PLANT TAXONOMY,
GEOGRAPHY AND FLORISTICS

СИСТЕМАТИКА, ФЛОРИСТИКА,
ГЕОГРАФІЯ РОСЛИН

https://doi.org/10.15407/ukrbotj82.04.345
RESEARCH ARTICLE

New and rare hybrids of Eudicots in the flora of Kharkiv Region, Ukraine

Heorhii M. BONDARENKO *, **Yurii G. GAMULYA**
V.N. Karazin Kharkiv National University,
4 Svobody Square, Kharkiv 61022, Ukraine
* Author for correspondence: *h.m.bondarenko@karazin.ua*

Abstract. The article contains data about interspecific hybrids of Eudicots recorded in Kharkiv Region, Ukraine. Totally, 25 hybrids of Eudicots were registered, described, and illustrated. An annotated list includes data about their distribution, ecological preferences, morphology, and information about the discovered localities. The article includes data of our own field survey, analyses of open databases on biodiversity, literature, and revision of the herbarium collections of the National Herbarium of Ukraine (KW) and V.N. Karazin Kharkiv National University (CWU). During field research, we discovered seven hybrids recorded in Ukraine for the first time (*Arctium* × *neumanii*, *Centaurea diffusa* × *C. jacea*, *C. jacea* × *C. nigrescens* subsp. *pinnatifida*, *C. nigrescens* subsp. *pinnatifida* × *C. phrygia* subsp. *pseudophrygia*, *Corydalis* × *hausmanii*, *Rubus* × *areschougii*, and *Verbascum* × *thapsi*) and six hybrids are new to Kharkiv Region (*Arctium* × *cimbricum*, *Betula* × *aurata*, *Salix* × *reichardtii*, *Verbascum* × *brockmuellerii*, *V.* × *pseudolychnitis*, *Utricularia* × *neglecta*). Some hybrids originated with participation of alien species or subspecies were registered (*Centaurea diffusa* and *C. nigrescens* subsp. *pinnatifida*). Besides, the article discusses the potential records of other hybrid Eudicots in the flora of Kharkiv Region in the future.

Keywords: alien species, biodiversity, chorology, ecology, hybridization, morphology, new species records

Introduction

The hybridization processes are well known in vascular plants. Nevertheless, many aspects of this phenomenon are considered obscure and still in need to be studied. Numerous investigations studying different sides of this issue (ecology, evolution, harvest productivity, plant selection, adaptation, etc.) prove the importance of the problem (Ainouche et al., 2004; Wisseman, 2005; Thompson et al., 2018; Wong et al., 2022; Feliner et al., 2023; Edger et al., 2025, etc.). For instance, some publications describe the adverse effects of hybrids on the autochthonous flora, even if one of the parental species is native to that territory (Bleeker et al., 2007; Hovick, Whitney, 2014; Ruhsam et al., 2014; Buhk, Thielsch, 2015, etc.). Thus, studies of possible hybrids originating between native and alien species, and of their impact on native plant diversity are relevant in the highlights of the current threats to biodiversity.

In the Ukrainian scientific literature, information about hybrid plants is still fragmentary. Nevertheless, numerous Ukrainian botanists' publications are dedicated to separate hybrids or they

ARTICLE HISTORY. Submitted 11 April 2025. Revised 08 August 2025. Published 31 August 2025
CITATION. Bondarenko H.M., Gamulya G.Yu. 2025. New and rare hybrids of Eudicots in the flora of Kharkiv Region, Ukraine. *Ukrainian Botanical Journal*, 82(4): 345–366. https://doi.org/10.15407/ukrbotj82.04.345

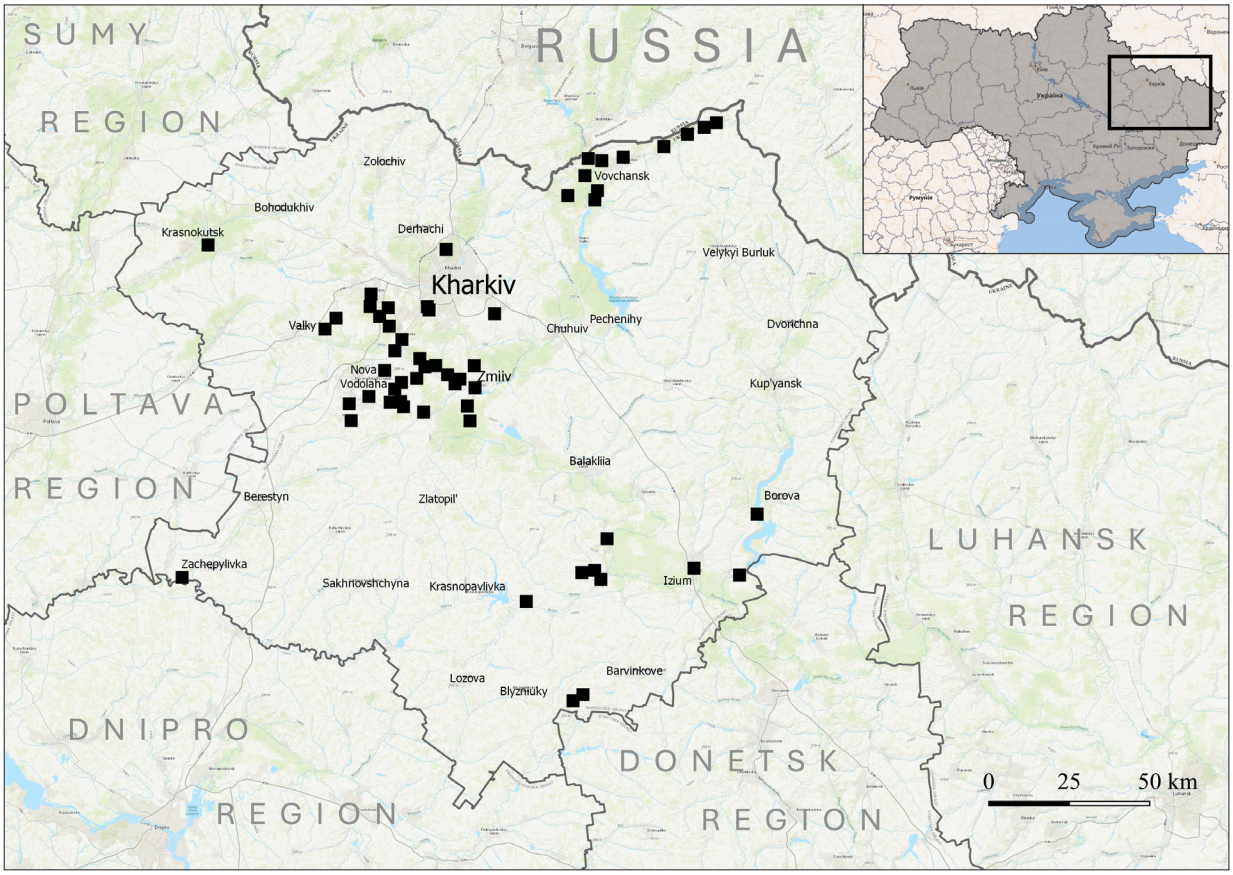

Fig. 1. The collection sites of the expeditions within Kharkiv Region, Ukraine. Base map: ESRI World Topo

mention some of hybrids in their floristic research (Mosyakin, Fedoronchuk, 1999; Bezsmertna et al., 2012; Peregrym, Didukh, 2014; Shynder et al., 2024; Fedoronchuk, 2022a, 2022b, 2023a, 2023b, 2024; Peregrym, Koopman, 2023; Klesczewski et al., 2024, etc.), in particular, in some multi-volume references, such as the *Flora of the Ukrainian SSR* (*Flora URSR*, 1938–1965). Investigations on hybrid plants in Kharkiv Region were also fragmentary, and the relevant publications contain mentions of the occurrences of only some hybrids (Naliwaiko, 1899; Lawrenko, 1923; Gorelova, Alyokhin, 2002; Peregrym, Kuzemko, 2010, etc.). The first attempts to gather generalized data on hybrids in the Ukrainian flora were made only in 2023 and were at that stage restricted to Monocots (Olshanskyi, 2023). Meanwhile, such integral research on hybrid plants in some countries exist (Cayouette, Catling, 1992; Stace et al., 2015). Thus, studies of the taxonomic diversity of hybrids are relevant at the national and local levels in Ukraine. This investigation starts the series of special research of the hybrid plants occurring in Kharkiv Region (Kharkivs'ka Oblast) within its current administrative borders. The article is dedicated to the records of rare and new hybrids of Eudicots in the flora of Ukraine, and in Kharkiv Region in particular.

Materials and Methods

The investigations were conducted during 2018–2025. The geography of the research covers the administrative territory of Kharkiv Region. The studied area includes Kharkiv City, Kharkiv, Chuhuiv, Bohodukhiv, Berestyn, Lozova, and Izium Districts (including the former Balakliia, Barvinkove, Vovchansk, Zmiiv, Nova Vodolaha, Valky, Krasnokutsk, Zachepylivka, and Borova Districts) (Fig. 1).

In addition to the field surveys, the list of hybrids contains the data from literature (Czerniajev, 1859; Schmalhausen, 1895, 1897; Naliwaiko, 1899; Širajefv, Lavrenko, 1926; Flora URSR, 1938–1965;

Opredelitel…, 1987; Gorelova, Alyokhin, 2002; Zvyagintseva, 2015; Shynder, Negrash, 2021, etc.), and open databases on biodiversity (GBIF, 2025–onward; iNaturalist, 2025–onward; UkrBIN, 2025–onward; POWO, 2025–onward). The observations of other persons are also used in the article, and such records contain the relevant references. Moreover, we revised the herbarium specimens deposited in the Herbarium of V.N. Karazin Kharkiv University — CWU (Kharkiv, Ukraine) and the National Herbarium of Ukraine — KW (M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Kyiv). The list of hybrids occurring in Kharkiv Region includes only plants confirmed by our observations and our revision of observations in databases and herbarium specimens.

The identification of plants is based on morphology. It includes analyses of the common characters of the hybrids and their putative parental species.

The nomenclature of names of species and hybrids follows the *Plant of the World Online* (POWO, 2025–onward) with some exceptions, such as *Arctium* × *cimbricum* (E.H.L. Krause) Hayek (Bánki et al., 2025), which is absent there. We also propose Ukrainian vernacular names for some hybrids that did not have such names.

Each hybrid mentioned in the article is accompanized with a short annotation that contains information about its distribution. Our observations and other authors' observations from *iNaturalist* (2025–onward) contains decimal geographical coordinates. Moreover, if possible, we determined approximate geographical coordinates of some localities where herbarium specimens were collected, according to data of their labels. Additionally, each mentioned herbarium specimen contains a translated and modified transcript of the label in accordance with modern names of administrative territories and other geographic elements. The map of the expedition spots was made in QGIS 3.18.1 Zürich (QGIS, 2024–onward) using the plugin *GBIF* Occurrences (Noé, 2024).

Results

Our investigations proved the presence of 25 rare and new hybrids of Eudicots in Kharkiv Region. We prepared an annotated list of the new and rare hybrids recorded in the region. The annotations contain hybrid formulas, data about distribution, ecology, and the revealed localities. Also, we provide short morphological characteristics and indicate the common features of hybrid plants and their parental species. The symbol "(+)" marks the localities that we discovered, while the localities from literature, open databases, or herbaria are marked by "(r)".

The list does not contain data about some hybrids that have wide distribution in Kharkiv Region (such as *Arctium* × *mixtum* (Simonk.) Nyman., *A.* × *nothum* (Ruhmer) J. Weiss, *Populus* × *canescens* (Aiton) Sm., *Salix* × *fragilis* L., etc.), which we observed during our field research. Moreover, we excluded some hybrid plants cultivated in the region and occurring only in cultivation (e.g., *Mentha* × *piperita* L., *Petunia* × *atkinsiana* (Sweet) D. Don ex W.H. Baxter, *Tilia* × *europaea* L., some hybrids of *Crataegus* sp., *Fragaria* sp., etc.). Besides, we exclude some widely distributed crops of hybrid origin, which can be taxonomically considered as nothospecies (e.g., *Prunus domestica* L., *P. cerasus* L., etc.).

An annotated list of new and rare hybrids of Eudicots recorded in Kharkiv Region

Abbreviations: **Distr.** — District; **vic.** — vicinity; **vill.** — village. Abbreviations of the districts in Kharkiv Region: **Bohod.** — Bohodukhiv; **Chuh.** — Chuhuiv; **Khark.** — Kharkiv; **Kup.** — Kup'yansk; **Loz.** — Lozova.

***Achillea* × *submicrantha* Tzvelev** (*Asteraceae*) — деревій майже дрібноцвітий.

Hybrid formula: *A. micrantha* Willd. × *A. setacea* Waldst. & Kit.

Notes on morphology: Heads pale yellow (intermediate between *A. micrantha* and *A. setacea*). Stems and leaves with varying levels of pubescence.

Distribution and ecology: A Pontic-Caspian taxon. In Ukraine it occurs sporadically in the Steppe zone and the southern part of the Left-Bank Forest-Steppe zone (Tzvelev, 1994: 121–122; GBIF Occurrence Download https://doi.org/10.15468/dl.4c5wrf, Accessed 20 August 2025). In Kharkiv Region, it grows on the sandy terrace of rivers' left banks (the Siverskyi Donets and the Oskil, and their tributaries). *Achillea* × *submicrantha* prefers sandy substrates and well-lit open spaces.

Studied localities: Chuh. Distr.: **1. (+)** vic. of Prylipka vill. (50.254260, 36.858880), the margin of a pine forest, Jun 2020, H. Bondarenko. Kup. Distr.: **2. (r)** Pisky vill. (~49.986145, 37.923377), on the slopes, Jul 1964, leg. & det.:? [*Notae criticae*:

Fig. 2. *Arctium* × *neumanii*. A: general habit; B: general inflorescence. Photos by H. Bondarenko

Achillea pannonica Scheele × *A. micrantha* Willd., det.: Л. Крицька] (KW019672). Izium Distr.: **3. (+)** Oskil vill. vic. (49.172038, 37.474008), an open sandy lawn on the dam of the Oskil Reservoir, Jul 2023, H. Bondarenko.

***Arctium* × *cimbricum* (E.H.L. Krause) Hayek** (~ *Arctium* × *scanicum* Rouy) (*Asteraceae*) — лопух кімврійський (Fig. S1).

Hybrid formula: *A. lappa* L. × *A. nemorosum* Lej.

Notes on morphology: Plants up to 2.0(2.2) m tall. Upper heads in corymbiform general inflorescence (as in *A. lappa*) and lower ones in racemiform general inflorescence (lower heads have short pedicels as *A. nemorosum* has them). Lower branches arched (as in *A. nemorosum*)

Distribution and ecology: An understudied hybrid of the widely distributed Eurasian species *A. lappa* and a relatively rare (in our region) European nemoral species *A. nemorosum*. According to habitat preferences of *A. nemorosum*, the revealed hybrid credibly occurs in the deciduous forests in the temperate zone of Europe. *Arctium* × *cimbricum* is reported for the flora of Ukraine (Onyshchenko et al., 2022).

Studied localities: Chuh. Distr.: **1. (+)** Homilshanski Lisy National Nature Park, vic. of Haidary vill. (49.627616, 36.301079), the oak forest, Jul 2024, H. Bondarenko, V. Siranskyi. Khark. Distr.: **2. (+)** Liubotyn town (49.930039, 35.926240; 49.914208, 35.926794; 49.913746, 35.927003), shady habitats; **3. (+)** vic. of Bystre vill. (49.895481, 35.936328), clearing in the oak forest, Aug 2024, H. Bondarenko.

***Arctium* × *neumanii* Rouy ex P. Fourn.** (*Asteraceae*) — лопух Ноймана (Fig. 2). A new hybrid for the flora of Ukraine.

Hybrid formula: *A. nemorosum* Lej. × *A. tomentosum* Mill.

Notes on morphology: Plant 1.5–1.6 m tall. Heads in racemiform general inflorescence (as in *A. nemorosum*) or upper heads in corymbiform general inflorescence. Phyllaries tomentose but not as intensively as in *A. tomentosum*.

Distribution and ecology: According to the open databases (GBIF Occurrence Download

https://doi.org/10.15468/dl.w852ac, Accessed 20 August 2025; iNaturalist, 2025–onward), this hybrid was registered in Sweden, the Netherlands, Germany, and Russia. Due to data deficiency, the total species range is uncertain. Quite possible, *A.* × *neumanii* is a nemoral hybrid distributed from Western Europe to Western Siberia. It has never been mentioned in the Ukrainian flora before. These are the first records of this hybrid in Ukraine. *Arctium* × *neumanii* grows in deciduous forests formed by beech, hornbeam, oak, and some other trees.

Studied localities: Khark. Distr.: **1. (+)** vic. of Verkhnia Ozeriana vill. (49.856867, 35.998079), fresh thickets on the bottom of the oak forest ravine, Sep 2023, H. Bondarenko. **2. (+)** Liubotyn town vic. (49.891560, 35.945524), margin of the oak forest, Aug 2024, H. Bondarenko, V. Siranskyi.

***Betula* × *aurata* Borkh.** (*Betulaceae*) — береза золотиста (Fig. S2). A new hybrid for the flora of Kharkiv Region.

Hybrid formula: *B. pendula* Roth × *B. pubescens* Ehrh.

Notes on morphology: Due to the morphological polymorphism of both parental species, *B.* × *aurata* also is variable in its morphological features. Young shoots are commonly reddish with lenticels (as *B. pendula*) and pubescent (as *B. pubescens*). Leaf blades are from orbicular-ovate to rhombic; slightly haired; margin serrate or doubly serrate.

Distribution and ecology: *Betula* × *aurata* sporadically occurs in Central Europe (POWO, 2025–onward). In Ukraine it grows in the northern and central parts of the country (Tarieiev et al., 2019). It prefers humid habitats on the sand terrace of the river's left banks. *Betula* × *aurata* can occur in the relief depression, around the swamps and bogs, etc.

Studied localities: Chuh. Distr.: **1. (+)** vic. of Artiukhivka vill., Ivankiv Forest (sporadically), the relief depressions in the pine forest, Sep 2024, H. Bondarenko, V. Siranskyi, K. Nesterenko.

***Centaurea diffusa* Lam. × *C. jacea* L.** (*Asteraceae*)

Notes on morphology: Perennial herb up to 30 cm. Stem erect, greyish, covered by dense woolly hairs or glabrous. Leaves alternate, greyish, covered by woolly hairs or glabrous. Lower and middle cauline leaves petiolate, pinnatipartite or pinnatisect (as in *C. diffusa*), lateral lobes lanceolate or linear, terminal lobe ellipsoid or lanceolate. Upper leaves sessile, lanceolate; margin entire. Flowers white (occasionally pink). Phyllary body ovate. Appendages pale (as in *C. diffusa*), membranous (as in *C. jacea*), ovate, margin pinnatisect, lobes linear. Inner phyllaries elongate. Appendages orbicular, with incised margin (Fig. 3).

Distribution and ecology: Geographical distribution remains insufficiently known. Two more records of this hybrid for the flora of Ukraine were made near Vysoke village (Bakhchysarai Distr., Autonomous Republic of Crimea; the forest margin in elevation ~500 m above the sea level; https://www.inaturalist.org/observations/108124720). Also, it is known from the herbaria (Specimen examined: Ukraine, Chernivtsi Region, Chernivtsi (formerly Zastavnyskyi) Distr., near Pohorilivka vill., Chornopototskyi Reserve, ~48.539947, 25.972925, the steppe slopes, July 7, 2004, leg. I.A. Korotchenko, det. H. Bondarenko (KW068101)). According to the ecological preferences of the parental species, the discovered hybrid credibly grows in herbaceous habitats.

Studied localities: Khark. Distr.: **1. (+)** vic. of Huliai Pole vill. (49.629332, 36.063796); the steppe ravine, Aug 2024, H. Bondarenko, V. Siranskyi.

***Centaurea jacea* L. × *C. nigrescens* subsp. *pinnatifida* (Fiori) Dostál.** (*Asteraceae*). A new alien hybrid to the flora of Ukraine.

Notes on morphology: Lower and middle cauline leaves pinnately lobed (as in *C. nigrescens* subsp. *pinnatifida*), less commonly entire. Appendage of phyllary with more or less wide membranaceous dark brown body (intermediate between *C. nigrescens* subsp. *pinnatifida* and *C. jacea*), but its margin fringed (as in *C. nigrescens* subsp. *pinnatifida*). Achene with pappi equalling to achene or a little shorter (as in *C. jacea*).

Distribution and ecology: The hybrids of *Centaurea jacea* s. l. and *Centaurea nigrescens* s. l. are reported for Central Europe (Koutecký et al., 2011). In Ukraine, it is known in Transcarpathia (Fodor, 1974), but the data about the hybrid with such subspecies as *Centaurea nigrescens* subsp. *pinnatifida* in Ukraine is absent. This subspecies was formerly unknown in the flora of Ukraine and was first discovered during our surveys (Bondarenko, Gamulya, 2025).

Studied localities: Khark. Distr.: **1. (+)** Sporadically in the vicinities of Liubotyn town and Bystre vill., the herbaceous habitats, forest margins, and the edges of agricultural fields, Jul 2023, Aug 2024, H. Bondarenko.

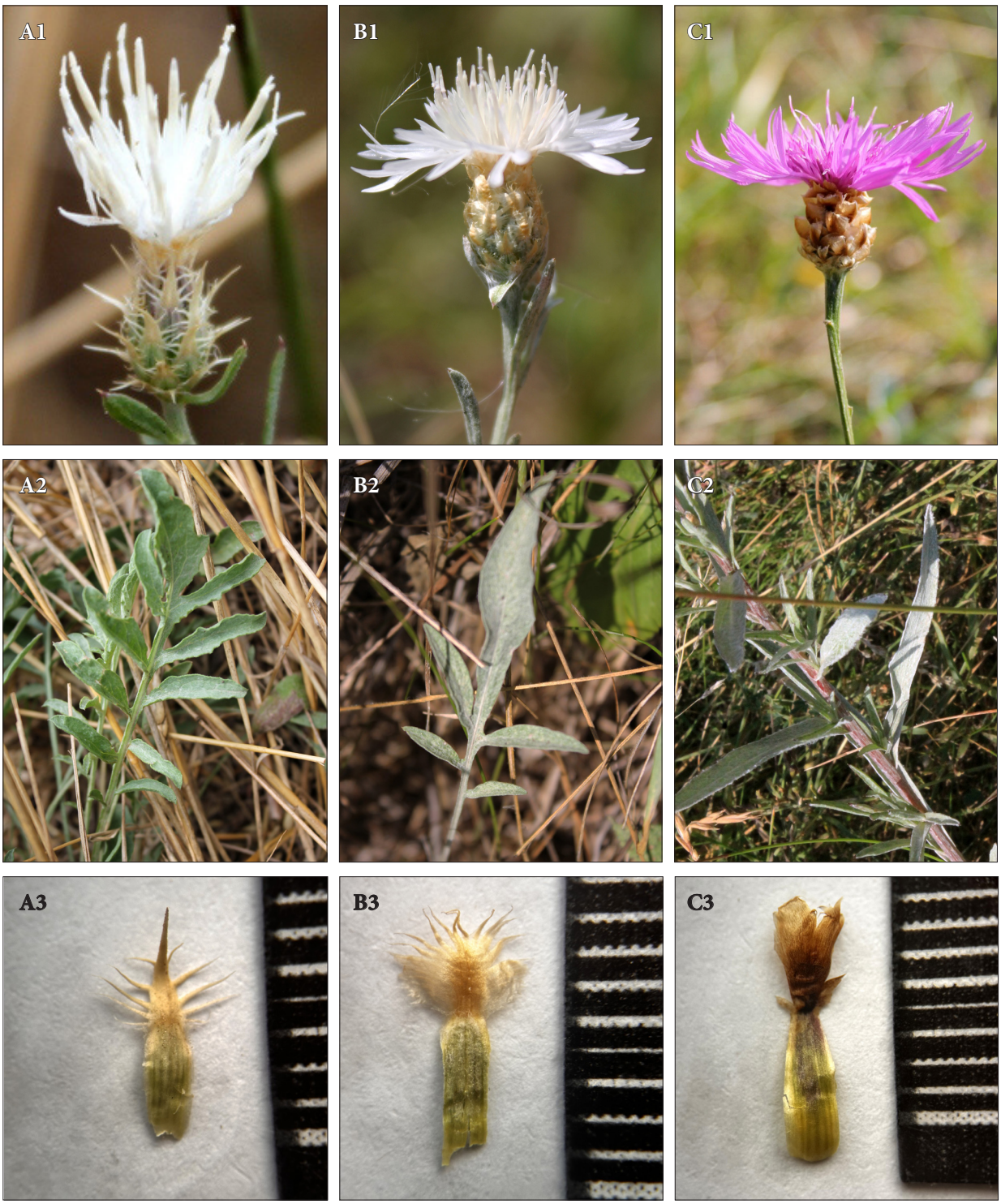

Fig. 3. Comparison of morphological features of two species of *Centaurea* and their hybrid. A: *C. diffusa*; B: *C. diffusa* × *C. jacea*; C: *C. jacea*; 1 — head; 2 — leaves; 3 — phyllary. Photos by H. Bondarenko

Fig. 4. Morphological comparison of some representatives of *Centaurea*. A: *C. nigrescens* subsp. *pinnatifida*; B: hybrid *C. nigrescens* subsp. *pinnatifida* × *C. phrygia* subsp. *pseudophrygia*; C: *C. phrygia* subsp. *pseudophrygia*; 1 — heads; 2 — middle leaves. Photos by H. Bondarenko

***Centaurea nigrescens* subsp. *pinnatifida* (Fiori) Dostál. × *C. phrygia* subsp. *pseudophrygia* (C.A. Mey.) Gugler**. (*Asteraceae*). An alien hybrid newly reported for the flora of Ukraine.

Notes on morphology: Perennial herb 30–60(70) tall. Lower leaves pinnatifid (*C. nigrescens* subsp. *pinnatifida*). Middle leaves sessile lanceolate or narrowly obovate, pinnatilobate. Upper leaves wide, sessile, lanceolate, with entire margin (*C. phrygia* subsp. *pseudophrygia*). Mature capitulum ovate, 1.5–2.0 cm long, 0.8–1.0 cm wide (*C. phrygia* subsp. *pseudophrygia*). Appendages of principal phyllaries' elongate-triangular (intermediate between those in *C. phrygia* subsp. *pseudophrygia* and *C. nigrescens* subsp. *pinnatifida*), black (*C. nigrescens* subsp. *pinnatifida*) or dark brown (intermediate between *C. phrygia* subsp. *pseudophrygia* and *C. nigrescens* subsp. *pinnatifida*), with long curved lobes, bent outward (*C. phrygia* subsp. *pseudophrygia*). Cypsela with papi (*C. phrygia* subsp. *pseudophrygia*) (Fig. 4).

Studied localities: Khark. Distr.: **1. (+)** vicinities of Liubotyn town, Aug 2024, H. Bondarenko.

***Centaurea* × *psammogena* Gáyer** (= *C.* × *varnensis* Velen.; = *C.* × *dobroczaevae* Tzvelev) (*Asteraceae*) — волошка псамогенна.

Hybrid formula: *C. diffusa* Lam. × *C. stoebe* L. s. l. (Fig. S3).

Notes on morphology: Plants well-branched from base (as in *C. diffusa*). Leaves pinnatisect, greyish. Principal phyllaries polymorphic, intermediate between those in parental species (Fig. S4). Terminal lobe of appendages shorter than *C. diffusa* has and longer than *C. stoebe* has. Appendages pale, brownish, dark brown (intermediate between *C. stoebe* and *C. diffusa*).

Distribution and ecology: According to the preferences of both parental species and data from herbarium labels, this hybrid occurs in dry grasslands. It occurs in Ukraine sporadically (Shynder, 2021). Tzvelev (1985) reported the presence of *C.* × *psammogena* (as *C.* × *dobroczaevae*) in Kharkiv Region. However, he did not specify the locality where he made these records. Also, this hybrid, under the name *C.* × *varnensis* Velen., was reported from the vicinities of Balakliia town (Shynder, Negrash, 2021).

Fig. 5. Comparison of two species of *Corydalis* and their hybrid. A: *C. intermedia*; B: *C.* × *hausmannii*; C: *C. solida*. Photos by H. Bondarenko

Studied localities: Khark. Distr.: **1. (+)** vic. of Huliai Pole vill. (49.640297, 36.066362), the steppe slopes, Aug 2024, H. Bondarenko, V. Siranskyi; **2. (r)** vic. of Kharkiv City (~49.949561, 36.186851), on the railway embankment, near Lypova Roshcha Station, near the bridge, Sep 27, 1926; leg. & det.: M. Kotov [Окр. г. Харькова, на насыпи жел. дороги вблизи ст. Липовая роща, у моста, 27.IX 1926; М. Котов. *Notae criticae*: *Centaurea diffusa* × *Centaurea arenaria*, X 1926, det.: E. Lavrenko]; (KW s.n.). Kup. Distr.: **3. (r)** Tokarivka vill. (49.771955, 37.876801); the steppe slopes, Sep 2019, V. Kletionkin, https://www.inaturalist.org/observations/147219702

***Corydalis* × *hausmannii* Klebelsberg** (*Papaveraceae*) — ряст Гаусмана. A new hybrid for the flora of Ukraine.

Hydrid formula: *C. intermedia* (L.) Mérat × *C. solida* (L.) Clairv.

Notes on morphology: Inflorescence racemose (as in *C. solida*) but with a smaller number of flowers (as in *C. intermedia*). Bracts oval (as in *C. intermedia*), with entire margins (as in *C. intermedia*) or very slightly dentate on tip (as in *C. solida*). Pedicels slightly shorter than fruits (as *C. solida*) (Fig. 5).

Distribution and ecology: The hybrid is known for Central and Northern Europe (POWO, 2025–onward). Parental species grows in forests, among shrubs. A spring ephemeroid.

Studied localities: Khark. Distr.: **1. (+)** vic. of Korotych vill. (49.925885, 36.023375), among shrubs, May 2021, H. Bondarenko.

***Jacobaea andrzejowskyi* (Tzvelev) B. Nord.** (≡ *Senecio andrzejowskyi* Tzvelev) (*Asteraceae*) — жовтозілля Анджейовського, якобея Анджейовського.

Hybrid formula: Possibly *J. borysthenica* (DC.) B. Nord. × *J. vulgaris* Gaertn.

Notes on morphology: Lower leaves pinnatisect with pinnatifid lobes (intermediate form between *J. borysthenica* and *J. vulgaris*), middle leaves twice pinnatisect with thin lobes (as in *J. borysthenica*). Outer cypselae with pappi (as in *J. vulgaris*).

Distribution and ecology: According to Tzvelev (1986), it is an endemic species of the area between the Dnipro and Volga rivers. The distribution of this supposed hybrid is insufficiently known. According to the *GBIF* (GBIF Occurrence Download https://doi.org/10.15468/dl.x34n2b, Accessed 20 August 2025) and literature (Davydov, Gomlya, 2021), in Ukraine it was recorded in Kharkiv (surroundings of Dvorichanskyi National Nature Park, the margin of a pine forest) and Poltava regions, and the Autonomous Republic of Crimea (Krasnoyarske vill. vicinity, near Lake Donuzlav). It prefers dry, sandy, and well-illuminated places.

Studied localities: Chuh. Distr.: **1. (+)** vic. of Chemuzhivka vill. (49.710193, 36.340771), the pine forest, Jul 2023, H. Bondarenko. Kup. Distr.: **2. (r)** vic. of Petrivka vill. (49.932226, 37.791010), the margin of the pine forest, Jun 2021, D. Davydov, https://www.inaturalist.org/observations/88837759.

***Mentha* × *verticillata* L.** (*Lamiaceae*) — м'ята кільчаста.

Hybrid formula: *M. aquatica* L. × *M. arvensis* L.

Notes on morphology: Stem usually branched (as in *M. aquatica*). Stem with a few whorls of flowers along (as in *M. arvensis*). Terminal ones close together in axils of short leaves.

Distribution and ecology: *Mentha* × *verticillata* is native to Europe (POWO, 2025–onward). In Ukraine, it sporadically occurs throughout the country, including Crimea (Opredelitel…, 1987; Yena, 2012). Both parental species prefer quite moist or humid habitats. Their hybrid also grows in such places (banks of the water, wetlands, etc.).

Studied localities: Chuh. Distr.: **1. (+)** vic. of Vysochynivka vill. (49.702564, 36.297865), the Mozh River floodplain, Aug 2023, H. Bondarenko, V. Siranskyi; **2. (+)** vic. of Haidary vill. (49.627340, 36.282659), the bottom of the dried Iskiv Pond, Sep 2020, H. Bondarenko. Khark. Distr.: **3. (+)** Liubotyn town (49.931283, 35.925187), the bank of the 3rd Pond, Aug 2024, H. Bondarenko; **4. (r)** Budy vill. (Pivdenne hromada, Kharkiv Distr., 49.899768, 36.001693), the Merefa River floodplain, Aug 2024, A. Novgorodsky, https://www.inaturalist.org/observations/239141673.

***Psephellus carbonatus* (Klokov) Greuter × *P. sumensis* (Kalen.) Greuter** (*P. marschallianus* (Spreng.) K. Koch auct. non fl. Reg. Charkiw.) (*Asteraceae*).

Notes on morphology: Both parental species belong to a species complex of *Psephellus marschallianus* (Spreng.) K. Koch. In literature and herbarium labels, *P. sumensis* or *P. carbonata* are often (mis)identified as *Centaurea marshalliana*, but they differ in their geographic ranges, habitat preferences, and some morphological features. Hybrid appendages have intermediate features: they are thinner than in *P. carbonatus* but wider than in *P. sumensis* (Fig. S5), and thus resembling those of *P. marschallianus*. However, *P. marschallianus* occurs southward from the region of our research and does not grow in our area (Klokov, 1963).

Distribution and ecology: The actual distribution of the hybrid is insufficiently studied. It is probably distributed in the eastern part of Ukraine and adjacent areas. According to herbarium labels and ecological preferences of the parental species, the hybrid occurs on carbonate outcrops.

Studied localities: Izium Distr.: **1. (r)** Izium town vicinities (Izium hromada, Izium Distr.), limestone slope, Jun 1, 1925, leg.: M.F. Tsentylovych, det. (as *Centaurea marschalliana* Spreng.): E. Lavrenko; [Харьковск. г. окр. г. Изюма, Известковый склон (щебень), 01.VI 1925; собр.: М.Ф. Центилович; опр. (*Centaura marschalliana* Spreng.): Е. Лавренко; *Notae criticae*: *Centaurea carbonata* Klok. × *C. sumensis* Kalen., 1939, det.: M. Klokov] (KW s.n.); 1820, leg.: V. Czernjajev, det. (as *Centaurea marschalliana* Spreng.): E. Lavrenko [*Centaurea ucranica*?, in montibus cretaceis, 1820 Sept. 19; *Centaurea sibirica*, in montibus, Izum] (KW s.n.); 1873, leg.: K. Gornitskyi, det. (as *Centaurea marschalliana* Spreng.): E. Lavrenko [Izjum; a. 1873. Mai. 3. In collibus incultis, solo subcretaceo. i.l.] (KW s.n.).

***Rubus* × *areschougii* A. Blytt** — ожина Арескуга (Fig. 6) (*Rosaceae*). A newly recorded hybrid for the flora of Ukraine.

Hybrid formula: *R. caesius* L. × *R. saxatilis* L.

Notes on morphology: Subshrubs up to 50 cm tall (lower than *R. caesius* and of the same size or slightly taller than *R. saxatilis*). Stem erect or arched, covered with thin spikes bent down and protruding trichomes. Leaves ternate, petiolate, with lanceolate stipules. Petiole covered thin bent-down spikes and protruding trichomes. Middle leaflet on more or less noticeable petiole, ovate or rhombic-ovate, with serrate margins. Lateral leaflets asymmetric, ovate, entire or dissected lengthwise, with serrate margins. Blade covered with short hairs. Flowers in racemose inflorescence. Sepals attached to fruits. Fruits reddish (as in *R. saxatilis*) with bluish tint (as in *R. caesius*).

Distribution and ecology: It is currently known in Central and Eastern Europe (Norway, Sweden, Germany, Slovakia, Hungary, and Russia) (POWO, 2025–onward; GBIF Occurrence Download https://doi.org/10.15468/dl.82zkwq, Accessed 20 August 2025). Presumably, it has a wider distribution in central and eastern parts of Europe. For instance, the possibility of the presence of this hybrid is mentioned in the Ukrainian flora checklist (Fedoronchuk, 2022b), but actual data about the distribution patterns in Ukraine are still absent.

Studied localities: Chuh. Distr.: **1. (+)** vic. of Myrhorody vill. (49.752281, 36.169871); the forest bog, Jul 2024, H. Bondarenko. Khark. Distr.: **2. (+)** two localities in Velykyi Bir Forest, surroundings of Tymchenky vill. (49.763632, 36.145359; 49.765759, 36.137930); through shrubs, Aug 2024, H. Bondarenko, V. Siranskyi.

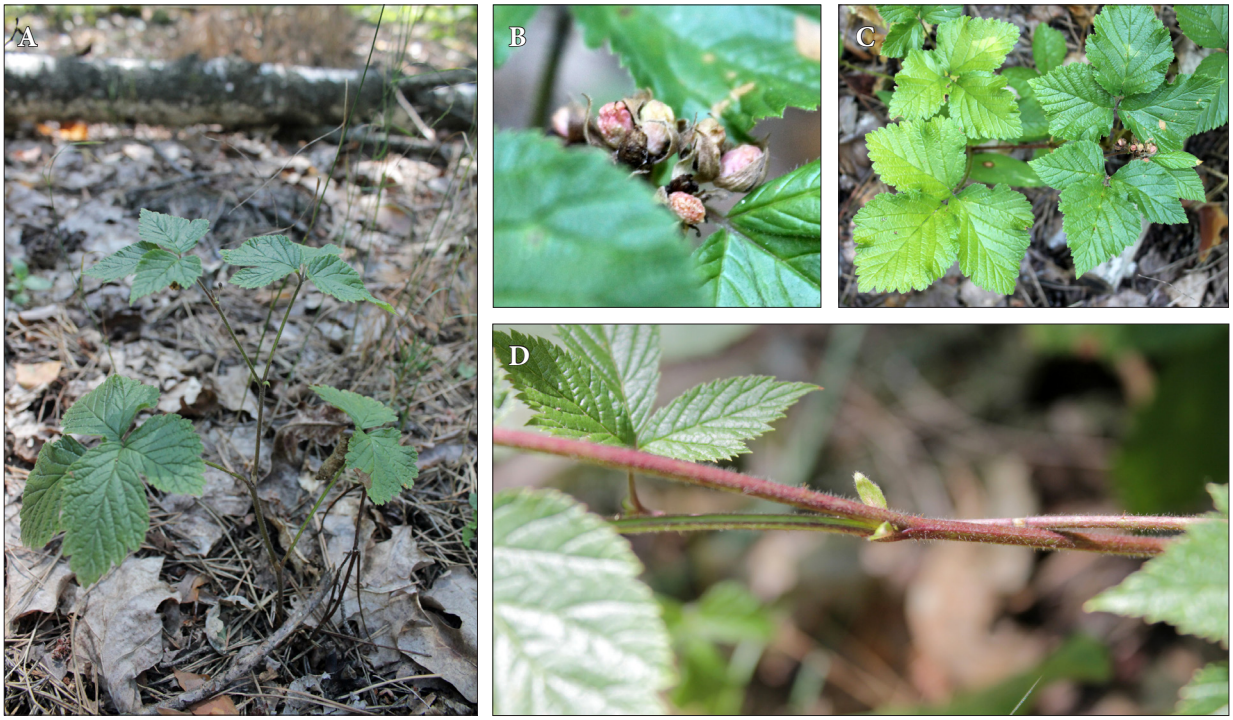

Fig. 6. *Rubus* × *areschougii*. A: general habit; B: fruits; C: leaves; D: trichomes and spikes on stems and petiole. Photos by H. Bondarenko

***Salix* × *reichardtii* A. Kern.** (*Salicaceae*) — верба Райхарда (Fig. S6).

Hybrid formula: *S. caprea* L. × *S. cinerea* L.

Notes on morphology: Low tree up to 4 m (as *S. caprea*). Young branches and buds canescent and pubescent (as in *S. cinerea*). Stipules herbaceous, semireniform. Leaf blade petiolate, elongate-obovate or elliptic (as in *S. cinerea*), abaxial surface canescence, margin slightly serrate. Leaves have 8–12 pairs of secondary veins (as in *S. caprea*). Pedicel 3–5 times longer than torus (as in *S. cinerea*). Pistil with short style (as in *S. cinerea*) (Kerner, 1860: 127–128).

Distribution and ecology: According to POWO (2025–onward), *S.* × *reichardtii* is sporadically distributed in Europe (British Isles, France, Belgium, Netherlands, Denmark, Norway, Finland, Sweden, Germany, Switzerland, Italy, Austria, Hungary, Romania, and the European part of Russia). The hybrid prefers humid and shady habitats.

Studied localities: Chuh. Distr.: **1. (+)** vic. of Tymchenky vill. (49.751673, 36.169116), the forest swamp in the pine forest, Aug 2024, H. Bondarenko, V. Siranskyi. Khark. Distr.: **2. (+)** vic. of Babai vill. (49.897058, 36.171595); the bottom of the forest ravine, oak forest, Jul 2025, H. Bondarenko; **3. (r)** Budy vill. (49.886667, 36.043307); the bank of the Orsivskyi Pond; Aug 2024, A. Novgorodsky, https://www.inaturalist.org/observations/241833783.

***Salvia nemorosa* L. × *S. nutans* L.** (~ *S. betonicifolia* Etl.; ~ *S. cernua* Czern. ex Des.-Shost.; ~ *S. cremenensis* Besser; ~ *S.* × *pendula* auct. Vahl) (*Lamiaceae*).

Notes on morphology: Polymorphic hybrid. Stem branched at inflorescence and branches well-developed (as in *S. nutans*). Stem covered by quite long soft trichomes (as in *S. nutans*). Inflorescence raceme, relatively remote (as in *S. nemorosa*), not dense, semi-erect (tips slightly pendulate (as in *S. nutans*). Bracts less developed than those in *S. nemorosa*, but more developed than bracts of *S. nutans*. Corolla morphologically intermediate between the parental species (Fig. S7).

Distribution and ecology: This hybrid probably occurs from the Balkan Peninsula to the Urals, and its range is limited by the distribution range of *S. nutans*. Hybrid grows in steppes and other types of dry grasslands.

Studied localities: Khark. Distr.: **1. (+)** vic. of Lypkuvativka vill. (49.730162, 35.979648), the

steppe slopes on the Dzhghun River's right bank, May 2024, H. Bondarenko. Loz. Distr.: **2. (+)** vic. of Nadezhdivka vill. (49.100520, 36.579814); the steppe slopes, May 2025, H. Bondarenko.

***Salvia* × *simonkaiana* Borbás** (*Lamiaceae*) — шавлія Шимонкая.

Hybrid formula: *S. nutans* L. × *S. pratensis* L. (= *Salvia* × *podolica* Błocki).

Notes on morphology: A polymorphic hybrid. Stem branched at inflorescence, branches well-developed (as in *S. nutans*). Inflorescence raceme, relatively remote (as in *S. pratensis*), not dense, semi-erect (tips slightly pendulate, as in *S. nutans*). Flowers more similar to those of *S. pratensis*: upper corolla lip quite large and arcuately curved, inner surface densely covered by more or less notable trichomes (Fig. S8). This hybrid resembles the previous one but has more remote-flowered inflorescence, larger flowers, and upper corolla lip more curved. Co-occurring parental species could help to identify this hybrid more accurately.

Distribution and ecology: As well as in the previous case, the distribution of this hybrid is limited by the range of *S. nutans*.

Studied localities: Khark. Distr.: **1. (+)** vic. of Lypkuvativka vill. (49.729786, 35.985583), the steppe slopes on the Dzhghun River right bank, May 2024, H. Bondarenko.

***Verbascum* × *ambiguum* Lej.** (*Scrophulariaceae*) — дивина двозначна.

Hybrid formula: *V. nigrum* L. × *V. densiflorum* Bertol.

Notes on morphology: Plant biennial, with well-developed tap root. Stem erect, angulate, reddish, covered with soft hairs, branched in inflorescence. Rosette and lower cauline leaves petiolate; petiole reddish (as in *V. nigrum*). Blade ellipsoid-lanceolate, both surfaces covered with woolly hairs (as in *V. densiflorum*); tip acuminate; margin crenate, decurrent (intermediate between *V. nigrum* and *V. densiflorum*); middle and upper cauline leaves sessile; blade elliptical-ovate, covered with woolly hairs; tip acuminate; blade margin cuneate, decurrent on stem (as in *V. densiflorum*). Flowers gathered in spike-like inflorescence, branched at base. Bracts short elongate-triangulate or lanceolate. Flowers in bunches of (4)5–10(12). Flowers ~2.5–3.0 cm wide, yellow. Stamen filaments yellow, pinkish lengthwise line on inner surface. All stamens haired (as in *V. nigrum*); trichomes white (as in *V. densiflorum*) on outer surface and reddish-pink (as in *V. nigrum*) on inner surface. Upper three anthers reniform; lower two anthers reniform or intermediate between reniform and elongate (Fig. S9). Capsules aborted.

Distribution and ecology: This hybrid is understudied. According to *POWO* (2025–onward), its native range is European. In *GBIF*, records cover the territories of Germany and Belgium (GBIF Occurrence Download https://doi.org/10.15468/dl.5nfjyy, Accessed 20 August 2025). The hybrid grows in light thermophilic biomes.

Studied localities: Khark. Distr.: **1. (+)** Liubotyn town (49.933945, 35.923629); the meadow slopes near the 3rd Pond, Aug 2024, H. Bondarenko; **2. (r)** vic. of Derhachi town and Peresichne vill., near the road in the forest ravine, near Peresichne vill.; Jul 21, 1919; leg.: E. Lavrenko; Mar 8, 1952, det. (as *V. nigrum* L. × *V. thapsiforme* Schrad.): M. Kotov [*Verbascum nigrum* × *thapsiforme* 21.VII 1919, Харьковск.у. с. Дергачи — с. Пересечное. У дороги, в лесной балке, близь последнего села. Собр, опр. Е. Лавренко] (KW s.n.; Kotov, 1960: 430).

***Verbascum* × *brockmuelleri* Ruhmer** (*Scrophulariaceae*) — дивина Брокмюллера (Fig. S10). A new hybrid for the flora of Kharkiv Region.

Hybrid formula: *V. nigrum* L. × *V. phlomoides* L.

Notes on morphology: Biennial herb up to 1.2 m tall. Stem slightly ribbed, slightly branched at inflorescence, densely covered with woolly hairs (as in *V. phlomoides*). Basal and lower cauline leaves petiolate, blade base rounded or cuneate (as in *V. phlomoides*). Middle cauline leaves sessile, subauriculate (as in *V. phlomoides*). Flowers quite large ~3.5–4.0 cm wide (as in *V. phlomoides*). All stamen filaments covered (as in *V. nigrum*) by mix of pale (as in *V. phlomoides*) and purple (as in *V. nigrum*) hairs. Lower anthers reniform (as in *V. nigrum*) or slightly decurrent (intermediate between *V. nigrum* and *V. phlomoides*). Stigma capitate.

Distribution and ecology: According to *POWO* (2025–onward), *V* × *brockmuelleri* occurs in Austria, Czechia, Germany, Hungary, Romania, Slovakia, and Switzerland. In Ukraine, it is mentioned (Kotov, 1960: 430) that the hybrid occurred in Ternopil Region. Our observation is the first record of *V* × *brockmuelleri* in the territory of Kharkiv Region. It grows in herbaceous habitats.

Studied localities: Chuh. Distr.: **1. (+)** Koropove vill. (49.596932, 36.340817), the sandy lawn at the Siverskyi Donets River floodplain, Jun 2025, H. Bondarenko.

***Verbascum* × *denudatum* Pfund** (*Scrophulariaceae*) — дивина роздягнута.

Hybrid formula: *V. lychnitis* L. × *V. phlomoides* L.

Notes on morphology: Biennial herb up to 1.5 m tall. Stem well-branched at inflorescence (as in *V. lychnitis*), covered by woolly and star-shaped trichomes (intermediate state). Basal and lower cauline leaves petiolate, hairier (*V. lychnitis*). Middle cauline leaves sessile, subauriculate (as in *V. phlomoides*). Flowers quite large ~3.5–4.5 cm wide (as in *V. phlomoides*). All stamen filaments covered by pale hairs (as in *V. lychnitis*). Fruits aborted.

Distribution and ecology: According to *POWO* (2025–onward), *V.* × *denudatum* occurs in France, Germany, Switzerland, Austria, Czechia, Slovakia, Hungary, Poland, and Romania. It grows in herbaceous habitats. In Ukraine, it occurred in Kharkiv, Kirovohrad, and Kyiv regions, and Kyiv City (Kotov, 1960: 430).

Studied localities: Khark. Distr.: **1. (+)** Lypkuvativka vill. (49.731939, 35.980912), country houses area, Jul 2025, H. Bondarenko; **2. (r)** Sokolnyky, Kharkiv City, among shrubs, left of the highway, Jul 1895, P.N. Naliwaiko (Naliwaiko, 1899; Kotov, 1960: 430). Chuh. Distr.: **3. (r)** Zaitsiv Yar, vic. of Haidary vill. (49.632176, 36.321794), the dry meadow, Jul 2021, M. Solohub-Yosef, https://www.inaturalist.org/observations/88436388. **4. (r)** Romantyka, vic. of Haidary vill., Homilshanski Lisy National Nature Park (49.617885203, 36.3172957869), the margin of the oak forest, Jun 2016, Yu. Bengus, https://www.inaturalist.org/observations/106698707.

***Verbascum* × *ignescens* Tausch** (*Scrophulariaceae*) — дивина полум'яна (Fig. S11, A).

Hybrid formula: *V. lychnitis* L. × *V. phoenecieum* L.

Notes on morphology: Stem well-branched at inflorescence (as in *V. lychnitis*). Leaves with irregularly crenate margin (as in *V. lychnitis*). Flowers peach-orange of pinkish (intermediate between those of *V. phoeniceum* and *V. lychnitis*), on well-developed pedicels (as in *V. phoeniceum*) but gathered in groups of (1)2–5 (as in *V. lychnitis*). Stamens with reddish hairs (intermediate state).

Distribution and ecology: *Verbascum* × *ignescens* has been observed in Slovakia (POWO, 2025–onward), in Russia (iNaturalist, 2025–onward), and in the southern regions of Ukraine (Moysiyenko, 2023; Moysiyenko et al., 2023).

Studied localities: Bohod. Distr.: **1. (r)** Valky, in herbaceous habitat; Jun 10, 1870; leg. & det (as *V. blattaria* L.): C. Gornitzkii [*Verbascum Blattaria* L. Walki; a. 1870. Jun. 10. In graminosis siccis; i.l.; *Notae criticae*: *V. phoeniceum* L. × *lychnitis* L., det. M. Котов] (KW s.n.; Kotov, 1960: 430).

***Verbascum* × *pseudolychnitis* Schur** (*Scrophulariaceae*) — дивина несправжньоборошниста (Fig. S12). A new hybrid for the flora of Kharkiv Region.

Hybrid formula: *V. chaixii* Vill. s. l. × *V. lychnitis* L.

Notes on morphology: Plant up to 70 cm tall. Stem well-branched at inflorescence (more likely to the habit of *V. lychnitis*), slightly angulate, covered with short hairs. Basal and lower leaves petiolate; middle and upper leaves sessile. Leaf blade elliptic or wide-lanceolate; margin crenate. Stamen filaments with mix of pale (as in *V. lychnitis*) and reddish (as in *V. chaixii*) trichomes.

Distribution and ecology: *Verbascum* × *pseudolychnitis* is distributed Western (France and Spain) and Central Europe (Czechia and Slovakia), and the Balkans (GBIF Occurrence Download https://doi.org/10.15468/dl.6acfjy, Accessed 20 August 2025; POWO, 2025–onward). In Ukraine, it was recorded in Crimea (Kotov, 1960: 430–431). It occurs predominantly in steppes and dry grasslands.

Studied localities: Chuh. Distr.: **1. (+)** vic. of Birochok Druhyi vill. (49.704182, 36.112783), herbaceous habitat along the railways, near the Birochok Druhyi station, Jul 2025, H. Bondarenko. Izium Distr.: **2. (+)** vic. of Havrylivka vill. (48.849135, 36.815142); steppe slope, Jun 2025. H. Bondarenko. Khark. Distr.: **3. (+)** vic. of Lypkuvativka vill. (49.730683, 35.987495), steppe slope, Jul 2025, H. Bondarenko.

***Verbascum* × *rubiginosum* Waldst. & Kit.** (*Scrophulariaceae*) — дивина іржаста (Fig. S11, B).

Hybrid formula: *V. chaixii* Vill. × *V. phoeniceum* L.

Notes on morphology: *Verbascum* × *rubiginosum* is very similar to *V.* × *ignescens*, and sometimes it causes difficulties in its identification. Tausch (1823) mentioned that *V.* × *rubiginosum* has a shorter rhizome and its leaves crenate, not undulate and irregularly serrate (as in *V.* × *ignescens*). The presence of the specific parental species is the most reliable way to identify a hybrid correctly.

Distribution and ecology: *Verbascum* × *rubiginosum* is distributed from Central to Eastern Europe: Germany, Czechia, Slovakia, Romania, Ukraine, the Chernozems belt and Caucasus

regions of Russia, and Kazakhstan (POWO, 2025–onward). In Ukraine it was registered in the Cherkasy, Donetsk, Kharkiv, Kherson, Kyiv, Luhansk, Mykolaiv, Poltava, and Sumy regions (Kotov, 1960: 430–431). It occurs predominantly in steppes and dry grasslands.

Studied localities: Chuh. Distr.: **1. (r)** vic. of Birky vill. (~49.696053, 36.079788), slopes, Jun 4, 1922; leg. & det. (as *Verbascum phoeniceum* L. × *orientale* M. Bieb.): E. Lavrenko [*Verbascum phoeniceum* × *V. orientale*, Харьковск. у. окр. ст. Борки, хут. Михайловский, опушка ... лесков в верховьях балки — "Глубокая Долина", 04.VI 1922 п.ст., собр. опр.: Е.В. Лавренко] (KW s.n.). Izium Distr.: **2. (r)** Velyka Komyshuvakha vill. outskirts (~49.112150, 37.028919), Batiliev Yar, the steppe slope, Jun 20, 1914; leg.: K. Zalessky; det. (as *V. rubiginosum*): E. Lavrenko [№1377a, *Verbascum* (*rubiginosum* auct. W.), Изюмск. у. Вел. Комышеваха, Батилев яр, степной склон, 20.VI 1914, собр.: Залесский, опр.: Е. Лавренко; *Notae criticae*: *Verbascum orietale* M.B. × *V. phoeniceum* L., 12.III 1952, det.: М. Котов] (KW s.n.); **3. (r)** vic. of Havrylivka vill. (~48.821379, 36.833735), the ravine near the road, Jun 18, 1914; leg.: K. Zalessky; det. (as *V. phoeniceum* L.): M. Kotov [№1313 *Verbascum phoeniceum*, Изюмский уезд, Гавриловка — (?) Мечебрловка, балка придорожная, 18.VI 1914, собр.: К. Залесский, опр.: М. Котов; *Notae criticae*: det. (as *V. orientale* M. Bieb.): Е.В. Лавренко; 20.IV 1925, det. (*Verbascum phoeniceum* L. × *orientale* M. Bieb.): М. Котов] (KW s.n.). Khark. Distr.: **4. (r)** Kharkiv City, dry ravine, May 20, 1854, leg. & det.: V. Czernjaew [*Verbascum rubiginosum*, сухой яр, Харьков, 20.V 1854, собр.: В. Черняев; *Notae criticae*: 08.I 1926; det. (as *Verbascum phoeniceum* L. × *orientale* M. Bieb.): M. Kotov] (KW s.n.). **5. (r)** Zhykhor, Kharkiv City, the pine forest, Jun 25, 1913; leg. & det. (as *V. phoeniceum* L.): ?Nekhai [№391 *Verbascum phoeniceum*, Харьков. у. Жихорь, бор, 25.VI 1913, собр.: (?) Нехай, опр.: М. Котов; *Notae criticae*: 08.III 1952 det. (as *Verbascum phoeniceum* L. × *orientale* M. Bieb.): M. Котов] (KW s.n.). Kup. Distr.: **6. (r)** vic. of Vilkhuvatka vill. (~50.157832, 37.507072), the ravine, 1895; leg. & det. (as *V. rubiginosum* Walds. & Kit.): V.I. Taliev [*Verbascum rubiginosum* W.K., с. Ольховатка, заказная балка, 1895, собр. опр.: В.И. Талиев; *Notae criticae*: det. (as *Verbascum phoeniceum* L. × *orientale* M. Bieb.): М. Котов] (KW s.n.). Loz. Distr.: **7. (r)** Lozova Town (Lozova Distr.; 48.873597, 36.306367); the herbaceous habitat, Jun 2025 (https://www.inaturalist.org/observations/289096780).

***Verbascum* × *schiedeanum* W.D.J. Koch** (*Scrophulariaceae*) — дивина східамська.

Hybrid formula: *V. nigrum* L. × *V. lychnitis* L.

Notes on morphology: The morphological features of *V.* × *schiedeanum* are well described in Klesczewski et al. (2024). Stem sulcate-angulose (intermediate between stems of *V. nigrum* and *V. lychnitis*). Rosette leaves petiolate; petiole reddish (as in *V. nigrum*); blade margin irregularly crenate, decurrent on petiole. Cauline leaves with short petioles; blade greyish-green (intermediate between those of *V. nigrum* and *V. lychnitis*). Inflorescence well-branched (as in *V. lychnitis*); flowers gathered in clusters of (2)4–8(10). All stamen filaments covered by trichomes; trichomes white or yellowish in base (as in *V. lychnitis*) and purple in tip (as in *V. nigrum*). Fruits aborted.

Distribution and ecology: *Verbascum* × *schiedeanum* occurs in Central Europe. In Ukraine it was registered in Kyiv, Kharkiv, Dnipro, Mykolaiv, and Poltava regions (Schmalhausen, 1897; Kotov, 1960; Klesczewski et al., 2024; iNaturalist, 2025–onward). It grows in grassland habitats.

Studied localities: Chuh. Distr.: **1. (r)** vic. of Haidary vill., in forest, the surroundings of the Biological Station of Kharkiv University, Jun 12, ?; leg. & det. (as *V. lychnitis* L.): Ya. Lepchenko [*Verbascum lychnitis* L., в лесу, …, Окр. Біол. Ст. Харьк. г. Змієвск. у. Собр.: Я. Лепченко; *Notae criticae*: *Verbascum nigrum* L. × *lychnitis* L., det.: М. Котов] (KW s.n.). Khark. Distr.: **2. (+)** vic. of Huliai Pole vill. (49.635904, 36.062790), the steppe slopes, Aug 2024, H. Bondarenko, V. Siranskyi; **3. (r)** vic. of Rokytne vill. (~49.804987, 35.967015), the margin of the pine forest, Aug 06, 1924, leg. & det. (as *V. lychnitis* L.): P. Kozlov [*Verbascum lychnitis* L., Харк. у., На опушке сос. бора у с. Рокитного, 06.VIII 1924; *Notae criticae*: *Verbascum lychnitis* L. × *nigrum* L., det.: М. Котов] (KW s.n.); **4. (r)** vic. of Derhachi town and Peresichne vill., near the road in the forest ravine, near Peresichne vill.; Jul 21, 1919; leg.: E. Lavrenko [*Verbascum lychnitis* L. × *V. plomoides* L.? 19 июля в… цвет в Сокольник в Кул справа от шоссе у дороги. Походит на 999×1002 Шм., но не вполне; листья яйцевидные, но не широко-яйцевидные; венчик скорее неболь., окр. г. Харькова; *Notae criticae*: *Verbascum lychnitis* L. × *nigrum* L., det.: М. Котов] (KW s.n.). **5. (r)**

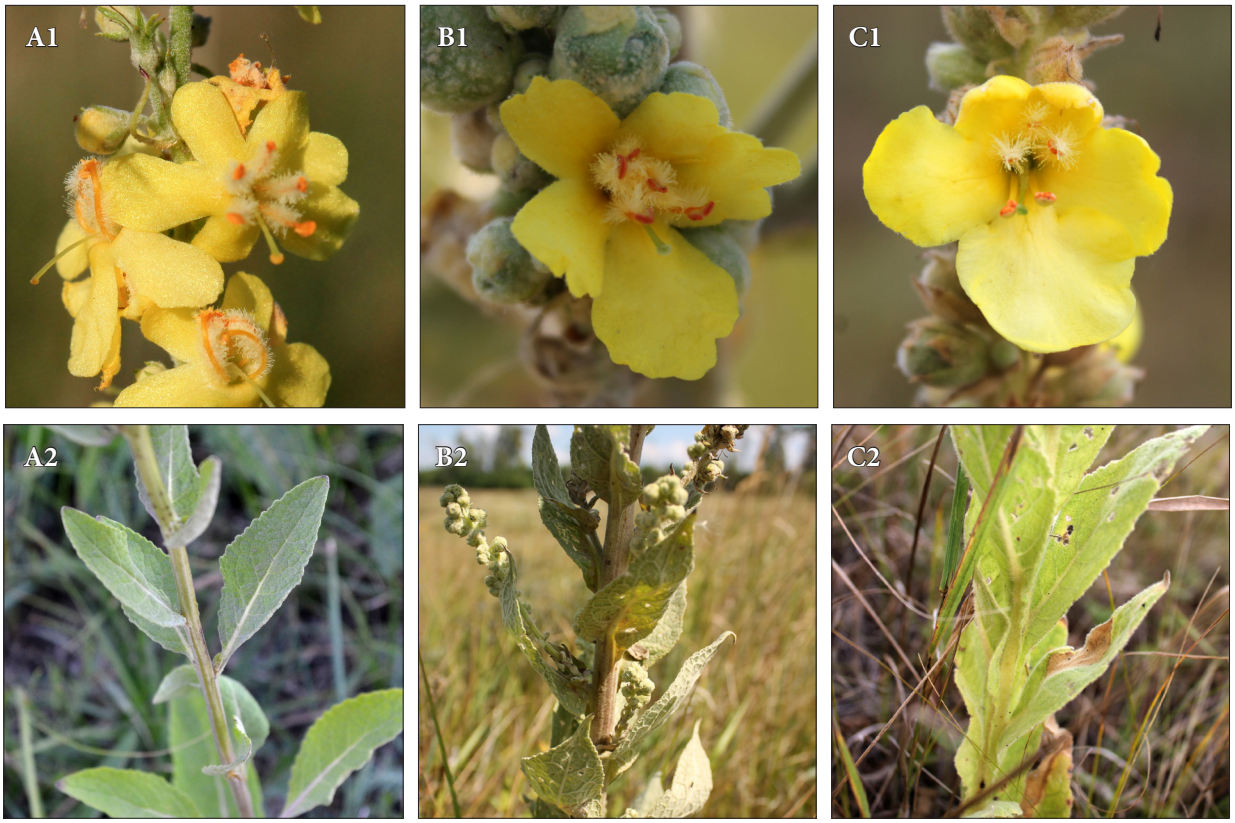

Fig. 7. Morphological comparison of two species of *Verbascum* and their hybrid. A: *V. lychnitis*; B: *V.* × *thapsi*; C: *V. thapsus*; 1 — flowers; 2 — middle leaves. Photos A1, B1, C1, B2, C2 by H. Bondarenko; photo A2 by V. Siranskyi

Nadtochii (~49.981646, 36.077720), the margin of Malinkin Bir Forest, Aug 1894, N.P. Naliwaiko (Naliwaiko, 1899; Kotov, 1960: 430).

***Verbascum* × *thapsi* L.** (*Scrophulariaceae*) — дивина ведмежоподібна. A new hybrid for the flora of Ukraine.

Hybrid formula: *V. thapsus* L. × *V. lychnitis* L.

Notes on morphology: Plant up to 1.5 m tall. Taproot developed. Stem erect, slightly sulcate, covered with dense soft hairs. Leaves alternate, sessile (as in *V. thapsus*). Leaf blade covered by woolly hairs, margin decurrent on stem (as in *V. thapsus*), irregularly crenate. Inflorescence well-branched (as in *V. lychnitis*). Flowers in clusters, yellow, ~2.5 cm wide. All stamens covered with yellowish hairs (as in *V. lychnitis*). Upper three anthers reniform, lower two anthers elongate (as in *V. thapsus*). Stigma capitate (as in *V. thapsus*) (Fig. 7).

Distribution and ecology: At present, *V.* × *thapsi* is known for the territories of France, Germany, Austria, Poland, and Russia. It is the first documented record of the *V.* × *thapsi* for the flora of Ukraine. It prefers mostly light habitats.

Studied localities: Khark. Distr.: **1. (+)** vic. of Huliai Pole vill. (49.629371, 36.063754); the steppe slopes, H. Bondarenko.

***Utricularia* × *neglecta* Lehm.** (syn. *Utricularia australis* R. Br. auct. non fl. Eur.) (*Lentibulariaceae*) — пухирник непомічений (Fig. S13).

Hybrid formula: *Utricularia tenuicaulis* Miki × *Utricularia vulgaris* L.

Notes to morphology: Aquatic plant. Stem up to 60 cm tall, branched. Leaves multiple pinnatisect into thin linear lobes (*U. vulgaris*); some of them converted into bladder-like traps. Flowers gathered in racemose inflorescence with reddish stem (as in *U. vulgaris*). Lower petal flat (as in *U. tenicaulis*). Spur pale yellow or with reddish lines (as in *U. tenuicaulis*).

Protection: *Utricularia* × *neglecta* is included in the *Red Data Book of Ukraine* as "*U. australis* R. Br.". Molecular data demonstrated that plants from

Europe identified as sterile "*U. australis*" in fact have a hybrid origin (Bobrov et al., 2022) and should be regarded as *U.* × *neglecta*, not as *U. australis* R. Br. s. str. *Utricularia australis* s. str. is actually distributed in Australia, New Zealand, and adjacent islands (POWO, 2025–onward).

Distribution and ecology: According to *POWO* (2025–onward), *U.* × *neglecta* occurs in many regions of the Old World (Europe, Middle, Southern, and South-Eastern Asia, Africa). According to the *Red Data Book of Ukraine* (2009), the localities of *U.* × *neglecta* are known in Zakarpattia (Transcarpathia) and Ivano-Frankivsk regions. Nevertheless, the recent investigations show that the hybrid is more widely distributed in Ukraine (Iakushenko, Orlov, 2015; Tomych, Derzhypilskyi, 2019; iNaturalist, 2025–onward). According to the latest data, it occurr in the Forest and Forest-Steppe zones, Transcarpathia, and Crimea. The origin of the populations in the newly revealed localities in Ukraine remains unknown. *Utricularia* × *neglecta* grows in oligotrophic freshwater habitats, such as ponds, lakes, and slow-flowing rivers.

Studied localities: Khark. Distr.: **1. (+)** vic. of Brazhnyky vill. (49.660061, 35.939161); the pond, H. Bondarenko; **2. (+)** vic. of Bidriahy vill. (49.879574, 35.973122); Dytbudynivskyi Pond, H. Bondarenko. Bohod. Distr.: **3. (r)** vic. of Vysokopillia vill. (49.919591, 35.451826), the reservoir on the Kolomak River, Aug 2018, D. Davydov, https://www.inaturalist.org/observations/40143840.; **4. (r)** Slobozhanskyi National Nature Park, vic. of Krasnokutsk town (50.053889, 35.189760), the forest bog, Aug 2021, K. Onyshchenko, https://www.inaturalist.org/observations/163442248.

Discussion

Some other hybrid of Eudicots probably occurring in Kharkiv Region. This article contains preliminary data about distribution patterns of some interspecific hybrids of Eudicots in Kharkiv Region and reflects the results of our field surveys and analyses of the existing reference data. In addition to that, we analyzed the literature and open databases to answer the question "What can be found in the future?" Numerous records of hybrids made in Kharkiv Region were mentioned in the multi-volume *Flora URSR* (1938–1965). Records of some hybrids have been confirmed by our field surveys and revision of herbarium collections. However, some of them are need to be reviewed and confirmed during future expeditions.

According to the latest checklist of the flora of Kharkiv Region (Gorelova, Alyokhin, 2002), *Crataegus fallacina* Klokov is mentioned as a species that grows in the region. According to *POWO* (2025–onward), this taxon is recognized as a synonym of the hybrid *Crataegus* × *kyrtostyla* nothovar. *kyrtostyla* (*C. monogyna* Jacq. × *C. rhipidophylla* var. *rhipidophylla*). We revised the herbarium specimens in KW and CWU herbaria to find samples identified as *Crataegus fallacina* and some relative taxa. Our search was resultless. Available photos of *Crataegus* sp. in *iNaturalist* (2025–onward) were not enough detailed to identify plants accurately. Most photos do not illustrate necessary morphological structures (characters of pubescence, features of generative organs, etc.). Nevertheless, according to reference data (Shynder, Negrash, 2021), *C.* × *kyrtostyla* nothovar. *kyrtostyla* occurred in the territory of the former Balakliia District (near Kreidianska Dacha and Protopopivka). This hybrid and its distribution in and around Kharkiv Region should be studied further.

Even among genera where we reported a few hybrids, we observed just a portion of hybrids that could potentially be observed in Kharkiv Region in the future. The analysis showed that several other *Verbascum* hybrids are expected there. *Verbascum* × *bastardii* Roem. & Schult. (*V. blattaria* L. × *V. densiflorum*), *V.* × *flagriforme* Pfund. (*V. phlomoides* L. × *V. blattaria*), *V.* × *intermedium* Rupr. ex Pfund (*V. blattaria* × *V. nigrum*), *V.* × *kerneri* Fritsch (*V. phlomoides* × *V. thapsus*), *V.* × *pterocaulon* Franch. (*V. blattaria* × *V. thapsus*), *V.* × *semialbum* Chaub. (*V. nigrum* × *V. thapsus*), and *V.* × *ustulatum* Čelak. (*V. nigrum* × *V. phoeniceum*) are among them. The parental species of all these mentioned hybrid taxa grow in Kharkiv Region. The great potential on hybridization between representatives of *Verbascum* was demonstrated even by our research, and thus further discoveries of new *Verbascum* hybrids are possible. For instance, Naliwaiko (1899) mentioned that he observed the hybrid of *V. densiflorum* (*V. thapsiforme* Schrad) and *V. lychnitis* on the margin of the Malinkin Bir Forest (currently, Nadtochii, Kharkiv City Agglomeration) on August 16, 1895. Moreover, he mentioned hybrid *V. phlomoides* × *V. chaixii* subsp. *orientale* Hayek (≡ *V. orientale* M. Bieb.) revealed between Karachivka (currently, Pokotylivka village, Kharkiv City Agglomeration)

and Babai village on July 23, 1895. One more note was dedicated to a record of the hybrid *V. lychnitis* × *V. chaixii* subsp. *orientale* Hayek made near Skurydyniskyi Mill (currently, Novobavarskyi Distr. of Kharkiv City) on August 7, 1894. Nonetheless, these reports are doubtful because they are not based on any available herbarium specimens. Some *Verbascum* hybrids that occurred in Kharkiv Region were cited by Kotov (1960) in the *Flora USSR* after his studies of the herbarium collection at the Institute of Botany in Kyiv (KW). Most of mentioned by Kotov hybrids of *Verbasum* were actually found in Kharkiv Region.

Moreover, we recorded various *Arctium* L. hybrids. Some of them have not been included in the present article because of their wide distribution in the region (*A.* × *nothum* (Ruhmer) J. Weiss and *A.* × *mixtum* (Simonk.) Nyman). Additionally, we analysed records made in Ukraine to predict the possible presence of other representatives we did not find during our investigations or in herbarium collections. In particular, *Arctium* × *ambiguum* (Celak.) Nyman (*A. lappa* × *A. tometosum*) that occurred in the Zakarpattia (Transcarpathian), Volyn, Rivne, Ternopil, Vinnytsia, Kyiv, Cherkasy, Kirovohrad (Kropyvnytsk), Mykolaiv, Poltava, and Zhytomyr regions, and in Kyiv City (iNaturalist, 2025–onward). Both parental species are widely distributed in Kharkiv Region. Shynder and Negrash (2021) reported that they observed *A.* × *ambiguum* in the surroundings of Balakliia town, but the precise locality is absent. Thus, *A.* × *ambiguum* is expected to be a more common hybrid in the region. In addition to *A.* × *ambiguum*, *A.* × *maassii* (M. Schultze) Rouy (*A. minus* × *A. nemorosum*) is known in the Ukrainian flora. This hybrid is much rarer because of the rarity of *A. nemorosum*. It was observed only in two localities (Vinnytsia and Zakarpattia (Transcarpathian) regions) (Onyshchenko et al., 2022; iNaturalist, 2025–onward). Both parental species of *A.* × *maassii* grow in Kharkiv Region, so their hybrid could be registered there in the future.

Representatives of *Salix* L. have a great potential for hybridization. According to the latest checklist of the flora of Kharkiv Region and other open sources (Gorelova, Alyokhin, 2002; iNaturalist, 2025–onward), at least thirteen species of this genus grow in the region. They all are able to form hybrids between each other. In the generalizing floristic publications on plant diversity of Kharkiv Region and local floras (Gorelova, Alyokhin, 2002; Zvyagintseva, 2015; Shynder, Negrash, 2021), there was mentioned at least one hybrid, *S.* × *fragilis* L. For a long time it was recognised as a species. However, in 2009 Belyaeva (2009) described a new species *S. euxina* and assumed the hybrid origin of *S.* × *fragilis* A. Kern. (Belyaeva, 2009). Obviously, in local floristic research, *S. fragilis* includes a complex of *S. euxina* and *S.* × *fragilis*. (*S. alba* × *S. euxina*). At least ten *Salix* sp. hybrids potentially could be observed in Kharkiv Region: *S.* × *eriophora* Borbás (*S. alba* × *S. triandra*), *S.* × *hermaphroditica* L. (*S. alba* × *S. euxina* × *S. pentandra*), *S.* × *holosericea* Willd. (*S. cinerea* × *S. viminalis*), *S.* × *hostii* A. Kern. (*S. caprea* × *S. viminalis*), *S.* × *mollissima* Hoffm. ex Elwert (*S. triandra* × *S. viminalis*), *S.* × *multinervis* Döll (*S. aurita* × *S. cinerea*), *S.* × *schumanniana* Seemen (*S. pentrandra* × *S. triandra*), *S.* × *speciosa* Host (*S. alba* × *S. euxina* × *S. triandra*), *S.* × *woloszczakii* Zalewski (*S. aurita* × *S. caprea* × *S. cinerea*). We observed individuals of *Salix* representatives similar to *S. cinerea* × *S. triandra* but this identification must be further confirmed.

This list of putatively occurring hybrids in Kharkiv Region is incomplete but contains the most credible ones.

Unresolved taxonomic and nomenclatural issues. Despite the long history of research on *Verbascum* hybrids, some taxonomic issues are still unresolved. Our research demonstrated that the hybrid *V. chaixii* × *V. lychnitis* occurs in Kharkiv Region at present, and it was recorded in the past (Naliwaiko, 1899). *V. chaixii* includes three accepted infraspecific taxa (subspecies): *V. chaixii* subsp. *austriacum* (Schott ex Roem. & Schult.) Hayek, *V. chaixii* subsp. *chaixii*, and *V. chaixii* subsp. *orientale* Hayek (POWO, 2025–onward). As reported by some authors (Gorelova, Alyokhin, 2002; Shynder, Negrash, 2021), the subspecies growing in Kharkiv Region is *V. chaixii* subsp. *austriacum*. However, in some Ukrainian publications (Opredelitel…, 1987; Gorelova, Alyokhin, 2002), *V. orientale* is recognized as a synonym of *V. chaixii* subsp. *austriacum*. During our field surveys, we observed some individuals that fit the description of *V. chaixii* subsp. *austriacus*, and some of them fit the characters of *V. chaixii* subsp. *orientale*.Both subspecies probably occur in Kharkiv Region. According to Art. H.5.1 of the *International Code of Nomenclature for algae, fungi, and plants* (Turland et al., 2025), "If the postulated or known parent taxa are at unequal ranks, the appropriate rank of the nothotaxon is the lowest

of these ranks". Thus, the new nomencatural combinations should be validated following the *ICN*.

Another unresolved problem refers to the status of some names of *Salvia* hybrids. For instance, there seems to be no accepted name available for the hybrid *S. nemorosa* × *S. nutans*. Fedoronchuk (2022a) considers *S.* × *pendula* Vahl. as a hybrid that originated with participation of *S. nemorosa*. At the same time, he assumes that the second parental species could be *S. nutans* or *S. pratensis*. The last species can hardly be a parental species for *S.* × *pendula* because it has pendulate inflorescence. Such character indicates that at least one of the parental species must be *S. nutans*. Pobedimova (1954: 350–353) supposed that *S. pendula* could be a hybrid between *S. nutans* and *S. virgata* Jacq., according to its intermediate morphological features. At the same time, she revised specimens identified as *S. cernua* Czern. ex Des.-Shost., and concluded that there are no diagnostic characters sufficient for recognizing *S. cernua* as a species separate from *S. pendula*. The same conclusion she made for *S. cremenescensis* Besser, considering its differences as not so valuable for separating this species from *S. pendula*. Thus, Pobedimova (1954) synonymized *S. pendula*, *S. cernua*, and *S. cremenescensis*. All these taxa occurred in different places quite far from their putative parental species *S. virgata*, occurring in Southern Europe, the Balkans, Crimea, the Caucasus, and Middle Asia. Therefore, Pobedimova (1954) rejects the hypothesis that *S. pendula* has the hybrid origin. Kotov (1960) recognized *S. cernua* and *S. cremenescensis* as species and did not synonymized them with *S. pendula*, as well as *S. betonicifolia* Etl. At the same time, he suggested that if *S. cernua* is of hybrid origin, it is a result of hybridization between *S. tesquicola* Klokov & Pobed. (= *S. nemorosa* s. l.) and *S. nutans*. According to *POWO* (2025–onward), *S.* × *pendula* is considered to be a hybrid with the hybrid formula *S. nutans* × *S. virgata*. Meanwhile, *POWO* recognizes *S. betonicifolia*, *S. cernua*, and *S. cremenescensis* as the heterotypic synonyms of *S. nutans*. Based on our analysis of the references, *S. betonicifolia*, *S. cernua*, and *S. cremenescensis* cannot be regarded as synonyms of *S. nutans*, while *S.* × *pendula* is accepted as a separate entity. We conclude Fedoronchuk could be right and *S.* × *pendula* could be a hybrid between *S. nemorosa* and *S. nutans*. These taxa should be critically revised using molecular methods to clarify their status as accepted names, synonyms, and hybrids.

Some genera of *Asteraceae* are represented in our area by closely related species with intermediate overlapping characters, which leads to difficulties in their identification. The genus *Jacobaea* is among such groups. *Jacobaea andrzejowskyi* belongs to the group of related species known as *J. vulgaris* aggr. (Mosyakin, Shiyan, 2019). This poorly known taxon is believed to be a Pontic-Caspian endemic species (Tzvelev, 1986). Indeed, *J. andrzejowskyi* is currently accepted as a species (POWO, 2025–onward; Euro+Med..., 2025–onward; WFO, 2024–onward). Tzvelev (1986) noticed in the protologue the transitional morphology of the newly described species, apparently intermediate between *J. vulgaris* and *J. borysthenica*, and thus he suggested the hybrid origin of this taxon. In particular, *J. andrzejowskyi* has intermediate characteristics of the leaves between the two putative parental species and has pappi on its cypselae (the character of *J. vulgaris*). Mosyakin and Shiyan (2019) also reviewed the specimens identified as *J. andrzejowskyi* and concluded that some of them are quite similar to *J. vulgaris* subsp. *pannonica* Hodálová & Mered'a (Hodálová et al., 2015). To clarify the status of each taxon, further research is necessary, preferably using molecular methods. We considered *J. andrzejowskyi* in this article due to its possible hybrid origin and intermediate morphology between *J. vulgaris* and *J. borysthenica*.

Conclusions

This article is the first attempt to collect and generalize data about the hybrid plants occurring in the flora of Kharkiv Region. It unites the data about some new and rare hybrids of Eudicots. Totally, we reported the presence of 24 hybrids and one putative hybrid. Among them, there are seven hybrids new for the flora of Ukraine (*Arctium* × *neumanii*, *Centaurea diffusa* × *C. jacea*, *C. jacea* × *C. nigrescens* subsp. *pinnatifida*, *C. nigrescens* subsp. *pinnatifida* × *C. phrygia* subsp. *pseudophrygia*, *Corydalis* × *hausmanii*, *Rubus* × *areschougii*, and *Verbascum* × *thapsi*) and six hybrids new for the flora of Kharkiv Region (*Arctium* × *cimbricum*, *Betula* × *aurata*, *Salix* × *reichardtii*, *Verbascum* × *brockmuellerii*, *V.* × *pseudolychnitis*, *Utricularia* × *neglecta*). Most of the recorded hybrids are spontaneous and are formed accidentally. Some genera (*Verbascum*, *Centaurea*, *Arctium*, etc.) demonstrate active hybridization processes in our region and in other parts of their geographic ranges.

Some revealed hybrids were formed with participation of species which are alien in the flora of Ukraine, e.g. *Centaurea diffusa* and *C. nigrescens* subsp. *pinnatifida*. Such hybrids should be recognized as adventive (alien, non-native) elements in the flora of Ukraine, as well as their parental species. Moreover, the effects of such newly formed hybrids on ecosystems and native species of the flora of Ukraine in general and Kharkiv Region in particular should be studied in more detail.

Acknowledgements

The authors are grateful to Dr. Denis Davydov, Dr. Natalia Shiyan, Ph.D. Olena Miskova (M.G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine, Kyiv, Ukraine), Dr. Petr Koutecký (University of South Bohemia, České Budějovice, Czech Republic), Dr. Mario Klesczewski (CEN Occitanie, Montpellier, France), Vladyslav Siranskyi, Artem Rokytianskyi, Kateryna Nesterenko (V.N. Karazin Kharkiv National University, Kharkiv, Ukraine), for their help in collecting and analyzing the specimens, their identifications and consultations. Also, we are grateful to Igor Pyshnyi for allowing us to use his photograph of *Psephellus carbonatus*. We are grateful to anonymous reviewers whose useful comments and recommendations much improved the present article. And finally, we are cordially grateful to the Armed Forces of Ukraine, to each defender who protects our country and all of us and gives us the possibility to live, work, and explore and protect our nature and biodiversity.

SUPPLEMENTARY MATERIAL

This article includes Supplementary Material S1 (Figs. S1–S13) available as: ukrbotj82-04-345-S1.pdf (7,443 KB).

ETHICS DECLARATION

The authors declare no conflict of interests.

ORCID

H.M. Bondarenko: https://orcid.org/0000-0001-9936-3482
Yu.G. Gamulya: https://orcid.org/0000-0002-7908-1995

REFERENCES

Ainouche M.L., Baumel A., Salmon A., Yannic G. 2004. Hybridization, polyploidy and speciation in *Spartina* (*Poaceae*). *New Phytologist*, 161: 165–172. https://doi.org/10.1046/j.1469-8137.2003.00926.x

Bánki O., Roskov Y., Döring M., Ower G., Hernández Robles D.R., Plata Corredor C.A., Stjernegaard Jeppesen T., Örn A., Pape T., Hobern D., Garnett S., Little H., DeWalt R.E., Miller J., Orrell T., Aalbu R., Abbott J., Aedo C., Aescht E. et al. 2025. *Catalogue of Life* (Version 2025-07-10). Catalogue of Life Foundation, Amsterdam, Netherlands. https://doi.org/10.48580/dgrrq

Belyaeva I. 2009. Nomenclature of *Salix fragilis* L. and a new species, *S. euxina* (*Salicaceae*). *Taxon*, 58(4): 1344–1348. https://doi.org/10.1002/tax.584021

Bezsmertna O.O., Peregrym M.M., Vasheka O.V. 2012. Genus *Asplenium* L. (*Aspleniaceae*) in the natural flora of Ukraine. *Ukrainian Botanical Journal*, 69(4): 544–558. [Безсмертна О.О., Перегрим М.М., Вашека О.В. 2012. Рід *Asplenium* L. (*Aspleniaceae*) у природній флорі України. *Український ботанічний журнал*, 69(4): 544–558.]

Bobrov A.A., Volkova P.A., Kopylov-Guskov Yu.O., Mochalova O.M., Kravchuk A.E., Nekrasova D.M. 2022. Unknown sides of *Utricularia* (*Lentibulariaceae*) diversity in East Europe and North Asia or how hybridization explained old taxonomical puzzles. *Perspectives in Plant Ecology, Evolution and Systematics*, 54: 125649. https://doi.org/10.1016/j.ppees.2021.125649

Bondarenko H.M., Gamulya Yu.G. 2025. *Centaurea nigrescens* (*Asteraceae*) in the flora of Ukraine: history of research and new data. *Chornomorski Botanical Journal*, 21(1): 82–93. [Бондаренко Г.М., Гамуля Ю.Г. 2025. *Centaurea nigrescens* (*Asteraceae*) у флорі України: історія досліджень та нові відомості. *Чорноморський ботанічний журнал*, 21(1): 82–93.] https://doi.org/10.32999/ksu1990-553X/2025-21-1-6

Bleeker W., Schmitz U., Ristow M. 2007. Interspecific hybridisation between alien and native plant species in Germany and its consequences for native biodiversity. *Biological Conservation*, 137(2): 248–253. https://doi.org/10.1016/j.biocon.2007.02.004

Buhk C., Thielsch A. 2015. Hybridisation boosts the invasion of an alien species complex: Insights into future invasiveness. *Perspectives in Plant Ecology, Evolution and Systematics*, 17(4): 274–283. https://doi.org/10.1016/j.ppees.2015.05.001

Cayouette J., Catling P.M. 1992. Hybridization in the genus *Carex* with special reference to North America. *Botanical Review*, 58: 351–438. https://doi.org/10.1007/BF02858773

Chervona knyha Ukrayiny. Roslynnyi svit (*Red Data Book of Ukraine. Plant Kingdom*). 2009. Ed. Ya.P. Didukh. Kyiv: Globalconsulting, 912 pp. [*Червона книга України. Рослинний світ*. 2009. Ред. Я.П. Дідуха. Київ: Глобалконсалтинг, 912 с.]

Czerniajev B.M. [Czerniaëw B.M.] 1859. *Conspectus plantarum circa Charkoviam et in Ucraina sponta crescentium*. Charkow: Typografia Universitas, 90 pp. [Черняев В.М. 1859. *Конспект растений в окрестностях Харькова и в Украине*. Харьков: Университетская типография, 90 с.]

Davydov D.A., Gomlya L.M. 2021. Vascular plants of Poltava town territorial commune: an annotated checklist. *Biology & Ecology*, 7(1): 70–81. [Давидов Д.А., Гомля Л.М. 2021. Судинні рослини Полтавської міської територіальної громади: анотований перелік. *Біологія та екологія*, 7(1): 70–81.] https://doi.org/10.33989/2021.7.1.243453

Edger P.P., Soltis D.E., Yochioka Sh., Vallejo-Marin M., Shimizu-Inatsugi R., Shimizu K.K., Salmon A., Hiscock S., Ainouche M., Soltis P.S. 2025. Natural neopolyploids: a stimulus for novel research. *New Phytologist*, 246(1): 78–93. https://doi.org/10.1111/nph.20437

Euro+Med PlantBase. 2005–onward. *The information resource for Euro-Mediterranean plant diversity*. Available at: https://www.emplantbase.org/home.html (Accessed 13 December 2024).

Fedoronchuk M.M. 2022a. Ukrainian flora checklist. 1: family *Lamiaceae* (*Lamiales*, Angiosperms). *Chornomorski Botanical Journal*, 18(1): 5–27. [Федорончук М.М. 2022a. Чекліст флори України. 1: родина *Lamiaceae* (*Lamiales*, Angiosperms). *Чорноморський ботанічний журнал*, 18(1): 5–27.] https://doi.org/10.32999/ksu1990-553X/2022-18-1-1

Fedoronchuk M.M. 2022b. Ukrainian flora checklist. 4: family *Rosaceae* (*Rosales*, Angiosperms). *Chornomorski Botanical Journal*, 18(4): 305–349 [Федорончук М.М. 2022b. Чекліст флори України. 4: родина *Rosaceae* (*Rosales*, Angiosperms). *Чорноморський ботанічний журнал*, 18(4): 305–349.] https://doi.org/10.32999/ksu1990-553X/2022-18-4-1

Fedoronchuk M.M. 2023a. Ukrainian flora checklist. 6: family *Crassulaceae*, *Grossulariaceae*, *Haloragaceae*, *Saxifragaceae* (*Saxifragales*, Angiosperms), and *Convolvulaceae* (incl. *Cuscutaceae*), *Solanaceae* (*Solanales*, Angiosperms). *Chornomorski Botanical Journal*, 19(2): 141–168. [Федорончук М.М. 2023a. Чекліст флори України. 6: Родини *Crassulaceae*, *Grossulariaceae*, *Haloragaceae*, *Saxifragaceae* (*Saxifragales*, Angiosperms) та *Convolvulaceae* (incl. *Cuscutaceae*), *Solanaceae* (*Solanales*, Angiosperms). *Чорноморський ботанічний журнал*, 19(2): 141–168.] https://doi.org/10.32999/ksu1990-553X/2023-19-2-1

Fedoronchuk M.M. 2023b. Ukrainian flora checklist. 7: family *Caprifoliaceae* s. l. (incl. *Dipsacaceae*, *Linnaeaceae*, *Valerianaceae*), *Viburnaceae* s. l. (incl. *Adoxaceae*, *Sambucaceae*) (*Dipsacales*, Angiosperms), and *Lythraceae* (incl. *Punicaceae*, *Trapaceae*), *Onagraceae*, *Myrtaceae* (*Myrtales*, Angiosperms). *Chornomorski Botanical Journal*, 19(3): 243–271. [Федорончук М.М. 2023b. Чекліст флори України. 7: родини *Caprifoliaceae* s. l. (incl. *Dipsacaceae*, *Linnaeaceae*, *Valerianaceae*), *Viburnaceae* s. l. (incl. *Adoxaceae*, *Sambucaceae*) (*Dipsacales*, Angiosperms) та *Lythraceae* (incl. *Punicaceae*, *Trapaceae*), *Onagraceae*, *Myrtaceae* (*Myrtales*, Angiosperms). *Чорноморський ботанічний журнал*, 19(3): 243–271.] https://doi.org/10.32999/ksu1990-553X/2023-19-3-1

Fedoronchuk M.M. 2024. Ukrainian flora checklist. 9: families *Cistaceae*, *Malvaceae* (incl. *Tiliaceae*) and *Thymelaeaceae* (*Malvales*, Angiosperms). *Chornomorski Botanical Journal*, 20(1): 5–18. [Федорончук М.М. 2024. Чекліст флори України. 9: родини *Cistaceae*, *Malvaceae* (incl. *Tiliaceae*) та *Thymelaeaceae* (*Malvales*, Angiosperms). *Чорноморський ботанічний журнал*, 20(1): 5–18.] https://doi.org/10.32999/ksu1990-553X/2024-20-1

Feliner G.N., Criado Ruiz D.C., Álvarez I., Villa-Machío I. 2023. The puzzle of plant hybridisation: a high propensity to hybridise but few hybrid zones reported. *Heredity*, 131(5): 307–315. https://doi.org/10.1038/s41437-023-00654-1

Fodor S.S. 1974. *Flora Zakarpattia*. Lviv: Vyshcha Shkola, 208 pp. [Фодор С.С. 1974. *Флора Закарпаття*. Львів: Вища школа, 208 с.]

Flora URSR (Flora RSS Ucrainicae). 1938–1965. Vols 1–12. Kyiv: Publisher of the Academy of Sciences of Ukrainian SSR. [*Флора УРСР*. 1938–1965. Т. 1–12. Київ: Видавництво Академії наук Української РСР.]

GBIF. 2025–onward. *The Global Biodiversity Information Facility*. Available from: https://www.gbif.org (Accessed 24 February 2025).

Gorelova L.N., Alyokhin A.A. 2002. *Rastitel'ny pokrov Kharkovshchiny: Ocherk rastitel'nosti, voprosy okhrany, annotirovannyi spisok sosudistykh rasteniy*. Kharkov: Publisher of V.N. Karazin Kharkiv National University, 231 pp. [Горелова Л.Н., Алехин А.А. 2002. *Растительный покров Харьковщины: Очерк растительности, вопросы охрани, аннотированный список сосудистых растений*. Харьков: Издательство Харьковского национального университета им. В.Н. Каразина, 231 с.]

Hodálová I., Mereďa P., Kučera J. 2015. Origin and systematic position of *Jacobaea vulgaris* (*Asteraceae*) octoploids: genetic and morphological evidence. *Plant Systematics and Evolution*, 301: 1517–1541. https://doi.org/10.1007/s00606-014-1163-0

Hovick S.M., Whitney K.D. 2014. Hybridisation is associated with increased fecundity and size in invasive taxa: meta-analytic support for the hybridisation-invasion hypothesis. *Ecology Letters*, 17(11): 1464–1477. https://doi.org/10.1111/ele.12355

Iakushenko D.M., Orlov O.O. 2015. New records of *Utricularia australis* (*Lentibulariaceae*) in Ukraine. *Ukrainian Botanical Journal*, 72(5): 468–473. https://doi.org/10.15407/ukrbotj72.05.468

iNaturalist. 2025–onward. Available at: www.inaturalist.org/ (Accessed 1 April 2025).

Kerner A. 1860. *Niederösterreichische Weiden*. Wien: Druck von Carl Ueberreuter, 160 pp. https://doi.org/10.5962/bhl.title.15620

Klesczewski M., Maciuga N., Giardi L., Davydov D.A., Allain P., Lecompte C. 2024. Molènes hybrides de France, 13 — *Verbascum* × *schiedeanum* Koch (*V. lychnitis* L. × *V. nigrum* L.). *Carnets Botaniques*, 196: 1–23. https://doi.org/10.34971/HC3H-7Y25

Klokov M.V. 1963. *Heterolophus*. In: *Flora SSSR*. Vol. 28. Eds B.K. Shishkin, E.G. Bobrov, S.K. Cherepanov. Moscow; Leningrad: Publisher of Academy of Science URSR, pp. 463–472. [Клоков М.В. 1963. *Heterolophus*. В кн.: *Флора СССР*. Т. 28. Ред. Б.К. Шишкин, Е.Г. Бобров, С.К. Черепанов. Москва; Ленинград: Издательство Академии наук СССР, с. 463–472.]

Kotov M.I. 1960. *Verbascum*. In: *Flora URSR*. Vol. 9. Ed. M.I. Kotov. Kyiv: Publisher of the Academy of Sciences of Ukrainian SSR, pp. 407–431. [Котов М.І. 1960. *Verbascum*. В кн.: *Флора УРСР*. Т. 9. Ред. М.І. Котов. Київ: Видавництво Академії наук Української РСР, с. 407–431.]

Koutecký P., Badurová T., Štech M, Košnar J., Karásek J. 2011. Hybridization between diploid *Centaurea pseudophrygia* and tetraploid *C. jacea* (*Asteraceae*): the role of mixed pollination, unreduced gametes, and mentor effects. *Biological Journal of the Linnean Society*, 104: 93–106. https://doi.org/10.1111/j.1095-8312.2011.01707.x

Lawrenko E.M. 1923. *Centaurea orientalis* × *Scabiosa* in Rossia australi. *Notulae systematicae ex Herbario Horti Botanici Petropolitani*, 6(5): 33–38. [Лавренко Е.М. 1923. Гибрид *Centaurea orientalis* × *Scabiosa* в южной России. *Ботанические материалы Гербария Главного Ботанического Сада РСФСР*, 6(5): 33–38.]

Mosyakin S.L., Fedoronchuk M.M. 1999. *Vascular plants of Ukraine. A nomenclatural checklist*. Kyiv: M.G. Kholodny Institute of Botany, xxiv + 345 pp.

Mosyakin S.L., Shiyan N.M. 2019. Nomenclatural and taxonomic notes on *Jacobaea borysthenica* (*Asteraceae*) and some related taxa. *Ukrainian Botanical Journal*, 76(6): 473–485. https://doi.org/10.15407/ukrbotj76.06.473

Moysiyenko I. 2023. *Checklist of vascular plants of the National Nature Park "Kamianska Sich" (Kherson region, Ukraine)*. Version 1.2. Kherson State University. Dataset https://doi.org/10.15468/725mp2 (Accessed 24 March 2025).

Moysiyenko I., Sudnik-Wójcikowska B., Dembicz I., Zachwatowicz M., Skobel N. 2023. *Flora of kurgans in the "Wild Fields" (Ukraine)*. Version 1.3. Kherson State University. Dataset https://doi.org/10.15468/x4drnu (Accessed 24 March 2025).

Naliwaiko P.N. 1899. Catalogus plantarum sponte nascentium, quas annis 1891–1897 circa Charkowiam collegit. *Travaux de la Société des naturalistes à l'Université Impériale de Kharkow*, 33: 83–232. [Наливайко П.Н. 1899. Список дикорастущих и одичалых цветковых и высших споровых растений, собранных в г. Харькове и его окрестностях в 1891–1897 гг. *Труды общества испытателей природы при Харьковском университете*, 33: 83–232.]

Noé N. 2024. *GBIF Occurences. QGIS GBIF API*. Available at: https://github.com/BelgianBiodiversityPlatform/qgis-gbif-api (Accessed 14 October 2024).

Olshanskyi I. 2023. Hybrids of monocots in the flora of Ukraine: Preliminary synopsis. *Biosystems Diversity*, 31(4): 420–427. https://doi.org/10.15421/012350

Onyshchenko V.A., Mosyakin S.L., Korotchenko I.A., Danylyk I.M., Burlaka M.D., Fedoronchuk M.M., Chorney I.I., Kish R.Ya., Olshanskyi I.H., Shiyan N.M., Zhygalova S.L., Tymchenko I.A., Kolomiychuk V.P., Novikov A.V., Boiko G.V., Shevera M.V., Protopopova V.V. 2022. *IUCN Red List categories of vascular plant species of the Ukrainian flora*. Ed. V.A. Onyshchenko. Kyiv: FOP Huliaeva V.M., 198 pp.

Opredelitel vysshikh rasteniy Ukrainy. 1987. Eds Yu.N. Prokudin, D.N. Dobrochayeva, B.V. Zaverukha, V.I. Chopik, V.V. Protopopova, L.I. Kritskaya. Kyiv: Naukova Dumka, 548 pp. [*Определитель высших растений Украины*. 1987. Ред. Ю.Н. Прокудин, Д.Н. Доброчаева, Б.В. Заверуха, В.И. Чопик, В.В. Протопопова, Л.И. Крицкая. Киев: Наукова думка, 548 с.]

Peregrym M.Мю, Didukh Ya.P. 2014. *Asplenium* × *heufleri* and *Woodsia alpina* on the Donetsk Upland. *Ukrainian Botanical Journal*, 71(1): 50–52. [Перегрим М.М., Дідух Я.П. 2014. *Asplenium* × *heufleri* і *Woodsia alpina* на Донецькому кряжі. *Український ботанічний журнал*, 71(1): 50–52.] https://doi.org/10.15407/ukrbotj71.01.050

Peregrym M.M., Kuzemko A.A. 2010. New infragenic hybrid in the flora of Ukraine × *Dactylocamptis uechtritziana* (Hausskn.) M. Peregrym et Kuzemko, comb. nov. (*Orchidaceae*). *Ukrainian Botanical Journal*, 67(5): 655–662. [Перегрим М.М., Куземко А.А. 2010. Новий для флори України міжродовий гібрид × *Dactylocamptis uechtritziana* (Hausskn.) M. Peregrym et Kuzemko, comb. nov. (*Orchidaceae*). *Український ботанічний журнал*, 67(5): 655–662.]

Peregrym M., Koopman J. 2023. *Carex* × *takhtadjanii* (*Carex diluta* × *C. distans*; *Cyperaceae*), a new hybrid for the flora of Ukraine. *Hacquetia*, 22(1): 1–6. https://doi.org/10.2478/hacq-2022-0011

Pobedimova E.G. 1954. *Salvia*. In: *Flora SSSR*. Vol. 21. Ed. B.K. Shishkin. Moscow; Leningrad: Publisher of Academy of Science URSR, pp. 350–353. [Победимова Е.Г. 1954. *Salvia*. В кн.: *Флора СССР*. Т. 21. Ред.: Б.К. Шишкин. Москва; Ленинград: Издательство Академии наук СССР, с. 350–353.]

POWO. 2025–onward. *Plants of the World Online*. Facilitated by the Royal Botanic Gardens, Kew. Available at: https://powo.science.kew.org/ (Accessed 30 March 2025).

QGIS. 2024–onward. *QGIS Home Page*. Available at: https://qgis.org/en/site/ (Accessed 14 October 2024).

Ruhsam M., Jacobs T., Watson K., Hollingsworth P.M. 2014. Is hybridisation a threat to *Rumex aquaticus* in Britain? *Plant Ecology & Diversity*, 8(4): 465–474. https://doi.org/10.1080/17550874.2014.941956

Schmalhausen I. 1895. *Flora of Middle and Southern Russia, Crimea, and Northern Caucasus*. Vol. 1. Kyiv: Izdatelstvo Kievskogo universiteta, 468 pp. [Шмальгаузен И. 1895. *Флора Средней и Южной России, Крыма и Северного Кавказа*. Т. 1. Киев: Издательство Киевского университета, 468 с.]

Schmalhausen I. 1897. *Flora of Central and Southern Russia, Crimea and the North Caucasus*. Vol. 2. Kyiv: Izdatelstvo Kievskogo universiteta, xvi + 752 pp. [Шмальгаузен И. 1897. *Флора Средней и Южной России, Крыма и Северного Кавказа*. Т. 2. Киев: Издательство Киевского университета, xvi + 752 с.]

Shynder O.I., Davydov D.A., Olshanskyi I.G., Levon A.F., Nesyn Yu.D. 2024. New floristic records in Kyiv City and its environs. *Ukrainian Botanical Journal*, 81(2): 100–144. [Шиндер О.І., Давидов Д.А., Ольшанський І.Г., Левон А.Ф., Несин Ю.Д. 2024. Нові флористичні знахідки у Києві та на його околицях. *Український ботанічний журнал*, 81(2): 100–144]. https://doi.org/10.15407/ukrbotj81.02.100

Shynder O., Negrash J. 2021. Checklist of the flora of the vicinity of Balakliya (Kharkiv Region, Ukraine): native and alien taxa, distribution of rare plants, new findings. *Plant Introduction*, 89/90: 13–71. https://doi.org/10.46341/PI2020043

Širajefv G., Lavrenko E. 1926. *Conspectus criticus florae provinceae Charkoviensis.* Pars 1. *Pteridophyta et Monocotyledones.* Brunae [Brno], 103 pp.

Stace C.A., Preston C.D., Pearman D.A. 2015. *Hybrid flora of the British Isles*. Bristol: Botanical Society of Britain & Ireland, 510 pp.

Tarieiev A., Olshanskyi I., Gailing O., Krutovsky K. 2019. Taxonomy of dark- and white-barked birches related to *Betula pendula* and *B. pubescens* (*Betulaceae*) in Ukraine based on both morphological traits and DNA markers. *Botanical Journal of the Linnean Society*, 191: 142–154. https://doi.org/10.1093/botlinnean/boz031

Tausch I.F. 1823. *Hortus canalius, seu, Plantarum rariorum quae in Horto Botanico illustrissimi, ac excellentissimi Josephi Malabaila comitis de Canal coluntur, Icones et Descriptiones*. Pragae [Prague/Praha]: Ex typo- et litho-graphia Theophili Haase. https://doi.org/10.5962/bhl.title.149853

Tomych M.V., Derzhypilskyi L.M. 2019. Znakhidky roslyn, zanesenykh do Chervonoi knyhy Ukrainy, v NPP Hutsulshchyna. In: *Znakhidky roslyn ta hrybiv Chervonoi khyhy ta Bernskoi konventsii (Resolutsiia 6).* T. 1. Ed. A.A. Kuzemko. Kyiv, Chernivtsi: Druk Art, pp. 353–357. [Томич М.В., Дердипільский Л.М. 2019. Знахідки рослин, занесених до Червоної книги України, в НПП "Гуцульщина". У зб.: *Знахідки рослин та грибів Червоної книги та Бернської конференції (Резолюція 6).* Т. 1. Ред. А.А. Куземко. Київ, Чернівці: Друк Арт, с. 353–357.]

Thompson J.D., Gauthier P., Papuga G., Pons V., Debussche M., Farris E. 2018. The conservation significance of natural hybridisation in Mediterranean plants: from a case study on *Cyclamen* (*Primulaceae*) to a general perspective. *Plant Biology*, 20: 128–138. https://doi.org/10.1111/plb.12595

Turland N.J., Wiersema J.H., Barrie F.R., Gandhi K.N., Gravendyck J., Greuter W., Hawksworth D. L., Herendeen P.S., Klopper R.R., Knapp S., Kusber W.-H., Li D.-Z., May T.W., Monro A.M., Prado J., Price M.J., Smith G.F., Zamora Señoret J.C. 2025. *International Code of Nomenclature for algae, fungi, and plants (Madrid Code)*. Chicago, USA: University of Chicago Press. [*Regnum Vegetabile*, vol. 162]. http://dx.doi.org/10.7208/chicago/9780226839479.001.0001

Tzvelev N.N. 1994. *Achillea*. In: *Flora partis Europaeae URSS*. T. 9. Ed. N.N. Tzvelev. St.-Petersburg: Nauka, pp. 117–127. [Цвелев Н.Н. 1994. *Achillea*. В кн.: *Флора Европейской части СССР.* Т. 9. Н.Н. Цвелев. Санкт-Петербург: Наука, с. 121–122.]

Tzvelev N.N. 1985. Notae de speciebus nonnullis florae partis Europaeae URSS. *Novitates Systematicae Plantarum Vascularium*, 22: 266–277. [Цвелев Н.Н. 1985. Заметки о некоторых видах Европейской части СССР. *Новости систематики высших растений*, 22: 266–277.]

Tzvelev N.N. 1986. De plantarum speciebus nonnulis pro parte Europaea URSS novis et raris. *Novitates Systematicae Plantarum Vascularium*, 23: 254–263. [Цвелев Н.Н. 1986. О некоторых новых и редких видах растений европейской части СССР. *Новости систематики высших растений*, 23: 254–263.]

UkrBIN. 2025–onward. *UkrBIN: Ukrainian Biodiversity Information Network [public project & web application]*. Available at: https://www.ukrbin.com (Accessed 20 January 2025).

Waldstein F.C., Kitaibel P. 1805. *Descriptiones at icones plantarum rariorum Hungariae.* Vol. 2. Viennae [Vienna / Wien]: Typis Matthiae Andreae Schmidt, Universit. Typogr., xxxii + 105–221 + tab. 101–200. Availalable at: https://bibdigital.rjb.csic.es/records/item/11189-descriptiones-et-icones-plantarum-rariorum-hungariae-vol-2

WFO. 2024–onward. *World Flora Online.* Availalable at: https://www.worldfloraonline.org/ (Accessed 14 October 2024).

Wissemann V. 2005. Evolution by hybridisation. The influence of reticulate evolution on biosymmetrical patterns and processes in plants. *Theory in Biosciences*, 123: 223–233. https://doi.org/10.1016/j.thbio.2004.09.003

Wong E.L., Hiscock S.J., Filatov D. 2022. The role of interspecific hybridisation in adaptation and speciation: Insights from studies in *Senecio*. *Frontiers in Plant Science*, 13: 907363. https://doi.org/10.3389/fpls.2022.907363

Yena A.V. 2012. *Spontaneous Flora of the Crimean Peninsula*. Simferopol: N. Orianda, 232 pp. [Ена А.В. 2012. *Природная флора Крымского полуострова*. Симферополь: Н. Ориана, 232 с.]

Zvyagintseva K.O. 2015. *An annotated checklist of the urban flora of Kharkiv*. Kharkiv: V.N. Karazin Kharkiv National University, 96 pp.

Нові та рідкісні гібриди справжніх дводольних рослин у флорі Харківської області (Україна)

Г.М. БОНДАРЕНКО, Ю.Г. ГАМУЛЯ
Харківський національний університет імені В. Н. Каразіна,
Площа Свободи 4, Харків 61022, Україна

Реферат. У статті наведено дані про малопоширені та нові гібриди справжніх дводольних рослин, що були зареєстровані в Харківській області. Загалом зафіксовано, описано та проілюстровано 25 гібридів. Анотований список містить дані про їхнє поширення, екологію, морфологію та інформацію про виявлені місцезнаходження. Робота базується на результатах власних польових досліджень, аналізі відкритих баз даних з біорізноманіття, літературних джерел та ревізії гербарних колекцій Національного гербарію України (KW) та Харківського національного університету імені В.Н. Каразіна (CWU). Під час польових досліджень нами виявлено 7 нових для України гібридів (*Arctium* × *neumanii*, *Centaurea diffusa* × *C. jacea*, *C. jacea* × *C. nigrescens* subsp. *pinnatifida*, *C. nigrescens* subsp. *pinnatifida* × *C. phrygia* subsp. *pseudophrygia*, *Corydalis* × *hausmanii*, *Rubus* × *areschougii*, *Verbascum* × *thapsi*) та 6 гібридів, нових для Харківської області (*Arctium* × *cimbricum*, *Betula* × *aurata*, *Salix* × *reichardtii*, *Verbascum* × *brockmuellerii*, *V.* × *pseudolychnitis*, *Utricularia* × *neglecta*). Зареєстровано гібриди, які виникли за участю чужорідних рослин (*Centaurea diffusa* та *C. nigrescens* subsp. *pinnatifida*). Обговорюються потенційні знахідки інших гібридів дводольних рослин у флорі Харківської області в майбутньому.

Ключові слова: біорізноманіття, гібридизація, екологія, морфологія, нові види, хорологія, чужорідні види