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The Most Common Dandelions in Middle Asia: The Problem of *Taraxacum* sect. *Macrocornuta*, *T.* sect. *Ceratoidea* sect. nova, and the Identity of *T. halophilum*

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With 4 Figures

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Summary

KIRSCHNER J. & ŠTĚPÁNEK J. 2008. The most common dandelions in Middle Asia: The problem of *Taraxacum* sect. *Macrocornuta*, *T.* sect. *Ceratoidea* sect. nova, and the identity of *T. halophilum*. – *Phyton* (Horn, Austria) 48 (1): 61–78, with 4 figures.

The most widespread dandelion group of subsaline sites in Middle Asia is *Taraxacum* sect. *Macrocornuta* SOEST s. l. It is shown that the group is heterogenous and several species occupying more humid habitats form a separate, closely related section. The new section is described under the name *T.* sect. *Ceratoidea* KIRSCHNER & ŠTĚPÁNEK. Among the species classified as members of the new section (*T. neolobulatum*, *T. bicornis*, *T. varsobicum*, *T. koksaghyz*, *T. badachschanicum*, *T. glaucanthos* and *T. halophilum*) the latter two are dealt with in more detail. *Taraxacum halophilum* (mostly lower Volga region) is recognized as a species close to but distinct from the widespread *T. glaucanthos* of Kazakhstan. Both species names are typified. Checklists of both sections, *Macrocornuta* s. str. and *Ceratoidea*, with typifications are given.

Zusammenfassung

KIRSCHNER J. & ŠTĚPÁNEK J. 2008. The most common dandelions in Middle Asia: The problem of *Taraxacum* sect. *Macrocornuta*, *T.* sect. *Ceratoidea* sect. nova, and the

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identity of *T. halophilum*. [Die verbreitetsten *Taraxaca* in Mittelasien: das Problem von *Taraxacum* sect. *Macrocornuta*, *T.* sect. *Ceratoidea* sect. nova und die Identität von *T. halophilum*.] – *Phyton* (Horn, Austria) 48(1): 61–78, mit 4 Abbildungen.

Die verbreitetste Gruppe der Gattung *Taraxacum* in halbsalzigen Biotopen in Mittelasien ist *T.* sect. *Macrocornuta* SOEST s. l. Es wird gezeigt, dass diese Gruppe heterogen ist und in der traditionellen Auffassung einige in feuchteren Habitaten wachsende Arten enthält, die auch auf Grund ihrer morphologischen Merkmale eine selbstständige Sektion darstellen. Die neue Sektion ist als *T.* sect. *Ceratoidea* KIRSCHER & ŠTĚPÁNEK beschrieben. Unter den Angehörigen dieser Sektion (*T. neolobulatum*, *T. bicorne*, *T. varsobicum*, *T. koksaghyz*, *T. badachschanicum*, *T. glaucanthos* und *T. halophilum*) werden die beiden letzteren, mehr oder weniger auf die Flora von Europa beschränkten Arten, eingehend besprochen. *Taraxacum halophilum* (vorwiegend im unteren Wolga-Gebiet) ist deutlich verschieden von der verwandten, vorwiegend in Kasachstan wachsenden Art *T. glaucanthos*. Die Namen beider Arten werden typisiert. Artverzeichnisse (mit Angabe der Typen) werden für beide Sektionen, *T.* sect. *Macrocornuta* s. str. und *T.* sect. *Ceratoidea*, gebracht.

1. Introduction

The rank of section in the taxonomy of *Taraxacum* conveys a summarized information on the complexity of the genus at the species level; at the same time, the system of sections represents a useful tool for non-specialists (KIRSCHNER & al. 2006, KIRSCHNER & ŠTĚPÁNEK 1996). The principles of *Taraxacum* taxonomy must reflect many phenomena such as low level of structural morphological differentiation in the genus, coexistence of agamospermy and sexuality, complex hybridity and polyploidy (KIRSCHNER & ŠTĚPÁNEK 2006).

The region of Middle Asia (according to BRUMMITT 2001) and adjacent territories are particularly rich in dandelions (ORAZOVA 1975, SCHISCHKIN 1964, VAINBERG 1991, SOEST 1977) but neither the above principles nor the sectional system have been consistently applied there, in contrast to, for instance, the treatment of *Taraxacum* in *Flora Iranica* (SOEST 1977).

2. The section *Macrocornuta* s.l.

The present article deals with the most common groups of dandelions in that region: plants of habitats with higher salinity, usually referred to as *Taraxacum* sect. *Macrocornuta* SOEST. This group of species occupies a large territory extending from the east Caspian region and the lowermost Volga in the west to Kazakhstan, Turkmenistan, Iran, Afghanistan, Uzbekistan, and reaching mountain regions of Kyrgyzstan, Tadjikistan, Pakistan, W China and NW India in the east.

The examination of the dandelion flora of Middle Asia in the field (J. ŠTĚPÁNEK) and herbarium studies in major collections show that the broadly understood sect. *Macrocornuta* is not homogenous and should be divided into two groups, the section *Macrocornuta* sensu stricto and a

newly recognized group described as *T. sect. Ceratoidea* below. The main differences between the two groups are summarized in Table 1.

Table 1. A comparison of morphological characters of the sections *Macrocornuta* and *Ceratoidea* of the genus *Taraxacum*.

	sect. <i>Ceratoidea</i>	sect. <i>Macrocornuta</i> s. str.
outer bract posture	appressed to loosely appressed, rarely erect	usually arcuate to patent, sometimes erecto-patent
outer bract colour	pale green	dark green, reddish, blackish green or green
leaf colour	yellowish green or pale glaucous-green	usually mid-green to dark green, often suffused purplish
leaf texture	leaves slightly thickened, subcoriaceous	leaves thin
stigmas	yellow	usually discoloured, rarely yellow
achene length	usually longer than 4 mm	usually shorter than 4 mm
cone shape	conical to cylindrical	usually cylindrical to subcylindrical, rarely subconical
rostrum length	usually shorter than 7–8 mm	usually longer than 7–8 mm
habitat	wet subsaline sites	dry subsaline sites

3. *Taraxacum* sect. *Ceratoidea* KIRSCHNER & ŠTĚPÁNEK, sect. nova

Typus: *T. neolobulatum* SOEST ex SCHISCHK.

Diagnosis: Plantae graciles, rarius mediocriter altae, foliis crassiusculis subglabris, laete viridibus vel pallide glaucescenti-viridibus, immaculatis, subintegris, sinuato-dentatis, late deltoideo-lobatis usque ad pinnatopartitis, lobis lateralibus plerumque patentibus vel subpatentibus, petiolis pallidis vel roseis. Involucrum ad basin saepissime rotundatum, raro obconicum, squamis exterioribus adpressis, rarius ad erectis, plerumque ovatis vel ovato-lanceolatis, raro lineari-lanceolatis, saepissime 4–6.5 mm longis, dilute virescentibus, non distincte anguste pallide marginatis vel albomarginatis, apice saepe purpurascentibus, sub apice corniculatis vel crasse breviter cornutis. Anthodium luteum vel saepe pallide luteum, ligulis exterioribus planis, extus stria rubescente notatis, stigmatibus luteis. Achenium griseo-stramineum vel olivaceo-stramineum, saepissime 3.5–5 mm longum (pyramide inclusa), plerumque angustum, superne subdense anguste et acute spinulosum spinulis saepe erectis, in pyramidem subconicam, rarius subcylindricam vel raro cylindricam saepissime 0.8–1.0 mm longam subsensim abiens, rostro plerumque 5–7 mm

longo, pappo albo vel niveo 5–7 mm longo. Plantae agamospermae vel sexuales. Florent Aprili – Iunio.

Description: Plants small to medium-sized, developing leaves and flowers simultaneously. Leaves usually slightly thickened or subcoriaceous, pale green to pale glaucous-green, not spotted, subglabrous, leaf surface at hair base not swollen, leaf shape not complicated, shallowly sinuate-dentate to lobate, less often deeply divided, lobes and interlobes often entire or very sparsely dentate, patent to subpatent, petiole pale green to purplish (adaxial surface of petiole and mid-rib without striatulate pattern), scapes erect, usually sparsely aranose. Involucre usually rounded, rarely obconical at the base, outer bracts usually appressed to loosely appressed or some of them less often erect, ovate to ovate-lanceolate, rarely linear-lanceolate, usually 4–6.5 mm long, 1–3.5 mm wide, usually pale yellowish green, with an indistinct paler or whitish border, often reddish near apex, most often with short thick obtuse horns or at least corniculate. Capitulum yellow or pale yellow, outer ligules striped reddish outside, stigmas pure yellow, pollen absent or present, regular or irregular in size. Achenes straw-grey to pale straw brownish, usually 3.5–5 mm long (including the cone), relatively narrow (usually narrower than or equalling 0.9 mm), body relatively densely, sometimes subsparingly spinulose above (spinules usually straight, erect, thin, acute), gradually to subgradually narrowing in a usually conical to subconical, rarely almost cylindrical cone (0.7–) 0.8–1.0 (–1.6) mm long, rostrum 5–7 (–8.5) mm long, pappus white to snow-white, usually (5–) 6 (–7) mm long. Flowering time: spring to early summer (depending also on the altitude). Plants reproducing sexually or agamospermous. Main habitat: wet or temporarily wet saline and subsaline places.

4. A Checklist of Species of the Section *Ceratoidea*

- T. neolobulatum* SOEST ex SCHISCHK. & TZVEL., Fl. URSS 29: 490 (1964); SOEST, Acta Bot. Neerl. 9: 305 (1960), nom. inval. (the reference to the replaced synonym was not direct and full, see Art. 33.3, Note 1) = *T. lobulatum* BORNH. & DAHLST., Acta Horti Berg. 9(1): 32 (1926), nom. illeg. – Lectotype, designated here: [Iran] Yesd in collibus regionis aridae Yesd et Tast, c. 1600 m s. m., J. BORNHÜLLER, Iter persico-turcicum 1892–1893, no. 5134 (JE, no. det. 19331 – Fig. 1; isotype: S!). – The type specimen probably is a sexual (pollen of regular size).
- T. badachschanicum* SCHISCHK. in SCHISCHKIN & TZVELEV in Fl. URSS 29: 508 & 737 (1964). – Holotype: Gorno-Badakhshanskaya AO, bassin reki Zapadnyi Pshart, dolina Psharta v ego nizhnem techenii [Upper Badakhshan Region, river Western Pshart basin, lower Pshart valley], 14. vi. 1958, N. N. TZVELEV 114 (LE, no. det. 5922).

- T. bicornis* DAHLST., Ark. Bot., 5(9): 29, Tab. 17 (1906). – Syntype: Plantae Turkestanicae, Alpes Alexandri, in valle fl. Kaschkara [probably southern Kyrgyzstan] locis graminosis humidis, 5. vi. 1896, V. F. BROTHERUS 103 (H, B [the latter probably destroyed]; isosyntype: LE, no. det. 8053).
- T. glaucanthos* (C. A. MEY. ex LEDEB.) DC., Prodr. Syst. Natur. 7(1): 147 (1838) = *Leontodon glaucanthos* C.A.MEY. ex LEDEB., Ic. Pl. Nov. Fl. Ross. Alt. 1: 9, tab. 33 (1829). – Lectotype, designated here: [Kazakhstan, Zaisan Lake region] “legi in locis humidiusculis” ad fl. Kurtschum et versus montes Arkaul, [1826, C. A. MEYER] (LE, no. det. 7925, see also comments in chapter 7.1.). – Note: ORAZOVA 1975: 78–80, Fig. 22 mentioned a LE specimen as a type and referred to Fig. 22 in her book. That would mean an effective lectotypification but, by mistake, ORAZOVA published a photograph of the type of another species, *T. glaucivirens* SCHISCHK., and her work is thus irrelevant for the typification of *T. glaucanthos*.
- T. halophilum* TRAUTVETTER ex REGEL, Descr. Pl. Nov. 7: 42 (1879), etiam TRAUTVETTER ex A. BECKER, Bull. Soc. Imp. Natur. Moscou, ser. nov., 1(1887): 222 (1887). – Lectotype, designated here: Flora Sareptana, im grauen Salzboden; [misit] A. BECKER 1866, det. ut *T. halophilum* [TRAUTVETTER scrip.], [annotated by TRAUTVETTER:] Scapi glaberrimi [illegible] ... glaucescentis foliola exteriora patula, subcorniculata, interioribus triplo vel quadruplo breviora, achaenia rostro plerumque breviora vel rostrum aequantia (LE, no. det. 8104).
- T. koksaghyz* RODIN, Acta Inst. Bot. Acad. Sci. URSS, ser. 1, 1: 187 (1933). – Holotype: Tian-Shan, dolina r. Kegen', bliz s. Sardzhas [Tien-Shan, valley of River Kegen', not far from village of Sardzhas], cultivated from roots and collected on June 14, 1933, by RODIN (LE, no. det. 6493). – Plants from the type locality were also distributed as Herb. Fl. SSSR, no. 3800 (e.g., LE, no. det. 7942).
- T. monochlamydeum* HAND.-MAZZ., Monogr. Gatt. Tarax. 43 (1907). – Lectotype: Turkestanica: In steppa ad Chawast prope Samarkand, O. PAULSEN (C, fide SCHISCHKIN & TZVELEV in Fl. URSS 29: 483, 1964). – The name was understood in a rather broad sense by HANDEL-MAZZETTI, and it was HAGLUND in PERSSON 1938 who restricted the taxon morphologically and made an attempt to typify it. He selected an isosyntype (Chiva, O. PAULSEN 1960, S). However, the specimen was not cited among syntypes (HANDEL-MAZZETTI studied PAULSEN's plants at C), and the S specimen is not eligible as a lectotype when most of the original syntypes are extant. Thus, the lectotypification that takes effect is that published in the Flora of the USSR where TZVELEV wrote: [translation from Russian] “Described from Middle Asia (vicinity of the town of Samarkand). Lectotype [deposited] in Copenhagen.” As there is only one syntype from the Samarkand vicinity, the indication of the lectotype is clear and unequivocal.

T. varsobicum SCHISCHK. & TZVELEV in KOMAROV, Fl. URSS 29: 537, 747 (1964). – Holotype: [Tadzhikistan] Juzhn. sklon Gissarskogo khrebtá [S slopes of Hissar Ridge], bass. r. Varzoba [Varzob river valley], plato Rundasht, 2600 m, 28. 6. 1946, V. PIS'YAUKOVA no. 256 (LE, no. det. 7949).

There are two similar species, intermediate between sections *Leucantha* and *Ceratoidea* (see KIRSCHNER, ŠTĚPÁNEK & KLIMEŠ 2006), *T. pojarkovae* SCHISCHK. and *T. chitralense* SOEST. They were treated in the latter work as they are morphologically closer to sect. *Leucantha*.

5. A Key to the Members of the Section *Ceratoidea*

- 1a Pollen absent 2
b Pollen present 3
- 2a Leaves conspicuously glaucous grey-green, with very narrow linear lateral lobes; rostrum 8–8.5 mm long *T. halophilum*
b Leaves yellowish green, green to greyish green; lateral lobes lingulate to broadly linear (rarely below 2 mm wide); rostrum usually to 6 mm *T. neolobulatum*
- 3a Outer bracts narrowly lanceolate, c. 1 mm wide *T. koksaghyz*
b Outer bracts ovate to ovate-lanceolate, more than 1.5 mm wide (usually 2–3 mm wide) 4
- 4a Cone subconical to conical 5
b Cone subcylindrical 7
- 5a Achenes to 4.5 mm long 6
b Achenes 4.5–5.5 mm long *T. badachschanicum*
- 6a Leaves with triangular, acute lateral lobes *T. bicorne*
b Leaves with lingulate, obtuse lobes *T. neolobulatum*
- 7a Achenes to 4 mm long; cone to 1 mm long *T. monochlamydeum*
b Achenes c. 5 mm long; cone longer than 1.2 mm 8
- 8a Leaf lateral lobes narrowly triangular, gradually narrowing in acuminate tip; leaves glaucous green *T. glaucanthos*
b Leaf lateral lobes broadly linear, lingulate, distal part often wider than lobe base, abruptly narrowing into the tip; leaves mid-green *T. varsobicum*

6. Comments on *Taraxacum halophilum*

6.1.

The name *T. halophilum* TRAUTVETTER is found on numerous herbarium labels of collections of A. BECKER from the vicinity of Sarepta, SE Russia. There are several papers where the name was effectively published

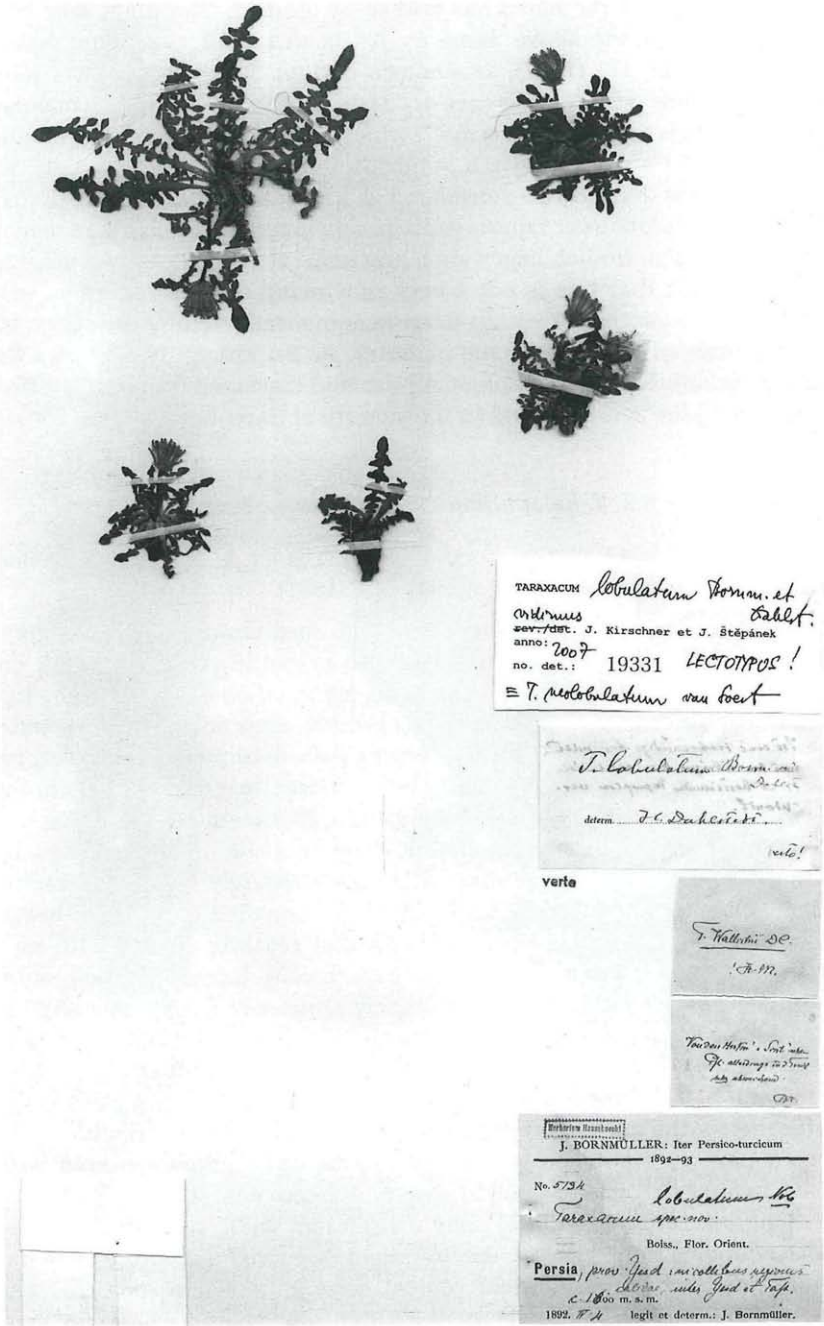


Fig. 1. Lectotype of *Taraxacum neolobulatum* SOEST ex SCHISCHK. (JE).

but the validity of the name has had to be studied. The plant was first mentioned under the above name by A. BECKER, Bull. Soc. Imp. Natur. Moscou 1867 (1): 111 (1867), as a *nomen nudum*. TRAUTVETTER 1884 published the name with a reference to REGEL 1879 but added a comment "*Taraxaci vulgaris* SCHRANK forma.", which makes the name again invalid under Art. 34.1.a. When REGEL's publication is analysed more closely, we find a sentence that may be considered as a validating description (REGEL 1879: 42): "*T. halophilum* Trautv. endlich, scheint einen durchaus sitzenden Pappus zu haben, freilich liegen auch hier keine reifen Früchtchen vor." As we must admit that this is not a very convincing case of validation of a name, we give another reference to an unequivocally valid publication later. The original collector of the material, A. BECKER, fully accepted the name *T. halophilum* at the rank of species and discussed diagnostic differences among the species found in the vicinity of Sarepta.

6.2. *T. halophilum* TRAUTVETTER ex REGEL,

Descr. Pl. Nov. 7: 42 (1879), etiam TRAUTVETTER ex A. BECKER, Bull. Soc. Imp. Natur. Moscou, ser. nov., 1 (1887): 222 (1887)

Description: Plants slender, small to medium-sized. Leaves grey-green to glaucous-green, linear-lanceolate in outline, usually 10–12 cm long, 1.0–1.7 cm wide, variable in shape, some, often early leaves c. 1.0–1.2 cm wide with undivided part c. 0.8 cm wide, apex acute, with 5–8 pairs of linear teeth, later, sometimes all leaves with 6–10 pairs of distinct, remote, linear lobes 0.5–1.2 cm long, lobes patent to downward-pointing, interlobes entire to sparsely remotely dentate (1–2 teeth per interlobe, late leaves more densely dentate); petiole long, narrow, unwinged, usually greenish. Scapes almost glabrous, often with sparsely scattered aranose hairs. Involucre narrow, c. 6–8 mm above the rounded base; inner bracts usually 12–15, elongating after anthesis and reaching 12–15 (–18) mm, distinctly greyish pruinose, corniculate to cornute below the apex; outer bracts usually 10–12, appressed to loosely appressed (later some slightly recurved at apex), pale green to green, with a narrow, indistinct, c. 0.2–0.4 mm wide whitish to pale greenish border, ovate to ovate-lanceolate, usually (3–) 4–5.5 mm long, (1.1–) 1.6–2.4 mm wide, with blunt short horns or flat below the apex. Flowers numerous, ligules pale yellow, outer ones striped pale grey outside; stigmas yellow to dirty yellow, covered with sparse hyaline hairs below; pollen absent. Achenes pale straw-grey, 4.6–5.1 mm long, narrowly turbinate, body 0.7–0.8 mm wide, sparsely spinulose above (spinules thin, straight, erecto-patent or curved upwards), very gradually narrowing into a thick, conical cone 0.7–0.9 mm long, rostrum medium thick (c. 0.10–0.15 mm), 8–8.5 mm long, pappus 6–7 mm long, white.

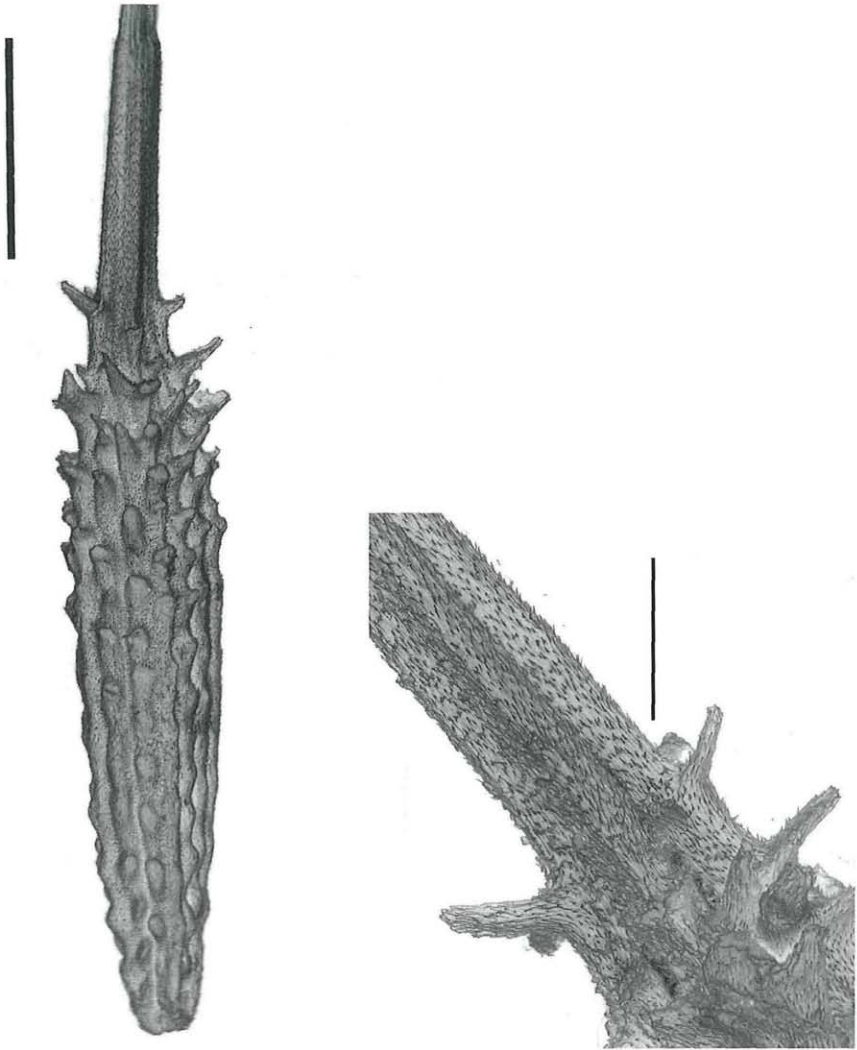


Fig. 2. SEM analysis of achenes of *Taraxacum alatavicum* SCHISCHK. (LE). – Scale bars: 1 mm (left), 0.3 mm (right).

Taraxacum halophilum is undoubtedly very closely related to *T. glaucanthos*. It differs from the latter in the absence of pollen and in a shorter, subconical cone of the achene (*T. glaucanthos* is polliniferous and has a long, cylindrical cone). Both species are most probably agamospermous (one apolline, the other with irregular pollen). While *T. glaucanthos* is distributed from the SW to the NE and E Kazakhstan, reaching the Altai in the east, *T. halophilum* is centred in the lower Volga region of Russia. It

should be added that both species are rather marginal members of the *Ceratoidea*.

6.3. Specimens Seen (* – with ripe fruits)

Russia, Volgograd Region, Sarepta [the southernmost part of the Volgograd agglomeration, c. 44°29' E, c. 48°31' N]: A. BECKER s. n., s. d. (WRSL, no. det. 17840). – Lehm Boden der Steppe gegen die Wolga, E. FIEK s. n., 17. v. 1883 (WRSL, no. det. 17839). – Sarepta, Gouv. Saratow, M. WETSCHKY s. n., v. 1883 (WRSL, no. det. 17838*). – Sarepta, Lehm- und Salzboden, A. BECKER s. n., 25. iv. 1887, distributed as E. HUNGER, Herb. Ross., no. 183 (JE, no. det. 17353; WRSL, no. det. 17837; LD, no. det. 17817). – Sarepta auf Salzhaltigem Steppenboden, nicht gerade häufig, E. FIEK s. n., 19. v. 1883 (WRSL, no. det. 17836*). – Aus der Umgebung von Sarepta, A. BECKER s. n., 1889 (LD, no. det. 17815, HANDEL-MAZZETTI det. as *T. glaucanthum*). – Gouvern. Saratow: Sarepta. Salzboden., A. BECKER s. n., v. [18]98, rev. by HANDEL-MAZZETTI as *T. glaucanthum* (JE, no. det. 17355). – In humidis pr. Sarepta, A. BECKER s. n., v. 1874, F. SCHULTZ, Herb. Norm., nov. ser., no. 842 (JE, no. det. 17356; OXF, no. det. 11978; W, no. det. 8991). – Sarepta, Salzboden, A. BECKER s. n., iv. 1896 (LD, no. det. 17816). – Sarepta. Salzboden., A. BECKER s. n., 24. iv. 1897 (JE, no. det. 17354). – Sarepta, fast überall, in Gärten, im Lehm Boden der Ebenen, Wiesen, auf den Bergen u. s. w., A. BECKER s. n., 21. iv. 1851 (LE, no. det. 8101). – Sarepta, A. BECKER s. n., sine dato (LE, no. det. 8105, 8106). – Sarepta., A. BECKER s. n., 1883, rev. HANDEL-MAZZETTI as *T. glaucanthum* (JE, no. det. 17352). – Fl. Sareptana, Salzboden, A. BECKER s. n., 25. iv. 1853 (LE, no. det. 8107). – In desertis salsis prope cot. Sareptam, sine coll. [A. BECKER] s. n., s. dat., distributed as A. BECKER Pl. Wolgae Infer. (ed. R. F. HOHENACKER), no. 168 (JE, no. det. 17355, 17351). – Sarepta, s. coll., s. d. (JE, no. det. 17352). – Sarepta, A. BECKER s. n., 1867 (JE, no. det. 17350); Sarepta, [A. BECKER] s. n., s. d. (BRNM 45798, no. det. 18018*); Sarepta., A. BECKER s. n., s. d. (BRNM 45799, no. det. 18019). – without locality, collector and date (PRC, no. det. 17581). – **Uzbekistan**, Desertum Aralense Kara-kum, inter lacus Dialangatsch-kul et Meldry-kul, E. G. BORSZCZOW no. 660, 29. viii. 1858 (LE, no. det. 7944). – **Kazakhstan**, Ural'skaya guberniya, oz. Charkhal, mezhdru vershinkami g. Ak-pulak [Ural River basin, Shalkar Lake, Akbulak, c. 50°30' N 51°40' E], S. VERUSHKIN, I. LARIN, K. MUSATOVA, T. POYARKOVA no. 84, 20. v. 1925 (LE, no. det. 8108*).

7. Comments on the Typification of *Taraxacum glaucanthos*

7.1.

The name most frequently appears as *T. glaucanthum* in the literature. However, the original orthography of its basionym is '*glaucanthos*' and it should be retained.

There is a certain confusion as regards the origin of the original material of the name *Leontodon glaucanthos*. In fact, a part of the original material is deposited among type specimens of the sector of Siberia and Far East in LE, the rest in the Middle Asia sector of LE. In order to understand the above typification, we first have to return to the diaries of the famous expedition of C. F. LEDEBOUR, C. A. MEYER and A. BUNGE to the

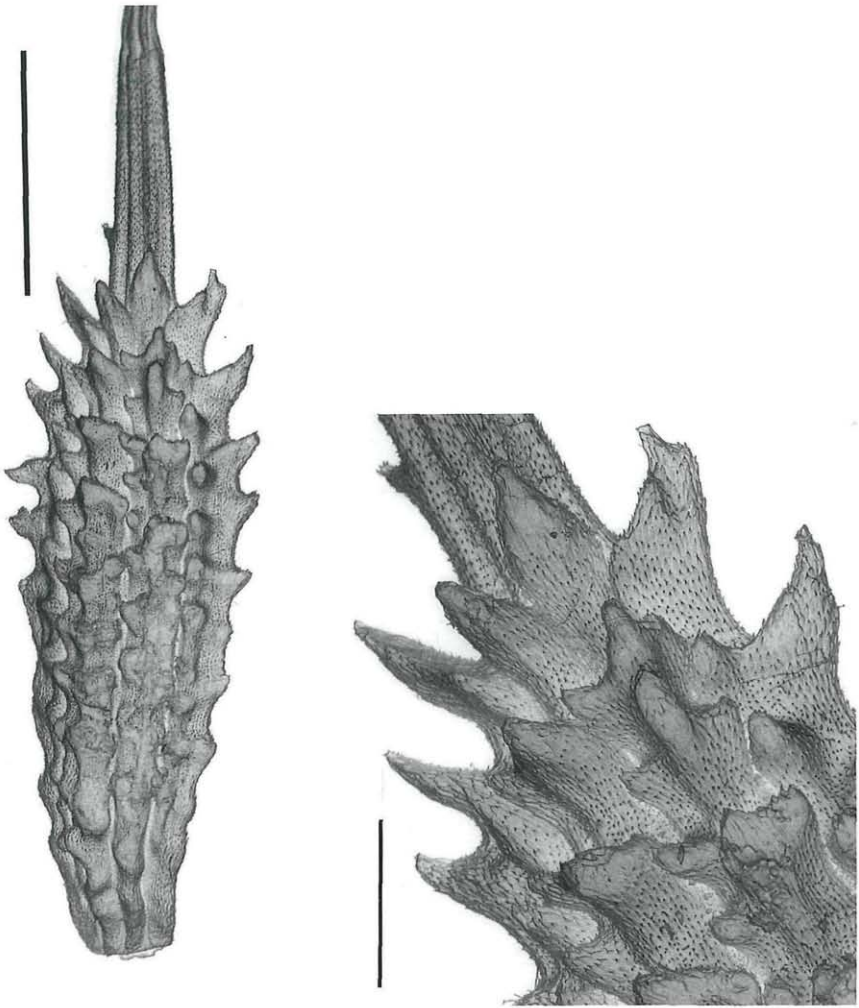


Fig. 3. SEM analysis of achenes of *Taraxacum vernale* SCHISCHK. (LE). – Scale bars: 1 mm (left), 0.3 mm (right).

Altai in 1826 (LEDEBOUR 1830). Each of the three main participants explored a separate area, and it was C. A. MEYER who visited a vicinity of Lake Zaisan in easternmost Kazakhstan and found an interesting new *Leontodon*. With a suggestion that it might represent a new species, he passed the material to LEDEBOUR and he later described it as *Leontodon glaucanthos*. The second main chapter of the diaries describes the work of C. A. MEYER (Tagebuch auf einer Reise durch die Kirgisen-Steppe zum Noor-Zaisan) and the new *Leontodon* is mentioned there from two sites:

On May 5, in the evening, MEYER reached Kurtschum River [lower stream, probably near what is now called Kumashkino] and on the 6th he collected plants in the vicinity (and on the 7th he prepared them for the herbarium). He also listed a "*Leontodon glaucanthos* n." there (LEDEBOUR 1830: 243). Later, the expedition camped on the shore of Lake Zaisan and (on May 13 or 14) C. A. MEYER collected plants on the hills of Arkaul and Dolen-kara (the exact route is depicted on maps published with the diaries but in separate folders). There, probably on the SE slopes of the Arkaul, he again collected a "*Leontodon glaucanthos* n." (LEDEBOUR 1830: 258).

These two sites are also cited in the protologue of *L. glaucanthos*; it should be added that the author of the name undoubtedly was C. A. MEYER while the description was provided by LEDEBOUR himself.

In Sankt Peterburg (LE) we found the following specimens that must be discussed as potential elements of the original material of the name:

1. Herbarium sheet with three labels
 - a. "Ad fluv. Tschuja legit cel. BUNGE" [ex herb. C. A. MEYER]. – Not eligible as the lectotype (different locality; the plant itself might represent *T. glaucanthos*).
 - b. "Dolgii lug am Fusse des [?]Gehänges, 30. VII.". – Again, not eligible as the lectotype because of the locality, date and also because this label is mounted separately and it is not possible to identify to which plant it belongs.
 - c. "Legi in locis humidiusculis ad fl. Kurtschum et versus montes Arkaul. Adnot. n. No. 100" [herb. C. A. MEYER], no. det. 7925. – An obvious candidate for the lectotype (designated as such above because of a relative completeness of the plants and the written recommendation of N. N. TZVELEV).
2. Herbarium sheet with a single label: "*Leontodon glaucanthos* m. Altai" [someone added "LEDEBOUR 1836"], no. det. 7983. – Plants of imperfect quality, doubtfully belonging to *T. glaucanthos*. Locality uncertain.
3. Herbarium specimen with two labels but without any certainty to which plants each label belongs:
 - a. "*Leontodon* n. species, no. 100. Bei den ... am Berge Arka-ul, d. 15 May" [C. A. MEYER]. – A clear part of the original material.
 - b. "*Leontodon forte* n. species. Ad fl. Kurtschum in locis subsalsis, d. 15 May" [C. A. MEYER]. – Together with the previous label, the material represents clear syntypes referred to in the protologue (both under no. det. 17874).
4. Drawing in LEDEBOUR 1829: tab. 33 represents another element of the original material, although not a syntype. The figure is rather schematic and does not depict important characters; it may correspond to some plants with almost entire leaves on herbarium sheet 1.

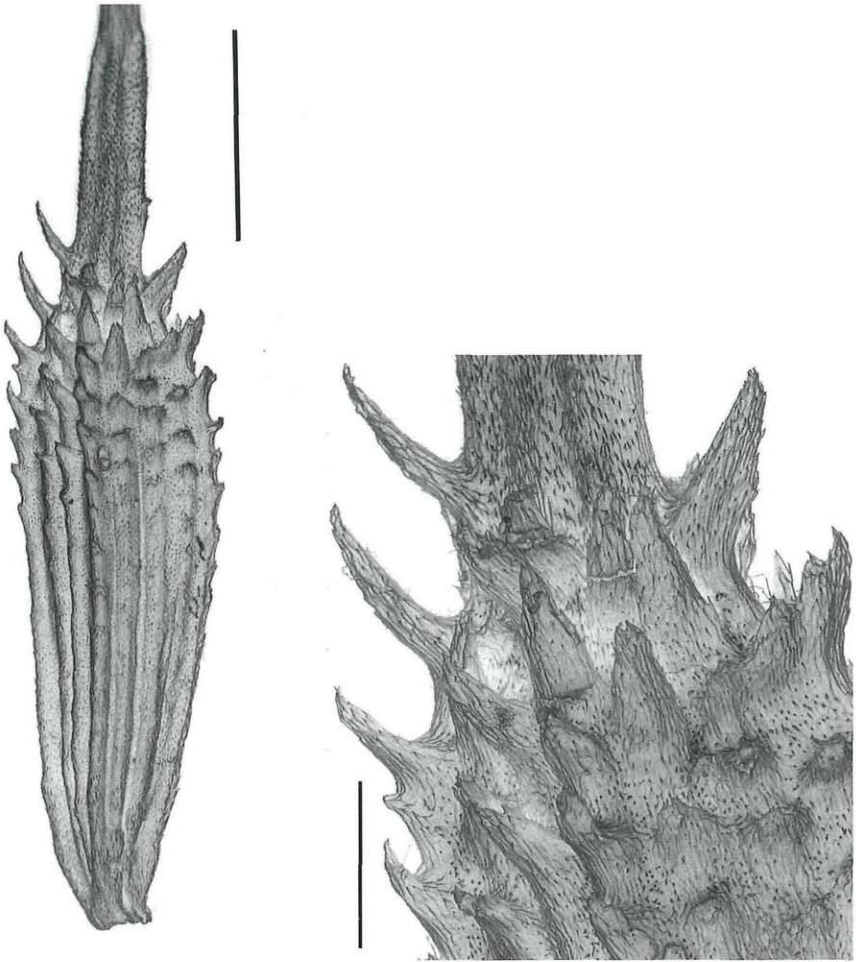


Fig. 4. SEM analysis of achenes of a species of the sect. *Ceratoidea*, close to *T. koksaghyz* RODIN, s. lat. – Scale bars: 1 mm (left), 0.3 mm (right).

7.2. Specimens Seen

Kazakhstan, Akt'yubinskaya gub., Chelkarskiy u., v 20 verst na zapad ot st. Chelkar [Shalkar], ... glinistye sklony kholma, 16. 5. 1927, [?] USAKOV, Pl. Kazak. no. 7 (LE, no. det. 17314). – Kazakhstan, vostochnoe Pribalkhash'e, Gory Arkharly, izvestnyaki, kamenistye sklony, 28. 5. 1976, V. P. BOCHANTZEV & V. V. BOCHANTZEV no. 1036 (LE, no. det. 17315). – Kazakhstan, centr. Betpak-dala, uroch. Kok-ashik, meteostancija, v zaroshei syrovatoi vyemke, 16. 6. 1960, B. GRUBOV s. n. (LE, no. det. 17316). – Sai, v 4 klm ot Karsakpaya [Qarsaqbay, W vicinity of Dzhezkazgan], 30. 5. 1936, s. coll., s. n. (LE, no. det. 17317). – [C. Kazakhstan, N. Caspian region, Atyrau vicinity] R. Sagiz, Ural'skaya obl., Gur'evskiy u., 7. 5. 1924, E. F. SEROVOI s. n. (LE, no. det.

17319; 18112). – Kazakhstan, Akt'yubinskaya gub., Mugodzhary, dolina reki Kaul-dzhur, lug [near railway, station of Ber-Chogur, NE of Dzhaman-Tau], 17. 5. 1927, F. N. RUSANOV no. 27 (LE, no. det. 17320). – Kazakhstan [NE Caspian region], Adaevskiy uezd, mezhdru rekoi Emboi [Emba River] i Ust'-urtom [Ust'-urt], mezhdru Baishuak i Ash-sorna, glinistyy sklon, 7. 5. 1926, F. N. RUSANOV no. 44/2 (LE, no. det. 17321). – Kazakhstan [E Caspian region, NW of Lake Asmantai], mezhdru peskami Sary-kum i logom Irgiz-bai-sai, 13. 5. 1926, M. D. SPIRIDONOV no. 243 (LE, no. det. 17322). – Kazakhstan [not far from no. det. 17322], Adaevskiy u., v 3–4 klm k yugu ot ... Zhaman-kairakun, 11. 5. 1926, M. D. SPIRIDONOV no. 191/15 (LE, no. det. 17323). – Turgaiskaya obl., Irgizskiy u., Mugodzharskia gory, v dolinach bliz Ber-Chogura, 6. 5. 1910, N. ANDROSOV s. n. (LE, no. det. 17324); Turgai, Ber-Chogur, 6. 5. 1910, N. ANDROSOV s. n. (LE). – Kazakhstan, Yuzhnaya chast' mugodzharskich gor, Mene-sai, 4. 5. 1926, F. N. RUSANOV no. 30 (LE, no. det. 17325). – [Kazakhstan] Ural'skaya obl., Temirskiy u., Ust'-urt, vershina ovraga [?] Airyuk [?], 18. 5. 1904, V. DUBYANSKIY no. 508 (LE, no. det. 17326). – Kazakhstan, Karagandinskaya obl., Zhana-Arkinskiy raion, gory Aktau, 6. 6. 1958, I. V. BORISOVA no. 5703 (LE, no. det. 17881). – Kazakhstan [Emba R.], v 5 km k yu.-yu.-z. ot ozera Zhumart, 30. 4. 1926, M. D. SPIRIDONOV no. 30/11 (LE, no. det. 18113). – Kazakhstan, Turgaiskaya obl., Irgizskiy u., B. Barsuki, 29. 4. 1904, V. DUBYANSKIY no. 109 (LE, no. det. 18114; 18141). – Kazakhstan, Turgaiskaya obl., Irgizskiy u., B. Barsuki, 29. 4. 1904, V. DUBYANSKIY no. 113 (LE, no. det. 18142). – Kazakhstan, Turgaiskaya obl., Irgizskiy u., B. Barsuki, 28. 4. 1904, V. DUBYANSKIY no. 100 (LE, no. det. 18142). – [Kazakhstan] In montosis deserti Soongoro-Kirghisici prope Arkalyk, 1840, KARELIN & KIRILOFF no. 23 et 318 [Arqalyk] (LE, no. det. 18115; 18117). – Kazakhstan, Semipalatinskaya obl., Zaisanskiy u., ber. oz. Zaisan, mezhdru Topolevym mysom u Peschanym, 21. 5. 1914, B. SHISHKIN s. n. (LE, no. det. 18116). – Kazakhstan, central'naya Beshpak-dala, mezhdru kolodcami Byr-tyusken i Kokashik, 15. 5. 1940, N. I. RUBTZOVS s. n. (LE, no. det. 18120). – Semipalatinsk. u. i okr., 1928, I. Kh. BLUMENTAL s. n. (LE, no. det. 18121). – Akmolinskaya obl., ... vpa-dayushchikh v r. Kuru, berstakh v 15 ot oz. Kurgaldzhina, 14. 6. 1914, S. S. GANESHIN no. 843 (LE, no. det. 18122). – Kazakhstan, Adaevskiy u., vdol' pravogo berega doliny loga Mana-Sai, 4. 5. 1926, M. D. SPIRIDONOV no. 96/6 (LE, no. det. 18125). – Kazakhstan [Emba R.], ploskaya kotlovina Khan-dyurt-kul, uroch. Kidei-takr, dno loga, 8. 5. 1926, M. D. SPIRIDONOV no. 149/1 (LE, no. det. 18126). – Karagandinskaya obl., gory Koksengir, 8. 5. 1959, V. I. RAGKOVSKAYA no. 6791 (LE, no. det. 18127). – Karagandinskaya obl., gory Koksengir, 2. 6. 1958, Z. V. KARAMYsheVA no. 5579 (LE, no. det. 18130). – Akmolinskaya obl., Barankul'skiy r-n, central'naya chast' gor Kokshetau, 20. 5. 1957, M. A. POPOVA no. 391 (LE, no. det. 18131). – Karagandinskaya obl., v 35 km k yugo-zapadu ot st. Zhana-Arka [c. 40 km NE of Almaty], lug po beregy Taldy-Manaka, 20. 5. 1958, Z. V. KARAMYsheVA no. 5339 (LE, no. det. 18132). – Karagandinskaya obl., gory Aktau, 6. 6. 1958, Z. V. KARAMYsheVA no. 5703 (LE, no. det. 18133). – Akmolinskaya obl., ber. r. Kulan-Utmesa [Kulanutmes], 11. 6. 1914, S. S. GANESHIN no. 757 (LE, no. det. 18134; 18135; 18136). – Kazakhstan [Emba R.], Adaevskiy u., mezhdru peskami Sary-kum i logom Irgiz-bai-sai, 12. 5. 1926, s. coll., no. 239/10 (LE, no. det. 18137). – Naurzumskiy gos. zapovednik, 30. 5. 1937, S. LEVITONSKIY [?] (LE, no. det. 18139). – Turgaiskaya obl. i u., Kizil-Dzhingil'skaya volost', sistema ozer v nizob'yakh Sary-su, v 25–30 v. V. ot oz. Tailyak-kul', okresnosti uroch. Ak-Suat, 20. 5. 1914, N. KRASHENINNIKOV no. 5083 (LE, no. det. 18140). – Kazakhstan, M. Barsuki, okresnosti Kara-Chokat, po glinistomu sklonu, 1930, A. D. GOZHEV, N. N.

GRAC-GUSEVA & A. V. MIZEROV s. n. (LE, no. det. 18144). – Turgaiskaya obl. i u., Kizil-Dzhingil'skaya volost', sistema ozer v nizob'yakh Sary-su, v 35–40 v. V. ot oz. Tailyak-kul', okresnosti uroch. Ak-Suat, 20. 5. 1914, N. KRASHENINNIKOV no. 5086 (LE, no. det. 18145). – Turgaiskaya obl. i u., Sary-su, M. D. SPIRIDONOV s. n. (LE, no. det. 18146). – Nizhnaya Syr-Dar'ya, Zhuzkuduk, 13. 5. 1958 [coll. illegible] (LE, no. det. 18200). – Priaralskie Karakumy, ur. Barboltyube (10 km sev. gory), 15. 5. 1959, ROSCHILD no. 1037 (LE, no. det. 18201). – ostrov Barsa-Khelnmek na Aral'skom more, 1935, M. V. NAZAROV s. n. (LE, no. det. 18202). – Bak-dak, Semirechenskaya obl., Koshum-less, 28. 4. 1910, V. A. STEKOLNIKOV no. 86 (LE, no. det. 18203). – Kazakhstan, Karakalinskiy okr., 2. 5. 1939, S. MALYKH s. n. (LE, no. det. 18204). – Bak-dak, Semirechenskaya obl., k. Saat-bai, 18. 4. 1910, V. A. STEKOLNIKOV no. 87 (LE, no. det. 18205). – Karagandinskaya obl., ber. r. Taldy-Manaka, 21. 5. 1958, I. V. BORISOVA no. 5342 (LE, no. det. 18206; 18128). – Karagandinskaya obl., gory Koksengir, vost. sklon sopki, 8. 5. 1959, I. V. BORISOVA no. 6795 (LE, no. det. 18129).

8. Species Names Referable to the Section *Macrocornuta*

SOEST s. str.

Our studies of the type specimens of most *Taraxacum* names based on the material from Middle Asia (mainly BM, E, JE, K, LE, PRA, W and WU) make it possible to classify the species names to sections. However, only further field studies would identify the species variation limits and mutual relationships among taxa. The names listed below therefore should serve as an aid for a future taxonomic revision, rather than a consolidated taxonomic checklist.

8.1. *Taraxacum* sect. *Macrocornuta* SOEST, Acta Bot. Neerl. 9: 304 (1960)

Type: *T. wallichii* DC.

- T. wallichii* DC., Prodr. 7 (1): 147 (1838). – Holotype: [India] Oude, 1825, WALLICH 3246/356 [as *Leontodon glaucescens* WALL.] (G-DC, no. det. 18904; isotype: K-WALLICH, no. det. 11728).
- T. aduncum* SOEST, Wentia 10: 18 (1963). – Holotype: Afghanistan, Doshi, 5. v. 1938, R. MEINERTZHAGEN s. n. (BM, no. det. 8454; isotype: BM, no. det. 8453).
- T. afghanicum* SOEST, Acta Bot. Neerl. 9: 305 (1960). – Holotype: Afghanistan, Nangarhar, Jalalabad valley, 20. ii. 1948, L. EDELBERG 20 (W !).
- T. alatavicum* SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 477, 731 (1964). – Holotype: Dzhungar Alatau, Chingil'dy, 27. v. 1955, V. GOLOSKOKOV (LE, no. det. 5925).
- T. aschabadense* SCHISCHK., Fl. Turkm. 7: 382 (1960). – Holotype: Turcomania, prope Aschabad, ad p. Kuropatkino, 2. iv. 1898, D. LITWINOW 1488 (LE, no. det. 5923).
- T. botschantzevii* SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 480, 732 (1964). – Holotype: Kazakhstan, Karatau, Baidzhonssai, 18. vi. 1958, V. BOCHANTZEV 445 (LE, no. det. 5921).

- T. butkovii* KOVALEVSK., Bot. Mater. Gerb. Inst. Bot. Akad. Nauk Uzb. SSR, Tashkent, 17: 8 (1962). – Holotype: Pamiro-Alai, gora Khodzha-Gurgut-Ata, 23. vii. 1934, A. BUTKOV (TAK, n. v., see fig. 15 in ORAZOVA 1975: 65).
- T. contristans* KOVALEVSK., Bot. Mater. Gerb. Inst. Bot. Akad. Nauk Uzb. SSR, Tashkent, 17: 9 (1962). – Holotype: Andizhanskaya oblast', Ferganskiy kanal, Nazar Makhram, 23. iv. 1959, S. KOVALEVSKAYA 189 (TAK, n. v.; isotype: LE, no. det. 5920).
- T. fedtschenkoi* HAND.-MAZZ., Monogr. Gatt. Tarax. 167 (1907). – Lectotype: Alaiskiy khrebet, Tal'dyk, 12. viii. 1901, O. A. FEDTSCHENKO & B. A. FEDTSCHENKO (fide SCHISCHK. & TZVEL., Fl. URSS 29: 536, 1964: LE, no. det. 6515). – Residual syntypes belong to other taxa.
- T. juzepczukii* SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 479, 731 (1964). – Holotype: Tashkent, Takhtakul, 29. iv. 1932, A. LAPIN (LE, no. det. 6494).
- T. kabulense* SOEST, Acta Bot. Neerl. 19: 25 (1970). – Holotype: Afghanistan, Kabul, Istalif, 1. v. 1967, K. H. RECHINGER 33646a (W, no. det. 9028). – Originally classified as a member of the sect. *Erythrocarpa*; achene characters clearly point to the sect. *Macrocornuta* s. str.
- T. lipskyi* SCHISCHK., Fl. Turkm. 7: 383 (1960). – Holotype: R. Sumbar, bliz Kara-Kala, 2. iv. 1916, E. CHERNYAKOVSKAYA 324 (LE, no. det. 6510).
- T. longipyramidatum* SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 489, 735 (1964). – Holotype: Alma-atinskaya oblast', stanc. Chemolgan, 28. v. 1934, A. GELD (LE, no. det. 6491).
- T. maracandicum* KOVALEVSK., Bot. Mater. Gerb. Inst. Bot. Akad. Nauk Uzb. SSR, Tashkent, 17: 10 (1962). – Holotype: Samarkand, pomologicheskii sad, 19. iv. 1957, A. VVEDENSKIY & S. KOVALEVSKAYA (TAK, n. v.; isotype: LE, no. det. 6508).
- T. modestum* KOVALEVSK. ex SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 509, 738 (1964). – Holotype: [mt.] Chimgan, 1904, sine coll. (LE, no. det. 6507).
- T. nevskii* JUZ., Tr. Bot. Inst. Akad. Nauk SSSR, ser. 1, 4: 293 (1937). – Holotype: Kugitang, protiv kishlaka Kholdzhafil'-Ata, 27. vi. 1931, S. A. NEVSKI 419 (LE, no. det. 6505). – The perfectly regular pollen indicates sexuality in the type plant.
- T. nikitinii* SCHISCHK., Fl. Turkm. 7: 383 (1960). – Holotype: Zakasp. obl., Mervskiy u., Tash-kepri, stanc. zhel. dor., 7. iv. 1912, LIPSKIY (LE, no. det. 6489).
- T. podlechii* SOEST, Mitt. Bot. Staatssamml. Muenchen 7: 323 (1970). – Holotype: Afghanistan, Baghlan, Khinjan-Tal, 20. v. 1965, D. PODLECH 10773 (M !; isotypes: K, no. det. 8812; L, no. det. 19579).
- T. pseudotianschanicum* DOLL, Feddes Repert., 83(7–8): 499 (1972 publ. 1973). – Holotype: Aktyubinskaya gub., mezhdurech'e Uil-Emba, Egikdy-bulak, 31. v. 1926, O. KNORRING 81 (LE, no. det. 7968).

- T. pseudowallichii* SOEST, Acta Bot. Neerl. 19: 27 (1970). – Holotype: Afghanistan, Gardez, versus jugum Sata Kandao, 3. vi. 1967, K. H. RECHINGER 35441 (W, no. det. 9038; isotype: G, no. det. 18314).
- T. seravschanicum* SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 558, 753 (1964). – Holotype: Zeravshanskiy khrebet, Masarif-sai, 24. vii. 1931, S. A. NIKITIN 413 (LE, no. det. 7962).
- T. tadzhikorum* OVCHINNIKOV ex SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 488, 734 (1964). – Holotype: Tadzhikistan, Gissarskiy khrebet, Takh-rinovskiy raion, Shomalik, 10. viii. 1947, P. OVCHINNIKOV & M. NADYROV (LE, no. det. 7954).
- T. taschkenticum* ORAZOVA, Illustr. Opred. Rast. Kazakh. 2: 450 (1972) = *T. praecox* SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 483, 732 (1964), nom. illeg. – Holotype: [vicinity of Tashkent] sel.'-khoz. stancia, sad stancii [Agricult. Experimental Station, orchard], 11. ii. 1903, sine coll. (LE, no. det. 6481).
- T. vernale* SCHISCHK., Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR 7: 7 (1937). – Holotype: Kazakhstan, Chemskiy [illegible], 12. v. 1930, B. SCHISCHKIN (LE, no. det. 7946).
- [*T. pullocarpum* SOEST, Wentia 10: 18 (1963), nom. inval. (ICBN, Art. 37.2, 37.3). – Original material: Kashmir, E. Liddar Valley, above Pahalgam, 28. v. 1959, HARBHAJAN SINGH & SOEST 165 (L, not traced; LWG, n. v.). – The name was not published validly in 1963, nor in 1977 by VAN SOEST. We have not seen the original material and cannot interpret the name safely (it may belong to other sections, too); we therefore refrain from validating the name.]

8.2. Possible Members of the sect. *Macrocornuta* to be Studied

- T. multiscaposum* SCHISCHK., Bot. Mat. Gerb. Bot. Inst. Akad. Nauk SSSR 7: 8 (1937). – Holotype: R. Kegen', Sarydzhas (LE, not located).
- T. baluchistanicum* SOEST in RECH., Fl. Iran. 122: 259 (1977). – Holotype: Baluchistan, Dehak versus Esfandak Murt, 13. iii. 1974, IRANSHAHR & ERSHAD 16319 (W, specimen not located).
- T. holophyllum* SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 484, 733 (1964). – Holotype: Taschkent, territorium stationis experimentalis olitorio-hortensis, sine dat. & coll. (LE, n. v.; isotype: TAK, n. v.).
- T. karatavicum* SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 558, 753 (1964). – Holotype: Karatau, Buyuk-tau, 1. vii. 1931, N. PAVLOV (MW !; isotype: LE !)
- T. turgaicum* SCHISCHK. in SCHISCHK. & TZVEL., Fl. URSS 29: 436, 728 (1964). – Holotype: Aktyubinskaya gub., Chelkarskiy u., mezhdru ozerami Tumaly-kul', 3. vi. 1927, O. KNORRING & N. BELOV 101 (LE, no. det. 7953; isotype: LE !).

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10. References

- BECKER A. 1887. Ueber *Taraxacum*- und *Glycyrrhiza*-Arten und *Alhagi camelorum*. – Bull. Soc. Imp. Natur. Moscou, ser. nov., 1: 222–226.
- BRUMMITT R. K. 2001. World geographical scheme for recording plant distributions. Plant Taxonomic Database Standards No. 2, ed. 2. – TDWG, York (U. K.).
- KIRSCHNER J. & ŠTĚPÁNEK J. 1996. Modes of speciation and evolution of sections in *Taraxacum*. – Folia geobot. phytotax. 31: 415–426.
- KIRSCHNER J. & ŠTĚPÁNEK J. 2006. Dandelions in Central Asia: A taxonomic revision of *Taraxacum* sect. *Leucantha*. – Preslia 78: 27–65.
- LEDEBOUR C. F. 1830. Reise durch das Altai-Gebirge und die soongorische Kirgisien-Steppe. – Verlag Heimer, Berlin.
- ORAZOVA A. O. 1975. Oduvančiki Kazachstana i Srednej Azii (Rod. *Taraxacum* WIGG.) [Dandelions of Kazakhstan and Middle Asia]. – Alma-Ata.
- REGEL E. 1879. Descriptiones plantarum novarum et minus cognitarum. Fasc. VII., p. [1] – 263, Petropoli 1879. [C. Plantarum regiones turkestanicas incolentium, secundum specimina sicca elaboratarum, descriptiones, pp. 17–249]
- SCHISCHKIN B. K. [& TZVELEV N. N., ed.] 1964. Rod 1667. Oduvančik – *Taraxacum* WIGG. – In: KOMAROV V. L. [red.], Flora SSSR 29: 405–560, 728–754. – Moskva & Leningrad.
- SOEST J. L. VAN 1977. 30. *Taraxacum*. – In: RECHINGER K. H. [ed.], Flora Iranica, Vol. 122, *Compositae* II – *Lactuceae*, pp. 223–285. – Graz.
- TRAUTVETTER E. R. 1884. Incrementa florum phanerogamae rossicae. – Acta Horti Petropol. 8–9: 458–469.
- VAINBERG T. I. 1991. Rod 977 (127). Oduvančik, Kokuch, Koku (tadzh.) – *Taraxacum* WIGG. – In: Flora Tadzhikskoi SSR, 10: 353–413, 462–469. – Nauka, Leningrad.

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