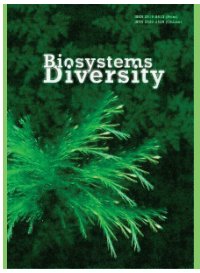

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Hybrids of monocots in the flora of Ukraine: Preliminary synopsis

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Monocots include ca. 74 000–85 000 species. It is one of the most species rich, ecologically and economically important groups of plants. At the same time, monocots are a key component of ecosystems and have utilitarian significance. In agriculture the majority of the biomass produced comes from monocots. Many plants from this group are used as ornamentals or medicinal plants. This work is devoted to the study of the nomenclature of monocot hybrids in the flora of Ukraine. In general, there are many unsolved problems in the nomenclature of hybrids. Numerous names require clarification. The aim of this study is to compile a list of intergeneric and interspecific hybrids of monocots in the flora of Ukraine. This list includes wild hybrids, as well as cultivated ones that grow spontaneously in the wild. The list of hybrids is compiled mainly on the basis of literary sources. The names of taxa and nothotaxa are indicated according to IPNI. Formulas of the hybrids, basionyms and synonyms are given for the hybrids. The list of monocots' hybrids in the flora of Ukraine offered here includes 87 hybrids. There are many hybrids in the following families: Cyperaceae (20), Orchidaceae (25), Poaceae (22) and Potamogetonaceae (8). In other families there are not many hybrids: Amaryllidaceae (1), Araceae (2), Asparagaceae (1), Commelinaceae (1), Iridaceae (1), Juncaceae (4), Liliaceae (1), Typhaceae (1). There were a number of difficulties during the preparation of this article: 1) there is not enough information, the hybridization of plant species is poorly studied in Ukraine, 2) it is difficult to draw a clear line between hybrids and species of hybridogenic origin, 3) disputed status of parental taxa (i.e. different researchers consider parental taxa in different ranks). Therefore, this list should be considered preliminary.

Keywords: hybrid; monocots; Liliopsida; flora of Ukraine; accepted name; nomenclature; synonym.

Introduction

Monocots are a group of flowering plants (angiosperms), the seeds of which typically contain only one embryonic leaf, or cotyledon. Monocots are a monophyletic group (Chase, 2004; Chase et al., 2006; Byng et al., 2016 [APG IV, 2016]). Different researchers considered this group in different ranks or without rank. Monocots include ca. 74 000–85 000 species (Christenhusz & Byng, 2016; Lughadha et al., 2016). They comprise 21–22% of all angiosperm species. It is one of the most species rich, ecologically and economically important groups of plants. At the same time, monocots are a key component of ecosystems and have utilitarian significance. In agriculture the majority of the biomass produced comes from monocots (wheat, maize, rice, rye, barley, sorghum, etc.). Many plants from this group are used as ornamentals (in particular, from the families Asparagaceae, Bromeliaceae, Iridaceae, Liliaceae, Orchidaceae). Also, many species of monocots belong to medicinal plants (Amaryllidaceae, Dioscoreaceae, Melanthiaceae species, etc.). Therefore, studies of phylogeny, taxonomy, morphology and ecology of monocotyledons are relevant.

This work is devoted to the study of the nomenclature of hybrids. Hybridization is process of interbreeding between individuals of different families, genera, species, subspecies or varieties. And spontaneous hybridization is common in this group of plants (Stace, 1975; Whitney et al., 2010; Stull et al., 2023). In Britain ca. 25% of plant species are involved in hybridization (Stace, 1975). It can be expected that approximately the same percentage of species will exist in the flora of Ukraine as well.

Hybrids are not the same. Baum (1969) showed that three major kinds of hybrids may be recognized:

Non taxonomic hybrids:

a) hybrids between individuals of the same species, or hybrids between individuals of the same intraspecific category.

Taxonomic hybrids:

b) intergeneric, interspecific, and intraspecific hybrids; here it is necessary to distinguish F_1 hybrids and succeeding generation hybrids.

c) amphidiploids and allopolyploids.

There are many unsolved problems in the nomenclature of hybrids. Numerous names require clarification. So, the aim of this study is to compile a list of intergeneric and interspecific hybrids of monocots in the flora of Ukraine.

Hybrids of monocots in the flora of Ukraine

This list includes wild hybrids, as well as cultivated ones that grow spontaneously in the wild. The list of hybrids is compiled mainly on the basis of literary sources. The most important literary sources for this work were Flora of the Ukrainian SSR (Bordzilowski et al., 1940; Kotov et al., 1950) and Checklist (Mosyakin & Fedoronchuk, 1999). Other sources are listed after the list of hybrids for each plant family. Hybrids from Juncaceae are listed according to both literature and personal observations. The names of taxa and nothotaxa are indicated according to IPNI (www.ipni.org). If a hybrid has a binomial name, then I first indicate this name, and after – the formula of the hybrid. Otherwise, only the formula is given. Also, basionym and synonyms are given for many names. By the "*" sign are indicated the hybrids for which no information was found about their growing in Ukraine (but there is a high probability that these hybrids can grow here).

Amaryllidaceae J. St.-Hil. (incl. Alliaceae Borkh., nom. cons.)

Allium* ×*agarmyschicum N. Friesen & Seregin, Bot. J. Linn. Soc. 178(1): 91 (2015).

Hybrid formula: ♀*Allium tarkhankuticum* Seregin × ♂*Allium marschallianum* Vved.

Literature: Seregin et al., 2015a.

Araceae Juss.

Lemna* ×*japonica Landolt, Veröff. Geobot. Inst. ETH Stiftung Rübel Zürich 70: 23 (1980).
Hybrid formula: *Lemna minor* L. × *Lemna turionifera* Landolt

Lemna gibba L. × ***Lemna minor*** L.
Literature: Braglia et al., 2021.

Asparagaceae Juss., nom. cons.

Polygonatum* ×*buschianum Tzvelev, Fl. Evropeiskoi Chasti SSSR 4: 260 (1979).
Hybrid formula: *Polygonatum odoratum* (Mill.) Druce × *Polygonatum orientale* Desf.
Literature: Yena, 2012.

Commelinaceae Mirb.

Tradescantia* ×*andersoniana W. Ludw. & Rohweder, Feddes Repert. Spec. Nov. Regni Veg. 56: 282 (1954).
Hybrid formula: *Tradescantia ohiensis* Raf. × *Tradescantia subaspera* Ker Gawl. × *Tradescantia virginiana* L.
Note. This hybrid is cultivated, sometimes it grows spontaneously (ephemerophyte).
Literature: Ludwig & Rohweder, 1954; Shynder et al., 2022b.

Cyperaceae Juss., nom. cons.

Carex* ×*alberti H. Lév., Bull. Géogr. Bot. 22: 48 (1912).
Hybrid formula: *Carex flacca* Schreb. × *Carex panicea* L.
Synonyms: *Carex* ×*barrei* H. Lév., Bull. Géogr. Bot. 22: 48 (1912).

Carex* ×*alsatica Zahn, Oesterr. Bot. Z. 40: 363 (1890).
Hybrid formula: *Carex demissa* Hornem. × *Carex flava* L.

Carex* ×*biharica Simonk., Enum. Fl. Transsilv.: 548 (1887).
Hybrid formula: *Carex canescens* L. × *Carex echinata* Murray

Carex* ×*boenninghausiana Weihe, Flora 9(2): 759 (1826).
Hybrid formula: *Carex paniculata* L. × *Carex remota* L.
Synonyms: *Carex* ×*boenninghauseniana* Kunth in Enum. Pl. 2: 404 (1837). *Carex* ×*bogdanensis* Zapał., Consp. Fl. Galic. Crit. 3: 233 (1911).

Carex* ×*bolina O. Lang, Linnaea 24(5): 551 (1852).
Hybrid formula: *Carex cespitosa* L. × *Carex nigra* (L.) Reichard

Carex* ×*csomadensis Simonk., Enum. Fl. Transsilv.: 556 (1887).
Hybrid formula: *Carex riparia* Curtis × *Carex vesicaria* L.

Carex* ×*evoluta Hartm., Kongl. Vetensk. Acad. Handl. (1818) 156.
Hybrid formula: *Carex lasiocarpa* Ehrh. × *Carex riparia* Curtis

Carex* ×*fussii Simonk., Enum. Fl. Transsilv.: 548 (1887).
Hybrid formula: *Carex elongata* L. × *Carex paniculata* L.

Carex* ×*involuta (Bab.) Syme, in: J. E. Smith, Engl. Bot. ed. III. 10: 169 (1870).
Basionym: *Carex vesicaria* var. *involuta* Bab., Man. Brit. Bot., ed. 2: 370 (1847).
Hybrid formula: *Carex rostrata* Stokes × *Carex vesicaria* L.
Synonyms: *Carex* ×*pannewitziana* Figert, Deutsche Bot. Monatsschr. 5: 97 (1887).

Carex* ×*kneuckeri P. Fourn., Fl. Compl. Plaine Franç.: 560 (1928).
Hybrid formula: *Carex hirta* L. × *Carex rostrata* Stokes

Carex* ×*ligniciensis Figart, Allg. Bot. Z. Syst. 6: 38 (1900).
Hybrid formula: *Carex buekii* Wimm. × *Carex nigra* (L.) Reichard (*Carex goodenoughii* Asch. & Graebn.)

Carex* ×*paczoskii Zapał., Consp. Fl. Galic. Crit. 3: 234 (1911).
Hybrid formula: *Carex pallescens* L. × *Carex pilosa* Scop.

Carex* ×*raciborskii Zapał., Consp. Fl. Galic. Crit. 3: 233 (1911).
Hybrid formula: *Carex dioica* L. × *Carex heleonastes* Ehrh. ex L.f.
Synonyms: *Carex* ×*microstachyoides* Montell, Meddeland. Soc. Fauna Fl. Fenn. 48: 112 (1924).

Carex* ×*ruedtii Kneuck., Excurs.-Fl. Baden [Seubert]. ed. 5, 67 (1891).
Hybrid formula: *Carex flava* L. × *Carex lepidocarpa* Tausch

Carex* ×*takhtadjanii Jac. Koopman & Więcław, Phytotaxa 494(1): 8 (2021).
Hybrid formula: *Carex diluta* M.Bieb. × *Carex distans* L.

Carex* ×*toezensis Simonk., Oesterr. Bot. Z. 41: 426 (1891).
Hybrid formula: *Carex melanostachya* Willd.× *Carex riparia* Curtis

Carex diluta M. Bieb. × ***Carex distans*** L.

Carex disnans L. × ***Carex karelinii*** Meinsh.

Carex flava L. × ***Carex oederi*** Retz.

Cyperus glaber L. × ***Cyperus glomeratus*** L.
Note. Perhaps, *Bolboschoenus laticarpus* Marhold, Hroudová, Ducháček & Zákr. also is the hybrid *Bolboschoenus yagara* (Ohwi) Y. C. Yang & M. Zhan × *Bolboschoenus planiculmis* (F. Schmidt) T. V. Egorova.
Literature: Zapałowicz, 1906; Zapałowicz, 1911; Więcław, 2014; Więcław & Wilhelm, 2014; Píšová et al., 2017; Koopman et al., 2018; Koopman et al., 2019; Danylyk & Olshanskyi, 2021; Peregrym & Koopman, 2023.

Iridaceae Juss., nom. cons.

Iris* ×*germanica L., Sp. Pl. 1: 38 (1753).
Hybrid formula: *Iris pallida* Lam. × *Iris variegata* L.
Synonyms: *Iris* ×*sambucina* L., Syst. Nat., ed. 10. 2: 863 (1759).
Note. This hybrid is cultivated, sometimes it grows spontaneously (ephemerophyte).
Literature: Mosyakin & Yavorska, 2002; Yena, 2012; Shynder & Shevchyk, 2023.

Juncaceae Juss., nom. cons.

Juncus* ×*alpiniformis Fernald, Rhodora 35: 235 (1933).
Hybrid formula: *Juncus alpinoarticulatus* Chaix × *Juncus articulatus* L.

Juncus* ×*diffusus Hoppe, Flora 2(1): 186 (1819).
Hybrid formula: *Juncus effusus* L. × *Juncus inflexus* L.

Juncus* ×*kern-reichgeltii Jansen & Wacht. ex Reichg., Fl. Neerl. 1: 201 (1964).
Hybrid formula: *Juncus conglomeratus* L. × *Juncus effusus* L.
Synonyms: *Juncus* ×*haussknechtii* P. Fourn., Fl. Compl. Plaine Franç.: 521 (1928), nom. illeg. *Juncus* ×*brueggeri* Domin, Preslia 13–15: 23 (1935), nom. inval.

Luzula campestris (L.) DC. × *Luzula pallescens* Sw.
Literature: Rogovich, 1855; Schmalhausen, 1886; Zapałowicz, 1906; Nilsson & Snogerup, 1971; Kirschner, 1991; Kirschner et al., 2002a; 2002b; 2002c.; Wilcox, 2010; Olshanskyi & Fedoronchuk, 2011; Olshanskyi & Fedoronchuk, 2012; Danylyk & Olshanskyi, 2021.

Liliaceae Juss., nom. cons.

Gagea* ×*polidorii J.-M.Tison, Acta Bot. Gallica 151(3): 319 (2004).
Hybrid formula: *Gagea fragifera* (Vill.) E. Bayer & G. López × *Gagea villosa* (M. Bieb.) Sweet
Synonyms: *Gagea* ×*microfistulosa* Levichev, Novosti Sist. Vyssh. Rast. 40: 39 (2009).
Literature: Tison, 2004; Levichev, 2008; Peruzzi, 2008; Peterson et al., 2009.

Orchidaceae Juss., nom. cons.

Anacamptis* ×*olida (Bréb.) H. Kretzschmar, Eccarius & H. Dietr., Orchid Gen. Anacamptis Orchis Neotinea: 428 (2007).
Basionym: *Orchis* ×*olida* Bréb., Fl. Normandie, ed. 2: 257 (1849).

Hybrid formula: *Anacamptis coriophora* (L.) R. M. Bateman, Pridgeon & M. W. Chase × *Anacamptis morio* (L.) R. M. Bateman, Pridgeon & M. W. Chase

Anacamptis ×simorrensis (E. G. Camus) H. Kretzschmar, Eccarius & H. Dietr., Orchid Gen. *Anacamptis* Orchis Neotinea: 428 (2007).

Basionym: ×*Anacamptorchis simorrensis* E. G. Camus, Monogr. Orchid.: 95 (1908).

Hybrid formula: *Anacamptis coriophora* (L.) R. M. Bateman, Pridgeon & M. W. Chase (*Anacamptis fragrans* (Pollini) R. M. Bateman) × *Anacamptis pyramidalis* (L.) Rich.

Synonyms: ×*Anacamptorchis ticinensis* Gsell, Boll. Soc. Ticinese Sci. Nat. 43: 74 (1948). *Anacamptis ×simorrensis* nothosubsp. *ticinensis* (Gsell) Fateryga & Kreutz, J. Eur. Orch. 46(2): 418 (2014).

Anacamptis ×timbali nothosubsp. ***reinhardii*** (Ugr. ex E. G. Camus) H. Kretzschmar, Eccarius & H. Dietr., Orchid Gen. *Anacamptis* Orchis Neotinea: 428 (2007).

Basionym: *Orchis* ×*reinhardii* Ugr. ex E. G. Camus, Monogr. Orchid.: 230 (1908).

Hybrid formula: *Anacamptis coriophora* (L.) R. M. Bateman, Pridgeon & M. W. Chase × *Anacamptis palustris* subsp. *elegans* (Heuff.) R. M. Bateman, Pridgeon & M. W. Chase

Synonyms: *Orchis* ×*ugrinskyana* Soó, Repert. Spec. Nov. Regni Veg. Sonderbeih. A 2: 186 (1932). *Anacamptis* ×*timbali* nothosubsp. *ugrinskyana* (Soó) H. Kretzschmar, Eccarius & H. Dietr., Orchid Gen. *Anacamptis* Orchis Neotinea: 428 (2007).

×Dactylocamptis uechtritziana (Hausskn.) B. Bock ex Peregrym & Kuzemko, Ukrayins'k. Bot. Zhurn. 67(5): 656 (2010).

Basionym: *Orchis* ×*uechtritziana* Hausskn., Mitt. Geogr. Ges. (Thüringen) Jena 2: 225 (1885).

Hybrid formula: *Anacamptis palustris* (Jacq.) R. M. Bateman, Pridgeon & M. W. Chase ×*Dactylorhiza incarnata* (L.) Soó

Synonyms: ×*Orchidactyla uechtritziana* (Hausskn.) Borsos & Soó, Ann. Univ. Sci. Budapest. Rolando Eotvos, Sect. Biol. 8: 315 (1966), nom. illeg. ×*Orchidactyla leguei* subsp. *uechtritziana* (Hausskn.) Potůček & F. Proch., Jahresber. Naturwiss. Vereins Wuppertal 25: 58 (1972).

×Dactylocampti suechtritziana nothosubsp. ***magyarii*** (Soó) Fateryga & Kreutz, J. Eur. Orch. 46(2): 418 (2014).

Basionym: *Orchis* ×*magyarii* Soó, Bot. Közlem. 31: 227 (1935).

Hybrid formula: *Dactylorhiza incarnata* (L.) Soó × *Anacamptis palustris* subsp. *elegans* (Heuff.) R. M. Bateman, Pridgeon & M. W. Chase

Dactylorhiza ×aschersoniana (Hausskn.) Borsos & Soó, Ann. Univ. Sci. Budapest. Rolando Eotvos, Sect. Biol. 3 (Geobot. Monogr. Orch. Pannon. & Karpat. Fl. IV.): 113 (1960).

Basionym: *Orchis* ×*aschersoniana* Hausskn., Mitt. Geogr. Ges. (Thüringen) Jena 2: 223 (1885).

Hybrid formula: *Dactylorhiza incarnata* (L.) Soó × *Dactylorhyza majalis* (Rchb.) P. F. Hunt & Summerh.

****Dactylorhiza ×ruppertii*** (M. Schulze) Borsos & Soó, Ann. Univ. Sci. Budapest. Rolando Eotvos, Sect. Biol. 3 (Geobot. Monogr. Orch. Pannon. & Karpat. Fl., 4): 122 (1960).

Basionym: *Orchis* ×*ruppertii* M. Schulze, Oesterr. Bot. Z. 49: 264 (1899).

Hybrid formula: *Dactylorhiza majalis* (Rchb.) P. F. Hunt & Summerh. × *Dactylorhiza sambucina* (L.) Soó

Dactylorhiza maculata subsp. ***fuchsii*** (Druce) Hyl. (*Dactylorhiza fuchsii* (Druce) Soó) × *Dactylorhyza majalis* (Rchb.) P. F. Hunt & Summerh.

Synonyms: *Orchis* ×*braunii* Halácsy, Oesterr. Bot. Z. 31: 137 (1881). *Dactylorhiza* ×*braunii* (Halácsy) Borsos & Soó, Ann. Univ. Sci. Budapest. Rolando Eotvos, Sect. Biol. 4 (Geobot. Monogr. Orch. Pannon. & Karpat. Fl. 5): 82 (1961). *Dactylorhiza* ×*dinglensis* nothosubsp. *braunii* (Halácsy) M. H. J. van der Meer, Cact. Phantast. 5(1): 1 (2019).

Note. For hybrid *D. incarnata* × *D. maculata* subsp. *fuchsii* the names *D.* ×*braunii* (Halácsy) Borsos & Soó or *D.* ×*dinglensis* nothosubsp. *braunii* (Halácsy) M. H. J. van der Meer are used. In my opinion, this decision needs further verification.

Epipactis ×schmalhausenii Richt., Pl. Europ. 1: 284 (1890).

Hybrid formula: *Epipactis atrorubens* (Hoffm.) Besser ×*Epipactis helleborine* (L.) Cranz

****Gymnadenia ×intermedia*** Peterm. Fl. Bienitz: 30 (1841).

Hybrid formula: *Gymnadenia conopsea* (L.) R. Br. × *Gymnadenia odoratissima* (L.) Rich.

Neotinea ×dietrichiana (Bogenh.) H. Kretzschmar, Eccarius & H. Dietr., Orchid Gen. *Anacamptis* Orchis Neotinea: 464 (2007).

Basionym: *Orchis* ×*dietrichiana* Bogenh., Taschenb. Fl. Jena: 351 (1850).

Hybrid formula: *Neotinea tridentata* (Scop.) R. M. Bateman, Pridgeon & M. W. Chase × *Neotinea ustulata* (L.) R. M. Bateman, Pridgeon & M. W. Chase

Synonyms: *Orchis* ×*austriaca* Kern., Oesterr. Bot. Z. 14: 139 (1864).

Ophrys ×minuticauda Duffort [nothosubsp. *minuticauda*], Orch. Gers (Bull. Vulg. Sc. Nat. Gers) 2: 27 (1902); E. G. Camus, Monogr. Orch.: 306 (1908).

Hybrid formula: *Ophrys apifera* Huds. × *Ophrys scolopax* subsp. *cornuta* (Steven) E. G. Camus (*Ophrys oestrifera* subsp. *bremifera* (Steven) K. Richt.)

Ophrys scolopax subsp. ***cornuta*** (Steven) E. G. Camus (*Ophrys oestrifera* M. Bieb.) × *Ophrys sphegodes* subsp. *taurica* (Aggeenko) Soó ex Niketic & Djordjevic (*Ophrys mammosa* Desf.. subsp. *mammosa*, *Ophrys mammosa* subsp. *caucasica* (Woronow ex Grossh.) Soó)

Orchis ×angusticruris Franch., Fl. Loir-et-Cher: 571 (1885).

Hybrid formula: *Orchis purpurea* Huds. × *Orchis simia* Lam.

Orchis ×beyrichii Kern., Verh. K. K. Zool.-Bot. Ges. Wien 15: 208 (1865).

Hybrid formula: *Orchis militaris* L. ×*Orchis simia* Lam.

Orchis ×beyrichii nothosubsp. ***golestanica*** (Renz) H. Kretzschmar, Eccarius & H. Dietr., Orchid Gen. *Anacamptis* Orchis Neotinea: 469 (2007).

Basionym: *Orchis* ×*golestanica* Renz, Fl. Iranica [Rechinger] 126: 118 (1978).

Hybrid formula: *Orchis militaris* subsp. *stevenii* (Rchb. f.) B. Baumann, H. Baumann, R. Lorenz & Ruedi Peter × *Orchis simia* Lam.

Synonyms: *Orchis* ×*mackaensis* Kreutz, Orchideeën 51(3): 72 (1989). *Orchis* ×*beyrichii* nothosubsp. *mackaensis* (Kreutz) Fateryga & Kreutz, J. Eur. Orch. 46(2): 419 (2014).

Orchis ×calliantha Renz & Taubenheim, Orchidee (Hamburg) 34(3): 95 (1983).

Hybrid formula: *Orchis punctulata* Steven ex Lindl. ×*Orchis simia* Lam.

Orchis ×hybrida Boenngh. ex Rchb., Fl. Germ. Excurs.: 125 (1830).

Hybrid formula: *Orchis militaris* L. × *Orchis purpurea* Huds.

Orchis ×loreziana Brügger, Beitr. Kenntn. Chur: 56; et in Jahresb. Naturf. Ges. Graub. II. 23-24: 118 (1880).

Hybrid formula: *Orchis mascula* (L.) L. × *Orchis pallens* L.

Orchis ×loreziana nothosubsp. ***kisslingii*** (Beck) Potůček, Preslia 48(2): 132 (1976).

Basionym: *Orchis* ×*kisslingii* Beck, Verh. K. K. Zool.-Bot. Ges. Wien 38: 768 (1888).

Hybrid formula: *Orchis mascula* subsp. *speciosa* (Mutel) Hegi × *Orchis pallens* L.

Orchis ×penzigiana nothosubsp. ***jailae*** (Soó) H. Kretzschmar, Eccarius & H. Dietr., Orchid Gen. *Anacamptis* Orchis Neotinea: 470 (2007).

Basionym: *Orchis* ×*jailae* Soó, Repert. Spec. Nov. Regni Veg. Sonderbeih. A 2: 190 (1932).

Hybrid formula: *Orchis mascula* subsp. *speciosa* (Mutel) Hegi × *Orchis provincialis* Balb. ex Lam. & DC.

Orchis ×permixta Soó, Repert. Spec. Nov. Regni Veg. Sonderbeih. A 2: 196 (1932).

Hybrid formula: *Orchis mascula* subsp. *speciosa* (Mutel) Hegi × *Orchis pallens* L. × *Orchis provincialis* Balb. ex Lam. & DC.

Synonyms: *Androrchis ×permixta* (Soó) W. Foelsche & Jakely, J. Eur. Orch. 41(2): 355 (2009).

Orchis ×plessidiaca Renz, Repert. Spec. Nov. Regni Veg. [Feddes Repert.] 25: 245 (1928).

Hybrid formula: *Orchis pallens* L. ×*Orchis provincialis* Balb. ex Lam. & DC.

Synonyms: *Androrchis ×plessidiaca* (Renz) W. Foelsche & Jakely, J. Eur. Orch. 41(2): 355 (2009).

Orchis ×wulffiana Soó, Repert. Spec. Nov. Regni Veg. Sonderbeih. A 2: 194 (1932).

Hybrid formula: *Orchis punctulata* Steven ex Lindl. × *Orchis purpurea* Huds.

Platanthera ×hybrida Brügger, Jahresber. Naturf. Ges. Graubündens II. 23-24: 118 (1880).

Hybrid formula: *Platanthera bifolia* (L.) Rich. × *Platanthera chlorantha* (Custer) Rchb.

Literature: Klinge, 1899; Ugrinskyi, 1913; Soó, 1960; Mosyakin, 1988; Peregrym & Kuzemko, 2010; Pinchuk & Tikhomirov, 2010; Sytschak & Kagalo, 2010; Bengus & Bengus, 2011; Djordjević et al., 2012; Fateryga & Kreutz, 2014; Fateryga et al., 2014; Seregin et al., 2015b; Bernacki, 2016; Fateryga et al., 2018; Dulugeac et al., 2019; van der Meer, 2019b; Anghelescu et al., 2020; Bersweden et al., 2020; Protopopova et al., 2020; Mateo Sanz, 2021; Fateryga et al., 2022.

Poaceae Barnhart, nom. cons.

×Agroelymus czernjaevii (Širj. & Lavrenko) Olshanskyi, Ukrayins'k. Bot. Zhurn. 80(2): 129 (2023).

Basionym: *Triticum ×czernjaevii* Širj. & Lavrenko, Consp. Fl. Chark. 1: 39 (1926).

Hybrid formula: *Agropyron tanaiticum* Nevski × *Elymus repens* (L.) Gould

Synonyms: *×Agrotrigia czernjaewii* (Širj. & Lavrenko) Sutorý, Čas. Morav. Muz., Vědy Přír. 78(1–2): 95 (1994).

×Agroelymus kotovii (Tzvelev) Olshanskyi, Ukrayins'k. Bot. Zhurn. 80(2): 129 (2023).

Basionym: *×Agrotrigia kotovii* Tzvelev, Novosti Sist. Vyssh. Rast. 9: 63 (1972).

Hybrid formula: *Agropyron cristatum* (L.) Gaertn. (*Agropyron pectinatum* (M. Bieb.) P. Beauv.)×*Elymus repens* (L.) Gould

Synonyms: *×Elymopyron kotovii* (Tzvelev) M. H. J. van der Meer, Cact. Phantast. 3(2): 24 (2019), nom. inval.

Agrostis ×murbeckii Fouill., Bull. Soc. Bot. France 79: 799, in obs. (1933).

Hybrid formula: *Agrostis capillaris* L. × *Agrostis stolonifera* L.

Bromus riparius Rehmann × ***Bromus sclerophyllus*** Boiss. (*Bromus cappadocicus* Boiss. & Balansa)

Synonyms: *Bromopsis ×taurica* Sljuss., Zlaki Ukrainy: 146 (1977), nom. illeg.

Calamagrostis ×acutiflora (Schrad.) DC., Fl. Franc. [de Candolle & Lamarck], ed. 3. 5: 255 (1815).

Basionym: *Arundo ×acutiflora* Schrad., Fl. Germ. (Schrader) 1: 217 (1806).

Hybrid formula: *Calamagrostis arundinacea* (L.) Roth × *Calamagrostis epigejos* (L.) Roth

Calamagrostis ×hartmaniana Fr., Summa Veg. Scand.: 241 (1845).

Hybrid formula: *Calamagrostis arundinacea* (L.) Roth × *Calamagrostis canescens* (Weber) Roth

Calamagrostis ×rigens Lindgr., Bot. Not. 1843: 4 (1843).

Hybrid formula: *Calamagrostis canescens* (Weber) Roth × *Calamagrostis epigejos* (L.) Roth

Calamagrostis ×vilnensis Besser, in Roem. et Schult. Add. ad Mant. 2: 602 (1827).

Hybrid formula: *Calamagrostis canescens* (Weber) Roth × *Calamagrostis stricta* (Timm) Koeler

Synonyms: *Calamagrostis halleriana* var. gracilescens Blytt, Norsk Fl.: 139 (1847). *Calamagrostis ×gracilescens* (Blytt) Blytt, Norges Fl. 1: 88 (1861).

Festuca ×pocutica Zapał., Consp. Fl. Galic. Crit. 3. 230 (1911).

Hybrid formula: *Festuca picturata* Pils (*Festuca picta* Kit. ex Schult.) × *Festuca porcii* Hack.

Festuca ×polovina Bednarska, Phytotaxa 356(2): 174 (2018).

Hybrid formula: *Festuca ovina* L. × *Festuca polesica* Zapał.

****Glyceria ×pedicellata*** F. Towns., Ann. Mag. Nat. Hist. ser. 2, 5: 105 (1850).

Hybrid formula: *Glyceria fluitans* (L.) R. Br.× *Glyceria notata* Chevall.

Lolium ×boucheanum Kunth, Révis. Gramin. 3: t. 220 (1834).

Hybrid formula: *Lolium multiflorum* Lam. ×*Lolium perenne* L.

Synonyms: *Lolium ×hybridum* Hausskn., Mitt. Thüring. Bot. Ges. 6: 32 (1888).

Lolium ×czarnohorense (Zapał.) Banfi, Galasso, Foggi, Kopecký & Ardenghi, Taxon 66(3): 711 (2017).

Basionym: *Festuca ×czarnohorensis* Zapał., Consp. Fl. Galic. Crit. 3. 230 (1911).

Hybrid formula: *Lolium apenninum* (De Not.) Ardenghi & Foggi × *Lolium giganteum* (L.) Darbysh.

Synonyms: *Schedonorus ×schlickumii* nothosubsp. *czarnohorensis* (Zapał.) B. Bock, Bull. Soc. Bot. Centre-Ouest, 43: 220 (2012).

Lolium ×elongatum (Ehrh.) Banfi, Galasso, Foggi, Kopecký & Ardenghi, Taxon 66(3): 711 (2017).

Basionym: *Festuca elongata* Ehrh., Beitr. Naturk. [Ehrhart] 6: 83, 133 (1791).

Hybrid formula: *Lolium perenne* L. × *Lolium pratense* (Huds.) Darbysh.

Synonyms: *Festuca loliacea* Huds., Fl. Angl.: 38 (1762). *Schedonorus loliaceus* (Huds.) P. Beauv., Ess. Agrostogr.: 177 (1812). *×Festulolium loliaceum* (Huds.) P. Fourn., Quatre Fl. France: 81 (1935). *×Schedolium loliaceum* (Huds.) Holub, Preslia 70: 112 (1998).

Lolium ×holmbergii (Dörfl.) Banfi, Galasso, Foggi, Kopecký & Ardenghi, Taxon 66(3): 713 (2017).

Basionym: *Festuca ×holmbergii* Dörfl., Herb. Norm. Sched. Cent. [Dörfler] No. 5379 (1911).

Hybrid formula: *Lolium arundinaceum* (Schreb.) Darbysh. × *Lolium perenne* L.

Synonyms: *×Festulolium holmbergii* (Dörfl.) P. Fourn., Quatre Fl. France 81 (1935). *×Schedololium holmbergii* (Dörfl.) Soreng & Terrell, Phytologia 83(2): 87 (1998).

Note. This hybrid is very rare (see: D. Davydov, 2020, www.inaturalist.org/observations/52003519).

Melica ×thuringiaca nothosubsp. ***chrysolepis*** (Klokov) W. Hempel, Feddes Repert. 122(1-2): 183 (2012).

Basionym: *Melica ×chrysolepis* Klokov, Bot. Zhurn. (Kiev) 4: 93 (1947).

Hybrid formula: *Melica ciliata* subsp. *taurica* (K. Koch) Tzvelev × *Melica transsilvanica* subsp. *klokovii* Tzvelev

Synonyms: *Melica ciliata* nothovar. *chrysolepis* (Klokov) Tzvelev, Zlaki SSSR 554 (1976).

Miscanthus ×longiberbis (Hack.) Nakai, Bot. Mag. (Tokyo) 31: 12 (1917).

Basionym: *Miscanthus matsumurae* var. *longiberbis* Hack., Bull. Herb. Boissier sér. 2, 4: 532 (1904).

Hybrid formula: *Miscanthus sacchariflorus* (Maxim.) Benth. & Hook. f. ex Franch. ×*Miscanthus sinensis* Andersson

Synonyms: *Miscanthus ×giganteus* J. M. Greef & Deuter ex Hodk. & Renvoize, Kew Bull. 56(3): 759 (2001).

Note. This hybrid is cultivated. There are isolated cases when this species grew spontaneously in Ukraine (see: O. Shynder, 2021, www.inaturalist.org/observations/94614403). Also, sometimes this species grows wild in other European countries (Galasso et al., 2022).

Poa* ×*figertii Gerhardt., Deutsche Bot. Monatsschr. 10: 152 (1892).
Hybrid formula: *Poa compressa* L. × *Poa nemoralis* L.

Sorghum* ×*drummondii (Steud.) Nees ex Millsp. & Chase, Publ. Field Columb. Mus., Bot. Ser. 3(1): 21 (1903).
Basionym: *Andropogon* ×*drummondii* Steud., Syn. Pl. Glumac. 1(4-5): 393 (1854).
Hybrid formula: *Sorghum arundinaceum* (Desv.) Stapf × *Sorghum bicolor* (L.) Moench
Synonyms: *Sorghum* ×*sudanense* (Piper) Stapf, Fl. Trop. Afr. [Oliver et al.] 9(1): 113 (1917).
Note. This hybrid is cultivated, sometimes it grows spontaneously (ephemerophyte).

Stipa* ×*fallacina Klokov & V. V. Ossycznjuk, Novosti Sist. Vyssh. Nizsh. Rast. 1975: 62 (1976).
Hybrid formula: *Stipa lessingiana* Trin. & Rupr. × *Stipa zalesskyi* Wilensky ex Grossh. s.l.

Stipa* ×*majalis Klokov, Novosti Sist. Vyssh. Nizsh. Rast. 1975: 43 (1976).
Hybrid formula: *Stipa lessingiana* Trin. & Rupr. × *Stipa pulcherrima* K. Koch

×*Thinoelymus mucronatus* (Opiz) Banfi, Nat. Hist. Sci. 5(2): 61 (2018).
Basionym: *Agropyron* ×*mucronatum* Opiz, Naturalientausch 6: 42 (1824).
Formula: *Elymus repens* (L.) Gould × *Thinopyrum intermedium* (Host) Barkworth & D. R. Dewey
Synonyms: *Elytrigia* ×*mucronata* (Opiz) Prokudin, Proc. Bot. Inst., Kharkov State Univ. 3: 178 (1938). *Elytrigia* ×*tesquicola* (Czerniak.) Prokudin, Proc. Bot. Inst., Kharkov State Univ. 3: 181 (1938). *Agropyron* ×*tesquicola* (Prokudin) Prokudin, Fl. URSR 2: 342 (1940).
Literature: Schmalhausen, 1886; Zapałowicz, 1906; Zapałowicz, 1911; Širjaev & Lavrenko, 1926; Kotov, 1938; Tzvelev, 1965; Prokudin & Druleva, 1972; Prokudin et al., 1977; Sieber, & Murray, 1982; Sutorý, 1993; Soreng, & Terrell, 1997; Kopecký et al., 2006; Bednarska, 2007; Fedoronchuk et al., 2007; Mahelka et al., 2007; Szczepaniak et al., 2007; Bednarska, 2009; Fedoronchuk et al., 2010; Paszko & Nobis, 2010; Tzvelev, 2014; Angelov & Szczepaniak, 2015; Seregin et al., 2015b; Banfi et al., 2017; Cepurīte & Rūrāne, 2017; Banfi, 2018; Bednarska & Nachychko, 2018; Majka et al., 2018; Krasniak, 2019; Paštová et al., 2019; van der Meer, 2019a; Tkach et al., 2020;Chorna et al., 2021; Urfusová et al., 2021; Wilcox et al., 2021; Peterson et al., 2022; Shynder et al., 2022a; Olshanskyi, 2023.

Potamogetonaceae Bercht. & J.Presl

Potamogeton* ×*angustifolius Bercht. & J. Presl, Prir. Rostlin Aneb. Rostl. 1: 19 (1823).
Hybrid formula: *Potamogeton gramineus* L. × *Potamogeton lucens* L.
Synonyms: *Potamogeton* ×*zizii* W. D. J. Koch ex Roth, Enum. Pl. Germ. 1(1): 531 (1827).

****Potamogeton* ×*belorussicus*** D.Dubovik, Fl. Belarusi 2: 57 (2013).
Hybrid formula: *Potamogeton compressus* L. × *Potamogeton friesii* Rupr.

****Potamogeton* ×*cooperi*** (Fryer) Fryer, Rep. Bot. Exch. Club Brit. Isles 1: 497 (1897).
Hybrid formula: *Potamogeton crispus* L. × *Potamogeton perfoliatus* L.

Potamogeton* ×*fluitans Roth, Tent. Fl. Germ. 1: 72 (1788).
Hybrid formula: *Potamogeton lucens* L. × *Potamogeton natans* L.
Synonyms: *Potamogeton* ×*sterilis* Hagstr., Kungl. Svenska Vetenskapsakad. Handl. n.f, 55(5): 238 (1916), nom. illeg.

Potamogeton* ×*nitens Weber, Fl. Holsat. Suppl.: 11 (1787).
Hybrid formula: *Potamogeton gramineus* L. × *Potamogeton perfoliatus* L.

Potamogeton* ×*salicifolius Wolfg., Mant. 3 (Schultes & Schultes f.) 3: 355 (1827).
Hybrid formula: *Potamogeton lucens* L. × *Potamogeton perfoliatus* L.
Synonyms: *Potamogeton* ×*decipiens* Nolte ex W. D. J. Koch, Syn. Fl. Germ. Helv., ed. 2 779 (1844).

****Potamogeton* ×*schreberi*** G. Fisch., Ber. Bayer. Bot. Ges. 11: 58 (1907).
Hybrid formula: *Potamogeton natans* L. × *Potamogeton nodosus* Poir.

Potamogeton* ×*sparganiifolius Laest. ex Fr., Novit. Fl. Suec. Mant. 1(1-3): 9 (1832).
Hybrid formula: *Potamogeton gramineus* L. × *Potamogeton natans* L.
Literature: Schmalhausen, 1886; Zapałowicz, 1906; Kaplan & Fehrer, 2013; Seregin et al., 2015b.

Typhaceae Juss., nom. cons.

Typha* ×*glauca Godr., Fl. Lorraine 3: 20; ed. 2, 2: 332 (1844).
Formula: *Typha angustifolia* L. × *Typha latifolia* L.
Literature: Tsyusko et al., 2005; Nowińska et al, 2014.

Discussion

Probably, the monograph "Hybrid Flora of the British Isles" (Stace et al., 2015) is the best among the works devoted to hybrids. Unfortunately, Ukrainian botanists are unlikely to be able to publish a similar book in the near future. However, everything is possible.

When preparing this article, I was fully aware that the information given here is incomplete and partly controversial.

Also, during the preparation of this article I had to make a slight digression. It turned out that there are many nomenclature problems in both Poaceae and Orchidaceae families that require special solutions. So, I proposed a new nothogenus ×*Kengdoroegneria* Olshanskyi for intergeneric hybrids between species of *Kengyilia* C. Yen & J. L. Yang and *Pseudoroegneria* (Nevski) Á. Löve; also some nomenclatural combinations in ×*Agroelymus* E. G. Camus ex A. Camus, ×*Elyleymus* B. R. Baum, *Elymus* L., and ×*Kengdoroegneria* were proposed by me (Olshanskyi, 2023). However, the nomenclature of Orchidaceae's hybrids is presented here as preliminary.

Difficulties that arose during the preparation of this article:

1) there is not enough information, because the hybridization of plant species is poorly studied in Ukraine,

2) it is difficult to draw a clear line between hybrids and species of hybridogenic origin,

3) disputed status of parental taxa (i.e. different researchers consider parental taxa in different ranks).

Therefore, I hope that taxonomists will pay more attention to the issues of hybridization and the geographical distribution of hybrids in Ukraine. Among other things, this problem is important because hybridization leads to various consequences: speciation, gene drift between populations of different species, or to the absorption of one species by another.

Recently, some researchers have discovered new hybrids of monocots for the territory of Ukraine (Bednarska, 2009; Peregrym & Kuzemko, 2010; Peregrym & Koopman, 2023). Hybrids are more often listed in floristic lists. Some more hybrids are in the modern lists of spontaneous flora of botanical gardens and arboretums (Shynder et al., 2022a, 2022b). I want to note that hybrids of monocots are quite actively researched in countries neighboring Ukraine. Thus, new hybrids were described from Romania (Anghelescu et al., 2021) and Poland (Szczepaniak et al., 2016). Some authors recorded the findings of hybrids in Romania (Dulugeac et al., 2019; Anghelescu et al., 2020; Řepka & Mendel, 2022), Hungary (Mesterházy et al., 2017), Slovakia (Bernátová, 2008; Koopman et al., 2021), Poland (Paszko & Nobis, 2010; Więcław, 2014; Nowińska et al., 2014; Kobierski et al., 2018; Koopman et al., 2019), etc.

Conclusions

In my opinion, this list of hybrids can be included in the new Checklist. The information provided here can be useful for botanists, ecologists and other researchers. This list will be useful to employees of nature reserves and national parks of Ukraine. Although hybrids are quite

unstable and random elements of any flora, their presence can indirectly indicate various processes: climate change, or pollution of the territory, etc. Therefore, further studies of hybrids are needed.

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