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Ergasiophytes of the Ukrainian flora

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Abstract: The results of an investigation of the ergasiophytes (species deliberately introduced to a region for cultivation) of the Ukraine (458 species) are presented. The systematic, life forms and morphological types of plants with respect to soil moisture spectras, origin and degree of naturalisation of species of this group are analyzed. A annotated list of ergasiophytes is provided.

Key words: alien species, ergasiophytes, invasive plants, Ukraine

1. Introduction

By the end of the 20th century, invasions of alien organisms, including plants, were widely realized as one of the major global threats to biodiversity (Pyšek *et al*. 1995; Baldacchino & Pizzuto 1996; Mooney & Cleland 2001; Reichard & White 2001; Kowarik 2002; Protopopova *et al.* 2002, 2003; Chornesky & Randall 2003; Davis 2003; Sax & Gaines 2003, etc.).

Ergasiophytes (species deliberately introduced to a region for cultivation) play a significant role synanthropisation, the process by which the native flora of a region becomes replaced by alien species. These species generally are delivered into a new region from places where they were cultivated. Therefore they are partially adapted to condition of anthropogenic habitats. So these species can adapt more easy and quickly to new conditions. The detection of the new species of alien invasive plants before they become invasive, with the aim of preventing their uncontrolled spread is one of necessary conditions of the *Convention on Biological Diversity* (1994), the *Global strategy on invasive alien species* (2001), the *European strategy on invasive alien species* (Genovesi & Shine 2004) and other international programmes and documents. It is the responsibility of every country which signed them, including Ukraine.

In compiling the list of the Ukrainian alien fraction flora has drawn attention to the increasing role of species which have been intentional introduction into the culture and later escaped. The number of ergasiophytes increases and many of the species are characterized by a high degree of naturalization. Therefore the necessity of special complex study of ergasiophytes arises.

The main aim of the study was to clarify of modern species composition of the Ukrainian flora ergasiophytes and their some characteristics.

The objectives of the study included: 1) inventory of ergasiophytes species, and preparation of the annotated list; 2) generalization of their systematic, biological and ecological characteristics, origin, as well as determination of the degree of naturalization in the region.

2. Material and methods

The present research focuses on the ergasiophytes of the Ukrainian alien fraction flora. The investigations are based on original data obtained by routine surveys in 2010-2014, the analysis of data in the literature and examinations of the collections of the Herbaria of M. G. Kholodny Institute of Botany, National Academy of Sciences of Ukraine (KW), Donetsk Botanical Garden, NAS of Ukraine (DNZ), Uzhgorod National University (UU), Y. Fedykovych National University (CHER), I. Franko Lviv National University (LW), T. Shevchenko Kyiv National University (KWU), I. I. Mechnikov Odessa National University (MSDU), V. N. Karazin Kharkiv National University (CWU), V. I. Vernadskyi Tavrian National University (SIMF), Crimean Branch of Agrotechnology Institute of National University of Biological Resources and Natural Uses (CSAU), Nikita

Botanical Garden-National Science Centre, Ukrainian Agricultural Academy of Sciences (YALT).

Comparative morphological and geographical methods were used in the present investigations. Taxonomic structure (according to Tolmachev 1974), life forms (according to Serebryakov 1962), and morphological types of plants with respect to soil moisture (according to Didukh 2000) of the ergasiophytes were analysed. Characteristics of area species prepared according to Flora of European part of USSR and Flora of Eastern Europe (Fedorov 1974-1987; Tzvelev 1989-1994, 1996-2004). The classification of alien plants proposed by Kornaś and modified by Protopopova (1991) and Moysiyenko (1999) was used, e.g. 'agrio-epoecophyte' – species which fully naturalized in anthropogenic, semi-natural and natural plant communities. Invasive and transformer groups determined according Richardson *et al*. (2000). The species names are given according to Mosyakin & Fedoronchuk (1999).

3. Results

Studies of alien plants over 25 year period testified that the process of synanthropisation of the floras of natural zones (Forest, Forest-Steppe, and Steppe and their divisions) and in the Ukrainian flora in general has been constantly progressing. We can observe clear tendencies for the number of alien species to increase, the growth of both 'naturalised' or 'stable' (agriophytes, agrio-epoecophytes, epoecophytes, colonophytes) and 'unstable' (ephemerophytes, ergasiophygophytes) components of the alien fraction of the flora, growing rates of immigration and dispersal, an increasing number and scope of invasions of certain invasive species (Protopopova *et al.* 2002, 2003).

The ergasiophyte group of the Ukraine, according to our data, is represented by at least 458 species of vascular plants from 297 genera and 92 families (see Appendix 1), or 46.3% of the alien fraction flora and 7.5% of total number of the Ukrainian flora. Tendency of increasing number of the Ukrainian alien fraction flora (black line) and ergasiophytes group species (gray line) during 150 years is presented on Fig. 1.

The taxonomic spectrum of leading places of ergasiophytes of the Ukrainie includes 12 families: Asteraceae (59 sp.), Rosaceae (36), Fabaceae (34), Brassicaceae and Poaceae (24 each), Apiaceae (16) Lamiaceae (14), Solanaceae (13), Caryophyllaceae (12), Polygonaceae (10), Chenopodiaceae and Malvaceae (9 each). These leading families comprise 260 species or 56.8% of the total. Three of leading families comprise 130 species or 28.6%. Other families contain from eight to one species, including 28 families which are presented only one or two species. The taxonomic spectrum of the leading families of ergasiophytes differs from the general spectra of the Ukrainian alien fraction flora as does the relative position of the families (excluding Asteraceae) and the presence of new ones (Rosaceae, Solanaceae, Polygonaceae).

The taxonomic spectrum of the leading genera of studied group is not clearly expressed. The largest number of species (7) are from the genus *Helianthus* L. The genera *Opuntia* Mill. and *Symphyotrichum* Nees include six species each; *Acer* L., *Allium* L., *Amaranthus* L. and *Brassica* L. – five species each; *Datura* L., *Juglans* L., *Lonicera* L., *Populus* L., *Prunus* L. *Pyrethrum* Zinn, *Rosa* L., *Spiraea* L., *Trifolium* L. and *Vitis* L. – four species each; 26 genera include three species each, 40 genera – two species each, and 214 – only one species each.

In the spectra of life forms of species of ergasiophytes of Ukraine (Fig. 2), as in the alien fraction flora, annuals prevail (142 sp. or 31%), but their participation percentage is lower. The second position is occupied by

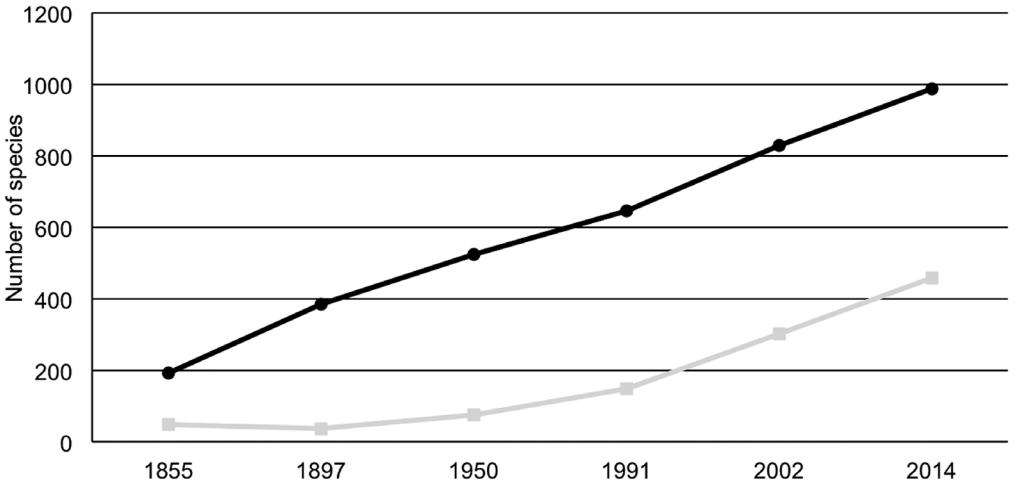

Fig. 1. Dynamics of the number of the Ukrainian alien fraction flora species (black line) and the Ukrainian ergasiophytes (gray line)

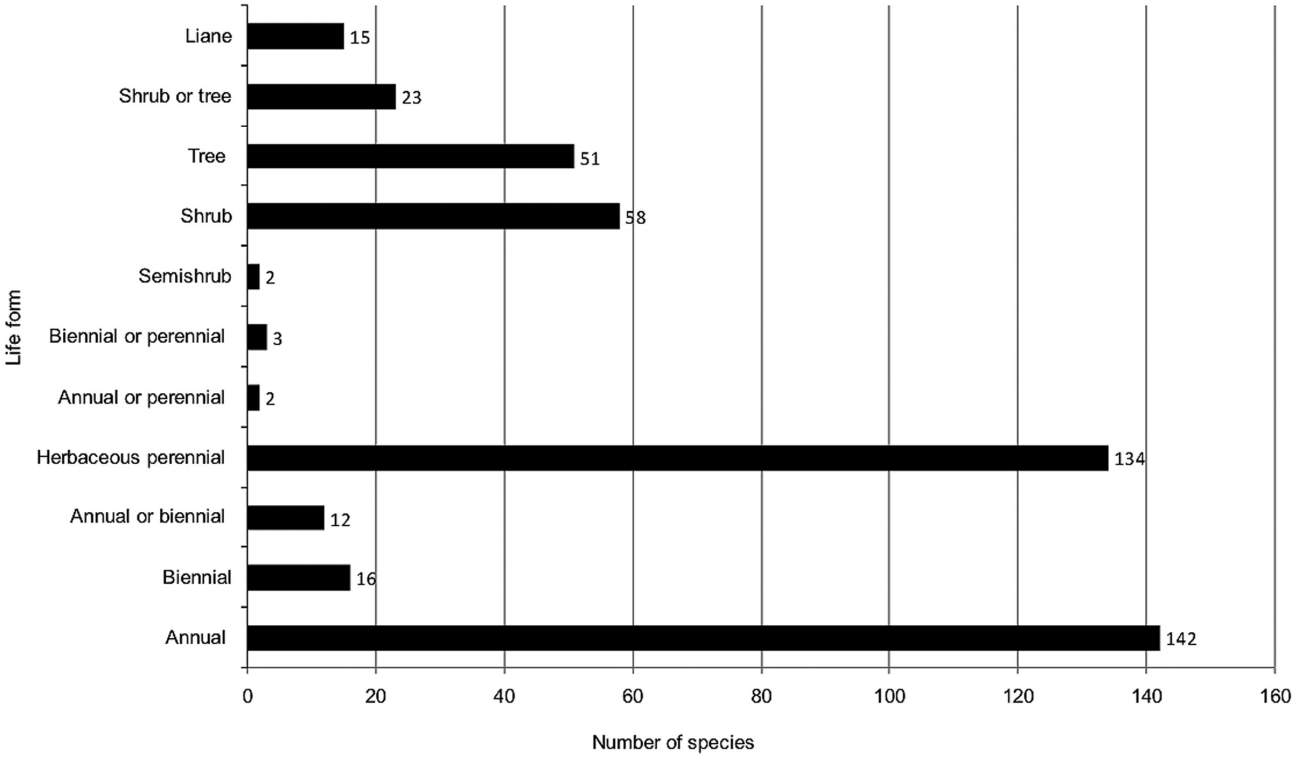

Fig. 2. Spectrum of life form of species of ergasiophytes of the Ukrainian flora

herbaceous perennials (134 or 29.3%). A pecularity of the spectra is the high participation of the shrubs and trees, among them there are 58 shrubs, 51 trees, 23 shrub or tree, 2 semishrubs (in total 133 species or 29.3%). Other groups do not include numerous species and are represented by from three to one species.

Among the ergasiophyte species of the Ukrainian flora with respect to soil moisture (Fig. 3) xero-mesophytes prevail (196 species or 42.8%). The second position occupied mesophytes (176 or 38.4%), the next position – meso-xerophytes (41 or 8.9%) and xerophytes (31 or 6.7%). The other groups, hydrophytes, hygrophytes, hygro-mesophytes and hydro-mesophytes, are unnumerous and presented from six to one species.

The species of ergasiophytes of the Ukrainian flora e vary in origin. With regard to their primary area of origin (Fedorov 1974-1987; Tzvelev 1989-1994, 1996-2004) ergasiophytes are divided into a number of types. The basis for this group is presented by origin from North America (105 species), the Mediterranean (85),

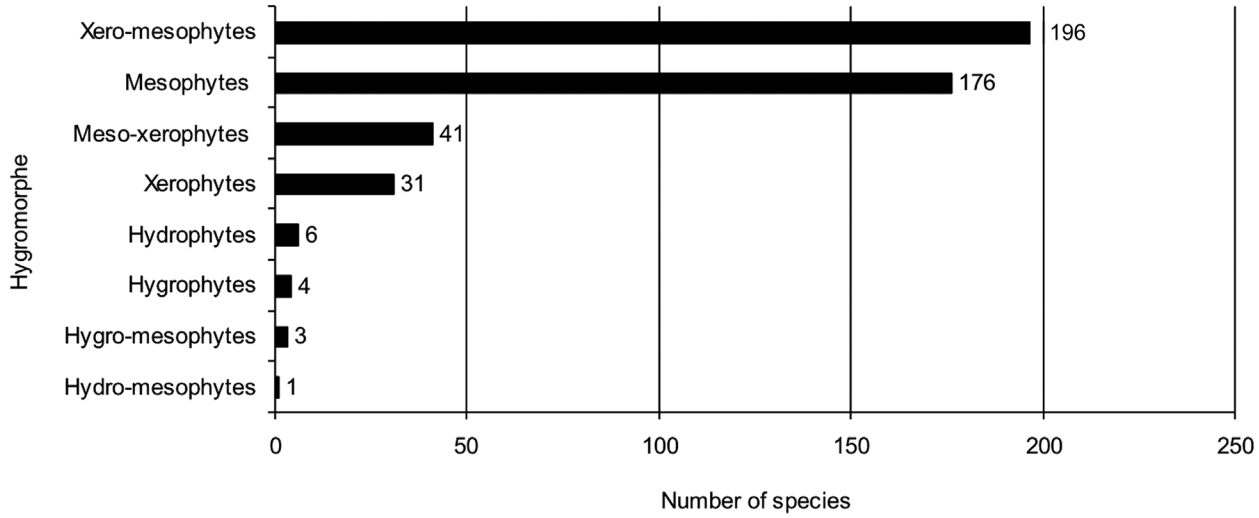

Fig. 3**.** Spectrum of the morphological types of plants with respect to soil moisture of species of of ergasiophytes of the Ukrainian flora

East Asia and Asia (26 each). The next large groups are South American (16), South European (15), Caucasic (13), West Mediterranean (11) and West European (10) in origin. The group of hybrid origin is represented by 16 species. Other groups do not include numerous species and are represented by from nine to one species, including 27 types of area and subdivision which consist one species only.

With respect to the time of immigration, the species of ergasiophytes of Ukrainian flora are divided in to archaeophytes (9 species) and kenophytes (449). Some species have a different status in different natural zones of Ukraine, e.g. the species *Acer tataricum* L. which is native in Forest-Steppe zones or *Rubus idaeus* L., native in Forest zones, are kenophytes in Crimea.

With regard to their degree of naturalization, the species of ergasiophytes of the Ukrainian flora may be divided into the 7 groups. e.g. agriophytes (27), agrio-epoecophytes (21), agrio-colonophytes (1), epoecophytes (22), colonophytes (66), ephemerophytes (43) and ergasiophygophytes (278). The degree of naturalization of numerous species differs in the various botanical and geographical regions of the Ukraine, e.g., *Antirrhinum majus* L. is an ergasiophygophyte in major of regions of Ukraine and an agriophyte in Crimea.

The extent of distribution of species of ergasiophytes varies. The distribution of a large part of the ephemerophytes and ergasiophygophytes has a pattern of a single or a few localities; some of them however were cultivated over a long period of time and are very common and sporadically distributed throughout the territory of the Ukraine. The majority of epoecophytes and colonophytes are distributed in more than three botanical and geographical regions of the Ukraine. Agriophytes are a component of plant communities in one or two regions. A tendency to active spread is most evident for agrio-epoecophytes and epoecophytes. The distribution of agriophytes is limited by the presence of corresponding plant communities susceptible to invasion. Thus, from the 458 species of ergasiophytes 137 or 29.9% were considered to be completely naturalized. Among them we have identified 31 species or 6.7% which may be defined as invasive, including 17 species or 3.7% transformers.

The cultivation of plants in Ukraine has an ancient history. The primary centres of cultivation were the monasteries which cultivated mainly medicinal plants, later apothecary gardens and private parks where numerous ornamental plants were planted. One of the first botanical gardens were created in Lubny (1721), Kharkiv (1804), Kremenets (1806), Nikita (1812), Odesa and Nizhyn (1820). Some alien species which were cultivated there now are widely distributed in Ukraine, e.g. C*yclachaena xanthiifolia* (Nutt.) Fresen. (from Kiev University Botanical Garden), *Ailanthus altissima* (Mill.) Swingle and *Bupleurum fruticosum* L. (from Nikita Botanical Garden, Crimea), *Acer negundo* L. and *Ailanthus altissima* (from Osnovyanskyi, modern Krasnokutskyi, Park, near Kharkiv), *Robinia pseudoacacia* L. (from Odesa and Kharkiv Botanical Gardens), *Abutilon theophrasti* Medik. (from Lubny Botanical Garden, Poltava Reg.), etc. In the 20th century an essential role in the cultivation of new plants for agricultural and technical purposes was taken up by Experimental Stations (Kharkiv, Poltava, Lubny, Maslivka, etc.). In recent years the uncontrolled import of wide range of ornamental and vegetable plants seed has been observed.

We have attempted to reconstruct the main stages of naturalization of some ergasiophytes (Table 1).

For the most part of this group, data about their first cultivation are absent. The literature (Palimpsestov 1855; Protopopova 1973; Vynogradova *et al.* 2010; Mayorov *et al.* 2012, etc.), Herbaria matherials, and original data concerning the naturalization of transformer species shows that the period from the first note as escaped plants to their expansion is from over 20 years to 100 or more, e.g. *Impatiens parviflora* DC. was known in cultivation in Ukraine from 1871 in Lviv gardens and parks, and from 1895 – in Dublyany park (Lviv Region). About 40 years later (1908) the first escaped plants of this species were noted in the Lviv area and in the Carpathians. The active distribution of this species was beginning 50 years ago and continues at present. In Europe as a whole, this period has lasted 50 years longer. Now in Polissya (the Forest zone) the species has been noted in plant communities of the *Querco-Fagetea* Br.-Bl. et Vlieg. 1937, *Robinietea* Jurko ex Hadač et Sofron 1980 and *Galio-Urticetea* Pass. 1967 em. Kopecky 1969 classes (Lukash 2008), and in Forest-Steppe zones of the *Alnetea glutinosae* Br.-Bl. et R. Tx. 1943 class also (Kaniv State Reserve) and in Bukovyna Cis-Carpathian in *Epilobietea angustifolii* Tx. et Prsg. ex von Rochow 1951, *Artemisietea vulgaris* Lohm., Prsg et R. Tx. in R. Tx. 1950, *Polygono-Poetea annuae* Rivas-Mart. 1975, and *Galio-Urticetea*, and in *Querco-Fagetea, Robinietea* classes (Protopopova *et al*. 2010). A similar situation has been observed for *Impatiens glandulifera* Royle. Presently this species in Polissya is a component of plant communities of the *Phragmito-Magnocaricetea* Klika in Klika et Novak 1941, *Molinio-Arrhenatheretea* R. Tx. 1937, *Alnetea glutinosae*, *Bidentea tripartiti* R. Tx., Lohm. et Prsg 1950 classes. In *Echinocystis lobata* (Michx.) Torr. & A. Gray the period of adaptation was about 40 years in Ukraine and 30-80 – in other parts of Europe. The period from the beginning of cultivation to an expansion in *Heracleum sosnowskyi* Manden was about 20 years, in *Solidago canadensis* L. and *Senecio cineraria* DC. – about 100 (Protopopova *et al.* 2000, 2012; Protopopova & Shevera 2013a, 2013b; Vinogradova *et al.* 2010). These examples show the different rates at which some species adapt to new conditions.

Now ergasiophytes are registered in Ukraine as components of almost all types of semi-natural and natural

Table 1. The main stages of naturalization of ergasiophytes in Ukraine

Species	First date of cultivation in Europe, country	First date of cultivation in Ukraine	Date and region of first registration as escaped plants	The start of active distribution and region
Acer negundo	1688, England	1809, Osnovyanskyi (modern Krasnokutskyi) dendrological park (Kharkiv Reg.); 1814 – Nikita Bot. Gard. (Crimea); 1816 – Kremenets Bot. Gard (Ternopil Reg.); 1825-1830 – Trykratskyi park of Skarzhynskyi (modern Odesa Reg.); 1865 – Velyko-Anadolskyi forestry (modern Donetsk Reg.)	1850s-1860s ,?	The second half of 20th c. Forest-Steppe zone
Ailanthus altissima	1740, ?	1809, Osnovyanskyi; 1814 – Nikita Bot. Gard.; 1820 – Simferopol, Sebastopol, Theodosia	1835, Crimea	The end of 20th c., Crimea
Ambrosia artemisiifolia	1863, Germany	1914, vill. Kudashivka (modern Dnipropetrovsk Reg.)	1925, Kiev	1950s-1960s, Steppe zone
Amorpha fruticosa	1724, England	1930s or middle of 19th c., Odesa parks, and Trykratsky park of Skarzhynsky (Odesa Reg.)	Probably the middle of 20th c., ?	1990s, Middle Dnipro Region
Bupleurum fruticosum	-	1814, Nikita Bot. Gard.	1885, Alupka (Crimea)	1914, South-Western Crimea
Echinocystis lobata	The second half of 19th c., ?	Probably first half of 20th c.	1933, vill. Didivtsi, Transcarpathia	1980s, western regions of Ukraine
Elaeagnus angustifolia	1792, Romanie	1930s, Odesa gardens	1925, vill. Foros and Sudak (Crimea)	1990s, steppe regions of Ukraine
Heracleum mantegazzianum	1817, England	1927, Osmoloda forestry (modern Ivano-Frankivsk Reg.)	1962, vill. Osmoloda	1990s, Transcarpathia
Heracleum sosnowskyi	1947, Russia	1960s-1970s, western and northern forest regions of Ukraine	-	90 years of 20th c., Transcarpathia, Polissya (Forest zone)
Impatiens parviflora	1831, Switherland	1871, Lviv parks	1908, Lviv	The middle of 20th c. Forest-Steppe zone and Polissya (Forest zone)
Impatiens glandulifera	1838, England	1930s, Transcarpathia and some western regions of Ukraine	1938, vill. Osiy and Hankovytsya, Transcarpathia; 1939, vill. Mykhaylivka, Khmelnytskyi Reg.	1990s, Transcarpathia
Helianthus tuberosus	1774, ?	?	?	1990s, Transcarpathia
Reynoutria japonica	1825, England	?	1929, Rachiv, Transcarpathia	1990s, Transcarpathia
Rhamnus alaternus		1812, Nikita Bot. Gard.	1860	Probably 1950s, Crimea (South bank)
Rudbeckia laciniata	1663, ?	the middle (?) and the end of 19th c. – the beginning of 20th c., Transcarpathia, Bukovyna	1903, vicinity of vill. Serednye, Transcarpathia, 1911 vill. Jordaneshti, Bykovyna	The end of the 20th c. Bukovyna, Transcarpathia
Senecio cineraria	?	First half of 19th c., probably in Nikita Bot. Gard.	1842	1950s Crimea (South bank)
Solidago canadensis	1645, England	The beginning of 19th c.	1886	1990s right bank of Forest-Steppe zone

plant communities and ecosystems (forest, steppe, aquatic vegetation, etc.), e.g. in forests we registered invasions of *Acer negundo*, *Impatiens parviflora*; along river shores, *Heracleum mantegazzianum, Impatiens glandulifera*, *Echinocystis lobata*, *Reynoutria japonica*, and several species of *Helianthus* L. form large, often monodominant, populations. The dispersal of invasive species represents a serious danger to native rare species and natural protected areas, e.g. the most dangerous alien plant in the Danube Biosphere Reserve in sandy habitats – *Elaeagnus angustifolium*, in Kaniv State Reserve in flood plain forest – *Acer negundo* L. and *Amorpha fruticosa* L. (Protopopova *et al*. 2006a).

4. Discussion

The spectrum of ergasiophytes according to origin of species are differentiated by large variety, however the success of species naturalization persists in those groups that in the general range of the Ukrainian alien fraction flora. The greatest success has a species of the North American and East Asian origin. As in the general spectrum of the Ukrainian alien fraction flora among ergasiophytes the species of Mediterranean origin are dominated, however most of them have a low degree of naturalization. Feature of the life form spectrum is higher percentage of perennials, shrubs and trees among the ergasiophytes; and in the morphological types of plants with respect to soil moisture spectrum the mesophytes group (in an aggregate) is dominated compared with the general spectrum of the Ukrainian alien fraction flora.

Growing of the species in culture at the first stages under the conditions of new region facilitate the naturalization of plants. In the literature (Vynogradova *et al.* 2010) the opinion was expressed that the seed and planting material are often imported not from primary habitats, and of the places where these species are cultivated. And that means they are already partly preadapted to the culture conditions. Nowadays this is also evidenced by reducing the time of naturalization of certain species. Increasing the number and diversity of anthropogenic and disturbed natural ecotopes that contribute to the emergence of new niches facilitates the introduction of alien species into synanthropic and disturbed natural plant communities. For example, in Ukraine due to changes of climatic conditions the mesophytisation of the Steppe zone ecotopes is observed, the changing of their water and salt regimes is noted (Vyshnevsky 2000). It has caused suppression of several species of local flora and facilitated naturalization of some ergasiophytes adapted to the conditions which have arisen. For example, *Elaeagnus angustifolia* actively consumes water resources and overcompetes many local species; it is a salt-tolerant species. It forms stands that change the light mode of the herbaceous vegetation layer in Steppe zone communities, thus affecting the species composition and the structure of plant communities. This species forms the association *Elaeagnetum angustifoliae* Chinkina, and occupies specific econiches in other communities, e.g., *Hippophoaeta rhamnoidis*, thus promoting degradation of aboriginal communities. The species *E. angustifolia* shows high invasive ability to penetrate many different types of habitats (ecotopes) and plant communities, which occurs in different floristic complexes (natural: psammophyton, pratophyton, halophyton, steppophyton, drymophyton, petrophyton, litoralophyton, and anthropogenic: aggeratophyton, and runkatiodrymophyton). The species occurs mostly on sandy and riverside semi-natural ecotopes with unstable and sparse plant cover. The most diversity of plant communities with participation of *E. angustifolia* is observed in sandy (8 associations) and riverside (7 associations) biotopes with sparse vegetation.The main limiting factors for the species distribution in the studied region are excessively humid ecotopes (Protopopova *et al.* 2006, 2009).

5. Conclusion

The above data shows that, the ergasiophyte group, represented by 458 species in Ukraine, plays a significant role in the enrichment of spontaneous flora (Protopopova & Shevera 2013a, 2013b). The results of our studies show that numerous species of this group reached a high degree of naturalization and are widely distributed.

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Appendix 1. Annotation list of ergasiophytes of the Ukrainian flora

The list including the next positions: name of species, family, life form, hydromorphe, chronological elements (data of first publication or fixation), origin, degree of naturalization, way of distribution; invasive or transformer (region).

Abutilon theophrasti Medik., Malvaceae, Ann., Xero-meso, Ken. (1855), E. As., Epoec., Erg.
Acer negundo L., Aceraceae, Tree, Meso, Ken., N. Am., Agr.-epoec., Erg.-kseno; invasive; transformer (forest and forest-steppe regions of Ukraine).
Acer platanoides L., Aceraceae, Tree, Meso, Ken. (Crimea)/natural species in Ukraine, Eur., Col., Erg.
Acer pseudoplatanus L., Aceraceae, Tree, Meso, Ken. (Crimea)/natural species in Ukraine, Eur.-Cauc. (Tzvelev 1996), Col., Erg.
Acer saccharinum L., Aceraceae, Tree, Meso, Ken., N. Am., Ergasphig., Erg.
Acer tataricum L., Aceraceae, Tree, Xero-meso, Ken. (Crimea)/natural species in Ukraine, Eur., Col., Erg.
Acorus calamus L., Araceae, Perenn., Hygro, Arch., As., Agr., Erg.; invasive.
Aesculus hippocastanum L., Hippocastanaceae, Trees, Meso, Ken., Med., Ergasphig., Erg.
Agrostemma githago L., Caryophyllaceae, Ann., Xero-meso, Arch., Anthrop., Ergasphig., Kseno-erg.
Ailanthus altissima (Mill.) Swingle, Simaroubaceae, Shrub, Xero-meso, Ken., E. As., Agr.-epoec., Erg.; invasive; transformer (Crimea).
Albizia julibrissin Durazz., Mimosaceae, Tree, Xero-meso, Ken. (Crimea), S. E. Transcauc., Col., Erg.
Alcea rosea L., Malvaceae, Perenn., Meso-xero, Ken., Med., Ergasphig., Erg.
Allium cepa L., Alliaceae, Bienn., Meso, Ken., C. As. (Mayorov *et al.* 2012) or Med. (Pyšek *et al.* 2012), Ergasphig., Erg.
Allium fistulosum L., Alliaceae, Perenn., Meso, Ken., E. As., Ergasphig., Erg.
Allium porrum L., Alliaceae, Ann. or bienn., Meso, Ken., E. Med., Ergasphig., Erg.
Allium sativum L., Alliaceae, Bienn., Meso, Ken., Mid. As., Ergasphig., Erg.
Allium victorialis L., Alliaceae, Perenn., Xero-meso, Ken. (Crimea)/natural species in Ukraine (Carpathian), sub.-Alp., Col., Erg.
Althaea officinalis L., Malvaceae, Perenn., Hygro-meso, Arch., Iran.-Tur., Agr.-epoec., Erg.
Amaranthus caudatus L., Amaranthaceae, Ann., Xero-meso, Ken., S. Am. (tropic.), Ergasphig., Erg.
Amaranthus caudatus L. ssp. *saueri* Jehlik, Amaranthaceae, Ann., Xero-meso, Ken., S. Am., Ergasphig., Erg.
Amaranthus cruentus L., Amaranthaceae, Ann., Xero-meso, Ken., Trop. Am. S. Am. (tropic.), Epoec., Erg.
Amaranthus hypochondriacus L., Amaranthaceae, Ann., Xero-meso, Ken., N. Am., Ergasphig., Erg.
Amaranthus spinosus L., Amaranthaceae, Ann., Xero-meso, Ken., S. Am., Ephem., Erg.
Amberboa moschata (L.) DC., Asteraceae, Ann., Xero, Ken., W. As., Ergasphig., Erg.
Ambrosia artemisiifolia L., Asteraceae, Ann., Xero-meso, Ken. (1925), N. Am., Agr.-epoec., Erg.-kseno; invasive; transformer (forest-steppe and steppe regions of Ukraine).
Ambrosia trifida L., Asteraceae, Ann., Xero-meso, Ken., N. Am., Ephem., Erg.
Amelanchier canadensis (L.) Medik., Rosaceae, Shrub or tree, Meso, Ken., N. Am., Ephem., Erg.
Amelanchier ovalis Medik., Rosaceae, Shrub, Meso, Ken., Med., Ergasphig., Erg.
Amelanchier spicata (Lam.) K. Koch, Rosaceae, Shrub, Meso, Ken., N. Am., Agr., Erg.; invasive.
Ammi majus L., Apiaceae, Bienn., Meso-xero, Ken., Med., Ephem., Erg.
Amorpha fruticosa L., Fabaceae, Shrub or tree, Meso, Ken., N. Am., Agr.-epoec., Erg.; invasive; transformer (central regions of Ukraine).
Anacyclus clavatus (Desf.) Pers., Asteraceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Anacyclus officinarum Hayne, Asteraceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Anemone fasciculata L., Ranunculaceae, Perenn., Meso, Ken. (Crimea – 1981), Cauc., Col., Erg.
Anethum graveolens L., Apiaceae, Ann., Meso, Ken., Med.-Iran.-Tur., Ergasphig., Erg.
Anredera cordifolia (Ten.) Steenis, Basellaceae, Liane, Meso, Ken., C. and S. Am., Ergasphig., Erg.
Anthericum liliago L., Asphodelaceae, Perenn., Xero-meso, Ken., Med., Ergasphig., Erg.
Antirrhinum majus L., Scrophulariaceae, Ann., Xero-meso, Ken., Med., Ergasphig. (Ukraine)/Agr. (Crimea), Erg.
Apium graveolens L., Apiaceae, Ann. or bienn., Meso, Ken., W. Eur. (Protopopova 1991) or unknown (Pyšek *et al.* 2012), Ergasphig., Erg.
Apocynum cannabinum L., Apocynaceae, Perenn., Meso, Ken. (2000), N. Am., Ergasphig., Erg.
Aquilegia vulgaris L., Ranunculaceae, Perenn., Xero-meso, Ken. (1898), W. Eur., Agr., Erg.
Armeniaca vulgaris Lam., Rosaceae, Tree, Meso-xero, Ken., E. and C. As., Ephem., Erg.
Armoracia rusticana (Lam.) Gaertn., Mey. & Scherb., Brassicaceaee, Perenn., Xero-meso, Ken., Iran.-Tur., Col., Erg.
Aronia melanocarpa (Michx.) Elliot, Rosaceae, Shrub, Meso, Ken., N. Am., Ergasphig., Erg.
Aronia ×mitschurinii A. K. Skvortsov & Yu. K. Maitulina, Rosaceae, Shrub, Meso, Ken., hybrid origin, Ergasphig., Erg.
Aronia ×prunifolia (Marshall) Rehder, Rosaceae, Shrub, Meso, Ken., hybrid origin, Ergasphig., Erg.
Arrhenatherum elatius (L.) J. Presl & C. Presl, Poaceae, Perenn., Meso, Ken., W. Eur., Agr.-epoec., Erg.: invasive.
Artemisia abrotanum L., Asteraceae, S.-shrub, Xero-meso, Arch., E. Med., Agr., Erg.-kseno.
Artemisia dracunculus L., Asteraceae, Perenn., Meso, Ken., As., Col., Erg.
Asclepias syriaca L., Asclepiadaceae, Perenn., Xero-meso, Ken. (1887), N. Am., Epoec., Erg., invasive (central regions of Ukraine).
Astrantia maxima Pall., Apiaceae, Peren., Meso, Ken. (Crimea), Cauc.-Eur. (Bagrikova 2013), Col., Erg.
Atriplex hortensis L., Chenopodiaceae, Ann., Meso, Ken., As., Col., Erg.
Avena sativa L., Poaceae, Ann., Meso, Ken., S. Eur., Ephem., Erg.
Balsamita major Desf., Asteraceae, Perenn., Meso, Ken., As. (Tzvelev 1994) or Eur.-Med. (Pyšek *et al.* 2012), Col., Erg.
Berberis amurensis Rupr. ex Maxim., Berberidaceae, Shrub, Meso, Ken., E. As., Ergasphig., Erg.
Berberis thunbergii DC., Berberidaceae, Shrub., Meso, Ken., E. As., Ergasphig., Erg.
Berberis vulgaris L., Berberidaceae, Shrub, Meso, Ken., E. As., Col., Erg.
Beta vulgaris L., Chenopodiaceae, Ann. or bienn., Meso, Ken., Med. or hybrid (Pyšek *et al.* 2012), Ephem., Erg.
Borago officinalis L., Boraginaceae, Ann., Meso, Ken., Med., Col., Erg.
Brassica juncea (L.) Czern., Brassicaceae, Ann., Meso-xero, Ken., S.-E. As., Ergasphig., Erg.

Brassica napus L., Brassicaceae, Ann. or bienn., Xero-meso, Ken., S. Eur., Ergasphig., Erg.
Brassica nigra (L.) W. D. J. Koch, Brassicaceae, Ann., Xero-meso, Ken., Med., Epoec., Erg.
Brassica oleracea L., Brassicaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Brassica rapa L., Brassicaceae, Ann., Xero-meso, Ken., W. As., Ergasphig., Erg.
Broussonetia papyrifera (L.) Vent., Moraceae, Tree or shrub, Xero-meso, Ken., E. As., Ergasphig., Erg.
Brunnera macrophylla (Adams) I. M. Johnst., Boraginaceae, Perenn., Xero-meso, Ken., Eur.-Med. (Pyšek *et al.* 2012), Ergasphig., Erg.
Buddleja davidii Franch., Buddlejaceae, Shrub, Meso, Ken. (Crimea), As., Col., Erg.
Bupleurum fruticosum L., Apiaceae, Shrub, Meso-xero, Ken., Med., Agr., Erg., invasive; transformer (Crimea).
Calendula officinalis L., Asteraceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Callistephus chinensis (L.) Nees, Asteraceae, Ann. or bienn., Meso, Ken., E. As., Ergasphig., Erg.
Camelina sativa (L.) Crantz ssp. *sativa*, Brassicaceae, Ann., Xero-meso, Arch., unknown (Pyšek *et al.* 2012), Epoec., Erg.
Campanula medium L., Campanulaceae, Bienn., Meso, Ken., S. Eur., Ergasphig., Erg.
Campsis grandiflora (Thunb.) K. Schumann, Bignoniaceae, Liana, Meso, Ken., E. As., Ergasphig., Erg.
Campsis radicans (L.) Seem., Bignoniaceae, Liana, Meso, Ken., N.Am., Ergasphig., Erg.
Cannabis sativa L., Cannabaceae, Ann.,Xero-meso, Ken., E. As., Epoec., Erg.
Caragana arborescens Lam., Fabaceae, Tree or shrub, Meso, Ken., Sib., Ergasphig., Erg.
Carthamus tinctorius L., Asteraceae, Ann., Meso-xero, Ken., S. As. (Mayorov *et al.* 2012), Ergasphig., Erg.
Castanea sativa Mill., Fagaceae, Tree, Meso, Ken., Cauc.-Asia Minor-Med., Ergasphig., Erg.
Catalpa bignonioides Walt., Bignoniaceae, Tree, Meso, Ken., N. Am., Ergasphig., Erg.
Cedrus atlantica (Endl.) Carrière, Pinaceae, Tree, Xero-meso, Ken. (Crimea – 1995), N.-W. Afr., Ergasphig., Erg.
Cedrus deodara (Roxb.) G. Don, Pinaceae, Tree, Xero-meso, Ken. (Crimea), C. As., Col., Erg.
Celtis australis L., Celtidaceae, Tree, Xero-meso, Ken. (Crimea), Med., Ergasphig., Erg.
Celtis caucasica Willd., Celtidaceae, Tree, Xero-meso, Ken. (Crimea), Cauc., Ergasphig., Erg.
Cenchrus longispinus (Hack.) Fernald, Poaceae, Ann., Meso-xero, Ken. (1950), N. Am., Agr.-epoec., Erg.-kseno; invasive.
Centranthus ruber (L.) DC., Valerianaceae, Perenn., Xero-meso, Ken. (Crimea), Med., Agr., Erg.
Cerastium tomentosum L., Caryophyllaceae, Perenn., Meso-xero, Ken. (Crimea), Med., Col., Erg.
Cerasus besseyi (Bailey) Sok., Rosaceae, Shrub, Meso, Ken., N. Am., Ergasphig., Erg.
Cerasus tomentosa (Thunb.) Wall., Rosaceae, Tree or shrub, Meso, Ken., E. As., Ergasphig., Erg.
Cerasus vulgaris Mill., Rosaceae, Tree or shrub, Meso, Ken., E. Med. or Balc., Ergasphig., Erg.
Ceratochloa carinata (Hook. & Arn.) Tutin, Poaceae, Bienn., Xero-meso, Ken., N. Am., Ephem., Erg.
Ceratostigma plumbaginoides Bunge, Plumbaginaceae, Perenn., Xero-meso, Ken., As., Col., Erg.
Cercis siliquastrum L., Caesalpiniaceae, Shrub, Xero-meso, Ken. (1809), Med., Ergasphig., Erg.
Chaenomeles japonica (Thunb.) Lindl., Rosaceae, Shrub, Meso, Ken., E. As., Ergasphig., Erg.
Chamaemelum nobile (L.) All., Asteraceae, Perenn., Meso, Ken., Med., Ergasphig., Erg.
Cheiranthus cheiri L., Brassicaceae, Perenn., Xero-meso, Ken., Med., Ergasphig., Erg.
Chenopodium capitatum (L.) Ambrosi, Chenopodiaceae, Ann., Xero-meso, Ken., W. Eur., Ergasphig., Erg.
Chenopodium foliosum Asch., Chenopodiaceae, Ann., Xero-meso, Ken., Eur.-Med.-As., Epoec., Erg.
Chenopodium schraderianum Schult., Chenopodiaceae, Ann., Meso, Ken., Afr. (tropic and subtropic), Ergasphig., Erg.
Chrysanthemum carinatum Schousb., Asteraceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Chrysanthemum coronarium L., Asteraceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Cicer arietinum L., Fabaceae, Ann., Ken., Meso, Med., Ephem., Erg.
Citrullus lanatus (Thunb.) Matsum. & Nakai, Cucurbitaceae, Ann., Xero-meso, Ken., Afr., Ergasphig., Erg.
Cleome spinosa Jacq., Cleomaceae, Ann., Xero-meso, Ken. (2013), S. Am., Ergasphig., Erg.
Clematis flammula L., Ranunculaceae, Liana, Xero-meso, Ken., Med., Col., Erg.
Clematis vitalba L., Ranunculaceae, Liana, Xero-meso, Ken., S. or C. Eur., Ergasphig., Erg.
Cnicus benedictus L., Asteraceae, Ann., Meso-xero, Ken., S. Eur., Ergasphig., Erg.
Colutea arborescens L., Fabaceae, Shrub, Meso-xero, Ken. (Crimea)/natural species in Ukraine, Eur.-Med. (Pyšek *et al.* 2012), Col., Erg.
Colutea orientalis Mill., Fabaceae, Tree, Xero, Ken. (Crimea), unknown, Agr., Erg.
Commelina communis L., Commelinaceae, Ann., Meso, Ken. (1946), S.-E. As., Ephem., Erg.-kseno.
Coreopsis grandiflora Hogg ex Sweet, Asteraceae, Ann. or bienn., Xero-meso, Ken., N. Am., Ergasphig., Erg.
Coreopsis tinctoria Nutt., Asteraceae, Ann. or bienn., Xero-meso, Ken., N. Am., Ergasphig., Erg.
Coriandrum sativum L., Apiaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Cosmos bipinnatus Cav., Asteraceae, Ann., Xero-meso, Ken., N. Am., Col., Erg.
Cotinus coggygria Scop., Anacardiaceae, Tree or shrub, Xero, Ken. (steppe regions of Ukraine)/natural species in Crimea, Med., Ergasphig., Erg.
Crocus flavus Weston, Iridaceae, Perenn., Xero-meso, Ken., unknown (Pyšek *et al.* 2012), Erg.-lip., Erg.
Cucumis sativus L., Cucurbitaceae, Ann., Meso, Ken., S.-E. As., Ergasphig., Erg.
Cucurbita maxima Duch., Cucurbitaceae, Ann., Meso, Ken., S. Am., Ergasphig., Erg.
Cucurbita pepo L., Cucurbitaceae, Ann., Meso, Ken., N. Am., Ergasphig., Erg.
Cupressus sempervirens L., Cupressaceae, Tree, Meso-xero, Ken. (Crimea – 1995), Med., Col., Erg.
Cyclamen hederifolium Ait., Primulaceae, Perenn., Meso, Ken., Med., Col., Erg.
Cyclamen vernum Sweet, Primulaceae, Perenn., Meso, Ken., Med., Ergasphig., Erg.
Cydonia oblonga Mill., Rosaceae, Shrub, Xero-meso, Ken. (Crimea), W. As., Col., Erg.
Cymbalaria muralis Gaertn., Mey. & Scherb., Scrophulariaceae, Bienn., Meso-xero, Ken., Med., Col., Erg.
Daphne laureola L., Thymelaeaceae, Shrub, Meso, Ken., Med., Ergasphig., Erg.
Datura innoxia Mill., Solanaceae, Ann., Xero-meso, Ken., N. Am., Ephem., Erg.
Datura meteloides DC., Solanaceae, Ann., Xero-meso, Ken., N. Am., Ergasphig., Erg.

Datura tatula L., Solanaceae, Ann., Xero-meso, Ken., N. Am., Ergasphig., Erg.
Dianthus barbatus L., Caryophyllaceae, Perenn., Meso, Ken., Middle Eur., Ergasphig., Erg. Рогович
Digitalis lanata Ehrh., Scrophulariaceae, Perenn., Meso, Ken. (2001), S. Eur.-Balcan, Col., Erg.
Digitalis purpurea L., Scrophulariaceae, Ann., Ken., Meso, Eur.-Med., Ergasphig., Erg.
Diospyros lotus L., Ebenaceae, Tree, Xero-meso, Ken. (Crimea), E. As., Col., Erg.
Dipsacus sativus (L.) Honck., Dipsacaceae, Bienn., Xero-meso, Ken., unknown (Pyšek *et al.* 2012) , Ergasphig., Erg.
Disphania schraderiana (Schult.) Mosyakin & Clemants, Chenopodiaceae, Ann., Xero-meso, Ken., Afr. (tropic and subtropic), Ergasphig., Erg.
Dracocephalum moldavica L., Lamiaceae, Ann., Xero-meso, Ken., E. As., Ergasphig., Erg.
Duchesnea indica (Andr.) Focke, Rosaceae, Perenn., Xero-meso, Ken., S.-E. As., Ergasphig., Erg.
Echinacea purpurea (L.) Moench, Asteraceae, Perenn., Xero-meso, Ken., N. Am., Ergasphig., Erg.
Echinochloa esculenta (A. Br.) H. Scholz, Poaceae, Ann., Xero-meso, Ken., E. As., Ergasphig., Erg.
Echinocystis lobata (Michx.) Torr. & Gray, Cucurbitaceae, Ann., Meso, Ken. (1929), N. Am., Agr.-epoec., Erg.; invasive; transformer (Transcarpathia).
Elaeagnus angustifolia L., Elaeagnaceae, Tree or shrub, Xero-meso, Ken., Med., Agr., Erg.; invasive; transformer (Black Sea Region).
Elaeagnus commutata Bernh. ex Rydb., Elaeagnaceae, Tree or shrub, Meso, Ken., N. Am., Col., Erg.
Elodea canadensis Michx., Hydrocharitaceae, Perenn., Hydro, Ken. (1894), N. Am., Agr., Erg., invasive.
Elodea densa (Planch.) Caspari, Hydrocharitaceae, Perenn., Hydro, Ken. (2001), S. Am., Ephem., Erg.
Elodea nuttallii (Planchon) H. St. Joh. Caspari, Hydrocharitaceae, Perenn., Hydro, Ken. (2004), N. Am., Ephem., Erg.
Eruca vesicaria (L.) Cav., Brassicaceae, Ann., Xero-meso, Ken., E. Med., Ephem., Erg.
Eschscholzia californica Cham., Papaveraceae, Ann., Meso-xero, Ken., N. Am., Ergasphig., Erg.
Eudianthe coeli-rosa (L.) Rchb., Caryophyllaceae, Ann., Xero-mezo, Ken. (Crimea), W. Med., Ephem., Kseno/Erg.
Euonymus japonica Thunb., Celastraceae, Shrub, Meso, Ken., E. As., Ergasphig., Erg.
Euonymus sacrosancta Koidz., Celastraceae, Shrub, Meso, Ken., E. As., Ergasphig., Erg.
Euphorbia lathyris L., Euphorbiaceae, Ann., Meso-xero, Ken., Med., Ergasphig., Erg.
Euphorbia marginata Pursh, Euphorbiaceae, Ann., Meso-xero, Ken., N. Am., Ergasphig., Erg.
Fagopyrum esculentum Moench, Polygonaceae, Ann., Meso, Ken., C. As., Ergasphig., Erg.
Fallopia baldschuanica (Regel) Holub, Polygonaceae, Liana, Xero-meso, Ken., Middle As., Ergasphig., Erg.
Ficus carica L., Moraceae, Tree or shrub, Xero, Ken., As.-Med., Epoec., Erg.
Flueggea suffruticosa (Pall.) Baillon, Euphorbiaceae, Shrub, Meso-xero, Ken. (1999), E. As., Col., Erg.
Foeniculum vulgare Mill., Apiaceae, Bienn., Xero-meso, Ken., Med., Col., Erg.
Fragaria ×ananassa (Duchesne) Duchesne, Rosaceae, Perenn., Meso, Ken., hybrid origin, Ergasphig., Erg.
Fraxinus ornus L., Oleaceae, Tree, Meso-xero, Ken., Med., Agr. Erg.; invasive.
Fraxinus pennsylvanica Marsh., Oleaceae, Oleaceae, Tree, Xero-meso, Ken., N. Am., Col., Erg.
Fritillaria ophioglossifolia Freun. & Sint., Liliaceae, Perenn., Meso, Ken. (Crimea), Cauc., Col., Erg.
Gaillardia pulchella Foug., Asteraceae, Ann. or bienn., Meso-xero, Ken., Am., Col., Erg.
Gleditsia triacanthos L., Caesalpiniaceae, Tree, Xero-meso, Ken., N. Am., Ergasphig., Erg.
Glycine max (L.) Merr., Fabaceae, Ann., Ken., Xero-meso, E. As., Ergasphig., Erg.
Grossularia uva-crispa (L.) Mill. ssp. *reclinata* (L.) Dostal, Grossulariaceae, Shrub, Meso, Ken., Eur., Ergasphig., Erg.
Gypsophila acutifolia Fisch. ex Spreng., Caryophyllaceae, Perenn., Xero-meso, Ken., Cauc., Ergasphig., Erg.
Gypsophila elegans M. Bieb., Caryophyllaceae, Ann., Xero-meso, Ken., Cauc.-Asia Minor or Eur.-Med. (Pyšek *et al.* 2012), Ephem., Erg.
Gypsophila paulii Klok., Caryophyllaceae, Perenn., Xero-meso, Ken. (S.-E. Ukraine, Ostapko, Boyko, Mosyakin 2010), S. Cis Black Sea, Ergasphig., Erg.
Halimodendron halodendron (Pall.) Voss, Fabaceae, Shrub, Meso, Ken., unknown, Ephem., Erg.
Helianthus annuus L. var. *macrocarpa* Lucznik, Asteraceae, Ann., Xero-meso, Ken., N. Am., Ephem., Erg.
Helianthus decapetalus L., Asteraceae, Perenn., Meso, Ken., N. Am., Epoec., Erg.
Helianthus ×laetiflorus Pers., Asteraceae, Perenn., Xero-meso, Ken., N. Am., Agr.-epoec., Erg.; invasive.
Helianthus rigidus (Cass.) Desf., Asteraceae, Perenn, Xero-meso, Ken., N. Am., Ergasphig., Erg.
Helianthus strumosus L., Asteraceae, Perenn., Meso, Ken., N. Am., Col., Erg.
Helianthus subcanescens (A.Gray) E. E. Wats., Asteraceae, Perenn., Meso, Ken., N. Am., Agr.-epoec., Erg.; invasive.
Helianthus tuberosus L., Asteraceae, Perenn., Meso, Ken., N. Am., Agr.-epoec., Erg.; invasive; transformer (Transcarpathia).
Helichrysum italicum (Roth) G. Don fil., Asteraceae, S.-shrub, Xero, Ken. (Crimea – 1995), Med., Col., Erg.
Heliopsis scabra Dun., Asteraceae, Perenn., Xero-meso, Ken., N. Am., Col., Erg.
Helleborus dumetorum Waldst. & Kit., Ranunculaceae, Perenn., Meso, Ken., S. Eur., Ergasphig., Erg.
Helleborus niger L., Ranunculaceae, Perenn., Meso, Ken., S. Eur., Ergasphig., Erg. Note. The species included in to Red Data Book of Ukraine, according to S. Mosyakin and M. Fedoronchuk (1999) probably cultivated and escaped.
Helleborus viridis L., Ranunculaceae, Perenn., Meso, Ken., S. Eur., Ergasphig., Erg.
Hemerocallis fulva (L.) L., Hemerocallidaceae, Perenn., Xero-meso, Ken., E. As. , Ergasphig., Erg.
Heracleum mantegazzianum Sommier & Levier, Apiaceae, Perenn., Hygro, Ken. (1964), Cauc., Agr.-epoec., Erg.; invasive; transformer (Carpathian).
Heracleum sosnowskyi Manden., *Apiaceae*, Perenn., Hygro, Ken., Cauc., Agr.-epoec., Erg., invasive; transformer (Carpathian, Polissya [Forest zone of Ukraine]).
Hesperis matronalis L., Brassicaceae, Ann. or bienn., Xero-meso, Ken. (left forest and steppe regions of Ukraine), Sub.-Med. (Ilyinska *et al.* 2007) or Eur. and Med. (Pyšek *et al.* 2012), Ergasphig., Erg.
Hesperis pycnotricha Borbas & Degen, Brassicaceae, Bienn., Meso, Ken., Cauc.-As. min., Ergasphig., Erg.
Hesperis sibirica L., Brassicaceae, Bienn., Meso, Ken., As., Ergasphig., Erg.
Hordeum distichon L., Poaceae, Ann., Xero-meso, Ken., E. Med., Ergasphig., Erg.

Hordeum jubatum L., Poaceae, Ann., Meso-xero, Ken., N. Am., Ephem., Erg.
Hordeum vulgare L., Poaceae, Ann., Xero-meso, Ken., As., Ergasphig., Erg.
Humulus japonicus Siebold & Zucc., Cannabaceae, Liana, Meso, Ken. (2002), E. As., Ergasphig., Erg.
Hypericum calycinum L., Hypericaceae, Shrub, Xero-meso, Ken., E. Med., Ergasphig., Erg.
Hyssopus officinalis L., Lamiaceae, Perenn., Xero-meso, Ken., Med., Ergasphig., Erg.
Iberis amara L., Brassicaceae, Ann., Xero-meso, Ken., Med. (Protopopova, 1991), Ergasphig., Erg.
Iberis pinnata L., Brassicaceae, Ann., Xero, Ken., W. Med., Ergasphig., Erg.
Iberis umbellata L., Brassicaceae, Ann. or bienn., Xero-meso, Ken., Med., Ergasphig., Erg.
Impatiens balfourii Hook. f., Balsaminaceae, Ann., Meso, Ken. (2013), W. Hymal., Ephem., Erg.
Impatiens glandulifera Royle, Balsaminaceae, Ann., Hydro-meso, Ken. (1939), S.-E. As., Agr.-epoec., Erg.; invasive; transformer (Transcarpathia).
Ipomoea purpurea (L.) Roth, Convolvulaceae, Ann., Xero-meso, Ken., Trop. Am., Ergasphig., Erg.
Iris ×germanica L., Iridaceae, Perenn., Meso, Ken. (Crimea), hybrid or Eur.-As. (Pyšek *et al.* 2012), Col., Erg.
Iris musulmanica Fomin, Iridaceae, Perenn., Meso, Ken., Cauc. or Eur. (Bagrikova 2013), Ergasphig., Erg.
Iris pallida Lam., Iridaceae, Perenn., Meso, Ken., Med., Ergasphig., Erg.
Iva xanthiifolia Nutt., Asteraceae, Perenn., Xero-meso, Ken. (1842), N. Am., Epoec., Erg.; invasive.
Jasminum nudiflorum Lindl., Oleaceae, Shrub, Xero-meso, Ken., E. As., Ergasphig., Erg.
Jasminum officinale L., Oleaceae, Shrub, Meso, Ken., E. Med., Ergasphig., Erg.
Juglans cinerea L., Juglandaceae, Tree, Meso, Ken., N. Am., Ergasphig., Erg.
Juglans mandshurica Maxim., Juglandaceae, Tree, Meso, Ken., As., Ergasphig., Erg.
Juglans nigra L., Juglandaceae, Tree, Meso, Ken., N. Am., Ergasphig., Erg.
Juglans regia L., Juglandaceae, Tree, Meso, Ken., Balcan-C. As., Ergasphig., Erg.
Kali collina (Pall.) Akhani & E. H. Roalson, Chenopodiaceae, Ann., Xero, Ken., Tur., Ergasphig., Erg.
Kochia scoparia (L.) Schrad., Chenopodiaceae, Ann., Meso-xero, Ken., Iran.-Tur., Ergasphig., Erg.
Koelreuteria paniculata Laxm., Sapindaceae, Tree or shrub, Meso, Ken. (Crimea), E. As., Col., Erg.
Laburnum anagyroides Medik., Fabaceae, Trees or shrub, Xero-meso, Ken., S. Eur., Ergasphig., Erg.
Lactuca sativa L., Asteraceae, Bienn., Meso, Ken., unknown (Pyšek *et al.* 2012), Ergasphig., Erg.
Lagurus ovatus L., Poaceae, Ann., Xero, Ken. (Crimea), Med. (Pyšek *et al.* 2012), Ephem., Kseno./Erg.
Lallemantia iberica (M. Bieb.) Fisch. & C. A. Mey., Lamiaceae, Ann., Meso-xero, Ken., W. As., Ergasphig., Erg.
Lamprocapnos spectabilis (L.) Fukuhara (Fumariaceae), Perenn., Meso, Ken., E. As. (Mayorov *et al.* 2012), Ergasphig., Erg.
Lathyrus odoratus L., Fabaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Lathyrus sativus L., Fabaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Laurocerasus officinalis M. Roem., Rosaceae, Tree or shrub, Xero-meso, Ken., Med.-Iran.-Tur., Agr., Erg.
Laurus nobilis L., Lauraceae, Tree or shrub, Xero-meso, Ken., Med., Ergasphig., Erg.
Lavandula angustifolia Mill., Lamiaceae, Perenn., Xero-meso, Ken., Med. (Pyšek *et al.* 2012), Ergasphig., Erg.
Lavatera trimestris L., Malvaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Lens culinaris Medik., Fabaceae, Ann., Meso, Ken., unknown (Pyšek *et al.* 2012), Ergasphig., Erg.
Lepidium sativum L., Brassicaceae, Ann., Meso, Ken., Med., Ergasphig., Erg.
Levisticum officinale W. D. J. Koch, Apiaceae, Perenn., Xero-meso, Ken., E. Med., Ergasphig., Erg.
Leucanthemum maximum (Ramond) DC., Asteraceae, Perenn., Xero-meso, Ken., W. Eur., Ergasphig., Erg.
Lilium monadelphum M. Bieb., Liliaceae, Perenn., Xero-meso, Ken. (Crimea), Cauc., Ephem., Erg.
Linaria bipartita (Vent.) Willd., Scrophulariaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Linaria incarnata (Vent.) Spreng., Scrophulariaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Linum grandiflorum Desf., Linaceae, Ann., Meso-xero, Ken., N. Afr., Col., Erg.
Linum usitatissimum L., Linaceae, Ann., Meso-xero, Ken., unknown, Ephem., Erg.
Lobularia maritima (L.) Desv., Brassicaceae, Ann., Meso-xero, Ken., Med., Ergasphig., Erg.
Lolium multiflorum Lam., Poaceae, Ann. or bienn., Meso, Ken., Med.-Iran.-Tur., Epoec., Erg.
Lonicera caprifolium L., Caprifoliaceae, Liana, Xero-meso, Ken., Med., Ergasphig., Erg.
Lonicera etrusca, Caprifoliaceae, Shrub, Xero-meso, Ken., Med., Agr. (Crimea), Erg.
Lonicera standishii Jacq., Caprifoliaceae, Shrub, Xero-meso, Ken. (Crimea), As., Col., Erg.
Lonicera tatarica L., Caprifoliaceae, Shrub or tree, Meso, Ken., As., Ergasphig., Erg.
Lunaria annua L., Brassicaceae, Ann., Xero-meso, Ken., S. Eur., Ergasphig., Erg.
Lupinus luteus L., Fabaceae, Ann., Meso, Ken., W. Med., Ergasphig., Erg.
Lupinus perennis L., Fabaceae, Perenn., Meso, Ken. N. Am., Ephem., Erg.
Lupinus polyphyllus Lindl., Fabaceae, Perenn., Meso, Ken., N. Am., Agr.-epoec., Erg.; invasive.
Lychnis chalcedonica L., Caryophyllaceae, Perenn., Meso, Ken., As., Ergasphig., Erg.
Lycium barbatum L., Solanaceae, Shrub, Meso-xero, Arch., E. As., Epoec., Erg.
Lycopersicon esculentum Mill. s.l., Solanaceae, Ann., Meso, Ken., S. Am., Ergasphig., Erg.
Maclura pomifera (Rafin.) Schneid., Moraceae, Tree, Meso, Ken. (Crimea), N. Am., Col., Erg.
Mahonia aquifolium (Pursh) Nutt., Berberidaceae, Shrub, Xero-meso, Ken., N. Am., Agr. (Polissya [Forest zone of Ukraine], Crimea), Erg.
Malope trifida Cav., Malvaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Malus domestica Borkh., Rosaceae, Tree, Meso, Ken., unknown, Ergasphig., Erg.
Malva mauritiana L., Malvaceae, Bienn., Xero-meso, Ken., Med., Epoec., Erg.
Malva moschata L., Malvaceae, Perenn., Xero-meso, Ken., Med. or As. min. (Protopopova 1991), Ergasphig., Erg.
Malva verticillata L., Malvaceae, Ann., Xero-meso, Ken., As., Ephem., Erg.
Matthiola bicornis (Sibth. & Smith) DC., Brassicaceae, Ann. or bienn., Xero-meso, Ken., Med., Ergasphig., Erg.

Matthiola incana (L.) R. Br., Brassicaceae, Ann. or bienn., Meso, Ken., S. Eur., Ergasphig., Erg.
Matthiola longipetala (Vent.) DC., Brassicaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Medicago sativa L., Fabaceae, Perenn., Xero-meso, Ken., E. Med., Epoec., Erg.
Melissa officinalis L., Lamiaceae, Perenn., Xero-meso, Ken., Med., Ergasphig., Erg.
Melo sativus Sager. ex M. Roem., Cucurbitaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Mentha ×gracilis Sole, Lamiaceae, Perenn., Meso, Ken., hybrid origin, Ephem., Erg.
Mentha ×piperita L., Lamiaceae, Perenn., Meso, Ken., hybrid origin, Ephem., Erg.
Mentha spicata L., Lamiaceae, Perenn., Hygro, Ken., Med., Ergasphig., Erg.
Mimulus guttatus DC., Scrophulariaceae, Perenn., Meso, Ken., N. Am., Ergasphig., Erg.
Miscanthus sinensis Anderson, Poaceae, Perenn., Xero-meso, Ken., E. As., Ergasphig., Erg.
Molucella laevis L., Lamiaceae, Ann., Xero-meso, Ken., Med.-Iran.-Tur., Ergasphig., Erg.
Morus alba L., Moraceae, Tree, Xero-meso, Ken., E. As., Ergasphig., Erg.
Morus nigra L., Moraceae, Tree, Xero-meso, Ken., As., Ergasphig., Erg.
Morus rubra L., Moraceae, Tree, Xero-meso, Ken. (Crimea), N.Am., Col., Erg.
Myrrhis odorata (L.) Scop., Apiaceae, Perenn., Meso, Ken., W. Eur., Ergasphig., Erg.
Narcissus poëticus L., Amaryllidaceae, Perenn., Xero-meso, Ken., Med. (Pyšek *et al.* 2012) or Eur. (Mayorov *et al.* 2012), Ergasphig., Erg.
Narcissus pseudonarcissus L., Amaryllidaceae, Perenn., Xero-meso, Ken., W. Eur., Ergasphig., Erg.
Nicandra physalodes (L.) Gaertn., Solanaceae, Ann., Xero-meso, Ken. (1855), S. Am., Ergasphig., Erg.
Nicotiana alata Link & Otto, Solanaceae, Ann., Meso, Ken., S. Am., Ergasphig., Erg.
Nicotiana tabacum L., Solanaceae, Ann., Meso, Ken, Trop. Am.., Ergasphig., Erg.
Nicotiana rustica L., Solanaceae, Ann., Meso, Ken (1869), N. Am.., Ergasphig., Erg.
Nigella sativa L., Ranunculaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Oenothera glazioviana Michelii, Onagraceae, Bienn., Xero-meso, Ken., N. Am., Ergasphig., Erg.
Oenothera suaveolens Desf., Onagraceae, Bienn., Xero-meso, Ken., unknown, Ergasphig., Erg.
Olea europaea L., Oleaceae, Tree or shrub, Meso-xero, Ken., E. Med., Ergasphig., Erg.
Omphalodes linifolia (L.) Moench, Boraginaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Omphalodes verna Moench, Boraginaceae, Perenn., Xero-meso, Ken., Med., Epoec., Erg.
Onobrychis viciifolia Scop., Fabaceae, Perenn., Xero-meso, Ken., S. Eur., Ephem., Erg.
Opuntia fragilis (Nutt.) Haw., Cactaceae, Perenn, Xero, Ken. (Crimea), C. Am., Agr., Erg.
Opuntia humifusa (RAfr.) RAfr., Cactaceae, Perenn., Xero, Ken. (Crimea – 2004), N. Am., Ergasphig., Erg.
Opuntia lindheimeri Engel., Cactaceae, Perenn., Xero, Ken. (Crimea), N. Am., Agr., Erg.
Opuntia phaeocantha Engelm., Cactaceae, Perenn., Xero, Ken. (Crimea – 2004), N. Am., Ergasphig., Erg.
Opuntia tortispina Engelm., Cactaceae, Perenn., Xero, Ken. (Crimea – 2004), N. Am., Ergasphig., Erg.
Opuntia vulgaris Mill., Cactaceae, Perenn., Xero, Ken. (Crimea – 2004), S. Am., Agr., Erg.
Ornithogalum kochii Parl., Hyacinthaceae, Perenn., Xero, Ken. (forest and forest-steppe regions of Ukraine), N. Pann., Ergasphig., Erg.
Ornithopus sativus Brot., Fabaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Padus serotina (Ehrh.) Ag., Rosaceae, Shrub, Xero-meso, Ken., N. Am., Agr., Erg.
Padus virginiana (L.) Roem., Rosaceae, Tree, Xero-meso, Ken., N. Am., Ergasphig., Erg.
Panicum miliaceum L., Poaceae, Ann., Xero-meso, Ken., S.-E. As., Ergasphig., Erg.
Papaver somniferum L., Papaveraceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Parthenocissus inserta (A. Kern.) Fritsch, Vitaceae, Liana, Meso, Ken., N. Am., Agr.-Epoec., Erg.
Parthenocissus quinquefolia (L.) Planch., Vitaceae, Liana, Meso, Ken., N.Am., Col., Erg.
Pastinaca sativa L., Apiaceae, Bienn., Meso, Ken., Eur.-As., Ephem., Erg.
Persicaria orientalis (L.) Spach, Polygonaceae, Ann., Meso, Ken., S.-E. As., Ergasphig., Erg.
Petrorhagia saxifraga (L.) Link, Caryophyllaceae, Ann., Xero, Ken., Med., Ergasphig., Erg.
Petrosedum rupestre (L.) Grulich, Crassulaceae, Perenn., Xero, Ken., Cauc., Ergasphig., Erg.
Petroselinum crispum (Mill.) A. W. Hill, Apiaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Petunia ×atkinsiana D. Don ex Loudon, Solanaceae, Ann., Meso, Ken., hybrid or unknown (Pyšek *et al.* 2012), Ergasphig., Erg.
Phacelia tanacetifolia Benth., Hydrophyllaceae, Ann., Xero-meso, Ken., N. Am., Ergasphig., Erg.
Phalaris canariensis L., Poaceae, Ann., Xero-meso, Ken., Med., Ephem., Erg.
Phalaris minor Retz., Poaceae, Ann., Xero-meso, Ken., Med., Ephem., Kseno./Erg.
Phaseolus vulgaris L., Fabaceae, Ann., Meso, Ken., S. Am., Ergasphig., Erg.
Phellodendron amurense Rupr., Rutaceae, Tree, Meso, Ken, E. As., Ergasphig., Erg.
Phlox paniculata L., Polemoniaceae, Perenn., Xero-meso, Ken., N. Am., Ergasphig., Erg.
Phlox subulata L., Polemoniaceae, Perenn., Xero, Ken., N. Am., Ergasphig., Erg.
Physalis ixocarpa Brot. ex Hornem., Solanaceae, Ann., Meso, Ken., N. Am., Ergasphig., Erg.
Physocarpus opulifolius (L.) Maxim., Rosaceae, Shrub, Xero-meso, Ken., N. Am., Ergasphig., Erg.
Phytolacca americana L., Phytolaccaceae, Perenn., Xero-meso, Ken., N. Am., Ergasphig., Erg.
Pimpinella anisum L., Apiaceae, Ann., Xero-meso, Ken., E. Med., Ergasphig., Erg.
Pinus banksiana Lamb., Pinaceae, Tree, Xero, Ken., N. Am., Ergasphig., Erg.
Pinus strobus L., Pinaceae, Trees, Xero, Ken., N. Am., Ergasphig., Erg.
Pistia stratiotes L., Araceae, Perenn., Hydro, Ken., Afr., Ephem., Erg.
Pisum arvense L., Fabaceae, Ann., Xero-meso, Ken., unknown (Pyšek *et al.* 2012), Cauc. (Protopopova 1991), Ergasphig., Erg.
Pisum sativum L., Fabaceae, Ann., Meso, Ken., S. Eur., Ergasphig., Erg.
Platanus ×hispanica Mill. ex Muenchh., Platanaceae, Tree, Xero-meso, Ken. (Crimea), hybrid origin, Col., Erg.
Platycladus orientalis (L.) Franco, Cupressaceae, Tree or shrub, Xero-meso, Ken., E. As., Ergasphig., Erg.

Polygala caucasica Rupr., Polygalaceae, Perenn., Meso, Ken. (Crimea – 1981), Cauc., Col., Erg.
Polygonum pensylvanicum L., Polygonaceae, Ann., Meso, Ken. (1998), N. Am., Ergasphig., Erg.
Populus balsamifera L., Salicaceae, Tree, Meso, Ken., N. Am., Ergasphig., Erg.
Populus ×canadensis Moench, Salicaceae, Tree, Meso, Ken., hybrid origin, Ergasphig., Erg.
Populus laurifolia Ledeb., Salicaceae, Tree, Meso, Ken., C. As., Ergasphig., Erg.
Populus simonii Carr., Salicaceae, Tree, Meso, Ken., E. As., Ergasphig., Erg.
Portulaca grandiflora Hook., Portulacaceae, Ann., Xero-meso, Ken., S. Am., Ergasphig., Erg.
Portulaca oleracea L. ssp. *sativa* (Haw.) Schuebl. & G. Martens, Portulacaceae, Ann., Xero-meso, Ken., Med. (Pyšek *et al.* 2012), Ergasphig., Erg.
Prunus cerasifera Ehrh., Rosaceae, Tree or shrub, Xero-meso, Ken., Med., Ergasphig., Erg.
Prunus divaricata Ledeb., Rosaceae, Tree or shrub, Xero-meso, Ken., As., Ergasphig., Erg.
Prunus domestica L., Rosaceae, Tree or shrub, Xero-meso, Ken., hybrid (Tzvelev 2001), Ergasphig., Erg.
Prunus insititia L., Rosaceae, Shrub or tree, Xero-meso, Ken., As., Ergasphig., Erg.,
Ptelea trifoliata L., Rutaceae, Tree, Meso, Ken., N. Am., Ergasphig., Erg.
Pueraria lobata (Willd.) Ohwi, Fabaceae, Shrub, Meso, Ken. (Crimea), S.-E. As., Col., Erg.
Pyracantha rogersiana (A. B. Jacks.) Bean., Rosaceae, Shrub, Meso, Ken. (Crimea), As., Col., Erg.
Pyrethrum cinerariifolium Trev., Asteraceae, Perenn., Xero-meso, Ken., Balcan., Ergasphig., Erg.
Pyrethrum macrophyllum (Waldst. & Kit.) Willd., Asteraceae, Perenn., Meso, Ken., E. Med., Ergasphig., Erg.
Pyrethrum partheniifolium Willd., Asteraceae, Perenn., Meso-xero, Ken., Med.-Iran.-Tur., Ergasphig., Erg.
Pyrethrum parthenium (L.) Smith, Asteraceae, Perenn., Meso-xero, Ken., W. Eur., Ergasphig., Erg.
Pyrus communis L., Rosaceae, Tree, Meso, Ken., unknown (Pyšek *et al.* 2012) or As. (Bagrikova 2013), Agr., Erg./Kseno.
Quercus ilex L., Fagaceae, Tree, Meso-xero, Ken. (Crimea), Med., Ergasphig., Erg.
Quercus palustris Moench, Fagaceae, Tree, Meso, Ken., N. Am., Agr., Erg.
Quercus rubra L., Fagaceae, Tree, Meso, Ken., N. Am., Agr., Erg.; invasive.
Raphanus sativus L., Brassicaceae, Ann. or bienn., Xero-meso, Ken., Med., Ergasphig., Erg.
Reynoutria ×bohemica Chrtek & Chrtkova, Polygonaceae, Perenn., Meso, Ken., hybrid origin, Epoec., Erg.; invasive.
Reynoutria japonica Houtt., Polygonaceae, Perenn., Meso, Ken. (1929), E. As., Agr.-epoec., Erg.; invasive; transformer (Transcarpathia).
Reynoutria sachalinensis (Fr. Schmidt) Nakai, Polygonaceae, Perenn., Meso, Ken. (1929), E. As., Col., Erg.
Rhamnus alaternus L., Rhamnaceae, Shrub, Xero-meso, Ken., Med., Agr., Erg.; invasive; transformer (Crimea).
Rhus typhina L., Anacardiaceae, Tree, Xero, Ken., N. Am., Ergasphig., Erg.
Ribes aureum Pursh, Grossulariaceae, Shrub, Meso, Ken., N. Am., Ergasphig., Erg.
Ribes rubrum L., Grossulariaceae, Shrub, Meso, Ken., W. Eur., Ergasphig., Erg.
Ribes spicatum E. Robson, Grossulariaceae, Shrub, Meso, Ken. (Crimea) / natural species in Ukraine, Eur.-As. (Pyšek *et al.* 2012) or Eur. (Bagrikova 2013), Col., Erg.
Ricinus communis L., Euphorbiaceae, Ann., Meso, Ken., Afr., Ergasphig., Erg.
Robinia hispida L., Fabaceae, Shrub, Xero-meso, Ken., N. Am., Col., Erg.
Robinia pseudoacacia L., Fabaceae, Tree, Xero-meso, Ken., N. Am., Epoec., Erg.; invasive.
Rosa alba L., Rosaceae, Shrub, Xero-meso, Ken., hybrid origin, Ergasphig., Erg.
Rosa centifolia L., Rosaceae, Shrub, Xero-meso, Ken., hybrid origin, Ergasphig., Erg.
Rosa multiflora Thunb., Rosaceae, Shrub, Xero-meso, Ken., E. As., Ergasphig., Erg.
Rosa rugosa Thunb., Rosaceae Shrub, Xero-meso, Ken., E. As., Col., Erg.
Rosmarinum officinalis L., Lamiaceae, S.-shrub, Meso-xero, Ken., Med., Ergasphig., Erg.
Rubia tinctorum L., Rubiaceae, Perenn., Meso-xero, Ken., Med.-Iran.-Tur., Col., Erg.
Rubus idaeus L., Rosaceae, Shrub, Meso, Ken. (Crimea)/natural species in Ukraine, Eur., Agr., Erg.
Rubus laciniatus Willd., Rosaceae, Shrub, Meso, Ken. (2013), unknown (Pyšek et al., 2012), Col., Erg.
Rubus macrophyllus Weihe & Nees, Rosaceae, Shrub, Meso, Ken. (S.-E. of Ukraine, Ostapko, Boyko, Mosyakin 2010), C. Eur. (Krassovskaya 2001), Col., Kseno-Erg.
Rudbeckia bicolor Nutt., Asteraceae, Perenn., Meso, Ken., N. Am., Ergasphig., Erg.
Rudbeckia hirta L., Asteraceae, Ann. or bienn., Xero-meso, Ken., N. Am., Col., Erg.
Rudbeckia laciniata L., Asteraceae, Bienn., Hygro-meso, Ken., N. Am., Agr.-epoec., Erg.; invasive; transformer (Transcarpathia, Bukobinian Cis Carpathian).
Rumex patientia L., Polygonaceae, Perenn., Xero-meso, Ken., Med., Ergasphig., Erg.
Sagittaria platyphylla (Engelm.) J. G. Smith, Alismataceae, Perenn., Meso-hygro, Ken. (1982), N. Am., Ergasphig., Erg.
Salix babylonica L., Salicaceae, Tree, Meso, Ken., C.-E. As., Ephem., Erg.
Salix fragilis L., Salicaceae, Trees, Meso, Arch., As. min., Agr., Erg.; invasive; transformer (central regions of Ukraine).
Salvia officinalis L., Lamiaceae, Perenn., Xero-meso, Ken., Med., Ergasphig., Erg.
Salvia splendens Ker Gawl., Lamiaceae, Perenn., Xero, Ken., S. Am., Ephem., Erg.
Sambucus racemosa L., Sambucaceae, Shrub or tree, Meso, Ken., W. Eur., Ergasphig., Erg.
Santolina chamaecyparissus L., Asteraceae, Shrub, Meso-xero, Ken., Med., Ergasphig., Erg.
Santolina virens Mill., Asteraceae, Shrub, Meso-xero, Ken., S. Eur., Ergasphig., Erg.
Saponaria officinalis L., Caryophyllaceae, Perenn., Xero-meso, Ken., Med., Agr.-epoec., Erg.
Satureja hortensis L., Lamiaceae, Ann., Xero-meso, Ken., Med. (Protopopova 1991) or Cauc.As. Min. (Mayorov *et al.* 2012), Ephem., Erg.
Scolymus maculatus L., Asteraceae, Ann., Xero, Ken., Med., Ergasphig., Erg.
Scorzonera hispanica L., Asteraceae, Perenn., Xero-meso, Ken., Balcan., Ergasphig., Erg.
Secale cereale L., Poaceae, Ann., Xero-meso, Arch., E. Med., Ergasphig., Erg.
Sedum spurium M. Bieb., Crassulaceae, Perenn., Xero-meso, Ken., Cauc.-As. min., Ergasphig., Erg.

Sempervivum tectorum L., Crassulaceae, Perenn., Meso-xero, Ken., Middle Eur. (mount.), Ergasphig., Erg.
Senecio cineraria DC., Asteraceae, Perenn., Xero, Ken., W. Med., Agr., Erg.
Setaria italica (L.) P. Beauv., Poaceae, Ann., Xero-meso, Ken., As., Ergasphig., Erg.
Sicyos angula L., Cucurbitaceae, Ann., Meso, Ken., N. Am., Agr., Erg.
Sida hermaphrodita (L.) Rusby, Malvaceae, Perenn., Xero, Ken. (Crimea), N. Am., Ephem., Erg.
Silene armeria L., Caryophyllaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Silene pendula L., Caryophyllaceae, Ann., Xero-meso, Ken., Med., Ergasphig., Erg.
Silphium perfoliatum L., Asteraceae, Perenn., Meso, Ken., N. Am., Col., Erg.
Silybum marianum (L.) Gaertn., Asteraceae, Ann. or bienn., Meso-xero, Ken., Med.-Iran.-Tur., Epoec., Erg.
Sinapis alba L., Brassicaceae, Ann., Xero-meso, Arch., Med.-Iran.-Tur., Epoec., Erg.
Sisyrinchium septentrionale Bicknell, Iridaceae, Perenn., Xero-meso, Ken., N. Am., Agr.-col., Erg.
Solanum melongena L., Solanaceae, Ann., Meso, Ken., As., Ergasphig., Erg.
Solanum tuberosum L., Solanaceae, Perenn., Meso, Ken., S. Am., Ergasphig., Erg.
Solidago canadensis L., Asteraceae, Perenn., Xero-meso, Ken., N. Am., Agr.-epoec., Erg.; invasive; transformer (forest and forest-steppe regions of Ukraine).
Solidago graminifolia (L.) Salisb., Asteraceae, Perenn., Meso, Ken., N. Am., Ergasphig., Erg.
Solidago serotinoides A. & D. Love, Asteraceae, Perenn., Meso, Ken., N. Am., Epoec., Erg.
Sophora japonica L., Fabaceae, Tree, Meso, Ken., E. As., Ergasphig., Erg.
Sorghum ×*almum* Parodi, Poaceae, Perenn., Xero-meso, Ken., hybrid origin, Ergasphig., Erg.
Sorghum saccharatum (L.) Moench, Poaceae, Ann., Xero-meso, Ken., S. As., Ergasphig., Erg.
Sorghum sudanense (Piper) Stapf, Poaceae, Ann., Xero-meso, Ken., Afr., Ergasphig., Erg.
Spartium junceum L., Fabaceae, Shrub, Ken., Xero, Med., Col. Erg.
Spinacia oleracea L., Chenopodiaceae, Ann., Meso, Ken., E. Med., Ergasphig., Erg.
Spiraea billardii Hérincq, Rosaceae, Shrub, Xero-meso, Ken., hybrid origin, Ergasphig., Erg.
Spiraea douglasii Hook., Rosaceae, Shrub, Meso, Ken., N. Am., Ergasphig., Erg.
Spiraea japonica L.f., Rosaceae, Shrub, Meso, Ken., E. As., Ergasphig., Erg.
Spiraea salicifolia L., Rosaceae, Shrub, Xero-meso, Ken., Eur.-As., Ergasphig., Erg.
Stachys byzantina K. Koch, Lamiaceae, Perenn., Xero, Ken., Balcan.-As. Min., Ergasphig., Erg.
Symphoricarpos albus (L.) S. F. Blake, Caprifoliaceae, Shrub, Meso-xero, Ken., N. Am., Ergasphig., Erg.
Symphyotrichum laevis L., Asteraceae, Perenn., Meso, Ken., N. Am., Col., Erg.
Symphyotrichum lanceolatus Willd., Asteraceae, Perenn., Meso, Ken., N. Am., Col., Erg.
Symphyotrichum novae-angliae L., Asteraceae, Perenn., Meso, Ken., N. Am., Ergasphig., Erg.
Symphyotrichum novi-belgii L., Asteraceae, Perenn., Meso, Ken., N. Am., Ergasphig., Erg.
Symphyotrichum ×*salignus* Willd., Asteraceae, Perenn., Meso, Ken., hybrid origin, Ephem., Erg.; invasive.
Symphyotrichum ×*versicolor* Willd., Asteraceae, Perenn., Meso, Ken., hybrid origin, Ephem., Erg.
Symphytum asperum Lepech., Boraginaceae, Perenn., Meso, Ken., Cauc.-E. Med., Ergasphig., Erg.
Symphytum caucasicum M. Bieb., Boraginaceae, Perenn., Meso, Ken., Cauc., Col., Erg.
Symphytum peregrinum Ledeb., Boraginaceae, Perenn., Meso, Ken., Cauc., Ergasphig., Erg.
Syringa vulgaris L., Oleaceae, Shrub, Xero-meso, Ken., S. Eur., Col., Erg.
Tagetes erecta L., Asteraceae, Ann., Meso, Ken., N. Am., Ergasphig., Erg.
Tamarix ramosissima Ledeb., Tamaricaceae, Shrub or tree, Meso-xero, Ken., Middle As., Agr., Erg.
Tamarix smyrnensis Bunge, Tamaricaceae, Shrub, Meso-xero, Ken., As. Min. and Middle, Ergasphig., Erg.
Tamarix tetrandra Pall. ex M. Bieb., Tamaricaceae, Shrub, Meso-xero, Ken. (Cis Black Sea Region), E. Med.-As. Min., Ergasphig., Erg.
Thladiantha dubia Bunge, Cucurbitaceae, Perenn., Meso, Ken., S.-E. As., Col., Erg.
Thlaspi perfoliatum L., Brassicaceae, Ann., Meso, Ken., Med., Ergasphig., Erg.
Thuja occidentalis L., Cupressaceae, Tree, Meso, Ken. N. Am., Ergasphig., Erg.
Toxicodendron radicans (L.) O. Kunze, Anacardiaceae, Liane, Xero-meso, Ken., N. Am., Ergasphig., Erg.
Tradescantia virginiana L., Commelinaceae, Perenn., Hygro-meso, Ken., N. Am., Ergasphig., Erg.
Tragopogon porrifolius L., Asteraceae, Perenn., Xero-meso, Ken., Med., Ergasphig., Erg.
Trifolium hybridum L., Fabaceae, Ann. or bienn., Meso, Ken., unknown, Ergasphig., Erg.
Trifolium incarnatum L., Fabaceae, Ann., Meso, Ken., W. Med., Ergasphig., Erg.
Trifolium resupinatum L., Fabaceae, Ann., Xero-meso, Ken., Med., Ephem., Erg.-kseno.
Trifolium sativum (Schreb.) Crome, Fabaceae, Perenn., Xero-meso, Ken., W.-C. Eur., Ergasphig., Erg.
Trigonella caerulea (L.) Ser., Fabaceae, Ann., Xero-meso, Ken., Med., Ephem., Erg.-kseno.
Trigonella foenum-graecum L., Fabaceae, Ann., Xero-meso, Ken., W. As., Ergasphig., Erg.
Triticum aestivum L., Poaceae, Ann., Xero-meso, Ken., As., Ergasphig., Erg.
Triticum durum Desf., Poaceae, Ann., Xero-meso, Ken., As., Ergasphig., Erg.
Tropaeolum majus L., Tropaeolaceae, Ann., Meso, Ken., S. Am., Ergasphig., Erg.
Tropaeolum minus L., Tropaeolaceae, Ann., Meso, Ken., S. Am., Ergasphig., Erg.
Tulipa sylvestris L., Liliaceae, Perenn., Xero-meso, Ken. (2013), Med., Col., Erg.
Ulex europaeus L., Fabaceae, Shrub, Xero, Ken., C.-W. Eur., Ergasphig., Erg.
Ulmus pumila L., Ulmaceae, Tree, Meso-xero, Ken., As., Epoec., Erg.
Verbesina encelioides (Cav.) Benth. & Hook. f. ex A. Gray, Asteraceae, Ann., Xero, Ken. (1934), N. Am., Epoec., Erg.
Veronica filiformis Smith, Scrophulariaceae, Ann.-bienn., Xero-meso, Ken., Med. (Pyšek *et al.* 2012), Ephem., Erg.-kseno.
Viburnum tinus L., Viburnaceae, Shrub, Xero-meso, Ken., Med., Agr. (Crimea), Erg.
Vicia faba L., Fabaceae, Ann., Meso, Ken., unknown, Ergasphig., Erg.
Vicia sativa L., Fabaceae, Ann., Meso, Ken., Med.-Afr.-As (Pyšek *et al.* 2012), Ephem., Erg.

Vinca major L., Apocynaceae, Perenn., Xero-meso, Ken. (Crimea), Med., Ergasphig., Erg.
Viola nemausensis Jord., Violaceae, Ann., Xero-meso, Ken., unknown, Ergasphig., Erg.
Viola ×wittrockiana Gams ex Hegi, Violaceae, Perenn., Meso, Ken., hybrid origin, Ergasphig., Erg.
Vitex agnus-castus L., Verbenaceae, Shrub, Xero-meso, Ken., Eur.-As., Ergasphig., Erg.
Vitis amurensis Rupr., Vitaceae, Liana, Meso, Ken., Far E., Col., Erg.
Vitis labrusca L., Vitaceae, Liana, Xero-meso, Ken., N. Am, Ergasphig., Erg.
Vitis vinifera L., Vitaceae, Liana, Meso-xero, Ken., unknown (Pyšek *et al.* 2012), Ergasphig., Erg.
Vitis vulpina L., Vitaceae, Liana, Xero-meso, Ken., N. Am., Col., Erg.
Zea mays L., Poaceae, Ann., Xero-meso, Ken., C.-S. Am., Ergasphig., Erg.
Zelkova carpinifolia (Pall.) K. Koch, Ulmaceae, Tree, Meso, Ken. (Crimea 1987), Cauc., Col., Erg.
Zinnia elegans Jacq., Asteraceae, Ann., Meso, Ken., N. Am., Ergasphig., Erg.
Zizania aquatica L., Poaceae, Ann., Hydro, Ken., N. Am., Col., Erg.
Zizania latifolia (Griseb.) Stapf, Poaceae, Perenn., Hydro, Ken., E. As., Agr., Erg.

Explanations: **life forms,** Ann. – annual, Bien. – biennial, Ann.-bienn. – annual or biennial, Perenn. – perennial; **hydromorphe,** Hydro – hydrophytes, Hygro – hygrophytes, Hygro-meso – hygro-mesophytes, Meso – mesophytes, Meso-hygro – meso-hygrophyte, Meso-xero – meso-xerophytes, Xero – xerophytes, Xero-meso – xero-mesophytes; **chronological elements,** Arch. – archaeophytes, Ken. – kenophytes; **degree of naturalization,** Agr. – agriophytes, Agr.-epoec. – agrio-epoecophytes, Col. – colonophytes, Ephem. – ephemerophytes, Epoec. – epoecophytes, Ergasphig. – ergasiophygophytes; **origin,** Afr. – African, Am. – American, As. – Asia, As. Min. – Asia Minor, As. Min.-Middle As. – Asia Minor-Middle Asia, Balc. – Balcan, Balk.-C. As. – Balcan-Central Asian, C. Am. – Central American, C. As. – Central Asian, C. Eur. – Central European, Cauc. – Caucasic, Cauc.-As. Min. – Caucasic-Asia Minor, Cauc.-As. Min.-Med. – Caucasic-Asia Minor –Mediterraneum, Cauc.-E. Med. – Caucasic-Eastern Mediterraneum, Cauc.-Eur. – Caucasic-European, E. As. – Eastern Asia, Eur. – European, Eur.-As. – European-Asian, Eur.-Cauc. – European-Caucasic, E. Med. – Eastern Mediterraneum, E. Med.-As. Min. – Eastern Mediterraneum-Asia Minor, Far E. – Far East, Iran-Tur. – Iran-Turanian, Med. – Mediterraneum, Med.-Afr.-As. – Mediterraneum-African-Asian, Med.-As. – Mediterraneum-Asian, Med.-Iran.-Tur. – Mediterraneum-Iran-Turanian, Med.-Middle As. – Mediterraneuum-Middle Asian, Middle As. – Middle Asia, Middle As. – Middle Asian, Middle Eur. – Middle European, Middle Eur.-Balk. – Middle European-Balkan, N. Afr. – Northern African, N.-W. Afr. – Northen-Western African, N. Am. – North American, N. Pann. – Northern Pannonian, S. Cis Black Sea – South Cis Black Sea, S. Am. – South American, S. As. – South Asia, S.-E. As. – South-Eastern Asia, S.-E. Transcauc. – South-Eastern Trasncaucasican, S.-Eur. – South European, Sib. – Siberian, sub.-Alp. – subalpic, Trop. Am. – Tropical American, Tur. – Turanian, W. As. – West Asia, W. As. Min. – Western Asia Minor, W.-C. Eur. – West-Central Euroupean, W. Med. – West Mediterraneum, W. Eur. – West European; **way of distribution,** Erg. – ergasiophytes, Erg.-kseno. – ergasio-ksenophytes