The circumscription of the *T. danubium* group

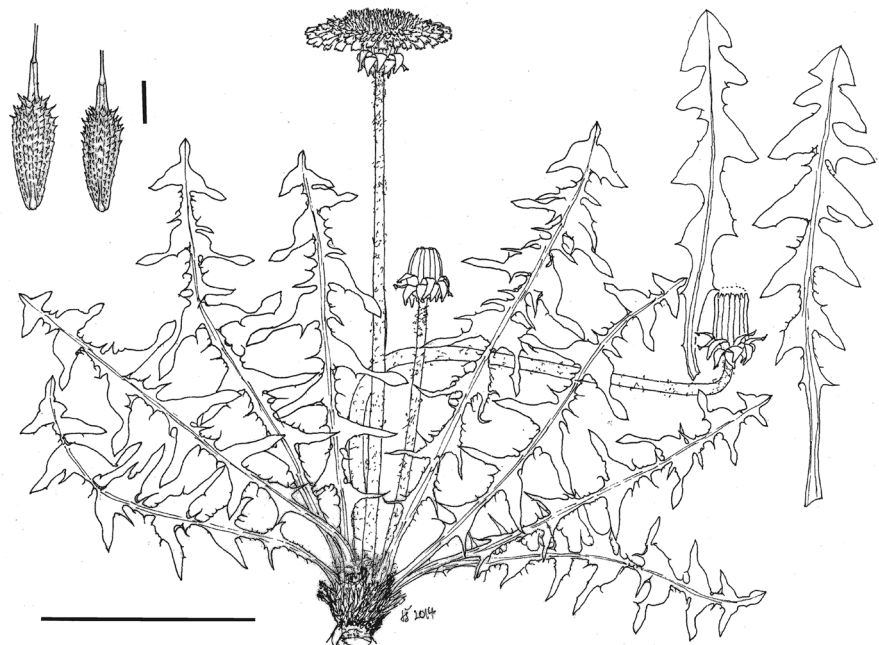
The best idea of the general appearance and other features can be developed on the basis of the illustrations (Fig. 1, 3–5, 7). It should be emphasized that a group

of agamosperous species is largely an artificial concept, mainly based on mutual similarity. Morphological characters shared by the members of this group can be briefly summarized as follows:

Plants small to medium-sized, relatively sparsely hairy, leaves deep to \pm dark green, not spotted, rarely with little spots, \pm regularly divided into numerous lateral segments, quite frequently with their most distal part dilated, interlobes short, usually not blotched, capitula \pm small to medium-sized, stigmas discoloured, pollen absent or present, with grains variable in size, involucre dark green, outer phyllaries patent, arcuate-patent to arcuate-recurved, often with tips approaching the involucre base, relatively short, with a narrow, \pm distinct pale or whitish border, corniculate near apex, inner phyllaries \pm short, not elongating later, achenes red-brown to dark brown, with a dense spinulosity above, spinules \pm erect-patent to suberect, achene body subabruptly to gradually narrowing into \pm cylindrical cone 0.6–1.2 (–1.5) mm long. – Agamosperms (only triploids are known).

There are two (similarly artificial) groups that may be comparable with that of *T. danubium*. First, it is the *T. lacistophyllum* group of northwestern and Northern Europe; leaves of its members are often \pm similar to those of *T. danubium*, but outer phyllaries are of a broader shape and usually loosely appressed to

Fig. 1 *Taraxacum danubium*. General habit (scale bar = 5 cm) and achenes (scale bar = 1 mm)



erect-patent at base and often arcuate distally (Wendt and Øllgaard 2015). Another group resembling that of *T. danubium* is the *T. scanicum* group (Vašut 2003; Vašut et al. 2005; Ge et al. 2011). Members of the latter group are characterized by an elongated, conspicuous leaf terminal segment, usually filiform-dentate or even narrowly lobulate at least at the base, and the outer phyllaries are ± irregularly patent-recurved to arcuate-patent. Further groups to be considered are the *T. rubicundum* group (see Štěpánek and Kirschner 2012) and the group of species similar to *T. divinum* Sonck and *T. gracilens* Dahlst., the latter differing primarily in the lower number of suberect to erect-patent outer phyllaries.

Identification key to the members of the *T. danubium* group

A note on the method of identification Only well developed plants, both in flower and with ripe achenes, are suitable for identification. Preferably, several specimens should be evaluated to cover the variation and plasticity ranges of each species.

- 1 Pollen absent2
- Pollen present4
- 2 Capitulum (fully opened) concave, 1.5–2 cm wide9. ***T. honestum***
- Capitulum (fully opened) flat to subconvex, at least 2.5 cm wide..... 3
- 3 Outer phyllaries with a white border 0.2–0.3 mm wide; stigmas light to medium dark discoloured; achenes dark red-brown to brown-red, 3.8–4.7 mm long, achene body very gradually narrowing into thin cylindrical cone 1.1–1.5 mm long 5. ***T. zivaschum***
- Outer phyllaries with a whitish border 0.1–0.2 mm wide; stigmas dark discoloured; achenes dark red-brown, dark purplish brown or pure dark brown, 3.1–4.1 mm long, achene body subabruptly narrowing into subcylindrical (i.e. conical at base) cone 0.7–1.1 mm long..... 3. ***T. persicum***
- 4 Leaf lateral segments abruptly narrowed near apex, obtusely acute to rounded at apex or with a lingulate, usually dilated most distal part..... 5
- Leaf lateral segments gradually narrowing, usually acute to acuminate..... 9
- 5 Achenes 3.3–3.9 mm long..... 6
- Achenes 4.0–4.7 mm long..... 8

- 6 Outer phyllaries suffused deep purple; achenes pale brown..... 10. ***T. annetteae***
- Outer phyllaries variously green, rarely suffused pale purplish; achenes dark brown or variously red-brown..... 7
- 7 Achenes deep dark red-brown, dark castaneous brown to dark purple-brown 1. ***T. danubium***
- Achenes medium dark brown, often with a rusty hue..... 7. ***T. epirensae***
- 8 Leaf lateral lobes abruptly narrowed distally or drop-shape dilated..... 6. ***T. lingulilobum***
- Leaf lateral lobes distally with a conspicuous triangular or rhombic appendage..... 2. ***T. kuzmanovii***
- 9 Outer phyllaries with an inconspicuous, greenish or reddish-purplish border to 0.1 mm wide; achenes medium dark red-brown or reddish brown; pappus 6–7 mm long..... 4. ***T. egnatiaae***
- Outer phyllaries with a distinct whitish border 0.1–0.2 mm wide; achenes purplish dark red-brown or dark brown; pappus 4–5(–6) mm long... 3. ***T. persicum***

1. ***Taraxacum danubium*** A. J. Richards, Acta. Fac. Rerum. Nat. Univ. Comen. 18: 108. 1970; *Taraxacum austriacum* var. *danubium* (A. J. Richards) R. Doll, Feddes Repert. 84: 21. 1973.

Type indication ‘Holotypus: Devínska Kobyla, near Bratislava, Slovakia. 1. 5. 1968. A. J. Richards.’
– Holotype: Not extant (see the note below).

See also Doll, Feddes Repert. 84: 21. 1973, apud *T. austriacum* var. *danubium*.

Type ‘Slovakia occidentalis. Δ Soroš ad oppidum Hlohovec, in xerophyticis *Fest. vales.*, solo calcareo.’, 2 May 1968, A. J. Richards & J. Májovský (OXF 54692, no. det. 11987, **lectotype, designated here**; isolectotypes: SLO, no. det. 28816 & 28818).

Exsiccates: *Taraxaca* Exs., numbers 400–404 and 1050 (for introductory notes on the exsiccate series, see Kirschner and Štěpánek 1992).

Etymology Derived from the ancient Roman name of the Danube, *Danubius* or *Danuvius*.

Note on the typification The holotype designated by Richards (1970: 108) was reported to come from the Devínska Kobyla, a hill above the Danube in the

vicinity of Bratislava, Slovakia. We studied the herbarium material in OXF and SLO (and other collections, including the personal collection of A. J. Richards, now deposited in NMW), and there is not any specimen from that locality under the name of *T. danubium*. We concluded that the original holotype is not extant. We therefore studied the protologue and the herbarium collections to find elements of the original material of this name, eligible for lectotypification. There is no direct protologue citation of a herbarium specimen other than the original holotype itself. However, several plants of *T. danubium* are mentioned in the text, from the Kováčovské kopce, from the Soroš Hill near Hlohovec, from Chotin, and from the Devínska Kobyla, all Slovakia ($2n = 24$ is recorded by Richards from three localities). There are three specimens, elements of the original material, eligible for the typification, all from the Soroš [Hill] near Hlohovec, collected by A. J. Richards and J. Májovský on 2 May 1968, and all with labels written by the latter collector. The specimen deposited in OXF was annotated by A. J. Richards as '*Taraxacum danubium* A. J. Richards, holotype'. We therefore select the OXF specimen as the lectotype above, and the remaining two specimens (SLO) become isolectotypes.

Description Plants small to medium-sized, up to 15 (–20) cm tall. Plant base with dense brownish hairs; tunic developed. Leaves patent to erect-patent, sparsely arachnoid to glabrescent, slightly greyish green, leaf blade oblong-elliptical in outline, 3–12 (–20) \times 1.5–3 (–4) cm, pinnatisect, with distinct teeth and lobules on interlobes, terminal segment relatively small, ca 1 cm long, in outer leaves helmet-shaped to \pm triangular, sometimes distinctly trilobed, apex \pm rounded, in inner leaves mucronate, mucro oblong to lingulate, slightly narrowed at the base, distal margin convex, sigmoid to concave, entire, proximal margin concave, entire; lateral segments (3) 4 (6) pairs, small, usually 0.7–2.0 \times 0.5–1.0 cm, moderately recurved to patent, triangular or narrowly so, sometimes hamate, obtusely acute to rounded, with an abruptly dilated (drop-shaped) tip, with distal margin distinctly concave, entire, less often with minute teeth, proximal margin concave to straight, entire or with a single conspicuous tooth; interlobes usually short and entire, in inner leaves to 1.5 cm long, often with \pm sparse long teeth, bordered dark; midvein pale green, in proximal 1/4 brownish pink; petiole narrow to very narrowly winged, usually pinkish to reddish purple. Scapes arachnoid, later only below capitulum and at base, light brownish pink to purplish pink

at base. Capitulum small, to 2.5–3 cm wide, distinctly convex, deep yellow. Outer phyllaries 9–14 (18), narrowly lanceolate to ovate-lanceolate, 6–8 \times 2–4 mm, \pm regularly arcuate-recurved to subreflexed with tips close to involucre base, adaxially slightly glaucous-green, rarely reddish, with a very narrow whitish, not very distinct border to 0.1 mm wide, abaxially dark bluish green, minutely corniculate near apex. Outer ligules flat, striped reddish to purplish grey-brown outside. Pollen abundant, irregular in size. Style long, stigmas exerted, discoloured, dark yellow-green to greyish green, with blackish pubescence outside, stigmas blackish when dry. Achenes deep dark red-brown, dark castaneous brown to deep purple-brown, relatively short and thick, (3.0–) 3.3–3.8 \times 0.8–1.0 mm, body medium densely to densely spinulose in upper 1/2–1/3, spinules erect-patent, acute, to 0.3 mm long, \pm abruptly narrowing into a narrow, cylindrical to subcylindrical cone (0.6–) 0.9–1.0 mm long, sometimes with 1(2) spinules at the base; beak (7–) 8–9.5 mm; pappus white to whitish, (5–) 5.5–6 mm long. – Fig. 1. – Agamosperm (the reproduction analysed by Richards 1970: 88). – $2n = 24$ (Richards 1970: 85–87, material from Slovakia; Trávníček et al. 2010, material from southern Moravia, Czech Republic). The diplospory in *T. danubium* was definitely proven by Vašut et al. (2014) by means of FISH including the DIP locus region.

Diagnostic notes Within the *T. danubium* group, this species could be confused with *T. persicum* only (because it is the only species of this group with the geographical range overlapping that of *T. danubium*). Central European *T. persicum*, however, lacks pollen (while pollen in *T. danubium* is abundantly developed). Moreover, *T. persicum* has narrower and more distinctly spinulose achenes, and more acute leaf lateral segments. The other members of this group are not sympatric with *T. danubium*, and the differences are summarized in the key above. In its general habit, *T. danubium* resembles certain populations of *T. erythrospermum* from Hungary, but the latter have shorter, less arcuate outer phyllaries, pollen grains of regular size, and a diploid chromosome number. *Taraxacum arcuatum* is another species that might be confused with *T. danubium*, but the shorter, erect-patent to suberect-arcuate outer phyllaries, paler stigmas and smaller achenes with a short cone are diagnostic for *T. arcuatum*. Leaf lateral segments with narrowed, linear middle part and the dilated apical part are also observed in *T. lacistophylloides*; the latter has

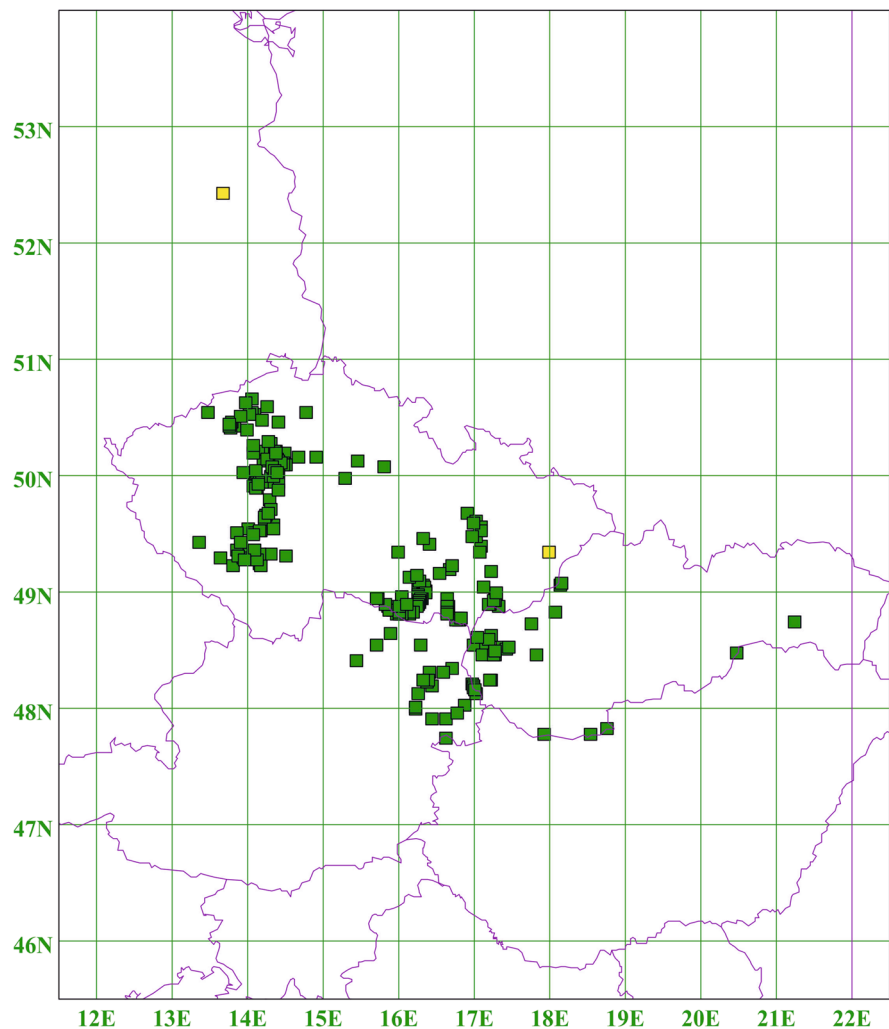
conspicuously hairy leaves and light greyish stramineous-brown achenes.

Distribution and habitat *Taraxacum danubium*, as a morphologically distinctive taxon, was recorded in several important works (Dudáš et al. 2020; Wolanin and Musiał 2018; Trávníček et al. 2010; Vašut 2003) and its overall distribution is relatively well explored, with almost 300 localities known. It is confined to Central Europe, and specimens or reliable records come from northeastern Austria, northern Hungary, most of western and southern Slovakia and southern Poland, and there is a remote locality in Berlin, probably of secondary origin (Uhlemann 2003); the most frequent occurrence of *T. danubium* is recorded in the Czechia, which not necessarily must be a bias due to the most thorough exploration (Map: Fig. 2).

Taraxacum danubium grows on both calcareous and acid substrates; it is most frequently found in open dry grasslands, along paths and forest margins and clearings in open deciduous woodlands, dry, sandy sites in villages, rocky slopes, often also in old quarries and on castle hills. It is most often found in hilly landscapes, at low or moderate elevations, usually between (130–) 200 and 700 m a. s. l., with a maximum of 920 m recorded in Slovakia (Dudáš et al. 2020). Its IUCN conservation status is estimated as LC, because of the number of localities known, the size of the distribution range, possibility of secondary habitats and the protected status of a number of natural localities.

A selection of representative specimens [A more complete list of specimens studied is given in the

Fig. 2 Distribution of *Taraxacum danubium* in Central Europe



Appendix, see also the map (Fig. 2).]: **CZECH REPUBLIC.** Louny, Chraberce, Srdov hill, 50° 25' 02.7" N, 13° 49' 15.2" E, 12 May 2001, V. Žíla (PR, no. det. 28952). – Mělník, Zeměchy, 210 m, 15 May 1971, A. Roubal 1203 (PRC, no. det. 19393). – Pardubice, Kunětická hora, 50° 04' 47.41" N, 15° 48' 46.62" E, 11 Apr 2007, M. Marek (PR, no. det. 27180). – Karlštejn, Velká Hora, 9 Apr 1946, I. Klášterský (PR, no. det. 28310). – Písek, Čížová, 26 Apr 1999, V. Žíla (PR & herb. Žíla, no. det. 15532). – Brno, Líšeň, Hornek, 420 m, 23 Apr 1967, M. Smejkal (BRNU, no. det. 20143). – Znojmo, near the castle, 26 Apr 1984, J. Kirschner (PRA, no. det. 19996). – Rohatec, sands along railway in N part of the village, 11 May 1985, A. van der Hulst, J. C. M. den Nijs, J. Kirschner & J. Štěpánek (PRA, no. det. 14817). – **AUSTRIA.** Niederösterreich, Wachau, ca 2–3 km NW of Weisenkirchen, ca 450–500 m, 10 Apr 1982, F. Krendl (W, no. det. 21452). – Wien, Türkenschanze, Apr 1879, R. Traxler (PR, no. det. 28856). – **SLOVAKIA.** Lakšárská Nová Ves, sandy sites N of the village, 5 May 1983, J. Kirschner & J. Štěpánek (PRA, no. det. 14819). – Bratislava, Devínska Nová Ves, dry slopes N of the village, 26 Apr 1982, J. Kirschner (PRA, no. det. 14820). – Slovenský kras, Domica Cave, Apr 1936, I. Klášterský (PR 103168 & 103172, no. det. 28260). – **HUNGARY.** Sopron, Fertőrákos, near a quarry NW of the village, 47° 44' 11" N, 16° 37' 13" E, 7 Apr 2014, B. Trávníček (OL, no. det. 29662). – **POLAND.** Wolanin and Musiał (2018: 20). – **GERMANY.** Uhlemann (2003: 35).

2. *Taraxacum kuzmanovii* Štěpánek & Kirschner, sp. nov.

Type ‘Bulgaria australis, oppidum Sandanski, in valle fl. Struma: in siccis supra pagum Strumjany’, 17 May 1987, B. Kuzmanov, cultivated from achenes BK 8702 as JŠ 3127, collected in 1989 (PRA, no. det. 28588, holotype; isotypes: PRA, no. det. 25841; also distributed as *Taraxaca Exsiccata*, no. 1017, PRA, no. det. 33516, etc.).

Etymology The epithet is introduced in honour of our colleague and friend, the late Bogdan Kuzmanov (1934–1991), a specialist in the taxonomy of the Bulgarian flora (Markova 1992).

Exsiccates *Taraxaca* Exs., no. 1017–1019.

Diagnosis *Plantae mediocres distinguendae foliis saturate usque obscure viridibus superne glabratis, lobis lateralibus plerumque medietate constricta, parte distali appendiciformi triangulari vel rhombiformi dilatata, phyllariis involucribus exterioribus numero 14–18, late ovatis usque lanceolatis, arcuato-patentibus vel arcuato-recurvis marginibus angustissimis indistinctis, apice saepissime conspicue corniculato, acheniis saturate brunneo-rubescensibus magnis, 4–4.6 mm longis, subtenuibus, corpore superne dense spinuloso, in pyramidem cylindricam 0.7–1.2 mm longam sensim transeunte, rostro 8–12 mm longo.*

Description Plants medium-sized, usually 6–16 cm tall, ± robust, scapes often numerous. Plant base with medium dense brownish hairs; tunic moderately developed. Leaves variously erect-patent, almost glabrous, with sparse hairs on midvein adaxial surface, deep dark green (abaxially slightly paler; leaf blade oblong to oblanceolate in outline, 6–12 × 1.5–3.5 cm, conspicuously pinnatisect to interruptedly pinnatisect (with main segments, lobules and variously large teeth), terminal segment usually ± small, usually 0.7–1.4 × 0.7–1.5 cm, triangular, broadly triangular to helmet-shaped, sometimes in distal 1/3 ± constricted to form a short lingulate subacute apex, with distal margin convex to straight, entire or with a single shallow incision, proximal margin straight to sigmoid, often with a single acute tooth; lateral segments 4–5 pairs, sometimes with additional proximal lobules, opposite to alternate, subhamate-recurved to ± patent, usually acute to acuminate, 0.8–1.5 cm long, 5–8 mm wide at base, constricted in the middle, with a distinct appendage-like triangular, angled drop-shaped or rhombic apical part, distal margin convex to sigmoid, entire or with 1–2 incisions and an acute tooth, proximal margin ± straight to concave or slightly sigmoid, often with a single big tooth at base, sometimes with 1–2 smaller teeth or rarely entire; interlobes usually 3–5 × 2–3 mm, with a few teeth of variable length, sometimes with lingulate denticulate lobules, with surface slightly suffused brown-purple, margins raised; midvein pale or light brownish-purplish; petiole narrow to very narrowly winged, 2–3 cm long, ± indistinctly grey-purplish. Scapes 6–15 cm long, overtopping leaves, purple at base and paler below capitulum, otherwise pale greenish, sparsely to subdensely arachnoid. Capitulum usually 3–3.5 cm wide, ± flat, deep yellow. Involucre glaucous green, ± rounded at base, ca 6 mm wide. Outer

phyllaries usually 14–18, broadly ovate to lanceolate, 5–7 × 2.5–4 mm wide, arcuate-patent to arcuate-recurved, sometimes with tips pointing to the involucre base, adaxially paler glaucous bluish green, sometimes pinkish, abaxially dark (glaucous) blackish green, slightly pruinose, corniculate (protuberance to 0.8 mm), paler border indistinct, ca 0.05 mm wide, margins distally ciliate or glabrous; inner phyllaries 11–12 mm long, of equal width, deep green, with 1–2 little blackish horns below apex. Outer ligules flat, striped purplish grey outside, with dark apical teeth, inner ligules canaliculate, with yellow apical teeth. Pollen present, irregular in size. Stigmas medium dark discoloured, light greyish yellow-green with blackish pubescence outside. Achenes medium dark to deep dark red-brown (to almost purplish brown or castaneous brown), relatively long and narrow, 4.0–4.6 × 0.9–1.0 mm, achene body relatively densely spinulose in upper 1/3–1/2 (spinules thin, often acuminate), ± gradually narrowing into cylindrical to sub-cylindrical cone 0.7–1.2 × 0.25–0.3 mm, sometimes with a few spinules at base; beak 8–12 mm; pappus 6–6.5 mm, dirty white to yellowish white. – Fig. 3. – Agamosperm (on the basis of pollen analysis).

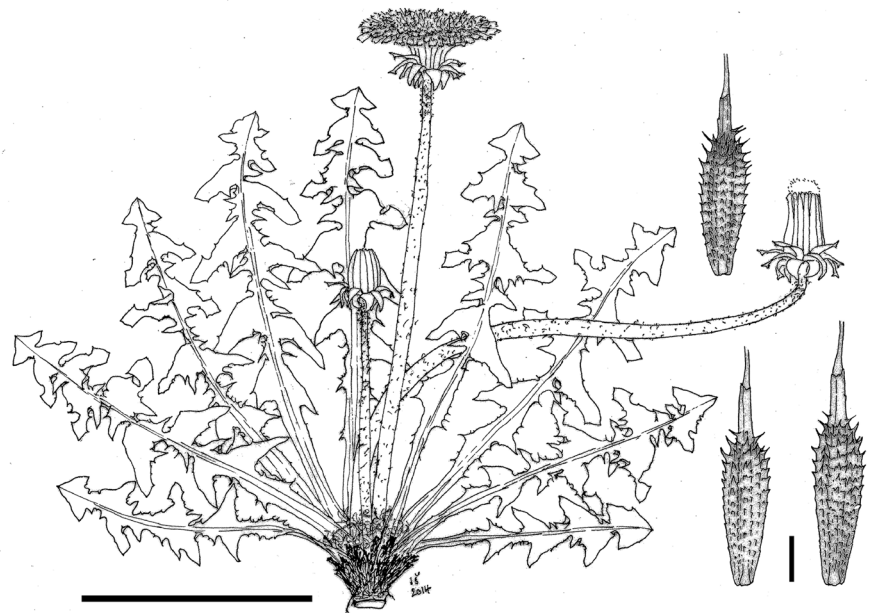
Diagnostic notes The most conspicuous feature of *T. kuzmanovii* is its leaf shape. The constricted lateral lobes with a dilated distal appendage of a triangular or rhombic shape is unique among members of the

T. danubium group. The closest species is undoubtedly *T. danubium* itself. *Taraxacum kuzmanovii* can be distinguished by leaf lateral segments often subhamate-recurved, with the distal appendage, outer phyllaries less conspicuously recurved, more often arcuate-patent, with more distinct, longer horns near their apex, and by achenes with a longer cone and longer beak. *Taraxacum danubium* is absent from the Balkan Peninsula.

Distribution and habitat Although it is quite distinctive and coming from regions satisfactorily covered by *Taraxacum* gatherings, it is known from two localities in southern Bulgaria and northern Greece (the distance between the two sites is not more than 125 km). We therefore consider *T. kuzmanovii* a relatively rare species. It most often grows on dry stony slopes and sunny low-coverage grasslands, open dry woodlands, at relatively low elevations between 150–320 m. Its IUCN conservation status is estimated as VU.

Note For comparison, we mention a species collected at, or near these two sites, *T. umbrosum* Sonck, Kirschner and Štěpánek in Štěpánek and Kirschner (2015: 161). It was collected at several dozen localities in Bulgaria, Greece and North Macedonia, and the frequency of its occurrence is in a sharp contrast with that of *T. kuzmanovii*. It also documents the sampling density in Bulgaria and northern Greece, which is also obvious from the distribution map of *T. lingulilobum* below (Fig. 6).

Fig. 3 *Taraxacum kuzmanovii*. General habit (scale bar = 5 cm) and achenes (scale bar = 1 mm)



Specimens examined **BULGARIA**. Sandanski, valley of the river Struma, near Strumyany, 1987, B. Kuzmanov, cultivated from achenes BK 8701 as JŠ 3125 (PRA, no. det. 25842). – **GREECE**. Thessaloniki, Ep. Langadha, Melissourgios, 320 m, 40° 33' 41" N, 23° 32' 31" E, 26 Apr 2003, R. Willing & E. Willing 115609 (B, no. det. 25840); and cultivated as JŠ 7944 (PRA, no. det. 25839). – Less safe identification: **GREECE**. Thessalia, Olympos, 6 May 1982, C. E. Sonck (H, no. det. 35067).

3. *Taraxacum persicum* van Soest, Acta Bot. Neerl. 9: 312. 1960.

Type indication ‘Typus: Iran, Asterabad: Bender Ges, in pascuis [Gorgan, Bandar Gaz, ca 36.783° N 53.946° E], 7 & 31.3. 1901, P. Sintenis, It. Transcaspico-persicum 1900/1901, no. 1433 (h. L, h. B. M. and h. K)’. – Photo of ‘type material’ in van Soest, Acta Bot. Neerl. 9: 324 (Fig. 9), 1960.

Type P. Sintenis, It. Transcaspico-persicum 1900/1901, no. 1433 (K, no. det. 8807, lectotype, *vide* van Soest, Catal. Erythrosperma, p. 42, 1966; isolectotypes: L 43109, no. det. 19686, BM, no. det. 8446).

Note Another typification was published by Doll, Feddes Repert. 84: 59. 1973. The Leiden specimen was designated as the lectotype (L, no. det. 19686) but the typification is preceded by van Soest (1966).

= *Taraxacum beckeri* van Soest, Proc. Koninkl. Nederl. Akad. Wetensch., Amsterdam, ser. C, 69: 437. 1966, as ‘beckerii’.

Type indication ‘Typus: Rossia austr.: Sarepta, Sandboden der Berge, 15. 6. 1881, A. Becker 182, s.n. [sub nomine] *T. gaucantho* (LAU) pro parte; furthermore: Sarepta, Becker: Ebenen an der Wolga bei Sarepta, Becker 474–1 (W) s.n. *T. corniculato*.’

Type LAU, holotype, n. v.; paratype: W!

Etymology Derived from Persia, an ancient Greek and Roman name for most of what is called Iran nowadays.

Description Plants small to medium-sized, 12–14 (–18) cm tall. Plant base with medium dense dirty whitish to brownish hairs; dark brown tunic moderately developed. Leaves variably erect-patent, with very sparse but long hairs, deep grass-green to ± dark green, not spotted; leaf blade narrowly elliptical to oblanceolate or narrowly so in outline, 7–9 (–15) × 1–2.5 (–3.5) cm, pinnatifid to pinnatisect, flat or with raised margins of lateral

segments; terminal segment relatively small, usually 0.8–1.3 (–2) × 1.1–1.5 (–2) cm, triangular to broadly so, often trilobed, acute to (lingulate-) mucronate, distal margin ± straight, usually entire or with a single asymmetrical incision or with 1–2 broad acute teeth, basal lobes ± patent to subrecurved, proximal margin slightly convex or ± sigmoid, entire or with 1–2 minute, ± broad acute teeth; lateral segments (3–) 5–6 pairs, usually opposite, triangular to broadly so (to deltoid), usually 4–9 (–14) mm long, 4–9 mm wide at base, ± subrecurved to patent, acute to acuminate, distal margin ± straight (or slightly concave to ± sigmoid), entire or with several minute teeth, some bigger, to 1.5 mm long, proximal margin ± straight (subconvex to slightly sigmoid), entire or with a single oblique tooth, the lowermost lateral segments approaching long narrow teeth; interlobes ± short to very short, sometimes almost absent, usually 2–6 × 3–4 (–7) mm, with raised margins, not coloured or seldom bordered brown-purple, irregularly dentate; midvein pale or light brownish, sometimes pinkish in proximal 1/4; petiole narrow, unwinged (but often broader towards the blade), usually 1.5–3 cm long, distinctly purple at base. Scapes equalling to ± overtopping leaves, usually 7–13 (–18) cm, brown-purple to purple at base, otherwise pale green, later suffused brown-purple, with scattered arachnoid hairs to sparsely arachnoid-floccose, denser below capitulum. Capitulum small to medium-sized, 2–3 (–3.5) cm wide, mid-yellow to paler so (not deep yellow), flat to ± concave, later convex, dense. Involucre medium dark to light green, ± not pruinose, truncate at base, ca 7 mm wide. Outer phyllaries 13–18, variably arcuate-patent, sometimes arcuate-recurved, ovate to narrowly lanceolate, 6–7 (–8) × 2.2–2.7 (–3.5) mm, abaxially evenly dark olivaceous green to bluish green (black-green when dry), pruinose, dark corniculate below apex, with a distinct whitish border (0.1–) 0.15–0.2 mm wide, margin distally ciliate, adaxially light green to pinkish light glaucous-green, suffused purplish in distal 1/3; inner phyllaries 10–11 (–13) mm, dark green, sometimes of unequal width, some corniculate below apex. Outer ligules short and narrow, ± flat, striped ± dark olivaceous greyish to almost blackish (with purple hue) outside, apical teeth dark grey, inner ligules canaliculate, short, gradually shorter towards the centre, narrow,

canaliculate, with apical teeth dirty yellow or reddish. Pollen absent, rarely (probably only in the NE part of the species' range) with pollen of variable grain size. Stigmas \pm dark discoloured, greyish yellow-green, with black pubescence outside (on distal part of style and proximal and middle parts of stigma lobes; the most distal part of lobes with pale pubescence). Achenes deep red-brown with purplish hue to deep brown, $3.1\text{--}4.1 \times 0.7\text{--}0.9$ mm, body \pm densely spinulose in upper 1/2, spinules erect-patent, \pm flattened (squamuliform), otherwise tuberculate to \pm smooth, gradually to subabruptly narrowing into a slender, \pm cylindrical to subcylindrical cone $0.7\text{--}1.1$ mm long (occasionally with a few spinules at base); beak (7–) 8–14 (–15) mm; pappus dirty yellowish, 4–5.5 (–6) mm. – Fig. 4. – Agamosperm (on the basis of pollen analysis).

Diagnostic notes *Taraxacum persicum*, usually lacking pollen, is distinct in having triangular or broadly triangular, acute leaf lateral segments, outer phyllaries irregularly arcuate-patent, abaxially dark olivaceous-green to dark bluish green (black-green when dry) and pruinose, with a distinct but narrow whitish border. Its achenes are dark purplish

brown to dark brown, small and slender, with cone $0.7\text{--}1.1$ mm long. It is similar to *T. egnatieae* but leaves of *T. persicum* are not suffused bronze, interlobes are not blotched, nor bordered, as a rule, and outer phyllaries are distinctly bordered; achenes of *T. persicum* are darker, often pure dark brown.

Distribution and habitat *Taraxacum persicum* occupies a large geographical range extending from Central and Eastern Europe to lower Volga River and the Caspian Sea region. However, there are large gaps in our documentation of this distribution, and there is a possibility that the distribution has a really disjunctive nature. In Central Europe, the populations of *T. persicum* are small and easy to overlook, while in the east, this species may be one of the dominant members of *T. sect. Erythrosperma*. It grows in a variety of dry, relatively open habitats, including steppe, subsaline sandy sites, calcareous grasslands, etc., mostly at low elevations. Its IUCN conservation status is difficult to estimate because of rather fragmentary data; we consider the LC category as the most appropriate.

Specimens examined **IRAN.** Gorgan, Bandar Gaz, 7 & 31 Mar 1901, *P. Sintenis*, distributed as *Sintenis, Iter transcaspico-persicum 1900–1901*, no. 1433 (G, no. det. 22491, 22373 & 22385; JE, no. det. 28530; K, no. det. 8807; L, no. det. 19686; PR, no. det. 28406; PRC, no. det. 20989 & 21151; S, no. det. 24276–8; WU, no. det. 22001; Z, no. det. 24931; ZT, no. det. 24437). – Iran, Mazandaran, Amal, Filband (village), 2,200 m, 8 May 1995, *Matin & Termeh* (IRAN 35242/1, dupl. PRA, no. det. 15362). – Iran, Mazandaran, Veresk, Vezmilash, Kouhaye Gelzar (Ghorogh), 1,900–2,750 m, 26 May 1980, *Termeh, Daneshpajuh & Zargani* (IRAN 35244/1, dupl. PRA, no. det. 15361). – **RUSSIA.** Volgograd, Old Sarepta, [usually without a date], *A. Becker* (S, no. det. 23509; G, no. det. 22516, 22395, 22371, 22283 & 22282; GZU, no. det. 27045; LE, no. det. 8102 & 17790; PRC, no. det. 26790 & 26789; WU, no. det. 8954; PR, no. det. 28040; WRSL, no. det. 28541; WU, no. det. 8954, 21998, 21975 & 21789). – Volgograd Region, Pallasovskiy District, Elton Lake, Mt Ulagan, 13 May 2011, *A. V. Popov*, cultivated as JŠ 9669 (PRA, no. det. 27767). – Volgograd Region, Pallasovskiy District, south shore of Elton Lake, 13 May 2011, *A. V. Popov*, cultivated as JŠ 9670 (PRA,

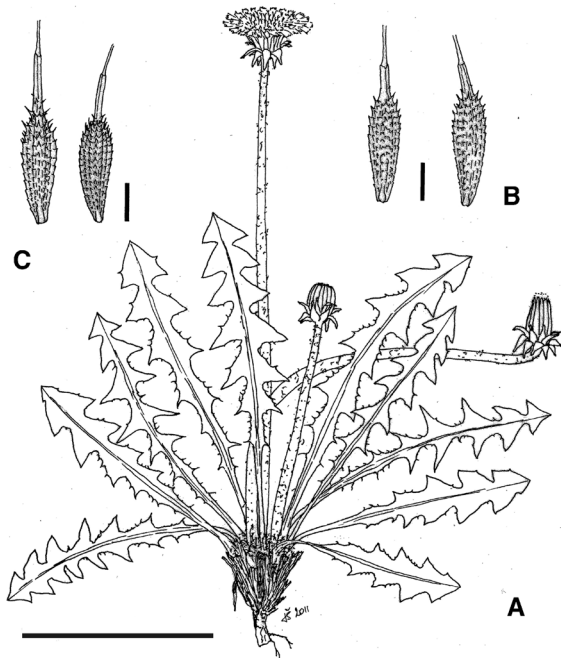


Fig. 4 *Taraxacum persicum*. A – general habit (scale bar = 5 cm) and B – achenes (scale bar = 1 mm). *Taraxacum zivaschum*; C – achenes (scale bar = 1 mm)

no. det. 27768). – **CZECH REPUBLIC.** Praha, Velká Chuchle, near the church, 50° 01' N, 14° 23' E, Apr 1990, *J. Štěpánek* (PRA, no. det. 29009), also cultivated as JŠ 4109 (PRA, no. det. 29007). – N Bohemia, Bílý Újezd, NW of Liščí vrch [hill], 7 May 1988, *K. Kubát* (LIT, no. det. 21711). – Kadaň, Mt Úhošť, 540 m, 13 May 1982, *J. Lorber* (LIT, no. det. 21710). – [vicinity of Libochovany, without clear localization], 1937–1938, *s. coll.* 85 (LIT, no. det. 22697). – NW Bohemia, Církvice, Mt Malý Deblík, 23 Apr 1967, *K. Kubát* (LIT, no. det. 22695). – Karlštejn, railway station, 8 Apr 1978, *M. Šrůtek* (ROZ, no. det. 10446). – Český kras, Praha, Kosoř, Černá rokle [gorge], 280–320 m, 2 May 1982, *J. Štěpánek* (PRA, no. det. 25043 & 25044); *Ibidem*: 18 Apr 1982, *J. Štěpánková & J. Štěpánek* (PRA, 25042). – Praha, Radotín, a ridge 1 km S of the village, 27 Apr 2001, *K. Boublík, M. Lepší & P. Lepší* (herb. K. Boublík, no. det. 25040). – Central Bohemia, S of Roblín, 380 m, 24 Apr 1971, *A. Roubal 1165* (PRC, no. det. 25046). – Ústí nad Labem, Církvice, 5 Apr 2000, *K. Boublík* (herb. Boublík, no. det. 27956). – NW Bohemia, Panenská skála near Vaňov, 20 Apr 2000, *K. Boublík* (herb. Boublík, no. det. 14938). – Praha, Radotín, Radotínské údolí [valley], 8 Apr 1950, *H. Zavřel* (BRA, no. det. 27817). – Karlštejn, 23 Apr 1860, *O. Nicklerl* (PR, no. det. 28604). – Central Bohemia, Kamýk nad Vltavou, ruin of Vrškamýk Castle, 349 m, 49° 38' 24.572" N, 14° 14' 17.636" E, 16 Apr 2020, *J. Zámečník* (herb. J. Zámečník, no. det. 36299). – NW Bohemia, Církvice, 240 m, 50° 34' 58" N, 14° 02' 19" E Apr 2019, *P. Zdvořák*, cultivated as JŠ 10698 (PRA, no. det. 36221). – Sebužín, Deblík, 310 m, 50° 34' 52" N, 14° 03' 10" E, 25 Apr 2019, *P. Zdvořák*, cultivated as JŠ 10697 (PRA, no. det. 36223). – S Moravia, Znojmo, Čížov, rocks opposite Hardegg, 16 May 1984, *V. Grulich* (MMI, no. det. 31887). – S Moravia, Znojmo, Čížov, rocks above the river Dyje 2 km S of the village, 17 Apr 1984, *V. Grulich* (MMI, no. det. 32117). – **AUSTRIA:** Wien, Kalksburg, 29 Apr 1877, *J. Wiesbauer* (WRSL, no. det. 28538). – **SLOVAKIA:** Štúrovo, Chľaba, 25 Apr 1982, *J. Kirschner & J. Štěpánek* (PRA, no. det. 29329). – **HUNGARY** : N Hungary, Börzöny Mts, Szent Mihály hill near Nagymáros, 150–485 m, 8 May 1970, *V. Vašák* (PR, no. det. 30940). – W Hungary, Veszprém, Tapolcai járás (distr. Tapolca), Zalahaláp, ca 1 km N of the

village, 295 m, 46° 55' 27.8" N, 17° 27' 34.0" E, 18 Apr 2015, *J. Zámečník, B. Trávníček & G. Király* (herb. J. Zámečník, no. det. 32633). – Tapolca, Zalahaláp village, Haláp hill, 46° 55' 25" N, 17° 27' 34" E, 18 Apr 2015, *B. Trávníček* (OL, no. det. 32797).

4. *Taraxacum egnatiae* Sonck, Ann. Bot. Fenn. 22: 140. 1985

Type Greece, Thessalia, Olimbos [Mt Olympus], roadside in regio abietina between Litochoron and Stavros, 500–600 m, 6 May 1982, *C. E. Sonck s.n.* (H 1571188, plant A, no. det. 25821, holotype, see also Štěpánek and Kirschner 2018: 368).

Etymology Named after Egnatia Street, Thessaloniki; Egnatia is a township in northern Greece.

Illustrations Sonck (1985: 141, Fig. 2, 147, Fig. 8B)

Description Plants small to medium-sized, usually to 12 cm tall. Plant base with dense yellowish hairs; tunic developed. Leaves ± patent to erect-patent, sparsely arachnoid, more densely so on the midvein, slightly greyish green and very often suffused bronze, leaf blade usually narrowly oblong in outline, 6–12 × 1.5–2.5 cm, pinnatisect, terminal segment medium-sized, 0.7–1.2 cm long, to ca 1.3 cm wide, helmet-shaped to ± broadly triangular, apex usually ± rounded, obtuse but often also acute, distal margin ± convex or ± straight, entire, proximal margin ± straight to subconvex, entire; lateral segments numerous, (5) 6–7 pairs, usually hamate-recurved to ± recurved, triangular or narrowly so, obtusely acute to acute, with distal margin convex, subentire or very sparsely denticulate in distal segments, regularly denticulate in proximal ones, proximal margin subconvex to straight, usually ± denticulate; interlobes usually very short, ± broad, with a few little teeth or ± entire, bordered brown purple and/or blotched; midvein purplish or bronze, petiole narrow to winged, usually pinkish to reddish purple, at least on midvein. Scapes usually floccose-arachnoid, usually suffused brownish purple. Capitulum small, to 2.5–3 cm wide, yellow. Involucre deep olivaceous-green to dark so, narrowly rounded and ca 6–8 mm wide at base. Outer phyllaries usually 10–13, lanceolate to ovate-lanceolate, 6–8 × 2–3 mm, often ± acuminate, ± erect-patent, ± patent to moderately arcuate-patent, abaxially dark green to blackish green, border not distinct, whitish green, ca 0.1 mm wide, apex minutely corniculate to ± flat; inner phyllaries ca 12 mm long. Outer ligules

flat, striped purplish grey outside. Pollen abundant, irregular in size. Style long, stigmas exerted, discoloured, yellow-green to greyish green, with blackish pubescence outside. Achenes medium deep brownish red, 3.8–4.2 × 0.8–0.9 (–1.0) mm, body medium densely to densely spinulose in upper 1/3, otherwise usually tuberculate, spinules short, erect-patent, acute, to 0.2 mm long, body subabruptly narrowing into a cylindrical cone usually 0.9–1.2 mm long, sometimes with a minute spinule at the base, beak ca 10 mm; pappus yellowish white 6–7 mm long. – Agamosperm. $2n = 24$ (count published by Sonck 1985: 141).

Diagnostic notes *Taraxacum egnatae* is very similar to *T. persicum* but differs in a number of features (summarized in Štěpánek and Kirschner 2018: 368), mainly the leaves suffused bronze, with blotched and bordered interlobes, usually ± patent outer phyllaries with a much less distinct and narrower border, floccose-arachnoid scapes, lighter coloured achenes with a longer pappus (6–7 mm long).

Distribution and habitat *Taraxacum egnatae* is known from a number of localities in northern Greece, and there is a large disjunction between those sites and a locality on the slopes above Yalta, Crimea, Ukraine. In most of the localities, *T. egnatae* grows along paths in open *Quercus* woodlands, woodland margins and similar habitats at relatively low elevations (ca 200–700 m). Its IUCN conservation status is estimated as LC.

Selected herbarium specimens examined **GREECE.** Thessaloniki, S of Kryoneri, 40° 47' 24" N, 23° 16' 42" E, 560 m, 4 Apr 2009, *R. Willing & E. Willing 181848* (B, no. det. 32360). – Pieria, SW of Mikri Milia, 40° 24' 25" N, 22° 25' 22" E, 400 m, 29 Mar 2009, *R. Willing & E. Willing 179908* (B, no. det. 32359). – Magnisia, Ep. Volou, SW of Keramidhi, 39° 32' 22" N, 22° 53' 35" E, 670 m, 4 Apr 2002, *R. Willing & E. Willing 97400* (B, no. det. 32386). – Serres, SW of Rodolithos, 40° 54' 08" N, 23° 56' 48" E, 270 m, 8 Apr 2009, *R. Willing & E. Willing 183038* (B, no. det. 33070). – Thessalia, Litochoron, Olimpos, 17 Apr 1981, *C. E. Sonck* (H 1596858, H 1568060, no. det. 25822). – Olympos, roadside between Litochoron and Stavros, 6 May 1982, *C. E. Sonck* (H 1596859, H 1568063, no. det. 25824, 25821); 17 Apr 1981, *C. E. Sonck* (PRA, no. det. 25817). – Graecia, Thessalia, Olympos, 6 Apr 1982, *C. E. Sonck* (PRA, no. det. 25818). – Makedonia, Thessaloniki, Egnatia,

16 Apr 1981, *C. E. Sonck* (H, no. det. 25823; H, no. det. 3495; PRA, no. det. 25819). – Thessaloniki, on a lawn in Egnatia Street, 16 Apr 1981, *C. E. Sonck*, cultivated in Helsinki 1982 (PRA, no. det. 25820). – Thessaloniki, S of Kryoneri, 560 m, 40° 47' 24" N, 23° 16' 42" E, 4 Apr 2009, *R. Willing & E. Willing 181848* (B, no. det. 32360). – Pieria, SW of Mikri Milia, 400 m, 40° 24' 25" N, 22° 25' 22" E, 29 Mar 2009, *R. Willing & E. Willing 179908* (B, no. det. 32359). – Serres, SW of Rodolithos, 270 m, 40° 54' 08" N, 23° 56' 48" E, 8 Apr 2009, *R. Willing & E. Willing 183038* (B, no. det. 33070). – **UKRAINE.** S Crimea, Yalta, along road in pine woodlands, slopes above the town, near 'Gruševaja poljana', 24 May 1989, *J. Štěpánek & J. Kirschner*, cultivated as JŠ 3520/3 and as JŠ 4903 (PRA, no. det. 28550); *Ibidem*, cultivated as JŠ 3520/3 – 2/3 (PRA, no. det. 28552). – Less safe identification: **GREECE.** Magnisia, Ep. Volou, SW of Keramidhi, 670 m, 39° 32' 22" N, 22° 53' 35" E, 4 Apr 2002, *R. Willing & E. Willing 97400* (B, no. det. 32386).

5. ***Taraxacum zivaschum*** Doll, Feddes Repert. 83 (7–8): 495. 1973

Type indication 'Typus: Holotypus im h LE (vidi); Locus typicus: SU: Dnepropetrowsker Gebiet, Tujuk-Tuk. 23. 4. 1936. Schiaiwitsch (?), and on Plate XVI: *Taraxacum zivaschum* Doll, sp. nov.

Type [UKRAINE] Государственные Азов.-Сивашские Заповедники / Днепропетровская об., Генический р-н., Сев. Бер. Сиваша, О-В Куюк-Тук [Sivash State Nature Reserve, Genichesk District, northern coasts of Sivash, island of Kuyuk-Tuk], 23 Apr 1934, [collector partly illegible, but probably:] *F. L. Popovich* (LE, no. det. 6530, holotype).

Etymology The epithet '*zivaschum*' is a mangled attempt to derive the name from a local Crimean term Sivash (Sıvaş in Crimean Tatar language, Сиваш in Ukrainian), a wetland and salt lake area in northern and northeastern Crimea, Ukraine. The correct form would be *sivasicum*, as used in a number of plant names, but the epithet *zivaschum* is not correctable, according to the ICN (Turland et al. 2018).

Note *Taraxacum zivaschum* is one of the species names in sect. *Erythrosperma* based on the type gathering only. The 2–3 specimens at LE are of a relatively satisfactory quality and well preserved, and their interpretation is therefore possible. When

the type material was compared with our rich material collected in southern Ukraine, it turned out that *T. zivaschum* occurs in the famous steppe vegetation reserve, Askania Nova. Our material was used to complete and amend the species' description (the type gathering lacks fully ripened achenes, and only one leaf morphotype is represented). It might be mentioned that Doll (op. c.) considered *T. zivaschum* as a member of sect. *Scariosa*, which is not supported by any morphological characters or other evidence.

Description Plants small, usually 5–9 cm tall (to 25 cm in fruit). Plant base with \pm dense brownish-whitish hairs; dark brown tunic well developed. Leaves sparsely arachnoid, light (slightly glaucous-) green, usually minutely spotted, usually $4\text{--}7 \times 1\text{--}1.7$ cm; blade oblanceolate to narrowly so in outline, pinnatisect; terminal segment not large, broadly triangular to triangular, usually $0.8\text{--}1.5 \times 0.8\text{--}1.5$ cm, acute to acuminate, distal margin concave to sigmoid or \pm straight, entire, basal lobules usually patent, proximal margin \pm straight, entire; lateral segments 4–5 pairs, triangular to narrowly deltoid, sometimes slightly hamate-recurved, usually recurved, acute, distal margin \pm straight or slightly convex, rarely \pm sigmoid, entire or with a single acute tooth (rarely two teeth), proximal margin slightly concave or \pm straight, entire or with 1–2 minute teeth; interlobes short to medium long, usually $1\text{--}4 \times 1\text{--}3$ mm, \pm entire or with a few narrow teeth of variable length, without darker colouration; midvein pale greenish; petiole narrow, 1–2 cm long, dark purple. Scapes thin, usually 4–9 cm long, usually overtopping leaves, greyish purple at base, otherwise pale, \pm densely floccose-arachnoid, later glabrescent. Capitulum small, ca 1.5–2 cm wide, paler yellow. Involucre rounded at base, ca 4 mm wide. Outer phyllaries 12–16, arcuate-recurved, relatively short, $4\text{--}5 \times 1.5\text{--}2$ mm, medium dark olivaceous-green, on both sides with a distinct whitish border 0.2–0.3 mm wide, margin variably but densely and distinctly ciliate, apex abaxially corniculate; inner phyllaries 10–11 mm long, of equal width, apex reddish, corniculate. Outer ligules \pm canaliculate, striped dark purplish grey-olivaceous outside, with apical teeth dark, inner ligules distinctly canaliculate, apical teeth dark yellow. Stigmas light to medium dark discoloured, greenish yellow, with \pm light to darker pubescence outside. Pollen absent. Achenes dark red-brown or brown-red, relatively narrow, $3.8\text{--}4.7 \times 0.7\text{--}0.8$ mm, achene body relatively

densely to medium densely spinulose in upper 1/2–1/3, spinules thin, to 0.3 mm long, erect-patent, body very gradually narrowing into a thin, cylindrical cone 1.1–1.5 mm long, sometimes with a few spinules at base; beak 9–10 mm; pappus yellowish white, 5–5.5 mm long. – Fig. 4C. – Agamosperm (on the basis of pollen analysis).

Diagnostic notes *Taraxacum zivaschum* is characterized by the absence of pollen, relatively short and dark outer phyllaries, and red-brown, long and very slender achenes with a very gradual achene body / cone transition, and a long thin cone. *Taraxacum persicum* is similar in its triangular, acute leaf lateral segments but differs from *T. zivaschum* in achene colour and shape, narrower phyllary border, darker stigmas and a different leaf segment shape. In its general habit, *T. zivaschum* approaches *T. parnassicum*, but the latter has very different achenes, shorter and \pm unbordered, and less recurved or \pm straight outer phyllaries. *T. danubium* is distinct in having pollen, a very characteristic leaf shape with dilated most distal parts of lateral segments, a narrower phyllary border, and thicker and shorter achenes. *T. kuzmanovii* is polliniferous, and has a narrower outer phyllary border.

Distribution and habitat Up to now, *T. zivaschum* has been found at Ukrainian localities in the Henichesk and Kherson Districts. It grows in dry, substeppe, steppe or open sites on a lime-rich substrate, in lowland regions only. Its IUCN conservation status is estimated as NT; there is a low number of localities known but they are situated in protected areas.

Specimens examined UKRAINE. Genichesk District, northern coasts of Sivash, island of Kuyuk-Tuk, 23 Apr 1934, [coll. illegible, probably F. L. Popovich] (LE, no. det. 6530, holotype); *Ibidem*, 22 Apr [1934, a different date by mistake?], [coll. illegible] (LE, no. det. 6529); *Ibidem*, 23 Apr 1934, Ф. Л. Попович [F. L. Popovich] (LE, no. det. 17799). – Kherson District, Novaja Kakhovka, village of Askania Nova, in the nature reserve near the village, 27 May 1989, J. Štěpánek & J. Kirschner, cultivated from roots no. JŠ 3523/2–2/1 (PRA, no. det. 28717); *Ibidem*, cultivated from roots no. JŠ 3523/2–1/2 (PRA, no. det. 28713); *Ibidem*, cultivated from achenes as JŠ 4908 (PRA, no. det. 28715). – Simferopol, village of Belaja near the eastern margin of the city, 2 May 1984, N. Tzvelev et al. 82, cult. as JŠ 3152 (PRA, no. det. 37186).

6. *Taraxacum lingulilobum* Sonck, Ann. Bot. Fennici 21: 164. 1984

Type Graecia, Thessalia, Olympos: väggkant mellan Litochoron och Stavros., 6 May 1982, C. E. Sonck s.n. (H 1540071, no. det. 25535, holotype).

Etymology The epithet is derived from the tongue-shaped distal part of lateral segments of leaves.

Description Plants medium-sized to subrobust, usually 10–12 cm tall. Plant base with \pm dense greyish to brownish-whitish hairs; dark brown tunic well developed. Leaves 7–14 \times 1.5–4 cm, subprostrate, relatively densely arachnoid, greyish deep green, not spotted; blade narrowly elliptical to oblanceolate, distinctly divided into segments, variously large lobules and teeth, also forming three-dimensional structures; terminal segment small to medium-sized, usually 1–1.8 (–2.5) \times 0.8–1.5 (–3) cm, triangular in outline, often trilobed with mucronate apex, mucro elongated into a lingulate to drop-shaped tip, distal margin usually concave and undulate, frequently with distinct 1–2 lobules on each side, basal lobules patent to subrecurved, narrowly oblong and usually lingulate-dilated distally, \pm acute, proximal margin sigmoid to \pm straight, entire or with a single distinct tooth near its base; lateral segments 4–6 (7) pairs, the lowermost ones similar to long narrow teeth, subrecurved to \pm patent, narrowly triangular in outline, usually 1.2–2.0 cm long, 0.5–1.0 cm wide at base, from a broad base \pm abruptly narrowed into a long, narrow, lingulate-elongated distal part, acute, distal margin concave to sigmoid, distally entire, with a few (1–3) long narrow teeth near the base, one of the teeth sometimes enlarged, proximal margin \pm straight or undulate, usually with a single narrow tooth near its base; interlobes relatively long and narrow, usually 5–12 \times 2–4 mm, with several variously long narrow to filiform teeth, surface green, not spotted, \pm indistinctly bordered purplish-brownish; midvein green to brownish green, densely arachnoid; petiole narrow, 2–3 cm long, greyish to purplish with brownish hue. Scapes \pm equalling leaves, brown-purple at base, otherwise purplish, later more deeply brownish grey-purple, densely arachnoid to floccose. Capitulum medium-sized, 3–4 cm wide, \pm flat to subconvex, deep yellow. Involucre \pm rounded at base. Outer phyllaries 15–21, light greyish green, slightly pruinose, 8–10 \times 3–4 mm, \pm irregularly arcuate patent, later arcuate-recurved, often with tips approaching

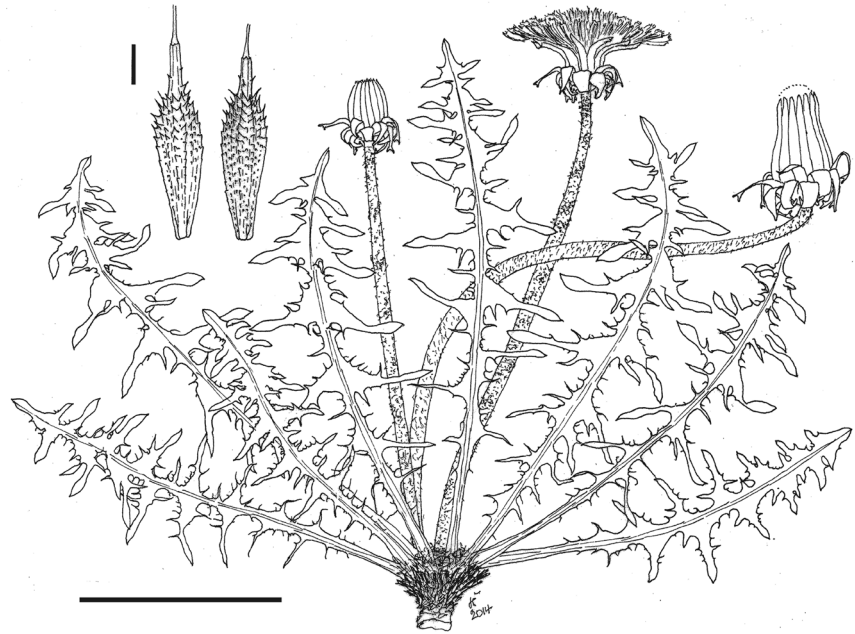
involucre base, abaxially dark olivaceous-green, corniculate, adaxially light green to greyish green, slightly pruinose, with a whitish border 0.1–0.3 mm wide, and often with a submarginal brown-purple strip; inner phyllaries narrow, glaucous green, pruinose, of equal width, ca 12 mm long in flower, later elongating, callose to corniculate. Outer ligules flat, striped dark purplish grey-olivaceous outside, apical teeth black-purple, inner ligules subcanaliculate, with yellow apical teeth. Stigmas relatively dark discoloured (grey-green, with black pubescence outside). Pollen abundantly developed, pollen grains variable in size. Achenes relatively large, 4.2–4.7 (–4.9) \times 0.9–1.1 mm, dark brown-purple (or violet-castaneous), achene body spinulose in the upper 1/3–1/4, spinules erect-patent, thin or sometimes broadened at base, up to 0.4 mm long, body \pm gradually narrowing into subcylindrical cone 1.0–1.2 (–1.3) mm long, often with minute spinules at the base; beak 9–11 mm; pappus yellowish white or dirty yellowish, 5.5–7 mm long. – Fig. 5. – Agamosperm (on the basis of pollen analysis).

Diagnostic notes Diagnostic features of this species include large brown-red achenes, 4.2–4.9 mm long (similar to those of *T. sect. Erythrocarpa*); it approaches *T. kuzmanovii* in this respect but can be distinguished by the complicated leaf segmentation pattern with variously long lobules and interlobe teeth. *Taraxacum danubium* is similar in the leaf shape and outer phyllary characters (with the exception of phyllary colour and less pronounced corniculation) but has achenes up to 3.8 mm long.

Distribution and habitat *Taraxacum lingulilobum* is a species known from northern Greece and the western part of the southernmost Bulgaria, according to the specimens available (Map: Fig. 6). Its occurrence in the neighbouring countries, e.g. North Macedonia, Albania or Turkey is probable. It grows in dry grasslands, dry slopes, rocky sites, often calcareous, margins of open oak woodlands and along paths, usually between ca 100 m and 2,000 m. Its IUCN conservation status is estimated as LC.

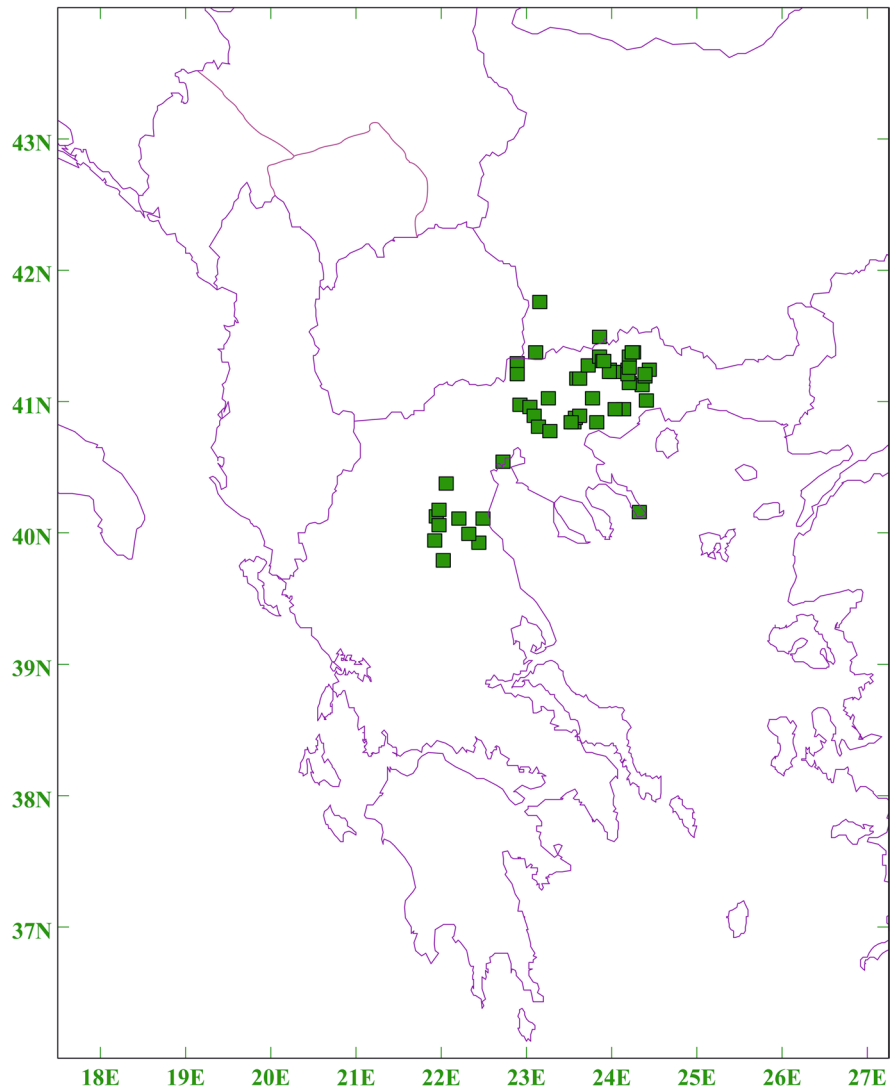
Specimens examined **BULGARIA.** Toce Dalčev, Petralik, 16 May 1988, B. Kuzmanov, cultivated as JŠ 3133 (PRA, no. det. 25539) & JŠ 4123 (PRA, no. det. 25540). – Sandanski, Struma valley, above Javorov railway stop, 30 May 1988, J. Kirschner, cultivated as 2921 (PRA, no. det. 25538). – Kolarevo, 4 May 1993, O. Šida, cultivated as JŠ 5436 (PRA,

Fig. 5 *Taraxacum lingulobum*. General habit (scale bar = 5 cm) and achenes (scale bar = 1 mm)



no. det. 25816). – **GREECE**. Kotsanis, Polimilo, 930 m, 40° 22' 25" N, 22° 03' 39" E, 28 Apr 2003, *R. Willing & E. Willing 115984* (B, no. det. 25541), also cultivated as JŠ 7944 (B, PRA, no. det. 25542). – Thessalia, Olympos, between Litochoron and Stavros, 6 May 1982, *C. E. Sonck* (H, no. det. 25535, holotype). – Thessalia, Olympos, 6 May 1982, *C. E. Sonck* (H, no. det. 25537 & 25536, isotypes). – Athos Peninsula, Mt Athos (2,033 m), near the church of Panagia, 2,000 m, 40° 09' 29" N, 24° 19' 38" E, 23 May 2011, *K. Sutorý* (BRNM, no. det. 28933), also cultivated as JŠ 9833 (PRA, no. det. 28931). – Halkidhiki, SO of Galatista, 520 m, 40° 27' 44" N, 23° 19' 19" E, 13 Apr 2003, *R. Willing & E. Willing 111300* (B, no. det. 29175). – Thessaloniki, Ep. Langadha, W of Vamvakia, 260 m, 40° 41' 48" N, 23° 36' 00" E, 25 Apr 2003, *R. Willing & E. Willing 115078* (B, no. det. 29173). – Ioannina, Ep. Dhodhonis, 2 km S of Aetopetra, 690 m, 39° 44' 59" N, 20° 33' 02" E, 24 Apr 2000, *R. Eisenblätter & E. Willing 80113* (B, no. det. 29171). – Thessaloniki, Ep. Langadha, Stavros, 1 m, 40° 39' 43" N, 23° 43' 07" E, 24 Apr 2003, *R. Willing & E. Willing 114685* (B, no. det. 29169). – Halkidhiki, Holomon, N of Paleokastro, 480 m, 40° 27' 15" N, 23° 24' 44" E, 13 Apr 2003, *R. Willing & E. Willing 111267* (B, no. det. 29167).

– Halkidhiki, Ep. Arneas, Holomon, W of Arnea, 650 m, 40° 29' 23" N, 23° 34' 53" E, 22 Apr 2003, *R. Willing & E. Willing 114214* (B, no. det. 29165). – Pella, Ep. Edhessis, NE of Kella, 620 m, 40° 47' 57" N, 21° 46' 30" E, 4 Apr 2003, *R. Willing & E. Willing 108890* (B, no. det. 29162). – Halkidhiki, Ep. Arneas, SE of Stratoniki, 335 m, 40° 31' 07" N, 23° 46' 53" E, 22 Apr 2003, *R. Willing & E. Willing 114030* (B, no. det. 29160). – Pella, Ep. Edhessis, SE of Dhrosia, 580 m, 40° 47' 20" N, 21° 52' 42" E, 4 Apr 2003, *R. Willing & E. Willing 108797* (B, no. det. 29158). – Pella, Ep. Edhessis, S of Vryta, 530 m, 40° 46' 54" N, 21° 55' 03" E, 4 Apr 2003, *R. Willing & E. Willing 108759* (B, no. det. 29154). – Serres, SW of Langadi, 430 m, 40° 50' 36" N, 23° 33' 12" E, 11 Apr 2009, *R. Willing & E. Willing 184155 & 184157* (B, no. det. 31730). – Serres, N of Langadi, 185 m, 40° 52' 36" N, 23° 34' 06" E, 11 Apr 2009, *R. Willing & E. Willing 184127* (B, no. det. 31728). – Serres, E of Sitochori, 70 m, 40° 53' 20" N, 23° 37' 58" E, 11 Apr 2009, *R. Willing & E. Willing 183969* (B, no. det. 31726). – Serres, N of Eleonas, 585 m, 41° 10' 19" N, 23° 35' 40" E, 4 May 2006, *R. Willing & E. Willing 157559* (B, no. det. 31724). – Serres, SW of Kastanoussa, 310 m, 41° 17' 08" N, 22° 53' 39" E, 26 Apr 2006, *R. Willing & E. Willing 155018* (B,

Fig. 6 Distribution range of *T. lingulilobum*

no. det. 31722). – Serres, SW of Theodorio, 490 m, 41° 12' 50" N, 22° 53' 51" E, 27 Apr 2006, *R. Willing & E. Willing 155289* (B, no. det. 31720). – Kilkis, SE of Kilkis, 280 m, 40° 58' 40" N, 22° 55' 16" E, 24 Apr 2006, *R. Willing & E. Willing 154062* (B, no. det. 31718). – Kilkis, SW of Melanthi, 510 m, 40° 57' 01" N, 23° 02' 35" E, 24 Apr 2006, *R. Willing & E. Willing 154239* (B, no. det. 31717). – Kilkis, NW of Dhorkas, 620 m, 40° 53' 26" N, 23° 05' 23" E, 24 Apr 2006, *R. Willing & E. Willing 154328* (B, no. det. 31715). – Thessaloniki, Paralia Axiou, 2 m, 40° 32' 06" N, 22° 43' 44" E, 28 Mar 2009, *R. Willing & E. Willing 179766* (B, no. det. 31713). – Serres, NE of Eleonas, 885 m, 41° 10' 53" N, 23° 37' 15" E, 4 May 2006, *R. Willing & E. Willing 157584* (B,

no. det. 31762). – Kozanis, NE of Trigoniko, 790 m, 40° 07' 17" N, 21° 56' 36" E, 11 Apr 2006, *R. Willing & E. Willing 150219* (B, no. det. 31760). – Dhrama, W of Kato Vrontous, 935 m, 41° 16' 34" N, 23° 43' 38" E, 4 May 2006, *R. Willing & E. Willing 157752* (B, no. det. 31759). – Thessaloniki, SW of Pende Vryses, 410 m, 40° 48' 06" N, 23° 08' 40" E, 4 Apr 2009, *R. Willing & E. Willing 181716* (B, no. det. 31757). – Serres, SE of Efkarpia, 38 m, 40° 50' 04" N, 23° 49' 23" E, 9 Apr 2009, *R. Willing & E. Willing 181914* (B, no. det. 31755). – Kavala, SW of Palea, 306 m, 41° 00' 22" N, 24° 24' 15" E, 30 Apr 2009, *R. Willing & E. Willing 190672* (B, no. det. 31753). – Larisa, S of Loutro, 730 m, 39° 56' 43" N, 21° 55' 47" E, 2 May 2009, *R. Willing*

& *E. Willing 191281* (B, no. det. 31751). – Kozanis, SW of Servia, 360 m, 40° 10' 28" N, 21° 58' 38" E, 11 Apr 2006, *R. Willing & E. Willing 149992* (B, no. det. 31749). – Drama, N of Ptelea, 267 m, 41° 14' 14" N, 24° 26' 47" E, 26 Apr 2009, *R. Willing & E. Willing 189382* (B, no. det. 31747). – Drama, E of Agora, 331 m, 41° 07' 43" N, 24° 21' 03" E, 27 Apr 2009, *R. Willing & E. Willing 189506 & 189505* (B, no. det. 31758). – Drama, S of Prinolofos, 300 m, 41° 11' 37" N, 24° 23' 10" E, 26 Apr 2009, *R. Willing & E. Willing 189196* (B, no. det. 31756). – Drama, N of Prinolofos, 400 m, 41° 12' 32" N, 24° 23' 10" E, 26 Apr 2009, *R. Willing & E. Willing 189243* (B, no. det. 31754). – Drama, N of Taxiarche, 410 m, 41° 14' 05" N, 24° 12' 00" E, 20 Apr 2009, *R. Willing & E. Willing 187194* (B, no. det. 31752). – Drama, SE of Granitis, 454 m, 41° 14' 58" N, 23° 58' 20" E, 24 Apr 2009, *R. Willing & E. Willing 188440* (B, no. det. 31750). – Drama, NE of Choristi, 125 m, 41° 08' 14" N, 24° 12' 49" E, 17 Apr 2009, *R. Willing & E. Willing 186012* (B, no. det. 31748). – Serres, N of Gazoros, 100 m, 41° 01' 45" N, 23° 46' 37" E, 16 Apr 2009, *R. Willing & E. Willing 185713* (B, no. det. 31746). – Drama, SSW of Taxiarche, 350 m, 41° 12' 41" N, 24° 11' 01" E, 20 Apr 2009, *R. Willing & E. Willing 187146* (B, no. det. 31745). – Drama, NNE of Petroussa, 410 m, 41° 13' 06" N, 24° 01' 07" E, 19 Apr 2009, *R. Willing & E. Willing 186954* (B, no. det. 31743). – Kavala, Georgiani, 370 m, 40° 56' 41" N, 24° 08' 36" E, 18 Apr 2009, *R. Willing & E. Willing 186543* (B, no. det. 31741). – Drama, N of Prosotsani, 302 m, 41° 13' 32" N, 23° 58' 10" E, 24 Apr 2009, *R. Willing & E. Willing 188676, 188716 & 188720* (B, no. det. 31737). – Drama, SE of Pappades, 585 m, 41° 20' 21" N, 24° 12' 31" E, 25 Apr 2009, *R. Willing & E. Willing 188829* (B, no. det. 31739). – Drama, S of Kato Nevrokopi, 564 m, 41° 20' 23" N, 23° 51' 51" E, 24 Apr 2009, *R. Willing & E. Willing 188583* (B, no. det. 31735). – Thessaloniki, SW of Kryoneri, 560 m, 40° 46' 51" N, 23° 16' 03" E, 4 Apr 2009, *R. Willing & E. Willing 181812* (B, no. det. 31733). – Larisa, SW of Kallipefki, 1,035 m, 39° 55' 46" N, 22° 26' 45" E, 3 May 2008, *R. Willing & E. Willing 177983* (B, no. det. 31744). – Kozanis, SE of Metaxa, 945 m, 40° 03' 56" N, 21° 58' 52" E, 4 May 2008, *R. Willing & E. Willing 178323* (B, no. det. 31742). – Larisa, E of Verdikousa, 335 m, 39° 47' 56" N, 22° 01' 44" E, 27 Apr 2008, *R. Willing & E. Willing*

175724 (B, no. det. 31740). – Serres, W of Proti, 603 m, 40° 56' 07" N, 24° 02' 43" E, 8 Apr 2009, *R. Willing & E. Willing 183172* (B, no. det. 31738). – Drama, NW of Granitis, 645 m, 41° 18' 30" N, 23° 53' 24" E, 24 Apr 2009, *R. Willing & E. Willing 188525* (B, no. det. 31736). – Drama, WNW of Granitis, 710 m, 41° 18' 19" N, 23° 54' 05" E, 24 Apr 2009, *R. Willing & E. Willing 188522* (B, no. det. 31734). – Drama, NNE of Taxiarche, 430 m, 41° 15' 06" N, 24° 12' 23" E, 20 Apr 2009, *R. Willing & E. Willing 187218* (B, no. det. 31732). – Larisa, SE of Kryovrysi, 960 m, 39° 59' 21" N, 22° 19' 25" E, 29 Apr 2008, *R. Willing & E. Willing 176460 & 176454* (B, no. det. 31731). – Drama, NE of Sidironero, 775 m, 41° 22' 30" N, 24° 15' 23" E, 25 Apr 2009, *R. Willing & E. Willing 188984 & 188985* (B, no. det. 31729). – Drama, E of Sidironero, 665 m, 41° 22' 05" N, 24° 14' 13" E, 25 Apr 2009, *R. Willing & E. Willing 188961* (B, no. det. 31727). – Drama, SE of Pappades, 585 m, 41° 20' 21" N, 24° 12' 31" E, 25 Apr 2009, *R. Willing & E. Willing 188845* (B, no. det. 31725). – Larisa, NW of Pythio, 935 m, 40° 06' 09" N, 22° 12' 37" E, 30 Apr 2008, *R. Willing & E. Willing 176916* (B, no. det. 31723). – Serres, SW of Kalokastro, 175 m, 41° 01' 49" N, 23° 15' 58" E, 13 Apr 2009, *R. Willing & E. Willing 184666* (B, no. det. 31721). – Serres, SW of Langadi, 530 m, 40° 50' 02" N, 23° 31' 19" E, 11 Apr 2009, *R. Willing & E. Willing 184182* (B, no. det. 31719). – Thessalia, Olympos, 6 May 1982, *C. E. Sonck* (H, no. det. 35071). – Makedonia, Kilkis, 14 Apr 1981, *C. E. Sonck*, cult. in Helsinki (H, no. det. 35069). – Less safe identification: GREECE. Halkidhiki, Ep. Arneas, Holomon, WSW of Arnea, 490 m, 40° 30' 19" N, 23° 32' 38" E, 22 Apr 2003, *R. Willing & E. Willing 114222* (B, no. det. 29150). – Etolia-Akarnania, Ep. Trihonidhos, N of Raina, 230 m, 38° 44' 40" N, 21° 25' 41" E, 29 Mar 1999, *R. Eisenblätter & E. Willing 72886* (B, no. det. 29177).

7. *Taraxacum epirense* van Soest, Proc. Kon. Ned. Akad. Wetensch., ser. C, 69: 441. 1966

Type Greece, Epirus, montes Pindus, in jugo Katara prope Metsovo, in graminosis versu Metsovo, ca 1,600 m, 11 May 1961, *K. H. Rechinger 23190* (W, no. det. 20857, holotype).

Note For the synonymy with nomenclatural notes, see Štěpánek and Kirschner (2014: 140). *Taraxacum*

vexatum Sonck (1986: 167 \equiv *T. lacistophylloides* Sonck 1985: 259, *nom. illeg.*) is a taxonomic synonym of *T. epirensis*.

Etymology Derived from Epirus, *Epeiros* in Greek, a region in the promontories of the Pindus Mts.

Description Plants medium-sized to subrobust, usually 12–16 cm tall. Plant base with \pm dense brownish-whitish hairs; dark brown tunic \pm well developed. Leaves variously erect-patent, usually 8–16 \times 1.5–4.5 cm, deep vivid-green, \pm sparsely arachnoid, not spotted; blade narrowly elliptical or narrowly oblong in outline, pinnatisect; terminal segment usually 6–25 \times 10–30 mm, broadly triangular to triangular in outline, often trilobed, apex acute or acuminate, usually with an elongated lingulate mucro, distal margin concave, usually sigmoid, entire, basal lobules patent to subrecurved, proximal margin subconcave to straight, entire; lateral segments (4) 5–6 (7) pairs, usually subrecurved to patent, elongated-lingulate, often bird-wing shaped (approaching those of *T. lacistophylloides*), from a broad base abruptly narrowed into elongated-lingulate distal part dilated near apex, usually 10–22 mm long, 3–12 mm wide at base, acute, distal margin sigmoid, less often subconcave, entire or with a single tooth, sometimes with a few unequal teeth near its base, proximal margin \pm straight, entire or with a single tooth, the lowermost segments usually much smaller, of the shape of a narrow long tooth; interlobes long and narrow, usually 6–13 \times 1.5–2 mm, irregularly sparsely dentate, raised upwards (as interlobe margins), surface slightly suffused brown-purple, bordered brown-purple; mid-vein pale or pinkish at base, sometimes wholly pinkish-purplish; petiole 2–3 cm long, narrow, purple or purplish. Scapes subequalling to equalling leaves, subdensely floccose arachnoid, reddish at base, otherwise pale green. Capitulum usually 2.5–3 cm wide, \pm flat, deep yellow. Involucre rounded at base, 6–7 mm wide, slightly pruinose. Outer phyllaries 17–22, lanceolate to narrowly so, 7–10 \times 2–4 mm, arcuate patent to distinctly recurved, adaxially greyish light green, often with a submarginal red-brown strip, with a pale border 0.1–0.3 mm wide, margin subsparingly ciliate, sometimes glabrous, abaxially dark olivaceous-green, sometimes black-green when dry, callose to corniculate. Inner phyllaries 11–13 mm long, somewhat unequally broad, slightly pruinose in the lower 1/2, distally \pm dark green, corniculate. Outer ligules flat, striped purplish grey-brown outside,

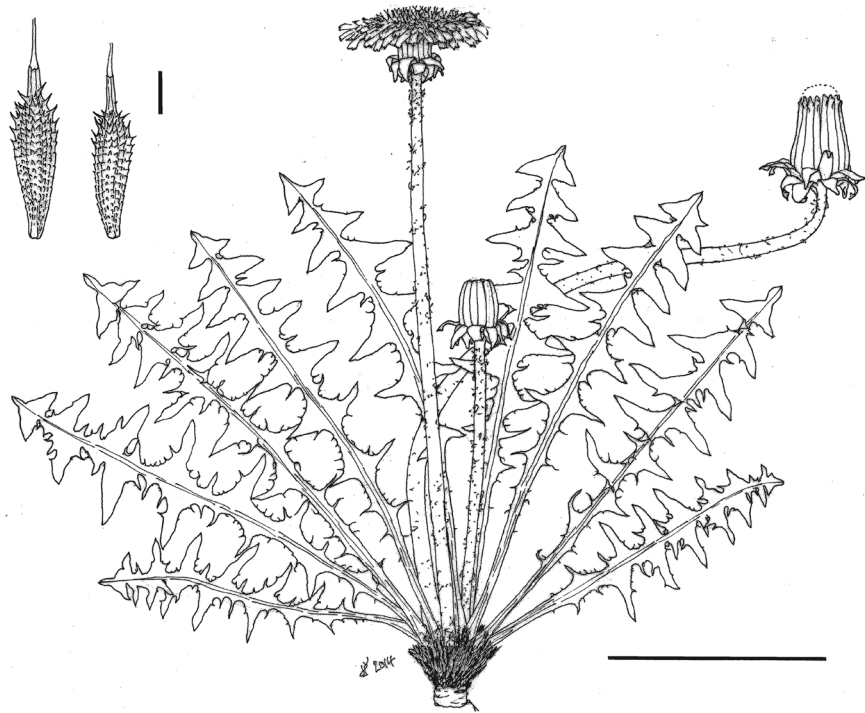
apical teeth blackish, inner ligules canaliculate, apical teeth dirty yellow to reddish. Stigmas medium dark discoloured, greyish yellow-green, with blackish pubescence outside. Pollen present, distinctly variable in size of pollen grains. Achenes medium dark brown, often with a rusty hue, sometimes basally with a silvery appearance, sometimes with a visible reddish hue (then \pm red-brown to castaneous), (3.1–) 3.4–3.9 (–4.3) \times 0.85–1.0 mm, achene body \pm densely spinulose in upper (2/5–) 1/3–1/4, spinules thin, erect, rarely short and squamuliform (no. det. 28940), body \pm gradually narrowing into a narrow, subcylindrical cone 0.6–0.8 (–1.0) mm long, sometimes with minute spinules at base; beak (9–) 10–11 mm; pappus dirty whitish to yellowish white, 5–6 mm long. – Fig. 7. – Agamosperm (on the basis of pollen analysis).

Diagnostic notes *Taraxacum epirensis* is characterized by numerous, usually patent, leaf lateral segments, numerous, arcuate-recurved outer phyllaries and a dark brown achene colour. It differs from *T. persicum* in the achene colour and polliniferous anthers, from *T. danubium* by thicker achenes of a different colouration, darker stigmas and the leaf shape, and from *T. kuzmanovii* and *T. lingulilobum* by the achene size and colour and the leaf shape. *Taraxacum epirensis* is a marginal member of the *T. danubium* group, probably a link between the latter and species around *T. acutiusculum* Sonck and *T. poliochloroides* Doll.

Distribution and habitat *Taraxacum epirensis* is relatively widely distributed in the Balkan Peninsula (Bulgaria, Romania, Greece), as pointed out by Štěpánek and Kirschner (2014). This distribution picture is corroborated by further localities from other regions of that area (Albania, Montenegro) and by further numerous localities from Greece. However, van Soest (1966) cited a few specimens also from Switzerland, Italy and France. At least the record from Italy is referable to another species, while the others remain doubtful.

Specimens examined **MONTENEGRO.** Krstac, between Cattaro [Kotor] and Cetinje, 25 May 1905, H. Lindberg (H, no. det. 28942). – **ALBANIA.** Valbona Valley National Park, Valbona: James Lake (Liqeni i Xhemeës) near the road Valbona – Bajram Curri, 770 m, 42° 27.584' N, 19° 55.153' E, 29 Jun 2011, M. Štěpánek & J. Hadinec, cult. as JŠ 9868 (PRA, no. det. 28940). – **GREECE.** Epiros, Pindus Mts, Katara Pass near Metsovo, ca 1,600 m, 11 May

Fig. 7 *Taraxacum epi-
rense*. General habit (scale
bar = 5 cm) and achenes
(scale bar = 1 mm)



1961, K. H. Rechinger 23190 (W, no. det. 20857). – Pindos, Katara Pass, dry serpentine, 1,500–1,700 m, 26 May 1994, A. J. Richards, cult. as JK 4092 (PRA, no. det. 25915). – Mt Tzena, Pellis, Almopias, N of the village of Notia, by a forest road, 1,600–1,750 m, 41° 09' N, 22° 11' E, 30 May 1999, Strid et al. 49021 (herb. Strid (C), no. det. 25965). – Trikala, Ep. Kalambakas, 3.3 km SW of Kastanea, 39° 41' N, 21° 21' 30" E, 1,240–1,280 m, 1 Jun 1993, E. Willing 29681 (B, no. det. 29156). – Grevena, Ep. Grevenon, NW of Krania, 690 m, 39° 54' 04" N, 21° 15' 57" E, 19 Apr 2002, R. Willing & E. Willing 101124 (B, no. det. 29152). – Epiros, Timfi Mts, between Oxia and Vilos [partly illegible], 1,350 m, 24 May 1999, P. Authier 15224 (herb. P. Authier, no. det. 15573). – Larisis, Mt Ossa, the road Spilia – Anatoli, 39° 46' N, 22° 41' E, 21 May 1998, H. Wittzell 5161, cult. as JŠ 7354 (PRA, no. det. 25775). – *Ibidem*: 21 May 1998, H. Wittzell 5162, cult. as JŠ 7351 (PRA, no. det. 25772). – Thessalia, Trikala, Kalambaka, at the railroad station, 20 Apr 1984, C. E. Sonck (H, no. det. 25753). – Thessalia, Trikala, Kalambaka, 20 Apr 1984, C. E. Sonck (H, no. det. 25764; PRA, no. det. 25768). – Thessalia, Trikala, Kalambaka, 20 Apr 1984, C. E. Sonck (H, no. det. 25766 & 25765). – Thessalia, Trikala, Kalambaka, at the railway

station, 20 Apr 1984, C. E. Sonck (H, no. det. 25767). – Epeiros, slopes of Katara NE of Metsovo, 25 Apr 1983, C. E. Sonck (H, no. det. 25860 & 25862). – Epeiros, slopes of Pindos near Metsovo, 25 Apr 1982, C. E. Sonck (H, no. det. 25861). – Serres, NE of Eleonas, 875 m, 41° 11' 32" N, 23° 38' 00" E, 4 May 2006, R. Willing & E. Willing 157609 (B, no. det. 31771). – Epeiros, mountain slope near Metsovo, 25 Apr 1983, C. E. Sonck (H, no. det. 35073). – Less safe identification: **GREECE**. Ioannina, Metsovo, roadside at 1,300 m, 28 May 1985, C. E. Sonck (PRA, no. det. 25863).

Note Herbarium specimens from Bulgaria and Romania cited in Štěpánek and Kirschner (2014) are not included in the list.

8. *Taraxacum honestum* Štěpánek & Kirschner, sp. nov.

Type [BULGARIA] Bulgaria merid.-occid., haud procul a pago Melnik, in vicinitate monasterii Roženskij monastyr, 3 May 1993, O. Šída, cultivated as JŠ 5431, collected in 1995 (PRA, no. det. 32357, holotype; isotypes: PRA, no. det. 32355 and duplicates).

Etymology Honourable, respectable.

Diagnosis Plantae parvae vel mediocres tunicatae, notabiles foliis cano-viridibus, interlobiis obscure maculatis, capitulis parvulis concavis, phyllariis involueralibus exterioribus numerosis, plerumque arcuato-patentibus vel arcuato-recurvis, antheris polline carentibus, acheniis rubescenti-brunneis vel brunneis, parvis, et pyramide anguste cylindrica, 0.8–1.2 mm longa.

Description Plants small to medium-sized, usually 9–13 cm tall. Root head simple, with a well developed dark brown tunic, and with a light greyish-brownish indumentum among petiole bases. Petiole narrow, unwinged (\pm narrowly winged in the outermost leaves), deep purple. Leaves erect-patent, usually 4–7 \times 1–1.5 cm, \pm greyish green, not spotted (interlobes \pm blotched brown-purple), sparsely arachnoid, later glabrescent, leaf blade lanceolate to \pm narrowly elliptic in outline, pinnatisect; terminal segment relatively small, usually 5–9 \times 5–11 mm, triangular to broadly triangular, less often helmet-shaped, symmetric to asymmetric, obtusely acute to acute, distal margin subsigmoid or almost straight, entire or with a single asymmetrical incision, proximal margin subsigmoid to \pm straight, entire or with a few minute teeth near the lobe base, basal lobules acute, subrecurved; lateral segments in 3–4 (5) pairs, opposite or alternate, relatively broad, usually 5–9 mm long, 4–7 mm wide at base, arcuate-recurved, almost subhamate-recurved, acute to subacute, distal margin convex to sigmoid, entire or seldom with 1–2 minute teeth, proximal margin subconvex, subsigmoid or subconcave, with a single distinct tooth or entire; interlobes short, medium broad, usually 1–3 \times 2–3 mm, usually with a single broad tooth or several small teeth, interlobe margin raised, surface distinctly blotched brown-purple; midvein purplish proximally, pale distally. Scapes overtopping leaves, usually 6–10 cm long, suffused purple proximally, otherwise pale greenish, \pm densely floccose-arachnoid. Capitulum yellow, relatively small, 1.5–2 cm wide, concave, with dense florets. Involucre ca 7 mm wide and \pm rounded at base. Outer phyllaries 17–22, regularly (i.e. not in one row but evenly distributed) arcuate-patent to arcuate-recurved to recurved, lanceolate to narrowly lanceolate, 6–7 \times 2–2.5 mm, adaxial surface greyish green, usually suffused purplish, abaxially blackish green (black when dry), border distinct, white, 0.1–0.3 (–0.4) mm wide, margin long ciliate, apex callose to corniculate; inner phyllaries 14–20, usually

ca 12 mm long, \pm unequally wide, with a darker, callose apex. Outer ligules subcanaliculate, striped purplish grey outside, with apical teeth grey-black, inner ligules subinvolute, short, apical teeth light purplish to grey-purple. Stigmas medium discoloured, yellow-green to greyish green, hairs of pubescence distally dark. Pollen absent (or a few deformed minute grains remaining in the anther tube). Achenes reddish brown to medium brown (castaneous-brown when unripe), 3.2–3.8 \times 0.8–0.9 mm, achene body with \pm dense erect-patent thin spinules to 0.2 mm long in the upper 1/4, otherwise tuberculate, subabruptly to \pm abruptly narrowing in a narrow cylindrical cone 0.8–1.2 mm long (cone sometimes subconical at base and / or slightly thickened distally); beak 8.5–11 mm long, pappus dirty whitish-brownish, 5–6 mm long. – Fig. 8. – Agamosperm (pollen missing).

Diagnostic notes *Taraxacum honestum* is characterized by a combination of pollen absence, relatively small, subconcave flower heads, outer phyllaries evenly distributed in an imbricate way, usually arcuate-recurved, with a distinct narrow border, and reddish brown to mid-brown achenes with a relatively short body and a long, cylindrical cone. In its leaf shape it somewhat approaches *T. egnatiae* but the above character combination is diagnostic.

Distribution and habitat It grows on dry, stony and sandy slopes with low-coverage grasslands. For the time being, it is known from a single macrolocality in the southern Pirin, Bulgaria, and it obviously is a relatively infrequent species in view of the relatively detailed exploration of the neighbouring areas of northern Greece and Bulgaria (on the other hand, it is a tiny plant easy to overlook). Its IUCN conservation status is therefore estimated as VU.

9. *Taraxacum annetteae* Uhlemann, Willdenowia 46(2): 225. 2016

Type Croatia, bay of Kvarner, isle of Krk, SE part of the island, pass at entrance to Baška valley, ca 50 m above monument, roadside, 10 Apr 2007, I. Uhlemann (B 10 0673409 !, holotype; isotypes: PRA, no. det. 32440, S, herb. Uhlemann).

Etymology Named after Annette Uhlemann, the wife of I. Uhlemann, an outstanding taraxacologist.

Description Plants medium-sized to small, (5–)10–15 cm tall, relatively slender. Petiole light purple, narrow, unwinged. Leaves slightly greyish



Fig. 8 *Taraxacum honestum*. General habit (PRA, no. det. 32357, holotype)

green, almost glabrous, not spotted, narrowly oblong-lanceolate, usually $5\text{--}10 \times 1.5\text{--}2.2$ cm, deeply pinnatisect; terminal segment usually tripartite, distal part narrowly triangular to \pm lingulate, usually with a pair of patent teeth or lobules near its base, otherwise entire, basal lobules \pm patent, usually linear-triangular or \pm lingulate, entire; lateral segments in 4–5 (6) pairs, patent to subpatent, narrowly triangular (and then most often entire or, in proximal segments denticulate on distal margin) or lingulate (with a dilated apical part), with distal margin often conspicuously lobulate-dentate; interlobes blotched brown-purple, usually dentate; midvein usually dirty green. Scape brownish green, arachnoid distally, sparsely arachnoid proximally. Capitulum yellow, 2–2.5 (–3) cm wide. Involucre olivaceous-green, slightly pruinose, ca 9 mm wide and \pm rounded at base. Outer phyllaries ca 15–20, arcuate-reflexed with apex pointing back

to scape, narrowly lanceolate, usually $8\text{--}9 \times 2\text{--}2.5$ (–3) mm, wholly and conspicuously suffused purple adaxially, deep brownish green abaxially, border narrow, indistinct, whitish, ca 0.1 mm wide, inside bordered darker purple, apex \pm corniculate. Outer ligules striped light greyish purple beneath, \pm flat, inner ligule teeth yellow or greyish yellow. Pollen present, pollen grains irregular in size. Stigmas discoloured, greyish green. Achenes light brown (without reddish hue), ca 3.3–3.5 mm long, achene body covered with long spinules above, \pm abruptly narrowing into a cylindrical cone 0.8–0.9 mm long; beak 8–9 mm long, pappus \pm white. – Fig. 9. – Agamosperm (on the basis of pollen analysis).

Diagnostic notes *Taraxacum annetteae* is a species distinct in having patent leaf segments, conspicuously arcuate-reflexed outer phyllaries suffused purple adaxially, dark discoloured stigmas and light brown achenes with long spinules. Within the *T. danubium* group, it can be distinguished by relatively small light brown achenes, the closest species being *T. epirense*.

Distribution and habitat *Taraxacum annetteae* is known from two, rather remote, sites in coastal Croatia (Krk Island, and the Starigrad vicinity). It grows in dry sparse grasslands along paths. Its IUCN conservation status is estimated as VU.

Specimen examined CROATIA. [the holotype locality, see above] 10 Apr 2007, I. Uhlemann (PRA, no. det. 32440, isotype).

Comments on *Taraxacum pineticola* Klokov, Bot. Mater. Gerb. Bot. Inst. Akad. Nauk SSSR 16: 367. 1954

Finally, we have to mention *T. pineticola*, a name without any recent interpretation. It is known from the type gathering deposited in LE (see below), a relatively rich set of plants collected in a very late season (June) in the vicinity of Kharkov, Ukraine, too late for a safe identification or comparison. The plants have summer leaves that were preserved under the woodland canopy but do not give any indication as regards the standard leaf shape in the full blossom time (Fig. 10). The characters observed on the plants, particularly the dark stigmas, the lack of pollen, outer phyllaries recurved, \pm narrowly bordered, achenes initially red-brown, later dark brown, do not exclude the *T. danubium* group (nor similar groups, such as the *T. scanicum* agg.). In conclusion, the name remains to be interpreted, pending the evaluation of erythrosporous plants from the *locus classicus* region.

Fig. 9 *Taraxacum annetteae*. Details of capitulum with outer phyllaries. Locality: Croatia, Starigrad, Velika Paklenica. Photographed by I. Uhlemann in 2009



Fig. 10 *Taraxacum pineticola*. General habit of a plant of the original material (LE, no. det. 6534). Scale bar = 2 cm



Specimens examined UKRAINE. Kharkov region, Chuhuiv Raion, Zmiiv, a pine grove along Donets River, near Zadonetskie Khutora, 3 Jun 1941, V. Kindyak (LE, no. det. 6536, holotype). [Original spelling: ‘УССР. Харьковская область, Змиевской р-н. Бор по Донцу в районе Донецких хуторов’, 3 Jun 1941, *Киндяк*, as *Taraxacum pineticola* Klokov, det. M. Klokov 25 Oct 1953 [Original little field label: ‘Задонецкие х-ра. Бор. 3/VI. 41 Киндяк’]. – ‘Харьковская обл. УССР, Змиевской район, Задонецкие Хутора. Бор’, 3 Jun 1940 [probably a mistake, correctly 1941], *Киндяк*, as *Taraxacum pineticola* Klokov, det. M. Klokov *sine dato* (LE, no. det. 6534, isotype). – ‘Змиевской рн. Бор’ 3 Jun [19]41, *Киндяк*, ut ‘*Taraxacum pineticola* Klokov’ det. M. Klokov s.d. (LE, no. det. 6535, isotype).]

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Data Availability The data analysed during the current study is available from the corresponding author on request.

Declarations

Conflict of interest There are no conflicting or competing interests associated with the present paper.

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Appendix

Taraxacum danubium A. J. Richards specimens examined:

CZECH REPUBLIC. NW Bohemia: Litoměřice, Radobýl Hill, 28 Apr 1934, *K. Preis* (PRC, no. det. 21180). – [three localities on the label] Litoměřice, [1] Vendula Hill, 11 Apr 1938; [2] Holý vrch, 1 Apr 1938; Církvice, Církvický Pecník, 23 May 1937, *s. coll.* 85 (LIT, no. det. 22698). – Velké Žernoseky, Vendula, 28 Apr 1971, *K. Kubát* (LIT, no. det. 22693). – Louny, W slope of Srdov Hill, 5 May 1973, *K. Kubát* (LIT, no. det. 21731). – Čičov near Hořenec, 20 Apr 1966, *K. Kubát* (LIT, no. det. 21720). – Jirkov, Vysoká Pec, ruin of Žeberk Castle, 705 m, 50° 32' 49.399" N, 13° 29' 0.200" E, 3 May 2008, *K. Boublík, M. Lepší & P. Lepší KB/36* (PRA, no. det. 26445). – Mt Sedlo near Úštěk, reserve, 27 May 1985, *K. Kubát* (LIT, no. det. 15204). – Velké Žernoseky, Kalvárie Hill, 3 May 1985, *K. Kubát* (LIT, no. det. 15205). – Úštěk, summit of Mt Sedlo, ca 720 m, 1981, *J. Štěpánek* (PRA, no. det. 14880). – Louny, Mt Raná, 4 May 2000, *K. Boublík & M. Lepší* (herb. *K. Boublík*, no. det. 14939). – Louny, Raná Hill, 8 May 1936, *M. Deyl* (PR 103148, no. det. 28351). – Louny, N part of the Raná Reserve, 50° 24' 15.696" N, 13° 46' 3.154" E, 25 Apr 2015, *P. Zdvorák* (herb. *P. Zdvorák*). – Velké Žernoseky,

Vendula Hill, 200–220 m, 22 Apr 1981, *J. Havlíčková & J. Štěpánek*, cult. as JŠ 8 (PRA, no. det. 15585). – Velké Žernoseky, Vendula Hill, 16 Apr 1935, *K. Preis* (PRC, no. det. 14964); 23 May 1982, *J. Kirschner* (PRA, no. det. 14814). – Lovosice, Mt Lovoš, 540 m, 8 May 1996, *Z. Kaplan* (PRA, no. det. 24099). – Lovosice, Oparno, below the summit of Mt Lovoš, 530–540 m, 50° 31' 37"N, 14° 01' 06"E, 30 Apr 2014, *J. Štěpánek & J. Kirschner* (PRA, no. det. 28929). – Medvědice, Lipská hora (688 m), 14 May 1977, *J. Štěpánek* (PRA, no. det. 14835). – Louny, Bělušice, Mt Milá, 450 m, 3 May 2002, *P. Lepší 1056* (herb. *P. Lepší*, no. det. 14991); 19 Apr 1946, *I. Klášterský* (PR 272386, no. det. 28307). – Ústí nad Labem, below Sřekov Castle, 17 May 1978, *J. Kirschner & J. Štěpánek* (PRA, no. det. 27759). – Štětí, Stračí, ca 235 m, 50° 27' 10" N, 14° 24' 40" E, 31 May 1998, *J. Štěpánek*, cult. as JŠ 7062 (PRA, no. det. 27766). – Mladá Boleslav, Vrchbělá, 311 m, 50° 32' 28.297" N, 14° 46' 14.725" E, 22 Apr 2012, *J. Zámečník* (herb. *J. Zámečník*, no. det. 27832). – Louny, Chraberce, Srdov Hill, 50° 25' 02.7" N, 13° 49' 15.2" E, 12 May 2001, *V. Žíla* (PR, no. det. 28952). – Libochovice, Křesín, Rohatec Hill, 50° 23' 39.0" N, 13° 59' 40.5" E, 12 May 2001, *V. Žíla* (PR, no. det. 28950). – Trmice, Rovný, 18 Apr 1976, *K. Kubát* (LIT, no. det. 29319). – Oleško, SE of the railway stop, 18 May 1968, *K. Kubát* (LIT, no. det. 29317). – Louny, Chraberce, Brník Hill, 50° 25' 10.6" N, 13° 49' 15.2" E, 12 May 2001, *V. Žíla* (PR, no. det. 29530). – Česká Lípa, Hradčany nad Ploučnicí, 280 m, 50° 37' 10.413" N, 14° 41' 53.486" E, 23 Apr 2016, *J. Zámečník* (herb. *J. Zámečník*, no. det. 32615). – Ústí nad Labem District, České středohoří, Sebuzín, Hoher Deblík [hill], 295 m, 50° 34' 50.359" N, 14° 3' 12.975" E, 25 Apr 2019, *P. Zdvorák* (PRC, no. det. 32954). – Česká Lípa District, Bezděz [hill], 535 m, 50° 32' 18" N, 14° 44' 7" E, 6 May 2018, *J. Zámečník & P. Mandys* (herb. *J. Zámečník*, no. det. 34858). – Mladá Boleslav District, 800–900 m NNE of Plužná, 297 m, 50° 28' 51.61" N, 14° 48' 27.44" E, 1 May 2020, *J. Zámečník & J. Doležal* (herb. *J. Zámečník*, no. det. 36336). – NE Bohemia: Lysá nad Labem: between Semice and Hradištko, Dolní Kersko, ca 180 m, 9 May 1984, *J. Štěpánek* (PRA, no. det. 19994). – Ráby, Kunětická hora, W of the castle, 50° 04' 50" N, 15° 48' 34" E, 9 Apr 2008, *V. Samková* (HR, no. det. 21046). – Ráby, Kunětická hora, S

- slope, 9 Apr 2008, *V. Samková* (HR, no. det. 21045). – Kunětická hora (294.0 m), 50° 04' 47.41" N, 15° 48' 46.62" E, 11 Apr 2007, *M. Marek* (PR, no. det. 27180 & 27179). – Sedlec, National natural sanctuary NPP Kaňk, 290 m, 49° 58' 10.7" N, 15° 17' 18.5" E, 15 Apr 2008, *J. Zámečník* (herb. *J. Zámečník*, no. det. 21083 & 22863). – Hradec Králové, Pamětník, S of the village, 210 m, 5 May 1995, *Z. Kaplan 95/84* (PRA, no. det. 24081). – **C Bohemia**: Příbram District, 2.7 km WNW of Obory, 413 m, 49° 40' 50.080" N, 14° 11' 25.556" E, 27 Apr 2019, *J. Zámečník* (herb. *J. Zámečník*, no. det. 36140 & 34733). – Obory, ca 2 km WNW Obory, 445 m, 49° 41' 17.51" N, 14° 11' 24.20" E, 21 Apr 2020, *J. Zámečník*, *B. Trávníček* & *V. Žíla* (herb. *J. Zámečník*, no. det. 36269 & 36294). – Příbram District, ca 1.8 km W of Obory, 49° 40' 55.715" N, 14° 11' 26.724" E, 428 m, 13 May 2017, *J. Zámečník* (herb. *J. Zámečník*, no. det. 34064; PRA, no. det. 33547, distributed as *Taraxaca exsiccata*, no. 1050); 49° 41' 01" N, 14° 11' 33" E, 20 May 2016, *J. Štěpánek* & *J. Zámečník*, cult as JŠ 10384 (PRA, no. det. 33078); 2.2 km W of Obory, 49° 0' 5.584" N, 14° 1' 7.62" E, 415 m, 13 May 2017, *J. Zámečník* (herb. *J. Zámečník*, no. det. 34026); 49° 40' 49.661" N, 14° 11' 28.906" E, 417 m, 13 May 2017, *J. Zámečník* (herb. *J. Zámečník*, no. det. 34019). – Příbram District, 2 km W of Obory, 418 m, 49° 40' 53.74" N, 14° 11' 13.19" E, 16 Apr 2020, *J. Zámečník* (herb. *J. Zámečník*, no. det. 36301 & 36292). – Příbram District, Obory, ca 1.2 km W of a bridge in the village, 49° 41' 05" N, 14° 11' 36" E, 11 May 2017, *J. Štěpánek* (PRA, no. det. 33150); ca 1.7 km W of a bridge in Obory, 49° 40' 50" N, 14° 11' 17" E, 11 May 2017, *J. Štěpánek* (PRA, no. det. 33152). – Příbram District, 1 km W of Kamýk nad Vltavou, 349 m, 49° 38' 24.572" N, 14° 14' 17.636" E, 21 Apr 2020, *J. Zámečník*, *B. Trávníček* & *V. Žíla* (herb. *J. Zámečník*, no. det. 36256). – Příbram District, ca 0.5 km NW of Velká nad Vltavou, 330 m, 49° 39' 47.27" N, 14° 14' 47.42" E, 21 Apr 2020, *J. Zámečník*, *B. Trávníček* & *V. Žíla* (herb. *J. Zámečník*, no. det. 36279). – Kamýk nad Vltavou, town centre, 272 m, 49° 38' 32.37" N, 14° 15' 6.19" E, 21 Apr 2020, *J. Zámečník*, *B. Trávníček* & *V. Žíla* (herb. *J. Zámečník*, no. det. 36275). – Příbram District, ca 1.5 km WSW of Nečín, 441 m, 49° 41' 52.67" N, 14° 12' 51.66" E, 18 Apr 2020, *J. Zámečník* (herb. *J. Zámečník*, no. det. 36276). – 1.1 km W of Nečín, 437 m, 49° 42' 0.52" N, 14° 13' 7.12" E, 18 Apr 2020, *J. Zámečník* (herb. *J. Zámečník*, no. det. 36270). – Příbram District, 300–400 m of Daleké Dušníky, 428 m, 49° 43' 39.03" N, 14° 11' 27.48" E, 18 Apr 2020, *J. Zámečník* (herb. *J. Zámečník*, no. det. 36264). – Příbram District, 1 km SW of Smolotely, 542 m, 49° 36' 59.93" N, 14° 8' 52.57" E, 16 Apr 2020, *J. Zámečník* (herb. *J. Zámečník*, no. det. 36281). – Příbram District, 600–700 m SW of Skalice u Dobříše, 469 m, 49° 42' 49.38" N, 14° 11' 44.44" E, 16 Apr 2020, *J. Zámečník* (herb. *J. Zámečník*, no. det. 36282). – Kamýk nad Vltavou, ruin of Vrškamýk Castle, 349 m, 49° 38' 24.572" N, 14° 14' 17.636" E, 16 Apr 2020, *J. Zámečník* (herb. *J. Zámečník*, no. det. 36302). – Sedlčany, Skoupý, Zbirov Hill, 49° 34' 58" N, 14° 20' 58" E, 9 Apr 2017, *J. Malíček 2008, 2009, 2010* (herb. *J. Malíček*, no. det. 33848). – Kamýk n. Vltavou, SW of Velká, 49° 39' 25" N, 14° 14' 47" E, 320 m, 15 Jun 2017, *J. Malíček 2012, 2013, 2014* (herb. *J. Malíček*, no. det. 33847). – Příbram District, 1.6 km SW of Vestec near Hřiměždice, 49° 40' 26.193" N, 14° 14' 59.599" E, 334 m, 13 May 2017, *J. Zámečník* (herb. *J. Zámečník*, no. det. 34020). – Příbram District, 1.5 km WSW of Nečín 49° 41' 43.510" N, 14° 12' 50.595" E, 443 m, 13 May 2017, *J. Zámečník* (herb. *J. Zámečník*, no. det. 34002). – Příbram District, W of Županovice, 49° 42' 26.677" N, 14° 17' 12.271" E, 384 m, 13 May 2017, *J. Zámečník* (herb. *J. Zámečník*, no. det. 34100). – Beroun District, Český kras, Mramor Hill, limestone, 12 May 1972, *L. Palek* (MP, no. det. 34264). – Beroun District, Český kras, Karlštejn, S slope of Plešivec Hill, 330 m, 49° 56' 05.1" N, 14° 11' 25.5" E, 6 Apr 2019, *Z. Kaplan 19/1* (PRA, no. det. 35313). – Beroun, Skryje, Týřovické skály [reserve] near Týřovice, [49° 58' 59.662" N, 13° 47' 33.370" E], 7 May 1971, *J. Holub* (PRA, no. det. 36040). – Černošice, Dolní Mokropsy, Kazín Hill, [49° 56' 52.235" N, 14° 20' 20.656" E], 14 May 1972, *D. Blažková* (PRA, no. det. 36154). – Praha, 13 Apr 1848, *J. N. Bayer* (WRSL, no. det. 28664). – Zvole near Prague, s. dato, *Čenek* (PR, no. det. 29012). – Prague, Dejvice, 4 May [18]07, *Opiz* (PR, no. det. 29015). – Nelahozevs near Veltrusy, 24 Apr 1874, *K. Polák* (PR, no. det. 29013); 9 May 1886, *J. E. Kabát* (PR, no. det. 26208). – Líbeznice, s. dato, [*Tausch*], Herb. Fl. Bohem. Univ., no. 941a (PR, no. det. 29011). – Praha, May

- 1849, *F. M. Opiz* (PR, no. det. 28953). – Praha, Suchdol, Kozí hřbety, 1 May 1993, *O. Šída* (PR, no. det. 29035). – Praha, Libeň, U českých loděnic [street], 200 m, 50° 06' 29" N, 14° 28' 08" E, 16 Apr 2005, *M. Marek* (PR, no. det. 16395). – Praha, Hrdlořezy, 19 Apr 1896, [*K. Tocl*] (PR, no. det. 28599). – Praha, Žižkov, Apr 1912, *F. Schuster* 837 (PR, no. det. 28048). – Praha, Tiché údolí, 1 May 1993, *V. Chán & V. Žila* (herb. V. Chán, no. det. 16980). – Mělník, Zeměchy, 210 m, 15 May 1971, *A. Roubal* 1203 (PRC, no. det. 19393). – Kladno, ca 500 m SW of Kováry, 240 m, 8 May 1963, *A. Roubal* 351 (PRC, no. det. 19392). – Kladno, ca 1.8 km NE of Pchery, 20 May 1962, *A. Roubal* 274 (PRC, no. det. 19391). – Soušův mlýn [mill], between Běloky and Hostouň, 330 m, 27 Apr 1978, *A. Roubal* 6822 (PRC, no. det. 19381). – Sedlčany, Skoupý, Kozince, 450 m, 13 May 2007, *J. Malíček* (herb. J. Malíček, no. det. 19426); 2 Apr 2007, *J. Malíček* (herb. J. Malíček, no. det. 19425); 500 m, 49° 34' 35.6" N, 14° 20' 09.6" E, 13 Apr 2007, *Štěpánek, Karlík & Malíček* (PRC, no. det. 19396 & 19395). – Praha, Hlubočepy, Prokopské údolí, 500 m W of the railway station, 1998, *O. Šída* (PR, no. det. 19808). – Sedlčansko, Podmoky, 400 m, 27 Apr 2008, *J. Malíček* 1504 (herb. J. Malíček, no. det. 19810). – Praha, Dejvice, between Svatý Matěj and the ruin of Baba, 20 May 1971, *A. Plocek* (PRA, no. det. 19997). – Praha, Bubeneč, Pecka Hill, May 1971, *A. Plocek* (PRA, no. det. 19995). – Brandýs nad Labem, Zápy, 9 May 1926, *K. Podhajska* (PRC, no. det. 20982). – Libčice nad Vltavou, 200–250 m, 30 Apr 1932, *J. Dostál* 5208 (PRC, no. det. 20980). – Kladno, Vinařice, Vinařická hora [hill], 26 Mar 1938, *J. Šindelář* (PRC, no. det. 20971). – Srbsko, Koda Reserve, 380 m, 21 Apr 1978, *D. Haščynová* (PRC, no. det. 20996); 300 m, 2 May 1931, *J. Dostál* (PR, no. det. 28264); *P. Špryňar* 5 (PRC, no. det. 17456). – Praha, Řeporyje, Dalejský profil, 2013, *M. Řezáč* (herb. M. Řezáč, no. det. 27176). – Dobřichovice, Karlické údolí [valley], 10 May 1929, *I. Klášterský* 1944 (PR, no. det. 28299). – Praha, Řeporyje, 21 Apr 1928, *coll.?* [illegible] (PRC, no. det. 21012). – Hostín, valley of Kačák, 250 m, 26 Apr 1931, *M. Deyl & P. Sillinger* (PRC, no. det. 21011 & 28283). – Libčice nad Vltavou, Liběhrad, 50° 12' 13.5" N, 14° 21' 44.5" E, 10 Apr 2009, *M. Marek* (herb. M. Marek, no. det. 22923). – Beroun, 1.5 km SSW of Tetín, 360 m, 1 May 1996, *Z. Kaplan* 96/64 (PRA, no. det. 24110). – Podkozí, valley of Kačák, Dědkův mlýn, 22 May 2006, *M. Štěpánek* (PRC, no. det. 26891). – Praha, between Suchdol and Sedlec, 30 Apr 1964, *A. Skalická* (PRC, no. det. 27086). – Srbsko, Chlum [hill], 300 m, 49° 56' 48" N, 14° 08' 05" E, 25 Apr 2012, *R. Paulič* (herb. R. Paulič, no. det. 27157). – Praha, banks of the river Vltava between Troja and Roztoky, 17 Apr 1937, *A. Z. Hnízdo* (SOB, no. det. 14935). – Nový Knín, 8 May 1937, *J. Vácha* (PRC, no. det. 14897). – NW of Tuchoměřice, 1997, *M. Štech* 97/3 (herb. M. Štech, no. det. 14943). – Praha, Zlíchov, 23 Apr 1918, *G. Beck* (PRC, no. det. 14915). – Roztoky, Podbaba railway station, 15 May 1941, *M. Pulchart* (PRC, no. det. 14910). – Praha, Podbabské skály Reserve, Apr [19]72, *J. Kubíková* (PR, no. det. 28075). – Srbsko, 4 May 1982, *J. Kirschner* T339 (PRA, no. det. 15590). – Karlštejn, Velká hora [hill], *H. Erchinger* (PRA, no. det. 15583); 9 Apr 1946, *I. Klášterský* (PR, no. det. 28310). – Sázava River, between Pikovice and Davle, 220 m, 16 Apr 1932, *J. Dostál* (PRC, no. det. 14972). – Beroun, Karlštejn, SE slope of Velká hora, 1 Apr 1945, *Medlinová & Hejný* (PRC, no. det. 14967). – Karlštejn, Haknovec, 10 May 1929, *I. Klášterský* 1928 (PR, no. det. 28252). – Praha, Prokopské údolí, Apr 1931, *s. coll.* (PRC, no. det. 14931); *s. a., s. coll.* (PR, no. det. 28413). – Praha, Troja, 13 Apr. 1945, *Medlinová* (PRC, no. det. 14925). – Praha, Trojský most [bridge], 22 May 1956, *J. Soják* (PR, no. det. 28325). – Praha, Zlíchov, Děvín Hill, 6 May 1982, *J. Kirschner* T305 (PRA, no. det. 3207). – Praha, Radotín, Rutický mlýn, 18 Apr 1982, *J. Štěpánková & J. Štěpánek* T175, T176 & T174 (PRA, no. det. 3209). – Praha, Radotín, 250 m, 5 Apr 1930, *J. Dostál* (PR, no. det. 28268). – Praha, Motol, 11 May 1977, *J. Kirschner & J. Štěpánek* (PRA, no. det. 14837). – Příbram, Županovice, May 1971, *A. Plocek* (PRA, no. det. 7048). – Beroun, Srbsko, Koda, 16 May 1981, *J. Kirschner & J. Štěpánek*, cult. as no. JŠ 31 (PRA, no. det. 14840). – Beroun, Koněprusy, Lom Na Kobyle [quarry], 26 May 1991, *J. Štěpánek* (PRA, no. det. 14830). – Praha, Zlíchov, Děvín Hill, 6 May 1982, *J. Kirschner* (PRA, no. det. 14821). – Sýkořice, 1 km SE of the village, ca 340 m, 12 May 1983, *J. Štěpánek* (PRA, no. det. 14816); ca 360 m, 17 May 1987, *J. Štěpánek*, *Taraxaca* Exs., no. 404 (PRA, no. det. 29250). – Praha, Prokopské údolí [valley], N

- of Klukovice, 50° 02' N, 14° 22' E, 31 Mar 1990, *J. Kirschner*, *P. Oosterveld* & *J. Štěpánek* (PRA, no. det. 14841), cult. as JŠ 4108 (PRA, no. det. 15201). – Praha, Velká Chuchle, the church, 50° 01' N, 14° 23' E, Apr 1990, *J. Štěpánek* (PRA, no. det. 14842); cult. as JŠ 4110 (PRA, no. det. 15202). – Praha, Prokopské údolí, Butovice, Hemrovy skály [rocks], 15 Apr 1993, *O. Šída* (PRA, no. det. 3211). – Libčice, 14 Apr 1914, *L. F. Čelakovský* (PR, no. det. 28243). – Praha, Troja, ZOO, 9 Apr 1991, *L. Kirschnerová*, cult. as JK 708 & JK 709 (PRA, no. det. 14843). – Český kras, Liteň, Mramor Hill, 2 May 1981, *J. Kirschner* & *J. Štěpánek*, cult. as JŠ 14 (PRA, no. det. 14832). – Beroun, Koněprusy, 4 May 1982, *J. Kirschner T289, T291, T290 & T286* (PRA, no. det. 14827). – Praha, Děvín Hill, 1 May 1983, *L. Kirschnerová* & *J. Kirschner* (PRA, no. det. 14831). – Beroun, Vinařice, Šamor Hill, ca 480 m, 26 May 1991, *J. Štěpánek* (PRA, no. det. 14829); 2 May 1981, *J. Kirschner* & *J. Štěpánek* (PRA, no. det. 14825); cult. as JŠ 15 (PRA, no. det. 14834). – Praha, Kosoř, Černá rokle [gorge], 280–320 m, 2 May 1982, *J. Štěpánek T211, T206, T213 & T207* (PRA, no. det. 14811); 18 Apr 1982, *J. Štěpánková* & *J. Štěpánek T159 & T161* (PRA, no. det. 14839 & 27761); 330 m, 20 May 1982, *J. Štěpánek* (PRA, no. det. 15200). – Kladno, Uhy, ca 230 m, 9 May 1973, *A. Roubal 2832* (PRC, no. det. 11190). – Sedlčany, Skoupý near Petrovice, Kozinec Reserve, ca 480 m, 1 May 2003, *M. Soukup, V. Chán & V. Žíla* (herb. M. Soukup, no. det. 14854); 49° 34' 31.8" N, 14° 20' 04.8" E, 1 May 2003, *V. Žíla & V. Chán* (PR & herb. V. Žíla, no. det. 15269). – Petrovice, Kojetín, ca 450 m, 1 May 2003, *M. Soukup, V. Chán & V. Žíla* (herb. M. Soukup, no. det. 15020). – Sedlčany, Velká, 315 m, 49° 39' 43.7" N, 14° 14' 44.6" E, 5 May 2013, *J. Malíček 1916 & 1920* (herb. J. Malíček, no. det. 27663 & 27659). – Sedlčany, Zduchovice, Jezerná [hill], 445 m, 49° 38' 02" N, 14° 13' 12" E, 5 May 2013, *J. Malíček 1917* (herb. J. Malíček, no. det. 27662). – Sedlčany, 1 km WNW of Hrachov, 325 m, 49° 40' 08" N, 14° 16' 48" E, 5 May 2013, *J. Malíček 1919* (herb. J. Malíček, no. det. 27660). – Beroun, Liteň, Mramor Hill (466 m), 2 May 1981, *J. Štěpánek* (PRA, no. det. 27755). – Slaný, Drchkov, 15 May 1976, *J. Štěpánek* (PRA, no. det. 27756). – Praha, Prokopské údolí, 1 May 1983, *L. Kirschnerová & J. Kirschner* (PRA, no. det. 27757). – Praha, Hemrovy skály [reserve] near Butovice, 14 May 1976, *J. Štěpánek* (PRA, no. det. 27758). – Beroun, 1 km E of Srbsko, 25 May 1982, *J. Štěpánek* (PRA, no. det. 27762). – S Bohemia: Tábor District, Černýšovice, Hutě, 49° 18' 33.2" N, 14° 30' 27.5" E, 400 m, 11 May 2003, *V. Žíla* (herb. V. Žíla, no. det. 34080). – Strakonice District, village of Lhota u Sv. Anny, 620 m, 49° 13' 54.1" N, 13° 48' 47.1" E, 7 May 2012, *R. Paulič* (PL, no. det. 32827). – Písek District, Kovářov, Chrást, left bank of the Orlík Reservoir, 49° 31' 01.7" N, 14° 10' 15.2" E, 365 m, 8 May 2003, *V. Žíla* (herb. V. Žíla, no. det. 34073). – Počaply, Stražiště, ca 505 m, 49° 32' 58.9" N, 14° 00' 12.6" E, 30 Apr 2005, *V. Chán, M. Soukup & V. Žíla* (herb. M. Soukup, no. det. 16384); *V. Žíla* (herb. V. Žíla, no. det. 16383). – Protivín, Heřmaň, Benešovský mlýn, 2 May 1998, *V. Žíla* (herb. V. Žíla, no. det. 15076); cult. as JŠ 7464 (PRA, no. det. 29327). – Kovářov, Chrást, bank of Orlík Reservoir, ca 365 m, 49° 31' 01.7" N, 14° 10' 15.2" E, 8 May 2003, *M. Soukup, V. Chán & V. Žíla* (herb. M. Soukup, no. det. 20924). – Strakonice, 1 km E of Brloh, 4 May 1989, *V. Žíla, V. Chán & J. Kirschner* (herb. V. Žíla, no. det. 13578 & 14826). – Strakonice, W of Řepice, shore of Dolejší rybník [pond], ca 400–440 m, 9 May 1960, *J. Moravec* (PR, no. det. 28233). – Plešovec, 6 May 1996, *B. Mandák & V. Chán* (herb. B. Mandák, no. det. 21673). – Blatná, Doubravice, ca 515 m, 49° 21' 21.5" N, 13° 51' 21.4" E, 24 Apr 2009, *V. Žíla* (herb. V. Žíla, no. det. 22238). – Kraselov, Lhota u Svaté Anny, 640 m, 49° 13' 54.1" N, 13° 48' 47.1" E, 7 May 2012, *R. Paulič* (herb. R. Paulič, no. det. 27167). – Písek, Brloh near Drhovle, 455 m, 49° 19' 54.1" N, 14° 01' 44.2" E, 19 Apr 2012, *R. Paulič* (herb. R. Paulič, no. det. 27160). – Nerestce: Nerestský lom [reserve], 463 m, 49° 30' 29.0" N, 14° 04' 05.8" E, 24 Apr 2012, *M. Soukup* (herb. M. Soukup, no. det. 27139). – Nerestce, limestone quarry, 474 m, 49° 30' 30.7" N, 14° 04' 09.8" E, 24 Apr 2012, *M. Soukup* (herb. M. Soukup, no. det. 27138); 466 m, 49° 30' 27.3" N, 14° 04' 07.0" E, 24 Apr 2012, *M. Soukup* (herb. M. Soukup, no. det. 27136); 459 m, 49° 30' 26.8" N, 14° 04' 01.7" E, 24 Apr 2012, *M. Soukup* (herb. M. Soukup, no. det. 27135). – Orlík, Kožlí, 0.4 km SW of Velký Vír, 370 m, 49° 31' 13.3" N, 14° 09' 22.8" E, 16 May 2010, *R. Paulič* (herb. R. Paulič, no. det. 27123). – Strakonice, 1 km NW of Rovná, 430–445 m, 28 Mar 1997,

- O. Kovárnová* (PRC, no. det. 16107). – Drhovle, NE of Brloh, 21 Apr 2005, *R. Paulič* (CB, no. det. 16698). – Písek, Horosedly, limestone quarry, 27 Apr 1998, *V. Žíla* (herb. Žíla, no. det. 13572). – Protivín, Heřmaň, Benešovský Mlýn, 2 Apr 1998, *V. Žíla* (herb. Žíla, no. det. 13569). – Strakonice, Rovná, near Sedlina Hill, 5 Apr 1986, *V. Žíla* (herb. Žíla, no. det. 13580). – Protivín, Skály, a dam of Skalský rybník [pond], 10 Apr 1998, *V. Žíla* (herb. Žíla, no. det. 13565). – Strakonice, Drhovle, Paměťice, 27 Apr 1998, *V. Žíla* (herb. Žíla, no. det. 13560); *V. Chán & V. Žíla* (herb. V. Chán, no. det. 13591). – Horosedly, old limestone quarries ESE, 27 Apr 1998, [*V. Chán*] (herb. V. Chán, no. det. 13589). – Březnice, Čimelice, Krsice, 27 Apr 1998, *V. Žíla* (PR & herb. Žíla, no. det. 15094). – Klatovy, Bolešiny, Zámkovská hora [hill], 435 m, 3 May 1997, *M. Král* (herb. M. Král, no. det. 14027). – Tábor District, Hutě, 10 Apr 2002, [*J. Douda*] (herb. J. Douda, no. det. 15017). – Tábor District, Hutě, 200 m S of the village, 26 Apr 2002, [*J. Douda*] (herb. J. Douda, no. det. 15012). – Tábor District, Hutě, 17 Apr 2001, [*J. Douda*] (herb. J. Douda, no. det. 15013). – Písek, Kestřany, 49° 17' 22.1" N, 14° 07' 38.6" E, 21 Apr 2002, *V. Žíla* (PR & herb. Žíla, no. det. 14863). – Slabčice, W of the village, 1 May 2003, *M. Soukup, V. Chán & V. Žíla* (herb. M. Soukup, no. det. 14852). – Slabčice, banks of the river Vltava, 380 m, 49° 19' 25.3" N, 14° 18' 16.8" E, 1 May 2003, *V. Žíla* (herb. Žíla, no. det. 14849). – Písek, S part, bank of the river Otava, ca 380 m, 5 May 2003, *M. Soukup* (herb. M. Soukup, no. det. 15613). – Čížová, a hill with a church of Sv. Jakub, ca 500 m, 5 May 2003, *M. Soukup* (herb. M. Soukup, no. det. 15610). – Putim, ca 0.5 km NE, 380 m, 30 Apr 2003, *M. Soukup* (herb. M. Soukup, no. det. 15606). – Kovářov, Chrást, shore of Orlík Reservoir, 365 m, 49° 31' 46.1" N, 14° 10' 17.7" E, 8 May 2003, *V. Žíla* (herb. Žíla, no. det. 15288). – Milevsko, Petrovice, Kojetín, 450 m, 49° 34' 31.8" N, 14° 20' 04.8" E, 1 May 2003, *V. Žíla* (PR & herb. Žíla, no. det. 15324). – Písek, Čížová, 26 Apr 1999, *V. Žíla* (PR & herb. Žíla, no. det. 15532). – Protivín, Heřmaň, Benešovský Mlýn, 370 m, 30 Apr 2004, *M. Soukup* (herb. M. Soukup, no. det. 15551). – Strakonice, Hubenov, 28 Apr 1999, *V. Žíla* (PR & herb. Žíla, no. det. 15536). – Protivín, Heřmaň, Benešovský Mlýn, 2 Apr 1998, *V. Žíla*, cult. as JŠ 7059 (PRA, no. det. 27765). – Blatná, Bělčice, Slepíčí hora (556.5), 512 m, 49° 30' 09.6" N, 13° 51' 41.6" E, 1 May 2001, *V. Žíla* (PR, no. det. 28951). – Blatná, Zadní Topič [pond], 473 m, 49° 25' 12.6" N, 13° 54' 07.7" E, 1 May 2001, *V. Žíla* (PR, no. det. 28949). – Strakonice, Přešovice, Slaník, 8 May 2001, *V. Žíla* (PR, no. det. 28954). – C Moravia: Tišnov, Lomnice, 13 Apr 1848, *F. S. Pluskal* (PR, no. det. 28074). – Brno, Stránská skála, 12 May 1956, *V. Pospíšil* (BRNM, no. det. 17174). – Velké Meziříčí, Oslava, 5 May 1972, *J. Skryja* (BRNU, no. det. 20146). – Brno, Líšeň, Hornek, 420 m, 23 Apr 1967, *M. Smejkal* (BRNU, no. det. 20143). – Loštice, Bouzov, Zkamenělé zámky [rocks], 27 May 1905, *F. Čouka* (BRNU, no. det. 20201). – Brno, *sine dato*, *Uličný* (BRNU, no. det. 20658). – Náměšť na Hané, Hluboký žleb [valley], 10 May 1942, *J. Otruba* (PRC, no. det. 20981). – Čelechovice na Hané, SE foot of Velký Kosíř [hill] (442 m), 280 m, 26 Apr 1995, *Z. Kaplan* (PRA, no. det. 24019 & 24055). – Olomouc, Slatinice, Malý Kosíř [hill], 290 m, 25 May 1995, *Z. Kaplan 95/120* (PRA, no. det. 24092). – Prostějov, SW of Vranovice, 240 m, 11 May 1996, *Z. Kaplan 96/87 & 96/85* (PRA, no. det. 24090 & 24089). – Brno, Stránská skála, 4 May 1982, *J. Štěpánek* (PRA, no. det. 14815). – Kroměříž, Chvalnov, Východ 260 m, 7 May 1956, *H. Zavřel* (BRA, no. det. 27780). – Brno, Ostopovice, Urbanův kopec [hill], 305 m, 49° 09' 16" N, 16° 32' 40" E, 8 May 2013, *O. Rotreklová OR13/1125* (BRNU, no. det. 30348). – S Moravia: Bzenec, 28 Mar & 27 Apr 1882, *J. Bubela* (BRNM, no. det. 16974; JE, no. det. 17336; BRNU, no. det. 20205; PR, no. det. 28244). – Mikulov, Pavlovské kopce, 24 Apr 1931, *F. Švestka* (BRNM, no. det. 17182). – Znojmo, Podmolí, Šóbes, 9 Apr 1993, *V. Grulich* (BRNU, no. det. 18093). – Znojmo, Podmolí, Kozí hřbety, 18 Apr 1992, *V. Grulich* (BRNU, no. det. 18092). – Znojmo, Těšetice, Zmijiště, 24 Apr 1993, *V. Grulich* (BRNU, no. det. 18090). – Znojmo, Kraví hora [hill], 16 Apr 1992, *V. Grulich* (BRNU, no. det. 18088). – Čížov, 2.6 km SSW, 17 Apr 1992, *V. Grulich* (BRNU, no. det. 18087). – Znojmo, near the castle, 26 Apr 1984, *J. Kirschner* (PRA, no. det. 19996). – Výmyslice, valley of the river Rokytá, Apr 1932, *J. Suza* (BRNU, no. det. 20210). – Pouzdřany, Kolby Reserve, 24 Apr 1949, *M. Součková* (BRNM, no. det. 21541). – Znojmo, 2.5 km SW of Lukov, 340 m, 18 Apr 1992, *Z. Kaplan* (herb. Z. Kaplan, no. det. 25186). – Břeclav, Klentnice, Pálava Hill, 460 m, 1 May 1992, *Z. Kaplan* (herb. Z. Kaplan,

no. det. 25183). – Bzenec, Starý Hrad, 28 Mar & 27 Apr 1882, *J. Bubela* (PR, no. det. 28341 & 28314; WU, no. det. 21984). – Bzenec, ca 2,300 m SE of the railway station, 205 m, 48° 57' 26.552" N, 17° 17' 17.156" E, 24 Apr 2010, *J. Zámečník* (herb. *J. Zámečník*, no. det. 25292). – Bzenec, ca 700m NNE of the railway stop of Bzenec-Přívoz, 198 m, 48° 56' 34.471" N, 17° 17' 31.048" E, 24 Apr 2010, *J. Zámečník* (herb. *J. Zámečník*, no. det. 25291). – Moravský Krumlov, Krumlovsko-rokytenské slepence [reserve], 300 m, 49° 03' 10.372" N, 16° 19' 07.63" E, 21 Apr 2011, *J. Zámečník* (herb. *J. Zámečník*, no. det. 25179). – Moravský Krumlov, St. Florian chapel, 49° 02' 52.029" N, 16° 19' 10.740" E, 21 Apr 2011, *J. Zámečník* (herb. *J. Zámečník*, no. det. 25181). – Moravský Krumlov, Bohutice, Leskoun Hill, May 1929, *F. Weber* (PR, no. det. 28272). – 2.9 km S of Strážnice, 7 May 2004, *J. W. Jongepier* (BRNU, no. det. 15218). – Bzenec-Přívoz, Váté písky Reserve, 4 May 2003, *J. W. Jongepier* (herb. *J. Jongepier*, no. det. 15240). – Bzenec, sands near Lideřovice, May 1933, *F. Weber* (PRC, no. det. 14905). – Znojmo, S of the castle, Apr 1981, *J. Kirschner*, cult. as JŠ 2 (PRA, no. det. 15588). – Znojmo, S of the town, 26 Apr 1984, *J. Kirschner* (PRA, no. det. 14823). – Rohatec, sandy sites near the railway, 5 May 1985, *J. Kirschner* (PRA, no. det. 15203), distributed as *Taraxaca* Exs., no. 402 (PRA, no. det. 29252); 3 May 1984, *J. Kirschner*, distributed as *Taraxaca* Exs., no. 403 (OXF, no. det. 11998; PRA, no. det. 29254); 11 May 1985, *A. van der Hulst*, *J. C. M. den Nijs*, *J. Kirschner* & *J. Štěpánek* (PRA, no. det. 14817); 14 May 1982, *J. Kirschner* (PRA, no. det. 14818). – Moravský Krumlov, near the railway station, 16° 20' E, 49° 03' N, 23 May 1989, *P. Bureš* (herb. *P. Bureš*, no. det. 7304), cult. as JŠ 4134 (PRA, no. det. 3210). – Znojmo, heathlands S of the town, 1 May 1981, *J. Kirschner*, cult. as JŠ 25 (PRA, no. det. 14828). – Břeclav, Valtice, Boří les, Chapel of St. Hubert, 188 m, 2 May 1997, *J. Danihelka* (MMI, no. det. 13632). – Valtice, ca 1.9 km ENE of the station Valtice-město, 200 m, *J. Danihelka* 97/1015 (MMI, no. det. 13975). – Bzenec-Přívoz, Váté písky [reserve], 30 Apr 1993, *J. W. Jongepier* (herb. *Jongepier*, no. det. 15125). – Rohatec, ca 185 m, 48° 53'–48° 53' 20" N, 17° 11'–17° 11' 30" E, 30 Apr 1995, *J. Štěpánek* (PRA, no. det. 27764). – Znojmo, the chateau hill, 27 Apr 1917, *H. Zerny* (W,

no. det. 1100). – Hlohovec, near SE shore of Hlohovecký rybník [pond], 170 m, 3 May 2003, *J. Danihelka* (BRNU, no. det. 30331). – Mikulov, Turoid, 17 Apr 1991, *M. Rigasová* (MMI, no. det. 31550). – Břeclav, Milovice, Milovická stráž (Reserve), ca 0.85 km S of the village steeple, 210–240 m, 5 Apr 2001, *J. Danihelka* DA 01/424 (MMI, no. det. 31534). – Znojmo, 2 km SE of Konice, Suchý kopec [hill], 26 Apr 1984, *V. Grulich* (MMI, no. det. 31888). – Znojmo, 3 km SW of Podmolí, Nový Hrádek, 15 May 1984, *V. Grulich* (MMI, no. det. 31881). – Znojmo, 2 km SW of Lukov, 16 May 1984, *V. Grulich* (MMI, no. det. 31889). – Hustopeče, Pouzdřany, Pouzdřanská step [reserve], 27 Apr 1986, *M. Chytrý* (BRNM, no. det. 31136). – Bzenec, along railway ca 3.0 km SSE of the station, 185 m, 5 May 1991, *R. Řepka* 14360 (BRNM, no. det. 31123). – Znojmo, Hostěradice na Moravě, ca 220 m, 48° 57' 10" N, 16° 15' 45" E, 29 Apr 2003, *K. Sutorý* (BRNM, no. det. 31124). – Břeclav, Pavlov near Dolní Věstonice, Děvín Hill, 48° 53' 41" N, 16° 39' 47" E, 26 Apr 2001, *K. Sutorý* (BRNM, no. det. 31129). – Pavlovské kopce, near the ruin of Děvičky Castle, 350 m, 22 Apr 1934, *A. Kluge* (MP, no. det. 34260). – Břeclav District, 2.7 km SW of Dolní Dunajovice, 275 m, 48° 50' 25.25" N, 16° 33' 50.98" E, 27 Apr 2018, *J. Zámečník* (herb. *J. Zámečník*, no. det. 34850). – Hodonín District, Kyjov, 1 km NE of Milotice, 182 m, 48° 57' 51.506" N, 17° 8' 50.813" E, 27 Apr 2018, *J. Zámečník* (herb. *J. Zámečník*, no. det. 34724). – Pavlovské kopce, Turoid Reserve, 310 m, 48° 49' 0.914" N, 16° 38' 20.834" E, 19 Apr 2018, *M. Pida*, *T. Révajová* et *P. Zdvořák* (PRC, no. det. 32949). – Valtice, ca 2.2 km S of Hlohovec, 205 m, 3 May 2003, *J. Danihelka* (BRNU, no. det. 30329).

AUSTRIA. Nieder-Oesterreich, Föhrenkogel u/ Rodaun [partly illegible], 3 May 1883, [collector illegible] (JE, no. det. 17365). – Wien, Prater, along the Donaukanal, ca 1 km NE of Freudenuer Hafenuerbrücke, 159 m, 25 Mar 1990, *E. Hörandl* (herb. *E. Hörandl*, no. det. 19993). – Burgenland, Parndorf, Alte Schanze, 184 m, 6 May 1988, *E. Hörandl* (herb. *E. Hörandl*, no. det. 19992). – Burgenland, ca 2 km NW of Donnerskirchen, ca 280–300 m, 21 Apr 1979, *E. Krendl* & *F. Krendl* (W, no. det. 21456). – Niederösterreich, Wachau, ca 2–3 km NW of Weissenkirchen, ca 450–500 m, 10 Apr 1982, *F. Krendl* (W, no. det. 21452). – Niederösterreich, Waldviertel,

ca 1 km NE of Schönberg am Kamp, ca 350–400 m, 23 Apr 1977, *F. Krendl* (W, no. det. 21423). – Burgenland, Jois, Jungerberg, ca 200 m, 6 Apr 1974, *F. Krendl* (W, no. det. 21422). – Nieder Oesterreich, 2.5 km NE of Merkersdorf, Umlaufberg, 350 m, 17 Apr 1992, *Z. Kaplan* (herb. Z. Kaplan, no. det. 25185). – Wien-Floridsdorf, Bisamberg, ca 1.5 km NW of Stammersdorf, 240 m, 23 Apr 1988, *W. Gutermann* (herb. W. Gutermann, no. det. 22059). – Nieder Oesterreich, Baden, 12 Apr 1902, *J. Witasek* (WU, no. det. 21968). – Nieder-Oesterreich, Marchfeld, Gänserndorf, 167–170 m, 23 Apr 1994, *J. Greimler* (WU, no. det. 21938). – Nieder-Oesterreich, Wien, Prater, 9 May 1886, Herb. *K. Richter* (WU, no. det. 21832). – Weinviertel, Kleinreinsprechtsdorf, ca 5 km E of Eggenburg, 280 m, 5 May 1986, *W. Gutermann 20821* (herb. W. Gutermann, no. det. 21218). – Niederösterreich, Wimpassing, 26 Apr 1958, *K. H. Rechinger* (W, no. det. 20835). – Niederösterreich, Wien, Obere Augartenstrasse, 5 May 1970, *W. Forstner* (W, no. det. 20838). – Niederösterreich, Wien, Danube dam below Floridsdorfer Brücke, 5 May 1970, *W. Forstner* (W, no. det. 20839). – Niederösterreich, Marchfeld between Deutsch Wagram and Strasshof, 9 Apr 1972, *M. Pull* (W, no. det. 20848). – Niederösterreich, between Wolfsthal and Berg, Apr 1889, *C. Aust* (PR, no. det. 28617). – Wien, Türkenschanze, Apr 1879, *R. Traxler* (PR, no. det. 28856). – Niederösterreich, Baden, 3 May 1905, *Richter* (PR, no. det. 29002).

SLOVAKIA. Localities published by Dudáš et al. (2020) are not repeated here; they are considered as reliable, and are displayed on the map (Fig. 2). – Kováčovské kopce, between Kamenica and Kováčov, 200 m, 9 Apr 1950, *J. Dostál* (PRC, no. det. 21028). – Biele Karpaty, Vršatec, Krivoklátska dolina, Babiná, 26 Apr 1994, *K. Devánová* (herb. K. Devánová, no. det. 15194). – Strážovská hornatina, Mnichova Lehota, Mnichova úboč, 16 Apr 1993, *K. Devánová* (herb. K. Devánová, no. det. 15189). – Borský Mikuláš, E outskirts, 25 Apr 1989, *J. W. Jongepier* (herb. J. W. Jongepier, no. det. 15113). – Malé Karpaty, Čachtice Castle, 11 May 1989, *J. W. Jongepier* (herb. J. W. Jongepier, no. det. 15109). – Záhorská nížina, Veľké Leváre, Abrod Reserve, 153 m, 48° 32' 7.36" N, 17° 00' 12.88" E, 24 Apr 2009, *J. Zámečník* (herb. J. Zámečník, no. det. 22850). – Záhorská nížina, ca 2.7 km W of Lakšárska Nová Ves, 215 m, 48° 34' 39.497" N, 17° 08' 58.184" E, 24 Apr 2009,

J. Zámečník (herb. J. Zámečník, no. det. 22882). – Záhorská nížina, along the river Rudava W of the bridge, 175 m, 3 May 1995, *Z. Kaplan 95/54* (PRA, no. det. 24034). – Veľké Leváre, Abrod Reserve, 3 May 2012, *J. Kučera* (herb. Jaromír Kučera, Bratislava, no. det. 26919). – Štúrovo, Čenkov, ca 1–1.5 km E of Čenkovská lesostep [reserve], 26 Apr 1982, *J. Štěpánek T309* (PRA, no. det. 15586). – Malacky, along the river Rudava, ca 2 km SW of Studienka, 190 m, 10 May 1987, *J. Kirschner & J. Štěpánek* (PRA, no. det. 15589). – Záhorská nížina, N of Lakšárska Nová Ves, 5 May 1983, *J. Kirschner & J. Štěpánek* (PRA, no. det. 14819). – Záhorská nížina, ca 6–7 km E of Malacky, 4 May 1987, *J. Kirschner & J. Štěpánek* (PRA, no. det. 14813). – Záhorská nížina, Závod, near Abrod Reserve, 1982, *J. Kirschner*, cult. as JŠ 200 (PRA, no. det. 14812). – Bratislava, N of Devínska Nová Ves, 26 Apr 1982, *J. Kirschner* (PRA, no. det. 14820). – Malacky, Závod, 5 May 1983, *J. Kirschner & J. Štěpánek* (PRA, no. det. 14824); 27 Apr 1982, *J. Kirschner* (PRA, no. det. 14822). – Bratislava, 1 km N of Vajnory, Panónsky háj, 29 Apr 1985, *J. Štěpánek* (PRA, no. det. 14836). – Malé Karpaty, a ridge ca 0.5 km E of the Ostrý kameň ruin, between Buková and Smolenice, 400–600 m, 17 May 1984, *J. Kirschner* (PRA, no. det. 14838). – Malé Karpaty, castle near Smolenice, 12 May 1962, *M. Deyl* (PR, no. det. 28241). – Malé Karpaty, Bratislava, Sv. Jur, 150 m, 31 Mar 1990, *B. Trávníček* (herb. Trávníček, no. det. 13615). – Bratislava, SW slopes of Devínska Kobyla, 16° 59' 0" E, 48° 11' N, 20 Apr 1990, *V. Feráková*, cult. as JŠ 4786 (PRA, no. det. 27754). – Biele Karpaty, Trenčín, Vršatecké Podhradie, Vršatec, 6 May 1982, *J. Štěpánek* (PRA, no. det. 27760). – Záhorská nížina, Lakšárska Nová Ves, 5 May 1983, *J. Kirschner & J. Štěpánek* (PRA, no. det. 27763); 4 May 1984, *J. Kirschner*, distr. as Taraxaca Exs., no. 400 (PRA, no. det. 29258), and Taraxaca Exs. no. 401 (PRA, no. det. 29256). – Borský Svätý Júr, 48° 36' 49.83" N, 17° 02' 19.33" E, 174 m, 27 Apr 2012, *J. Zámečník* (herb. J. Zámečník, no. det. 27829). – Malé Karpaty, Mt Roštún near Sološnica, 16 Apr 1939, *V. Valenta* (BRA, no. det. 27786). – Malé Karpaty, Sološnica, Mt Malý Roštún, 451 m, 48° 27' 20.794" N, 17° 15' 12.017" E, 2 May 2013, *J. Zámečník* (herb. Zámečník, no. det. 28698). – Smolenice, near Trstín, 250 m, 14 Apr 1976, *J. Dvořák* (BRA, no. det. 27813). – Malé Karpaty, Pohanská [Hill] above Plavecké Podhradie, 400 m, 9 Apr 1939, *V. Valenta* (BRA,

no. det. 27784). – Slovenský kras, Domic Cave, Apr 1936, *I. Klášterský* (PR, no. det. 28260). – Devínska Kobyla, SE of Svätopluk [local allotments], 19 Apr 1984, *Halada* (SLO, no. det. 28822). – Devínska Kobyla, Devínska cesta, 19 Apr 1984, *Feráková, Drábová, Ondrušová & Halada* (SLO, no. det. 28820). – Bratislava, SW slopes of Devínska Kobyla, 21 Apr 1983, *V. Feráková*, cult. as JŠ 1006 (PRA, no. det. 28814). – Senica, Šajdíkové Humence, 2.5 km SSW of the village, 25 Apr 1989, *V. Grulich & B. Trávníček* (MMI, no. det. 31905). – Senica, Borský Mikuláš, 25 Apr 1989, *V. Grulich & B. Trávníček* (MMI, no. det. 31903). – Senica, Borský Mikuláš, 1.5 km W of the village, 17 Apr 1983, *V. Grulich* (MMI, no. det. 31861). – Senica, Brodské, 22 Apr 1984, *V. Grulich* (MMI, no. det. 31882). – Senica, Gbely, 1.5 km SSW of the railway stop, 22 Apr 1984, *V. Grulich* (MMI, no. det. 31880). – Trenčín District, Dolná Súča, Krasín Hill, 27 Apr 2018, *M. Dudáš* (KO, no. det. 34823, 34825, 34834). – Ilava District, Košecké Podhradie, Košeca Castle, 450 m, 48° 58' 33.2" N, 18° 18' 26.4" E, 28 Apr 2018, *M. Dudáš* (KO, no. det. 34826). – Trenčín District, Dolná Poruba, Slopský vrch [hill], 27 Apr 2018, *M. Dudáš* (KO, no. det. 34824). – Považská Bystrica District, Záskalie, Mt Veľký Manín, limestone rocks above Vápencová jaskyňa, 834 m, 49° 08' 03.8" N, 18° 30' 12.3" E, 30 Apr 2018, *M. Dudáš* (KO, no. det. 34822). – Strážovské vrchy, Omšenie [village], Mt Langáč, 620 m, 48° 54' 44.4" N, 18° 12' 57.8" E, 13 Apr 2017, *M. Dudáš* (KO, no. det. 33882). – Strážovské vrchy, Omšenie [village], Mt Baba, 30 Apr 2017, *M. Dudáš* (KO, no. det. 33877). – Strážovské vrchy, Omšenie [village], Mt Sokolovica, 30 Apr 2017, *M. Dudáš* (KO, no. det. 33875). – Rožňava District, Slovenský kras, Brzotín, Brzotínske skály Reserve, 6 May 1954, *J. Holub* (PRA, no. det. 33885). – Nitra, Zoborská lesostep [reserve], 48° 20' 52.968" N, 18° 05' 45.374" E, Apr 2018, photo *Jiří Kameníček* (no. det. 34155). – Malé Karpaty Mts, Trnava District, Buková, ruin of the Ostrý Kameň castle, 466 m, 28 Apr 2018, *J. Zámečník* (herb. J. Zámečník, no. det. 34720, 34743 & 34735). – Cerová vrchovina [hills], Drňa, towards Birín Hill, 15 May 1977, *J. Holub* (PRA, no. det. 35176). – Javorníky Mts, Povážska Bystrica District, Udiča, Klapy Reserve, 517 m, 49° 09' 40" N, 18° 25' 03" E, 29 Apr 2017, *M. Dudáš*, cult. by J. Zámečník as 477/2017 (herb. J. Zámečník, no. det. 35397). – Strážovské vrchy Mts, Uhrovské Podhradie, Uhrovský hrad [castle], 598 m, 1

May 2020, *M. Dudáš* (KO, no. det. 35723). – Slovenský kras, Gemerská Hôrka, Skalná ruža [hostel], ca 235 m, 21 Apr 2020, *M. Dudáš* (KO, no. det. 35744). – Bratislava, Devínska Kobyla, the reserve on SW slopes, 21 Apr 1983, *V. Feráková 2* (PRA, no. det. 35496, chromosome number: $2n = 24$, counted by J. Štěpánek as 35/84); *Ibidem*: cult. as JŠ 1006 (PRA, no. det. 35503). – Komárno, Veľké Kosihy, Derhídia, 30 Apr 1987, *V. Grulich* (MMI, no. det. 9368). – Košice, Podhradová, 26 Apr 2015, *M. Dudáš* (KO, no. det. 30171).

HUNGARY. Veszprém Region, Tapolca Distr., Zalahaláp, 1 km N, 295 m s.m., 46° 55' 27.8" N, 17° 27' 34.0" E, 18 Apr 2015, *J. Zámečník, B. Trávníček & G. Király* (herb. J. Zámečník, no. det. 32467); 46° 56' 30" N, 17° 25' 36" E, *B. Trávníček* (OL, no. det. 32805); Zalahaláp, Haláp Hill, 46° 55' 25" N, 17° 27' 34" E, *B. Trávníček* (OL, no. det. 32799). – Pápa, Noszlop village, 47° 10' 41" N, 17° 28' 23" E, 18 Apr 2015, *B. Trávníček* (OL, no. det. 32795). – Pákozd, S of the village, 131 m, 47° 13' 10" N, 18° 34' 43" E, 8 Apr 2014, *G. Király*, cult. as JŠ 10464 (PRA, no. det. 33447). – NE Hungary, distr. Sopron-Fertődi kistérség, village of Sopronköhida, Győr-Moson-Sopron megye, Nezíder Lake, 1,490 m NNE of the centre of the village, 172 m, 47° 44' 14.5" N, 16° 37' 25.9" E, 7 Apr 2014, *J. Zámečník, B. Trávníček & G. Király* (herb. J. Zámečník, no. det. 29388). – Hungary, Fertőrákos village (near Sopron town), near quarry NW of the village, 47° 44' 11" N, 16° 37' 13" E, 7 Apr 2014, *B. Trávníček* (OL, no. det. 29662).

POLAND. Reliable records published by Wolanin and Musiał (2018) are not repeated here, only displayed on the map (Fig. 2)

GERMANY. Uhlemann (2003: 35).

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