Nomenclature survey of the genus *Amaranthus* (Amaranthaceae). 10. What is *Amaranthus commutatus*?

Duilio Iamonico

Department of Biology, Botany Unit, University of Pisa, via Luca Ghini 13, Pisa, IT-56126, Italy; d.iamonico@yahoo.it


Abstract: The name *Amaranthus commutatus*, originally validated by Kerner for a plant taxon from Hungary and Slovakia, was studied as part of a series of contributions with the final aim to clarify the complicated nomenclature of the genus *Amaranthus*. On the basis of the protologue, the name *Amaranthus commutatus* cannot be associated with any European species, while out of Europe, Kerner’s original data of *A. commutatus* may match the morphology of the Australian species *A. rhomboeus*. Unfortunately, no original material has been traced so far and thus no lectotype can be designated (Arts. 9.3 and 9.4 of Shenzhen Code). Consequently, neotypification is desirable according to Art. 9.8. However no specimens of *Amaranthus* seen by Kerner have been traced and it was very difficult to understand Kerner’s concept of that taxon. Having no suitable specimens available, I prefer to avoid the designation of a neotype, and the possible synonymization of *A. commutatus* with *A. rhomboeus* based just on Kerner’s data. Furthermore, the synonyms cited by Kerner in the protologue (*Amaranthus blitum* var. *polygonoides* (here lectotypified on a specimen preserved at K), and *A. blitum* var. *prostratus* (lectotype designated by Iamonico in 2016 on a Balbis’ illustration) refer to other species, i.e. *A. albus* (new proposed synonym) and *A. deflexus*, respectively. The treatment of *Amaranthus commutatus* appears inconsistent but this fact is not ground for rejecting of the name since does not threat any other name and there are no disadvantageous nomenclatural changes (Art. 56.1). Since the failure to properly designate a type, and the impossibility to reject *A. commutatus*, Kerner’s name continues to be of ambiguous nature and is proposed as listed as a name incertae sedis.

Keywords: Bulgaria, Hungary, *incertae sedis*, nomenclature, new synonym, Slovakia, typification.
Introduction

*Amaranthus* L. (Amaranthaceae Juss.) comprises 70–75 (probably more) monoecious and dioecious species with almost worldwide distribution. Many species are known as naturalized or occasional aliens far beyond their native ranges. Approximately the half (or more) of the species are native to the Americas, and the remaining ones to other continents where some of them are also used as ornamentals, food, and medicals and are able to escape from cultivation causing mainly economic impact to the agricultural systems (Costea et al. 2001; Hernández-Ledesma et al. 2015; Iamonico 2015a; Das 2016).

*Amaranthus* is a taxonomically critical genus from due to its high phenotypic variability and partly hybridization that caused nomenclatural problems and misapplication of the names (see e.g., Mosyakin & Robertson 1996; Costea et al. 2001; Iamonico 2015a, 2016b, 2017; Iamonico & Galasso 2018).

The flora of Europe includes ca. 43 *Amaranthus* species (Iamonico 2015b). *Amaranthus commutatus* was recorded by Iamonico (2015b) in Bulgaria only, on the basis of data by Asayov & Petrova (2006) who reported the species in four floristic regions, i.e. Danubian Plain, The Predbalkan (West and East) (North-West of Bulgaria) and Thracian Plain (Central-South of Bulgaria). Moreover, Iamonico (l.c.) indicated *A. commutatus* as “Preliminary accepted”, so indicating the need for further studies.

As part of the ongoing nomenclatural investigations on all names published in *Amaranthus*, I present here the tenth contribution that refers to *A. commutatus* A.Kern. The previous nine papers were on Linnaean names (Iamonico 2014a, 2014b), names linked to the Italian flora (Iamonico 2016a), *Amaranthus gracilis* Desf. and related names (Iamonico 2016b), Moquin-Tandon’s names published in Candolle’s Prodromus (Iamonico 2016c), names linked to the Australian flora (Iamonico & Palmer 2020), Willdenow’s names (Iamonico 2020a) the aggregate *Amaranthus polygonoides/A. anderssonii* (Iamonico 2020b) and Roxburgh's names (Iamonico 2020c).

Materials and Methods

The research was carried out by examination of original material and other specimens and/or their digital images in the herbaria B, BM, FI, G, GH, HFLA, K, LINN, MO, MPU, NY, P, PH, RO, US, W, and WU (herbarium codes are given according to Thiers 2020 [continuously updated]). Relevant literature (protologues included) was also analyzed. The ICN articles cited in the text refer to the Shenzhen Code (Turland et al. 2018).

Results and discussion

*Amaranthus commutatus* was originally described by Kerner (1875: 194) who provided a nomenclatural and taxonomic discussion about some names, i.e. *A. blitum var. polygonoides* Moq., *A. blitum var. prostratus* Fenzl, *A. prostratus* sensu
Sadler, *A. blitum* L. s.str., and *A. viridis* L., and a morphological comparison with the latter three species; habitats and provenance were also reported (“On sandy, salt-incrusted places near stagnant water, along river banks and on ruderal places close to settlements near Muzsla, Pest, Soroksar, Monor, Pilis Nagy Körös. 95—250 Meter”, translated from German). Note that all these localities are not located in Bulgaria (the only country in which *A. commutatus* is currently recorded; Iamonico 2015b), but they are part of southern Slovakia (Muzsla [currently Mužla]) and Hungary (all the other cited sites). Thus, at the current state of knowledge, *A. commutatus* would occur in Bulgaria, Hungary, and Slovakia.

Kerner (1875) placed *Amaranthus blitum* var. *polygonoides* Moq., *A. blitum* var. *prostratus* Fenzl, *A. prostratus* sensu Sadler in the synonymy of *A. commutatus* that was proposed for the plants occurring in Eastern Europe identified by Sadler [1826: 354, not page 454 as erroneously reported by Kerner (l.c.) (probably an orthographic error)] as *A. prostratus* [“Die Diagnose...Sadler....A. prostratus” (*A. commutatus* Kern)...”]. Sadler [1826: 354] given a description of *A. prostratus* Balb. reporting “Schult. Oest. Fl. I. 274”. Schultes (1814: 274-275), in turn, cited Balbis’s original reference of *A. prostratus* (“Balbis misc. Bot. t. 10”). Kerner (l.c) stated that *A. prostratus* (a name that he considered to be a synonym of *A. deflexus* L.1) is a ruderal plant of predominantly Mediterranean distribution that reaches in Western Europe to Angers and Paris but does not surpass the border of the Mediterranean region in Eastern Europe (up to the Austrian Hungary [former Austro-Hungarian Monarchy] at Canale in the Isonzo valley near Goerz, Triest and Fiume), while in Eastern Europe the species [as stated above, named by Sadler (1826) as *A. prostratus*], does not occur. Kerner (l.c) indicated that what Sadler identified as *A. prostratus* identified as *A. prostratus* is another species widely distributed in Southeastern Europe which is most closely related to *A. blitum* [a name that Kerner (l.c.) considered as synonym of *A. sylvestris* Desf.], from which *A. commutatus* differs in both vegetative [stem prostrate, leaves petioled, cuneate at the base, and wider] and generative (synflorescences leafless and arranged in terminal spikes, 3 tepals, and seeds with a blunt lateral keel) characters [(actually these morphological characters also occur in *A. deflexus* (= *A. prostratus* Balb.) (see e.g. Bayón 2015; Iamonico 2015a)]. Moreover, Kerner (l.c.) compared his new species with *A. viridis* [a name that Kerner (l.c.) referred to the Sadler’s *A. blitum*] highlighting that fruits in *A. commutatus* are dehiscent (vs. indehiscent in *A. viridis*). In conclusion, Kerner (l.c.) classified the Eastern Europe populations of *A. prostratus* sensu Sadler (1826: 354) as a different species which he named *A. commutatus*.

On the basis of the current concept in *Amaranthus* (e.g., Bao et al. 2003; Mosyakin & Robertson 2003; Bayón 2015; Iamonico 2015a), *A. commutatus* can be included in *Amaranthus* subgen. *Albersia* (Kunth) Gren. & Godr. (sensu Mosyakin & Robertson 1996; Iamonico 2015a). Concerning the European flora (Iamonico 2015b), the

---

1 The name *A. prostratus* (= *A. deflexus*) was lectotypified by iamonico (2016a: 527) on a Balbis’ illustration.
combination of the morphological characters of Kerner’s species cannot be observed, for subgen. *Albersia*, in any species with 3 tepals, and fruits dehiscent (see Tab. 1).

Out of Europe, only one taxon belonging to subgen. *Albersia* shows the combination of characters indicated by Kerner (1875), i.e. the Australian species *Amaranthus rhombeus* R.Br. (see e.g., Palmer 2009; Bayón 2015).

Unfortunately, no original material that can be used for lectotypification purpose [note that no holotype (see Art. 9.1 of ICN) was indicated by Kerner 1875: 194] was traced, and a neotypification would be possible (Arts. 9.3, 9.4, and 9.8 of the ICN). However, since the morphological data provided by Kerner (l.c.) cannot be associated with any European species of *Amaranthus* subgen. *Albersia*, it is very difficult to understand Kerner’s concept of *A. commutatus*. I have not been able to trace any specimen of *Amaranthus* that was seen by Kerner and labelled as *A. commutatus*. I found only a few exsiccate (at P, see https://science.mnhn.fr/institution/mnhn/collection/p/item/list?scientificName=Amaranthus+commutatus) collected in Hungary and identified as *A. commutatus* but those actually refer to *A. blitum* s.l. (pers. obs.), a species with indehiscent fruits (see Iamonico 2015a), not dehiscent as stated by Kerner (1875) in the protologue of his *A. commutatus*. Moreover, no useful Sadler’s specimen from E-Europe, which could be useful to understand the Kerner’s concept of his *A. commutatus*, was traced.

About 30 years later than Kerner (1875), Beck (1909: 179) placed Kerner’s taxon under *Amaranthus viridis* L., proposing the variety rank [as a new combination, i.e. *A. viridis* var. *commutatus* (A.Kern.) Beck]. However, Beck (l.c.) listed in synonymy the Moquin-Tandon’s *A. blitum* var. *polygonoides* which, according to the below discussion, is actually to be referred to *A. albus*. The Beck’s combination is to be considered as pro parte synonym of *A. commutatus* A.Kern.

Finally, Hayek (1956: 256–257) accepted the Kern’s taxon at species rank reporting it as morphologically similar to *Amaranthus sylvestris* Desf. from which would differ by the structure of the synflorescence, spike-like (*A. sylvestris* has axillary glomerules only according to Hayek 1956). On the basis of the Hayek’s diagnostic key, these two species are, in turn, different from *A. viridis* by the fruit (dehiscent vs. indehiscent in *A. viridis*) and the bracts (shorter than the perianth vs. as long as the tepals in *A. viridis*).

All in all, Kerner’s concept of *Amaranthus commutatus* appears to be ambiguous.

A further fact that proves the difficult in understanding Kerner’s *Amaranthus commutatus* concept is the cited synonym *A. blitum var. polygonoides* (Kerner 1875: 194). This variety (which name is still untyped; see Iamonico 2016c) was published by Moquin-Tandon (1849: 263), who provided a short diagnosis (“foliis minoribus obovatis obtusissimis”), the provenance (“In Hungaria prope Austriam ... India Orientali, Africa”), and references to herbarium specimens [“In Hungaria prope Austriae (DC!)” (one or more Candolle’s specimens), and “Amaranthus polygonoides herb. ampl. Cæt. Ind. Or. n. 6906, non Linn. (one Wallich’s specimen related to his Numerical list – Wallich (1832)]. These mentioned specimens are syntypes (Art. 9.6
of ICN) for Moquin-Tandon’s name *A. blitum var. polygonoides*. I traced a specimen at K (barcode K000195197) that bears three complete plants (with roots), and four parts of plants (i.e. terminal or lateral synflorescences), and two original labels reporting the following annotations: “6096 *Amaranthus polygonoides* L. | Hb. Wight”, and “8th Nov 1826 | 6906 | Fichionopoly [an Indian locality according to Kew database (http://apps.kew.org/herbcat/detailsQuery.do?barcode=K000195197)]”. The characters of leaves of K000195197 match Moquin-Tandon’s diagnosis and the specimen (plants part of the single gathering; see Art. 9.17 of the ICN) is here designated as the lectotype of the name *A. blitum var. polygonoides*. Based on the current concept in *Amaranthus* (e.g., Bao et al. 2003; Mosyakin & Robertson 2003; Bayón 2015; Iamonico 2015a) *A. blitum var. polygonoides* [proposed by Carretero (1984: 276) at subspecies rank of *A. blitum*] can be synonymized with *A. albus* L., especially for the bracts which are awned and are longer than the perianth in K000195197. Since *A. albus* displays syflorescences in axillary glomerules, never arranged in terminal spikes (as would occur in *A. commutatus* according to the protologue by Kerner 1875: 194), Kerner’s synonymy with Moquin-Tandon’s names is most probably incorrect. Note that synonymy between *A. albus* and *A. blitum var. polygonoides* have never been proposed before.


Finally, as regards another synonym cited by Kerner (1875: 194) — *Amaranthus blitum var. prostratus* — it was published by Fenzl (1851: 858) as a prostrate variety (β) of *A. blitum* with a short terminal synflorescences. Fenzl (l.c.) cited in synonymy “*Amaranthus blitum* LINN. ac auct. plum. partim”, “*A. blitum* var. α. (partim) β *polygonoides* et γ. *nanus* MOQ.-TAND. l. c. (l.us. foliis majoribus, minoribus obtusissimis rotundatis ac minutis fere oblongis), and “*A. prostratus* BAST. Fl. Main. et Loir. p. 344”. While *A. blitum* is currently considered as a good and distinct species (see e.g., Mosyakin & Robertson 2003, Iamonico 2015a), *A. blitum* var. (γ) *nanus*, and *A. blitum* var. (β) *polygonoides* are treated as synonyms of, respectively, *A. blitoides* S. Watson (see Iamonico 2016c: 91) and *A. albus* (see just above in the present paper). Concerning “*A. prostratus* Bast.”, this citation would refer to Flore du département de Maine et Loire by Bastard (1809: 344). Bastard (l.c.) listed
Tab. 1 Morphological characters of European species with 3 tepals, and fruits dehiscent that belong to *Amaranthus* subgen. *Albersia*. Different characters, as compared to *A. commutatus*, are underlined.

<table>
<thead>
<tr>
<th>Species</th>
<th>Stem</th>
<th>Leaves</th>
<th>Synflorescence</th>
</tr>
</thead>
<tbody>
<tr>
<td><em>A. commutatus</em></td>
<td>Prostrate</td>
<td>Elliptic to rhombic</td>
<td>Terminal spike-like</td>
</tr>
<tr>
<td><em>A. albus</em></td>
<td>Usually erect (rarely prostrate)</td>
<td>Ovate, elliptic to spathulate</td>
<td>Axillary glomerules</td>
</tr>
<tr>
<td><em>A. californicus</em></td>
<td>Prostrate</td>
<td>Linear to lanceolate, spathulate</td>
<td>Axillary glomerules</td>
</tr>
<tr>
<td><em>A. capensis</em></td>
<td>Prostrate</td>
<td>Ovate to elliptic</td>
<td>Axillary glomerules</td>
</tr>
<tr>
<td><em>A. dinteri</em></td>
<td>Decumbent to erect</td>
<td>Ovate-rhomboidal to lanceolate</td>
<td>Axillary glomerules, and terminal spike-like*</td>
</tr>
<tr>
<td><em>A. graecizans s.l.</em></td>
<td>Erect</td>
<td>Ovate, elliptic to spathulate</td>
<td>Axillary glomerules</td>
</tr>
<tr>
<td><em>A. thunbergii</em></td>
<td>Decumbent to erect</td>
<td>Ovate, lanceolate</td>
<td>Axillary glomerules, and terminal spike-like</td>
</tr>
<tr>
<td><em>A. tricolor</em></td>
<td>Erect</td>
<td>Ovate, lanceolate</td>
<td>Axillary glomerules, and terminal spike-like</td>
</tr>
</tbody>
</table>

* Only the subsp. *aschersonianus* (Thell.) Costea *et al.*

*A. prostratus* citing “Decand. Synops. 2283. bis.” which refers to Lamarck & Candolle’s Synopsis Plantarum (Lamarck & Candolle 1806: 199, marked as “2283**”). Lamarck & Candolle (l.c.), in turn, did not report any synonym, so his *A. prostratus* would appear as a new species. However Candolle, in the 2nd Edition of *Synopsis Plantarum* (Candolle 1828: 394), cited “*A. prostratus* (Balb. misc. p. 44. t. 10.)”. As a consequence, I can hypothesize that Lamarck & Candolle (1806: 199) also referred to Balbis’ *A. prostratus*, and not consider this species, in the 1st Edition of *Synopsis Plantarum*, as new. The citation “*A. prostratus* Bast.” by Fenzl (1851: 858) so could be referred to Balbis’ *A. prostratus*, the Fenzl’s variety can be interpreted as a new combination of Balbis’ name [*Amaranthus blitum var. prostratus* (Balb.) Fenzl], and has the same type as the name proposed by Balbis (Tab. 10 in Balbis 1804; see Iamonico 2016a). *A. prostratus* is currently considered as a synonym of *A. deflexus* L. (Iamonico 2016a: 527).


= *Amaranthus prostratus* Bellardi ex Balbis, Misc. Bot.: 44. 1804 ≡ *Amaranthus blitum var. prostratus* (Balb.) Fenzl in Ledebour, Flora Rossica 3(2): 858. 1851, excl. syn. *A. blitum var. (γ) nanus* (= *A. blitoides* S. Watson), and *A. blitum var. (β) polygonoides* (= *A. albus*).

Conclusions

*Amaranthus commutatus*, a species currently recorded in Bulgaria only (Iamonico 2015b), was originally described by Kerner (1875: 194) from the territory of Hungary and Slovakia.

The combination of morphological characters provided by Kerner (1875: 194) to characterize *Amaranthus commutatus* (which clearly belongs to subgen. *Albersia* sensu Mosyakin & Robertson 1996) cannot be observed in any European species with 3 tepals, and fruits dehiscent (see Tab. 1), while out of Europe, it could be associated to the Australian *A. rhombeus* only (see e.g., Palmer 2009).

The synonyms cited by Kerner (1875: 194), i.e. *Amaranthus blitum* var. *polygonoides* Moq. and *Amaranthus blitum* var. *prostratus* (Balb.) Fenzl, refer, respectively, to *A. albus* (new synonymy proposed in the present paper) and *A. deflexus* (see Iamonico 2016a: 527), which are two currently accepted species that cannot be associated with *A. commutatus* based on Kerner’s description (see Tab. 1 for *A. albus*, while *A. deflexus* differs from *A. commutatus* in having fruits indehiscent).

*Amaranthus commutatus* was very rarely cited in literature, and I found only a few references, most of which are the recent Databases [IPNI 2008+; Marhold & Hindák 2018 (sub *A. lividus* L. subsp. *ascendens* (Loisel.) Soó = *A. blitum*); Lucian et al. 2018; Tropicos 2018+]. Note that WCSP (2018), based on Govaerts (1995), listed *A. commutatus* as an accepted species native to Australia (Queensland). Palmer (2009) did not cite *A. commutatus* in his Conspectus of Australian amaranths, and she reported 18 taxa as occurring in Queensland [*A. blitum*, *A. caudatus* L., *A. centralis* J.Palmer & Mowat, *A. cochleitepalus* Domin, *A. cuspidifolius* Domin, *A. dubius* Mart. ex Thell., *A. graecizans* L. subsp. *silvestris* (Vill.) Brenan, *A. grandiflorus* (J.M. Black) J.M. Black, *A. hybridus* L., *A. interruptus* R.Br., *A. macrocarpus* Benth. S.la., *A. mitchelli* Benth., *A. retroflexus* L., *A. rhombeus* R.Br., *A. spinosus* L., *A. tricolor* L., *A. undulatus* R.Br., *A. viridis* L.], all being morphologically different from *A. commutatus* as described by Kerner (1875: 194) except *A. rhombeus*. It is not clear why WCSP (2018) reports *A. commutatus* as an accepted and Australian native species. Anyway, *A. rhombeus* was never recorded in Europe (see e.g., Iamonico 2015b) and it is unlikely that *A. commutatus* could be considered as an its heterotypic synonym. Unfortunately, just the Kerner’s morphological data do not allow to verify this fact.

Note, however, that Kerner (1875: 194) considered *Amaranthus sylvestris* as synonym of *A. blitum*, a species that Kerner (l.c.) reported as the most closely related to his *A. commutatus*. The Desfontaines’ *A. sylvestris* is a nomen nudum and not validly published (Arts. 38.1 and 38.2 of ICN) and it is actually referable to *A. graecizans* subsp. *sylvestris* (Vill.) Brenan (see e.g., Iamonico 2015a). The nomenclatural history of the Linnaean *A. blitum* is very complicated (see e.g., Iamonico & Das 2014: 294-295) and various authors, especially in the past, considered the taxon *sylvestris* as an its synonym—as made by Kerner l.c.—or, in other cases, as a variety (e.g., Hooker 1885: 721). The association *sylvestris*-*blitum* by Kerner (l.c.) is a further example of the nomenclatural and taxonomic confusion
that is related to the *A. blitum* group. Anyway, even if we considered the Kerner’s concept of *A. blitum* as the same of *A. graecizans* subsp. *sylvestris*, this latter taxon cannot be ascribed to *A. commutatus* (see Tab. 1).

All things considered, the treatment of *Amaranthus commutatus* appears inconsistent. However, this fact is not the reason for rejecting of the name since it does not threaten any other name [e.g., the possible synonymy with *A. rhombeus*, a species published earlier than *A. commutatus* (1810 vs. 1875) and so having nomenclatural priority] and thus no disadvantageous nomenclatural changes are expected (Art. 56.1 of the ICN). The failure to properly designate a lectotype or a neotype, and the impossibility to reject *A. commutatus* according to the ICN, causes the continued ambiguous nature of Kerner’s name and results in listing it as an unresolved name of uncertain identity and affinity (a name incertae sedis).


**References**


Iamonico D. (2014b): Amaranthus gangeticus (Amaranthaceae), a name incertae sedis. – Phytotaxa 162(5): 299–300. http://dx.doi.org/10.11646/phytotaxa.162.5.2


doi.org/10.12705/Code.2018

Wallich N. (1832): Numerical list of dried specimens of plants in the Museum of the Honl. East India Company /which have been supplied by Dr. Wallich, superintendent of the botanic garden at Calcutta. – London, 306 pp.


Received: March 27th 2020
Revised: August 4th 2020
Accepted: September 7th 2020