Two new apomictic *Taraxacum* microspecies of the section *Erythrosperma* from Central Europe

Dva nové druhy pampelišek ze sekce *Erythrosperma* ze střední Evropy

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Two new species, *Taraxacum maricum* and *Taraxacum cristatum,* of the section *Erythrosperma* from Central Europe are described in this paper. These species are similar to western European taxa, *T. maricum* to *T. proximum*, and *T. cristatum* is morphologically close to *T. scanicum*. Both new taxa are triploid apomictic microspecies. Specific characteristics, information on distribution and ecology and comparison with similar species are presented. Pictures and distribution maps of the new species are also included.

Keywords: Central Europe, chromosome number, geographical distribution, new species, *Taraxacum* sect. *Erythrosperma*, taxonomy

Introduction

Biosystematical research of agamospermy has a long tradition in Central Europe and continues to yield new remarkable results (e.g. Krahulec et al. 2004, Øllgaard 2003). Recently our interest has been focused on *Taraxacum* sect. *Erythrosperma* (H. Lindb.) Dahlst., a section that comprises approximately 150 species. They usually occur in xerothermic and dry habitats. In the eastern part of Central Europe, twelve previously described species of the section *Erythrosperma* have been recognized and their distributions described (Kirschner & Štěpánek 1995, 1997, 1998, Kirschner et al. 2002, Trávníček & Hájek 1996, Vašut 2003). During a study of the lesser dandelions in Czechia, several common morphotypes were recognized (e.g. Vašut 2001, 2003). Most of them occur in only a few localities, and some have unresolved relationships to species described by Klášterský (1938) and van Soest (1966) from Slovakia and Austria, respectively. South Moravia, S Slovakia, E Austria and Hungary are parts of Central Europe where diploid sexual plants of the section *Erythrosperma* can be found. They are classified as a separate species, *Taraxacum erythrospermum* Andrz., morphologically very polymorphic and therefore sometimes difficult to identify. This is because morphological characters of the diploids overlap those of apomictic microspecies. Moreover, there is a potential of hybridization between *T. erythrospermum* and the apomictic microspecies (see also Richards 1970, Vašut 2003).

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The authors have observed some of these morphotypes for more than a decade. The intensive study of the lesser dandelions on the western margin of the Pannonian basin in recent years (e.g. Vašut 2001, 2003) has improved our knowledge of the morphology and plasticity, as well as the ecological behaviour and distribution of four morphotypes. The recent description of *Taraxacum prunicolor* M. Schmid et al. and *T. princeps* Vašut et Trávníček (Schmid et al. 2004, Vašut & Trávníček 2004) is followed by the description of the remaining two species, i.e. *T. maricum* Vašut et al. spec. nova and *T. cristatum* Kirschner et al. spec. nova, in this paper.

Material and methods

The present study is a continuation of an investigation of the lesser dandelions in Moravia published by the first author (Vašut 2003). Detailed information on Methods is published there. In addition, plants were studied at and from dozens of localities in Austria, Hungary and Slovakia.

Description of new species

Taraxacum proximum group

Although *Taraxacum proximum* (Dahlst.) Raunk. s.l. certainly belongs to the section *Erythrosperma*, it is morphologically (and partly ecologically) intermediate between species of this section and the section *Ruderalia* Kirschner et al. *T. proximum* is not a homogenous species in Europe (Oosterveld 1993, Oosterveld in Schmid et al. 1998, Vašut 2003). The most common morphotype in NW Pannonia, clearly different from Dahlstedt's *T. proximum* s. str., is known from many localities in Moravia, W Slovakia and Lower Austria, and is described here as a new species.

Taraxacum maricum Vašut, Kirschner et Štěpánek, **spec. nova** Fig. 1–3

[*T. maricum* Vašut, Kirschner et Štěpánek, nomen, in Uhlemann (2003: 36)]

Descriptio: Plantae subgraciles usque mediocres. Folia subpatentia usque suberecta, circumscriptione anguste elliptica vel oblanceolata, plerumque 7–15(–20) cm longa, 2.0–3.5(–5.0) cm lata, cano-viridia, non splendida, immaculata. Lobus terminalis foliorum interiorum elongatus, longe triangularis, galeatus, margine proximali leviter sigmoideo vel recto, integro, margine distali sigmoideo et integerrimo. Lobi laterales plerumque numero 3–5 utrobique, plerumque oppositi vel fere oppositi, foliorum exteriorum triangulares, marginibus distalibus rectis vel convexis, integris vel raro minute denticulatis, marginibus proximalibus rectis; lobi laterales foliorum intermediorum et interiorum plerumque triangulares usque anguste triangulares, acuti, marginibus distalibus leviter sigmoideis vel convexis, plerumque integerrimis vel sparse denticulatis, tamen in speciminibus luci valde expositis distincte dentatis, marginibus proximalibus rectis vel sigmoideis, rarius dentatis. Interlobia lata et brevia, imprimis foliorum intermediorum interdum longe acuteque dentata (dentibus usque 0.5 cm longis). Petiolus angustus, violaceus, nervus medianus ex dimidia parte subviolaceus. Scapus folia superans, inferne violaceus, maturans totus violaceus, ad apicem plerumque araneosus. Calathia convexa, ad 2.5–3.0 cm in diametro, (in margo pallide, in centro saturate) lutea, ligulae marginales planae, subtus taenia media olivaceo-subbrunnea ornatae. Squamae involucris interiores pruinosae, obscure virides, irregulariter latae (aliqua longitudinaliter conjunctae), ad apicem corniculatae; squamae exteriores anguste ovatae usque anguste lanceolatae, 6.5-8 mm longae, 1.5-3 mm latae, fere regulariter recurvatae, numero 11–14, plerumque supra griseo-virides usque subrubescentes, plerumque ad margines rubrae et albidomembranacee praetextae, ad apicem corniculatae. Stigmata olivacea, sicca atra. Antherae polliniferae. Achenia purpureo-brunnea, sicca brunnea,

Fig. 1. Holotype of *Taraxacum maricum*. Bar = 5 cm.

immatura (luteo-)rutila, in parte superiori dense spinulosa, in parte inferiori tuberculata usque levia, 3.8–4.1 longa (pyramide inclusa), in pyramidem anguste conicam usque cylindricam, 0.7–1.0 mm longam subabrupte transeuntia. Rostrum 6–8 mm longum, pappus 5–6 mm longus, sordide albidus. Species apomicta (agamosperma) e sectione *Erythrospermorum*.

H o l o t y p u s : Moravia australis, distr. Hodonín, oppidum Bzenec: in graminosis siccis arenosisque haud procul oppidi, 2 km ad meridiem ab ecclesia in centro oppidi versus (loca protecta "Vojenské cvičiště Bzenec"), 200 m s. m., 48°58'N 17°17'E. Leg. R. J. Vašut, 23. 4. 2000 (Fig. 1). Holotypus in PR conservatur (colectio typorum, no. 11642), isotypi in OL, PRA, herb. H. Øllgaard et in herb. R. J. Vašut (no. 156.1).

E x s i c c a t a : Kirschner et Štěpánek, Taraxaca Exsiccata, fasc. XIII (2003), no. 605–608 (no. 608 paratypi).

E t y m o l o g y : named after the river Morava (Marus in Latin, March in German). The new species is common in the catchment area of this river.

K a r y o l o g y : 2n = 3x = 24 (S Moravia: Pouzdřany); 2n ~ 3x (distinguished by flow-cytometry from six localities: SW Moravia: Oleksovice; S Moravia: Bulhary; S Moravia: Hodonín, along the road Hodonín – Dubňany; S Moravia: Pouzdřany; SW Moravia: Hluboké Mašůvky).

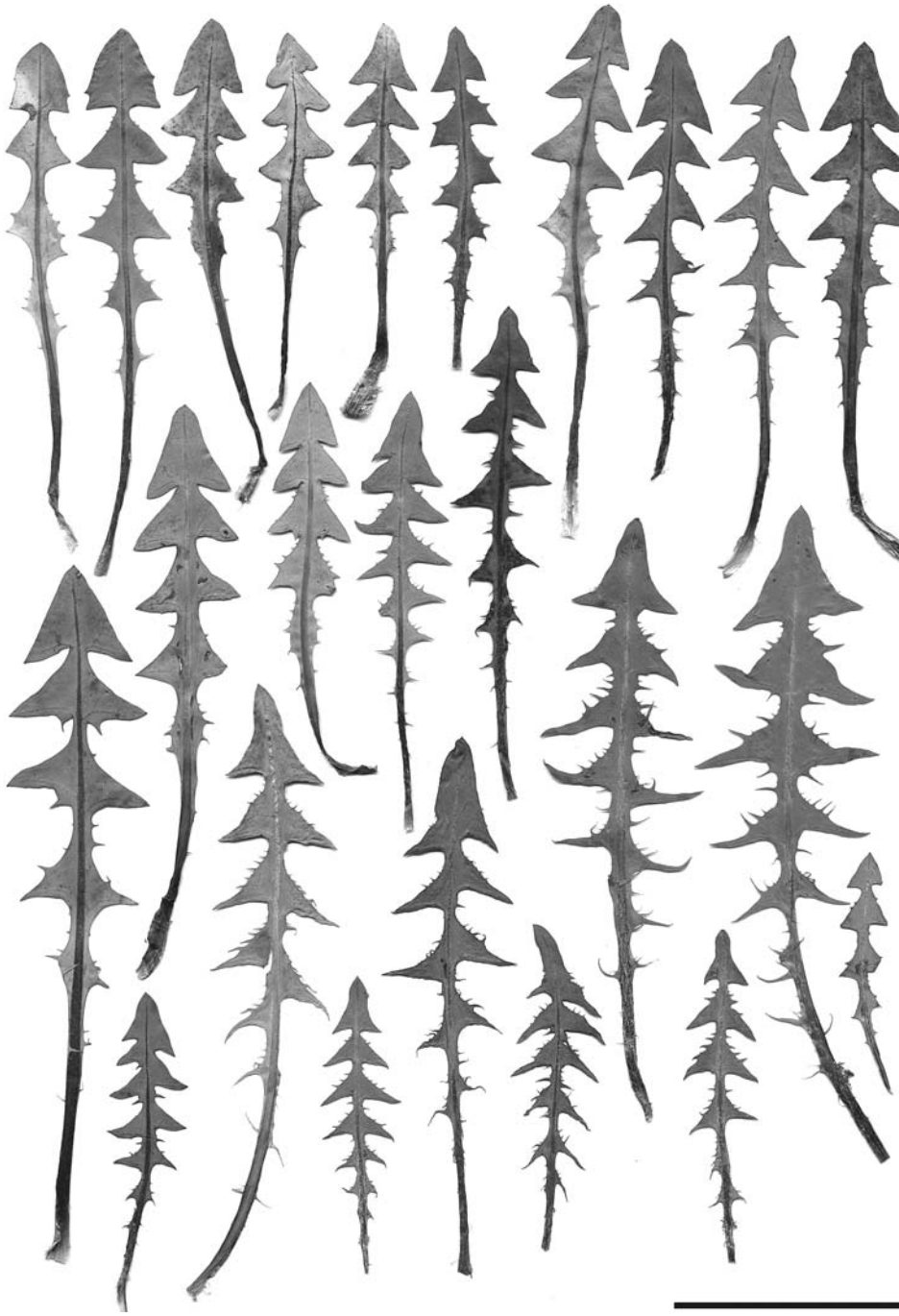

Fig. 2. Variation in leaf-shape in *Taraxacum maricum* . Leaves are from plants growing in different localities and habitats. Bar = 5 cm.

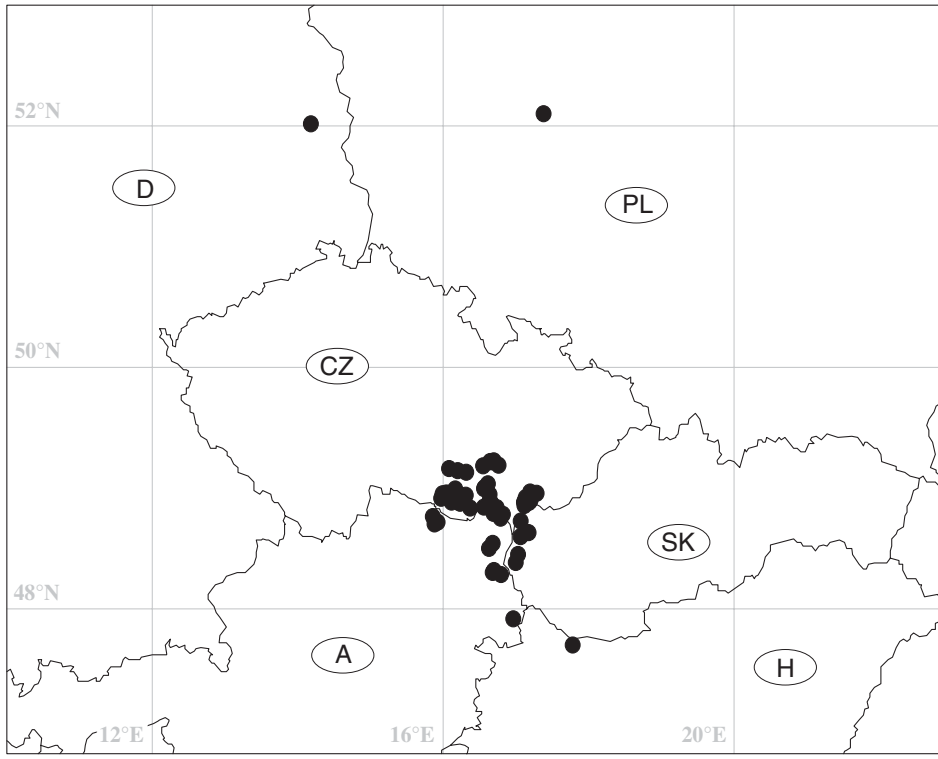

Fig. 3. – Presently known distribution of *Taraxacum maricum* in Central Europe.

S i m i l a r s p e c i e s : *Taraxacum maricum* is similar to *T. proximum*. It is distinguished from the latter by a unique character combination: short leaf shape with usually only 3–5 short lateral lobes which are usually entire or slightly denticulate on the distal margin; capitulum is distinctly convex and darker in the middle; outer bracts are corniculate and distinctly bordered with a white hyaline margin and very often also with a reddish border; anthers are polliniferous; achenes are red-brown, brown when dried. Differences between these species are summarized in Table 1.

Another two species similar to *T. proximum* were described. *T. pseudoproximum* Soest was described from Nieuwenhoorn in the province Zuid-Holland (the Netherlands). This species differs from *T. maricum* in having a markedly different leaf-shape. Leaves of *T. pseudoproximum* are broader in outline (i.e. lateral lobes are longer, with a slightly elongated apex), have more lateral lobes (5–8) than those of *T. maricum* and their interlobes are very short (lateral lobes are close together). Achenes of the holotype are brown. Unfortunately, it has only been found at Nieuwenhoorn. The second species, *T. proximiforme* Soest, is known from the United Kingdom and the Channel coast of France, Belgium and the Netherlands (Dudman & Richards 1997) and can be distinguished by having straw-coloured achenes and more lateral lobes than *T. maricum*.

In Central Europe, older plants (which have inner leaves only) can be superficially confused with *T. plumbeum* Dahlst. Inner leaves of older plants (collected in May or later) or

Table 1. – Main differences between *Taraxacum maricum* and *T. proximum*

Character	*T. maricum*	*T. proximum*
Pollen	present	absent
Strip of outer ligules	grey-violet	purple
Outer bracts	bordered	not bordered
Colour of achenes	red-brown	dark brown
Terminal lobe	obtuse	acute
Lateral lobes	3–5 entire to slightly denticulate	4–6 entire to distinctly denticulate

plants collected on very sunny sites can have quite narrow lateral lobes with denticulate distal margins. The terminal leaf-lobe may be narrow (as in *T. plumbeum*) and also slightly denticulate on distal margin. *Taraxacum plumbeum* is easily distinguished from *T. maricum* by the very dark involucrum, erect and violet-reddish outer bracts and light brown achenes with a short cone (max. 0.8 mm long).

E c o l o g y : *Taraxacum maricum* usually occurs in semi-ruderal dry habitats, mainly on sandy soils. It prefers subruderal habitats like paths in open woods on sandy soils, especially locust-woods (*Balloto nigrae-Robinion*), and to a lesser extent oak- or pine-woods. The species can also occur in ruderal places, e.g. abandoned mining areas, railway stations or road margins. It is rarely observed as a weed in vineyards.

D i s t r i b u t i o n : *Taraxacum maricum* occurs in lowlands in the western part of Pannonian basin, and follows the river Morava (March) and its tributaries, especially Dyje (Thaya) (Fig. 3). It is quite common in sandy areas of S Moravia, W Slovakia (Záhorie) and E Austria (Marchfeld). In Moravia the species is most plentiful near the town of Hodonín (Doubrava wood) and northwards to the town of Znojmo. However, occurrence in N Hungary is highly probable, although there is only one record (near Györ). One isolated locality is documented for Brandenburg, Germany (Uhlemann 2003). Another is recorded from SW Poland. Plants that probably belong to *T. maricum* were collected in Solec. Although the mature seeds necessary for unambiguous determination were not available, leaf shape, character of the capitula and outer and inner bracts fully support the determination of *T. maricum*.

S e l e c t e d h e r b a r i u m s p e c i m e n s

Austria – Lower Austria: Schönfeld im Marchfeld: in graminosis siccis arenosisque in via silvestri (*Pinetum*) inter pagos Schönfeld et Oberweiden, ca. 2.2 km situ septentr.-orientali ab ecclesia in centro pagi Schönfeld, ca. 160 m s. m. (Vašut 2001 OL, Taraxaca Exs., no. 607). – Gänserndorf: in graminosis siccis arenosisque in via silvestri (*Pinetum*) inter urbem Gänserndorf et pagum Obersiebenbrunn, in peripheria merid. vici Gänserndorf-Süd; ca. 160 m s. m. (Vašut 2001 OL). – Strasshof an der Nordbahn: in graminosis siccis arenosisque in via silvestri (*Pinetum*), 2 km ad orientem ab ecclesia in centro oppidi (Vašut 2003 OL). – Gänserndorf-Siedlung (Vašut 2003 OL). – Waitzendorf: in margine viae inter pagos Waitzendorf et Untermixnitz, ca. 0.5 km situ boreo-occidentali ab ecclesia in centro pagi (Vašut & Vašutová 2003 OL). – Oberfladnitz: in margine viae inter pagos Oberfladnitz et Untermixnitz, ca. 1 km situ australi a capella in centro pagi (Vašut & Vašutová 2003 OL). – Pillersdorf: in graminosis siccis ante ecclesiam in cetro pagi (Vašut & Vašutová 2003 OL). – Burgenland: Mönchhof: in margine viae in nemore (*Robinietum*) in regione collina „Pardorfer Heide“, ca. 5 km situ boreo-orientali ab ecclesia in centro oppidi (Vašut 2003 OL). – Gattendorf: in margine viae in nemore prope viam inter pagos Gattendorf et Neudorf, ca. 3 km situ occidentali ab ecclesia in centro oppidi (Vašut 2003 OL).

Czech Republic – Moravia: Miroslav: in semitis in nemore (*Robinietum*) in colle Markův kopec (303 m), haud procul a vertice collis (loca protecta "Miroslavské kopce"), 290 m s. m. (Vašut 1998 OL; 2000 OL). – Oleksovice: in margine viae in nemore (*Robinietum*), 1 km ad orient.-merid.-orientem a centro pagi (ecclesia), 230 m s. m. (Vašut 2000 OL). – Oleksovice: in via silvestri in nemore (*Robinietum*), apud loc. protect. "Oleksovické vřesoviště", ca. 0.8 km ad merid.-occid.-meridiem ab ecclesia in centro pagi, 250 m s. m. (Vašut 2001 OL). – Lechovice: in graminosis in viis silvestribus (*Robinietum*) in peripheria orientali pagi (haud procul ab ecclesia), 220 m s. m. (Vašut 2001 OL, Taraxaca Exs., no. 605). – Žabčice: inter viam et marginem *Robinieti*, 1 km ad occidentem a statione ferriviaria, 210 m s. m. (Vašut 2000 OL). – Pohořelice: *Robinietum* apud viam ad urbem Židlochovice, 3 km situ septentr.-orientali a centro oppidi, 200 m s. m. (Vašut 2000 OL). – Brno: na okraji promenádní cesty v lese na JV svahu Strážné (Schutzberg) u Nového Lískovce [Brno: along path in wood on SE slopes of Strážné hill] (Smejkal 1991 BRNU). – Hostěradice: *Robinietum* in cota Sandberg (250 m), 2 km ad merid.-merid.-orient. a pago Hostěradice versus (Sutorý 1986 BRNM). – Bulhary: prope viam publicam in peripheria septenr.-occidentali pagi, 200 m s. m. (Vašut 1998 OL). – Sedlec: in nemore exsisso in declivi merid.-orientali collis Liščí kopec, 1.3 km ad septentr.-occid.-septentriones a centro pagi (ecclesia), 230 m s. m. (Vašut 2000 OL). – Hrušovany nad Jevišovkou: in semitis in nemore (*Robinietum*), 2.5 km ad occidentem a centro pagi (ecclesia), 200 m s. m. (Vašut 2000 OL). – Lednice: in caespite deculcato in ripa piscinae Mlýnský rybník, sub "aede" Apollonův chrám, 180 m s. m. (Vašut 2000 OL). – Valtice: loc. protect. Rendez-vous, 2.5 km situ septentr.-orientali a centro oppidi, 195 m s. m. (Vašut 1999 OL). – Dolní Věstonice: ad septentr.-occidentem versus, in arenosis, 177 m. (Pospíšil 1968 BRNM). – Židlochovice: spáry a koruna zídky bývalého hřbitova (dnes hřiště) u kostela na levém břehu Svratky [Židlochovice: wall of churchyard, left bank of the Svratka river], 175 m s. m. (Danihelka 1998 herb. Danihelka). – Ratíškovice: in margine viae Ratíškovice – Dubňany (in silva), 2 km ad occid.-occid.-meridiem a centro pagi (ecclesia), 230 m s. m. (Vašut 2000 OL). – Vracov: in margine viae Vracov – Vacenovice (in silva) prope pagum Vracov, 200 m s. m. (Vašut 2000 OL). – Bzenec: in graminosis arenosis haud procul oppidi, 2 km ad meridiem a centro oppidi (ecclesia) (loca protecta "Vojenské cvičiště Bzenec"), 200 m s. m. (Vašut 1999, 2000 OL). – Hodonín: in caespitibus ad stationem ferroviae (Kirschner 1982 PRA). – Hodonín: in graminosis siccis prope stationem ferroviae Rohatec-zastávka (Kirschner 1982 PRA). – Hodonín: in pago Rohatec (Kirschner 1984 PRA). – Hodonín – in arenosis sec. ferroviam in pago Rohatec (Kirschner 1985 PRA, Tarax. Exs. No. 608). – Hodonín: in silvis lucidis Dúbrava dictis, haud procul a casa venatoria Červené Domky (Řepka & Kirschner 1989 PRA). – Hodonín: na červené značce 0.5 km od stanice na Strážnici [Hodonín: red turistic pathway, 0.5 km from the railway station] (Kirschner 1982 PRA). – Hodonín: silva Doubrava, in graminosis in via silvestri "Lužická cesta" et apud viam ad Dubňany, 3 km situ septentr.-occid.-septentrionali a centro urbis, 187 m s. m. (Trávníček & Vašut 1998 OL; Vašut & Vašutová 1999 OL). – Hodonín: silva Doubrava, in graminosis in via silvestri "Lužická cesta", 3.5 km situ septentr.-occidentali a centro urbis, 200 m s. m. (Vašut 1998 OL). – Brno-Maloměřice: in statione ferroviae, 270 m s. m. (Vašut 1998 OL). – Tvarožná: in graminosis deculcatis in declivibus septentr.-orientalibus collis Santon (296 m), in peripheria merid.-occidentali pagi, 275 m s. m. (Vašut 1998 OL). – Pouzdřany: in vineto, 2 km situ septentr.-orientali a centro pagi, 290 m s. m. (Vašut 1998 OL). – Bojanovice: in margine viae silvestris, 2 km ad merid.-merid.-orientem a centro pagi, 340 m s. m. (Vašut 2000 OL). – Hluboké Mašůvky: in graminosis siccis arenosisque in viis silvestribus (*Robinietum*), 2.8 km ad septentr.-orientem a centro pagi (ecclesia), 320 m s. m. (Vašut 2000 OL, herb. I. Uhlemann). – Oslavany: ca. 2 km SZ od žel. st., výslunná stráň nad ř. Oslavou ve městě Oslavany [Oslavany: xerothermic slopes, 2 km towards NW from the railway station], 230 m. (Schusterová 1980 BRNU). – Vevčice: graminosis in margine viae prope lapicidinas vastas, 1 km ad merid.-orientem a centro pagi, 280 m s. m. (Vašut 2000 OL). – Brno-Líšeň: Hády (424 m): in fundo lapicidinarum vastarum, 2 km situ orient.-sepentr.-orientali a vertice collis, 400 m s. m. (Vašut 1999 OL).

Germany – Brandenburg: Jessern, Schwielochsee (Uhlemann 2003: 36 – determination confirmed by RJV).

Hungary: Gönyü: in margine viae in nemore prope viam inter urbem Győr et oppidum Gönyü, propinquius ad oppidum Gönyü (Vašut 2003 OL).

Poland – Great Poland: distr. Krzykosy, Solec: na wale przeciwpowodziowym nad rzeką Wartą [on a dike along the Wartą river] (Czarna 2003 POZNB; determination uncertain, see above).

Slovakia: Senica: ad marginem silvae (*Pinetum apertum*) in substrato arenoso, loco U Duba dicto prope pagum Šaštínské Stráže, ca. 183 m s. m. (Slavoňovský 1962 PRC). – Borský Sv. Jur: in graminosis siccis arenosisque in via silvestri (*Pinetum*), 2 km situ merid.-orientali ab ecclesia in centro pagi, 170 m s. m. (Vašut 2001 OL, Taraxaca Exs., no. 606). – Gbely: in graminosis siccis arenosisque in via silvestri (*Pinetum*), inter pagos Šaštín-Stráže et Borský Mikuláš, 1 km situ orient.-merid.-orientali ab ecclesia in centro pagi, 180 m s. m. (Vašut 2001 OL).

Taraxacum scanicum group

Taraxacum scanicum Dahlst. is a species described from the Skåne region and frequently recorded in W and N Europe. A terminal lobe with typically elongated lingulate apex and narrow achenes with a long cone is very characteristic of this species. It is easily identified in W Europe. In contrast, in Central Europe there are several morphotypes that share the morphological characteristics of *T. scanicum* but differ in other features (e.g. colour of achenes, colour and position of outer bracts etc.). The most widespread species of *T. scanicum*-like morphotypes, named *T. prunicolor,* was recently described (Schmid et al. 2004). The second species differs from *T. scanicum* in having brown achenes, a denticulate terminal lobe margin and a tiny general habit, and in occurring mainly in the south-eastern part of Central Europe, is described here.

Taraxacum cristatum Kirschner, Štěpánek et Vašut, **spec. nova** Fig. 4–6

[*T. cristatum* Kirschner et Štěpánek, nomen, in Chán et al. (2001: 151) et in Kirschner et al. (2002: 692)]

D e s c r i p t i o : Plantae graciles. Folia suberecta, ambitu elliptica vel oblanceolata, plerumque 5–10 cm longa et 1–2 cm lata, (pallide) viridia, glabra. Lobus terminalis foliorum exteriorum longe triangularis, saepe marginibus undulatis, foliorum interiorum praelongus, lingulatus, ad basin denticulatus. Lobi laterales plerumque numero 2–4 utrobique, oppositi, foliorum exteriorum triangulares, foliorum interiorum falcatis marginibus distalibus convexis, denticulatis. Interlobia foliorum interiorum angusta et longa, undulata vel denticulata, plerumque atro-maculosa. Petiolus angustus, subroseus usque subviolaceus. Scapi virides usque subviolacei, superne araneosi. Calathia convexa, 20–25 mm in diametro, lutea, ligulae marginales extus stria griseo-brunnea usque rosacea notatae. Squamae involucri interiores virides, pruinosae, squamae exteriores ad basin patentes et superne iregulariter curvatae (reclinatae, recurvae vel arcuatae), numero (7–) 9–11, lanceolatae, 0.7–2.0 × 6.0–8.0 mm, pallide virides (usque subroseae), corniculatae, marginibus albidomembranaceis (ca 0.1–0.2 mm latis). Stigmata olivacea, in sicco atra. Antherae polliniferae. Achenia (griseo-purpureo-) brunnea, sicca brunnea, (3.5–) 3.7–4.2 (–4.6) mm longa (pyramide inclusa), corpore superne dense spinuloso spinulis comparate magnis, saepe lente flexis; pyramis longa angusta cylindrica, (0.7–) 0.9–1.1 (–1.2) mm longa, in corporem achenii abrupte transiens. Species apomicta (agamosperma) e sectione *Erythrospermorum*.

H o l o t y p u s : Slovacia merid.-orientalis, opp. Rožňava, pagus Krásnohorské Podhradie (Krasznahorkaváralja): in graminosis siccis prope viam ad ruinam castelli Krásna Hôrka. Leg. R. J. Vašut et M. Vašutová, 1. 5. 2004. Holotypus in PRA, isotypi in OL, PRC et in herbarium R. J. Vašut (no. 412.02) conservantur.

E x s i c c a t a : Kirschner et Štěpánek, Taraxaca Exsiccata, fasc. XIII (2003), no. 610 et 611 (utrumque e paratypis constant).

E t y m o l o g y : *cristatum* means crested. The name refers to the denticulate distal margin of the lower half of the terminal leaf lobe.

K a r y o l o g y : 2n ~ 3x (determined by flow-cytometry from three localities: SW Moravia: Výrovice; S Moravia: Rohatec; S Moravia: Bzenec).

S i m i l a r s p e c i e s : The species most similar to *T. cristatum* are *T. scanicum* Dahlst. and *T. prunicolor*. Both species have a similar typically elongate-lingulate terminal lobe apex and narrow achenes with a long cone. Easier to distinguish is *T. prunicolor*, which has distinctly reddish-violet, regularly recurved and indistinctly bordered outer bracts, slightly convex capitulum and dark involucre. The achenes are brown as in *T. cristatum*. *Taraxacum scanicum* has similar capitulum and involucre, but can be distinguished with certainty from *T. cristatum* by longer leaves, teeth on the distal margin of lateral lobes and simple tooth (teeth) on the distal margin of the terminal lobe. Achenes of *T. scanicum* are red-brown.

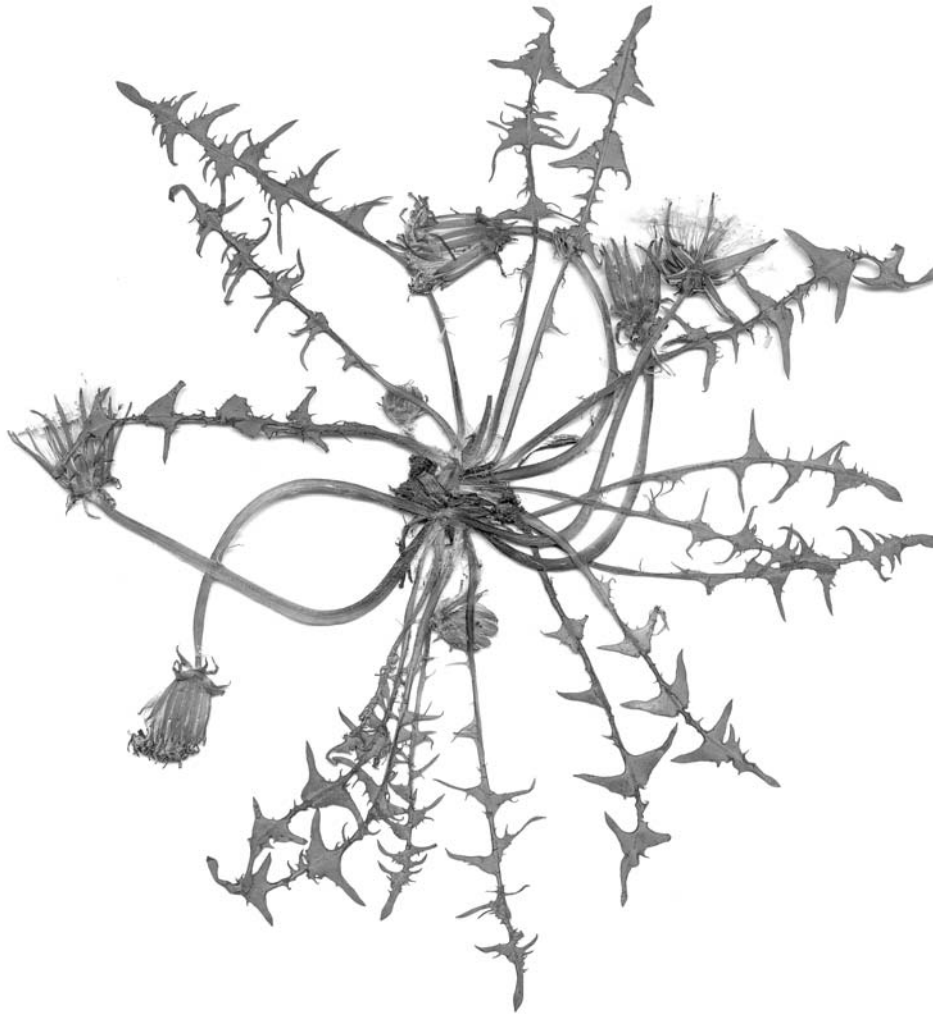

Fig. 4. Holotype of *Taraxacum cristatum*. Bar = 5 cm.

Taraxacum plumbeum Dahlst. (syn.: *T. franconicum* Sahlin) also typically has denticulate distal margin to the terminal lobe and therefore younger plants can easily be confused with *T. cristatum*. *Taraxacum plumbeum* can be differentiated with certainty by its dark involucrum with erect, dark and often reddish, very conspicuously bordered (> 0.2 mm, in *T. cristatum* < 0.2 mm) outer bracts and light brown achenes with a short conical cone (max. 0.8 mm long).

Another brown-achened species, *T. disseminatum* Hagl., has a similar leaf-shape. This species is known from W Europe and may occur at the same localities as *T. cristatum* in W Bohemia. Unique specific characters such as mostly galeate terminal lobes, very conspicuously toothed distal margins of terminal and lateral lobes and, completely brown (greyish brown) fruits differentiate *T. disseminatum* from *T. cristatum*. For a comparison of the main characters of *T. cristatum*, *T. scanicum* and *T. plumbeum* see Table 2.

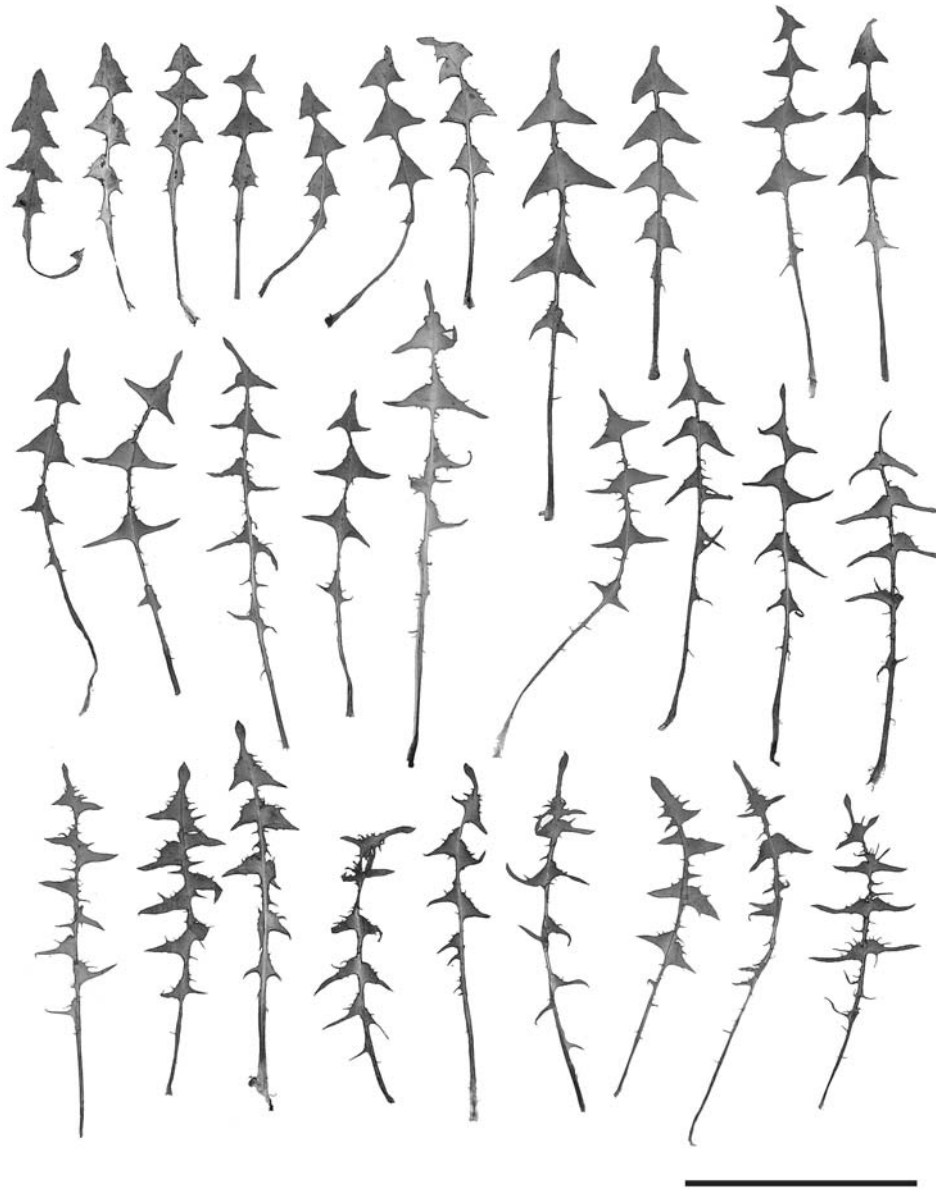

Fig. 5. Variation in leaf-shape in *Taraxacum cristatum* . Leaves are from plants growing in different localities and habitats. Bar = 5 cm.

E c o l o g y : *Taraxacum cristatum* usually grows in natural dry and xerothermic grasslands, usually in plant communities of the *Festucion valesiacae* or *Koelerio-Phleion phleoidis* alliances. Regionally, it prefers calcareous soils (e.g. S Bohemia). The species is most abundant in regions with sandy soils (S Moravia, W Slovakia), where it usually

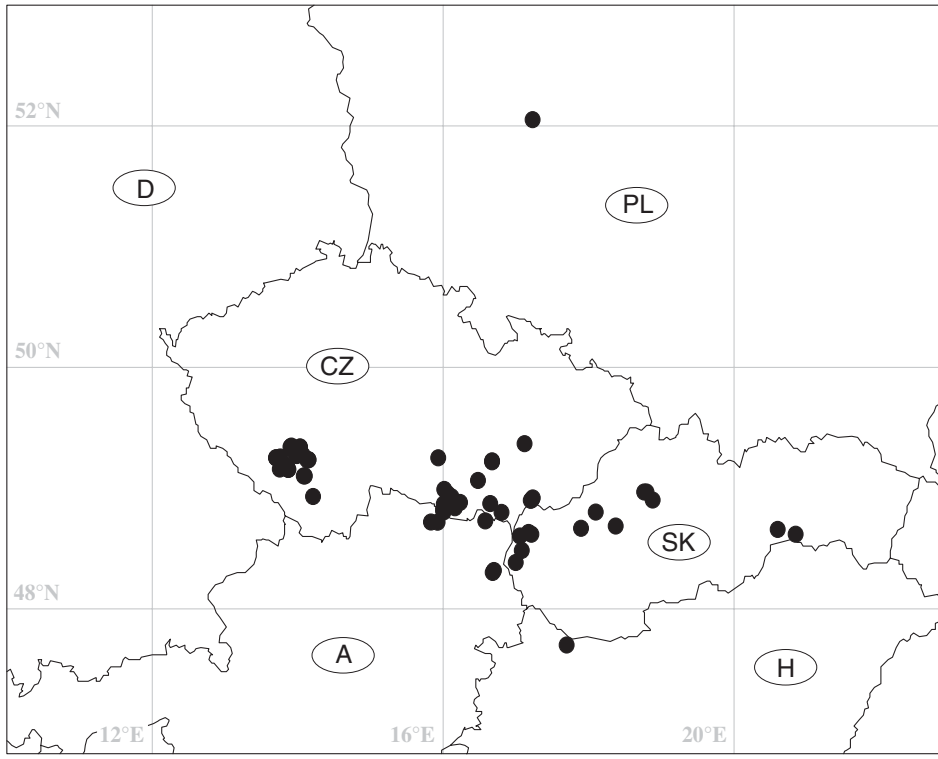

Fig. 6. – Presently known distribution of *Taraxacum cristatum* in Central Europe.

grows along paths in open woods (especially locust-woods of the *Balloto nigrae-Robinion* alliance, but also pine- or oak-woods). The species also grows in dry ruderal sites, mainly abandoned limestone quarries.

Distribution: *Taraxacum cristatum* occurs in the southern part of Central Europe (Fig. 6), and was recorded in Czechia (southern parts of Bohemia and Moravia), Austria (Lower Austria), Slovakia, N Hungary and SW Poland (Książ Wielkopolski). In the Czech Republic, the frequency of occurrence of this species decreases towards the north, and *T. cristatum* is most abundant in the calcareous region of SW Bohemia and in SW Moravia (in the so-called Praebohemicum, mainly near the town of Znojmo). *Taraxacum cristatum* is also very abundant in the sandy area of NE Austria (Marchfeld, near the town of Gänserndorf) and W Slovakia (Záhorie), on both flanks of the Morava river (March).

Selected herbarium specimens

Austria – Lower Austria: Gänserndorf: in graminosis siccis arenosisque in via silvestri (*Pinetum*) inter urbem Gänserndorf et pagum Obersiebenbrunn, in vici Gänserndorf-Süd peripheria australi, alt. ca. 160 m s. m. (Vašut 2001 OL, Taraxaca Exs., no. 610). – Strasshof an der Nordbahn: in graminosis siccis arenosisque in via silvestri (*Pinetum*), 2 km situ orientali ab ecclesia in centro oppidi (Vašut 2003 OL). – Falkenstein: secundum vias ad ruinam arcis Falkenstein, ca 0.7 km situ occidentali ab ecclesia in centro pagi, 415 m s. m. (Vašut 2003 OL). – Pillersdorf: in graminosis siccis ante ecclesiam in centro pagi (Vašut & Vašutová 2003 OL). – Pulkau: in graminosis in viis silvestribus, ca. 3 km situ septentr.-occidentali a centro oppidi (Vašut 2001 OL).

Table 2. – Main differences among *Taraxacum cristatum* , *T. scanicum* and *T. plumbeum.*

	T. cristatum	*T. scanicum*	*T. plumbeum*
Outer bracts form and position	lanceolate, spreading	lanceolate, spreading	ovate to lanceolate, erect
Colour of outer bracts	pale green	green	dark green
Involucrum (colour of inner bracts)	(pale) green, pruinose	green	dark green, pruinose
Achene colour	brown	red-brown	light brown
Achene cone	0.7–0.9 (–1.0) mm	1.0 mm	0.7 mm
Leaves	pale green	green	dark grey green, matt, araneous
Lateral lobes	2–4 triangular to falcate	4–6 deltoid	5–6 falcate

Czech Republic – Bohemia: Strakonice: pascuis in colle supra ripam sinistram fluminis Otava merid.-orient. a pago Přešťovice, ca. 385–418 m s. m. (Moravec 1959 PR). – Písek: pascuis in cota 393, sept. a pago St. Kestřany ca. 385–390 m s. m. (Moravec 1959 PR). – Strakonice: pascuis et limitibus in colle sept. a piscinula ad viam publicam sept.-occ. a pago Celnice, ca 420–430 m. (Moravec 1961 PR). – Písek, Heřmaň-Benešovský mlýn, výslunná stráň jižně od objektu [Heřmaň-Benešovský mlýn mill, xerothermic slope towards S] (Soukup 1998 herb. Soukup; no. det. 13392). – Strakonice, pagus Frymburk u Volenic: in colle in vicinitate capellae in pago (Žíla 1998 herb. Žíla; no. det. 15098). – Strakonice, pagus Drhovle, vicus Pamětice: in clivis occid. collis (c. 478.3) situ merid. a vico Pamětice (Žíla 1998 herb. Žíla; no. det. 15100). – Strakonice, pagus Drhovle, vicus Brloh: in via in vallo piscinae Michovka situ occid. a vico (Žíla 1998 herb. Žíla; no. det. 15101). – Volyně, pagus Zechovice: in pratis in summo collis (c. 592.4), situ merid.-orient. a pago (Žíla 1998 herb. Žíla; no. det. 15102). – Protivín, pagus Heřmaň: in colle ad solitudinem Benešovský mlýn situ orient. a pago (Žíla 1998 herb. Žíla; no. det. 15108). – Zechovice u Volyně: louky ve vrcholové části návrší s vápencovými lomy (kóta 592.4) jihovýchodně od osady, roztr. společně s *Vicia lathyroides* [Zechovice u Volyně: meadows in hillock with limestone mining area, towards SE] (Chán & Žíla 1998 herb. Chán; no. det. 15086). – Strakonice, pagus Chrašťovice: ad marginem piscinae Velkolázský rybník, situ bor.-orient. a pago (Žíla, Chán & Kirschner 1989 herb. Žíla; no. det. 15087). – Strakonice, pagus Radomyšl: in caespitibus ad viam versus templum „Sv. Jan" situ bor.-orient. a pago (Žíla 1998 herb. Žíla; no. det. 15146). – Volyně, pagus Nihošovice: in proximitate aediculae „Sv. Antonín", situ merid.-occid. a pago, 505 m s. m. (Žíla 2002 herb. Žíla; no. det. 15312). – Volyně, pagus Dobrš: in vicinitate aediculae in pago, 710 m s. m. (Žíla 2002 herb. Žíla; no. det. 15309). – List of several more localities from southern Bohemia (revised by JŠ) is given by Chán et al. (2001). – Moravia: Lechovice: in silva lucida haud procul ab ecclesia in peripheria orientali pagi, 230 m s. m. (Vašut 2001 OL). – Hödnitz bei Znaim [Hodonice near Znojmo] (Oborny 1871 PRC). – Dolní Kounice: východně, skalnatá stráň, 260 m n. m. [Dolní Kounice, E, rocky slope] (Pospíšil 1968 BRNM). – Havraníky: in declivia aprica in peripheria merid. pagi, 300 m n. m. (Vašut 1999 OL). – Horní Věstonice: apud semitas prope petram Martinka, 1 km ad occident.-austr.-occidentem a vertice montis Děvín (549 m), 350 m s. m. (Vašut 2000 OL) – Eisgrub in Mähren [Lednice] (H. Zimmermann 1912 PR). – Rohatec: inter viam publicam et ferroviam in peripheria septentr.-orientali pagi (Kirschner 1982 PRA). – Rohatec: prope ferroviam inter Hodonín et Moravský Písek, 180 m s. m. (Vašut 1998 OL). – Rohatec: silva Doubrava (U sedmi cest), 0.5 km ad septentr.-occidentem a cota 190 m, 180 m s. m. (Vašut 1998 OL). – Brno: Hády (424 m) (Šourek 1954 PR; Sutorý 1977 BRNM). – Brno: Hády (424 m), in graminosis secundum semitas in lapicidinis vastis, 1 km ad meridiem a vertice collis, 330 m s. m. (Vašut 1998 OL). – Hradčany – Kobeřice: in graminosis secundum semitas in lapicidinis vastis in peripheria occidentali pagi Kobeřice, 230 m s. m. (Vašut & Vašutová 1999 OL). – Znojmo: in graminosis secundum semitas in lapicidinis vastis Cínová hora in peripheria occidentali urbis, 320–330 m s. m. (Vašut et al. 2000 herb. R. J. Vašut). – Výrovice: in graminosis siccis deculcarisque apud marginem merid. pagi, ca. 270 m s. m. (Vašut 2000 OL). – Černín: in peripheria septentrionali pagi, 300 m s. m. (Vašut 1999 OL). – Rudlice: in peripheria septentrionali pagi, 300 m s. m. (Vašut 1999 OL). – Trnava: collis Kobylinec, in peripheria austro-occidentali pagi, 450 m s. m. (Vašut 2000 OL).

Hungary: Györ: in margine viae in nemore prope viam inter urbes Györ et Komárom, prope urbem Györ, ca. 7 km situ boreo-orientali a centro urbis (Vašut 2003 OL).

Poland – Great Poland: distr. Książ Wielkopolski, Książ Wielkopolski: w lasku akacjowym w N cześci miasta „Torfica“ [in locust-wood, in N part of the locality known as “Torfica”] (Czarna 2000 POZNB; 2003 POZNB).

Slovakia: distr. Rožňava, pag. Zádiel (Szádelö): in petris calcareis supra saltum Zádielská dolina, 1.5 km ad septentr.-orient.-septentriones a centro pagi, 600 m s. m. (Vašut 1999 OL). – distr. Senica, Gbely: in graminosis siccis arenosisque in via silvestri (*Pinetum*), inter pagos Šaštín-Stráže et Borský Mikuláš, 1 km situ orient.-austr.-orientali ab ecclesia in centro pagi, 180 m s. m. (Vašut 2001 OL, Taraxaca Exs., no. 611). – Borský Mikuláš: na okraji lesa u obce [Borský Mikuláš – along the wood near the village] (Slavoňovský 1961 BRNU). – distr. Senica, Borský Sv. Jur: in graminosis siccis arenosisque in via silvestri (*Pinetum*), 2 km situ merid.-orientali ab ecclesia in centro pagi; 170 m s. m. (Vašut 2001 OL). – Plavecký Štvrtok: in graminosis arenosis in viis silvestribus prope viam publicam inter Malacky et Plavecký Štvrtok (Vašut 2001 OL). – Kláštor pod Znievom: in graminosis siccis in summo collis Zniev (980 m), 3 km situ austro-occid.-occidentali ab ecclesia in centro pagi (Vašut 2003 OL). – Kláštor pod Znievom: in graminosis siccis circum viam dolorosam, 1 km situ austro-occidentali ab ecclesia in centro pagi (Vašut 2003 OL). – Mošovce: in pascuo sicco in peripheria orientali pagi, ca. 2 km situ oriento-austro-orientali a capella in centro pagi (Vašut 2003 OL). – Tematínské vrchy, cesta Tematín – Lúka, stepní louka [Tematínské vrchy hills, Tematín way – Lúka, xerothermic grassland] (Jongepier 1992 herb. Jongepier; no. det. 15118). – Jastrabie: pri ceste od dediny, na spraši, ca. 320 m s. m. [Jastrabie: along road from the village] (Schidlay 1944 BRA). – Partizánske, pagus Hradiště: in graminosis siccis prope ecclesiam in peripheria septentr.-occidentali pagi (Vašut & Vašutová 2004 OL).

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Souhrn

Ve střední Evropě bylo pozorováno několik morfotypů blízkých dvěma západoevropským druhům pampelišek, *T. proximum* a *T. scanicum*. Dva morfotypy jsou v této práci popsány jako nové druhy pro vědu. Nový druh *T. maricum* Vašut et al. (pampeliška pomoravská) je příbuzný p. spřízněné (*T. proximum*), od které se nejnápadněji odlišuje prašníky vytvářejícími pyl, méně komplikovaně utvářenou listovou čepelí (viz členitost a zubatost) a charakterem vnějších zákrovních listenů (nápadně bíle a často načervenale lemované). Druh je hojně rozšířený na jihovýchodní Moravě, západním Slovensku a v severovýchodním Rakousku. Druhý nový druh, *T. cristatum* Kirschner et al. (p. hřebínkatá), je blízký p. skandinávské (*T. scanicum*) a vyznačuje se malým počtem postranních listových úkrojků, drobně zoubkatým okrajem koncového úkrojku, hnědými nažkami a neuspořádaně rozestálými až dolů ohnutými vnějšími zákrovními listeny. Druh je roztroušeně rozšířen v jižní části střední Evropy.

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