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STUDIES ON *CHENOPODIUM ALBUM* S. L. (CHENOPODIACEAE / AMARANTHACEAE S. L.): *CHENOPODIUM PEDUNCULARE*

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Abstract – *Chenopodium album* s. l. is one of the most taxonomically difficult groups of taxa in the genus *Chenopodium* s. s. due to its high phenotypic variability and possible ancient and current hybridization which led to numerous nomenclatural problems and misapplication of names. Proper application of many names in *Chenopodium* (especially taxa described in the 18–19th centuries) still remains uncertain. As currently accepted in recent publications, several subspecies can be considered under *C. album* for the European flora, i.e *C. album* L. subsp. *album*, *C. album* subsp. *pedunculare* (Bertol.) Arcang., and *C. album* subsp. *borbasii* (Murr) Soó. Bertoloni's *C. pedunculare* (basionym of *C. album* subsp. *pedunculare*) appears still poorly understood taxonomically. The present contribution is based on field surveys, analyses of the relevant literature (protologues included), and examination of specimens preserved in several herbaria. The name *C. pedunculare* was lectotypified by Dvořák (1984) on a specimen deposited at BOLO. Based on morphology and chorology considerations, that taxon can be recognizes at species rank. For nomenclatural purposes, the names *C. concatenatum* Thuillier (and *sensu* Aellen), *C. glomerulosum*, and the Linnaean *C. viride* are discussed. *C. concatenatum* is here lectotypified on a specimen deposited at G. The names *C. glomerulosum* Rchb. and *C. viride* L. remain taxonomically unresolved. Morphological comparison of original specimens of *C. pedunculare*, and *C. lanceolatum* Muehl. ex Willd. demonstrated that, despite their superficial similarity, it is not advisable to synonymize these taxa.

Keywords: *Chenopodium album*, *C. concatenatum*, *C. glomerulosum*, *C. pedunculare*, *C. viride*, Europe, Italy, nomenclature, synonymy, typification.

Introduction

The genus *Chenopodium* L. (Chenopodiaceae / Amaranthaceae *sensu* APG IV, 2016) was formally established by Linnaeus (1753), who initially placed in this genus 22 species. Of these Linnaean species, only three names are considered belonging to *Chenopodium* s. s., while the others are currently accepted in at least 9 other genera: *Bassia* All., *Blitum* L., *Chenopodiastrum* S. Fuentes & al., *Dysphania* R. Br., *Lipandra* Moq., *Oxybasis* Kar. & Kir., *Spirobassia* Freitag & G. Kadereit, *Suaeda* Forssk. ex J.F. Gmel., and *Teloxys* Moq. (the list of Linnaean species and their current placement are provided in Mosyakin, 2015). *Chenopodium* s. l. traditionally comprised until recently about 150 (up to 200?) species with nearly worldwide distribution (see e.g., Aellen, 1960–1961; Clemants & Mosyakin, 2003). Kadereit et al. (2003; 2005; 2010) and especially Fuentes-Bazan et al. (2012a; 2012b) clearly demonstrated that *Chenopodium* in that traditional circumscription is polyphyletic, and a new classification of Chenopodioideae Burnett was proposed (Fuentes-Bazan et al., 2012b). Species until recently included in a "traditional" genus *Chenopodium* (in a much narrower circumscription as compared to the original Linnaean concept) are arranged now in three tribes (Chenopodieae = Atripliceae, Anserineae, and Dysphanieae) and seven genera (see Fuentes-Bazan et al., 2012b). The classification by Fuentes-Bazan et al. (2012b) is currently accepted in many newer publications (see e.g., Iamonico, 2010; Iamonico, 2012; Iamonico, 2011; Iamonico, 2014; Mosyakin, 2013; Uotila, 2013; Uotila, 2017; Sukhorukov et al., 2013; Sukhorukov, 2014; Sukhorukov &

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Kushunina, 2014; Hernández-Ledesma et al., 2015; Mosyakin & Iamonico, 2017). In the light of this new classification, *Chenopodium* s. s. was reduced to comprise 55−65 species (see Hernández-Ledesma et al., 2015; Sukhorukov & Kushunina, 2014; Uotila, 2017), but the estimated number of species will be probably changed due to further research, and depending on a species concept applied by various authors.

Chenopodium s. s. remains a critical genus from both nomenclatural and taxonomic viewpoints due to its high phenotypic variability and ancient, recent, and partly current hybridization (Mandák et al., 2012; Feodorova et al., 2017; Krak et al., 2016; Hodková & Mandák, 2018), which led to nomenclatural problems and often misapplication of names (see case studies in Clemants & Mosyakin, 1996; Mosyakin, 2003; Mosyakin, 2017; Uotila, 2017). Allopolyploidy played an important role in the evolution of taxa of *Chenopodium* s. s., due to which tetraploid and hexaploid taxa often combine two or more different genomes of ancestral diploids (Walsh et al., 2015; Kolano et al., 2016; Krak et al., 2016, etc.). One of the most difficult *Chenopodium* groups is represented by *C. album* L. and related mainly hexaploid taxa (see e.g., Aellen, 1960; Uotila, 1978; Dvořák, 1989; Dvořák, 1993; Dvořák et al., 1983; Rahiminezhad, 1995; Iamonico, 2010; Mosyakin, 2017), for which hundreds of names were published during the centuries (see IPNI 2018–onward). This aggregate includes an uncertain number of species, from ca. 9 to many more, depending on the species concepts applied by various authors (see e.g., Aellen 1960–1960; Clemants & Mosyakin, 2003; Iamonico, 2010). *Chenopodium album* s. l. is certainly one of the most taxonomically difficult species aggregates in the group (e.g., Akeroyd, 1993; Rahiminezhad, 1995; Uotila, 2001). According to Uotila (2011), three subspecies are currently recognized under *C. album* for the European flora, i.e subsp. *album*, subsp. *pedunculare* (Bertol.) Arcang., and subsp. *borbasii* (Murr) Soó; the latter two names appearing still poorly understood at present.

As part of the ongoing nomenclatural studies on Chenopodiaceae s. s. (e.g., Iamonico, 2010; Iamonico & Jarvis, 2012; Iamonico & Kadereit, 2013; Mosyakin & Iamonico, 2017), a contribution concerning *C. pedunculare* Bertol. (basionym of *C. album* subsp. *pedunculare*) and some similar taxa or forms is presented here with the aim of morphology-based clarification of their taxonomic identity. That clarification seems to be needed in view of the current morphological and molecular research, which requires proper application of names. *C. pedunculare* was accepted in some floras and articles as a species (e.g., Reynier, 1907; Dvořák, 1984; Mosyakin, 1996; Paśnik, 1999; Tzvelev, 2000), or more recently as a subspecies of *C. album* (e.g., Walter, 1995; Danihelka et al., 2012; Grozeva, 2012; Pyšek et al., 2012). It is also currently recognized as a subspecies of *C. album* in the *Euro+Med Plantbase* (Uotila, 2011).

Material and methods

The work is based on field surveys, analyses of the relevant literature (protologues included), and checking/examination of specimens preserved in the Herbaria B, BM, BOLO, BR, FI, G, GOET, HFLA, JE, LE, LINN, MPU, OXF, PH, RO, S, and W (acronyms according to Thiers, 2018+). The articles of the *International Code of Nomenclature for Algae, Fungi, and Plants* (ICN) cited through the text follow McNeill et al. (2012).

Results and discussion

Chenopodium concatenatum

Chenopodium concatenatum was described by Thuillier (1799), who provided a diagnosis, and the habitat ("*in locis glareosis*"). Dvořák (1984) reported (page 457) "*Chenopodium concatenatum* Aellen in Hegi, Ill. Fl. Mitteleur. 3/2: 650, 1960 non Thuillier 125, 1799" in the synonymy of *C. pedunculare*, but Aellen (1960) just mentioned (page 650) that name as a synonym of *C. album* subsp. *album* var. *album* "f. *cymigerum* (Koch) A. Ludwig (1914)", following another accepted form, "f. *glomerulosum* (Rchb.) A. Ludwig (1913)". Thus, Dvořák (l.c.) concluded (page 461) that Aellen misapplied the name *C. concatenatum* to another infraspecific entity, and thus Dvořák did not support possible identity of *C. concatenatum* and *C. pedunculare*, even though at the rank of a mere form. We traced a specimen at G (code 00177356) bearing a plant which seems to be part of Thuillier's collection, as indicated in the printed label on the top-right corner of the sheet. We thus consider the G specimen as original material for the name *C. concatenatum*; it matches Thuillier's diagnosis, and it is here designated as the lectotype. Lectotypes of *C. pedunculare* (BOLO) and *C. concatenatum* (G) are morphologically different and cannot be ascribed to the same taxon (different characters refer respectively to: dense vs. sparse branching pattern, lax vs. condensed inflorescences, pedunculate vs. not pedunculate glomerules, fruit about 1.5 mm vs. about 1 mm in diameter). According to the current concept (e.g., Akeroyd, 1993; Uotila, 2001; Clemants & Mosyakin, 2003; Iamonico, 2018), *C. concatenatum* can be considered as one of the many forms of *C. album*.

Chenopodium glomerulosum

Reichenbach (1832a) described (page 579) *Chenopodium glomerulosum* with a short diagnosis. He also provided the citation "*Rchb.* pl. crit. X. *ic.* …" referring to of his

Iconographia botanica seu plantae criticae. That citation (with "...") most probably indicated his intention to include that plant in volume 10 or another forthcoming issue of *Iconographia botanica seu plantae criticae* (Reichenbach, 1832b), but *C. glomerulosum* was not listed in VI–XI or other centuriae of that work, so his intention has never been implemented. Furthermore, no original specimens were traced in the herbaria B, BM, BR, GOET, JE, LE, MPU, OXF, PH, S, and W where Reichenbach's collections are preserved (see Stafleu & Cowans 1983). It should be also noted that Reichenbach described *C. glomerulosum* as a hybrid of or an intermediate form between *C. viride* and *C. album* (see the sign before the name in the protologue, and also his treatment of that name in his *Flora Saxonica*: Reichenbach, 1844). Beaugé (1974) in his thorough overview of earlier literature on *C. album* s. l. also listed the names *C.* ×*glomerulosum* ("*viridi-album*" in Reichenbach) and *C.* ×*paganum* ("*albo-viride*") as hybrids. In view of that, *C. glomerulosum* still remains among many other unresolved names in *Chenopodium*.

Chenopodium pedunculare

Bertoloni (1837) validated (page 32) *Chenopodium pedunculare* through a short diagnosis ("caule erecto; foliis oblongo-lanceolatis, subintegris; spici cymosis, longe pedunculatis; seminibus grandiusculis, nitidis, glabris"), a more detailed description, and the provenance ("Legi Sarzanae in viis campestribus. Haubi Fossa Clodia ad viam *della Madonna* a Prof. Naccario"); a morphological comparison with *C. album* was also provided.

While discussing taxonomy, karyology and morphology of *C. pedunculare*, Dvořák (1984) reproduced (page 457) the text of Bertoloni's protologue, but his lectotypification of the name has been done by the capture under his Fig. 2 on the next page 458 (Dvořák, 1984), by the following statement: "Type of *Chenopodium pedunculare* Bertol. The sender: Prof. Davide Ubaldi, Università di Bologna, Institutio del orto Botanico. One of two photograph diapositives concerning the two specimens of *Chenopodium pedunculare* Bertol. which are keeped [sic!] in the herbarium of Bologna. Photo made by M. Kratochvílová". According to Art. 7.10 of the ICN (McNeill et al., 2012), that statement clearly constitutes effective lectotypification.

Following that lectotypification and information about the collections of Bertoloni deposited at BOLO (Stafleu & Cowan, 1976), Duilio Iamonico found a specimen collected in "*Sarzana*" in 1804, as reported on the original label. The plant on the sheet (a terminal part of a branch) morphologically matches the diagnosis by Bertoloni (1837) and the image in Dvořák (1984). The BOLO specimen is part of original material, it corresponds the current concept of the taxon (see e.g., Iamonico, 2017), and thus the lectotypification of the name *C. pedunculare* proposed by Dvořák (1984) should be accepted. Since Dvořák (1984, black-and-white photograph, Fig. 2) reproduced only the upper part of the lectotype, with the original label, we provide here the complete color image of that specimen (Fig. 1).

Among the morphological characters potentially suitable for identification of *Chenopodium pedunculare*, the structure of the inflorescence (a feature used by Bertoloni in the epithet of his new species, "*pedunculare*"] cannot be considered as diagnostic since similar inflorescences occur in other taxa of the *C. album* aggregate. Also the shape of leaf blades [lanceolate (2−)3−5 times longer than wide, with margins entire and more or less parallel, base cuneate, and apex obtuse and mucronate] is not sufficient to characterize the species. The character referred to margins (entire and parallel) resembles that in *C. betaceum* Andrz. (− *C. strictum* auct. non Roth, see Mosyakin, 2017), which is, however, a different tetraploid taxon, judging from several other morphological features, especially the structure and color of the stem that in *C. betaceum* is usually dark green to reddish, with prominent dark red stripes, and branched with lowermost branches ascending from an almost horizontal base (see e.g, Iamonico, 2010 sub *C. strictum* s. l.; Mosyakin, 2017). On the contrary, the size of fruits/seeds seems to be a character that distinguishes *C. pedunculare*, as already reported by Bertoloni (1837) in the protologue ("seminibus grandiusculis"). Diameter of mature fruits is usually not less than 1.4 mm (usually about 1.5 mm), while fruits in most of other morphotypes of *C. album* s. lat. are usually smaller. Also, fruits in *C. pedunculare* are rather thick (more than 0.7 mm vs. less than 0.7 mm in *C. album s.l.*). On the basis of the lectotype (BOLO), other specimens examined, the original diagnosis and description (Bertoloni, 1837), and the current concept of the taxon (e.g., Aellen, 1960; Akeroyd, 1993; Rahiminezhad, 1995; Clemants & Mosyakin, 2003; Uotila, 2001; Iamonico, 2010; Iamonico, 2017), seeds size, together with lanceolate leaves (2−)3−5 times longer than wide, and long pedunculate glomerules can be considered to distinguish Bertoloni's species from other taxa of the *C. album* group.

Dvořák (1984) discussed (pages 458−459) in more detail the understanding of *Chenopodium pedunculare* by various authors and demonstrated that most of the cited researchers (W.D.J. Koch, A. Moquin-Tandon, G. Beck, P. Ascherson & P. Graebner, J. Murr, and some others) paid attention only or mostly to the inflorescence structure and leaf shape of that taxon and because of that most probably misapplied that name to several other taxa (species or mainly infraspecific entities) of the *C. album* aggregate. He also noted some additional characters of *C. pedunculare* s. s., especially the comparatively large fruit/seed size (already reported by Bertoloni in the protologue, see above), the general branching habit (plants "from the base branched, the branches are

erecto-patentes to nearly patent"), and the leaf color (reported as "grey-blue") (Dvořák, 1984).
Sukhorukov (2014) reported the following carpological characteristics for *C. album* s. s. and *C. pedunculare*:

1) ***Chenopodium album*** s. s. (Sukhorukov, 2014):
   Fruit 1.2–1.5 mm in diameter, 0.6–0.7 mm thick. Pericarpium 1–2(3)-layered, easily removed under mechanical influence [by rubbing], external (or single) layer with papillae up to 55 μm thick. Seed slightly keeled, black; testa ca. 50 μm (in summertime terminal seeds) and 17–25 μm (in autumn seeds), smooth, with stalactites (traslated from Russian).

2) ***Chenopodium pedunculare*** (Sukhorukov, 2014): Fruit 1.4–1.5 mm in diameter, 0.8–0.9 mm thick. Pericarp 1–2-layered, papillose (papillae up to 60 μm), easily removed under mechanical influence. Seed black, without keel. Tests ca. 50 μm thick, smooth, with stalactites (traslated from Russian).

Despite these differences, Sukhorukov (2014) did not accept *C. pedunculare* as a species in the taxonomic part of his book, but mentioned it in a note under *C. album*: "In some cases, forms of *C. album* with entire ovate leaves, leafless inflorescence, and corymbose-arranged glomerules on long branches can be identified as *C. pedunculare*, but their taxonomic status is still unclear. Such forms are quite often found, for example, in Moscow Region and are also known from the Leningrad, Sverdlovsk, Tambov, Tver regions, and Karelia" (traslated from Russian).
Currently *Chenopodium pedunculare* is accepted at subspecies rank in *C. album* based on the combination made by Arcangeli (1882) who distinguished two subspecies, i.e. subsp. *viride* (L.) Pursh and subsp. *pedunculare* (Bertol.) Arcang., the latter one having leaves oblong-lanceolate, entire, whitish abaxially and inflorescences pedunculate according to Arcangeli (l.c.). As discussed above, the lax inflorescence structure is a character that occasionally occurs in several entities in the *C. album* group. Moreover, the distribution area of the Bertoloni's taxon (S-, E-, and NE-Europe) partially overlaps with ranges of another currently recognized subspecies [i.e. subsp. *borbasii* (Murr) Soó] and the nominal taxon, subsp. *album* (Uotila, 2011). Also the habitats of the three taxa are the same or similar (many human-made ruderal and segetal areas, also some naturally disturbed habitats). As a consequence, the subspecies rank applied to *C. pedunculare* is not the best choice for the taxon, while the species level seems to be better.
Recently Iamonico & Clementi (2016) investigated the name *Chenopodium lanceolatum* Muhl. ex Willd. and proposed its lectotypification based on a specimen preserved in the Willdenow Herbarium at B-W (code 05365-010; image available from: https://plants.jstor. org/stable/10.5555/al.ap. specimen.b%20-w% 200 5365 %20-01%200 and http://ww2.bgbm.org/herbarium/specim en. cfm?Specime n PK=110 297&idThumb=324929&Specimen Sequenz =1&loan=0). The Willdenow's name was treated in current literature mainly as a synonym of *C. album* subsp. *album*. The lectotype of *C. lanceolatum*, which originated from North America (see details in Iamonico & Clementi, 2016), displays some characters that match those of the type of *C. pedunculare*, including the feature referred to the prominently pedunculate inflorescence. However, forms with paniculate and pedunculate inflorescences often occur in taxa of the *C. album* aggregate, as well as in some North American taxa. Moreover, the lectotype of *C. lanceolatum* is represented by an upper part of a terminal or lateral branch, with several lanceolate leaves and young partial inflorescences without mature fruits. Another original specimen (B-W 05365-020, image available from https://plants.jstor.org/stable/10.5555/al.ap.specimen.b%20-w%2005365%20-02%200) also contains three branch fragments not particularly suitable for a precise identification. Thus, the name *C. lanceolatum* remains taxonomically unresolved, and even its application to similar European forms is questionable. Because of that we consider it improper, or at least not advisable, to synonymize *C. pedunculare* with *C. lanceolatum*.
Several other taxa of the *C. album* aggregate with much-branched paniculate inflorescences were described in earlier literature, e.g. *C. concatenatum* Thuill. (1799), *C. strictum* Roth (1820, see details in Mosyakin, 2017), *C. glomerulosum* Rchb. (see an overview in Beaugé, 1974), *C. patulum* Roth (1820), and *C. viride* L. The proper taxonomic application of those names remains controversial. Here we consider in more detail only one such taxon — *C. concatenatum* — in comparison with *C. pedunculare* (see discussion above under the subparagraph "Chenopodium concatenatum"), and also briefly discuss the Linnaean name *C. viride* (see just below, under the subparagraph "Chenopodium viride").

Chenopodium viride

This name was validated by Linnaeus (1753) in the 1st edition of *Species Plantarum* (page 219), with a short diagnosis (in fact, a polynomial) ["CHENOPODIUM foliis rhomboideis dentato-sinuatis, racemis ramosis subnudis", taken *verbatim* from Linnaeus (1745), and Dalibard (1749)], two synonyms cited from Vaillant (1727, t. 7, f. 1, "Chenopodium sylvestre, opuli folio", page 36), and Dillenius (1719, "Chenopodium folio oblongo integro" pages 154, and 62), and the provenance ("*Habitat in* Europae *cultis*").
Uotila (1978) extensively discussed the taxonomic and nomenclatural difficulties with *Chenopodium viride*, typified

the name using a specimen deposited at LINN (no. 313.9, image at http://linnean-online.org/3083/), and proposed to synonymize it under *C. album*.

The lectotype (a branch with leaves and partial inflorescences) displays the following morphological characters: leaf blades ovate to lanceolate and entire (most of the upper ones) or ovate-rhomboidal and dentate (the lower ones), all petiolate, with petioles up to as long as leaf blades; glomerules arranged in lax paniculate partial inflorescences, pedunculate (peduncles about 1 cm long); fruit about 1.5 mm in diameter. In its general habit, the Linnaean plant is very similar to the plant described of Bertoloni as *C. pedunculare*. That was noted also by Dvořák (1984), who considered the Linnaean name as *nomen confusum* and listed the name "*Chenopodium viride* L. <...> nom. confus." in synonymy of *C. pedunculare*. The name *C. viride* now is not in current use, and in the past was often rejected or ignored as *nomen ambiguum*. However, its synonymization with *C. album* s. s. (as suggested by Uotila, 1978) also seems to be a rather "rough" taxonomic option, especially now, when more evidence is becoming available indicating that what is usually called "*C. album*" is in fact still an aggregate of several hexaploid races that most probably emerged from several independent allopolyploidization events. Considering that, probably the best nomenclatural solution would be to propose the name *C. viride* L. for rejection because of its uncertain identity and the history of (mis)application to both diploids (now accepted mainly as *C. suecicum* Murr) and hexaploids (various taxa and forms of the *C. album* aggregate, incl. *C. pedunculare* s. str.).

Taxonomic Treatment

Chenopodium album L., Sp. Pl. 1: 219. 1753 subsp. ***album***. – Type (lectotype, designated by Brenan 1954: 6): Herb. Linn no. 313.8 (LINN!, image of the lectotype available at http://www.nhm.ac.uk/our- science/data/linnaean- typification/search/detailimage.dsml?ID=215300 and http://linnean-online.org/3082/).

= *Chenopodium concatenatum* Thuill., Fl. Env. Paris, ed. 2: 125−126. 1799. – Type (lectotype, designated here): FRANCE. Paris, *habitat in locis glareosis*, an 1799, *Thuillier s.n.* (G00177356!, image of the lectotype available at http:// www. ville -ge.ch/ musinfo /bd/ cjb/chg/adetail.php?id=180597&base=img&lang=en and https://plants.jstor.org/stable/10.5555/al.ap.specimen.g00177356).

Chenopodium pedunculare Bertol., Fl. Ital. 1: 32. 1837 ≡ *C. album* subsp. *pedunculare* (Bertol.) Arcang., Comp. Fl. Ital.: 594. 1882. – Type (lectotype, designated by Dvořák 1984: 458, *Fig. 2*): ITALY. Emilia-Romagna, "*Legi Sarzana in viis campestribus*, 1804", *Bertoloni s.n.* (BOLO!) *(Fig. 1)*.

− *C. album* subsp. *album* var. *album* f. *cymigerum* (Koch) A. Ludwig (incl. *Chenopodium concatenatum*) *sensu* Aellen in Hegi, Ill. Fl. Mitteleur. 3(2): 650. 1960, p.p.

Fig. 1. Lectotype of the name *Chenopodium pedunculare* (BOLO!).

Concluding Remarks

In view of the arguments provided above, we think it is worth discussing here a more general nomenclatural question directly relevant to further development of taxonomy and nomenclature of *Chenopodium*: should we attempt to typifiy all taxa validly described in the genus, including obscure and forgotten ones? The current version of the ICN (McNeill et al., 2012) provides several tools and protocols for establishing the proper application of names through typification, including neotypification, and epitypification. Dozens of names in *Chenopodium* (species and infraspecific taxa) have been validated by numerous authors (see IPNI 2018–onward, and

an overview in Beaugé, 1974), but many of those names (especially published in the 18th–19th centuries) are not in current use; they often remain untypified, and their proper application is uncertain. In some cases, no reliable original material is available, while in other cases the taxonomic identity of available original material is uncertain and these specimens cannot be assigned with certainty to any currently accepted taxon. In our opinion, epitypification and/or neotypification resulting in nomenclatural resurrection of such obscure names is not advisable, especially in cases when restoration of such names to current use may disrupt the currently accepted nomenclature of widely recognized species. On the other hand, cases of misapplication of some earlier and obscure names to currently recognized species should be clarified and corrected. A recent example is the case on the taxonomically uncertain name *C. strictum* Roth originally applicable to some unidentified Indian plants, which was widely misapplied (following Aellen, 1929) to a well-distinguished Eurasian tetraploid species that should be properly called *C. betaceum* Andrz. (see Mosyakin, 2017). Rejection and conservation proposals for some names are also options to be used following the progress of field- and herbarium-based taxonomy, morphology, and molecular phylogenetic and populational genetics of taxa of the complicated but fascinating group of *Chenopodium album* and its relatives.

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