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Nomenclatural and taxonomic notes on *Jacobaea borysthenea* (*Asteraceae*) and some related taxa

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Abstract. Following our recent lectotypification (with a specimen from G-DC) of the name *Senecio praealtus* Bertol. var. *borystheneus* DC. validated by de Candolle based on Andrzejowski's and Besser's specimens from Ukraine, we provide here information on additional original specimens of that taxon (KW: Besser and Turczaninow historical collections), which is now recognized as *Jacobaea borysthenea* (DC.) B.Nord. & Greuter and which was until recently widely accepted as *Senecio borystheneus* (DC.) Andr. ex Czern. (*Asteraceae*). In particular, there are two isolectotypes in KW collected by Andrzejowski near Kyslyakivka (now Lymany, Mykolayiv Region, Ukraine), as well as some other specimens collected near Zaporizhzhya (Andrzejowski) and in southern Podolia (Besser and/or Andrzejowski). Some related Eastern European taxa of the taxonomically complicated *Jacobaea vulgaris* Gaertn. (= *Senecio jacobaea* L.) aggregate and misapplied names are discussed as well. The identity of the name *Senecio divaricatus* Andr. (*nom. illeg.*, non L.) is clarified; it is a synonym of *Jacobaea borysthenea*. It is also confirmed that *Senecio podolianus* Panigrahi is an illegitimate replacement name for *S. borystheneus*. *Jacobaea borysthenea* seems to be closely related to *J. andrzejowskyi* (Tzvelev) B.Nord. & Greuter and *J. vulgaris* subsp. *pannonica* Hodálová & Mered'a; the two latter taxa morphologically differ from *J. borysthenea* but are very similar to each other and may be even conspecific. Further studies are needed for clarifying the complex evolutionary and biogeographical patterns within the *J. vulgaris* aggregate in Eastern Europe and adjacent areas.

Keywords: *Asteraceae*, herbarium, *Jacobaea*, nomenclature, *Senecio*, taxonomy, Ukraine

Supplementary Material. Electronic Supplement (Figures E1–E4, e1–e4) is available in the online version of this article at: <https://ukrbotj.co.ua/archive/76/6/473>

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Реферат. На доповнення до нещодавно проведеної нами лектотипіфікації назви *Senecio praealtus* Bertol. var. *borystheneus* DC. (зразок з гербарію G-DC), що була запропонована О.П. де Кандоллем на основі зразків А.Л. Анджейовського та В.Г. Бессера з України, ми подаємо тут інформацію про додаткові оригінальні зразки цього таксона (KW: історичні гербарні колекції Бессера та Турчанінова), який зараз розглядається як *Jacobaea borysthenea* (DC.) B.Nord. & Greuter, а донедавна широко визнавався як *Senecio borystheneus* (DC.) Andr. ex Czern. (*Asteraceae*). Зокрема, у гербарії KW виявлено два ізолектотиби, зібрані Анджейовським біля Кисляківки (зараз Лимани, Миколаївська область, Україна), а також деякі інші зразки, зібрані біля Запоріжжя (Анджейовський) та на півдні Поділля (Бессер та/або Анджейовський). Обговорені деякі споріднені східноєвропейські таксони зі складу систематично складної групи *Jacobaea vulgaris* Gaertn. (= *Senecio jacobaea* L.) agg., а також назви, що були невірно застосовані до нашого таксона. Прояснено таксономічний статус *Senecio divaricatus* Andr. (*nom. illeg.*, non L.): ця назва є синонімом *Jacobaea borysthenea*. Підтверджено, що *Senecio podolianus* Panigrahi є незаконною назвою, помилково запропонованою на заміну *S. borystheneus*. Ймовірно, що вид *Jacobaea borysthenea* близько споріднений з *J. andrzejowskyi* (Tzvelev) B.Nord. & Greuter та *J. vulgaris* subsp. *pannonica* Hodálová & Mered'a; два останні морфологічно відмінні від *J. borysthenea*, але дуже подібні між собою, а може й належать до одного й того ж виду. Потрібні подальші дослідження для виявлення складної еволюційної та біогеографічної картини у межах видового комплексу *J. vulgaris* agg. у Східній Європі та на прилеглих територіях.

Ключові слова: *Asteraceae*, *Jacobaea*, *Senecio*, гербарій, номенклатура, систематика, Україна

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Introduction

The present nomenclatural and taxonomic contribution is a continuation of our earlier publications on East European taxa of the species aggregate of *Jacobaea vulgaris* Gaertn. (= *Senecio jacobaea* L.) (see Mosyakin, Yena, 2017; Mosyakin, 2018 dated "2017"; Mosyakin et al., 2019). In particular, in our recent article (Mosyakin et al., 2019) we designated the lectotype for *Senecio praealtus* Bertol. var. *borysthenticus* DC., the basionym of the currently accepted name *Jacobaea borysthentica* (DC.) B. Nord. & Greuter, but some nomenclatural and taxonomic details and considerations on that species remained beyond the scope of our short nomenclatural note. These additional details and considerations are provided below.

Senecio borysthenticus (DC.) Andr. ex Czern. (originally described as *S. praealtus* Bertol. var. *borysthenticus* DC.: see de Candolle, 1838 dated "1837") was widely and readily recognized as a species in many East European taxonomic treatments, floras and identification manuals (Gruner, 1869 dated "1868"; Taliev, 1935; Stankov, Taliev, 1949; Schischkin, 1961 [English translations: Shishkin, 1995; Schischkin, 2000]; Minderova, 1962; Privalova, 1969; Chater, Walters, 1976; Tzvelev, 1986; Katina, 1987; Konechnaya, 1994; Mosyakin, Fedoronchuk, 1999; Kucherevskiy, 2004; Tarasov, 2012; etc.). The species-rank combination in *Senecio* was validated by Czerniaëw (1859: 32) by indirect reference, as *Senecio* "748. Borysthenticus. Andr. Ch. In arenosis", where "Ch." means "Charkovia" (Kharkiv) (see details in Mosyakin et al., 2019).

In earlier literature that taxon was often recognized as a variety, *S. jacobaea* var. *borysthenticus* (DC.) Trautv. (Trautvetter, 1854, 1855; Schmalhausen, 1886, 1897; Rogowicz, 1869), or as *S. praealtus* var. *borysthenticus* (e.g., Ledebour, 1845), but the authorship of the first variety was cited differently in various publications. We confirmed (Mosyakin et al., 2019) that the variety-rank combination has been validated by Trautvetter (1854), not by Gruner (1869 dated "1868") or Schmalhausen (1886). Andrzejowski (1862), being probably unaware of the article by Trautvetter (1854), used the same variety name, as "*S. Jacobaea* var. *borysthenticus* Andr.". However, his text of 1862 is in need of a more thorough analysis, which is provided below.

Recently Ciocârlan (2009: 815) proposed the subspecies-rank combination, *Senecio jacobaea* L. subsp. *borysthenticus* (DC.) Ciocârlan (*comb. inval.*,

sine basion.). However, keeping this taxon in the genus *Senecio* is not in accordance with new phylogenetic data and the currently accepted taxonomic delimitation of genera in *Senecioneae* (see Pelser et al., 2007; Nordenstam et al., 2009, etc.).

Molecular phylogenetic studies demonstrated that *Jacobaea* Mill. (validated by Miller, 1754) deserves recognition as a separate genus quite distant phylogenetically from *Senecio* L. *sensu stricto* (Pelser et al., 2002, 2004, 2007, 2010; Nordenstam, 2007; Nordenstam et al., 2009, etc.), and because of that *S. borysthenticus* was transferred to *Jacobaea* as *J. borysthentica* (DC.) B. Nord. & Greuter (in Greuter, Raab-Straube, 2006), together with many other taxa earlier treated in *Senecio* (see relevant nomenclatural actions in Pelser et al., 2006; Nordenstam, 2006; Greuter, Raab-Straube, 2006, 2007; Verloove, Lambinon, 2011; Mosyakin, Yena, 2017, etc.). The name *Jacobaea borysthentica* is currently accepted in botanical literature and databases (Greuter, 2006–onward; Greuter, Raab-Straube, 2008; Ostapko et al., 2010; Shapoval, 2012; Yena, 2012; Onyschenko et al., 2017; POWO, 2019–onward).

The species aggregate *Jacobaea vulgaris* is rather problematic taxonomically; it contains various poorly delimited and closely related taxa treated either as species or infraspecific entities (see Wysk et al., 2009; Hodálová et al., 2010, 2015; Mered'a et al., 2016, etc.).

Judging from available evidence, *Jacobaea borysthentica* occurs in southern regions of Eastern Europe, mainly in sandy steppe and alluvial habitats along river valleys in southern and central regions of Ukraine and adjacent areas of the southwestern European part of Russia (Schischkin, 1961; Minderova, 1962; Tzvelev, 1986; Konechnaya, 1994; Katina, 1987; Kucherevskiy, 2004; Tarasov, 2012). This species is also reported from Romania (Popescu, 1972, 1973; Ciocârlan, 2009, 2011; Doroftei et al., 2011; Negrean, 2011) and Belarus (Parfenov et al., 1987; Tretyakov, 1999). In our opinion, Belarusian records need confirmation. At least, we have not seen any reliable specimens of *J. borysthentica* from Belarus. In addition to confirmed records from Ukraine, Romania, and Russia, the species most probably also occurs in Moldova because it is reliably recorded in the nearby territories in Ukraine; however, it is not reported in Geideman (1986 and earlier editions).

Jacobaea borysthentica is listed (as *Senecio borysthenticus*) as a regionally protected species in Dnipropetrovsk (Dnipro), Donetsk, Luhansk

(Lugansk), and Odesa (Odessa) administrative regions (*oblas'ts*) of Ukraine (Andrienko, Peregrym, 2012) and is considered a rare and threatened plant in Romania (Făgăraș et al., 2010). It was included in the second edition of the *Red Data Book of the Republic of Belarus* (Darafeev et al., 1993; see also Parfenov et al., 1987), but is not listed anymore in the third edition (Horuzhyk et al., 2005) because the species was re-considered as an alien in Belarus.

Types of Ukrainian species of *Senecio sensu lato* were considered by Shiyan et al. (2013) but the name *Senecio praealtus* var. *borysthenicus* was effectively lectotypified only recently (Mosyakin et al., 2019), with the specimen G00471753 from the de Candolle Herbarium (G-DC, Conservatoire et Jardin botaniques, Genève, Switzerland). The name *S. praealtus* Bertol. was lectotypified earlier by Iamonico and Managlia (2015).

The herbarium acronyms here and below are given following *Index Herbariorum* (Thiers, 2008—onward).

Original specimens (syntypes) in G-DC

De Candolle (1838 dated "1837": 351) provided the following geographical information for his "*S. praealtus* β *Borysthenicus*": "in pratis Podoliæ, Cherson. Russiæ circ. Borysth. (Bess.!). Sen. Borysthenicus Andr. ex Bess. in litt. (v. s.)". This information corresponds to some areas in the Podolian Governorate of the former Russian Empire ("in pratis Podoliæ") and the Kherson Governorate near the Dnipro River ("Cherson. Russiæ circ. Borysth."). The specimens (two collected by Andrzejowski, one by Andrzejowski or Besser; see Mosyakin et al., 2019) were provided to de Candolle by Besser, most probably in 1831. The three original specimens (syntypes) are currently deposited in the de Candolle Herbarium (G-DC), with the following labels:

G00471752: "*Senecio affinis tenuifolio* [&?] *borysthenico*. Kislakowka. Gub. Cherson. DC 1831 [the year of provenance by de Candolle – S.M.]. Herb. W. Besser";

G00471753: "*Senecio borysthenicus* Andr. circa Kislakowka gub. Cherson. 27 [meaning 1827; most probably the year of provenance by Besser – S.M.] DC. 1831 [the year of provenance by de Candolle – S.M.]. Herb. W. Besser"; there is also a small envelope with parts of inflorescences and flowers and the inscription "ach. radii striata glabra disci puberula" (by Candolle) corresponding to the phrase "achæniis radii glabris disci puberis" used by Candolle in his description of *S. praealtus* (Candolle, 1838 dated "1837": 351); the

label pinned in the bottom right corner of the sheet with the name "*Senecio Borysthenicus* Andr.!" (by Candolle) belongs to all three syntypes;

G00471754: "*Senecio tenuifolius?* involucri squamis enerv. ciliatis apice spha... [ending of the word illegible, probably "sphacelatis"? – S.M.], bracteis copiosis linearis-lanceolatis. E pratis Pod[olia]. austr. 1831 [the year of provenance by de Candolle, added in darker ink – S.M.]. Herb. W. Besser".

Blue labels with typographically printed words "Herb. W. Besser" mounted on the three mentioned specimens are printed on the blue paper that seems to be identical to the paper used for publication of the first edition of Besser's *Catalogue* (Besser, 1810)]

The three syntypes cited above and specifically the lectotype (G00471753) are discussed in our lectotypification note (Mosyakin et al., 2019). However, several other original specimens collected and annotated as *Senecio borysthenicus* by Besser and/or Andrzejowski are currently deposited in the Besser and Turczaninow historical collections in the National Herbarium of Ukraine (KW, Herbarium of the M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Kyiv); these specimens deserve additional discussion, which is provided below.

Original and some other historical specimens in the Besser and Turczaninow memorial collections at KW

Specimens in the Turczaninow herbarium (KW-TURCZ). One specimen from the Turczaninow herbarium has the characteristic blue label of Besser: "*Senecio borysthenicus* Andrzej. Circa Kislakowka, Gub. Cherson. Herb. W. Besser" (KW001002876, Fig. 1). The village of Kyslyakivka (now Lymany in Vitovs'ky District of Mykolayiv Region, southern Ukraine) was located on the shore of the Southern Bug Estuary (*Бузький лиман* in Ukrainian) near its confluence with the Dnipro (Dnieper) Estuary (*Дніпровський лиман* in Ukrainian), in the former Kherson Governorate. It was mentioned as "Kiślakówka" by Andrzejowski in Chapter 2 "*Kraina wapienna i nadmorska*" ("*The limestone and seashore land*") of his *Rys botaniczny...* (Andrzejowski, 1823: 23). Another specimen in the same folder has the white label "*Senecio borysthenicus* Andrzej. **Senecio praealtus** β: [the second identification was added in darker ink, evidently after de Candolle's publication – S.M.]. Ad Cataractas fl. Borysthen. Herb. W. Besser" (KW001002877, Fig. E1, Electronic Supplement). It was evidently collected somewhere near the Dnipro cataracts, most probably in the present-day Zaporizhzhya Region of Ukraine.



Figure 1: Isoelectotype of *Jacobaea borysthenea* (*Senecio praealtus* var. *borysthenicus*, *S. borysthenicus*) from the Turczaninow historical herbarium at KW, collected by Andrzejowski near Kyslyakivka (now Lymany, Vitovs'ky District, Mykolayiv Region, Ukraine), KW001002876

Both plants (KW001002876 and KW001002877) taxonomically belong to *Jacobaea borysthena*, and the first specimen can be regarded as an isolectotype.

The specimen KW001002882 (Fig. E2, Electronic Supplement) collected by Andrzejowski is labeled as "*Senecio Borysthenicus* Nob. in saxosis ad Borysthenum inter Cortitz et Sienilnikowa". These localities are in need of some comments. Andrzejowski (1830: 42) mentioned "wyspa Cortitz" (Khortytysya Island on the Dnipro, within the present-day city of Zaporizhzhya) and further commented that the settlement of German [Mennonite] colonists known as *Cortitz Einlage* was called *Kichkas* (*Kiczkas* in Polish) by locals ("kolonija nazwana od Niemców Cortitz Einlage u krajowców Kiczkas": Andrzejowski, 1830: 43). It was also mentioned in French in Andrzejowski's geological contribution as "la Colonie allemande Cortitz Einlage nommée chez les habitans [*sic!* – S.M.] Kiezkas (Quitschekase)" (Andrzejowski, 1850: 216). Andrzejowski (1830: 51) also visited "cały wzgórek od Wołnichii do Sienilnikowej", and these toponyms probably refer to Vil'nyanka village or the nearby town of Vil'nyansk (formerly also known as Sofiyivka) in Zaporizhzhya Region, and the present-day village of Ivanivka (formerly Ivanivs'ke Synel'nykove). In our opinion, "Sienilnikowa" mentioned by Andrzejowski should not be confused with the present-day town of Synel'nykove, Dnipropetrovsk Region, ca. 75 km from Zaporizhzhya; at the time of Andrzejowski's travels it was probably just a small village. Thus, both "Cortitz" and "Sienilnikowa" refer to the present-day city of Zaporizhzhya and adjacent areas.

The same folder contained two additional specimens collected by Czerniaëw (also variously transliterated as Chernyaev, Tschernaiew, Czerniaiev, or Czernajew) in the eastern part of Ukraine (KW001002878: "Starobielsk et Charcow" – now Starobil'sk in Luhansk Region, and Kharkiv in Kharkiv Region, Ukraine) and in an adjacent part of Russia on the Don River (KW001002879: "ad Tanain"). However, these poorly preserved specimens do not belong to the original material of *S. praealtus* var. *borysthenicus*. Moreover, morphologically they differ from *Jacobaea borysthena* and belong to *J. vulgaris sensu lato*. The sheet KW001002878 contains four plant fragments: two of them are evidently parts of the same plant (probably collected in or near Kharkiv? identifiable as *J. vulgaris*) and the other two (upper parts with inflorescences, mounted on the left side of the sheet, probably collected in Starobil'sk?) are morphologically different from the right-side plant. It

looks like there are two collections with one label, and some plant fragments (collected in Starobil'sk?) may in fact belong to the taxon now known as *J. andrzejowskyi* (Tzvelev) B. Nord. & Greuter (in Greuter, Raab-Straube, 2006: 712). Despite the partial misapplication of the name *Senecio borysthenicus*, Czerniaëw validly published the species-rank combination (see above).

Specimens in the Besser herbarium (KW-BESS).

The original folder annotated as "*Sen. Jacobaea* β *Borysthenicus*" in the Besser herbarium (KW) contained 12 unmounted specimens and plant fragments collected in Ukraine (the Dnieper cataracts near the present-day Zaporizhzhya, "Tauria", "Podolia", etc.), most of which indeed belong to *J. borysthena*. However, at least two specimens are identifiable as *J. erucifolia* (L.) G. Gaertn., B. Mey. & Scherb. *sensu lato* (incl. *J. grandidentata* (Ledeb.) Vasjukov), which probably reflects the uncertainty in Besser's understanding of the identity of these taxa; these plants were collected in "Tauria" (most probably Crimea) and in "Cherson" or "Podolia" (two labels in one specimen, one label was probably misplaced). Additional information is provided below on selected specimens with original informative labels and original annotations.

The specimen KW001002880 (Fig. 2) from the Besser herbarium was collected in the same locality as the lectotype of *Senecio praealtus* var. *borysthenicus* (formerly Kyslyakivka, now Lymany) and can be regarded as an isolectotype. Its label also contains a brief description by Andrzejowski: "involucr. ovatis enerviis ciliatis apice subsphacelatis, bracteis copiosis, linearilanceolatis elongatis. ad Hyp. infer. prope Kislakowka".

Another specimen [three plant fragments that were originally in the subfolder labeled as "*Sen. praealtus* β *Borysthenicus*"; now mounted on two sheets, KW001002881 (sheet 1, Fig. E3, Electronic Supplement) and KW001002883 (sheet 2, Fig. E4, Electronic Supplement)], also contains a description and geographical information on two separate labels: (Label 1) "**Prope Kiczkas et** [text probably added later, in darker ink – S.M.] ad Cataractas Borysthenis 1823"; (Label 2) "***Sen. praealtus* β *Borysthenicus* DC.** [later identification added in darker ink at the top of the label – S.M.] *Senecio borysthenicus* Nobis. involucr. lato-ovatis acutiusculis 3nerviis carinatis apice sphacelatis, bracteis paucis lanceolatis brevibus, radiis calathidi longioribus". As we commented above, "Kiczkas" was the local name of the German colony Cortitz Einlage, now within the city of Zaporizhzhya.

Thus the Turczaninow and Besser historical collections at KW contain several original specimens,



Figure 2: Isolectotype of *Jacobaea borysthena* (*Senecio praealtus* var. *borysthenicus*, *S. borysthenicus*) from the Besser historical herbarium at KW (KW001002876)

including two isoelectotypes (KW001002876 and KW001002880, Fig. 1 and Fig. 2, respectively) collected by Andrzejowski in or near Lymany village (formerly Kyslyakivka, Kherson Governorate) in Vitovs'ky District of Mykolayiv Region. These specimens from KW, in addition to the three specimens from the de Candolle Herbarium (G-DC, see Catalogue des herbiers de Genève (CHG), 2019—onward; Mosyakin et al., 2019), provide sufficient information for establishing the precise morphology-based identity of *Jacobaea borysthenea*.

Andrzejowski's treatment of *Senecio* in 1862

In his *Continuatio Enumerationis Plantarum...* Andrzejowski (1862: 103) listed the taxa of *Senecio* (*sensu lato*) occurring in the former Podolian Governorate and adjacent areas. Since that publication is rare and not available online, we provide here the text fragment from that treatment relevant to the taxa discussed in our article.

"3. *Jacobæa* L. *vulgaris*, Julio.

β. *borystheneus*, *orgyalis florib. minoribus*. Kiew.

γ. *lanatus*, *caulis et folia praecipue subtus incano-lanata*, ad Tyram.

δ. *grandiflorus*, *1-3pedalis, radiis involucro duplo longioribus, corymbis fastigiatis, virens, in nemorosis Podoliæ frequens*.

4. *divaricatus* A. *caulibus patenti ramosis, fastigiatis cano floccosis, foliis pinnati-sectis, segmentis linearibus, obtusis, margine revolutis, infimis sublyratis utrinque viridibus; cal. squamis concoloribus, radiis longitudine calycis Nob. Videtur biennis, flores S. Jacobææ, caules ramosissimi, ramis patentissimis. Habitus totius plantæ singularis, nullum e Senecionibus refert. In arenosis a Sawran ad Nicolaëf in arenosis hypanicis frequens, ad Cataractas Borystheneis prope Cortitz Einlage quoque reperitur. Julio.*

5. *tenuifolius* Jacq. *in pratis sylvat. Podol. superioris, Julio.*

6. *arenarius* MB. *erucæfolius* Enum. Bess. *in campis Pod. inferioris, nec non Gub. Chers. vulgaris. Julio, Augusto*".

We were unable to find any original specimens annotated as *Senecio divaricatus* Andrz. in the Besser memorial herbarium (where most of Andrzejowski's specimens are deposited) or in any other collection at KW. However, the description and geographical information provided by Andrzejowski leaves no doubt that this name is applicable to the taxon originally

described as *Senecio praealtus* var. *borystheneus* and now accepted as *Jacobaea borysthenea*. Andrzejowski's record of *Senecio jacobaea* var. *borystheneus* from Kyiv (Kiev) is somewhat enigmatic because typical plants of *Jacobaea borysthenea* are unknown in the Kyiv area. Most probably that record in fact refers to alluvial plants of the *J. vulgaris* aggregate identical to or approaching *J. andrzejowskyi*, or to some other taxon of that species complex.

It is not clear why Andrzejowski decided to change the original circumscription of his *Senecio borystheneus*, as initially outlined and annotated in the Besser and de Candolle herbaria. In any case, it is nomenclaturally irrelevant because the name *S. divaricatus* Andrz. is illegitimate, being a later homonym of *S. divaricatus* L. (Linnaeus, 1753: 866).

The text by Andrzejowski (1862), in particular, his treatment of "*S. tenuifolius* Jacq." and "*S. arenarius* MB. *erucifolius* Enum. Bess." [meaning *S. erucifolius sensu* Besser in his *Enumeratio...* (Besser, 1822) — S.M.] also confirms the earlier conclusion by Mosyakin (2018 dated "2017") that the name "*S. ucranicus*" has never been validly published by Besser because the word "*Ucranicus*" was not intended as a specific epithet and the species name was not accepted by Besser. Consequently, the name *S. ucranicus* Hodálová (1999: 334) is legitimate and the subspecies-rank combination should be cited as *S. hercynicus* Herborg subsp. *ucranicus* (Hodálová) Greuter (as originally proposed in Greuter, 2003: 247).

The status of *Senecio podolianus* Panigrahi

There were two different versions of English translations published for several volumes of the *Flora of the USSR* (see Schmid, 1998, who described that as a "bibliographically Kafkaesque situation"). In his editorial note to the treatment of *Senecio* in the "Indian" version (which seems to be rarer in libraries than the "US version", and is not available online) of the English translation of Vol. 26, the scientific editor of that volume Panigrahi (1995: 822) introduced the name *S. podolianus* Panigrahi with the following justification, reproduced here *in toto* and *verbatim*:

"It is not clear as to why *S. borystheneus* Andrz. ex DC. (1837), 'nom. in syn.' is treated as the correct name for this species, nor it is indicated where *S. borystheneus* Andrz. was "already done", as stated under the "Note" above. The place of publication of Steven's observation is also not given. If *S. praealtus* β *borystheneus* DC. (1837) is a valid name at (?)

varietal rank, its transfer as *S. borysthenticus* (DC.) at species rank, would render it as a later homonym of *S. borysthenticus* Grossh., Opred [should be "Opred.", an abbreviation of *Opredelitel'* – S.M.] Rast. Kavk. [sic! should be "Kavk.", from *Kavkaza* – S.M.]: 470 () [sic! the year is missing – S.M.] (see sl. no. 10). Hence, a 'nom. nov.' has been proposed, *S. podolianus* Panigr., nom. nov., based on *S. praealtus* β *borysthenticus* DC., Prodr. 6 (1837) 351 the name commemorating the type locality Podolia (Art. 7.3 and Art. 33.2, ICBN, 1994)".

The evidently illegitimate replacement name *S. podolianus* proposed by Panigrahi resulted from his insufficient acquaintance with botanical literature on the subject and misinterpretation of the rules of nomenclature. Grossheim (1949: 470) did not describe a new species but just cited the name "*S. borysthenticus* Andrz." that he misapplied to the Caucasian plants that were later described as *S. schischkinianus* Sofieva (1957: 83) [= *Jacobaea schischkiniana* (Sofieva) B. Nord. & Greuter (in Greuter, Raab-Straube, 2006: 713)]; the latter species was also recently reported from Kalmykia (Sagalaev et al., 2012). However, as we noted above, before Grossheim the binomial *Senecio borysthenticus* was validated earlier (Czerniaew, 1859) and used by several other authors (e. g., Gruner, 1869 dated "1868"; Taliev, 1935; Stankov, Taliev, 1949, etc.).

Nomenclature of *Jacobaea borysthentica*

Jacobaea borysthentica (DC.) B. Nord. & Greuter, Willdenowia 36(2): 712. 2006.

≡ *Senecio praealtus* Bertol. var. [β] *borysthenticus* DC., Prodr. [A.P. de Candolle] 6: 351. 1838.
≡ *S. borysthenticus* (DC.) Andrz. ex Czern., Conspect. Pl. Charc.: 32. 1859, p.p., *quoad nom.* ≡ *S. jacobaea* L. var. *borysthenticus* (DC.) Trautv., Bull. Classe Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg 12 (21–22): 351. 1854 [reprinted in: *Mélanges Biol. Bull. Phys.-Math. Acad. Imp. Sci. Saint-Petersbourg* 2(2): 131. 1855].
≡ *S. podolianus* Panigrahi, Fl. USSR (English translation ed. G. Panigrahi) 26: 822. 1995, *nom. illeg.* (published as "*nom. nov.*" for *S. borysthenticus*). ≡ *S. jacobaea* L. subsp. *borysthenticus* (DC.) Ciocârlan, Fl. Il. României, ed. 3: 815. 2009, *nom. inval.* (*sine basion.* Art. 41.5 of the ICN).

Type: G00471753 (see label information above; digital image available from <https://www.ville-ge.ch/musinfo/bd/cjb/chg/adetail.php?id=329614> and <https://plants.jstor.org/stable/10.5555/al.ap.specimen.g00471753>), lectotype, designated by Mosyakin et al. (2019).

= *Senecio divaricatus* Andrz., Univ. Izv. (Kiev) [vol. of 1862] No. 7: 103. 1862, *nom. illeg.*, non L. 1753.

Type: not designated; described from several localities in southern Ukraine (see above).

Some names misapplied to *Jacobaea borysthentica* in the past, remaining taxonomic problems, and concluding remarks

The name "*Senecio armenius*" was sometimes misapplied to *Jacobaea borysthentica*. That invalid name was mentioned by Ledebour (1845: 634) in synonymy of *Senecio praealtus*, as "S. armenius. M. a Bieb. ex Besser *Enum.* p. 33. Nr. 1082. — Eichw. *Skizze* p. 148". Evidently, "*S. armenius*" was a misspelling of *S. arenarius* M. Bieb. ex Besser (non Thunb.). Both Besser (1822: 33) and Eichwald (1830: 148) used the name *S. arenarius* (in both cases as *nomen nudum*). The same misspelling is found in Montresor (1886: 386), who also cited "*S. armenius*" in synonymy of *S. praealtus*. In any case, the name *S. arenarius* validated in Besser (1823: 212; see Mosyakin, 2018 dated "2017") is an illegitimate later homonym of *S. arenarius* Thunb. (Prodr. Pl. Cap. 2: 158. 1800). The illegitimate name *S. arenarius* M. Bieb. ex Besser is now considered a synonym of *Jacobaea grandidentata* (Ledeb.) Vasjukov [see synonymy in: Vasjukov in Raab-Straube, Raus (2015: 452) and Mosyakin et al. (2018 dated "2017": 128)].

Jacobaea borysthentica was also occasionally misidentified as *Senecio erucifolius* L. *sensu lato*. For example, Steven (1856: 388) commented on plants that he listed under "775. *S. erucaefolius*": "Var. β *S. tenuifolius* De C. Prodr. foliorum laciniis longis tenuibus Abrotani, quam in arena mobili inter Pepecop et Aleschki legi, et circa Kertsch copiose crescere refert D'Urville, nimis a genuina diversa et propriam speciem constituere meretum". At least the plants reported by Steven from the area north of the Isthmus of Perekop ("Perecop", connecting the Crimean Peninsula to the mainland part of Ukraine) toward the Oleshky ("Aleschki") Sands (in the present-day Kherson Region, on the left bank of the lower reaches of the Dnipro) may probably refer to *Jacobaea borysthentica*.

At least some earlier literature records of *Senecio borysthenticus* (especially from northern and eastern parts of its range) may in fact refer to *Jacobaea andrzejowskyi* or similar forms. When describing *Senecio andrzejowskyi* Tzvelev (now accepted as a species of *Jacobaea*), Tzvelev (1986: 254–255) mentioned that it seems to be morphologically intermediate between *S. jacobaea* and *S. borysthenticus*, and further hypothesized that his new species might be of ancient hybrid origin, resulting from introgressive hybridization of northern populations of

the psammophytic species *S. borysthenicus* with the meadow-steppe *S. jacobaea sensu stricto*.

High-resolution scanned images of the holotype (LE01053112) and isotype (LE01053113) of *S. andrzejowskyi* were kindly provided by Ivan V. Tatanov and Irina V. Sokolova (LE, see below). Judging from these images, *Jacobaea andrzejowskyi* is morphologically quite close to (or even identical with?) the octoploid forms of the *J. vulgaris* aggregate recently described as *J. vulgaris* subsp. *pannonica* Hodálová & Mered'a [see Hodálová et al., 2015 (online before print Nov. 2014): 1538]. Both these taxa, however, evidently differ in their morphology from *J. borysthenea*, which should be regarded as a rather well delimited species, both morphologically and ecologically.

Rather large populations of the plants morphologically corresponding to *Jacobaea vulgaris* subsp. *pannonica* were observed and collected by Sergei Mosyakin in 2017 and 2018 in meadow and meadow-steppe habitats on slopes of the valley of the Hnylyi Tikych River, and on nearby slopes of hills and ravines near the village of Snizhky, Stavyshe District, Kyiv Region, close to the border with Cherkasy Region. At present it is the easternmost known locality of that taxon, in Ukraine and in general. However, it is quite possible that this taxon is much more widespread in Eastern Europe than it has been expected before. Its relationships with other taxa of the *J. vulgaris* aggregate from Eastern Europe (reported as taxa of *Senecio sensu lato*: see Tzvelev 1986; Konechnaya, 1994, etc.), such as *J. andrzejowskyi* (see above) and *J. ferganensis* (Schischk.) B. Nord. & Greuter (*Senecio ferganensis* Schischk.), remain insufficiently known. Comprehensive studies of the whole species aggregate of *J. vulgaris* and related taxa in Eurasia (and especially in Eastern Europe) may bring new important results complementing the studies of this plant group in Western and Central Europe (e.g., Wysk et al., 2009; Hodálová et al., 2010, 2015; Mered'a et al., 2016).

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Figure 1E. A specimen of "*Senecio borysthencus* Andrzej." from the Turczaninow herbarium in KW (received by Turczaninow from Besser), collected by Andrzejowski at cataracts of the Dnipro (present-day Zaporizhzhya Region), KW001002877.



Figure 2E. A specimen of "*Senecio borysthenicus* Nob." from the Turczaninow herbarium in KW, collected by Andrzejowski in or near the present-day city of Zaporizhzhya, KW001002882.



Figure 3E. A specimen labeled as "*Sen. praealtus* β *Borysthenticus*" from the Besser herbarium in KW, collected by Andrzejowski near cataracts of the Dnipro in or near the present-day city of Zaporizhzhya, sheet 1 (KW001002881).



Figure 4E. The same specimen as in Fig. 3E, sheet 2 (KW001002883).