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Lectotypification and comments on the taxonomic status of *Taraxacum pobedimovae* Schischk. (Asteraceae: *Crepidinae*)

V. V. Fateryga[1, 5], B. R. Kuluev[2, 6], S. A. Svirin[3, 4, 7], A. V. Fateryga[1, 8]*

[1] *T. I. Vyazemsky Karadag Scientific Station – Nature Reserve of RAS – Branch of A. O. Kovalevsky Institute of Biology of the Southern Seas of RAS, Nauki St., 24, Kurortnoye, Feodosiya, Republic of Crimea, 298188, Russian Federation*

[2] *Institute of Biochemistry and Genetics of the Ufa Federal Research Centre of RAS, Oktyabrya Pr., 71, Ufa, Republic of Bashkortostan, 450054, Russian Federation*

[3] *Urban Development Institute of the Sevastopol State University, Kornilova Emb., 1, Sevastopol, 299011, Russian Federation*

[4] *Nikitsky Botanical Garden – National Scientific Center of RAS, Nikita, Yalta, Republic of Crimea, 298648, Russian Federation*

[5] *E-mail: valentina_vt@mail.ru; ORCID iD: https://orcid.org/0000-0002-0031-1955*

[6] *E-mail: kuluev@bk.ru; ORCID iD: https://orcid.org/0000-0002-1564-164X*

[7] *E-mail: sapsan7@mail.ru; ORCID iD: https://orcid.org/0000-0003-1709-080X*

[8] *E-mail: fater_84@list.ru; ORCID iD: https://orcid.org/0000-0002-5346-3477*

* *Corresponding author*

Keywords: Crimea, dandelion, endemic species, *Taraxacum hybernum*.

Summary. *Taraxacum pobedimovae* Schischk. was previously considered a synonym of *T. hybernum* Steven. The type of the former species consists of several plants mounted on a single specimen, which were found to belong to two different taxa: typical *T. hybernum* and the species previously referred to as the pinkish-achened form of *T. hybernum*. The lectotype of *T. pobedimovae* corresponding to the pinkish-achened form is designated. *Taraxacum pobedimovae* differs from *T. hybernum* by pinkish (not brown) achenes which are longer and with narrower spinules in comparison with those of the latter species. In addition, *T. pobedimovae* usually has larger and more numerous leaves with prominently purple veins, longer scapes, and larger capitula, as well as a larger and more branched root. The differences between these two species were confirmed by RAPD, ISSR, and SSR markers as well. The length of the achene beak, previously reported as the diagnostic character, is not useful to distinguish *T. pobedimovae* from *T. hybernum*.

Лектотипификация и замечания по поводу таксономического статуса *Taraxacum pobedimovae* Schischk. (Asteraceae: *Crepidinae*)

В. В. Фатерыга[1], Б. Р. Кулуев[2], С. А. Свирин[3, 4], А. В. Фатерыга[1]

[1] *Карадагская научная станция им. Т. И. Вяземского – природный заповедник РАН – филиал Института биологии южных морей им. А. О. Ковалевского РАН, ул. Науки, 24, пгт Курортное, г. Феодосия, Республика Крым, 298188, Россия*

[2] *Институт биохимии и генетики Уфимского федерального исследовательского центра РАН, пр. Октября, 71, г. Уфа, Республика Башкортостан, 450054, Россия*

[3] *Институт развития города Севастопольского государственного университета, наб. Корнилова, 1, г. Севастополь, 299011, Россия*

[4] *Никитский ботанический сад – Национальный научный центр РАН, пгт Никита, г. Ялта, Республика Крым, 298648, Россия*

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Ключевые слова: Крым, одуванчик, эндемик, *Taraxacum hybernum*.

Аннотация. *Taraxacum pobedimovae* Schischk. ранее считался синонимом *T. hybernum* Steven. Тип первого вида состоял из нескольких особей, смонтированных на один гербарный лист, которые принадлежат к двум разным таксонам: типичному *T. hybernum* и виду, который ранее был известен как розовосемянковая форма *T. hybernum*. Обозначен лектотип *T. pobedimovae*, соответствующий розовосемянковой форме. *Taraxacum pobedimovae* отличается от *T. hybernum* розовыми (а не бурыми) семянками, которые имеют бóльшую длину и менее широкие шипики. Кроме того, *T. pobedimovae* обычно характеризуется более крупными и многочисленными листьями с характерными пурпурными жилками, более длинными цветоносами и крупными корзинками, а также более крупным и разветвленным корнем. Между этими двумя видами также существуют отличия по маркерам RAPD, ISSR и SSR. Длина носика семянки, ранее считавшаяся диагностическим признаком, не имеет значения для разграничения *T. pobedimovae* и *T. hybernum*.

Introduction

With ca. 24 700 described species, the family Asteraceae is one of the largest plant families in the world (Christenhusz, Byng, 2016). Among them, the genus *Taraxacum* Wigg., with about 2 800 species known so far, is the most taxonomically complicated. This genus is characterized by prevailing complex multiple hybridity, frequent polyploidy, and widespread agamospermous reproduction (Kirschner, Štěpánek, 1996; Kirschner et al., 2014). Agamospermous microspecies are taxonomic entities recognizable by a set of minute morphological features (Kirschner et al., 2016). Due to the large number of species, their uniform morphology and high phenetic plasticity, plant identification at the species level is challenging even for specialists (Rewicz et al., 2020). The genus *Taraxacum* is poorly studied in Russia, but its studies are increased nowadays (Efimov, Trávníček, 2022; Kirschner et al., 2022a, b).

Taraxacum pobedimovae Schischk. was described from Sevastopol in the Crimea (Schischkin, 1964) as a species closely related to *T. hybernum* Steven (sect. *Scariosa* Hand.-Mazz.). The latter one was also described from the Crimea, specifically from Nikita in the vicinity of Yalta (von Steven, 1856). The only key character used to distinguish *T. pobedimovae* from *T. hybernum* by Schischkin (1964) was the length of the achene beak: 7–8 mm vs. 4–6.5 mm. Other characters mentioned in the protologue of *T. pobedimovae* were either identical to those in *T. hybernum*, such as phyllary length and achene body length, or largely overlapping and sometimes even not clearly circumscribed, such as plant height (6–20 cm vs. 5–16 cm), number of scapes (usually several vs. single or 2–5), achene color (brownish vs. light yellowish-brown), pyramis length (1–1.4 mm vs. 0.8–1.3 mm), pappus length (5 mm vs. 4–5 mm), etc. Soon after that, Privalova (1969) synonymyzed *T. pobedimovae* with *T. hybernum*. She found that the length of the achene beak was 4–6(6.5) mm in *T. hybernum* s. l., including specimens collected by E. G. Pobedimova from Sevastopol. Later, Tzvelev (1989) also noted that the taxonomic status of *T. pobedimovae* required further confirmation, although he maintained it as a separate species. Further study of the relationships of this pair of species was conducted by Yena (2001) who also carefully measured achene beaks. He found that this character is highly variable in *T. hybernum* s. l. (4–9 mm) and considered both species conspecific. Indeed, the length of the achene beak has rather low importance in the taxonomy of dandelions (Rewicz et al., 2020; Wolanin et al., 2023). Modern international databases such as Euro+Med Plantbase (Kirschner et al., 2007+) and POWO (2022) also treat *T. pobedimovae* as a synonym of *T. hybernum*.

Kuluev et al. (2018) collected specimens of *T. hybernum* from 10 localities in the Crimean Peninsula (including the type localities of both *T. hybernum* and *T. pobedimovae*) and studied them using SSR, RAPD, and ISSR markers. As the result, they found that the Crimean population of *T. hybernum* was genetically homogeneous.

Different forms of *T. hybernum* were, however, also mentioned even before the description of *T. pobedimovae* by Schischkin (1964), giving evidence of the existence of more than one species merged under this specific name. Particularly, Filippov et al. (1948) reported the presence of a so-called pinkish-achened form which was different from typical *T. hybernum* by a pinkish (not brown) color of the achenes. Besides this, the pinkish-achened form differed from plants with the brown achenes by larger and more numerous leaves, longer scapes, and larger capitula, as well as by a larger and more branched root (Filippov et al., 1948). We found such a form in 2018 in Verkhnesadovoye in the vicinity of Sevastopol. Both forms were cultivated in Ufa City where their multilocus DNA polymorphism and content of

both natural rubber and inulin were studied (Bari et al., 2021; Kuluev et al., 2022). The results showed that the pinkish-achened dandelion had the greatest root mass in comparison with both typical *T. hybernum* and *T. kok-saghyz* Rodin, another well-known rubber-bearing dandelion. At the same time, the molar mass of rubber and the content of inulin in both the pinkish-achened dandelion and *T. kok-saghyz* were higher than those in typical *T. hybernum*. Thus, the pinkish-achened dandelion was considered a good alternative for *T. kok-saghyz* and recommended for domestication and cultivation as a source of high molar mass natural rubber and inulin (Kuluev et al., 2022).

Bari et al. (2021) showed numerous differences between the pinkish-achened dandelion and typical *T. hybernum* in RAPD, ISSR, and SSR markers. Due to these differences, as well as to the abovementioned differences in morphology, we consider the pinkish-achened dandelion not a form of *T. hybernum* but a distinct species. However, it remains unclear which scientific name could be applied to this species and *T. pobedimovae* being one of the possible alternatives. Working on this question, we once again returned to studying the type of *T. pobedimovae* and checking the taxonomic status of this species.

Material and methods

The type of *T. pobedimovae* was studied in the herbarium LE. Living plants were observed in two localities: between Kamyshovaya and Pesochnaya bays in Sevastopol [44°35'52"N, 33°25'45"E] and in Verkhnesadovoye in the vicinity of Sevastopol [44°41'20"N, 33°41'36"E]. The plant records were documented by digital photographs; specimens were collected and deposited in the herbaria CSAU and PHEO. Achenes were studied both in the field from mature infructescences and from the herbarium specimens with immature infructescences.

Results and discussion

Taraxacum pobedimovae Schischk. 1964, Fl. URSS, 29: 531, 744. **Lectotype** (Fateryga, **designated here**): "Окр. г. Севастополя, бухта Камышевая, на глинисто-известняковом обрыве к морю [Vicinity of Sevastopol, Kamyshovaya Bay, on a clayey-calcareous cliff to the sea]. 25 VIII 1962. E. Pobedimova, V. Gladkova. 484" (upper left-hand plant, LE01107802!) (Fig. 1, indicated with an arrow).

Taxonomic notes: Schischkin (1964) cited the gathering No. 484 by E. Pobedimova and V. Gladkova as the type of *T. pobedimovae*. This gathering (currently barcoded as LE01107802) contains six plants. Most of them are with detached achenes which are stored separately from the plants, in a paper envelope glued to the upper part of the herbarium sheet (Fig. 1). We had an opportunity to examine the content of this envelope as well as achenes from the upper left-hand plant (the upper right-hand plant was also with achenes attached to the plant, but they were covered by phyllaries and, therefore, difficult to study).

The question to be answered was which species the type of *T. pobedimovae* was conspecific to (typical *T. hybernum* or the pinkish-achened dandelion). The studied achenes were discolored but, nevertheless, they distinctly belonged to two different species. A part of the achenes in the envelope belonged to *T. hybernum* (Fig. 2A, on the right), while the remained ones, as well as the achenes from the upper left-hand plant, were more similar (but not identical) to those of the pinkish-achened dandelion (Fig. 2A, at the center and on the left). The mature achenes of the pinkish-achened dandelion were somewhat different (Fig. 2B), but this was apparently due to the fact that the plants from the gathering No. 484 had been collected in flower and/or with immature achenes. To check this, we also collected a specimen of the pinkish-achened dandelion with the root and allowed achenes to mature in herbarium. By this way, we received achenes morphologically identical to those of the type of *T. pobedimovae* (excluding some of them belonged to *T. hybernum*) (Fig. 2C).

Therefore, it is clear that the dandelions of the gathering No. 484 belong to more than one taxon (both the pinkish-achened dandelion and *T. hybernum*) and a designation of the lectotype is required according to Art. 9.3 and 9.14 of ICN (Turland et al., 2018). Schischkin (1964) apparently used all six plants in the description of *T. pobedimovae*, at least because he mentioned that the plant height was 6–20 cm, i. e., the whole range of plants mounted on the specimen No. 484 was included. We hereby designate the upper left-hand plant as the lectotype of *T. pobedimovae* because its identity is clear due to the achenes available to study. Therefore, *T. pobedimovae* should be removed from the synonymy of *T. hybernum* and accepted for the species previously referred to as the pinkish-achened form by Filippov et al. (1948), Bari et al. (2021), and Kuluev et al. (2022).

Nomenclature notes: The species was described by Schischkin (1964) as "*Taraxacum pobedimoviae*". Among the modern taxonomic databases, the same spelling can be found, e. g., in POWO (2022). Ac-

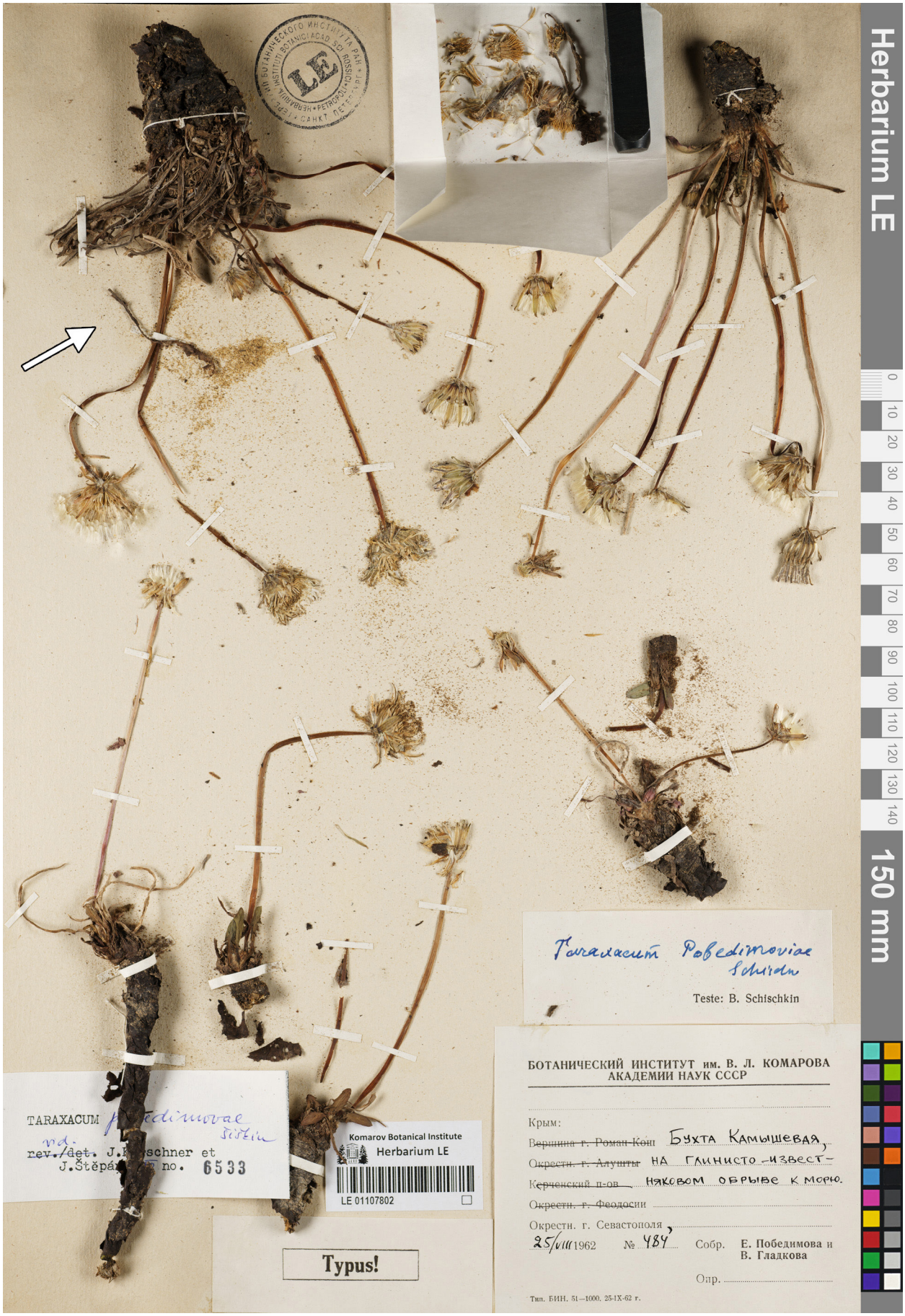

Fig. 1. Type specimen of *Taraxacum pobedimovae* Schischk. (LE01107802), the lectotype is indicated with an arrow.

cording to Art. 60.8 of ICN (Turland et al., 2018), the termination of a specific epithet derived from a personal name ending with "a" (such as Pobedimova) should be made by adding "e" and terminations contradicting to this standard are treated as errors to be corrected. Therefore, the letter "i" should be deleted from the epithet "*pobedimoviae*" and the correct name of this species is *T. pobedimovae*.

Differences from *Taraxacum hybernum*: Privalova (1969) and Yena (2001) have already revealed that the length of the achene beak is not useful to distinguish *T. pobedimovae* from *T. hybernum* (cf. Fig. 2B, D). The main diagnostic character is the color and the structure of the achene body. Mature achenes of *T. pobedimovae* (Fig. 2B) are pinkish, longer than those of *T. hybernum*, and with narrower spinules; mature achenes of *T. hybernum* (Fig. 2D) are light-brown, shorter than those of *T. pobedimovae*, and with broader spinules. Besides this, as stated above, *T. pobedimovae* usually has larger and more numerous leaves with prominently purple veins, longer scapes, and larger capitula, as well as a larger and more branched root (Kuluev et al., 2022). These characters are, however, only statistically useful in addition to the main diagnostic character of the achene color. The habit of a living plant of *T. pobedimovae* is shown in Fig. 3.

Additional specimens examined: "Crimea, vicinity of Sevastopol, Verkhnesadovoye, 44°41'20"N, 33°41'36"E, roadside of a highway. 22 XI 2018. A. V. Fateryga s. n." (PHEO); "Sevastopol, between Kamyshovaya and Pesochnaya bays, 44°35'52"N, 33°25'45"E. 7 XI 2022. S. A. Svirin s. n. (CSAU)".

Distribution: The species in known only from the Sevastopol area (endemic).

Conclusion

Taraxacum pobedimovae is the name which should be accepted for the distinct species previously referred to as the pinkish-achened form of *T. hybernum* by Filippov et al. (1948), Bari et al. (2021), and Kuluev et al. (2022).

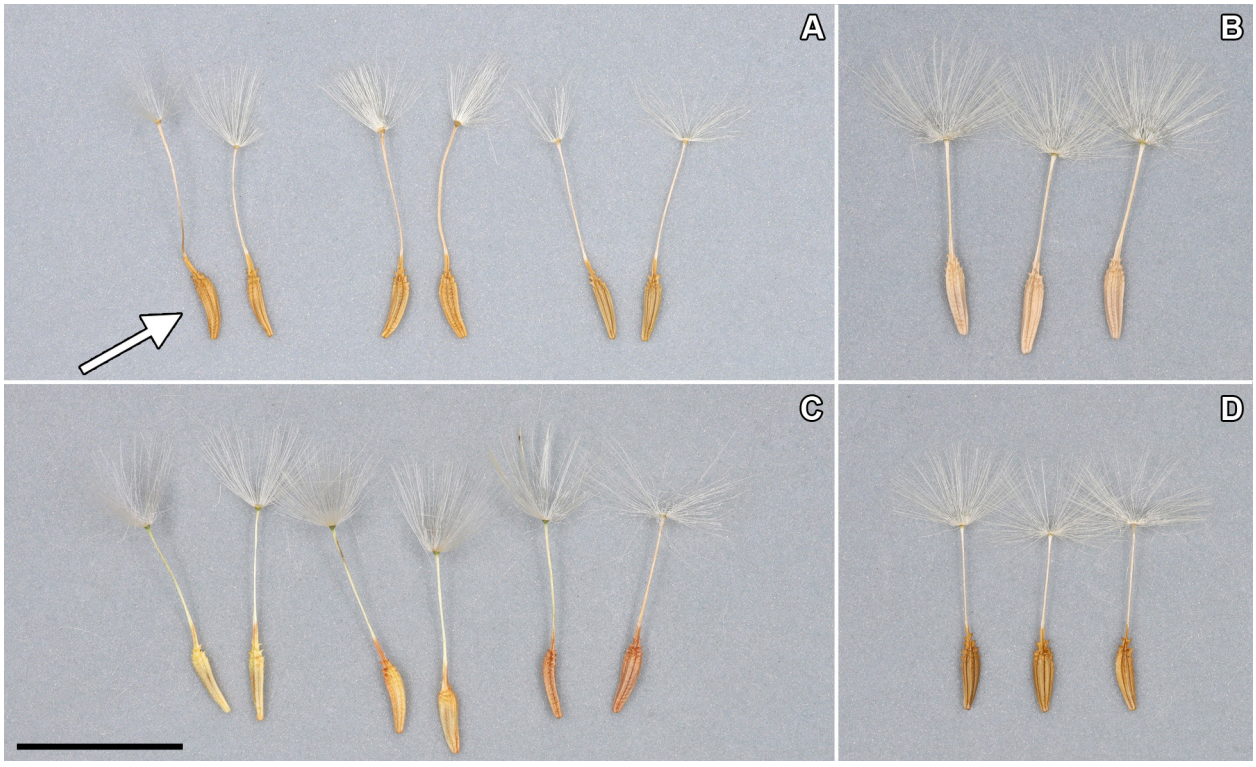

Fig. 2. Achenes of *Taraxacum pobedimovae* Schischk. and *T. hybernum* Steven: A – achenes from the LE01107802 gathering (arrow indicates two achenes from the lectotype of *T. pobedimovae* on the left while four other achenes are from the envelope: two of *T. pobedimovae* at the center and two of *T. hybernum* on the right); B – mature achenes of *T. pobedimovae* collected in the field (vicinity of Sevastopol, Verkhnesadovoye, 31 X 2021); C – achenes of *T. pobedimovae* of various degree of maturity (from a herbarium specimen collected in flower and with immature achenes in Sevastopol, between Kamyshovaya and Pesochnaya bays, 7 XI 2022); D – mature achenes of *T. hybernum* collected in the field (vicinity of Sevastopol, Verkhnesadovoye, 31 X 2021). Scale bar = 1 cm. Photos by A. V. Fateryga.

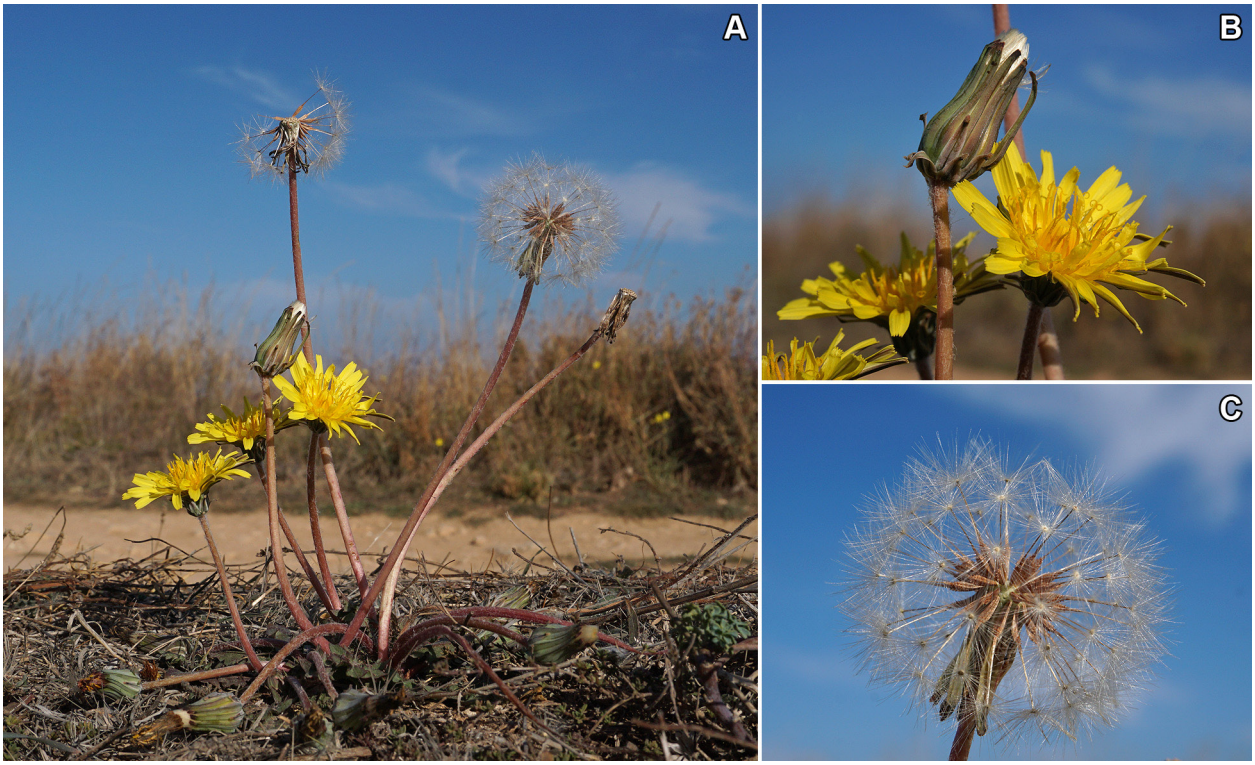

Fig. 3. *Taraxacum pobedimovae* Schischk. (Sevastopol, between Kamyshovaya and Pesochnaya bays, 7 XI 2022): A – plant with flowers and fruits; B – inflorescence and immature infructescence; C – mature infructescence. Photos by S. A. Svirin.

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