

New nomenclatural combinations for taxa of *Pentanema* (*Asteraceae*) occurring in Ukraine

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Boiko G.V., Korniyenko O.M., Mosyakin S.L. **New nomenclatural combinations for taxa of *Pentanema* (*Asteraceae*) occurring in Ukraine.** Ukr. Bot. J., 2018, 75(5): 436–440.

Abstract. Recent molecular phylogenetic results demonstrated that the genus *Inula* in its traditional circumscription is polyphyletic and its type, *I. helenium*, belongs to a clade phylogenetically distant from the clade containing the majority of species earlier placed in *Inula*. The nomenclatural proposal to conserve the generic name *Inula* with *I. hirta* as the conserved type has not been adopted. Because of that the genus *Inula* s. str. now comprises ca. 5 species (*I. helenium* and its relatives). The genus *Pentanema* was considerably re-circumscribed to include most of taxa earlier treated in *Inula*. Several taxa of *Inula* s.l. occurring in Ukraine, however, did not have respective names available in *Pentanema*, but such names are needed for the forthcoming checklist of vascular plants of Ukraine (in preparation). The following new nomenclatural combinations are validated: *Pentanema asperum* (Poir.) G.V.Boiko & Korniyenko, comb. nov. (*Inula aspera* Poir.), *P. caspicum* (F.K.Blum) G.V.Boiko, Korniyenko & Mosyakin, comb. nov. (*I. caspica* F.K.Blum in Ledeb.), *P. × medium* (M.Bieb.) G.V.Boiko & Korniyenko, comb. nov. (*I. media* M.Bieb.), and *P. sabuletorum* (Czern. ex Lavrenko) G.V.Boiko & Korniyenko, comb. nov. (*I. sabuletorum* Czern. ex Lavrenko). Additionally, two new subspecies-rank combinations, *P. salicinum* (L.) D. Gut.Larr. et al. subsp. *asperum* (Poir.) Mosyakin and *P. salicinum* subsp. *sabuletorum* (Czern. ex Lavrenko) Mosyakin, comb. nov., are proposed by the third author.

Keywords: *Asteraceae*, *Inula*, nomenclature, taxonomy, Ukraine, Europe

Introduction

Recent taxonomic and molecular phylogenetic results (see Anderberg, 1991; Anderberg et al., 2005; Anderberg, Eldenäs, 2007; Nylinder, Anderberg, 2015; Gutiérrez-Larruscain et al., 2018, and references therein) demonstrated that the genus *Inula* L. (Linnaeus, 1753) (*Asteraceae*) in its traditionally accepted circumscription is polyphyletic. The type of the genus, *I. helenium* L. (designated by Britton and Brown, 1913: 457; and confirmed by Hitchcock and Green, 1929: 182; see also Art. 10.6 and 10.7 of the ICN: Turland et al., 2018), belongs to a phylo-genetically distinct clade that is rather distant from the largest clade containing most of the species earlier placed in *Inula*. The recognition of that clade as a separate genus required numerous new combinations and was considered disruptive for nomenclature. Because of that, the nomenclatural proposal to conserve the generic name *Inula* with *I. hirta* L. as the conserved type has been made (Santos-Vicente et al., 2012). In our opinion, that nomenclatural solution was best for the nomenclatural stability. Unfortunately, that conservation proposal has not been adopted (Applequist, 2013) "considering that transferring the well-known medicinal species *I. helenium* to the unfamiliar genus *Corvisartia* would

cause confusion, particularly among non-specialists" (see Gutiérrez-Larruscain et al., 2018: 150). Thus, now the genus *Inula* s. str. comprises only ca. 5 species (*I. helenium* and its relatives).

The earliest valid generic name applicable to the clade containing most of taxa earlier placed in *Inula* sensu lato seems to be *Pentanema* Cass.; that name was originally coined by Cassini for just one species, *P. divaricatum* Cass. (published as "*divaricata*", but see Art. 62.2(c) of the ICN: Turland et al., 2018; = *Inula divaricata* (Cass.) Boiss. 1875, nom illeg., non Nutt. 1818; = *Vicoa divaricata* (Cass.) Oliv. & Hiern), which is morphologically rather deviant from other species placed in *Inula* s. l. Later the application and circumscription of *Pentanema* were modified to cover ca. 15 (up to 18) species of *Inuleae* occurring mainly in Central, Southern, and Southeastern Asia, with extensions to Africa (see Gorshkova, 1959; Anderberg, Eldenäs, 2007; Chen, Anderberg, 2011, etc.).

Recently the genus *Pentanema* was considerably re-circumscribed to include most of taxa usually treated in *Inula* in the past, and numerous required nomenclatural novelties (new combinations) have been validated by Gutiérrez-Larruscain et al. (2018).

Several taxa of *Inula* s.l. occurring in Ukraine, however, still do not have available names in *Pentanema*,

but such names are needed for the forthcoming checklist of vascular plants of Ukraine (Mosyakin et al., in preparation). The following additional taxa not treated in Gutiérrez-Larruscain et al. (2018) were usually recognized in Eastern Europe in general and in Ukraine in particular: *Inula aspera* Poir. (= *I. salicina* L. subsp. *aspera* (Poir.) Hayek), *I. caspica* F.K.Blum in Ledeb., *I. ×media* M.Bieb. (accepted as a hybrid *I. germanica* L. × *I. salicina* L., see Gorshkova, 1959: 452; Gubanov, 1994: 86, etc.), and *I. sabuletorum* Czern. ex Lavrenko (= *I. salicina* L. subsp. *sabuletorum* (Czern. ex Lavrenko) Soják) (Gorshkova, 1959; Stankov, Taliev, 1957; Dobrochaeva, 1962; Gubanov, 1994, Czerepanov, 1995, Greuter, 2006–onward, etc.). All these species-rank names are also currently accepted in the *Plants of the World Online* database (<http://www.plantsoftheworldonline.org>, accessed 27.10.2018).

New nomenclatural combinations in *Pentanema* for these taxa are provided below.

Validation of new combinations

Pentanema asperum (Poir.) G.V.Boiko & Korniyenko, comb. nov.

Basionym: *Inula aspera* Poir. in Lam., Encycl. [J. Lamarck & al.] Suppl. 3: 154. 1813. ≡ *I. salicina* L. subsp. *aspera* (Poir.) Hayek, Prodr. Fl. Penins. Balcan. 2: 602. 1931.

Pentanema caspicum (F.K.Blum) G.V.Boiko, Korniyenko & Mosyakin, comb. nov.

Basionym: *Inula caspica* F.K.Blum in Ledeb., Ind. Sem. Hort. Dorpat.: 10. 1822.

Note: In the protologue Ledebour (1822) explicitly ascribed the new species to "Blum", but later its authorship was variously cited as "Blum" (e.g., Schmalhausen, 1897: 52; Stankov, Taliev, 1957: 376; Gubanov, 1994: 86), "Ledeb." (*IPNI*: www.ipni.org, accessed 27.10.2018), "Blum in Ledeb." (e.g., Gorshkova, 1959: 460), "Blum ex Ledeb." (Lut, 2018–onward, and several other sources), or "Blume" (e.g., Krasheninnikov, 1936: 325). No authors with the last name Blum and life dates corresponding to the period of scientific activity of Ledebour are currently listed in *IPNI* (l.c.). However, it is evident that Ledebour ascribed the authorship of the species name and description to Friedrich K. Blum (also known in Russia as Fedor Kondratievich Blum; ca. 1785–1820 or 1821, exact life dates unknown), a German-born medical doctor and amateur naturalist, who first visited the Lower Volga area in 1810 or 1811 and later, after

his study at Dorpat University (now the University of Tartu, Estonia) in 1813–1815, since 1817 worked as a public health inspector in Astrakhan and collected plants along the Volga from Astrakhan upstream to Sarepta (now part of Volgograd). Blum evidently met Ledebour at Dorpat University where Ledebour was a professor during 1811–1836. Herbarium specimens collected by Blum were used by Ledebour when he prepared his *Flora Rossica*; they are still present in the Ledebour herbarium in LE, and also in MW (Lipschitz, 1947; Shcherbakova, 1979).

Pentanema ×medium (M.Bieb.) G.V.Boiko & Korniyenko, comb. nov.

Basionym: *Inula media* M.Bieb. 1819, Fl. Taur. Cauc. 3(Suppl.): 576., in adnot.

Note: This taxon is considered to be a hybrid between *Inula germanica* and *I. salicina* (see Gorshkova, 1959: 452; Nyárády, 1964; Gubanov, 1994: 86), now accepted as *Pentanema germanicum* (L.) D.Gut.Larr., Santos-Vicente, Anderb., E.Rico & M.M.Mart.Ort. and *P. salicinum* (L.) D.Gut.Larr., Santos-Vicente, Anderb., E.Rico & M.M.Mart.Ort. (see Gutiérrez-Larruscain et al., 2018: 159).

Pentanema sabuletorum (Czern. ex Lavrenko) G.V.Boiko & Korniyenko, comb. nov.

Basionym: *Inula sabuletorum* Czern. ex Lavrenko, Ind. Sem. Hort. Bot. Charjkov. 1925: 7. 1926. ≡ *I. salicina* L. subsp. *sabuletorum* (Czern. ex Lavrenko) Soják, Čas. Nár. Mus., Odd. Přír., 140(3–4): 131. 1972.

Note: The original text from the protologue by Lavrenko was reproduced *in toto* in Botschantzev (1959: 636).

The two species recognized above as *Pentanema asperum* and *P. sabuletorum* are closely related to *P. salicinum*; they were sometimes treated as subspecies of the latter (see Soó, 1972; Gubanov, 1994, Antipova, 1997, etc.). However, most of Russian and Ukrainian authors (e.g., Stankov, Taliev, 1957; Gorshkova, 1959; Dobrochaeva, 1962; Czerepanov, 1985; Mosyakin & Fedoronchuk, 1999, and references therein), who usually applied a rather narrow species concept, accepted these taxa as separate species of *Inula*. The names *I. aspera* and *I. sabuletorum* (as well as *I. caspia* and *I. media*) are currently listed as accepted names in the *Plants of the World Online* (<http://www.plantsoftheworldonline.org/>, accessed 27.10.2018) and some other databases. This option is also accepted here by two authors of the present article (Ganna Boiko

and Olga Korniyenko), who prefer the species rank for *P. asperum* and *P. sabuletorum*.

However, the wide morphological variation within the *P. salicinum* group and the presence of forms supposedly transitional or morphologically intermediate between *P. salicinum* s. str., *P. asperum*, and *P. sabuletorum* resulted in recognition of several infraspecific entities within the taxon earlier known as *Inula salicina* s.l. (see above). Because of that the third author (Sergei Mosyakin) is in favor of the subspecies rank for the two taxa originally described as *Inula aspera* and *I. sabuletorum*, to be treated now as two subspecies of *P. salicinum*.

The corresponding subspecies-rank combinations are validated below. They should not be treated as alternative names (which are invalid under the current Code: Art. 36.3 of the ICN: Turland et al., 2018; see also Mosyakin, McNeill, 2016) because, even if validated in the same publications, they are proposed and accepted by different authors. Alternative names are defined by the ICN (Art. 36.3 and Glossary: Turland et al., 2018) as names based on the same type and "accepted simultaneously for the same taxon **by the same author** [emphasis added] and accepted as alternatives **by that author** [emphasis added] in the same publication".

Thus, the species-rank combinations are validated above by Boiko and Korniyenko, while the subspecies-rank combinations below are explicitly accepted by Mosyakin.

Pentanema salicinum (L.) D.Gut.Larr. et al. subsp. *asperum* (Poir.) Mosyakin, comb. nov.

Basionym: *Inula aspera* Poir. in Lam., Encycl. [J. Lamarck & al.] Suppl. 3: 154. 1813. ≡ *I. salicina* L. subsp. *aspera* (Poir.) Hayek, Prodr. Fl. Penins. Balcan. 2: 602. 1931.

Pentanema salicinum (L.) D.Gut.Larr. et al. subsp. *sabuletorum* (Czern. ex Lavrenko) Mosyakin, comb. nov.

Basionym: *Inula sabuletorum* Czern. ex Lavrenko, Ind. Sem. Hort. Bot. Charjkov. 1925: 7. 1926. ≡ *I. salicina* L. subsp. *sabuletorum* (Czern. ex Lavrenko) Soják, Čas. Nár. Mus., Odd. Přír., 140(3–4): 131. 1972.

Another subspecies, *Inula salicina* subsp. *denticulata* (Borbás) Soó, was sometimes recognized as a presumably endemic Pannonian psammophytic taxon (see Soó, 1972). Nomenclature and identity of that taxon remain problematic. The species name *I. denticulata* was briefly mentioned by Borbás (1888:

325) with the reference to "*I. Pseudosalicina* Simk. non Schur", which can be viewed as indirect reference to *I. pseudosalicina* Simonk. (Simkovics, 1878: 151, with a brief Hungarian description), but not to the taxon described by Schur as *I. hybrida* Baumg. var. [a.] *pseudosalicina* Schur (as "*Pseudo-salicina*": Schur, 1866: 312). The name *I. pseudosalicina* attributed to "Simkov. ex Beck" is currently listed in IPNI (www.ipni.orh, accessed 27.10.2018), but that name was mentioned by Beck (1882: 303) only in synonymy of *I. salicina*. In the *Plants of the World Online* (<http://www.plantsoftheworldonline.org/taxon/urn:lsid:ipni.org:names:225839-1>, accessed 27.10.2018) the name *I. denticulata* Borbás is listed as a synonym of the later but anyway accepted (!) name *I. sabuletorum*. In fact, possible identity of the mentioned taxa with the East European taxon known as *I. sabuletorum* is at least very questionable.

Because of the remaining taxonomic and nomenclatural uncertainties regarding the proper application and typification (and in some cases even validity) of various names used for the Pannonian and some other central-southeastern European (mainly Hungarian and Romanian) plants of the *Pentanema salicinum* / *Inula salicina* group (e.g., in Schur, 1972; Borbás, 1888; Beck, 1882, Nyárády, 1964, etc.), we prefer here to use for the psammophytic race occurring in Ukraine the epithet *sabuletorum* that is certainly applicable to our taxon.

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- Результати недавніх молекулярно-філогенетичних досліджень показали, що род *Inula* у традиційному розумінні є поліфілетичним, а його тип, *I. helenium*, належить до кладі, що філогенетично віддалена від кладі, що містить більшість видів, які раніше включалися до *Inula*. Номенклатурна пропозиція законсервувати родову назву *Inula* із законсервованим типом *I. hirta* не була прийнята. Через це род *Inula* тепер включає приблизно 5 видів (*I. helenium* та споріднені види). Обсяг роду *Pentanema* був значно змінений, завдяки чому до нього зараз включено більшість таксонів, що раніше розглядалися у складі *Inula*. Проте, декілька таксонів *Inula* s. l., які поширені в Україні, не мали відповідних назв у роді *Pentanema*, але такі назви є необхідними для запланованого нового видання номенклатурного конспекту судинних рослин України. Здійснені такі нові номенклатурні комбінації: *Pentanema asperum* (Poir.) G.V.Boiko & Korniyenko, comb. nov. (*Inula aspera* Poir.), *P. caspicum* (F.K.Blum) G.V.Boiko, Korniyenko & Mosyakin, comb. nov. (*I. caspica* F.K.Blum in Ledeb.), *P. × medium* (M.Bieb.) G.V.Boiko & Korniyenko, comb. nov. (*I. media* M.Bieb.), *P. sabuletorum* (Czern. ex Lavrenko) G.V.Boiko & Korniyenko, comb. nov. (*I. sabuletorum* Czern. ex Lavrenko). Крім того, одним з авторів пропозиції є нові комбінації в ранге підвиду: *P. salicinum* (L.) D.Gut.Larr. et al. subsp. *asperum* (Poir.) Mosyakin, comb. nov. і *P. salicinum* subsp. *sabuletorum* (Czern. ex Lavrenko) Mosyakin, comb. nov.
- Ключевые слова:** *Asteraceae*, *Inula*, номенклатура, систематика, Украина, Европа.