

# The Nonnative Flora of the Kiev (Kyiv) Urban Area, Ukraine: A Checklist and Brief Analysis\*

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## Abstract

In this paper, an annotated checklist of the nonnative flora of the city and suburbs of Kiev (Kyiv in Ukrainian transliteration), Ukraine, is presented in tabular form. For each taxon, the following data are provided: occurrence, generalized distribution in the area, degree of naturalization, time of immigration, mode of immigration, and geographical origin. The total nonnative flora (past and present) of the Kiev Urban Area (KUA) consists of 536 species of vascular plants belonging to 297 genera and 71 families. It is the most diverse nonnative flora of any urban region in Ukraine. The modern nonnative flora includes 356 species of 207 genera and 62 families. The stable component of the flora consists of 198 species of 147 genera and 51 families. Ephemerophytes (175 species, or 49.2%) and epoecophytes (99 species, or 28.2%) clearly prevail among Kiev's modern nonnative flora. The percentage of species introduced before the end of the 19th century, including archaeophytes (19.6%) and kenophytes (31%), equals that of the eukenophytes (49.4%), the species that were introduced during the 20th century. Leading roles are

played by species native to Mediterranean (254 species, or 50.3%) and North American (99 species or 16.3%) floristic regions. Interestingly, North American taxa form the largest portion of the group of species that successfully naturalized in the 20th century; they are followed by plants from eastern Asia. The nonnative plants in the modern urban flora of Kiev continue to gain in importance. This is evident from the high numbers of newcomers that arrived during the last 20 years of the 20th century.

## Introduction

The Kiev City Agglomeration (Kiev Urban Area, KUA) is situated in the central part of the eastern European plains, at the border of the forest and forest-steppe physiographic and vegetation zones. Ukraine's capital, the city of Kiev (Kyiv in the Ukrainian-based transliteration), is the natural center of this urbanized area. It is surrounded by several satellite towns and smaller settlements, including Irpin, Brovary, Boryspil, Vyshgorod, and Boyarka. Kiev and its satellites are located on both banks of the Dnipro (Dnieper) River. The area of Kiev within its official administrative borders is 824 square

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kilometers; its population is currently about 2,616,000 people (according to the 2001 census; other estimates that consider recent migration patterns place it at close to 3 million).

Seminatural and man-made habitats are well represented in KUA, and the region's altered or disturbed plant communities are formed mostly by synanthropic plant species. During their long history in central Ukraine, and the Kiev area in particular, humans have greatly promoted the immigration of nonnative plants through migration, war, trade, agriculture, urbanization, and other activities. The oldest fossil human remains in Kiev date to the late Paleolithic era. In Neolithic times, the area was already home to well-developed agriculture, cattle breeding, and various trade crafts.

By the ninth century A.D., Kiev had become an important political and economic center of eastern Europe, with extensive political and trade contacts in the Baltic and Mediterranean regions, in central and western Europe, western and central Asia, and the Caucasus, as well as in other adjacent and distant areas. In the 18th century, Kiev began to develop as an industrial city. Continued development resulted in the formation of a large urbanized area with a dramatically transformed flora and vegetation.

Nonnative plants are an important component of any modern urban flora. The present checklist of Kiev's nonnative flora was compiled using literature data (Bortnyak, 1978a, 1978b; Bortnyak, et al., 1992; Kotov, 1979; Mosyakin, 1990, 1991a, 1991b, 1995, 1996; Protopopova, 1973, 1991; Yavorska & Mosyakin, 2001; and many others), herbarium collections (mainly the collection of the National Herbarium of Ukraine), and data from our recent field studies (in particular, Mosyakin's collections and observations made in 1985–2002 and Yavorska's

collections and studies of 1998–2001). However, because of the dynamics of the process of synanthropization of the flora in the Kiev region, the list cannot be regarded as the final one. It only generalizes the most recent stage of nonnative plant study and remains open for further additions and corrections. The number of nonnative species will grow not only as a result of their casual dispersal and immigration but also due to the deliberate introduction into cultivation of new plants, some of which undoubtedly will be able to adapt to, or naturalize in, the man-altered habitats of KUA.

Families, genera within families, and species within genera are arranged in our table alphabetically. The nomenclature mainly follows the checklist of vascular plants of Ukraine (Mosyakin & Fedoronchuk, 1999). The terminology on synanthropic floras and nonnative plants used in the article follows that of European publications. Please note that this terminology is not commonly used in English-speaking countries. However, explanations and discussion of it can be found in many useful publications (Thellung, 1918; Jäger, 1988; di Castri, 1989; Kornas, 1968, 1990; Protopopova, 1973, 1991; and many others). C. Lambelet-Haueter (1990, 1991) presents especially detailed historical overviews. A good North American introduction to traditional European-style studies of nonnative floras can be found in V. Muhlenbach's classic article (1979) on nonnative plants inhabiting the railroads of St. Louis, Missouri. G. Nesom (2000) provides a more recent discussion on categories of alien plants.

The central and eastern European sources on urban floristics are too numerous to be listed here extensively; therefore we cite only selected publications directly related to the nonnative flora of Kiev or to the methods used in this study. Additional

references can be found in the cited books and articles.

## Categories and Abbreviations

For the checklist of nonnative species, the following categories and abbreviations were used:

### *Occurrence of species in the modern nonnative flora of KUA (column 1)*

**C**—Common: plants that are widespread and abundant in the territory of the city and/or in adjacent towns and villages.

**D**—Disappeared: plants that were reported in early surveys but are now considered extirpated (or in some cases eradicated) in the territory.

**E**—Ephemera-ergasiophytes: plants introduced by man that occasionally escape beyond cultivation but usually do not persist except in the immediate vicinity of their area of cultivation. These plants do not show pronounced trends toward naturalization, and their occurrence depends on a reliable (stable) source of dissemination (e.g., deriving from plants that are extensively and/or permanently cultivated in the area concerned).

**L**—Local: plants that only occur in some parts of the city but may be locally abundant.

**R**—Rare: plants that occur in three to five (sometimes up to seven) localities.

**S**—Sporadic: plants that occur almost everywhere in the city but not in abundance.

**U**—Unicates: plants collected in one to three localities in KUA during recent decades but not registered during our 1996–2001 floristic survey of the area.

### *Distribution of species (column 2)*

**B**—Plants found within the town of Boryspil.

**Bo**—Plants found within the town of Boyarka.

**Br**—Plants found within the suburb Brovary.

**Ir**—Plants found within the town of Irpin.

**K**—Plants found within the city of Kiev only.

**KUA**—Plants found within the territory of the city of Kiev and its suburbs.

### *Degree of naturalization (column 3)*

**Agr**—Agriophytes: naturalized in natural and seminatural habitats.

**Col**—Colonophytes: epoeophytes that occur in the area in one to several stable colonies but which show little or no trend toward further expansion.

**Eph**—Ephemerophytes: nonnaturalized species, occasional immigrants, or waifs.

**Epo**—Epoecophytes: naturalized in man-made and disturbed habitats.

**Hagr**—Hemiagriophytes: naturalized mostly in seminatural or disturbed habitats.

Note: For extinct species, the degree of naturalization is not indicated.

### *Time of immigration to KUA (column 4)*

**arch**—Archaeophytes: plants that immigrated before the end of the 15th century.

**eu-A**—Eukenophytes-A: plants that immigrated in the first half of the 20th century.

**eu-B**—Eukenophytes-B: plants that immigrated after World War II to the end of the 1970s.

**eu-C**—Eukenophytes-C: plants that immigrated during the last 20 years.

**ken**—Kenophytes: plants that immigrated between the 16th century and the end of the 19th century.

### *Mode of immigration (column 5)*

The above groups are segregated according to the traditional classification (see Lambelet-Haueter, 1990, 1991; Protopopova, 1991, et al.), modified by N.A. Vyukova (1985). For archaeophytes, the mode of immigration to KUA is not specified due to the lack of scientifically reliable data. However, we specify the immigration status for a few archaeophytes (14 species of cultivated plants and some specialized weeds of crops) in those rare cases when it is reliably known from archaeobotanical and historical sources. Those species whose nonnative status in the territory of research is questionable (especially when it is unclear whether borders of the native range of a species probably cover, or at least closely approach, our territory) are also provisionally listed below, but their names in column 1 are preceded by a question mark (?).

**Erg**—Ergasiophytes: plants that were intentionally introduced and cultivated by man, and then spread from places of their cultivation.

**Xen**—Xenophytes: plants introduced unintentionally.

**X-Erg**—Xeno-ergasiophytes: plants cultivated outside of the studied area but unintentionally introduced to Kiev.

*Initial (original, native) ranges of nonnative species (column 6)*

**Afr**—African; **Afr-Sas**—African–south Asian; **anthr**—of anthropogenic origin (taxa that emerged and evolved in man-made habitats); **As**—Asian; **AsM**—Asia Minor; **CAM**—Central American; **CaAs**—central Asian; **Cauc**—Caucasian; **CEu**—central European; **EAs**—eastern Asian; **EMed**—eastern Mediterranean; **hybr**—species of hybrid origin; **Ir-An**—Irano-Anatolian; **Ir-Tr**—Irano-Turanian; **Med**—Mediterranean; **Med-Cas**—Mediterranean–Irano-Turanian (or Mediterranean–central Asian); **Med-Ir-An**—Mediterranean–Irano-Anatolian; **n/a**—initial range uncertain (34 species); **NAm**—North American; **NMed**—North Mediterranean; **Pon**—Pontic; **S-Eas**—southeastern Asian; **SAm**—South American; **SAs**—south Asian; **SEu**—southern European; **Sib**—Siberian; **WEu**—western European; **WMed**—western Mediterranean.

## Checklist of Nonnative Plants of the Kiev Urban Area

<b>Families and Species</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>ACERACEAE</b>						
<i>Acer negundo</i> L.	C	KUA	Agr	eu-A	Erg	NAm
<i>Acer pseudoplatanus</i> L.	S	KUA	Epo	eu-B	Erg	WEu
<i>Acer saccharinum</i> L.	S	KV	Hagr	eu-B	Erg	NAm
<b>AMARANTHACEAE</b>						
<i>Amaranthus albus</i> L.	C	KUA	Epo	eu-A	Xen	NAm
<i>Amaranthus blitoides</i> S. Watson	C	KUA	Epo	eu-B	Xen	NAm
<i>Amaranthus blitum</i> L. (= <i>A. lividus</i> L.)	R	K	Eph	ken	Erg	S-EAs
<i>Amaranthus caudatus</i> L.	R	KUA	Eph	ken	Erg	SAm
<i>Amaranthus cruentus</i> L. (incl. <i>A. paniculatus</i> L.)	E	KUA	Eph	eu-A	Erg	CAM
<i>Amaranthus hybridus</i> L. s. str.	R	K	Eph	eu-C	Xen	CAM
<i>Amaranthus hypochondriacus</i> L.	E	K	Eph	eu-C	Erg	NAm

<i>Amaranthus palmeri</i> S. Watson	U	K	Eph	eu-C	Xen	NAm
<i>Amaranthus powellii</i> S. Watson	L	KUA	Epo	eu-C	Xen	CAM
<i>Amaranthus retroflexus</i> L.	C	KUA	Epo	ken	Xen	NAm
<i>Amaranthus rudis</i> Sauer	U	K	Eph	eu-C	Xen	NAm
<i>Amaranthus spinosus</i> L.	U	K	Eph	eu-C	Erg	SAm
<i>Amaranthus tuberculatus</i> (Moq.) Sauer	U	K	Eph	eu-C	Xen	NAm
<b>ANACARDIACEAE</b>						
<i>Cotinus coggygria</i> Scop.	L	K	Hagr	eu-B	Erg	Med
<i>Toxicodendron radicans</i> (L.) O. Kuntze	E	K	Eph	eu-C	Erg	NAm
<b>APIACEAE</b>						
? <i>Aethusa cynapium</i> L.	C	KUA	Epo	arch		WEu
<i>Anethum graveolens</i> L.	L	KUA	Epo	ken	Erg	Med-CAs
<i>Anthriscus cerefolium</i> (L.) Hoffm.	R	K	Eph	eu-B	Xen	Med
<i>Bifora radians</i> M. Bieb.	R	K	Eph	eu-C	Xen	Med
<i>Bupleurum rotundifolium</i> L.	R	KUA	Eph	eu-A		Med-Ir-An
<i>Carum carvi</i> L.	E	KUA	Eph	ken	Erg	n/a
<i>Caucalis platycarpos</i> L.	D	K	Eph	eu-A	Xen	Med
? <i>Conium maculatum</i> L.	C	KUA	Epo	n/a	Xen	Med-CAs
<i>Coriandrum sativum</i> L.	E	KUA	Eph	ken	Erg	Med
<i>Foeniculum vulgare</i> Mill.	E	KUA	Eph	ken	Erg	Med
<i>Heracleum mantegazzianum</i> Sommier & Levier	L	K	Col	eu-C	Erg	Cauc
<i>Levisticum officinale</i> Koch	E	KUA	Col	ken	Erg	Med-CAs
<i>Pastinaca sativa</i> L.	E	KUA	Eph	ken	Erg	Med-CAs
<i>Pastinaca umbrosa</i> Steven ex DC.	S	K	Epo	ken	Xen	Med-CAs
<i>Petroselinum crispum</i> (Mill.) A.W. Hill	E	KUA	Eph	ken	Erg	Med
<i>Turgenia latifolia</i> (L.) Hoffm.	U	K	Eph	eu-C	Xen	Med
<b>APOCYNACEAE</b>						
<i>Apocynum cannabinum</i> L.	L	KUA	Col	eu-C	Erg	n/a
<i>Vinca minor</i> L.	L	KUA	Hagr	ken	Erg	n/a
<b>ARACEAE (incl. ACORACEAE)</b>						
<i>Acorus calamus</i> L.	S	KUA	Agr	arch		S-EAs
<b>ASCLEPIADACEAE</b>						
<i>Asclepias syriaca</i> L.	S	K,Ir	Epo	ken	Erg	NAm
<b>ASPHODELACEAE</b>						
<i>Anthericum liliiago</i> L.	E	K	Eph	ken	Erg	Med
<b>ASTERACCAE</b>						
<i>Achillea micrantha</i> Willd.	D	K	Eph?	eu-A	Xen	Pon
<i>Acroptilon repens</i> (L.) DC.	R	K	Col	eu-C	Xen	Ir-Tr
<i>Ageratum houstonianum</i> Mill.	R	KUA	Eph	eu-B	Erg	CAM
<i>Ambrosia artemisiifolia</i> L.	S	KUA	Epo	eu-B	Xen	NAm
<i>Ambrosia trifida</i> L.	U	K	Eph	eu-C	Xen	NAm
<i>Anthemis arvensis</i> L.	S	KUA	Epo	arch		NMed
<i>Anthemis cotula</i> L.	S	KUA	Eph	arch		EMed
? <i>Artemisia absinthium</i> L.	S	KUA	Epo	arch		Med-CAs

<i>Artemisia annua</i> L.	C	KUA	Hagr	eu-A	Xen	EAs
<i>Artemisia argyi</i> Levéillé & Vaniot	R	K	Col	eu-C	Xen	EAs
<i>Artemisia dracunculus</i> L.	R	K	Eph	eu-C	Xen	Sub
<i>Artemisia glauca</i> Pallas ex Willd.	R	K	Eph	eu-C	Xen	Sub
<i>Artemisia rubripes</i> Nakai	D	K	Eph	eu-C	Xen	EAs
<i>Artemisia selengensis</i> Turcz. ex Besser	D	KUA	?	eu-C	Xen	CAs
<i>Artemisia sieversiana</i> Willd.	L	KUA	Epo	eu-C	Xen	Med-CAs
<i>Artemisia tournefortiana</i> Reichb.	L	K	Col	eu-C	Xen	Ir-Tr
<i>Artemisia umbrosa</i> (Turcz. ex Besser) Pamp.	R	K	Eph	eu-C	Xen	EAs
<i>Aster lanceolatus</i> Willd.	S	KUA	Eph	ken	Erg	NAm
<i>Aster novae-angliae</i> L.	E	KUA	Eph	ken	Erg	NAm
<i>Aster novi-belgii</i> L.	E	KUA	Eph	ken	Erg	NAm
<i>Aster x salignus</i> Willd.	E	KUA	Eph	ken	Erg	NAm
<i>Bellis perennis</i> L.	E	K	Eph	ken	Erg	n/a
<i>Bidens connata</i> Muehl. ex Willd.	L	K	Hagr	eu-C	Xen	NAm
<i>Bidens frondosa</i> L.	S	K	Agr	eu-B	Xen	NAm
<i>Calendula officinalis</i> L.	E	KUA	Eph	ken	Erg	Med
<i>Carduus acanthoides</i> L.	L	KUA	Epo	arch		NMed
<i>Carduus nutans</i> L.	L	KUA	Epo	arch		NMed
<i>Centaurea cyanus</i> L.	S	KUA	Epo	arch		Med
<i>Centaurea depressa</i> M.Bieb.	R	K	Eph	eu-C	Xen	Ir-Tr
<i>Centaurea diffusa</i> Lam.	R	K	Epo	eu-A	Xen	Med-CAs
<i>Cichorium endivia</i> L.	D	K	?	ken	Erg	Med-CAs
? <i>Cichorium intybus</i> L.	C	KUA	Hagr	arch		Med-CAs
<i>Cirsium ciliatum</i> (Murr.) Moench	U	K	Eph	eu-C	Xen	Kv
<i>Conyza canadensis</i> (L.) Cronq. (= <i>Erigeron canadensis</i> L.)	C	KUA	Hagr	ken	Xen	NAm
<i>Coreopsis grandiflora</i> Hogg ex Sweet	E	K	Eph	eu-C	Erg	NAm
<i>Cosmos bipinnatus</i> Cav.	E	KUA	Eph	eu-C	Erg	CAm
<i>Galinsoga parviflora</i> Cav.	C	KUA	Epo	ken	Erg	SAm
<i>Galinsoga urticifolia</i> (Kunth) Benth. ( <i>G. ciliata</i> auct.)	R	K	Eph	eu-C	Xen	SAm
<i>Grindelia squarrosa</i> (Pursh) Dunal	L	KUA	Col	eu-B	Xen	NAm
<i>Helianthus annuus</i> L.	R	KUA	Eph	ken	Erg	NAm
<i>Helianthus decapetalus</i> L.	S	KUA	Col	eu-C	Erg	NAm
<i>Helianthus rigidus</i> (Cass.) Desf.	E	K	Eph	eu-C	Erg	NAm
<i>Helianthus subcanescens</i> (A.Gray) E. Watson	S	KUA	Col	eu-C	Erg	NAm
<i>Helianthus tuberosus</i> L.	L	KUA	Col	ken	Erg	SAm
<i>Helianthus x laetiflorus</i> Pers.	S	KUA	Col	eu-C	Erg	NAm
<i>Inula helenium</i> L.	E	KUA	Eph	eu-A	Erg	n/a
<i>Iva xanthiifolia</i> Nutt.	C	KUA	Epo	ken	Erg	NAm
<i>Lactuca sativa</i> L.	E	KUA	Eph	ken	Erg	n/a
? <i>Lactuca serriola</i> L.	S	KUA	Epo	arch		Med-CAs
<i>Lactuca tatarica</i> (L.) C.A.Mey.	L	KUA	Col	eu-B	Xen	Ir-Tr
<i>Lepidotheca suaveolens</i> (Pursh) Nutt.	C	KUA	Epo	ken	Xen	NAm
<i>Matricaria recutita</i> L.	C	KUA	Epo	ken	Erg	WEu

<i>Onopordon acanthium</i> L.	C	KUA	Epo	arch		Med-CAs
<i>Phalacrolooma annuum</i> (L.) Dumort.	C	KUA	Epo	ken	Xen	NAm
<i>Phalacrolooma septentrionale</i> (Fern. et Wieg.) Tzvelev	C	KUA	Epo	eu-B	Xen	NAm
<i>Pyrethrum partheniifolium</i> Willd.	E	K	Eph	eu-B	Erg	Med
<i>Pyrethrum parthenium</i> (L.) Smith	E	K	Col	eu-A	Erg	WEu
<i>Rudbeckia hirta</i> L. (incl. <i>R. bicolor</i> Nutt.)	L	KUA	Eph	ken	Erg	NAm
<i>Rudbeckia laciniata</i> L.	R	KUA	Col	ken	Erg	NAm
<i>Senecio viscosus</i> L.	S	KUA	Epo	eu-B	Xen	CEv
? <i>Senecio vulgaris</i> L.	S	KUA	Epo	arch		Med
<i>Silphium perfoliatum</i> L.	L	KV	Col	eu-C	Erg	NAm
<i>Solidago canadensis</i> L.	L	KUA	Hagr	ken	Erg	NAm
<i>Solidago serotinoidea</i> A.Löve & D.Löve ( <i>S. gigantea</i> auct.)	L	KUA	Col	eu-B	Erg	NAm
<i>Sonchus arvensis</i> L.	L	KUA	Epo	arch		Med
<i>Sonchus asper</i> (L.) Hill	S	KUA	Epo	arch		Med
<i>Sonchus oleraceus</i> L.	S	KUA	Epo	arch		Med
<i>Tagetes erecta</i> L.	E	KUA	Eph	ken	Erg	CAM
<i>Tagetes patula</i> L.	E	KUA	Eph	ken	Erg	CAM
<i>Tripleurospermum inodorum</i> (L.) Sch.Bip.	R	KUA	Epo	arch		EMed
<i>Xanthium albinum</i> (Widder) H.Scholz	C	KUA	Agr	eu-B	Xen	WEu
<i>Xanthium ripicola</i> Holub	L	KUA	Epo	eu-B	Xen	CEv
<i>Xanthium spinosum</i> L.	U	KUA	Eph	ken	Xen	SAM
<i>Xanthium strumarium</i> L. s. str.	R	KUA	Epo	arch		Ir-Tr
<b>BALSAMINACEAE</b>						
<i>Impatiens glandulifera</i> Royle ( <i>I. roylei</i> Walp.)	S	K	Hagr	eu-B	Erg	S-EAs
<i>Impatiens parviflora</i> DC.	C	KUA	Agr	ken	Erg	Med-CAs
<b>BERBERIDACEAE</b>						
<i>Berberis thunbergii</i> DC.	E	KUA	Col	eu-C	Erg	EAs
<i>Berberis vulgaris</i> L.	S	KUA	Col	ken	Erg	n/a
<i>Mahonia aquifolium</i> (Pursh) Nutt.	L	KV	Agr	eu-B	Erg	NAm
<b>BORAGINACEAE</b>						
<i>Anchusa officinalis</i> L.	C	KUA	Epo	arch		Med
<i>Argusia sibirica</i> (L.) Dandy	R	K,Ir	Eph	eu-A	Xen	Med-CAs
<i>Borago officinalis</i> L.	R	K	Epo	ken	X-Erg	Med
<i>Buglossoides arvensis</i> (L.) I.M.Johnst.	L	KUA	Epo	arch		Med-CAs
<i>Cynoglossum officinale</i> L.	L	KUA	Epo	arch		Med
<i>Echium plantagineum</i> L.	D	KUA	?	eu-A	Xen	Med
<i>Lappula patula</i> (Lehm.) Menyh.	R	K	Epo	eu-A	Xen	Med-CAs
<i>Lappula squarrosa</i> (Retz.) Dumort.	L	KUA	Epo	arch		Med-CAs
? <i>Myosotis arvensis</i> (L.) Hill	C	KUA	Epo	arch		Med-CAs
<i>Symphytum asperum</i> Lepechin	E	K	Col	ken	Erg	WMed
<b>BRASSICACEAE</b>						
<i>Armoracia rusticana</i> P.Gaertn., B.Mey. & Scherb.	L	KUA	Agr	arch	X-Erg	Ir-Tr
<i>Brassica campestris</i> L.	C	KUA	Epo	arch	X-Erg	Med-CAs
<i>Brassica juncea</i> (L.) Czern.	L	KUA	Eph	eu-B	Xen	Ir-Tr

<i>Brassica napus</i> L.	R	KUA	Eph	ken	Erg	SEu
<i>Brassica nigra</i> (L.) W.D.J.Koch	S	KUA	Epo	eu-A	X-Erg	Med
<i>Brassica rapa</i> L.	R	KUA	Eph	ken	Erg	Med
<i>Bunias orientalis</i> L.	S	KUA	Epo	ken	Xen	EMed
<i>Camelina alyssum</i> (Mill.) Thell.	D	KUA	?	arch		ant
<i>Camelina microcarpa</i> Andrz.	L	K	Epo	arch		Med-CAs
<i>Camelina sativa</i> (L.) Crantz	L	KUA	Eph	arch		ant
? <i>Capsella bursa-pastoris</i> (L.) Medik.	C	KUA	Agr	arch		n/a
<i>Capsella orientalis</i> Klokov ( <i>C. bursa-pastoris</i> aggr.)	U	K	Eph	eu-B	Xen	Pon
<i>Capsella rubella</i> Reut. ( <i>C. bursa-pastoris</i> aggr.)	D	K	?	eu-B	Xen	Med
<i>Cardaria draba</i> (L.) Desv.	C	KUA	Epo	ken	Xen	Med
<i>Cardaria pubescens</i> (C.A.Mey.) Jarm.	R	K	Eph	eu-C	Xen	n/a
<i>Chorispora tenella</i> (Pall.) DC.	L	KUA	Epo	ken	Xen	Med-CAs
? <i>Descurainia sophia</i> (L.) Webb. ex Prantl	C	KUA	Epo	arch		Med-CAs
<i>Diplotaxis muralis</i> (L.) DC.	L	KUA	Eph	eu-A	Xen	SEu
<i>Diplotaxis tenuifolia</i> (L.) DC.	C	KUA	Epo	ken	Xen	Med
<i>Eruca vesicaria</i> (L.) Cav. (= <i>E. sativa</i> Mill.)	R	KUA	Eph	arch	X-Erg	Med
<i>Erucastrum armoracioides</i> (Czern. ex Turcz.) Cruchet	D	KUA	?	eu-A	Xen	Ir-Tr
<i>Erysimum cheiranthoides</i> L.	L	KUA	Epo	arch		Med-CAs
<i>Erysimum repandum</i> L.	S	KUA	Epo	arch		Med-CAs
<i>Euclidium syriacum</i> (L.) R.Br.	U	K	Eph	eu-C	Xen	Ir-Tr
<i>Goldbachia laevigata</i> (M.Bieb.) DC.	U	K	Eph	eu-C	Xen	CAs
<i>Hesperis matronalis</i> L.	E	KUA	Eph	ken	Erg	Ir-Tr
<i>Hirschfeldia incana</i> (L.) Lagr.-Foss.	L	K	Col	eu-C	Xen	EMed
<i>Iberis amara</i> L.	E	KUA	Eph	ken	Erg	Med
<i>Iberis umbellata</i> L.	E	KUA	Eph	ken	Erg	Med
<i>Isatis tinctoria</i> L.	D	K	?	ken	Xen	Med-CAs
<i>Lepidium campestre</i> (L.) R.Br.	R	K	Eph	arch		Med
<i>Lepidium densiflorum</i> Schrad.	C	KUA	Epo	ken	Xen	NAm
<i>Lepidium latifolium</i> L. s.l. (incl. <i>L. affine</i> Ledeb.)	L	KUA	Col	ken	Xen	Ir-Tr
<i>Lepidium perfoliatum</i> L.	L	KUA	Epo	ken	Xen	Med-CAs
<i>Lepidium ruderales</i> L.	S	KUA	Epo	arch		Med-CAs
<i>Lobularia maritima</i> (L.) Desv.	E	KUA	Eph	ken	Erg	Med
<i>Matthiola bicornis</i> (Sibth. & Sm.) DC.	E	KUA	Eph	ken	Erg	Med
<i>Matthiola incana</i> (L.) R. Br.	E	KUA	Eph	ken	Erg	Med
<i>Matthiola longipetala</i> (Vent.) DC.	E	KUA	Eph	ken	Erg	Med
<i>Myagrum perfoliatum</i> L.	R	K	Eph	eu-C	Xen	Med
<i>Neslia paniculata</i> (L.) Desv.	R	K	Eph	arch		ant
? <i>Raphanus candidus</i> Worosch.	R	KUA	Epo	eu-B	Xen	hybr
<i>Raphanus raphanistrum</i> L.	S	KUA	Epo	arch		Med
<i>Raphanus sativus</i> L.	R	KUA	Eph	ken	Erg	Med
<i>Rapistrum perenne</i> (L.) All.	R	KUA	Col	eu-A	Xen	Med
<i>Rapistrum rugosum</i> (L.) Bergeret	R	KUA	Eph	eu-A	Xen	Med
<i>Sinapis alba</i> L.	S	KUA	Eph	arch	X-Erg	Med

<i>Sinapis arvensis</i> L.	S	KUA	Eph	arch		Med
<i>Sinapis dissecta</i> Lag.	R	K	Eph	eu-A	Xen	Med
<i>Sisymbrium altissimum</i> L.	C	KUA	Epo	ken	Xen	Med-CAs
<i>Sisymbrium loeselii</i> L.	C	KUA	Epo	ken	Xen	Med-CAs
? <i>Sisymbrium officinale</i> (L.) Scop.	C	KUA	Epo	arch		Med
<i>Sisymbrium orientale</i> L.	R	K	Eph	eu-C	Xen	Med
<i>Sisymbrium volgense</i> M.Bieb. ex Fourn.	S	KUA	Epo	eu-A	Xen	Pon
<i>Thlaspi arvense</i> L.	C	KUA	Epo	arch		Ir-Tr
<b>CAESALPINIACEAE</b>						
<i>Gleditsia triacanthos</i> L.	R	KUA	Col	ken	Erg	NAm
<b>CAMPANULACEAE</b>						
<i>Campanula medium</i> L.	E	KUA	Eph	eu-C	Erg	n/a
<b>CANNABACEAE</b>						
<i>Cannabis sativa</i> L. s.l. (incl. <i>C. ruderalis</i> Janisch.)	C	KUA	Epo	arch		Ir-Tr
<b>CAPRIFOLIACEAE</b>						
<i>Lonicera caprifolium</i> L.	L	K	Col	eu-A	Erg	Med
<i>Lonicera tatarica</i> L.	L	KUA	Col	eu-A	Erg	Sub
<i>Symphoricarpos albus</i> (L.) S.F.Blake	L	KUA	Col	eu-B	Erg	NAm
<i>Viburnum lantana</i> L.	L	K	Col	eu-A	Erg	Med
<b>CARYOPHYLLACEAE</b>						
<i>Agrostemma githago</i> L.	U	K	Eph	arch		ant
<i>Dianthus barbatus</i> L.	E	KUA	Eph	eu-B	Erg	Med
<i>Dianthus euponticus</i> Zapal.	E	K,Ir	Eph	eu-B	Xen	EMed
<i>Gypsophila perfoliata</i> L.	L	K	Eph	eu-B	Xen	Ir-Tr
<i>Lychnis chalcedonica</i> L.	S	KUA	Epo	ken	Erg	As
<i>Oberna cserei</i> (Baumg.) Ikonn.	D	K	?	eu-A	Xen	Med
<i>Petrorhagia saxifraga</i> (L.) Link	E	K	Eph	ken	Erg	Med
<i>Saponaria officinalis</i> L.	S	KUA	HAgr	ken	X-Erg	Med
<i>Scleranthus annuus</i> L.	S	KUA	Epo	arch		WMed
<i>Silene armeria</i> L.	R	K	Eph	?		n/a
<i>Silene dichotoma</i> Ehrh.	R	K	Eph	eu-A	Xen	WEu
<i>Silene gallica</i> L.	S	KUA	Epo	eu-B	Xen	WMed
<i>Silene pendula</i> L.	S	KUA	Epo	ken	Erg	Med
<i>Spergula arvensis</i> L.	S	KUA	Epo	ken	Xen	Med
<i>Spergula maxima</i> Weihe	D	KUA	?	arch		ant
<i>Spergula morisonii</i> Boreau	R	K,Br	Eph	eu-B	Xen	WEu
<i>Vaccaria hispanica</i> (Mill.) Rauschert	U	KUA	Eph	arch		S-EAs
<b>CHENOPODIACEAE</b>						
<i>Atriplex hortensis</i> L.	L	KUA	Epo	ken	Erg	Ir-Tr
<i>Atriplex micrantha</i> C.A. Mey.(= <i>A. heterosperma</i> Bunge)	R	K	Eph	ken	Xen	Ir-Tr
<i>Atriplex rosea</i> L.	R	KUA	Eph	eu-B	Xen	Med
<i>Atriplex sagittata</i> Borkh. (= <i>A. nitens</i> Schkuhr)	C	KUA	Epo	arch		Ir-Tr
? <i>Atriplex tatarica</i> L.	C	KUA	Hagr	arch		Med-CAs
<i>Ceratocarpus arenarius</i> L.	O	K	Eph	eu-C	Xen	Med-CAs

<i>Chenopodium berlandieri</i> Moq.	R	K	Eph	eu-C	Xen	NAm
<i>Chenopodium botrys</i> L.	R	KUA	Eph	eu-A	X-Erg	Med-CAs
<i>Chenopodium chenopodioides</i> (L.) Aellen	R	K	Eph	eu-C	Xen	Med-CAs
<i>Chenopodium ficifolium</i> Smith	S	KUA	Epo	eu-A	Xen	EAs
<i>Chenopodium foliosum</i> Asch.	U	K	Eph	eu-C	Erg	Med
<i>Chenopodium glaucophyllum</i> Aellen	U	K	Eph	eu-C	Xen	NAm
<i>Chenopodium hybridum</i> L.	S	KUA	Epo	n/a		Res
<i>Chenopodium missouriense</i> Aellen	U	K	Eph	eu-C	Xen	NAm
<i>Chenopodium murale</i> L.	U	K	Eph	arch		Med
<i>Chenopodium opulifolium</i> Schrader ex DC.	S	KUA	Epo	arch		Med
? <i>Chenopodium polyspermum</i> L.	S	KUA	Epo	arch		n/a
<i>Chenopodium pratericola</i> Rydb.	U	K	Eph	eu-C	Xen	NAm
<i>Chenopodium probstii</i> Aellen	R	K	Eph	eu-C	Xen	n/a
<i>Chenopodium reticulatum</i> Aellen	U	K	Eph	eu-C	Xen	n/a
<i>Chenopodium schraderianum</i> Schultes	R	K	Eph	eu-C	Xen	Afr
<i>Chenopodium striatiforme</i> J. Murr	S	KUA	Epo	n/a	Xen	Med
<i>Chenopodium strictum</i> Roth	C	KUA	Epo	n/a	Xen	NAm
<i>Chenopodium urbicum</i> L.	R	K	Eph	n/a	Xen	Med-CAs
<i>Chenopodium vulvaria</i> L.	D	K	?	ken	Xen	Med-CAs
<i>Corispermum declinatum</i> Steph. ex Iljin	R	K	Eph	eu-C	Xen	EAs
<i>Corispermum pallasii</i> Steven (C. leptopterum auct.)	S	K	Epo	eu-C	Xen	Sub
<i>Corispermum redowskii</i> Fisch. ex Steven	R	K,Br	Eph	eu-B	Xen	Sub
<i>Kochia scoparia</i> (L.) Schrader s.l.	S	KUA	Epo	ken	Erg	Ir-Tr
<i>Polycnemum arvense</i> L.	R	K	Eph	ken	Xen	Med-CAs
<i>Salsola collina</i> Pallas	L	K,Ir	Epo	eu-C	Xen	Med-CAs
<i>Salsola tragus</i> L. s. str. (= <i>S. ruthenica</i> Iljin)	C	KUA	Epo	ken	Xen	Ir-Tr
<i>Spinacia oleracea</i> L.	S	KUA	Eph	ken	Erg	Med-CAs
<b>COMMELINACEAE</b>						
<i>Commelina communis</i> L.	S	KUA	Epo	eu-A	Erg	S-EAs
<i>Tradescantia virginiana</i> L.	E	K	Eph	eu-C	Erg	NAm
<b>CONVOLVULACEAE</b>						
<i>Calystegia spectabilis</i> (Brummitt) Tzvelev ( <i>C. inflata</i> auct.)	E	K	Eph	eu-C	Erg	NAm
<i>Ipomoea hederacea</i> (L.) Jacq.	E	K	Eph	eu-C	Xen	CAm
<i>Ipomoea purpurea</i> (L.) Roth	S	KUA	Eph	eu-B	Erg	SAm
<b>CRASSULACEAE</b>						
<i>Sedum rupestre</i> L. (incl. <i>S. reflexum</i> L.)	R	K	Col	eu-B	Erg	Kv
<i>Sedum spurium</i> M. Bieb.	R	K	Col	eu-A	Erg	Kv
<b>CUCURBITACEAE</b>						
<i>Bryonia alba</i> L.	S	KUA	Epo	ken	Erg	Med-Cas
<i>Citrus lanatus</i> (Thunb.) Matsum. & Nakai	E	KUA	Eph	ken	Erg	NAm
<i>Cucurbita pepo</i> L.	E	KUA	Eph	ken	Erg	NAm
<i>Echinocystis lobata</i> (Michx.) Torr. & A.Gray	S	KUA	Agr	eu-B	Erg	NAm
<i>Sicyos angulata</i> L.	E	K	Col	ken	Erg	NAm
<i>Thladiantha dubia</i> Bunge	E	K	Col	eu-A	Erg	EAs

<b>CUSCUTACEAE</b>						
<i>Cuscuta campestris</i> Yunck.	S	KUA	Epo	eu-B	Xen	NAm
<i>Cuscuta gronovii</i> Willd. ex Roemer & Schultes	R	K	Eph	eu-B	Xen	NAm
<b>EQUISETACEAE</b>						
<i>Equisetum ramosissimum</i> Desf.	R	KUA	Col	eu-B	Xen	n/a
<b>EUPHORBIACEAE</b>						
<i>Euphorbia dentata</i> Michx.	L	K	Epo	eu-C	Xen	NAm
<i>Euphorbia falcata</i> L.	L	K	Epo	arch		Med-CAs
<i>Euphorbia helioscopia</i> L.	S	KUA	Epo	arch		Med
<i>Euphorbia marginata</i> Pursh	R	KUA	Eph	eu-C	Erg	NAm
<i>Euphorbia peplus</i> L.	S	KUA	Epo	arch		Med
<i>Flueggea suffruticosa</i> (Pallas) Baillon	L	K	Col	eu-C	Erg	EAs
<b>FABACEAE</b>						
<i>Amorpha fruticosa</i> L.	L	KUA	Agr	eu-B	Erg	NAm
<i>Astragalus onobrychis</i> L.	R	KUA	Col	ken	Erg	Med-CAs
<i>Caragana arborescens</i> Lam.	L	KUA	Hagr	eu-B	Erg	Sub
<i>Caragana frutex</i> (L.) K.Koch	E	KUA	Col	eu-B	Erg	Ir-Tr
<i>Lathyrus odoratus</i> L.	R	KUA	Eph	ken	Erg	Med
<i>Lathyrus sativus</i> L.	E	KUA	Eph	eu-C	Erg	Med
<i>Lathyrus tuberosus</i> L.	L	KUA	Hagr	ken	Erg	Med-CAs
<i>Lens culinaris</i> Medik.	E	KUA	Eph	ken	Erg	Med
<i>Lupinus polyphyllus</i> Lindl.	L	KUA	Hagr	eu-C	Erg	NAm
<i>Medicago minima</i> (L.) Bartal.	U	KUA	Eph	ken	Xen	n/a
<i>Medicago sativa</i> L.	C	KUA	Epo	ken	Erg	AsM
<i>Onobrychis viciifolia</i> Scop.	R	KUA	Eph	ken	Erg	SEu
<i>Ornithopus sativus</i> Brot.	R	KUA	Eph	eu-C	Erg	WMed
<i>Phaseolus vulgaris</i> L.	E	KUA	Eph	ken	Erg	SAm
<i>Pisum sativum</i> L.	E	KUA	Eph	ken	Erg	Ir-Tr
<i>Robinia pseudoacacia</i> L.	C	KUA	Hagr	eu-A	Erg	NAm
? <i>Trifolium hybridum</i> L.	S	KUA	Epo	eu-A	Erg	Med
<i>Trifolium incarnatum</i> L.	E	KUA	Eph	eu-A	Erg	EMed
<i>Trifolium resupinatum</i> L.	R	K	Eph	eu-C	Xen	Med-CAs
<i>Trifolium sativum</i> (Schreber) Crome	R	KUA	Eph	eu-A	Erg	WEu
<i>Trigonella caerulea</i> (L.) Sér.	L	KUA	Eph	ken	Erg	Med
<i>Vicia angustifolia</i> Reichard	L	KUA	Eph	ken	Xen	Med-CAs
<i>Vicia faba</i> L.	E	KUA	Eph	ken	Erg	Ir-Tr
<i>Vicia hirsuta</i> (L.) S.F.Gray	L	KUA	Eph	arch		WMed
<i>Vicia sativa</i> L.	L	KUA	Eph	ken	Erg	hybr
<i>Vicia tetrasperma</i> (L.) Schreber	S	KUA	Eph	arch		Med
<i>Vicia villosa</i> Roth s.l. (incl. <i>V.sordida</i> Waldst. & Kit.)	R	KUA	HAgr	arch		Med
<b>FAGACEAE</b>						
<i>Quercus palustris</i> Moench	E	K	Col	eu-C	Erg	NAm
<i>Quercus rubra</i> L. (= <i>Q. borealis</i> Michx.)	S	KV	Hagr	eu-B	Erg	NAm
<b>FUMARIACEAE</b>						

<i>Fumaria officinalis</i> L.	S	KUA	Epo	arch		Med
<i>Fumaria schleicheri</i> Soy.-Willem.	L	KUA	Epo	arch		Ir-Tr
<i>Fumaria vaillantii</i> Loisel.	L	KUA	Epo	eu-A	Xen	Med-CAs
<b>GERANIACEAE</b>						
<i>Erodium cicutarium</i> (L.) L'Hér.	C	KUA	Eph	arch		Med-CAs
<i>Geranium dissectum</i> L.	L	KUA	Epo	arch		Med
<i>Geranium molle</i> L.	D	K	?	ken	Xen	Med
<i>Geranium pusillum</i> L.	S	KUA	Epo	arch		Ir-An
<i>Geranium pyrenaicum</i> Burm. f.	L	K	Epo	ken	Xen	Med
<i>Geranium sibiricum</i> L.	C	KUA	Epo	ken	Erg	Ir-Tr
<b>HEMEROCALLIDACEAE</b>						
<i>Hemerocallis fulva</i> (L.) L.	E	KUA	Eph	eu-B	Erg	EAs
<i>Hemerocallis lilioasphodelus</i> L.	E	KUA	Eph	eu-B	Erg	EAs
<b>HYDROCHARITACEAE</b>						
<i>Elodea canadensis</i> Michx.	C	KUA	Agr	ken	Xen	NAm
<b>HYDROPHYLLACEAE</b>						
<i>Phacelia tanacetifolia</i> Benth.	E	K	Eph	ken	Erg	NAm
<b>IRIDACEAE</b>						
<i>Iris florentina</i> L.	E	KUA	Eph	ken	Erg	Med
<i>Iris germanica</i> L.	E	KUA	Eph	ken	Erg	WEu
<i>Limonium meyeri</i> (Boiss.) O.Kuntze	R	K	Col	eu-C	Xen	Med
<i>Sisyrinchium septentrionale</i> Bicknell	R	K	Eph	ken	Erg	NAm
<b>JUGLANDACEAE</b>						
<i>Juglans mandshurica</i> Maxim.	L	KUA	Col	eu-C	Erg	EAs
<i>Juglans regia</i> L.	S	KUA	Eph	eu-C	Erg	EAs
<b>JUNCACEAE</b>						
<i>Juncus tenuis</i> Willd. (= <i>J. macer</i> S.F.Gray)	C	KUA	Hagr	ken	Xen	NAm
<b>LAMIACEAE</b>						
? <i>Ballota nigra</i> L. s.l.	C	KUA	Hagr	arch		Med
<i>Dracocephalum thymiflorum</i> L.	D	K	?	ken	Erg	EAs
<i>Elsholtzia ciliata</i> (Thunb.) Hyl.	S	K	Epo	eu-A	Xen	EAs
<i>Galeopsis ladanum</i> L.	L	KUA	Epo	arch		NMed
<i>Lamium album</i> L. s.l.	L	KUA	Epo	arch		CAs
<i>Lamium amplexicaule</i> L.	L	KUA	Epo	arch		Med-CAs
? <i>Lamium purpureum</i> L.	C	KUA	Hagr	arch		Med
<i>Marrubium vulgare</i> L.	R	KUA	Eph	arch		Med-CAs
<i>Melissa officinalis</i> L.	E	KUA	Eph	ken	Erg	n/a
<i>Mentha arvensis</i> L.	E	KUA	Eph	ken	Erg	n/a
<i>Mentha spicata</i> L.	E	KUA	Epo	ken	X-Erg	Med
<i>Mentha x piperita</i> L.	E	KUA	Eph	ken	Erg	n/a
<i>Nepeta cataria</i> L.	L	KUA	Epo	arch		EMed
<i>Salvia reflexa</i> Hornem.	R	K	Eph	eu-C	Xen	NAm
<i>Sideritis montana</i> L.	R	K	Epo	ken	Xen	Med
<i>Stachys annua</i> (L.) L.	S	KUA	Epo	arch		WMed

<b>LINACEAE</b>						
<i>Linum ustitatissimum</i> L.	E	KUA	Eph	arch	Erg	As
<b>MALVACEAE</b>						
<i>Abutilon theophrastii</i> Medik.	L	K	Epo	ken	Erg	EAs
<i>Alcea rosea</i> L.	E	KUA	Col	ken	Erg	n/a
<i>Hibiscus syriacus</i> L.	E	K	Eph	eu-C	Erg	n/a
<i>Hibiscus trionum</i> L.	D	K	?	eu-B	Xen	Med
<i>Malva crispa</i> (L.) L.	L	KUA	Epo	ken	Erg	EAs
<i>Malva excisa</i> Reichenb.	L	KUA	Eph	arch	X-Erg	Pon
<i>Malva mauritiana</i> L.	E	KUA	Eph	ken	Erg	Med
<i>Malva neglecta</i> Wallr.	C	KUA	Epo	arch	X-Erg	Ir-Tr
<i>Malva pusilla</i> Smith.	C	KUA	Epo	arch	X-Erg	Res
<i>Malva sylvestris</i> L.	L	K	Hagr	arch	X-Erg	Med
<i>Sida rhombifolia</i> L.	U	K	Eph	eu-C	Xen	S-EAs
<b>MORACEAE</b>						
<i>Morus alba</i> L.	S	KUA	Epo	ken	Erg	EAs
<b>NYCTAGINACEAE</b>						
<i>Oxybaphus nyctagineus</i> (Michx.) Sweet	S	KUA	Epo	ken	X-Erg	NAm
<b>OLEACEAE</b>						
<i>Fraxinus lanceolata</i> Borkh.	R	K	Col	eu-B	Erg	NAm
<i>Fraxinus pennsylvanica</i> Marshall	S	K	Epo	eu-B	Erg	NAm
<i>Ligustrum vulgare</i> L.	E	KUA	Col	eu-C	Erg	n/a
<i>Syringa vulgaris</i> L.	E	K	Col	ken	Erg	EMed
<b>ONAGRACEAE</b>						
<i>Epilobium ciliatum</i> Raf. s.l. (= <i>E. adenocaulon</i> Hausskn.)	C	K	Agr	eu-B	Xen	NAm
<i>Oenothera biennis</i> L. s.l.	L	KUA	Epo	ken	Xen	NAm
<i>Oenothera laciniata</i> Hill	O	K	Eph	eu-C	Xen	NAm
<i>Oenothera rubricaulis</i> Klebahn	C	KUA	Hagr	eu-A	Xen	WEu
<i>Oenothera oakesiana</i> (A. Gray) S. Watson & Coulter	R	K	Eph	ken	Xen	NAm
<i>Oenothera villosa</i> Thunb. s.l.	C	K	Epo	eu-B	Erg	NAm
<b>OROBANCHACEAE</b>						
<i>Orobanche cernua</i> Loefl.	R	KUA	Eph	ken	Xen	ant
<i>Phelipanche ramosa</i> (L.) Pomel ( <i>Orobanche ramosa</i> L.)	L	K	Eph	ken	Xen	Med-CAs
<b>OXALIDACEAE</b>						
<i>Xanthoxalis dillenii</i> (Jacq.) Holub	L	KUA	Epo	eu-B	Xen	NAm
<i>Xanthoxalis stricta</i> (L.) Small	C	KUA	Hagr	ken	Xen	NAm
<b>PAPAVERACEAE</b>						
<i>Glaucium corniculatum</i> (L.) J. Rudolph	R	B	Eph	ken	Xen	Med
<i>Papaver dubium</i> L.	S	KUA	Eph	arch		Med-CAs
<i>Papaver ocellatum</i> Woronow	U	K	Eph	eu-C	Xen	Ir-Tr
<i>Papaver rhoeas</i> L.	C	KUA	Epo	arch		Med-CAs
<i>Papaver somniferum</i> L.	D	KUA	?	ken	ErgMed	EMed
<b>POACEAE (= GRAMINEAE)</b>						
<i>Agropyron cristatum</i> (L.) P.Beauv. s. str.	R	K	Eph	eu-C	Xen	Ir-Tr

<i>Agropyron pectinatum</i> (M.Bieb.) P.Beauv.	R	KUA	Eph	arch		Ir-Tr
<i>Alopecurus myosuroides</i> Huds.	L	K	Eph	eu-C	Xen	Med-Ir-An
<i>Anisantha sterilis</i> (L.) Nevski (= <i>Bromus sterilis</i> L.)	R	K	Eph	eu-B	Xen	Med-Ir-An
<i>Anisantha tectorum</i> (L.) Nevski (= <i>Bromus tectorum</i> L.)	S	KUA	Epo	arch		Med-CAs
<i>Apera spica-venti</i> (L.) P.Beauv.	C	KUA	Agr	arch		n/a
<i>Arrhenatherum elatius</i> (L.) J.Presl & C.Presl	R	KUA	Eph	ken	Erg	WEu
<i>Avena fatua</i> L.	U	KUA	Eph	arch	Xen	Ir-Tr
<i>Avena nuda</i> L.	D	KUA	?	ken	Erg	WEu
<i>Avena sativa</i> L.	L	KUA	Eph	arch	Erg	SEu
<i>Avena strigosa</i> Schreb.	D	K	?	eu-A	Xen	ant
<i>Beckmannia syzigachne</i> (Steud.) Fern.	U	K	Eph	eu-C	Xen	NAm
<i>Bromus arvensis</i> L.	C	KUA	Epo	arch		NMed
<i>Bromus commutatus</i> Schrad.	D	KUA	?	ken	Xen	WEu
<i>Bromus hordeaceus</i> L.	C	KUA	Hagr	arch		NMed
<i>Bromus japonicus</i> Thunb.	S	KUA	Epo	ken	Xen	Med
<i>Bromus secalinus</i> L.	D	KUA	?	arch		ant
<i>Bromus squarrosus</i> L.	S	KUA	Epo	ken	Xen	Med-CAs
<i>Cenchrus longispinus</i> (Hack.) Fern.	S	K	Epo	eu-C	Xen	NAm
<i>Ceratochloa carinata</i> (Hook. & Arn.) Tutin	L	K	Col	eu-C	X-Erg	NAm
<i>Ceratochloa cathartica</i> (M.Vahl.) Herter	R	K	Eph	eu-C	X-Erg	SAm
<i>Cynodon dactylon</i> (L.) Pers.	R	K	Col	eu-B	Xen	Med-CAs
<i>Digitaria ciliaris</i> (Retz.) Koeler	U	K	Eph	eu-C	Xen	Med
<i>Digitaria pectiniformis</i> (Henrard) Tzvelev	R	K	Eph	ken	Xen	Med
<i>Digitaria sanguinalis</i> (L.) Scop.	C	KUA	Agr	arch		S-EAs
<i>Echinochloa colona</i> (L.) Link	U	K	Eph	eu-C	X-Erg	SAs
? <i>Echinochloa crusgalli</i> (L.) P.Beauv. s.l.	C	KUA	Hagr	arch		S-EAs
<i>Echinochloa esculenta</i> (A.Br.) H.Scholz	U	K	Eph	eu-C	X-Erg	EAs
<i>Echinochloa frumentacea</i> Link	U	K	Eph	eu-C	Xen	S-EAs
<i>Echinochloa microstachya</i> (Wiegand) Rydb.	L	K	Col	eu-C	Xen	NAm
<i>Echinochloa oryzicola</i> (Vasing.) Vasing.	U	K	Eph	eu-C	Xen	EAs
<i>Echinochloa oryzoides</i> (Ard.) Fritsch	U	K	Eph	eu-C	Xen	S-EAs
<i>Echinochloa wiegandii</i> (Fassett) McNeill & Dore	U	K	Eph	eu-C	Xen	NAm
<i>Eleusine indica</i> (L.) Gaertn.	U	K	Eph	eu-C	Xen	Afr-SAs
<i>Elymus sibiricus</i> L.	U	K	Eph	eu-C	Xen	EAs
<i>Elymus trachycaulus</i> (Link) Gould & Schinners	R	K	Eph	eu-C	X-Erg	NAm
<i>Eragrostis cilianensis</i> (All.) Vign. ex Janchen	R	K	Eph	eu-C	Xen	Med
<i>Eragrostis minor</i> Host	C	K	Hagr	ken	Xen	Med-CAs
<i>Eragrostis multiflora</i> Steudel	R	K	Eph	eu-C	Xen	S-EAs
<i>Eragrostis pectinacea</i> (Michx.) Nees	S	KUA	Epo	eu-C	Xen	NAm
<i>Eragrostis pilosa</i> (L.) P.Beauv.	C	KUA	Hagr	ken	Xen	EAs
<i>Eremopyrum orientale</i> (L.) Jaub. & Spach	R	K	Eph	eu-C	Xen	Ir-Tr
<i>Hordeum distichon</i> L.	R	KUA	Eph	ken	Erg	Ir-Tr
<i>Hordeum jubatum</i> L.	L	K	Col	eu-C	Xen	NAm

<i>Hordeum leporinum</i> Link	R	K	Eph	eu-A	Xen	Med
<i>Hordeum murinum</i> L.	L	K	Col	eu-A	Xen	Med-CAs
<i>Hordeum vulgare</i> L.	E	KUA	Eph	ken	Erg	Ir-Tr
<i>Lolium multiflorum</i> Lam.	S	KUA	Eph	ken	Erg	Med-CAs
<i>Lolium persicum</i> Boiss. & Hohen.	R	K	Eph	eu-C	Xen	Ir-Tr
<i>Lolium remotum</i> Schrank	D	KUA	?	arch		ant
<i>Lolium temulentum</i> L.	R	KUA	?	arch		NMed
<i>Panicum capillare</i> L. s.l.	L	K	Eph	eu-C	Xen	NAm
<i>Panicum dichotomiflorum</i> Michx.	R	K	Eph	eu-C	Xen	NAm
<i>Panicum miliaceum</i> L. s.l.	E	KUA	Eph	ken	Erg	EAs
<i>Phalaris canariensis</i> L.	E	K	Eph	ken	Erg	Med
<i>Puccinellia hauptiana</i> V.Krecz.	U	K	Eph	eu-C	Xen	CAs
<i>Puccinellia nuttalliana</i> (Schult.) A.Hitche.	U	K	Eph	eu-C	Xen	NAm
<i>Puccinellia poecilantha</i> (K.Koch) Grossh.	R	K	Eph	eu-C	Xen	Ir-Tr
<i>Puccinellia tenuissima</i> Litv. ex V.Krecz.	R	K	Eph	eu-C	Xen	Med-CAs
<i>Sclerochloa dura</i> (L.) P.Beauv.	L	K	Eph	arch		Med-CAs
<i>Secale cereale</i> L.	E	KUA	Eph	arch	Erg	AsM
<i>Secale sylvestre</i> Host	R	K	Eph	eu-B	Xen	n/a
<i>Setaria adhaerens</i> (Forssk.) Chiov.	R	K	Eph	eu-C	Xen	Afr-SAs
<i>Setaria faberi</i> F.Herrmann s.l.	U	K	Eph	eu-C	Xen	EAs
? <i>Setaria glauca</i> (L.) P.Beauv. ( <i>S. pumila</i> auct.)	C	KUA	Hagr	arch		S-EAs
<i>Setaria italica</i> (L.) P.Beauv.	S	KUA	Eph	ken	Erg	EAs
<i>Setaria pycnocomma</i> (Steud.) Henrard ex Nakai	L	KUA	Epo	eu-C	Xen	EAs
<i>Setaria verticilliformis</i> Dumort.	R	K	Eph	arch		Med
? <i>Setaria viridis</i> (L.) P.Beauv.	S	KUA	Hagr	arch		Med-CAs
<i>Sorghum bicolor</i> (L.) Moench s. str.	U	K	Eph	eu-C	X-Erg	SAs
<i>Sorghum cernuum</i> (Ard.) Host	U	K	Eph	eu-C	X-Erg	SAs
<i>Sorghum halepense</i> (L.) Pers.	L	K	Col	eu-C	X-Erg	Med
<i>Sorghum saccharatum</i> (L.) Moench	R	K	Eph	ken	X-Erg	SAs
<i>Sorghum sudanense</i> (Piper) Stapf	E	K	Eph	eu-C	Xen	Afr
<i>Trisetum sibiricum</i> Rupr.	R	K	Eph	n/a		n/a
<i>Triticum aestivum</i> L.	R	KUA	Eph	ken	Erg	Ir-Tr
<i>Triticum durum</i> Desf.	R	KUA	Eph	ken	Erg	Ir-Tr
<i>Zea mays</i> L.	E	KUA	Eph	ken	Erg	CAM
<b>POLEMONIACEAE</b>						
<i>Phlox paniculata</i> L.	E	KUA	Col	eu-B	Erg	NAm
<i>Phlox subulata</i> L.	E	KUA	Col	eu-B	Erg	NAm
<b>POLYGONACEAE</b>						
<i>Fagopyrum esculentum</i> Moench	S	KUA	Eph	ken	Erg	EAs
<i>Fagopyrum tataricum</i> (L.) P. Gaertn.	R	KUA	Eph	ken	Xen	EAs
? <i>Fallopia convolvulus</i> (L.) A. Löve.	C	KUA	Epo	arch		As
<i>Persicaria orientali</i> (L.) Spach	E	K	Eph	eu-C	Erg	S-EAs
<i>Polygonum ramosissimum</i> Michx.	U	K	Eph	eu-C	Xen	NAm
<i>Reynoutria japonica</i> Houtt.	S	K	Epo	eu-C	Erg	EAs

<i>R. sachalinensis</i> (F.Schmidt ex Maxim.) Nakai	R	K	Epo	eu-C	Erg	EAs
<i>Rumex longifolius</i> DC.	R	KUA	Epo	ken	X-Erg	n/a
<i>Rumex patientia</i> L.	R	KUA	Eph	ken	Erg	Med
<i>Rumex stenophyllus</i> Ledeb.	S	K	Epo	eu-B	Xen	Med-CAs
<i>Rumex triangulivalvis</i> (Danser) Rech.f.	L	K	Col	eu-C	Xen	NAm
<b>PORTULACACEAE</b>						
<i>Portulaca grandiflora</i> Hook.	E	KUA	Eph	eu-C	Erg	hybr
<i>Portulaca oleracea</i> L.	S	K	Epo	arch		Med-CAs
<b>PRIMULACEAE</b>						
<i>Anagallis arvensis</i> L.	C	KUA	Epo	arch		Med-CAs
<b>RANUNCULACEAE</b>						
<i>Adonis aestivalis</i> L.	U	K	Eph	eu-A	Xen	Med-CAs
<i>Adonis annua</i> L.	D	K	?	ken	Xen	Med
<i>Adonis flammeus</i> Jacq.	D	K	?	ken	Xen	Med-CAs
<i>Aquilegia vulgaris</i> L.	E	KUA	Col	ken	Erg	WEu
<i>Clematis jackmannii</i> Moore	E	K	Col	eu-C	Erg	hybr
<i>Clematis viticella</i> L.	E	K	Col	eu-C	Erg	Kv
<i>Consolida ajacis</i> (L.) Schur	E	KUA	Eph	ken	Erg	n/a
<i>Consolida orientalis</i> (J.Gay) Schroedinger	U	K	Eph	eu-C	Xen	Med
<i>Consolida paniculata</i> (Host) Schur	U	K	Eph	eu-C	Xen	Med
<i>Consolida regalis</i> S.F.Gray	S	KUA	Epo	arch		Med-CAs
<i>Nigella arvensis</i> L.	E	KUA	Eph	eu-B	Xen	EMed
<i>Nigella damascena</i> L.	E	KUA	Eph	ken	Erg	Med
<i>Nigella sativa</i> L.	E	K	Eph	ken	Erg	Med-CAs
<i>Nigella segetalis</i> M.Bieb.	U	K	Eph	eu-C	Xen	EMed
<i>Ranunculus arvensis</i> L.	U	K	Eph	eu-C	Xen	Med-CAs
<b>RESEDACEAE</b>						
<i>Reseda lutea</i> L.	S	KUA	Epo	eu-A	Xen	Med
<i>Reseda luteola</i> L.	D	KUA	?	arch	X-Erg	Med
<b>ROSACEAE</b>						
<i>Amelanchier ovalis</i> Medik.	E	KUA	Col	eu-B	Erg	Med
<i>Armeniaca vulgaris</i> Lam.	E	KUA	Col	ken	Erg	EAs
<i>Aronia melanocarpa</i> (Michx.) Elliot s.l.	R	KUA	Col	eu-C	Erg	NAm
<i>Cerasus mahaleb</i> (L.) Mill.	E	KUA	Col	eu-B	Erg	EMed
<i>Cerasus vulgaris</i> Mill.	E	KUA	Col	eu-B	Erg	EMed
<i>Cotoneaster melanocarpus</i> Fisch. ex Blytt	R	KUA	Col	eu-B	Erg	Ir-Tr
<i>Fragaria x ananassa</i> (Duchesne) Duchesne	E	KUA	Col	ken	Erg	hybr
<i>Malus baccata</i> (L.) Borkh.	E	KUA	Col	ken	Erg	Sub
<i>Malus domestica</i> Borkh.	E	KUA	Col	ken	Erg	n/a
<i>Padus serotina</i> (Ehrh.) Ag. (= <i>Prunus serotina</i> Ehrh.)	L	KUA	Agr	eu-B	Erg	NAm
<i>Physocarpus opulifolius</i> (L.) Maxim.	L	K	Col	eu-B	Erg	NAm
<i>Potentilla longifolia</i> Willd. ex Schlecht.	R	K	Col	eu-C	Xen	As
<i>Potentilla paradoxa</i> Nutt. ex Torr. & A.Gray	S	K	Epo	eu-C	Xen	As
<i>Potentilla tergemina</i> Soják	D	K	?	eu-C	Xen	EAs

<i>Poterium polygamum</i> Waldst. & Kit.	L	KUA	Epo	eu-B	Xen	Med-CAs
<i>Poterium sanguisorba</i> L.	S	KUA	Epo	eu-B	Xen	Med-CAs
<i>Rosa rugosa</i> Thunb.	E	KUA	Col	ken	Erg	EAs
<i>Sorbaria sorbifolia</i> (L.) A. Braun	E	KUA	Col	ken	Erg	n/a
<i>Spiraea chamaedryfolia</i> L.	E	K	Col	ken	Erg	n/a
<i>Spiraea douglasii</i> Hook. s.l.	L	K	Col	eu-C	Erg	NAM
<i>Spiraea salicifolia</i> L.	L	KUA	Epo	eu-C	Erg	Sub
<b>RUBIACEAE</b>						
? <i>Galium exoletum</i> Klokov	U	K	Eph	eu-B	Xen	WEu
? <i>Galium spurium</i> L.	R	K	Eph	eu-A	Xen	ant
<i>Sherardia arvensis</i> L.	R	KUA	Eph	arch		WMed
<b>RUTACEAE</b>						
<i>Ptelea trifoliata</i> L.	L	K	Hagr	eu-B	Erg	NAM
<b>SALICACEAE</b>						
<i>Populus balsamifera</i> L.	L	K	Col	eu-C	Erg	NAM
<i>Populus bolleana</i> Lauche	L	K	Col	eu-C	Erg	Med-CAs
<i>Populus deltoides</i> Marshall	L	K	Col	eu-C	Erg	Med-CAs
<i>Salix fragilis</i> L.	C	KUA	Agr	arch		Med-CAs
<b>SCROPHULARIACEAE</b>						
<i>Antirrhinum majus</i> L.	E	KUA	Eph	ken	Erg	Med
<i>Veronica cardiocarpa</i> (Kar. & Kir.) Walp.	L	K	Epo	eu-C	Xen	Ir-Tr
<i>Veronica filiformis</i> Smith	L	K	Eph	eu-C	Erg	Kv
<i>Veronica hederifolia</i> L.	S	KUA	Epo	eu-A	Xen	Med
<i>Veronica persica</i> Poir.	L	KUA	Epo	ken	Xen	Ir-Tr
<i>Veronica polita</i> Fr.	S	KUA	Epo	arch		Med-CAs
<b>SIMAROUBACEAE</b>						
<i>Ailanthus altissima</i> (Mill.) Swingle	R	K	Epo	eu-C	Erg	EAs
<b>SOLANACEAE</b>						
<i>Datura stramonium</i> L.	L	KUA	Epo	ken	Xen	As
<i>Hyoscyamus niger</i> L.	S	KUA	Epo	ken	Xen	Ir-An
<i>Lycium barbarum</i> L.	S	K,Bo	Hagr	arch	Erg	EAs
<i>Lycopersicon esculentum</i> Mill. ( <i>Solanum lycopersicum</i> L.)	E	KUA	Eph	ken	Erg	SAM
<i>Nicandra physalodes</i> (L.) P. Gaertn.	E	K	Epo	ken	Erg	SAM
<i>Nicotiana glauca</i> Link & Otto	E	KUA	Eph	ken	Erg	Cam
<i>Petunia x atkinsiana</i> D. Don. ex Loudon	E	KUA	Eph	ken	Erg	hybr
<i>Physalis alkekengi</i> L.	E	K	Eph	eu-C	Erg	Med
<i>Physalis ixocarpa</i> Brot. ex Hornem.	E	KUA	Eph	eu-C	Erg	CAM
<i>Solanum alatum</i> Moench	L	KUA	Epo	ken	Xen	WEu
<i>Solanum carolinense</i> L.	R	K	Eph	eu-C	Xen	NAM
<i>Solanum schultesii</i> Opiz	R	K	Eph	ken	Xen	Med
<i>Solanum tuberosum</i> L.	E	KUA	Eph	ken	Erg	SAM
<b>THYMELAEACEAE</b>						
<i>Thymelaea passerina</i> (L.) Coss. & Germ.	D	KUA	?	arch		Med-CAs
<b>TYPHACEAE</b>						

<i>Typha laxmannii</i> Lepech.	L	K	Col	eu-B	Xen	Med-CAs
<b>ULMACEAE</b>						
<i>Celtis occidentalis</i> L.	E	K	Col	eu-C	Erg	EAs
<i>Ulmus pumila</i> L.	S	K	Hagr	eu-C	Erg	EAs
<b>URTICACEAE</b>						
<i>Parietaria officinalis</i> L.	E	K	Eph	?	Erg	Med
<i>Urtica urens</i> L.	S	KUA	Epo	arch		Med
<b>VERBENACEAE</b>						
<i>Verbena officinalis</i> L.	S	KUA	Epo	arch		Med-Ir-An
<b>VITACEAE</b>						
<i>Parthenocissus inserta</i> (A.Kerner) Fritsch	C	KUA	Hagr	eu-B	Erg	NAm
<i>Parthenocissus quinquefolia</i> (L.) Planch.	L	K	Col	eu-B	Erg	NAm
<i>Vitis labrusca</i> L.	L	KUA	Eph	eu-C	Erg	n/a
<i>Vitis vinifera</i> L.	L	KUA	Eph	eu-C	Erg	n/a
<b>ZYGOPHYLLACEAE</b>						
<i>Tribulus terrestris</i> L.	L	K	Eph	eu-A	Xen	Med

## Results and Analysis

According to the data, the total nonnative flora (past and present) of KUA consists of 536 species of vascular plants belonging to 297 genera and 71 families. The flora has the highest degree of diversity of any urban nonnative flora in Ukraine. The modern nonnative flora, confirmed for the area in 1997–2001, consists of 356 species belonging to 207 genera and 62 families. We did not include in this group plants that are now considered extinct in the territory of research (28 species), recent unstable introductions (occasionally introduced during the last 20 years), plants not confirmed with new collections during the 1997–2001 study (48 species), and Ephemero-ergasiophytes (104 species). The stable component of the modern nonnative flora includes only effectively naturalized species (agriophytes, hemiagriophytes, and epocophytes). This component is represented by 198 species belonging to 147 genera and 51 families.

The observations indicate that 63 species (17.7% of the total number of modern nonnative plants) are

widespread over practically the whole territory of KUA, and that they are stable and abundant components of disturbed habitats. The majority of the nonnative species analyzed (108 species, or 30.3%) occur infrequently, 99 species (27.8%) occur locally, 86 species (24.2%) are sporadic, and at least 37 species from these groups display pronounced trends toward further dispersal and invasions within the studied area.

In examining the taxonomic structure of the nonnative flora, we found that, unlike the native regional flora, just a few families contain a considerable portion of the species (Asteraceae, Poaceae, and Brassicaceae comprise 38.8% of species; 6 leading families comprise 54.1%; and 15 leading families, 76.7%). This is typical of other nonnative floras (Protopopova, 1991; Vyukova, 1985; Mosyakin & Yavorska, 2001, etc.). In its taxonomic spectrum, the studied flora proved to be more similar to other nonnative floras of the Palaearctics than to the native flora of the Kiev region, where it is

physically located. In contrast to the native flora of KUA, the role of the families Brassicaceae, Chenopodiaceae, and Polygonaceae is somewhat elevated, as is the role of Poaceae, Asteraceae, and Rosaceae. The families Asteraceae, Onagraceae, Rosaceae, and Polygonaceae play leading roles in forming the stable component of the alien flora.

Our analysis of nonnative plants by their degree of naturalization has shown that ephemeroxytes (175 species, or 49.2%) and epocophytes (99 species, or 28.2%) clearly prevail in the structure of the modern nonnative flora of Kiev. Smaller numbers of species are represented by colonophytes (42 species, or 11.7%) and agriophytes (21 species, or 5.7%). The group of typical agriophytes is smallest (19 species, or 5.2%). Thus, ephemeroxytes and epocophytes are over three times more numerous than agriophytes, hemiagriophytes, and colonophytes combined, which again is rather typical of nonnative floras. These data testify to instability in the present nonnative component of KUA's flora as it goes through an intensive period of formation. The nonnative fraction of the Kiev flora is characterized by a much higher level of instability in species composition compared to floras of satellite cities. This is due to increased numbers of recently introduced ephemeroxytes and ergasiophytes in KUA. Nevertheless, there is some degree of stabilization in the species composition. The ratio of stable to unstable components in the structure of the modern nonnative flora is 54% to 46%, respectively.

The percentage of species introduced before the end of the 19th century, which includes archaeophytes (19.6%) and kenophytes (31%), is roughly equal to that of eukenophytes (49.4%), species that were introduced during the 20th century. According to the obtained data, the last century saw

the number of nonnative species swell at an ever-increasing rate. Though eukenophytes-C immigrated to our territory within the shortest time span (20 years) of the three eukenophyte subgroups, they constitute 55.8% of the total number of eukenophytes (subgroups A and B constitute 17.3% and 26.9%, respectively).

In mode of immigration, xenophytes (47.8%) and ergasiophytes (46.5%) dominate. Xeno-ergasiophytes constitute only 5.7% of the whole nonnative flora. Taking into account the increased role (both in the number of species and their growing participation in plant communities) of ergasiophytes in the structure of our nonnative flora and vegetation, it would be wise to pay more attention to the naturalization ability of newly introduced cultivated plants. There are numerous cases of uncontrollable invasions by some of these plants in our city and adjacent areas.

In the formation of the total nonnative flora of KUA, the leading role is played by species native to the ancient Mediterranean (254 species; or 50.3%) and North American (99 species, or 16.3%) floristic regions. The American group (122 species, or 21.5%) includes taxa native to both North and South America. Much fewer of our nonnative species immigrated from Asia (81 species, or 19%), Europe (22 species, or 4.7%), Caucasus (6 species, 1.3%), and other regions (3.2%). Interestingly, North American taxa form the largest portion of the group of species that successfully naturalized in the 20th century (36% of all eukenophytes). They are followed in that group by eastern Asian plants (26% of all eukenophytes).

Nonnative plants are gaining in importance in the modern urban flora of Kiev. In general, in the second half of the 20th century, the number of new nonnative plants increased tenfold compared with the number of taxa registered from the end of the 19th to

the middle of the 20th century. The number of completely naturalized species at least doubled. Finally, since more than half of the century's nonnative species immigrated only within the last two decades, we can expect further growth in the number of new nonnative plants.

## References

- Bortnyak, M.M. (1978a). New finds of adventive plants in Kiev Region. *Ukrainskyi Botanichnyi Zhurnal* 35(2), 127–130 (in Ukrainian).
- Bortnyak, M.M. (1978b). New finds in the flora of Kiev Region. *Ukrainskyi Botanichnyi Zhurnal* 35(4), 356–361 (in Ukrainian).
- Bortnyak, M.M., Lyubchenko, V.M., Voytyuk, Y.A. & Golyachenko, T.V. (1992). Adventive plants and escaped introduced [cultivated] species in the flora of the middle Dnieper area. *Bulletin of the Main Botanical Garden [Moscow]* 163, 57–61 (in Russian).
- Di Castri, F. (1989). History of biological invasions with special emphasis on the Old World. In J.A. Drake, H.A. Mooney, F. di Castri, R.H. Groves, F.J. Kruger, M. Rejmanek, M. Williamson (Eds.), *Biological invasions: A global perspective* (pp. 1–30). Chichester, England: John Wiley & Sons.
- Jäger, E.J. (1988). Möglichkeiten der Prognose synanthroper Pflanzenausbreitungen. *Flora* 180, 101–131.
- Kornas, J. (1968). A geographical-historical classification of synanthropic plants. *Materialy Zakladu Fitosochologii Stosowanej, UW, Warszawa-Bialowieza* 25, 33–41.
- Kornas, J. (1990). Plant invasions in central Europe: Historical and ecological aspects. In F. di Castri, A.J. Hansen & M. Debusshe (Eds.), *Biological invasions in Europe and the Mediterranean basin* (pp. 19–36). Dordrecht, the Netherlands: Kluwer Academic Publishers.
- Kotov, M.I. (1979). Changes in the flora of Kiev and its environs during the last 200 years. *Botanicheski Zhurnal* 64(1), 53–57 (in Russian).
- Lambelet-Haueter, C. (1990). Mauvaises herbes et flore anthropogène. I. Définitions, concepts et caractéristiques écologiques. *Saussurea* 21, 47–73.
- Lambelet-Haueter, C. (1991). Mauvaises herbes et flore anthropogène. II. Classifications et catégories. *Saussurea* 22, 49–81.
- Mosyakin, S.L. (1990). New and noteworthy alien species of *Artemisia* L. (Asteraceae) in the Ukrainian SSR. *Ukrainskyi Botanichnyi Zhurnal*. 47(4), 10–13 (in Ukrainian).
- Mosyakin, S.L. (1991a). New data on distribution of alien grasses (Poaceae) in Kiev. *Ukrainskyi Botanichnyi Zhurnal* 48(3), 45–48 (in Ukrainian).
- Mosyakin, S.L. (1991b). Preliminary list of recent additions to the nonnative flora of the Ukraine. *Ukrainskyi Botanichnyi Zhurnal*. 48(4), 28–34.
- Mosyakin, S.L. (1995). The genus *Amaranthus* L. (Amaranthaceae) in Ukraine: A review. *Ukrainskyi Botanichnyi Zhurnal* 52(2), 225–234 (in Ukrainian).
- Mosyakin, S.L. (1996). Territorial patterns of expansion of nonnative plants in the urban environment (with special reference to the city of Kiev). *Ukrainskyi Botanichnyi Zhurnal*, 53(5), 536–545.
- Mosyakin, S.L. & Fedoronchuk, M.M. (1999). *Vascular plants of Ukraine: A nomenclatural checklist*. Kiev: M.G. Kholodny Institute of Botany.
- Muhlenbach, V. (1979). Contributions to the synanthropic (adventive) flora of the railroads in St. Louis, Missouri, USA. *Annals of the Missouri Botanical Garden* 66, 1–108.
- Nesom, G.L. (2000). Which nonnative plants are included in floristic accounts. *Sida* 19, 189–193.
- Protopopova, V.V. (1973). *Adventive plants of the forest-steppe and steppe zones of Ukraine*. Kiev: Naukova Dumka (in Ukrainian).
- Protopopova, V.V. (1991). *The synanthropic flora of Ukraine and ways of its development*. Kiev: Naukova Dumka (in Russian).
- Thellung, A. (1918) (published 1919). Zur Terminologie der Adventiv- und Ruderalfloristik. *Allgemeine Botanische Zeitschrift für Systematik Floristik, Pflanzengeographie (Karlsruhe)*, 24/25, 36–66.
- Vyukova, N.A. (1985). The nonnative flora of the Lipetsk region and adjacent areas. Candidate Science doctoral dissertation. Moscow: Moscow State University (in Russian).
- Yavorska, O.G. & Mosyakin, S.L. (2001). The nonnative fraction of the urban flora of the Kiev Region. *Naukovi Zapysky NaUKMA, Biologiya i Ekologiya* 19, 55–68 (in Ukrainian).
- Ma, J.S. & Liu, Q.R. (1998). The present situation and prospects of plant taxonomy in China. *Taxon* 47(1), 67–74.
- Ma, J.S. & Wu, C.Y. (1993). Taxonomic revision on Euphorbian species from southwestern China. *Acta Botanica Yunnanica* 15(2), 113–121 (in Chinese).

Merrill, E.D. & Walker, E.H. (1938). *A bibliography of eastern Asiatic botany*. Jamaica Plain, MA: Arnold Arboretum.

Nedoluzhko, V.A. (1984). The distribution of *Ambrosia artemisiifolia* (Asteraceae) in the Primorsk region. *Botanicheski i Zhurnal* 69(4), 527–529 (in Russian).

Walker, E.H. (1960). *A bibliography of eastern Asiatic botany; Supplement 1*. Washington, D.C.: American Institute of Biological Sciences.

Zhu, Y.G., Sha, W. & Zhou, F.J. (1998). Primary research on genetic structure and adaptability of *Ambrosia trifida* and *A. artemisiifolia*. *Reports and Abstracts Presented at the 65th Anniversary of the Botanical Society of China*, 327 (in Chinese).

## Glossary

**Agriophytes:** Naturalized in natural and seminatural habitats.

**Archaeophytes:** Plants that immigrated before the end of the 15th century.

**Colonophytes:** Epocophytes that occur in the area in one to several stable colonies but which show little or no trend toward further expansion.

**Ephemerophytes:** Nonnaturalized, occasional immigrants, or waifs.

**Epocophytes:** Naturalized in man-made and disturbed habitats

**Ergasiophytes:** Plants that were intentionally introduced and cultivated by man, and then spread from places of their cultivation.

**Eukenophytes:** Plants that immigrated in the 20th century.

**Hemiagriophytes:** Naturalized mostly in seminatural or disturbed habitats.

**Kenophytes:** Plants that immigrated between the 16th century and the end of the 19th century.

**Palaeartic:** Found in the arctic regions of the Old World.

**Xenophytes:** Plants introduced unintentionally.

**Xeno-ergasiophytes:** Plants cultivated outside of the studied area but unintentionally introduced.

**Synanthropic:** Living in close association with humans.