

A REVISION OF *TARAXACUM* SECT. *PIESIS* (COMPOSITAE)

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Abstract: On the basis of allozyme and cultivation data, and of additional herbarium material, a taxonomic and nomenclatural revision of *Taraxacum* sect. *Piesis* A.J. RICHARDS ex KIRSCHNER et ŠTĚPÁNEK is provided. The section is made up of halophilous, sexually reproducing taxa. In *T. stenocephalum* BOISS. et KOTSCHY, *T. pindicum* KIRSCHNER et ŠTĚPÁNEK, sp. nov., and *T. perenne* KIRSCHNER et ŠTĚPÁNEK, sp. nov., a tetraploid chromosome number has been recorded, representing the only known case of sexuality at the tetraploid level in the genus. The complex of *T. stenocephalum*, includes some geographically and morphologically extreme populations treated as subspecies: subsp. *gumusanicum* (SOEST) KIRSCHNER et ŠTĚPÁNEK, comb. nov., subsp. *magnum* KIRSCHNER et ŠTĚPÁNEK, subsp. nov., and subsp. *daralagesicum* (SCHISCHK.) KIRSCHNER et ŠTĚPÁNEK, comb. nov. In addition to *T. bessarabicum* (HORNEM.) HAND.-MAZZ., a widely distributed Eurasian species, *T. stenocephalum*, a complex centred in Transcaucasia and Anatolia, and *T. pachypodum* H. LINDB., a North African endemic, four new species are described: *T. salsum* KIRSCHNER et ŠTĚPÁNEK, sp. nov., a diploid endemic confined to E Crimea, *T. perenne* KIRSCHNER et ŠTĚPÁNEK, sp. nov., a tetraploid sexual species known only from SW Crimea, *T. pindicum* KIRSCHNER et ŠTĚPÁNEK, sp. nov., a remarkable tetraploid endemic to the Pindos Mts., Greece, and *T. salsitatis* KIRSCHNER, ŠTĚPÁNEK et YIRDIRIMLI, sp. nov., an Anatolian diploid species. Furthermore, a hybrid between *T. salsum* and *T. bessarabicum* from Crimea (documented on the basis of allozyme data elsewhere) is given a binomial, *T. xmesohalobium* KIRSCHNER et ŠTĚPÁNEK, nothosp. nov.

INTRODUCTION

Species of *Taraxacum* sect. *Piesis* A.J. RICHARDS ex KIRSCHNER et ŠTĚPÁNEK have many features unique to the genus or shared by few other taxa. Up to now, only sexual taxa have been found to belong to the section (some of them having wide geographical ranges). The members of the section have their main flowering period in summer or early autumn. In addition, biological features unusual in the genus were ascertained in some species: autogamy, sexuality at the tetraploid level, natural interspecific hybridization (rarely documented in *Taraxacum*), rare male sterility, etc. (KIRSCHNER et al. 1994).

The allozyme and karyotype variation and breeding behaviour of the most widely distributed species of the section (and, maybe, of the whole genus), *T. bessarabicum* (HORNEM.) HAND.-MAZZ., has recently been studied (KIRSCHNER et al. 1994). During the study, live material of numerous accessions of other members of the section was examined. Together with abundant herbarium material, the data available have allowed us to evaluate the taxonomy of the whole section.

The taxonomic approach recognizing agamospermous “microspecies” of narrow phenotypic range, used in most *Taraxacum* groups, is of no value in a section where the taxa are exclusively sexual. Many of the taxa studied proved to be extremely variable in many features, such as colour and size of achenes, colour of stigmas or leaf shape, and many variants coexist within

a population. The variation is even more extensive than that encountered within sexual species in other, related genera. Thus, only taxa showing distinct geographical and ecological ranges, morphologically separated from one another, i.e. entities fully comparable to species recognized in purely sexual genera, are accepted as species here. Less distinct, more local population units are given the rank of subspecies. The results document the importance of a thorough understanding of the reproduction modes in the group studied for the taxonomic conclusions adopted. The more widespread members of the section have usually been described under several to many names; the authors of synonyms either were not aware of different modes of reproduction in the genus or, implicitly, supposed apomixis in their material.

MATERIAL AND METHODS

Results of karyological and allozyme analyses are based on KIRSCHNER et al. (1994), where methods used are described in detail. Methods of cultivation of the sect. *Piesis* samples are the same as given in KIRSCHNER & ŠTĚPÁNEK (1993: 297, 300, Plate 18).

The material primarily comes from our expeditions to the Caucasus (1993), S Ukraine and Crimea (1989), C Asia, the Altai, and from a number of excursions in C and W Europe. Many samples were gathered for us (as seeds or roots) by our collaborators: B. Křisa (Turkey), D. Fišerová (Greece), A. Blab (Austria), P. Tomšovic (Hungary), J. Hadinec and J. Michálek (Moravia), V. Hadincová (Austria), L. Klimeš (Morocco) and V. Mikoláš (E Slovakia).

The following herbaria have been consulted to complete our studies: BM, BP, BPU, BR, BRA, BRNM, BRNU, E, JE, K, KRA, KRAM, KW, L, LE, LD, M, NS, OP, OXF, PR, PRC, RNG, SAV, SLO, SOM, W, WU, and microfiche (or microfilm) editions of G-DC, G-BOISS, etc. The specimens quoted are given numbered determination labels ("no. det."), in exceptional cases the specimens are identified by means of other (e.g. collection) numbers. The material of the authors is deposited in herbarium PRA (Herbarium of the Institute of Botany, Academy of Sciences of the Czech Republic, Průhonice, cf. KIRSCHNER & ŠTĚPÁNEK 1998).

THE SECTION *PIESIS*

Until recently, the section appeared under the name *T. sect. Leptocephala* SOEST in the literature. It was B.L. Burtt (in HILLIARD & BURTT 1975: 100) who suggested that the correct name of the section should have been based on *Pyrrhopappus* DC. sect. *Piesis* DC. but the formal nomenclatural procedure was published later by KIRSCHNER & ŠTĚPÁNEK (1993). The correct nomenclature of the section is summarized below:

***Taraxacum* WIGGERS sect. *Piesis* (DC.) A.J. RICHARDS ex KIRSCHNER et ŠTĚPÁNEK, *Folia Geobot. Phytotax.* 28: 297, 1993.**

≡ [Bas.] *Pyrrhopappus* DC. sect. *Piesis* DC. *Prodr. Syst. Natur.* 7: 144, 1838. – Typus: *Pyrrhopappus taraxacoides* DC.; LT: G-DC! (lectotype, see HILLIARD 1977: 618).

= *T. sect. Leptocephala* SOEST, *Vegetatio* 5–6: 532, 1954. – Typus: *Taraxacum bessarabicum* (HORNEM.) HAND.-MAZZ.; LT: W (see below).

Morphologically, the following features diagnose the section: Involucre usually narrow at the base (4–6, rarely 9–10 mm in diameter), outer involucral bracts linear to linear-lanceolate, usually adpressed to erect, narrowly bordered (margins usually pale to membranaceous),

callose to conspicuously corniculate at the apex. Achenes usually only sparsely and shortly spinulose above, gradually to (rarely) subabruptly narrowing to a subcylindrical cone 0.4–1.9 mm long, rostrum well developed (2.0–7.5 mm), pappus dirty yellowish to pale pinkish-brown.

Description

Flowers and leaves develop simultaneously. Main flowering season: summer, late summer or autumn. Main habitat: subsaline and saline habitats. Plants usually small. Leaves slightly fleshy or of neutral consistency, sparsely araneous or usually subglabrous, leaf lobation usually uncomplicated. Leaf lobes patent or pointing downwards. Leaf blade unspotted, sometimes with dark bordered or blotched interlobes. Scapes unbranched, growing from the centre of the leaf rosette, subglabrous, sparsely araneous, or araneous, particularly below the capitulum. Capitulum after flowering pointing upwards. Involucre with slightly subconical to rounded base, usually narrow, cylindrical at the base. Flowers yellow. Ligules flat. Pollen usually present. Exterior and/or interior involucre bracts callose to corniculate at the apex. Exterior bracts 10 to 16, of equal length or slightly imbricate, adpressed or loosely adpressed to erect, linear to lanceolate, short, usually less than 5 mm (often less than half the size of the inner) or medium long. Prevailing colour of exterior bracts: pale greenish, often suffused red or pinkish, pale green, or green. Exterior bracts with narrow paler or reddish margins, usually sparsely ciliate. Achenes of various coloration, usually pale greyish, sparsely spinulose above, 4.2 to 5.5 mm long, gradually narrowing to the cone. Cone subcylindrical, (0.4) 0.5–1.6 (1.9) mm long. Rostrum thick or thin, 2.5 to 5.5(–7.5) mm long. Pappus 4.0 to 6.5 mm long, yellowish-brown, yellowish, or pinkish-brown, not deciduous. Receptacle glabrous. Plants exclusively sexual, irrespective of ploidy level.

It should be mentioned that karyological investigation of five representatives of the section revealed significant uniformity, with a very low level of karyotype differentiation in both diploid and tetraploid taxa (KRAHULCOVÁ in KIRSCHNER et al. 1994).

The concept of sections also involves the ecological nature of the group. *Taraxacum* sect. *Piesis* comprises halophilous and subhalophilous taxa preferring slightly to strongly disturbed saline meadows and pastures, and sometimes also shore communities (in Transcaucasia and C Asia, soils with higher salinity are widespread, and include a number of additional habitats). Recently, MIKOLÁŠ & MIHOKOVÁ (1993) found *T. bessarabicum* growing in a purely synanthropic habitat (in an imission area of a magnesite plant). Locally, e.g. in the SW foothills of the Caucasus or in the Pindos Mts., representatives of the section can be found on other mineral rich substrates (such as ophiolitic soils).

A very important biological feature of the section is its late summer and early autumn flowering. At low altitudes there are only a few *Taraxacum* groups with such a late flowering season, e.g., *T.* sect. *Dioszegia* (HEUFF.) HEUFF. (= sect. *Serotina* SOEST); some species of the Mediterranean sect. *Scariosa* HAND.-MAZZ. may blossom in autumn and winter, and in *T.* sect. *Sonchidium* (DC.) KIRSCHNER et ŠTĚPÁNEK some species also flower late.

Up to now, only sexual taxa have been found to belong to the section. The majority of them are diploids. *Taraxacum stenocephalum* BOISS. et KOTSCHY was found by us to be tetraploid, a diploid chromosome number was reported by Arevshatyan (on herbarium labels). *T. pindicum* KIRSCHNER et ŠTĚPÁNEK and *T. perenne* KIRSCHNER et ŠTĚPÁNEK are probably purely tetraploid. The latter three species represent the only well-documented cases of sexuality at the tetraploid level in the genus.

The sexuality of the members of the sect. *Piesis* leads to extensive variation and some geographical trends in the variability (such as local differentiation) can be found.

In *Taraxacum*, a “horizontal” sectional structure, as developed by VAN SOEST, is relatively well established, and allows for a practical treatment of species with very different modes of reproduction. However, hierarchical or phyletic relationships among sections are not so clear, and the data published to date does not allow us to suggest plausible hypotheses about the ancestry of most groups. We limit ourselves to stating that *Taraxacum* sect. *Dioszegia* seems to be the closest relative of the sect. *Piesis*, and that both sections may have a common ancestry with the sect. *Sonchidium*.

Taxonomic survey of the section

1. *T. bessarabicum* (HORNEM.) HAND.-MAZZ.
2. *T. stenocephalum* BOISS. et KOTSCHY
 - a. *T. stenocephalum* subsp. *stenocephalum*
 - b. *T. stenocephalum* subsp. *magnum* KIRSCHNER et ŠTĚPÁNEK
 - c. *T. stenocephalum* subsp. *daralagesicum* (SCHISCHK.) KIRSCHNER et ŠTĚPÁNEK
 - d. *T. stenocephalum* subsp. *gumusanicum* (SOEST) KIRSCHNER et ŠTĚPÁNEK
3. *T. pachypodium* H. LINDB.
4. *T. perenne* KIRSCHNER et ŠTĚPÁNEK
5. *T. salsum* KIRSCHNER et ŠTĚPÁNEK
6. *T. salsitatis* KIRSCHNER, ŠTĚPÁNEK et YIRDIRIMLI
7. *T. pindicum* KIRSCHNER et ŠTĚPÁNEK
8. *T. ×mesohalobium* KIRSCHNER et ŠTĚPÁNEK (*T. salsum* × *T. bessarabicum*)

Key to the members of the section *Piesis*

- 1a Rostrum to achene less than 3 mm long 2
- b Rostrum longer than 3 mm 3
- 2a Outer bracts lanceolate, ecallose, imbricate; achenes 4.2–4.5 mm long 4. *T. perenne*
- b Outer bracts ± linear, slightly corniculate to callose, not imbricate; achenes less than 4 mm long 3. *T. pachypodium*
- 3a Leaves usually entire or shallowly lobate, dark green, petioles purple; outer bracts with very narrow indistinct margins 5. *T. salsum*
- b Leaves usually deeply divided when well developed, pale to mid-green, petioles green to pinkish; outer bracts with ± distinct margins 4
- 4a Outer bracts erect, erecto-patent or arcuate, rarely loosely adpressed, conspicuously corniculate 2a. *T. stenocephalum* subsp. *stenocephalum*
- b Outer bracts tightly to loosely adpressed, ecallose to minutely corniculate 5
- 5a Cone to the achenes usually 0.4–0.5 mm long 7. *T. pindicum*
- b Cone to the achenes longer than 1.0 mm 6
- 6a Outer bracts broadly lanceolate or ovate-lanceolate, imbricate, with distinct broad white margins 6. *T. salsitatis*

- b Outer bracts linear to linear-lanceolate, not imbricate, with narrow, in conspicuous margins 7
- 7a Leaves narrow, usually up to 1.5 cm wide, ± glabrous, lateral lobes usually patent to forward pointing 1. *T. bessarabicum*
- b Leaves usually broader than 2 cm, sparsely to densely araneous, lateral lobes backward pointing (when patent and when leaves subglabrous, then terminal lobe of much greater size than the lateral ones) 8
- 8a Terminal lobe much larger and broader than the lateral ones, pappus dirty yellowish 2b. *T. stenocephalum* subsp. *magnum*
- b Terminal lobe middle-sized, not broader than the lateral ones, pappus pale pinkish-brown 9
- 9a Cone to the achenes about 1.1–1.2 mm long, rostrum usually 3.0–4.5 mm long, plant base sparsely araneous 2d. *T. stenocephalum* subsp. *gumusanicum*
- b Cone to the achenes about 1.5–1.8 mm long, rostrum usually about 6 mm long, plant base densely hairy 2c. *T. stenocephalum* subsp. *daralagesicum*

1. *Taraxacum bessarabicum* (HORNEM.) HAND.-MAZZ. Monogr. Gatt. Tarax. 26, 1907.

≡ [Bas.] *Leontodon bessarabicus* HORNEM. Suppl. Hort. Bot. Hafn. 88, 1819. – LT: Bessarabia, ex horto vindobonensi (HORNEMAN W) (cf. VAN SOEST 1975: 792; unfortunately, curators of W failed to locate this specimen recently, and we have to rely on the interpretation of VAN SOEST, and on the fact that in “Bessarabia” *T. bessarabicum* is the only representative of the section).

= *Taraxacum salinum* BESSER Enum. Pl. Volhyn. 31, 1822. – LT, **hoc loco**: e Podol (BESSER BP-KIT, no. det. 2974); ILT: G-DC!

= *Taraxacum procumbens* LESS., Linnaea 9(1834): 181, 1835. – LT, **hoc loco**: Ietskaya zashchita (1832 LESSING LE, no. det. 6500); ILT: LE, no. det. 6532.

= *Pyrrhopappus taraxacoides* DC. Prodr. Syst. Natur. 7: 144, 1838. – LT: South Africa, Cape, Berg ad Zwart Key (DRÈGE 6176 G-DC!) (seen as a microfiche, selected by HILLIARD 1977: 618). [The other original syntype, “ad Cap. Bonae Spei” (ECKLON G-DC!), may represent a different taxon.]

≡ *Taraxacum capense* SCH. BIP., Flora 31: 170, 1848, nom. illeg. (Art. 52.1, 52.2), nom. nov. pro *Pyrrhopappus taraxacoides* DC. [The name *Taraxacum taraxacoides* (HOPPE et HORNSCH.) WILLK. appeared in 1870.]

= *Taraxacum fulvipilis* HARV. in HARV. et Sond. Fl. Cap. 3: 527, 1865. – T: betw. Tafelberg & Wildschuttsberg (DRÈGE 6176 S!) (a photograph studied; the plant was also studied by A.J. Richards, see BURTT in HILLIARD & BURTT 1975).

= *Taraxacum microcephalum* SCHUR Enum. Pl. Transsilv. 367, 1866. – LT, **hoc loco**: Reussmarkt (SCHUR W, no. det. 8975!) [non *T. microcephalum* POMEL 1874]

= *Taraxacum salsugineum* LAMOTTE, Bull. Soc. Bot. France 21: 123, 1874. – T: n. v. (plants from a type locality studied, see also below).

- = *Leontodon pinnatifidus* TAUSCH, Flora (Regensburg) 7: 249, 1824. – HT: (without locality and collector PRC, no. det. 9574) (non *Taraxacum pinnatifidum* SOEST 1975).
- = *Leontodon dentatus* TAUSCH, Flora (Regensburg) 7: 248, 1824. – T: [F.W. SCHMIDT s. n.] not located.
- = *Leontodon parviflorus* TAUSCH, Flora (Regensburg) 12: 35, 1829. – HT: De pratis Bohemiae? (without locality and collector PRC, no. det. 9575).
- = *Leontodon parviflorus* TAUSCH var. *incisus* TAUSCH, Flora (Regensburg) 12: 35, 1829. – HT: (without locality and collector PRC, no. det. 9574) (The type is identical with that of *L. pinnatifidus*).

Note

The name *Taraxacum leptocephalum* RCHB. (REICHENBACH 1831), most frequently used for *T. bessarabicum* in the last century, is based on Hochstetter's material from S Moravia, Czech Republic. Later on, H.G. Reichenbach (fil.) published a picture of the Hochstetter's specimen ("Moenitzer See in Mähren", REICHENBACH 1858: 25, fig. 55.4). The plant is probably referable to *T. bessarabicum* that is known to have occurred at the site. A duplicate of the Hochstetter's collection is in W, and represents *T. bessarabicum*, see HANDEL-MAZZETTI (1907: 28). It is necessary to locate the type specimen to exclude the possibility of confusion with a local taxon of the section *Palustria* (H. LINDB.) DAHLST.

Exsiccates: *Taraxaca* Exsiccata, no. 354–365.

Brief description

Leaves mid-green to pale yellowish green, ± glabrous, narrow, usually up to 1.5 cm wide, almost undivided to deeply divided, sparsely to (less often) ± densely dentate (interlobes usually 3–6 mm wide); lateral lobes usually patent, often slightly forward-pointing, rarely triangular, downward-pointing; interlobes usually entire, usually short to indistinct, less often narrowly triangular-elongate; petioles pale green, rarely suffused pinkish.

Scapes sparsely araneous, rarely with bracteoles below capitulum; involucre narrow, almost cylindrical, 5–7 mm in diameter at the base. Exterior involucre bracts adpressed (rarely loosely adpressed), sparsely ciliate to ± glabrous, slightly callose to minutely corniculate, linear to linear-lanceolate (4.0–)5.0–6.5 mm long, (0.6–)1.0–1.6(–2.0) mm wide, pale green to pale pinkish-brown, rarely deep green and suffused reddish, with 0.2–0.4 mm wide indistinct pale margins. Ligules striped reddish or reddish-greyish outside, stigmas yellow or dirty yellow or green, pollen present.

Achenes pale greyish straw-brown, sparsely to densely, usually shortly spinulose above (4.5–)5.0–5.5(–6.5) mm long (incl. the cone), gradually to subabruptly narrowing to 1.1–1.4 (–1.7) mm long cone; rostrum (3.5–)4.5–5.0(–5.5) mm long, thin; pappus pale pinkish-brown, 5.5–6.5 mm long.

2n=16 (see KRAHULCOVÁ in KIRSCHNER et al. 1994).

Variability

In spite of an extremely large geographical range, *T. bessarabicum* is markedly morphologically homogeneous, with some minor aberrations in achene size (a population from S Ukraine), leaf shape (lateral leaf lobes often dentate and downward pointing, terminal lobe elongated in some plants from Crimea, leaves often shallowly divided or almost entire in some plants from Pamiro-Alai, Zeravshan) or stigma colour. The genetic and historical

basis for this variation pattern has been discussed in KIRSCHNER et al. (1994). It is evident that the pattern of allozyme variation is not congruent with the variation in karyotype and morphology. In the above paper we suggested that the allozyme differentiation is in connection with a refuge-core/marginal phenomenon depending on migration in the postglacial period.

The population from Auvergne, France (see also KIRSCHNER et al. 1994, Tab. 1) has been given special attention because it has often been recognized as a separate taxon (cf. HANDEL-MAZZETTI 1907: 26–29; VAN SOEST 1975: 793), even at the rank of species as *T. salsugineum* LAMOTTE. Neither allozyme analyses nor a detailed morphological examination showed any taxonomically important difference between the French and other European plants of *T. bessarabicum*. As there is almost no difference in the ecological requirements of the French plants, either, we have enough evidence to conclude that *T. salsugineum* LAMOTTE is fully identical with *T. bessarabicum*.

Another case to be mentioned concerns South African populations of the sect. *Piesis*, often referred to as *Taraxacum fulvipilis* HARV. An older name, *Pyrrhopappus taraxacoides* DC. was shown to be synonymous with *T. fulvipilis* (described from the same region) by NORTHINGTON (1974). The type of *T. fulvipilis* was examined by B.L. Burt and A.J. Richards (HILLIARD & BURTT 1975) who found it identical with *T. bessarabicum* (which agrees with our observations of the type). We have studied microfiche prints of both original syntypes of *Pyrrhopappus taraxacoides*, and have seen some herbarium specimens of the South African populations (herb. K, also quoted by HILLIARD & BURTT, 1975). A specimen from the Cape, Matlaring River (ACOCKS 2505 K, no. det. 9842) was studied more closely (pollen regular, stigmas yellow, outer bracts linear, greenish, pappus pinkish, etc.). On the basis of morphological observations, we confirm the results of the above works: *Pyrrhopappus taraxacoides* and *Taraxacum fulvipilis* belong to *Taraxacum bessarabicum*.

In KIRSCHNER et al. (1994), allozyme analyses revealed the aberrant nature of a C Asian population of *T. bessarabicum* from the Pamiro-Alai, Zeravshan region. The population sample exhibited a high level of heterozygosity indicating frequent outcrossing (in the other samples of *T. bessarabicum* studied, high homozygosity confirmed the previously reported predominant selfing). Outcrossing in the Zeravshan plants was also ascertained in the course of cultivation experiments. In addition, the Zeravshan population harbours many unique alleles not found in the other samples. Morphologically, we have failed to find any character distinguishing this population from the others, other than a tendency to have almost entire to shallowly divided leaves under certain conditions. We consider this difference as insufficient for treating the Zeravshan plants as a separate taxon.

Distribution

Taraxacum bessarabicum is a species which has one of the largest native distribution ranges among *Taraxaca*. Its distribution area comprises isolated localities in Spain (HUGHES & RICHARDS 1988) and west-central France (Auvergne). One, probably ephemeral, occurrence is known from S Poland. A more or less continuous distribution range extends from W and C Bohemia, S Moravia and adjacent Austria and S Slovakia to the Pannonian basin (Hungary, Romania, Vojvodina) and reaches NE Bulgaria. *Taraxacum bessarabicum* is frequent in S Ukraine, Crimea, S European Russia, the basin of the lower Volga, and the N part of C Asia. In the east, it is distributed in SW Siberia, the Altai, and gradually ceases to occur in the Transbaikalia, Mongolia and NW China. In the C Asian mountains and south of them, it is much less common (scattered localities known from Turkey, Transcaucasia, Syria, Iran and

Afghanistan). The occurrence of *T. bessarabicum* in South Africa deserves a special note. While VAN SOEST (1977) suggested a secondary nature of the S African localities, BURTT DAVY (1935) gave facts leading him to conclude that they “remove any suspicion of possible human introduction”. More detailed morphological and allozyme studies are necessary to confirm or reject the above hypotheses.

2. *Taraxacum stenocephalum* BOISS. et KOTSCHY in BOISS., Fl. Orient. 3: 790, 1875.

Taxonomic complexity of this variable group of populations centred on Transcaucasia and N Anatolia is reflected in the number of names referable to the group. In particular, two names have been continuously misinterpreted in the most important *Taraxacum* literature.

The name *T. stenocephalum* BOISS. et KOTSCHY, although based on good material and, in fact, clearly typified, has not been accepted in any important account of *Taraxaca*. HANDEL-MAZZETTI (1907: 18–19) relegated it to the synonymy of *T. microcephalum* (in spite of knowing that the latter was a later homonym). VAN SOEST (1975, 1977) equates *T. stenocephalum* with *T. bessarabicum*. The type material from North Anatolia in G-BOISS, however, belongs to another taxon comprising the Transcaucasian and N Anatolian group of *Piesis* populations.

Even more complicated are the nomenclatural problems of *T. stenolepium*. The name *Taraxacum stenolepium* HAND.-MAZZ. appears in two contradictory conceptions in the literature. Both are based on the syntypes listed by HANDEL-MAZZETTI (1907). VAN SOEST (1963), in an informal way (i.e. without lectotypification), restricted the usage of the name to cover plants from the Himalaya, and published a new species name, *T. szovitsii* SOEST, to accommodate the Transcaucasian material – the majority of syntypes of the original *T. stenolepium*. *T. szovitsii* is based on the SZOVITS collection (SZOVITS 633) from Karabagh (L!, G-DC!). TZVELEV (in SCHISCHKIN & TZVELEV 1964) selected a lectotype for *T. stenolepium* from the same SZOVITS collection from Karabagh (LE!), and his choice should be followed. Thus, *T. szovitsii* is to be relegated to the rich synonymy of *T. stenolepium* (there is no retroactivity of lectotypification, and *T. szovitsii*, even when based on a duplicate of the lectotype of *T. stenolepium*, is not nomenclaturally illegitimate).

According to the lectotype, the name *Taraxacum stenocephalum* refers to a N Anatolian and Transcaucasian species of the section *Piesis*, to the most common representative of the section in that region. It includes a large assemblage of tetraploid (and perhaps also diploid) populations whose variation is exceedingly great, both within and among populations. The plants vary in leaf shape and indumentum, in posture, colour and corniculation of outer bracts, in stigma colour, achene size and colour, rostrum length and thickness, pappus colour and length, etc. The examination of other Caucasian and Transcaucasian taxa shows that these sexual tetraploids might have played an important role in the sectional evolution and speciation of *Taraxacum* in that region.

The group has not received any attention as a whole in the literature, and that is why many of its forms, either locally distinct or only individually extreme, have been described as separate species. In addition to *T. stenolepium* HAND.-MAZZ. and *T. szovitsii* SOEST, there is *T. anatolicum* SOEST (with f. *anatolicum* and f. *stramineum* SOEST) from Turkey, a form clearly belonging to *T. stenocephalum* subsp. *stenocephalum*, *T. georgicum* SOEST, a name based on the rather weak material of Hohenacker's exsiccate from Schuscha (L!, K!, W!, etc.), but undoubtedly belonging to *T. stenocephalum* s. str. Another name referable to the

typical *T. stenocephalum* is *T. podkumokense* GALUSHKO from the Caucasus. DOLL (1977) also contributed to this nomenclatural confusion. His *T. wardenium* undoubtedly belongs to the typical *T. stenocephalum*.

Other names belonging to the assemblage of *T. stenocephalum* refer to taxa that differ from the type subspecies in some respects; these are treated as subspecies of *T. stenocephalum* below. *Taraxacum daralagesicum* SCHISCHK. refers to an Armenian endemic classified as *T. stenocephalum* subsp. *daralagesicum* here. Another taxon of this group is *T. bessarabicum* subsp. *gumusanicum*. Although its original material is limited to a few duplicates of a single exsiccate, the name in all likelihood represents a local taxon understood as *T. stenocephalum* subsp. *gumusanicum* below. Last, a local conspicuous group of populations close to *T. stenocephalum* s. str., confined to the Black Sea region of the westernmost Caucasus is described as *T. stenocephalum* subsp. *magnum*.

Taraxacum stenocephalum can be briefly diagnosed as follows: Plants relatively robust; leaves \pm entire or deeply divided and usually dentate, usually wider than 2 cm; lateral lobes usually triangular and slightly downward pointing; interlobes relatively wide [(2–)5–14 mm], leaves usually wider than 2 cm. Involucres usually not conspicuously narrow (6–10 mm in diameter at the base); outer bracts laxly adpressed to erecto-patent or arcuate, usually conspicuously corniculate, with distinct narrow margins. Achenes pale greyish, pale brown, brown or reddish, 3.4–6.5 mm long; cone 0.4–1.9 mm long; pappus yellowish to pale pinkish-brown.

Note

Another name to be mentioned is *T. hohenackerianum* SOEST, Proc. Kon. Ned. Akad. Wetensch. C, 69: 371, 1966. The original material and its duplicates (Caucasus, Quetschet (IT: s.d. HOHENACKER M, no. det. 11276; W, no. det. 8985) are of poor quality. We have failed to identify the material at the level of subspecies. However, the fact that the name is referable to *T. stenocephalum* s.l. is beyond any doubt.

The holotype and two isotypes from Afghanistan (i.e., the only material known) of *T. calciphilum* A.J. RICHARDS et SOEST [Bot. J. Linn. Soc. 65: 42, 1972, Bard-i-Amir (1968 DOBSON OXF, no. det. 11636, 11996)] undoubtedly belong to the sect. *Piesis*, and in all likelihood, to the group of *T. stenocephalum*. The original material of *T. calciphilum* is a tetraploid with very slightly irregular pollen; sexuality is therefore possible (A.J. RICHARDS, in litt., did not exclude this possibility, either). More material is needed to show whether *T. calciphilum* represents a separate taxon within *T. stenocephalum*.

2a. *Taraxacum stenocephalum* BOISS. et KOTSCHY in BOISS., Fl. Orient. 3: 790, 1875, subsp. *stenocephalum*

LT, **hoc loco**: Ad Alischeri Chan inter Trapezunt et Baiburt, alt. 6200 (28. VII., KOTSCHY, Iter cilicico-kurdicum 1859, Suppl. 649, G-BOISS, photo! Identified as *T. stenocephalum* with Boissier's note "sp. nov. distinctissima!", LT is the upper middle specimen).

= *Taraxacum stenolepium* HAND.-MAZZ. Monogr. Gatt. Tarax. 121, 1907. – LT: In pratis montium altiorum Karab. orient. (1829 SZOVITS 633 LE, no. det. 6065, cf. SCHISCHKIN & TZVELEV 1964: 536).

= *Taraxacum szovitsii* SOEST, Wentia 10: 17, 1963. – ST: Karabagh (SZOVITS 633 L!, G-DC!)

- = *Taraxacum podkumokense* GALUSHKO, *Novosti Sist. Vyssh. Rast.* 8: 269, 1971. – HT: Caucasus borealis, Podkumok, na Marinskii pereval, 1700 m (1964 GALUSHKO LE, no. det. 6067).
- = *Taraxacum georgicum* SOEST, *Proc. Kon. Ned. Akad. Wetensch. C*, 69: 370, 1966. – HT: Prope Schuscha Georg. Cauc. (1838 HOHENACKER L, no. det. 9318, duplicates also W!, PRC!, K!, etc.).
- = *Taraxacum anatolicum* SOEST, *Acta Bot. Neerl.* 17: 438, 1968. – HT: Anatolia orient., Agri, inter Agri et Horasan (RECHINGER 14988 W, no. det. 9020); IT: L, no. det. 9640.
- = *Taraxacum anatolicum* f. *stramineum* SOEST, *Acta Bot. Neerl.* 17: 485, 1968. – HT: Agri, inter Agri et Horasan (RECHINGER 15061 W, no. det. 9021); IT: K, no. det. 8820, E, no. det. 11854.
- = *Taraxacum wardenium* R. DOLL, *Feddes Repert.* 88: 261, 1977. – HT: JERE, n. v. (interpreted on the basis of DOLL 1977: fig. XXXII, below).

Exsiccates: *Taraxaca* Exsiccata, 193–198.

Brief description (Figs. 1, 2)

Leaves mid-green, ± glabrous to araneous, shallowly to deeply divided (width of interlobes 5–14 mm), rarely ± entire; lateral lobes patent to slightly downward pointing, sparsely to densely dentate; interlobes almost entire, dentate or even lobulate, terminal lobe usually middle-sized, sometimes elongated (not conspicuously broader than the lateral ones); petioles green to purple.

Scapes usually sparsely araneous, often more densely hairy below the capitulum; involucre not narrow, 7–10 mm in diameter at the base. Exterior involucre bracts loosely adpressed, erecto-patent to arcuate, usually ± glabrous, rarely ciliate, usually conspicuously corniculate, linear-lanceolate or ± linear, 5.0–8.5 mm long, 0.7–2.3 mm wide, pale to dark green or blackish, often suffused pink to reddish, with 0.1–0.5 mm wide distinct margins. Ligules striped usually greyish green, rarely pale greyish pink, stigmas yellow, dirty yellow, pale green to dark green, pollen present.

Achenes pale greyish straw-brown, pale brown, reddish brown or reddish, densely or sparsely spinulose above, 3.3–5.1 mm long (incl. the cone), subabruptly to ± gradually narrowing to 0.4–1.0 mm long cone; rostrum (4.5–)5.0–6.5(–7.5) mm long, sometimes ± thick; pappus dirty white to dirty yellow (rarely slightly pinkish), 5–7 mm long.

2n=32 (KRAHULCOVÁ in KIRSCHNER et al. 1994).

2n=16 (AREVSHATYAN 1973: 39; a voucher specimen studied in BM, no. det. 8452, see below; there are some doubts, however, whether all the numerous duplicates distributed by Arevshatyan with recorded chromosome numbers were examined karyologically).

An extremely variable subspecies. It is very likely that the subspecies represents a young diploid-tetraploid complex with extreme heterozygosity (cf. KIRSCHNER et al. 1994). The nature of sexuality in the tetraploid cytotype will be given an additional study. Cultivation experiments and allozyme analyses (KIRSCHNER et al. 1994) show the basis of the enormous variation: obligate outcrossing, very high proportion of polymorphic loci, considerable heterozygosity. In spite of the fact that the subsp. *stenocephalum* varies in a number of conspicuous features (such as fruit colour and shape, colour of pappus, colour of stigmas, size of fruits, etc.), the mosaic pattern of the character distribution does not allow us to recognize any taxa within it.



Fig. 1. *Taraxacum stenocephalum* BOISS. et KOTSCHY. The lectotype of *Taraxacum stenolepium* HAND.-MAZZ. (LE).



Fig. 2. *Taraxacum stenocephalum* BOISS. et KOTSCHY. Isotype of *Taraxacum anatolicum* f. *stramineum* SOEST (K).

Distribution

Taraxacum stenocephalum subsp. *stenocephalum* is very common in the Transcaucasia (Georgia, Armenia, Azerbaidzhan) and northern Anatolia. Locally, it reaches the northern slopes of the Caucasus (Podkumok). A few additional localities are known from Iraq (VAN SOEST 1977), Afghanistan and Iran.

2b. *Taraxacum stenocephalum* subsp. *magnum* KIRSCHNER et ŠTĚPÁNEK, subsp. nov.

HT: Gelendzhik, Tonkii mys (1936 CHERNYAKOVSKAYA LE, no. det. 8848).

Diagnosis

A *T. stenocephalo* subsp. *stenocephalo* acheniis longis (ad 6.5 mm), in parte superiore sparsissime tuberculatis, longius pyramidatis (pyramis ad 1.9 mm), bracteis exterioribus minute callosis vel ecallosis, laxe adpressis vel adpressis, lobo terminali foliorum magno, conspicuo, interlobiis valde dentatis vel lobulatis differt.

Brief description

Leaves deep green, sparsely araneous to \pm glabrous, deeply divided (width of interlobes 2.0–3.5 mm); lateral lobes few, usually narrow, patent to hamate, small, rarely triangular, proximal margin dentate; interlobes narrow, usually dentate to densely dentate, often lobulate, terminal lobe very large, broadly triangular to obtuse, sparsely dentate, rarely slightly incised; petioles pale green.

Scapes sparsely araneous; involucre narrow, about 6 mm in diameter at the base. Exterior involucre bracts adpressed to laxly adpressed, sparsely ciliate near the apex, ecallose to slightly callose, linear, 5.0–7.5 mm long, 0.8–1.4 mm wide, usually suffused pinkish-brown, with ca. 0.3 mm wide indistinct margins. Ligules striped grey, stigmas dark green (to blackish), pollen present, regular in size.

Achenes greyish straw coloured, very sparsely and shortly tuberculate above, 6.0–6.5 mm long (incl. the cone), gradually narrowing to 1.6–1.9 mm long \pm cylindrical cone; rostrum 5 mm long; pappus dirty yellowish, 6.5 mm long.

2n=? (regular pollen indicates sexuality).

A conspicuous local form, distinct in having a very unusual leaf shape, large achenes and almost ecallose outer bracts. So far as the material goes, it is confined to the Novorossiisk and Sochi regions of the Black Sea foothills of the westernmost Caucasus. It seems to be a marginal isolate of the complicated group of forms of *T. stenocephalum* s.l., and we therefore treat this type as a relatively distinct subspecies of *T. stenocephalum*.

2c. *Taraxacum stenocephalum* subsp. *daralagesicum* (SCHISCHK.) KIRSCHNER et ŠTĚPÁNEK, comb. nov.

\equiv [Bas.] *Taraxacum daralagesicum* SCHISCHK in Fl. USSR 29: 534, 745, 1964. – HT: Armenia, Daralagezskii raion, sel. Okbadyr-Alagez (1931 KARYAGIN & SAFIEV LE, no. det. 6071).

Brief description

Leaves mid-green, often subcoriaceous, sparsely to densely araneous at the base, shallowly to deeply divided (interlobes 4–9 mm wide), lateral lobes \pm triangular, usually slightly downward pointing, numerous, sparsely dentate, terminal lobe dentate to lobulate; interlobes short and \pm broad, often lobulate; petioles green or pinkish.

Scapes densely araneous; involucre ± narrow, 6–7 mm in diameter at the base. Exterior involucre bracts adpressed to loosely adpressed, ± glabrous, ecallose to slightly callose, linear or linear-lanceolate, 4.0–6.5 mm long, 1.3–1.8 mm wide, pale pinkish-brown to greenish, with 0.2–0.3 mm wide indistinct margins. Ligules striped pinkish grey, stigmas yellow, pollen present, regular in size.

Achenes pale straw-brown, rarely reddish, with few sparse long spinules above, 5.9–6.5 mm long (incl. the cone), gradually to subabruptly narrowing to 1.5–1.8 mm long cone; rostrum 2.0–3.0(–4.5) mm long (sometimes thicker); pappus pale pinkish-brown, 5.5 mm long.

2n=? (regular pollen indicates sexuality).

Another locally distinct form deviating from the type subspecies in its long achenes with short rostrum, pinkish-brown pappus, leaf shape, densely araneous scapes and plant base. General habit of more slender specimens of subsp. *daralagesicum* might be confused with that of *T. bessarabicum*, but achene characters, indumentum and leaf texture distinguish these two taxa. *Taraxacum stenocephalum* subsp. *daralagesicum* seems to be confined to a small region in Armenia. Similar to the type subspecies, subsp. *daralagesicum* is variable in achene colour (both grey-brown and reddish achenes were found).

2d. *Taraxacum stenocephalum* subsp. *gumusanicum* (SOEST) KIRSCHNER et ŠTĚPÁNEK, comb. nov.

≡ [Bas.] *Taraxacum bessarabicum* subsp. *gumusanicum* SOEST, Acta Bot. Neerl. 17: 483, 1968. – HT: Armenia turcica, Szandschak Gmschkhane, Aimene-bogas, in campis (SINTENIS, It. orient. 1894, no. 7409, BR, no. det. 8844); IT: PRC! LD! WU!.

Brief description

Plants medium-sized. Leaves about 10 cm long and 1.5–2.0 cm wide, sparsely araneous, deeply divided (interlobes 2–4 mm wide); lateral lobes often approximated, narrowly triangular, rarely hamate, downward pointing, often incised, sparsely dentate; interlobes short, sometimes lobulate, terminal lobe medium-sized, triangular to sagittate; petioles [?] reddish.

Scapes araneous; involucre narrow, about 6 mm in diameter at the base. Exterior involucre bracts adpressed, ciliate, ecallose (flat) at the apex, linear-lanceolate, 5.0–6.5 mm long, 1.5–1.9 mm wide, brownish green, with 0.2–0.4 mm wide margins. Ligules striped pinkish grey, stigmas pale greenish, pollen present.

Achenes pale brownish-reddish, or greyish, not densely spinulose above, 5.7–5.8 mm long (incl. the cone), gradually narrowing to 1.1–1.2 mm long cone; rostrum 6 mm long; pappus yellowish-pinkish, 5.5 mm long.

The relatively scanty material studied (plants of the type collection) does not allow any evaluation of the variability of subsp. *gumusanicum*. Features summarized above suggest that it represents a form occupying an intermediate position between *T. stenocephalum* subsp. *stenocephalum* (which is similar in leaf shape) and *T. salsitatis* (see below, similar achenes).

3. *Taraxacum pachypodium* H. LINDB., Acta Soc. Sci. Fenn., Ser. Nova B, 1(2): 173, 1932.

ST: H, etc. Holotype not designated by H. LINDBERG. Material from the only locality listed was distributed as duplicates, a specimen studied in K, no. det. 8794 (Ras-el-Ma prope Azrou, ... Oued Ifrane, c. 1600 m, LINDBERG 5194).

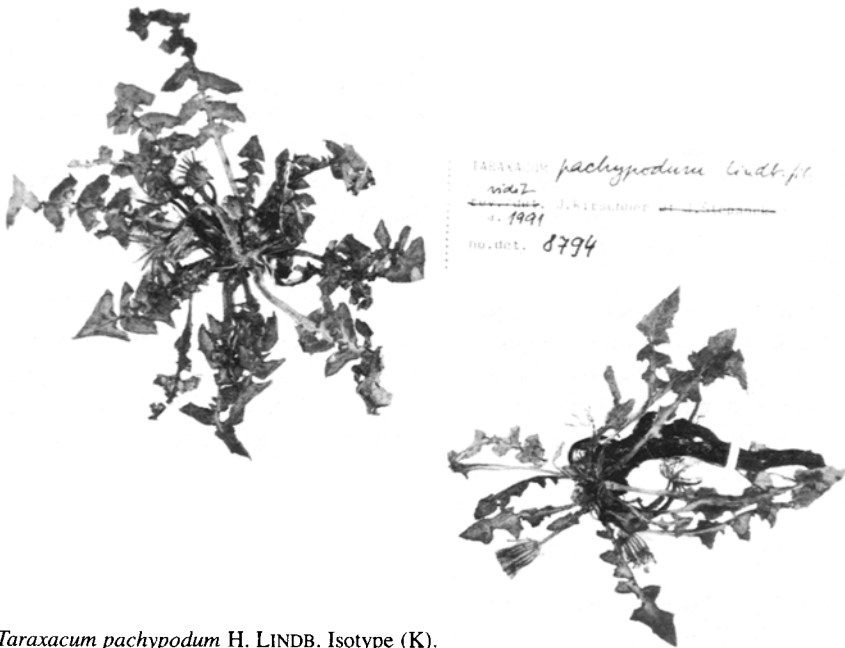


Fig. 3. *Taraxacum pachypodum* H. LINDB. Isotype (K).

Note

There are some older names that may be referable to *T. pachypodum*. POMEL (1874) published four new *Taraxacum* species, three of which have, according to the description, some features in common with *T. pachypodum*. *Taraxacum inaequilobum* is an autumn flowering plant (achene and leaf characters do not correspond to those of *T. pachypodum*), and *T. microcephalum* is relatively close to the sect. *Piesis* in many traits but the name is illegitimate (a later homonym). Both names may belong to the section *Scariosa*, as well. The name *T. atlanticum* POMEL might refer to *T. pachypodum* but it is characterized as a late spring flowering species by POMEL (*T. atlanticum* POMEL was equated with *T. pachypodum* by EMBERGER & MAIRE 1941: 1168). Unfortunately, we did not examine the original plants described by POMEL (no response from Algiers herbaria).

Brief description (Fig. 3)

Leaves greyish green to mid-green, sparsely araneous to \pm glabrous, usually deeply divided [width of interlobes 1–2(–3.5) mm]; lateral lobes hamate, downward pointing (often obtuse), sparsely dentate on proximal margin or entire; interlobes entire to sparsely lobulate, terminal lobe deltoid to triangular, often obtuse; petioles green (rarely purple).

Scapes densely araneous; involucre narrow, 5–7 mm in diameter near the base. Exterior involucre bracts adpressed to loosely adpressed, sparsely ciliate near the apex, slightly callose to shortly corniculate, linear, 3.5–6 mm long, 0.8–1.2 mm wide, pale green (usually suffused brownish pink), with 0.2–0.3 mm wide distinct margins. Ligules striped greyish pink outside, stigmas dirty yellow to dark green, pollen present, regular in size.

Achenes pale greyish, sparsely and shortly spinulose above, 3.5–3.8 mm long (incl. the cone), gradually narrowing to 0.7–0.9 mm long cone; rostrum 2.0–3.5(–4.0) mm long, often thick; pappus yellowish-pinkish, 3–4 mm long.

$2n=?$ (regular pollen and often limited seed set point to sexuality, possibly at the diploid level).

Note

Plants from two Algerian localities (wadi Ouerk, 22.VII.1968 BOTSHANTSEV 1034 LE, no. det. 10957, and Biskra, El Alia, CHEVALLIER K, no. det. 11879) have larger achenes (up to 5.2 mm). The nature of this difference remains to be studied on more complete material; the other specimens examined are homogeneous in this respect.

The species is distinct in its achene characters (small size of all parts except the cone), dense scape hairiness, and the leaf shape (similar to that of *T. perenne*).

Distribution

Up to now, very few localities have been recorded, all in habitats with subhalophilous or halophilous vegetation, mostly at higher altitudes in Morocco and Algeria.

4. *Taraxacum perenne* KIRSCHNER et ŠTĚPÁNEK, sp. nov.

HT: Ucraina, paeninsula Krym (Tauria), regio Sevastopol, in valle Baidarskaya dolina: in graminosis subsalsis non procul a pago Orlinoe (1989 KIRSCHNER & ŠTĚPÁNEK, planta culta sub no. JŠ 3517, a. 1991 lecta, PRA, no. det. 8843, isotypi ibidem).

Descriptio (Fig. 4)

Plantae parvae usque mediocres, radice majore crassa, radicibus lateralibus stoloniformibus etiam perennantes. Folia pallide viridia, sparse araneosa, plerumque 7–8 cm longa et ad 2 cm lata, profunde lobata. Lobus terminalis minor, acutus, anguste triangularis vel tripartitus, lobi laterales numero 3–4 utrobique, \pm remoti, oppositi vel interdum alterni, patentes vel paulo hamati, anguste triangulares, marginibus proximalibus remote dentatis, marginibus distalibus convexis integris. Interlobia angusta, 1.5–3 mm lata, 0.2–1.0 cm longa, viridia, petiolus angustus, pallide violaceus vel viridis.

Scapus sparse araneosus vel araneosus luteo-viridis vel cupreus. Involucrum ad basin subtrotundatum, angustum, 5–6 mm in diametro, squamis interioribus atro-viridibus, 10–11 mm longis, callosis, squamis exterioribus numero 10–14, imbricatis, anguste usque late lanceolatis, arcte adpressis, \pm glabris vel sparsissime ciliatis, ecallosis, 4.0–4.5 mm longis, 1.3–1.9 mm latis, cupreo-coloratis vel roseo-viridibus, stria media obscura (atro-viridi) notatis, marginibus pallidis distinctis 0.2 mm latis.

Calathium planum, ca 1.5–2.0 cm in diametro, luteum, ligulae marginales planae, extus stria pallide griseo-rosea ornatae. Stigmata obscura, atro-viridia, antherae polliniferae.

Achenium griseo-stramineum, superne brevissime spinulosum vel tuberculatum, ceterum laeve vel tuberculis minimis sparse instructum, 4.2–4.5 mm longum (pyramide inclusa), in pyramidem subconicam, 0.8–1.0 mm longam sensim vel subsensim abiens; rostrum crassiusculum, 1.7–2.5 mm longum, pappus sordide luteus et pallide rubellus 5.0–5.5 mm longus. Floret autumnno.

$2n=32$ (det. KRAHULCOVÁ).

During our expedition to Ukraine and Crimea we collected a rich sample of subhalophilous plants in the valley of Baidarskaya dolina in SW Crimea. Along with *Taraxacum pseudomurbeckianum* TZVELEV of the sect. *Palustria* (H. LINDB.) DAHLST., a very conspicuous type of the sect. *Piesis* was gathered and cultivated at Průhonice Experimental Garden, Institute



Fig. 4. *Taraxacum perenne* KIRSCHNER et ŠTĚPÁNEK. The holotype.

of Botany. It turned out to have a very unusual and remarkable combination of morphological and biological features. First, it is a sexual tetraploid, a feature otherwise known exclusively in *T. stenocephalum* and *T. pindicum* within the genus. It develops underground lateral (almost stoloniform) roots, another unique character in the genus. Morphologically, it is very distinct in having a subconical cone to the achenes and a short thick rostrum. Its outer bracts are imbricate and often have a broadly lanceolate shape, involucre are very narrow. Patent and subhamate, dentate lateral lobes determine a distinct leaf form, distantly similar to that of *T. pachypodium*.

The above combination of characters clearly distinguishes the Crimean form as a distinct species. As *T. perenne* does not have any close relative within the section, considerations about its evolution might be only speculative. Up to now, *Taraxacum perenne* is known from one single population in Crimea.

5. *Taraxacum salsum* KIRSCHNER et ŠTĚPÁNEK, sp. nov.

HT: Ukraine. E Crimea, isthmus of Arabatskaya Strelka, in the vicinity of Strelkovoe, 100–200 m of the Azov Sea coast (1989 KIRSCHNER & ŠTĚPÁNEK, cult. no. JŠ 3497, PRA, no. det. 8842); IT: ibidem; PT: E Crimea, Arabatskaya Strelka, Strelkovoe, shore of Sivash salt lakes,

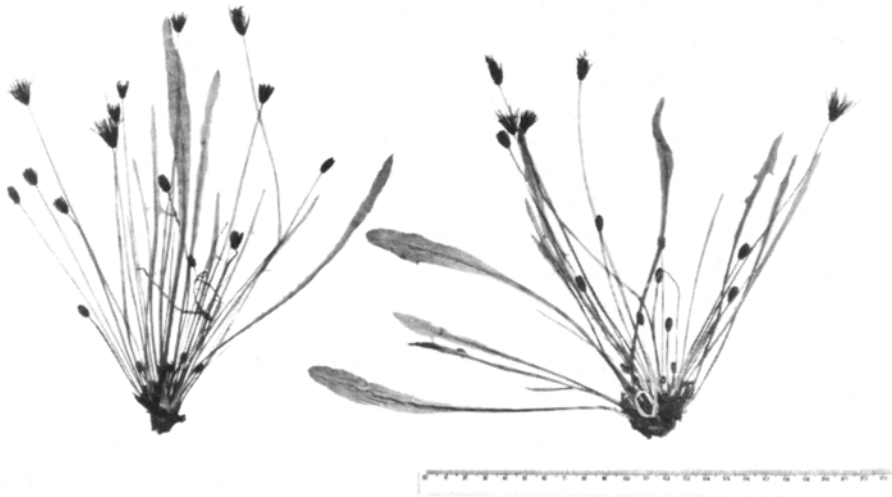


Fig. 5. *Taraxacum salsum* KIRSCHNER et ŠTĚPÁNEK. The holotype.

ca. 500 m W of the holotype locality (1989 KIRSCHNER & ŠTĚPÁNEK, cult. no. JŠ 3501, PRA, no. det. 8841).

Exsiccat: Taraxaca Exsiccata, no. 352 a,b.

Descriptio (Fig. 5)

Plantae parvae vel mediocres. Folia suberecta, saturate vel obscure viridia, ± glaberrima, plerumque 8–14 cm longa et ad 1.3 cm lata, integra vel remote denticulata, rarius non profunde lobulata-lobata, lobo terminali elongato, lobis lateralibus numero 2–3 late triangularibus, oppositis, raro sagittatis, integris. Interlobia plerumque 4–8 mm lata, petiolus angustus, saturate violaceus.

Scapus sparse araneosus vel ± glaber, pallide viridis vel violaceus. Involucrum angustum, cylindricum, ad basin 4–6 mm in diametro, nitidum, squamis interioribus 11–13 mm longis, ecallosis, obscure viridibus, squamis exterioribus numero 12–16, lanceolatis vel anguste lanceolatis, arcte adpressis, paulo nitentibus, glabris vel raro sparsissime ciliatis, ecallosis vel leviter callosis, 3.5–5.5 mm longis, 1.5–2.2 mm latis, obscure (atro-viriditer) coloratis vel roseo-viridibus, marginibus angustissimis inconspicuis, 0.05–0.2(–0.3) mm latis.

Calathium planum, ad 2.0 cm in diametro, laete luteum, ligulae marginales planae, extus stria grisea vel griseo-rosea notatae. Stigmata sordide lutea vel pallide viridia, antherae polliniferae.

Achenium pallide griseo-stramineum, superne sparse spinulosum, ceterum ± laeve, 4.5–5.5 mm longum (pyramide inclusa), in pyramidem ± cylindricam 0.7–0.9 mm longam sensim abiens, rostrum 3.5–4.5 mm longum, pappus pallide brunnescenti-rubellus, 6–7 mm longus. Floret autumnno.

2n=16 (KRAHULCOVÁ in KIRSCHNER et al. 1994).

In the eastern Crimea south of Genichesk is an area of salt lakes called Sivashi that are separated from the Azov Sea by a strip-like isthmus, Arabatskaya Strelka. The shallow lakes have flat open grassy shores with soils of high salinity, rich in halophilous vegetation. Adjacent salt meadows and pastures were visited by us in 1989. In the vicinity of the village of Strelkovoe, we found two meadow localities, one dominated by an unknown species of *Piesis*, the other with *T. bessarabicum* and the *Piesis* species side by side.

Upon closer examination in cultivation, the unknown plants proved to represent a distinctive new species of the sect. *Piesis*, described as *T. salsum* above, characterized by a number of morphological features: leaves \pm entire, dark green, with purple petioles, dark (slightly glossy) outer bracts without distinct border, relatively short cone to the achenes, long pappus, etc. *Taraxacum salsum* is an outcrossing diploid sexual species, as shown by allozyme, karyotype and hybridization investigations (KIRSCHNER et al. 1994).

6. *Taraxacum salsitatis* KIRSCHNER, ŠTĚPÁNEK et YIRDIRIMLI, sp. nov.

HT: Turcia, Anatolia merid., montes Taurus, in declivi sicco petroso in pylis Kiliki prope pagum Topbaksar in valle fl. Pozanti, solo vulcanico, alt. ca. 900 m s.m. (1988 KŘISA, cult. no. JŠ 4207, PRA, no. det. 8840); IT: ibidem; PT: Turcia, Anatolia centr., in salso prope pagum Sasgeçit, ca. 10 km situ bor.-occid. ab oppido Ereğli, alt. ca. 1100 m s.m. (1988 KŘISA, cult. no. JŠ 4203, PRA, no. det. 8839); Specimen ceterum: ex semin. Haertu Dagħ (s.d. HAUSSKNECHT JE, no. det. 9187).

Descriptio (Fig. 6)

Plantae mediocres. Folia viridia, \pm glabra, ad 17 cm longa et 1.5–2.2 cm lata, profunde lobata. Lobus terminalis elongatus vel anguste triangularis, plerumque sagittatus, lobi laterales numero 3–4, sagittati vel anguste oblique triangulares, reflexi, alterni vel interdum oppositi, marginibus distalibus plerumque concavis, remote dentatis. Interlobia \pm brevia, ca 0.5 cm longa, 3–6 mm lata, petiolus viridis.

Scapus araneosus, luteo- vel roseo-viridis. Involucrum \pm angustum, ad basin 6–7 mm in diametro, subrotundatum, squamis interioribus atro-viridibus, ad 15–16 mm longis, \pm ecallosis, squamis exterioribus numero 12–16, imbricatis, lanceolatis vel ovato-lanceolatis, arcte adpressis, sparse ciliatis vel glabris, ecallosis, 4.0–6.5 mm longis, 1.3–2.8 mm latis, athermis vel roseo-viridibus, marginibus distinctis albis 0.3–0.5 mm latis.

Calathium planum, ca. 2.5 cm in diametro, luteum, ligulae marginales planae, extus stria pallide griseo-rosea notatae. Stigmata sordide lutea vel pallide virescentia, antherae polliniferae.

Achenium pallide griseo-brunnescens (paulo rubescens), superne subdense spinulosum, 4.5–5.1 mm longum (pyramide inclusa), in pyramidem \pm cylindricam (1.0–)1.2–1.4 mm longam subsensim vel subabrupte abiens, rostrum 4.5–6.0 mm longum, pappus pallide brunescenti-rubellus. Floret autumnno.

$2n=16$ (in HT and PT collection det. KRAHULCOVÁ in KIRSCHNER et al. 1994).

Taraxacum salsitatis seems to be distributed in Anatolia in saline and subsaline habitats. Broader, ovate-lanceolate, imbricate, distinctly white bordered ecallose outer bracts, pale greyish achenes with pinkish tinge, and characteristic leaf shape are diagnostic for this species. *Taraxacum salsum* and (probably) *T. stenocephalum* subsp. *gumusanicum* can be regarded as closer relatives of *T. salsitatis*.



Fig. 6. *Taraxacum salsitatis* KIRSCHNER, ŠTĚPÁNEK et YIRDIRIMLI. The holotype.

7. *Taraxacum pindicum* KIRSCHNER et ŠTĚPÁNEK, sp. nov.

HT: Greece, the Pindos Mts., ca. 1 km S of the Katara Pass, above Koridallos village (1993 FIŠEROVÁ, pl. culta, a. 1994 lecta, PRA, no. det. 11299); IT: ibidem.

Descriptio

Plantae parvae. Folia subgriseo-viridia, sparse araneosa vel araneosa, ad 8 cm longa et ca. 1.5 cm lata, profunde divisa. Lobus terminalis sagittatus vel \pm triangularis, 1.5–2.5 cm longus, lobi laterales numero (3)4–5 utrobique, acuti, sagittati vel paulo hamati, lineari-triangulares usque anguste triangulares, marginibus distalibus ad basin uno lobulo praediti vel integris. Interlobia angusta vel angustissima, plerumque 1–2 (ad 3) mm lata, plerumque 4–6 mm longa, integra, raro obscure marginata, plerumque viridia, petiolus angustus, viridis.

Scapus pallide viridis vel roseus, \pm dense araneosus vel araneosus. Involucrum ad basin angustum, 4–5 mm latum, squamis interioribus pallide viridibus vel paulo roseis, angustissimis, ad 11 mm longis, callosis, squamis exterioribus numero 12–15, linearibus (vel lineari-triangularibus ad lineari-lanceolatis), 3.5–5.5 mm longis, 0.8–1.2 mm latis, arcte adpressis, superne sparsissime ciliatis, callosis vel indistincte corniculatis, viridibus vel pallide roseo-viridibus, marginibus pallidis membranaceis 0.1–0.2 mm latis vel \pm emarginatis.



Fig. 7. *Taraxacum xmesohalobium* KIRSCHNER et ŠTĚPÁNEK. The holotype.

Calathium planum vel paulo convexum, ca. 2 cm in diametro, luteum, ligulae marginales planae, extus stria rubro-badia (sordide grisea in sicco) ornatae. Stigmata griseo-lutea vel pallide luteo-viridia, antherae polliniferae.

Achenium griseo-stramineum, superne sparse brevissime acute spinulosum, ceterum laeve, 4.3–4.5 mm longum (pyramide inclusa), in pyramidem subconicam, 0.4–0.5 mm longam sensim abiens, rostrum 3.5–4.0 longum, pappus pallide rubellus 5.0–5.5 mm longus. Floret autumno (Augusto vel Septembri).

$2n=32$ (det. J. ŠTĚPÁNEK, e holotypo et isotypo).

A remarkably distinct taxon, completely isolated from the other *Piesis* taxa. A short, \pm conical cone to the achenes, short rostrum, very narrow outer bracts, narrow interlobes and narrowly triangular lateral lobes to the leaves are diagnostic for this species. It is another tetraploid sexual, which is a very rare feature in the genus. It seems to be related to *T. perenne* and *T. bessarabicum*.

Ecologically, *T. pindicum* differs from most of the other representatives of the section. It grows in open coniferous woods or pastures and along roadsides on bare substrates rich in mineral nutrients (mostly ophiolitic soils). A similar habitat has been recorded for some sites of *T. stenocephalum* subsp. *magnum*, and may represent a refuge of local populations of facultative halophytes under changing conditions.

Taraxacum pindicum seems to be confined to the Pindos Mts. It is possible that some of the Pindos localities listed in Mountain flora of Greece (RICHARDS 1991: 507) under the name *T. cylleneum* FÜRNKRANZ refer to *T. pindicum* (which is the case of no. det. 11634).

8. A hybrid between *Taraxacum salsum* and *T. bessarabicum*

In the E Crimea, in the isthmus of Arabatskaya Strelka, the two parental taxa usually are \pm spatially separated. At a few places they come in contact but, among numerous plants collected there, we found only two plants difficult to assign to either of the parents. As the two plants were suspected to represent a hybrid between these two species, we have screened one of them and their progeny by means of gel electrophoresis of allozymes. The results are given in more detail in KIRSCHNER et al. (1994). Here it should be mentioned that the presumed parental taxa have mutually exclusive (homozygous) alleles at two loci while the critical plants were mostly heterozygous with the parental alleles at the two loci, which proves the hybrid status and parentage of the plants.

Morphologically, the hybrid is \pm intermediate between the parents; regard to the outer bracts it is closer to *T. salsum*, in the leaf shape to *T. bessarabicum*. In the following, the hybrid is formally given a binomial.

Taraxacum \times *mesohalobium* KIRSCHNER et ŠTĚPÁNEK, nothosp. nov. (= *Taraxacum bessarabicum* \times *T. salsum*)

HT: Ukraine, Crimea, isthmus of Arabatskaya Strelka, salt meadows ca. 100–200 m from the Azov Sea coast, near Strelkovoje (1989 KIRSCHNER & ŠTĚPÁNEK, cult. no. of root: JŠ 3500/108, PRA, no. det. 10923).

Diagnosis

Plantae inter *T. bessarabicum* et *T. salsum* intermediae, prior species a planta nostra colore involucri bractearum pallide viridi (rubescens) et forma eorum latiore, altera foliorum forma et petiolis violaceis distinguitur.

Brief description (Fig. 7)

Leaves mid-green, \pm glabrous, usually deeply divided (interlobes 3–6 mm wide); lateral lobes numerous, downward pointing, sparsely dentate or \pm entire; interlobes almost entire, terminal lobe usually elongated, often sagittate; petioles green.

Scapes araneous; involucre narrow, 6–7 mm in diameter at the base. Exterior involucre bracts adpressed, ciliate, callose to corniculate, lanceolate, 5–6 mm long, 1.5–2.0 mm wide, pale green-pinkish, with 0.2–0.4 paler margins. Ligules striped pink-grey, stigmas dirty yellow to pale green, pollen present.

Achenes pale greyish, sparsely spinulose above, 6.1–6.8 mm long (incl. the cone), gradually narrowing to 1.0–1.2 mm long cone. Rostrum 3.5–5.5 mm long; pappus pale pinkish-brown, 6.0–6.5 mm long.

Doubtful or excluded names

Taraxacum gaditanum TALAVERA, Lagasalia 14: 161, 1986. HT: SEV. IT: SEV! – We have studied the type collection. The plants undoubtedly belong to *Taraxacum* sect. *Scariosa*.

Taraxacum jashilkuliense VAINBERG Fl. Tadjh. SSR 10: 466, 1991. – A taxon reportedly close to *T. bessarabicum*. We have failed to gain access to the type material (TAK).

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APPENDIX

Selected herbarium specimens examined

1. *Taraxacum bessarabicum*

France. Massif Central, distr. Clermont-Ferrand, dept. Puy-de-Dôme, St. Nectaire, (1992 KIRSCHNER & ŠTĚPÁNKOVÁ PRA, no. det. 11305). Puy-de-Dôme, Riom (1879 HÉRIBAUD BP, no. det. 2192; 1880 HÉRIBAUD BP, no. det. 2191). **Poland.** Wolica Siesławska, koto Buska (1955 JASIEWICZ KRAM, no. det. 3252). **Czech Republic.** Bohemia, Vitčice (1984 ŠTĚPÁNEK PRA, no. det. 7670). Bohemia, Soos (1963 LHOTSKÁ PR, no. det. 568). Moravia, Dobré Pole (1982 HROUDA PRA, no. det. 7671). Moravia, Sokolnice u Brna (1969 WEBER

PR, no. det. 584). **Slovakia.** Tvrdošovce (1986 GRULICH, KIRSCHNER & ŠTĚPÁNEK PRA, no. det. 7673). Nová Stráž (1933 WEBER PR, no. det. 563). Močenok (1937 KRIST BRNU, no. det. 57). Ťahanovce (1990 [MIKOLÁŠ] KO, no. det. 8493). **Austria.** Neusiedler See (s.d. CZAGH WRSL, no. det. 3161). Breitensee im Marchfelde (1872 HALÁCSY KRA, no. det. 3316). Wilfleinsdorf bei Wien (1876 WIESBAUR BP, no. det. 647). **Hungary.** regio Kiskunság, p. Fülöpháza (1984 TOMŠOVIC PRA, no. det. 7663, 11307). Comit. Fejér, Dinnyés (1938 BOROS BP, no. det. 3745). Tihany (1957 FUTÁK SAV, no. det. 2488). **Bulgaria.** Varna (1886 BORNMÜLLER L, no. det. 9646). Tolbukhinsko, s. Durankulak (1965 JORDANOV, GANCHEV & KOICHEV SOM, no. det. 3712). **Romania.** Halta Barbulești, Ursiceni (1969 DEYL PR, no. det. 304). Besarabia, distr. Hotin, Vancicauti (1933 GUȘULEAC & ȚOPA KRA, no. det. 3318). **Ukraine.** Odessa, s. Yasska (1930 OPPERMANN KW, no. det. 6313). Voznesensk, Doroshovka (1985 ŠTĚPÁNEK & KIRSCHNER PRA, no. det. 11303). Novotroickii raion, s. Turkmenovka (1927 LEVINA KW, no. det. 6323). Menzheleevskoi raion, khutor Tarazhi (1928 ZOZ KW, no. det. 6312). Zmieov (1913 SVIRENKO KW, no. det. 6321). Charcoviae (1825 [CZERNIAEW] KW, no. det. 6306). Krym, Strelkovoe (1989 ŠTĚPÁNEK & KIRSCHNER PRA, no. det. 11304). **Russia.** Voronezhskaya obl., Rossoshanskii raion, Jevstratovka (1965 DUBOVİK KW, no. det. 6361). Distr. Belgorod, Kursk (1910 PALLON LE, no. det. 8303). Sarepta (s.d. BECKER W, no. det. 8974). Uralskaya gub., Gurevskii u., Zhilaya kosa (1927 NIKITIN LE, no. det. 8071). Zavolzh'e, Malouzensk (1932 SMIRNOV 458 LE, no. det. 8305). Saratov (s.d. s.coll. LE, no. det. 8228). Buzuluk, Krasno-Samarskaya dacha (1915 YANISHEVSKII LE, no. det. 8229). Orenburg (s.d. KARELIN LE, no. det. 8240).

Armenia. Artashatskii rayon, s. Kachtsrashen (1967 AREVSHATYAN KRAM, no. det. 3296, "2n=16"). Yuva (1967 AREVSHATYAN K, no. det. 9848). **Turkey.** Konya-Kayajik (1947 DAVIS 14737 K, no. det. 11857). Mughla, Sandras dagh (1947 DAVIS 13625 E, no. det. 11858). **Syria.** Damascus (1937 DINSMORE 20300 K, no. det. 9849). **Iran.** Hamadan, Kuh-e-Alvand (1977 TERMÉ & MATENE L, no. det. 9645). Prov. Shahrud-Bustam, m. Shahvar supra Nekarman (1948 K. H. & F. RECHINGER 5940 W-R, no. det. 9025). Shibli Lake Sanjan (1966 FURSE K, no. det. 9850). NW Iran, Sarab-Duzduzan (1996 SÁDLO PRA). **Afghanistan.** Kabul: Logartal (1963 NEUBAUER 3393 W, no. det. 9024).

Central Asia. Kazakhstan. Tian-Shan, okr. Karakol, o. Issyk-Kul (1933 KOTOV KW, no. det. 6359). Pavlodarskaya oblast', Urlyutyubskii raion, Urlyutyub (1955 TZVELEV et al. LE, no. det. 8085). Semipalatinskaya obl., Karkaral. u., r. Shaitan (1890 KORZHINSKII LE, no. det. 8090). Soongoro-Kirghizia, r. Kokbekta, Semipalatinsk (1840 KARELIN & KIRILOFF LE, no. det. 8099). Tian-Shan, Terskii Ala-Tau, Tekes (1950 s. coll. LE, no. det. 8271). Zailiiskii Ala-Tau, Podgornaya, pos. Shilik (1937 POPOV & GOLOSOKOV LE, no. det. 8268). Kzyl-Ordynskii okr., Karsakgaiskii raion, g. Aigar-dzhan (1929 SHIPCHINSKII LE, no. det. 8267). Turgaiskaya obl., r. Ak-Kushuk (1908 KRASHENINNIKOV LE, no. det. 8083). **Kirghizia.** Tonskii raion, Berbulak (1949 SOBOLEV LE, no. det. 8263). s. Rybach'e, o. Issyk-kul (1930 JUZEPCHUK LE, no. det. 8264). Pamiro-Alai, Ak Terek, Kargan (1990 ŠTĚPÁNEK PRA, no. det. 11308). Pamiro-Alai, Zeravshan valley, Khadishar (1990 ŠTĚPÁNEK PRA, no. det. 11306).

Siberia. Zilairskii kanton, Bashkiriya, kh. Bogachevskii (1929 KRASHENINNIKOV & AFANASIEV LE, no. det. 8241). g. Omsk, r. Irtysh (s.d. GOLDE LE, no. det. 8261). Prov. Tobolsk, Ishim (1912 GORODKOV LE, no. det. 8259). Tobolskaya gub., Jalutorovskii u., d. Okunevka (1912 SVITISH LE, no. det. 8258). Kainsk. okr., d. Bergul (1890 KORZHINSKII LE, no. det. 8256). Tomsk. gub., Kuznetskii u., r. Usteva (1912 KUZNETSOV LE, no. det. 8255). Yeniseiskaya gub., Achinskii u., s. Andropovka (1912 KUZNETSOV LE, no. det. 8249). Irkutsk. gub., Verkholensk. okr., s. Biryulka (1909 ALEKSANDROV LE, no. det. 8246). Irkutsk. gub., Balagansk. okr., s. Bazheevskii (1902 MALTSEV LE, no. det. 8245). Krasnoyarskii kr., Sharypovskii raion, s. Kosye Lozhi (1981 TUPITSINA NS, no. det. 4471). Shrypovskii raion, d. Ivanovka (1981 TUPITSINA LE, no. det. 4470). Zap. Sayan, s. Usinskoe (1980 SHULO & NALPINA NS, no. det. 4454). Krasnoturanskii raion, s. Tubinsk (1965 NEIFELD & ALEKSEEVA LE, no. det. 8252). Minusinskii raion, s. Malaya Inya (1969 ZVEREVA & SOZINOVA LE, no. det. 8251). Altai, Kosh-Agachskii raion, s. Kosh-Agach (1982 KRASNIKOV NS, no. det. 4464, 4453). Altai, Kosh-Agachskii raion, s. Kurai (1982 KRASNIKOV NS, no. det. 4452). Novosibirskaya obl., Karasukskii raion, Karasuk (1983 KROGULEVICH NS, no. det. 4465). Barnaulsk. u., mezhd. Veselym Yarom a Lebyazhim (1913 KRYLOV LE, no. det. 8254). Altaiskii kraj, Znamenskii raion, s. Znamensk (1954 ALEKSANDROVA & GURICHOVA LE, no. det. 8253). Tuva, Kaa-Chemskii raion, r. Sizim (1978 SHAULO NS, no. det. 4466). Tuva, Tandinskii raion, s. Emchest (1977 NEIFELD & JENISHEVSKAYA NS, no. det. 4469). Zap. Sayan, Uyukskii khr., r. Sesarlig (1974 DANILYUK & KURLAIEV LE, no. det. 8247).

China. North Xinjiang, Tekes, 1430 m (24.VIII.1978 NW Institute of Botany Team 2752 WUK). Jeminay, 1220 m (22.VIII.1974 ZHANG ZHENWAN 4169 WUK). Burqin, 640 m (26.VIII.1974 ZHANG ZHENWAN 4258 WUK). Altay (13.VIII.1980 LIU GUOJUN a564 XJBI). Tacheng (15.VIII.1976 KELIMU 582 XJBI). Bole (27.VIII.1958 GUAN KEJIAN 4679 XJBI).

South Africa. Kalahari-Karoo, Kuruman distr., Matlaring River, Cotton End (1937 ACOCKS 2505 K, no. det. 9842, 9843). Bechuanaland, sources of the Mosherva River (1812 BURCHELL K, no. det. 9844).

2. *Taraxacum stenocephalum* subsp. *stenocephalum*

Afghanistan. Ghazni (1962 RECHINGER 17374 K). **Iran.** 'an Ufer des Kurr (STAFF, It. persicum 1202 WU). **Turkey.** Kars, Ardahan-Hauvan (1957 DAVIS & HEDGE BM, no. det. 8448, E, no. det. 11656). 4 km N of Erzurum (1966 DAVIS K, no. det. 9846). **Azerbaijan.** prov. Baku, distr. Kuba, pag. Leze (1929 SACHOKIA LE, no. det. 8312). Distr. Shemakha, pp. Astrachanka et Alty-Agatsh et Ebery-Larat (1930 [GROSSHEIM] LE, no. det. 8222). Prov. Baku, distr. Kuba, m. Shach-Dagh (1929 SACHOKIA LE, no. det. 8309). Prov. Baku, distr. Shemacha, fl. Mollalar-Aschaj (1928 SACHOKIA LE, no. det. 8313). Prope Khoi, prov. Aderbeidschan (s.d. SZOWITS K, no. det. 9762). Karabagh (s.d. HOHENACKER LE, no. det. 8132). Karabagh, r. Bazaitschai (s.d. SZOVITS LE, no. det. 8129). Karabagh & Guriel (s.d., SZOVITS herb. A.J. Richards, no. det. 11637). **Armenia.** Aparan (1968 AREVSHATYAN K, no. det. 9847). Vardenisskii raion (1970 AREVSHATYAN L, no. det. 9644). Araratskii raion, s. Yuva (1967 AREVSHATYAN BM, no. det. 8452). Gegamskii khr., o. Aknalikh (1970 GAMBARYAN BM, no. det. 8449). Yerevan (1975 KURKA herb. Kurka, no. det. 694). Lake Sevan (1960 SAVICH LE, no. det. 8183). Malyi Ararat (s.d. GROSSHEIM LE, no. det. 8322). Distr. Nachitschevan, m. Salvarty (1927 GAVRILOV & DOLUKHANOV LE, no. det. 8136). Distr. Novo-Bayazet, Keity-Janych (1928 GROSSHEIM & ZEDELMEIER K, no. det. 9761). **Georgia.** Caucasus, regio m. Kasbek, inter opp. Kasbegi et p. Vardisubani (1985 ŠTĚPÁNEK PRA, no. det. 6901). Zakavkaz'e, Bakuryani (1924 DZEVANOVSKII LE, no. det. 8172). Prov. Tiflis, distr. Achalkalaki (Dzhavachetia), l. Bugdashen (1924 ZEDELMEIER LE, no. det. 8157). Kazbeg – Lars (1950 s. coll. LE, no. det. 8063). Prov. Tiflis, distr. Gori, p. Bakuriani, s. Krasnaya Tserkov (1918 KOZLOWSKY LE, no. det. 8315). M. Kasbek (1844 KOLENATI 2208 LE, no. det. 8133).

Taraxacum stenocephalum subsp. *magnum*

Russia. Gelendzhik, Tonkii mys (1936 CHERNYAKOVSKAYA LE, no. det. 8847, IT). Novorossiisk, [?] Myskhako (1924 POYARKOVA 448 LE, no. det. 8850). Gelendzhik, Adlerova shchel' – Nazarova shchel' (1976 DUBOVIK & NOVOSAD KW, no. det. 8849).

Taraxacum stenocephalum subsp. *daralagesicum*

Armenia. Daralaghez, prope pagum Alaghez (1931 KARYAGIN & SAFIEV LE, no. det. 8153). Daralagdskii raion, okr. sel. [?] Gyuli-duza (1934 SAFIEV LE, no. det. 8155; 1931 KARYAGIN LE, no. det. 8154). Distr. Novo-Baiazet, inter pagum Adiaman infer. et urbem (1923 GROSSHEIM & ZEDELMEIER LE, no. det. 8146). Distr. Zangezour, in monte Ketschal dagh (1926 GROSSHEIM & YAROSHENKO LE, no. det. 8152). [?] Kozhaiskii rayon, [?] Dzhraber (1953 TAMAMSHYAN LE, no. det. 8845, 8846).

3. *Taraxacum pachypodum*

Morocco. Iter Maroccanum 1926. Atlas Medium, Ras-el-Ma prope Azrou, in prato juxta flumen Oued Ifrane, c. 1600 m (ut *T. pachypodum* n. sp., LINDBERG 5194 K, no. det. 8794). N Morocco, grid 522315, above Azrou on road to Midelt, 1860 m (1991 GARDNER et al. 4881 herb. A.J. Richards, no. det. 11635; RNG, no. det. 11639; E, no. det. 11758). Atlas, ca. 120 km S of Fes, at the shore of Lake Sidi-Ali (1996 KLIMEŠ, cultivated as JŠ 6052, multiplicates PRA). High Atlas, above Gorges du Dadès, Msemrir, 2654 m (1974 RU & BM expedition 859 RU, no. det. 11640). Atlas, N side of J. Azourki (1973 DAVIS 55237 E, no. det. 11759). **Algeria.** district of Chellala (Reibell), village of Taguine, salt places along the right bank of wadi Touil (BOTSHANTSEV 136 LE, no. det. 10958). Chellala (Reibell) district, village of Taguine, road verge (BOTSHANTSEV 1278 LE, no. det. 10956). Biskra, sub palmis, ... ad "El Alia" (CHEVALLIER, Pl. Sahar. Alger. 449 WU, no. det. 9008, also PRC). Constantine (1839 BOVÉ K, no. det. 1188).

4. *Taraxacum pindicum*

Greece. Pindus Gebirge, NW Metsovon, ca. 3–4 km NW vom Katara Paß, ca. 1600–1700 m (1978 E. & F. KRENDL PRA, no. det. 11298). Smolikas, E ridge, 2.5 km S of Samarina (1975 HARTVIG & SEBERG herb. A.J. Richards, no. det. 11634). Nom. Ioannina, Katara Pass, west side, serpentine rocks amongst *Buxus* and road verge by lorry park, alt. 1580 m (1997 RICHARDS herb. A.J. Richards, no. det. 12854).