

HOW REALLY EXTENSIVE IS THE ORIGINAL MATERIAL OF *JUNCUS KOCHII* (JUNCACEAE)? – A TAXONOMIC AND NOMENCLATURAL REVISION

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ABSTRACT

The identity of the original material of *Juncus kochii* F. W. Schultz (Juncaceae) is discussed. The taxon at present is best regarded as *Juncus bulbosus* L. subsp. *kochii* (F. W. Schultz) Reichg. The relevant literature (protologue and references therein) was searched and details of all original elements were compiled. Nomenclatural and taxonomic remarks are given. *Juncus welwitschii* Hochst. ex Steud. is here excluded as a synonym of *Juncus bulbosus* subsp. *kochii*.

KEY WORDS: bulbous rush, Juncaceae, *Juncus bulbosus*, *Juncus bulbosus* subsp. *kochii*, *Juncus kochii*, *Juncus welwitschii*, nomenclature, original material, typification.

INTRODUCTION

The paper forms a part of the ‘*Juncus bulbosus* Synonyms Typification Project’ (e.g., Proćków 2002, 2006a-c, 2007, 2008a, b), aimed at clarifying the complicated nomenclature (synonymy) within this extremely variable taxon (because of the high morphological diversity of the bulbous rush, there exist about 60 synonyms). *Juncus kochii* F. W. Schultz and *J. supinus* Moench var. *nigritellus* W. D. J. Koch were lectotypified recently as homotypic (Proćków 2006a). At present they are best regarded as *Juncus bulbosus* L. subsp. *kochii* (F. W. Schultz) Reichg. (see e.g., Casper and Krausch 1980; Proćków 2006a).

It should be noted that *Juncus kochii* was treated as a substitute for “*J. nigritellus* W. D. J. Koch non D. Don” but Koch (1837) clearly cited Don without the intention of publishing a new name (Kirschner 2002). In this situation there was no evidence for the existence of the name *J. nigritellus* W. D. J. Koch (1837) non D. Don. Moreover, Schultz also (1855) did not mention in the *J. kochii* protologue Koch’s validly published illegitimate junior homonym – *J. supinus* var. *nigritellus* W. D. J. Koch, 1844 *nom. illeg.* [non (D. Don) F. W. Schultz, 1840] but only his own misapplication of Don’s epithet at varietal rank (i.e. a new combination based on D. Don’s name [= *J. supinus* var. *nigritellus* (D. Don in J. E. Smith, 1831) F. W. Schultz, 1840

= *J. supinus* var. *nigritellus* (D. Don ex Macreight, 1837) F. W. Schultz, 1840 = synonym of *J. articulatus* L. subsp. *articulatus*], though erroneously applied to Koch’s taxon – cf. Art. 7.4 of the *ICBN* and see Proćków 2006a, b, 2007). Consequently, Art. 7.3 (Greuter et al. 2000) did not apply and only Schultz’s own material was relevant for typification (Proćków 2006a).

The discussion on the original Schultz’s material of *J. kochii* is introduced here because: (1) there were many controversies connected with the material earlier (i.e. which specimens are or are not the types), and (2) these significant data had been not included within my recent papers (Proćków 2006a,b). Thus the relevant literature (protologue and references therein) was searched and details of all original elements were compiled. Namely a few localities/collections are mentioned in the protologue of *J. kochii*, and these specimens can, therefore, be regarded as original material (italic: after Schultz’s indirect reference to his “Fl. d. Pfalz”, 1846):

- (a) nur in den kältesten Gegenden an den nördlichen Abdachungen der Wasserscheide des Vogesensandsteingebirgs und zwar am Ursprunge der nach Westen (der Blies, Saar und Mosel zu) fliessenden Bäche;
- (b) an einem sumpfigen Waldabhänge zwischen dem Stüderhofe und dem Dorfe Mölschbach, 2 Stunden

von Kaiserslautern (seit Koch) zwischen Sphagnum und Hypnum oft mit *Lysimachia nemorum*, *Blechnum spicant*, *Osmunda regalis*;

- (c) und am Fusse dieser hohen waldigen, nach Norden gerichteten Bergabhänge auf einer moosigen Moorwiese!;
- (d) so wie eine Stunde weiter in den waldigen Bergthälern hinter Trippstadt, beim Lauberhof und beim Johanniskreuz.

The localities (and, consequently, also the original material) are thus more numerous than reported by Kirschner (2002: 162) – he cites only ‘zwischen d. Stüderhofe u.d. Dorfe Mölschbach 2 Stunden v. Kaiserslautern’ (Pročków 2006a).

Schultz (1855) cites, besides, the following references to earlier publications:

1) '*J. nigrifellus* Koch [1837] non Don', where only one locality is given: "In sylvarum mont[us]osarum locis uliginosis, (an einem sumpfigen Waldabhänge zwischen d. Stüderhofe u. d. Dorfe Mölschbach 2 Stunden v. Kaiserslautern v. mir selbst, aber mit unreifen Kapseln, gefunden)";

2) '*J. supinus* δ *nigrifellus* F. S. in Flora bot. Zeit. 1840, p. 640', with the locality "im Torfmoore zu Bitsch" (but see Pročków 2006b);

3) 'Fl. d. Pfalz' [Schultz 1846], where, compared to Schultz's later paper (1855) only after Blies stream, rivers Saar and Mosel are added (see above point a), and additional epithets for the locality for point c ("am Fusse dieser hohen waldigen, nach Norden gerichteten Bergabhänge auf einer moosigen Moorwiese!"). Furthermore, other, additional references are given here ('F. S. Arch. de la Fl. pag. 62', 'Fl. G. et G. exs., add. au 56 de la 4^e Cent.', '*Juncus nigrifellus* Koch, F. S. Fl. G. et G. exs. 356 [it should be: 'exs. 56' – see Pročków 2006b]'), while the remaining ones are repeated as in other bibliographic positions cited by Schultz.



Fig. 1A. Original material of *Juncus kochii* gathered by F. W. Schultz near Mölschbach (Germany) in 1843 – plants from the herbarium sheet L 106430 ex Herb. W. D. J. Koch! (photo by the author).

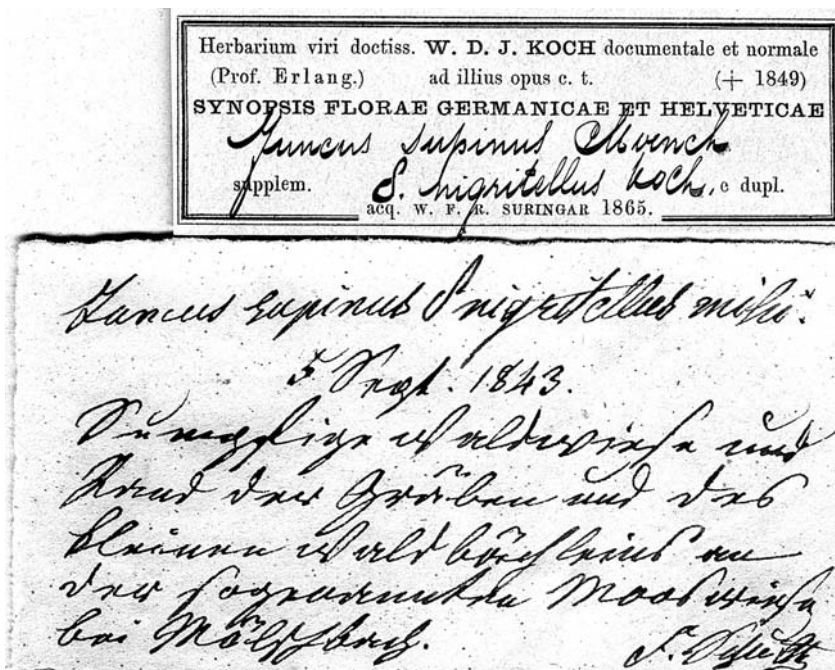


Fig. 1B. Schultz's gothic handwriting label (in German) and W. D. J. Koch's herbarium printed label – both from the herbarium sheet, which was subsequently acquired by W. F. R. Suringar in 1865 (L 106430! – photo by the author).

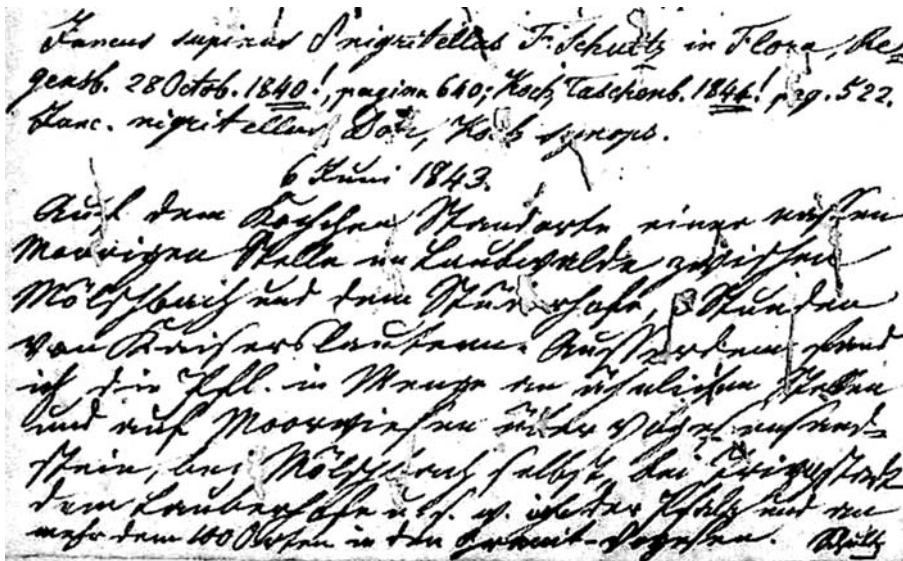


Fig. 2. Schultz's gothic handwriting label from the herbarium sheet RB 180551 partly damaged by pest insects (photo sent by Jardim Botânico do Rio de Janeiro, Herbário, Brasil).

Based on the detailed taxonomic analyses, Schultz's herbarium material from the environs of Bitche (Moselle, Lorraine) and Gérardmer (Vosges, Lorraine) – both in France (i.e., a major part of the material mentioned within points 2 and 3, above), was critically formerly discussed and has been rejected as useless for typification of *J. kochii* because of taxonomic reasons, though it was listed both in the protologue and also as indirect references therein Schultz's earlier publications (Pročków 2006b).

THE ORIGINAL HERBARIUM MATERIAL EXAMINED

with detailed localities and original determinations is as follows:

[Abbreviation: HK – “Herbarium viri doctiss. W. D. J. Koch [Prof. Erlang., †1849] documentale et normale ad illius opus c. t. Synopsis Florae Germanicae et Helveticae. acq. W. F. R. Suringar 1865.”]

Germany (Rhineland-Palatinate):

- A) Auf Ihrem Standorte beim Stüderhof von H.[ern] Böhmer gesammelt und mir mitgetheilt [Schultz's handwriting]. July 1838, HK, *Böhmer/Schultz?* [see comments below] (L 106429 ex Herb. W. D. J. Koch!) – *Juncus nigritellus* [7 plants] – Fig. 1 and 2 in Pročków 2007;
- B) Sumpfige Waldwiese und Rand der Gräben und des kleinen Waldbächleins an der sogenannten Mooswiese bei Mölsch-

bach. 5 Sep 1843, HK, F. Schultz (L 106430 ex Herb. W. D. J. Koch!) – *Juncus supinus* δ *nigritellus* mihi [2 plants] – Fig. 1A and B;

- C) Auf dem Kochschen Standorte einer nassen moorigen Stelle im Laubwalde zwischen Mölschbach und dem Stüderhofe, 3 Stunden von Kaiserslautern. Ausserdem fand ich die Pfl.[anze] in Menge an ähnlichen Stellen und auf Moorswiesen über Vogesensandstein, bei Mölschbach selbst, bei Trippstadt dem Lauberhofe u. s. w. in der Pfalz und an mehr denn 100 Orten in den Granit-Vogesen. 6 June 1843, Schultz (RB 180551, photo seen) – *Juncus supinus* δ *nigritellus* F. Schultz [6 plants] – Fig. 2;
- D) Côte merécageuse dans les bois des montagnes, du grès vosgien, à Moelschbach, près Kaiserslautern. 28 July 1828 [prob. 1838! – see comments below], Flora Galliae et Germaniae exsiccata – 4^e Cent., *Boehmer, No. 55, Schultz misit Jan 1841* (K ex Herb. J. Gay! – bottom left part of the sheet) – *Juncus nigritellus* Don, Engl. bot. suppl. t. 2643, K. Syn. 730 [2 plants] – Fig. 3;
- E) Sumpfige Stellen sowohl im Walde als in Moorswiesen bei Mölschbach und Trippstadt gemein. [add. remark in red on the label:] Autographen F. Schulzii. 6 July 1843, F. Schultz (BM 792845 ex Herb. R. J. Shuttleworth!) – *Juncus nigritellus* Don [the name erased], *Juncus supinus* δ *nigritellus* F. Schultz, *Juncus kochii* F. Schultz [1 plant] – Fig. 4A and B;
- F) [En fleurs] Endroit marécageux d'une côte dans les forêts sur le grès vosgien près de Moelschbach, aux environs de Kaiserslautern. [En fruits] Marais tourbeux sur le grès vosgien dans la vallée entre Trippstadt et le Johanniskreuz, aux environs de Kaiserslautern. 6 July 1843 [en fleurs], 5 Sep 1843 [en fruits], Flora Galliae et Germaniae exsiccata, Add. au n° 56 de la 4^e cent., F. Schultz, No. 56 (M 10234!; HAL 86172!; B!; L^I 106418!; L^{II} 106426 ex Herb. Hasskarl!; K ex Herb. J. Gay!; JE!; G^I 13213 ex Herb. Delessert!; G^{II} 13214 ex Herb. de Candolle!; P^I 403941 ex Herb. Grenier! – Fig. 5; P^{II} 494149 ex Herb. E. Cosson!; NCY ex Herb. Soyer-Villemet, photo seen) – *Juncus supinus* δ *nigritellus* F. Schultz in Flora, bot. Ztg. 1840, p. 640; *J. nigritellus* Don; K. Syn. 730 [M – 6 plants, HAL – 6, B – 7, L^I – 3, L^{II} – 3, K – 7, JE – 4, G^I – 6, G^{II} – 8, P^I – 6, P^{II} – 9, NCY – 4].

Flora Galliae et Germaniae exsiccata. — 4^e Cent.

55. JUNCUS NIGRITELLUS, Don. Engl. bot. suppl. t. 2643; K. Syn. 750.

28 Juillet 1828.

Côte marécageuse dans les bois des montagnes, du grès vosgien, à Moelschbach, près Kaiserslautern;

déc. Koch, rec. Böhmer. *Schultz misit Janvier 1841.*

Fig. 3. Exsiccate printed label from the herbarium of J. Gay (K! – bottom left part of the sheet) with: (1) the proof that the specimen was certainly examined by F. W. Schultz, and (2) probably an erroneous year of collection – see Discussion (photo by the author).

DISCUSSION

In the case of *J. kochii* it is important that Schultz (1855) provided its new diagnosis (not cited directly from earlier



Fig. 4A. Original material of *Juncus kochii* collected by F. W. Schultz between Mölschbach and Trippstadt (Germany) in 1843 – the plant from the herbarium sheet BM 792845 ex Herb. R. J. Shuttleworth! (photo by the author).



Fig. 5. Isosytype printed label from the herbarium of J. Ch. M. Grenier (P 403941!) where it is stated that the exsiccate sheet contains a mixed material from two localities and besides collected by F. W. Schultz on different dates, with no possibility to assign precise localities to particular plants – see Discussion (photo by the author).

(‘Peren.’) and the habitat (‘gewöhnlich zwischen faulem Laube, faulem Nadeln, *Sphagnum* oder *Hypnum*’), as well as the fact that additional localities were listed, mean that it is not a *nomen novum* for *Juncus supinus* var. *nigritellus* W. D. J. Koch, *nom. illeg.* with which it was therefore not necessarily homotypic! Thus the name *Juncus kochii* was validly published, the species was clearly described, and the original material was specified by the author. But as recently lectotypification was made (Pročków 2006a) both names (*J. kochii* F. W. Schultz and *J. supinus* var. *nigritellus* W. D. J. Koch) just now are homotypic indeed.

Therefore there are 17 herbarium specimens, i.e., 6 specimens and 11 duplicates (not 16 as stated in Pročków (2006a), because the additional duplicate of Schultz’s exsiccate No. 56, Add. – P 494149 ex Herb. E. Cosson – has been found). They appear to represent original material and the most of them fit well with Schultz’s description and reflect well his concept of *J. kochii* and the current application of the epithet, except for F. Schultz, No. 56, Add. from JE, where both top plants and the bottom left plant have green perianths and the same situation is for F. Schultz, No. 56, Add. from K (ex Herb. J. Gay), where the top second plant from the left has green perianths as well (see also remarks on G 13214-sheet, below). Namely, in

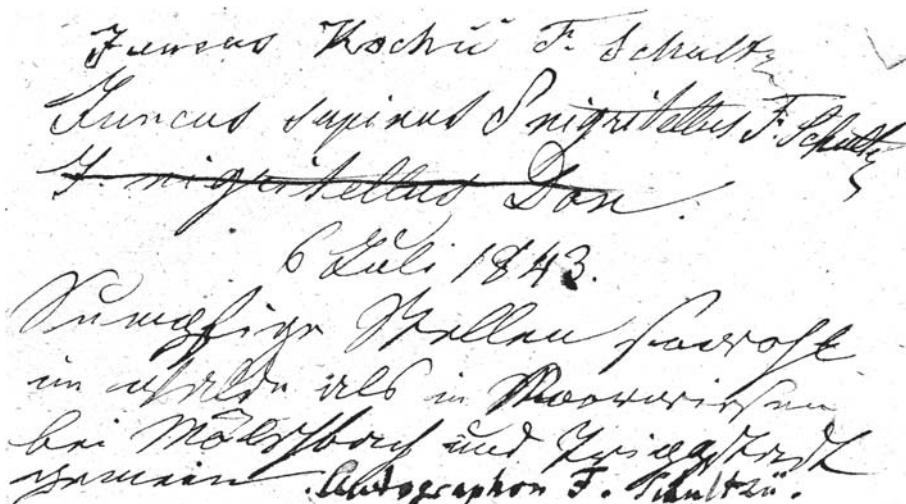


Fig. 4B. Schultz’s gothic handwriting label from the herbarium sheet which was subsequently acquired by R. J. Shuttleworth, with: (1) the additional remark (in red) on the label: “Autographen F. Schulzii”, and (2) the erased name “*Juncus nigritellus* Don” as incorrect – see Introduction (BM 792845! – photo by the author).

works – see Introduction). Its existence (as a narrowed and slightly modified set of characters), combined with additional information on the flowering time (besides July, additionally June was mentioned), durability of the life form

the protologue Schultz (1855) states that flowers of rushes are usually lighter when the plants grow in cooler or shaded places. Schultz was, however, convinced that such habitat conditions had no effect on the perianth colour in *J.*

kochii (it should be always 'dark, usually black-red or violet-brown'). But my recent taxonomic revision of the diagnostic features of *J. bulbosus* subsp. *kochii* showed that the taxon also can have greenish or green perianth segments (Proćków 2008a). The information from herbarium labels, on the location of the localities and the habitat of the examined specimens was not in disagreement with the protologue as well. Comparative characters, based on the protologue of *Juncus kochii*, between *J. bulbosus* subsp. *kochii* and subsp. *bulbosus* in the floral and fruit characters are shown in the Table 1 in Proćków (2006a).

Specimen and his duplicates from 'Fl. Gall. & Germ. Exsicc., Add. au n° 56 de la 4^e cent.' (listed as F, above) contain a mixed material from two localities i.e. neighbourhood of Mölschbach and Trippstadt and Johanniskreuz (besides, collected on different dates), with no possibility to assign precise localities to particular plants (Fig. 5). However, almost the whole collection is in agreement with the protologue except the top middle and top right plants of G 13214, with characters that disagree with the diagnosis – the specimens do not represent subsp. *kochii* (and it should as well be noted that such information was not stated in Proćków 2006a, wherein *J. kochii* was recently lectotypified). In the situation it is also important that the discussed specimens of the collection have to be regarded as isosyntypes because they are really cited as specimens (not locality data) in the indirect reference in 'Fl. d. Pfalz' [Schultz 1846], i.e. as 'Fl. G. et G. exs., add. au 56 de la 4^e Cent.' (see point 3, above). In turn, the herbarium specimens of residual original material of *J. kochii* (listed as B-E, see above) are not syntypes because in fact they are not cited in the protologue as specimens, only locality data (cf. McNeill et al. 2006: Art. 9.4). However, in my opinion in the particular case, the whole original material (listed as B-F, i.e., both the specimens are isosyntypes or not) have equal rights to be selected as lectotype of *J. kochii* in a subsequent lectotypification, if actual recently designated type would have been lost or destroyed in the future (but compare McNeill et al. 2006: Art. 9.10). Namely the residual original material (listed as B-E) is not mixed (plants are collected in one given locality) while isosyntypes are (see above).

The specimen, Fl. Gall. & Germ. Exsicc. No. 55 from K (bottom left part of the sheet), though collected by Böhmer (see also below), can be regarded as original material, since it was certainly examined by Schultz (note on the label: 'Schultz misit Jan 1841' – Fig. 3). The sheet probably contains also an erroneous year of collection (though not necessarily, since the plants for the exsiccate could have been collected much earlier): 1838 seems more likely than 1828, as suggested by: (1) No. 56 of 4th Cent. of the Fl. Gall. & Germ. Exsicc. (plants from this sheet were collected on 28 Jun 1839) and (2) the reference 'K. Syn. 730' [Koch, Syn. Fl. Germ. Helv. 730 (1837)] on the herbarium label (Fig. 3).

In turn, lectotype of *J. kochii* (and of *J. supinus* var. *nigritellus* accordingly) is the specimen L 106429 (see Figures 1 and 2 in Proćków 2007). Schultz obtained the plants from the sheet also from Böhmer (he did not collect them himself – see above), but an additional, narrow, probably later added label bears information '*supinus nigritellus* Schultz legit' (see Figure 2 in Proćków 2007).

Furthermore, the names *J. kochii* and *J. welwitschii* Hochst. ex Steud. are often treated as synonymous (e.g., by Lindberg 1933 or Rothmaler & all. 1986, who both most likely had never seen any type material of the taxa). But only one sheet/plant of the whole original material of *J. welwitschii* (G 12606 ex Hb. Delessert) really belongs to *J. bulbosus* subsp. *kochii* (Proćków 2006c). So *J. welwitschii* should be excluded from the synonymy of *J. kochii* what may be summarized thus:

***Juncus bulbosus* L. subsp. *kochii* (F. W. Schultz) Reicheg.** in S. J. van Ooststroom & al., Fl. Neerl. 1 (6): 189. 1964. = *Juncus kochii* F. W. Schultz, Jahresber. Pollichia 13: 32. 1855. = *Juncus supinus* Moench var. *kochii* (F. W. Schultz) Syme, Engl. Bot., ed. 3B (10): 33. 1870. = *Juncus supinus* subsp. *kochii* (F. W. Schultz) Nyman, Consp. Fl. Eur. 748. 1882. = *Juncus supinus* race *kochii* Rouy, Fl. France 13: 244. 1912. = *Juncus supinus* var. *nigritellus* W. D. J. Koch, Syn. Fl. Germ. Helv., ed. 2 (2): 843. 1844, nom. illeg. (non (D. Don) F. W. Schultz, 1840).

LECTOTYPE (designated by J. Proćków, 2006a: 790): [Rhineland-Palatinate, SW Germany] "Auf Ihrem Standorte beim Stüderhof von H.[errn] Böhmer gesammelt und mir mitgeteilt" [Schultz's handwriting], Jul 1838, "*Juncus nigritellus*", Böhmer/F. W. Schultz? – L 106429 ex Herb. W. D. J. Koch! (Figs 1 and 2 in Proćków 2007).

Isosyntypes: M 10234!; HAL 86172!; B (Schultz 56, Add.); L 106418!; L 106426 ex Herb. Hasskarl!; K ex Herb. J. Gay (Schultz 56, Add.); JE (Schultz 56, Add.); G 13213 ex Herb. Delessert!; G 13214 ex Herb. de Candolle (except the top middle and top right plants!); P 403941 ex Herb. Grenier! (Fig. 5); P 494149 ex Herb. E. Cosson!; NCY ex Herb. Soyer-Villemet (Schultz 56, Add.), photo seen [i.e. duplicates listed as F, above].

Residual original material of *J. kochii*: L 106430 ex Herb. W. D. J. Koch! (Fig. 1A and B); RB 180551, photo seen (Fig. 2); K ex Herb. J. Gay (Boehmer 55)! – bottom left part of the sheet (Fig. 3); BM 792845 ex Herb. R. J. Shuttleworth! (Fig. 4A and B) [i.e. specimens listed as B-E, above].

SYNONYM EXCLUDED HERE: *Juncus welwitschii* Hochst. ex Steud., Syn. Pl. Glumac. 2: 304. 1855. = *Juncus supinus* Moench var. *welwitschii* (Hochst. ex Steud.) Cout., Bol. Soc. Brot. 8: 106. 1890. = *Juncus supinus* subsp. *welwitschii* (Hochst. ex Steud.) K. Richt. Pl. Eur. 1: 180. 1890. = *Juncus bulbosus* L. f. *welwitschii* (Hochst. ex Steud.) Soó, Acta Bot. Acad. Sci. Hung. 16 (3-4): 366. 1971. HOLOTYPE: Portugal. "In arena humida ad ripam Tagi sinistram. June 1840" F. M. J. Welwitsch 324 (P!). Isotypes: TUB 11144!, K!, FI 185300, photo seen. Isosyntype: SW Portugal, prov. Setúbal. "In Extremaduræ transtagaræ humidis arenosis intra Coína & Azeitão rarius. 20 June 1840" F. M. J. Welwitsch 324 (LISU-P7749!; Fig. 1 in Proćków 2006c). Isotype or isosyntype: W, not seen.

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