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Habitat preferences and phytocoenotic range of *Reynoutria japonica* Houtt. in Ukraine

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Abstract: Based on vegetation plots extracted from phytosociological databases and literature sources, the current distribution of *Reynoutria japonica* in Ukraine was assessed in terms of habitat preferences and phytocoenotic affiliation. It has been found that *R. japonica* in Ukraine is spread across four habitat types: anthropogenic areas, floodplain forests, shrublands, and gravel bars. The most frequent occurrences of the studied species were found in anthropogenic habitats covered by mesophilous nitrophilous tall herbs. Within the floodplain habitats, *R. japonica* was most frequently found in temperate riparian willow-poplar forests and temperate riparian hardwood forests. *R. japonica* is much less frequently related to shrub habitats and gravel bars. It occurs with different covers, reaching its maximum values on anthropogenic sites. The analysis of the phytocoenotic range of species showed that it is a component of the vegetation belonging to the classes *Epilobietea angustifolii*, *Salicetea purpurea*, *Alno glutinosae-Populetea albae*, and *Thlaspietea rotundifolii*. The analysis of habitat types and plant communities with the participation of *R. japonica* in Ukraine showed that the species occurs in ecological environments closely related to those that are characteristic of the species in its native range – mesophylous soils, rich in nutrients, which is a favorable factor in the process of species accelerated adaptation to new territories.

Keywords: invasion, floodplain forest, man-made habitats, expert system, syntaxonomy, Ukraine.

Introduction

Biological invasions have been recognized worldwide as a global threat (Pyšek et al. 1995; Davis 2003). They not only cause biodiversity loss at different geographical scales but also lead to structural perturbations of entire ecosystems in terms of their functioning and delivering of basic ecosystem services (Hegedüšová-Vantarová et al. 2023). This problem has become especially evident with the intensification of global processes, in particular climate changes, which significantly extend the possible migration trajectories for alien species and shorten the period of their adaptation in a new ecological space. In this respect, the greatest risks are associated with invasive species, which significantly affect the ecosystems by reducing their biodiversity, preventing the reproduction of native species, and creating conditions in which some aborigine plant species are suppressed, while others are threatened with complete extinction (Protopopova et al. 2010). The study of such species is important because it is necessary to control their distribution, assess the damage they are causing to the ecosystem, etc. It is therefore obvious that invasive plants are at the centre of the scientific interests of botanists and ecologists.

There are also very important studies of those alien species that have not yet acquired the status of invasive species at the national level but are actively spreading in certain regions or habitat types, causing a loss of biodiversity at the local level and are potentially dangerous in terms of their rapid territorial expansion. Such species not only invade different habitat types and rapidly adapt to local ecological environments but also demonstrate the ability to create phytocoenotic relationships with native species and form their phytocoenotic environment. In this way, they cross the last barrier to a successful and complete introduction with further naturalization in new regions. The greatest threat they pose is the irreparable ecological damage they can cause, which can be prevented by monitoring and controlling the spreading of such species.

In Ukraine, there is sufficient attention paid to potentially invasive alien plants. Information about these species is available in scientific journals, conference materials (Burda et al. 2023), and on digital platforms such as GBIF (https://www.gbif.org) and UkrBIN (UkrBIN 2017), where observations of numerous plant species are recorded.

Reynoutria japonica (Japanese knotweed) is a potentially invasive alien plant species. It is spreading actively across the new territories of Ukraine and shows a tendency to expand the range of preferable abiotic conditions. *R. japonica* is a perennial herbaceous plant from the Polygonaceae family. It has a big rhizome with numerous branches. Stems are erect, tubular, 1–2 (up to 3) m tall, branched at the top, often with reddish spots at the bottom. The leaves are petiolate, egg-shaped or oval, dark green on the top, and much lighter on the reverse side. Inflorescences axillary, collected in a panicle, 2–4 flowers in the axils. The phenological optimum of plant is May-September. *R. japonica* prefers moist, slightly acidic, or neutral, non-saline soils, rich in nutrient elements. Species is native to Japan, including the Kuril

Islands, China, Taiwan, and Vietnam. Within the natural range, the preferable habitats of this plant are the river banks (Ohno 1979), wet or swamp forests (Makita et al. 1979) and forest fridges (Bailey 2003). *R. japonica* can occasionally also grow along roads.

R. japonica was introduced to Europe from China in the 17th century. Since that time, it has spread to many countries, including Europe and beyond (North America, Australia, and New Zealand), where it now has the status of an invasive species (The Global Invasive… 2023). The time of introduction of *R. japonica* in Ukraine remains unknown. According to Protopopova et al. (2015) the species most likely was introduced to Ukraine from neighboring Romania. Until now, most of the data on *R. japonica* in Ukrainian botanical, in particular, phytosociological, literature related to its distribution across anthropogenically disturbed areas (Soroka 2008; Tokaryuk et al. 2012, 2018; Dubyna et al. 2019) in the ruderal vegetation. During the studies of the floodplain forests of Ukraine, we recorded numerous localities and noted the active distribution of *R. japonica* in this vegetation type as well. These observations induced us to reveal habitat preferences and the phytocoenotic range of *R. japonica* in Ukraine. The aims of this study to show (i) which habitat types are invaded by *R. japonica* and (ii) what is the phytocoenotic range of *R. japonica* in Ukraine?

Material and Methods

Our research is based on the vegetation plots (relevés), both unpublished and published, where *R. japonica* was observed (Tab. 1). The relevés were sampled in 2014–2020 across the territory of Ukraine using the Braun-Blanquet approach (Braun-Blanquet 1964) on areas ranging from 100–200 m^2. All plots are stored in the "Database of Floodplain Forests of Ukraine" (Borsukevych 2023b), created with Turboveg 2.92 software (Hennekens & Schaminée 2001). For the analysis, we also used data from the "Ukrainian Wetland Database" (Iemelianova 2018), publications by Soroka (2008), Tokaryuk et al. (2018), and unpublished relevés kindly provided by D. Dubyna.

Data is processed in two steps. First, using the "Build query" function in the Turboveg environment, we selected all plots with the occurrence of *R. japonica* from the databases. A total of 55 relevés, sampled on the territories of Zakarpattya, Ivano-Frankivsk, Lviv and Khmel'nyts'kyi regions, were selected. We also used 18 phytosociological relevés published in literature sources. They contained localities of plant communities with *R. japonica* occurrences from the territories of Lviv and Chernivtsi regions. Four vegetation plots of D. Dubyna were sampled on the territory of Kyiv. In total, our final dataset consisted of 77 relevés of plant communities with different percentage cover of *R. japonica*, the geographical distribution of which is shown in Fig. 1.

To identify the habitat affiliation of *R. japonica* we analyzed the final dataset by the EUNIS-ESy expert system (Chytrý et al. 2020). We performed this analysis in the

Tab. 1 Sources and number of vegetation plots used in this study.

Authors of vegetation plots	Number of vegetation plots	Sources of vegetation plots
L. Borsukevych	55	Database of floodplain forests of Ukraine (author of relevés/manager L. Borsukevych)
A. Tokaryuk	3	Tokaryuk et al. (2018)
A. Tokaryuk, K. Korzhan	4	Tokaryuk et al. (2018)
M. Soroka	10	Soroka (2008)
D. Dubyna	4	unpublished data
S. Yusyp, D. Iakushenko	1	Ukrainian Wetland Database (manager S. Iemelianova)

JUICE 7.1 software (Tichý 2002). The nomenclature of vascular plant species was unified according to Euro+MedBase (Euro+Med 2023). The names of syntaxons of the highest hierarchical level (classes, orders, and alliances) correspond to those given by Mucina et al. (2016). The names of vegetation associations are given according to the "Prodrome of Vegetation of Ukraine" (Dubyna et al. 2019).

Results

According to the results of our data processing with the EUNIS-ESy expert system, most of the vegetation plots were assigned to a specific habitat type of the third hierarchical level (Fig. 2). In some cases, relevés were classified only at the highest level and were identified, for example, as forest (type T) or shrub (Sa) habitats. 26 vegetation plots were identified as forests and other wooded lands (Tab. 2). Most of the classified relevés within this group were assigned to the riparian willow and poplar forests (T11) (Fig. 3), and hardwood riparian forest (T13) dominated by alder carr (*Alnus glutinosa*) and European ash (*Fraxinus excelsior*). Three plots were classified within alder forests in river floodplains on mineral soils (T12) (Fig. 4).

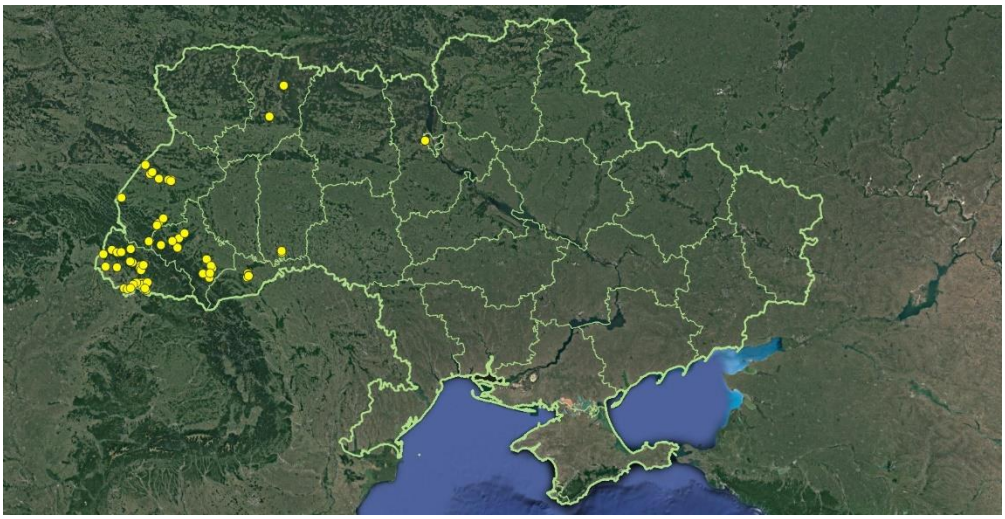

Fig. 1 Distribution map of the analyzed vegetation plots with the *R. japonica* occurrences in Ukraine.

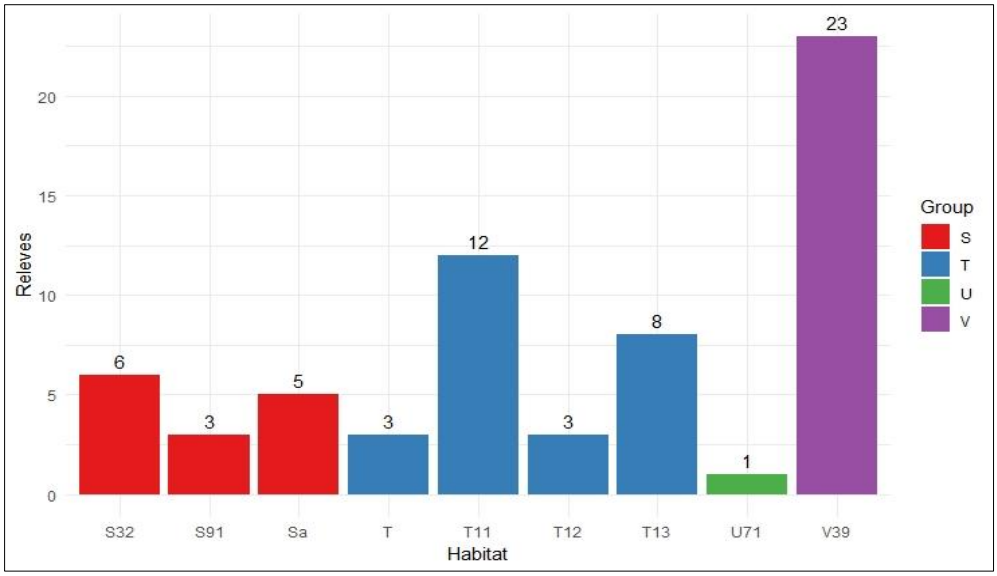

Fig. 2 Number of plots with *R. japonica* within different habitat types. On the horizontal (x, abscissa) axis indicated habitat types; on the vertical (y, ordinate) axis, number of vegetation plots. Abbreviation for habitat types: Sa – Scrubs, S32 – Temperate *Rubus* scrubs, S91 – Temperate riparian scrubs, T – Forests and other wooded land, T11 – Temperate *Salix* and *Populus* riparian forests, T12 – *Alnus glutinosa-Alnus incana* forests on riparian and mineral soils, T13 – Temperate hardwood riparian forest, U71 – Unvegetated or sparsely vegetated gravel bar in montane and alpine regions, V39– Mesic perennial anthropogenic herbaceous vegetation.

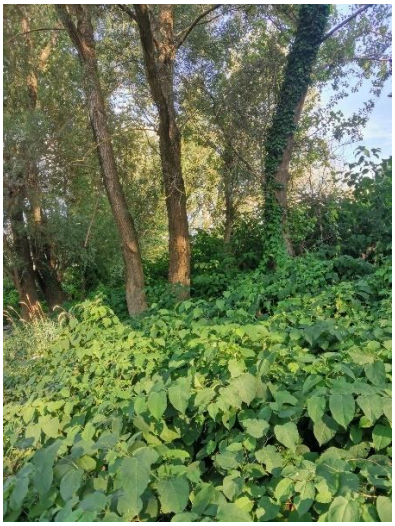

Fig. 3 Stands of the temperate *Salix* and *Populus* riparian forests with *R. japonica* (Zakarpattya region, Mukachevo district, Kinlod' village, foto by L. Borsukevych).

Fig. 4 Stands of the *Alnus glutinosa-Alnus incana* forests with *R. japonica* (Zakarpattya region, Irshava district, between villages Dovge and Bronka, the right bank of the river Borzhava, foto by L. Borsukevych).

Another three plots could be identified only up to the highest hierarchical level. This is a community where the tree layer consists of *Acer campestre*, *A. negundo*, *Carpinus betulus*, *Salix* ×*rubens*, *Tilia cordata*, *Ulmus glabra*, and the herb layer is dominated by typical mesophylous nemoral species (*Glechoma hederacea*, *Ficaria verna*, *Lamium maculatum*, *Pulmonaria obscura*, *Stachys sylvatica*). Another large group of relevés according to our results were related to anthropogenic habitats, in particular to the type V39 that is characterized by the predominance of nitrophilous grasses (Tab. 3, Fig. 5) and frequent participation of *Elytrigia repens*, *Glechoma hederacea*, *Lolium perenne*, *Solidago canadensis*, *Urtica dioica*.

R. japonica was significantly less associated with shrub habitats. Most often, it was recorded within habitats dominated by *Rubus caesius* (type S32) (Tab. 4, Fig. 6), where the participation of mesophylous forest species such as *Aegopodium podagraria*, *Alliaria petiolata*, *Brachypodium sylvaticum*, *Chaerophyllum aromaticum*, *Eupatorium cannabinum*, *Filipendula ulmaria*, *Stachys sylvatica*, *Urtica dioica* is noticeable in herb layer. Among the shrubs, *Salix purpurea* and *S*. × *rubens* are the most abundant. Another three localities of *R. japonica* were classified as riparian shrubs (S91) (Fig. 7) with *Salix triandra*. The expert system assigned one relevé from our dataset to the type U71, which includes unvegetated or sparsely vegetated gravel bars in the montane and alpine regions of Europe. 13 vegetation plots could not be identified by the expert system at any hierarchical level (Tab. 5).

Fig. 5 Stands of the mesic perennial anthropogenic herbaceous vegetation with *R. japonica* (Zakarpattya region, Mukachevo district, Kolchyno village, Latorytsia river, foto by L. Borsukevych).

Fig. 6 Stands of the temperate *Rubus* scrubs with *R. japonica* (Zakarpattya region, Irshava district, Dovge village, National Park "Zacharovanyj Kraj", foto by L. Borsukevych).

Fig. 7 Stands of the temperate *Salix triandra* scrubs with *R. japonica* (Ivano-Frankivsk region, Kalush district, Dobrovliany village, foto by L. Borsukevych).

The percentage cover of *R. japonica* varies significantly across different habitat types (Fig. 8). This species may occur as a single individual or be a dominant component of the herb layer. The highest cover values of *R. japonica* are found within anthropogenic habitats. With high coverage, *R. japonica* was also found in willow-poplar floodplain forests and shrub thickets formed by *Rubus caesius*.

A critical overview of the phytosociological literature (Dubyna et al. 2019) suggests that in Ukraine, *R. japonica* is a diagnostic component of the vegetation class *Epilobietea angustifolii*, particularly the *Polygonetum cuspidati* association. This species is also mentioned within the *Thlaspietea rotundifolii* class. Our analysis of vegetation plots sampled during field studies shows that *R. japonica* is a frequent component of the *Salicetea purpurea* class vegetation. In general, syntaxonomical synopsis of the vegetation with the occurrence of *R. japonica* in Ukraine is follow:

Epilobietea angustifolii Tx. et Preising ex von Rochow 1951. *Galio-Alliarietalia* Oberd. in Görs et T. Müller 1969, *Geo urbani-Alliarion officinalis* Lohmeyer et Oberd. in Görs et T. Müller 1969: *Polygonetum cuspidati* Görs et T. Müller in Görs 1975.

Robinietea Jurko ex Hadač et Sofron 1980. *Chelidonio-Robinietalia pseudoacaciae* Jurko ex Hadač et Sofron 1980, *Chelidonio majoris-Robinion pseudoacaciae* Hadač et Sofron ex Vítková in Chytrý 2013: *Chelidonio-Robinietum* Jurko 1963.

Thlaspietea rotundifolii Br.-Bl. 1948. *Epilobietalia fleischeri* Moor 1958, *Salicion incanae* Aichinger 1933: *Tussilago-Calamagrostietum pseudophragmites* Pawłowski et Walas 1949 corr. Malinovskiy et Krichfalushiy 2000.

Salicetea purpureae Moor 1958. *Salicetalia purpureae* Moor 1958, *Salicion eleagno-daphnoidis* (Moor 1958) Grass 1993: *Salicion albae* Soó 1951; *Salicion triandrae* T. Müller et Görs 1958.

Alno Glutinosae-Populetea albae P. Fukarek et Fabijanić 1968. *Alno-Fraxinetalia excelsioris* Passarge 1968: *Alnion incanae* Pawłowski et al. 1928.

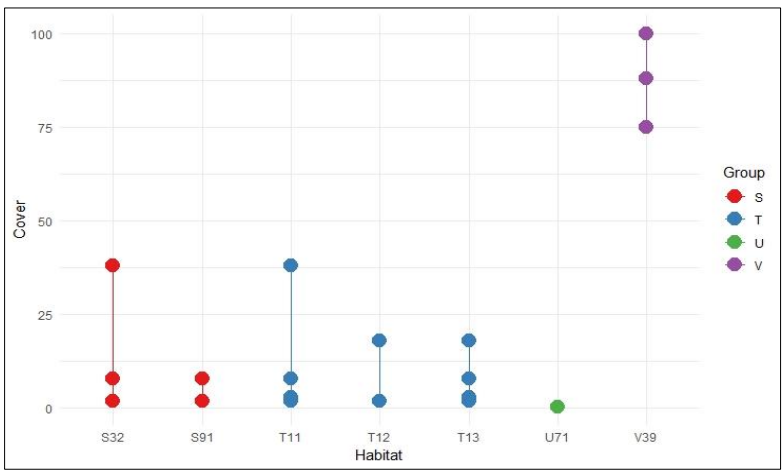

Fig. 8 The ranges of percentage cover of *R. japonica* in different habitat types. On the horizontal (x, abscissa) axis indicated habitat types; on the vertical (y, ordinate) axis, percentage cover of *R. japonica* across each habitat type. Abbreviations for habitat type are in Fig. 2.

Discussion

The habitat and phytocoenotic range of *R. japonica* in Ukraine were examined. Our data were scattered mainly between two groups and demonstrated a close association of this species with floodplain forests and anthropogenic habitats dominated by perennial ruderal herbs. Due to a complex of abiotic factors, such as mesic to slightly wet, nutrient-rich soils, these habitats are extremely favourable for the successful introduction and spreading of alien species, including invasive ones. The analyzed plots contain many neophytes (e.g. *Acer negundo*, *Ambrosia artemisiifolia*, *Erigeron canadensis*, *E. annuus*, *Impatiens parviflora*, *Solidago canadensis*, *Xanthium strumarium*), which are already invasive in the territory of Ukraine or may achieve this status due to their rapid invasion and expansion in different habitat types.

Considering the habitat affiliation of *R. japonica* in its native range, the occurrence of this species in Ukraine across floodplain forests and anthropogenic habitats was quite expected due to the similarity of ecological conditions. Studies on the impact of *R. japonica* in other countries confirm the same pattern (Mandák et al. 2004; Gerber et al. 2008; Vaseková et al. 2022). In Ukraine, *R. japonica* is found within anthropogenic areas, particularly along transport routes, watercourses, and forest edges. Our study confirms reports by other scientists (Bímová et al. 2004; Gašparovičová et al. 2022) of a close association between *R. japonica* and human disturbance along railway or road infrastructure. However, due to the species' high growth rate (Aguilera et al. 2010; Maurel et al. 2010), ability to produce large amounts of biomass (Aguilera et al. 2010; Stefanowicz et al. 2020), and high regenerative capacity (Bímová et al. 2003; Dauer & Jongejans 2013), it is highly possible that this species will colonize other types of disturbed areas in the next feature.

The expansion of *R. japonica* across riparian habitats is also significant. This trend is similar to other regions where *R. japonica* is widespread (Mandák et al. 2004; Vaseková et al. 2022). Furthermore, Jovanovíc et al. (2018) predicted that in riparian habitats *R. japonica* could expand its range by up to 30–40%. However, not all riparian habitats were equally affected by *R. japonica*. Temperate riparian scrubs were the least affected of all the riparian habitats we analyzed. This habitat is characterized by the dominance of *Salix triandra*, *S. viminalis* and some other willows. According to Dommanget et al. (2019), there are fast-growing willows and other woody species with a high restoration potential that can alter the phytocoenotic behavior of *R. japonica* under competitive pressure. Thus, *R. japonica*'s productivity is significantly reduced, producing fewer ramets, smaller shoots, and less biomass, both above and underground.

It is noteworthy to find a record of *R. japonica* in habitat type U71, which comprises gravel bars of mountain rivers and streams with sparse vegetation or without formed vegetation cover. On the one hand, free ecological space and available ecological resources in conditions of weak phytocoenotic competition are quite favourable factors that facilitate the introduction of alien species into a new geographical and

coenotic environment. At the same time, this type of habitat is quite dynamic due to periodic flooding and significant fluctuations in the speed and intensity of water flow (Kalníková et al. 2021) and is also characterized by substrates poor in organic matter and nutrients. Even though riparian zones along rivers may serve as corridors for the dispersal of alien species (Pyšek & Prach 1993; Gašparovičová et al. 2022) mountain watercourses are more likely to be transit zones for the spread of *R. japonica* to other areas with more favourable conditions for its survival and reproduction. The presence of *R. japonica* in such a specific environment may also be an indication of the species' broad adaptive range. Considering its high reproductive ability and successful adaptation, it is likely that Japanese knotweed could potentially colonize the banks of the mountain rivers with a more or less formed substrate, as well as other alpine habitats. The mountain and subalpine tall grass and fern edges (EUNIS type R56) are most likely to be at risk.

We failed to identify some parts of our dataset with the EUNIS-ESy expert system. After a thorough analysis of these plots, we found that they represented stands composed mainly of *Salix ×rubens*, *S. purpurea* and *Alnus incana*. The herb layer of these stands had a relatively heterogeneous species composition, with both typical forest species and ruderal elements occurring with high constancy. This was probably the main reason for the expert system's output.

Determining the phytocoenotic relationship of *R. japonica* in Ukraine is a challenge at this stage. Based on literature analysis, we conclude that *R. japonica* is a diagnostic species of the ruderal vegetation, in particular of the class *Epilobietea angustifolii*, which includes tall herbaceous semi-natural perennial vegetation on disturbed forest edges, nutrient-rich riparian fringes and in forest clearings in temperate and boreal Eurasia (Mucina et al. 2016). The “Prodrome of Vegetation of Ukraine” (Dubyna et al. 2019) suggests that Japanese knotweed stands belong to the vegetation association *Polygonetum cuspidati*, which occupies disturbed, nitrified, shady, or semi-shady areas on forest edges, near watercourses or along roadsides. Dubyna et al. (2019) based their classification on the data of Soroka (2008) from the Ukrainian Roztochya. It has been noted by authors that the synchorology of this community is related to the western regions of the forest and forest-steppe zones of Ukraine. This is supported by the results of other studies. For instance, Tokaryuk et al. (2018) described the *Polygonetum cuspidati* association in Bukovyna, while Dziuba et al. (2018) reported it in the Berehovo (Zakarpattya region). *R. japonica* was also reported with very low cover values in stands of *Chelidonio-Robinietum* association belonging to the *Robinietea* class (Tokaryuk et al. 2018), which combines artificial tree and shrub plantations. The latest syntaxonomical review of the ruderal vegetation of Ukraine, conducted by Dubyna et al. (2021) confirms the syntaxonomic interpretation of the vegetation with the participation of *R. japonica*, based on the most representative phytosociological database of anthropogenic vegetation. A single occurrence of *R. japonica* was registered within the association *Tussilago-Calamagrostietum pseudophragmites* of the class *Thlaspietea rotundifolii*

(Derzypilskyi et al. 2011), which represents the vegetation of scree and gravelly substrates on riverbanks in the Alps and Carpathians.

The insufficiently representative dataset does not allow us to correctly identify the relevés of the floodplain forests at the association level. At the pan-European scale, there is no well-validated tool such as the EUNIS-ESy expert system (Chytrý et al. 2020) for habitat classification, which we applied to assess the habitat range of *R. japonica*. An expert system proposed by Douda et al. (2016) for the classification of floodplain forests in Europe does not include the full range of vegetation correlated with the occurrence of *R. japonica* in our study. Thus, this expert system does not include formal definitions for the syntaxonomic identification of the vegetation formed by trees and shrubs of the genus *Salix*. The syntaxonomic system of the floodplain forest vegetation of Ukraine, based on the phytosociological database with representative phytocoenotic and geographical coverage of the entire territory of Ukraine, is still in the stage of elaboration. Many issues still need to be solved at the level of alliances or even classes, taking into account the complexity of this vegetation type (Borsukevych 2023a). From a syntaxonomic point of view, the communities from our database with the participation of *R. japonica* should be considered as communities that belong to the alliances *Salicion albae*, *Salicion triandrae*, and probably *Salicion eleagno-daphnoidis* of the class *Salicetea purpureae*, as well as to the alliance *Alnion incanae*, which belong to the class *Alno glutinosae-Populetea albae*. However, further research is required for the final verification of these assumptions, both from the point of view of collecting new field data and solving syntaxonomic problems.

The analysis of habitats and plant communities with *R. japonica* showed that in Ukraine this species occurs in its typical ecological conditions – mesophytic soils, rich in nutrients, which support the species introduction and successful adaptation to the new areas. It also significantly accelerates the processes of *R. japonica* naturalization. At the same time, two important points deserve special attention. The first one is the ability of *R. japonica* to invade specific environments. The documentation of the species in the alpine habitat most likely indicates a possible broad range of its adaptation strategy, involving additional mechanisms of reproduction and the exploitation of ecological resources. The introduction and distribution of *R. japonica* in the floodplain forests confirms its high invasive potential in terms of a) the formation of stable populations capable of constant reproduction; b) high competitiveness, which is reflected in the ability to be a stable component in such structured systems as floodplain forests; c) crossing the phytocoenotic barriers within new ecological environment. Therefore, in studying the processes of invasion, special attention should be paid to the floodplain forests, which, due to their complexity in ecological conditions and landscape configuration, are one of the main "hubs" of migration and adaptation of the alien species (Wagner et al. 2017; Anđelković & Radulović 2022). The second thing is that the wide ecological spectrum of *R. japonica* occurrences in Ukraine indicates the urgency of monitoring the spreading of the species and the dynamics of its reproduction in the new territories.

The involvement of professional scientific assessments, forecasts, and models are necessary to prevent possible ecological losses caused by this species in the future. The involvement of citizen science resources and social media groups is also appropriate to solve this problem (Marcenò et al. 2021; Kuzemko 2023).

Conclusions

Reynoutria japonica is one of the alien plant species with a tendency to invade different habitats in several regions of Ukraine. Our study has shown that so far, the range of habitats frequently affected by this species is mostly restricted to anthropogenic habitats, floodplain forests, and shrubs. At the same time, *R. japonica* has been recorded in relatively specific alpine habitats, which may indicate its broad adaptive abilities. From a syntaxonomic point of view, *R. japonica* is a component of several vegetation types. It is a diagnostic and dominant species of the phytosociological association *Polygonetum cuspidati* from the class *Epilobietea angustifolii* and is an accompanied species of the associations *Chelidonio-Robinietum* (class *Robinietea*) and *Tussilago-Calamagrostietum pseudophragmites* (class *Thlaspietea rotundifolii*). With different values of percentage frequency and coverage, this species was found across vegetation of the classes *Salicetea purpurea* and *Alno glutinosae-Populetea albae*. Considering the broad habitat and phytosociological spectrum of *R. japonica* in Ukraine, monitoring measurements are necessary to control the spreading of the species and to follow the dynamics of its invasion of new areas and habitat types.

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Tab. 2 Phytosociological relevés of forest habitat types with *R. japonica* occurrences.

Plot number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26
Relevé area (m^2)	200	200	200	200	200	200	200	100	200	200	200	200	200	200	200	200	200	100	200	200	200	200	200	200	200	200
Altitude (m)	114	121	147	118	184	127	183	155	355	163	434	160	118	131	138	259	582	290	208	190	172	213	124	180	176	224
Cover total (%)	90	90	100	100	100	100	100	100	100	90	100	100	90	90	100	100	100	100	90	90	90	100	80	100	95	100
Cover tree layer (%)	70	60	95	75	70	70	70	-	40	65	60	70	70	65	60	95	85	-	70	70	80	90	70	80	70	95
Cover shrub layer (%)	1	2	40	95	60	60	30	90	70	40	80	30	20	70	30	2	30	85	40	30	2	30	60	70	30	3
Cover herb layer (%)	70	80	100	40	90	95	100	90	100	80	90	60	90	60	100	100	98	100	90	70	70	95	70	95	90	98
Cover moss layer (%)	2	-	30	5	-	3	-	15	-	10	20	-	-	5	-	40	40	-	5	20	5	5	5	20	-	30
Cover litter layer (%)	20	'	90	10	90	100	100	5	80	20	60	100	60	20	20	100	40	10	30	30	30	100	10	80	100	90
Mosses identified (Yes/No)	Y	N	Y	Y	N	Y	N	Y	N	Y	Y	N	N	Y	N	Y	Y	N	Y	Y	Y	Y	Y	Y	N	Y
EUNIS Code	T	T	T	T11	T11	T11	T11	T11	T11	T11	T11	T11	T11	T11	T11	T12	T12	T12	T13	T13	T13	T13	T13	T13	T13	T13
Reynoutria japonica	**r**	**2**	**+**	**2**	**+**	**1**	**1**	**2**	**1**	**+**	**2**	**+**	**2**	**+**	**1**	**3**	**3**	**+**	**1**	**1**	**1**	**2**	**+**	**+**	**+**	**+**
Populus nigra	.	.	.	.	5	4	4	3	1	.	.	.	2	+	4	4	+	.	.	.	.	.	.	.	.	.
Salix purpurea	.	.	3	2	.	1	.	2	2	2	.	.	r	.	.	3	2	.	2	.	.	.	.	.	.	.
Acer negundo	r	r	.	.	1	4	2	1	+	.	3	.	2	.	1	.	.	.	.	.	.	.	.	3	.	2
Rubus caesius	1	+	5	3	1	4	.	5	3	4	2	.	3	3	4	3	4	.	5	2	2	3	4	1	3	2
Salix ×rubens	4	4	.	3	.	.	.	4	.	.	.	.	.	.	.	.	2	.	+	.	.	.	1	.	.	1
Salix viminalis	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Salix alba	.	.	.	.	3	1	+	.	4	.	4	.	4	4	.	.	.	.	.	.	.	.	.	.	.	.
Populus alba	.	.	.	.	1	.	2	.	.	.	.	.	.	.	2	.	.	.	r	.	.	.	.	.	.	.
Solidago gigantea	.	2	.	.	1	2	+	1	+	+	1	.	2	.	1	3	.	.	.	.	.	.	.	+	+	.
Urtica dioica	+	2	.	4	.	.	1	.	.	+	.	+	.	2	1	.	+	+	.	1	.	+	+	.	.	1
Glechoma hederacea	.	.	.	.	1	1	.	.	.	+	2	.	.	.	1	3	.	.	.	.	1	2	.	2	.	1
Humulus lupulus	1	+	1	.	+	1	.	+	.	1	.	+	1	2	+	+	.	.	+	.	.	.	.	.	+	+
Calystegia sepium	1	1	+	1	+	.	.	.	+	1	+	.	.	1	+	.	.	.	.	r	.	.	+	.	.	.
Alnus glutinosa	.	.	.	1	.	.	.	.	.	.	+	.	+	.	.	.	+	.	.	3	4	4	5	.	5	.
Alnus incana	.	.	2	.	.	.	.	+	.	.	.	2	.	.	.	.	4	5	4	.	.	+	.	.	+	.
Aegopodium podagraria	+	.	+	3	3	4	5	.	+	4	4	5	.	.	.	+	3	5	1	1	2	2	4	4	5	2
Schedonorus giganteus	.	.	.	.	.	+	+	.	.	.	1	.	.	+	+	.	+	1	+	+	+	1	+	+	.	.
Circaea lutetiana	.	.	.	.	.	.	+	.	.	.	2	.	.	+	.	.	.	.	.	.	.	1	1	+	+	.
Prunus padus subsp. *padus*	.	.	.	.	.	.	.	+	.	+	.	4	.	.	.	.	.	.	.	.	.	.	.	.	1	.
Chrysosplenium alternifolium	.	.	.	2	.	.	.	.	.	.	.	2	.	.	.	.	.	1	.	.	.	+	.	.	1	.

Tab. 2 - cont.

Stellaria nemorum	.	.	.	1	.	.	+	.	.	.	2	+	.	.	.	.	1	+	.	+	1	1	+	.	.	.
Lamium galeobdolon	.	.	.	.	.	.	.	.	.	2	.	1	.	.	.	.	4	1	.	.	.	2	4	.	.	.
Impatiens noli-tangere	.	+	.	+	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	+	.	.	1	.	.	.
Stachys sylvatica	.	.	+	.	.	.	.	.	.	.	.	1	.	.	.	.	.	2	+	.	.	.	.	.	.	1
Fraxinus excelsior	.	.	.	.	.	.	.	.	.	r	.	+	.	+	.	.	+	1	.	+	2	2	.	.	.	4
Ulmus glabra	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	r	.	.	.	.
Ulmus laevis	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	r	.	.
Other species																										
Cornus sanguinea	.	.	+	+	5	+	4	1	.	+	+	.	+	.	4	2	1	.	1	+	2	1	2	1	+	1
Brachypodium sylvaticum	.	.	.	1	r	2	.	.	.	1	.	+	.	+	.	+	2	1	1	2	3	2	1	.	+	2
Galium aparine	.	.	1	2	.	1	2	1	.	+	.	+	+	+	.	+	2	1	+	+	.	+	2	.	2	3
Echinocystis lobata	.	.	.	1	+	+	.	+	+	+	+	.	+	+	+	1	+	.	+	1	.	+	+	.	+	.
Impatiens parviflora	.	1	.	+	.	+	1	.	.	1	.	.	.	1	.	.	+	+	+	1	2	2	+	.	.	.
Erigeron annuus	.	+	+	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	1	+	+	+	.	.	.	.
Geum urbanum	.	.	.	.	.	+	+	.	.	1	.	.	.	.	+	.	+	+	.	+	1	+	.	.	1	1
Eupatorium cannabinum	.	r	+	+	.	1	.	.	+	+	+	.	.	+	+	+	+	.	+	1	+	+	+	.	.	.
Dactylis glomerata	.	+	+	.	+	+	.	.	.	+	.	r	.	.	.	.	+	1	+	+	.	.	+	.	.	+
Elymus caninus	+	.	1	.	.	.	+	.	.	+	.	+	.	+	.	.	+	+	+	.	+	.	.	.	.	.
Lamium maculatum	.	.	+	1	.	.	2	.	.	+	.	+	.	+	.	.	1	1	.	r	.	.	.	.	+	4
Chaerophyllum aromaticum	.	.	.	2	.	.	.	.	.	2	+	+	.	.	.	.	1	1	.	+	+	1	1	.	.	1
Sambucus nigra	.	.	.	+	.	+	2	.	.	.	2	.	.	2	+	.	.	+	.	.	2	r	+	2	4	+
Lysimachia nummularia	.	.	.	2	2	.	+	.	+	1	.	1	.	.	1	1	2	2	+	.	.	.	.	.	.	.
Lycopus europaeus	.	+	+	+	+	.	.	.	+	.	+	.	.	+	+	+	.	r	+	+	.	+	+	.	.	.
Ranunculus repens	+	+	.	+	.	.	.	.	.	.	+	.	.	+	.	.	+	.	+	1	.	+	.	+	.	.
Salix triandra	+	.	1	4	.	.	.	.	+	r	.	+	+	.	.	.	.	.	.	2	.	.	+	.	.	.
Bidens frondosa	+	+	.	.	.	.	.	+	2	.	+	.	.	.	.	+	.	.	+	1	+	.	.	+	.	.
Poa trivialis	2	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	+	2	.	.	.	+	.	.
Onoclea struthiopteris	.	.	.	.	.	.	.	.	+	1	+	2	.	.	.	.	r	2	.	.	2	2	.	.	+	.
Equisetum arvense	.	.	+	.	+	.	.	+	+	+	+	+	.	.	.	.	.	+	.	r	.	.	.	.	.	.
Myosoton aquaticum	1	+	+	+	.	.	.	+	.	.	+	.	.	.	.	.	.	.	+	2	.	.	+	.	+	.
Corylus avellana	.	.	.	r	.	.	+	.	.	3	.	2	.	.	.	.	.	+	.	.	2	2	2	.	+	.
Anthriscus sylvestris	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	+	+
Tussilago farfara	+	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	2	.	1	.	.	.	.
Phalaroides arundinacea	1	1	.	.	.	+	.	+	2	.	1	.	.	2	.	+	.	.	.	.	.	.	.	+	.	.
Alliaria petiolata	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	+	.	.	2
Carex sylvatica	.	.	.	1	.	.	.	.	.	.	.	1	.	.	.	.	+	1	.	.	.	+	+	2	.	.
Euonymus europeaus	.	.	.	+	.	.	.	.	.	1	.	2	.	.	.	.	.	.	.	.	+	.	1	.	2	2
Helianthus tuberosus	.	+	.	2	.	.	.	2	2	.	.	.	.	+	1	2	.	.	.	.	.	.	+	.	.	.
Aethusa cynapium	+	+	.	.	.	.	+	.	.	r	+	.	.	+	.	.	+	.	r	+	.	.	.	.	.	.

Tab. 2 - cont.

Angelica sylvestris	.	1	+	.	.	.	.	.	.	.	.	r	.	.	r	.	+	+	.	+	r	.	.	.	.	.
Cerastium sylvaticum	.	.	.	+	.	1	.	.	.	2	.	.	.	.	.	.	.	.	+	.	.	.	1	.	+	.
Carex hirta	1	.	+	.	+	.	.	+	+	.	.	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.
Agrostis stolonifera	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	1	.	.	.	2	+	+	.	.	.	.
Oxyrrhynchium hians	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	1	1	2	.	.	.
Filipendula ulmaria	.	.	.	+	.	.	.	.	.	+	.	+	.	.	.	.	.	1	.	.	.	.	.	.	+	.
Glechoma hirsuta	.	.	1	2	.	.	.	.	.	.	.	2	.	.	.	.	2	3	2	.	.	.	2	.	.	.
Lysimachia vulgaris	.	.	.	.	+	.	.	.	+	+	.	+	.	.	+	.	.	.	.	.	+	+	.	.	.	.
Mentha longifolia	1	.	+	.	.	.	.	.	+	.	.	.	.	+	.	.	.	+	+	.	+	.	.	.	.	.
Persicaria maculosa	+	2	.	.	.	.	.	.	1	.	+	.	.	.	.	.	.	.	.	2	.	+	.	+	.	.
Galeopsis speciosa	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	1	+	+	.	.	+	.	.	.
Heracleum pubescens	+	+	.	.	.	.	.	.	.	1	+	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.
Petasites hybridus	.	.	+	.	.	.	.	.	.	r	r	.	.	.	.	.	.	+	.	+	.	+	+	.	.	.
Moehringia trinervia	.	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	1	.	.	.	.	+	.	.	.	+
Oxalis dillenii	.	+	.	+	.	.	.	.	+	.	+	.	.	.	.	.	+	.	.	.	+	.	.	.	.	.
Asarum europaeum	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	+	.	.	.	.	1	.	.	+
Torilis japonica	.	.	.	.	r	+	.	+	.	.	.	.	.	.	.	+	+	.	r	+	.	.	.	.	.	.
Acer campestre	.	.	.	+	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.	+	r	1	.	3
Mentha arvensis	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	+	+	+	.	.	.	.
Silene baccifera	.	.	.	1	.	+	.	+	.	.	.	.	.	.	.	.	.	.	+	1	.	.	.	.	.	+
Poa nemoralis	.	.	1	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	+	.	.	.	.	+
Heracleum sphondylium	.	.	+	+	.	.	.	.	.	r	.	.	.	.	.	.	.	r	.	.	.	+	+	.	.	.
Impatiens glandulifera	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	+	.	+	.
Salvia glutinosa	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	1	+	.	.	.	.
Salix elaeagnos	.	.	3	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	r	.
Chelidonium majus	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+
Cardamine flexuosa	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	+	+	.	.	.	.	.	.	.	.
Lythrum salicaria	.	.	.	.	.	.	.	+	+	+	.	.	.	.	+	+	.	.	.	+	.	.	.	.	.	.
Juglans regia	.	.	.	.	.	r	r	.	.	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	.	.
Ajuga reptans	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	+	.	.	.	.	.	+	.	.	+
Athyrium filix-femina	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	+	.	.	.	+	.
Acer pseudoplatanus	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	2	.	.	.	.	.	.	.	2
Prunella vulgaris	.	r	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Saponaria officinalis	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	r	.	+	.	.	.	.	.
Viburnum opulus	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	+	.	.	.	.	.
Stellaria holostea	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	.	.	+	.	.	.	.	+	.	.	.
Lapsana communis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	+	.	.	.	+
Urtica dioica subsp. *galeopsifolia*	.	.	.	.	.	1	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	1	+	.
Silene dioica	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.

Tab. 2 - cont.

Taraxacum sect. *Taraxacum*	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.
Cerasus avium	.	.	r	.	.	.	.	.	.	.	.	1	.	.	r	.	.	.	r	.	.	.	.	.	.	.
Elytrigia repens	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	+	.	.	.	.	.	.	.	.	.
Geranium phaeum	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	2
Potentilla reptans	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.
Astragalus glycyphyllos	.	.	r	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	r	.	.	.	.	.	.	.
Carex remota	.	+	.	+	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.
Salix euxina	.	.	1	.	.	.	.	.	.	3	.	4	.	.	.	.	.	.	.	3	.	.	.	.	.	.
Leersia oryzoides	.	1	.	.	.	.	.	.	+	.	+	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.
Chaerophyllum temulum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	.	+
Galeopsis pubescens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	+	.	.	.	.	.	+
Ficaria verna	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	3	2
Scirpus sylvaticus	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	1	.	+	.	.	.	.
Carduus crispus	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	+	.	r	.	.	.	.
Crataegus monogyna	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	r	.	.	.	.	.	r	.
Equisetum palustre	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.
Solanum dulcamara	.	.	.	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	+	.	r	.	.
Stachys palustris	.	.	.	.	r	.	.	.	.	+	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.
Cardamine impatiens	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	+	+	.	.	.	.
Leptodictyum riparium	2	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.
Pulmonaria officinalis	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	+	.	.	.	.	.	.	.	.
Petasites albus	.	.	.	.	.	.	.	.	.	.	.	+	.	1	.	.	.	+	.	.	.	.	.	.	.	.
Carex riparia	.	.	.	.	+	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.
Vitis vinifera	.	.	.	+	.	.	+	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	.	.
Rumex obtusifolius subsp. *sylvestris*	+	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	.	.	.	.	.	.	.	r	.	.
Rubus idaeus	.	.	.	.	.	.	.	.	.	+	.	+	.	.	.	.	.	2	.	.	.	.	.	.	.	.
Artemisia vulgaris	.	+	.	.	.	.	.	.	.	.	.	.	.	+	.	+	+	.	.	+	.	+	.	.	.	.
Clematis vitalba	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	.	.	.	.	.	+	r	.	.	.	.
Bryophytes																										
Plagiomnium undulatum	.	.	.	.	.	.	+	.	1	1	+	2	.	.	.	.	1	3	.	.	1	2	1	.	1	.
Plagiomnium affine	.	.	.	.	.	.	.	.	.	1	.	.	.	.	.	.	1	1	.	.	2	1	.	.	2	.
Brachythecium rutabulum	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	3	.	.	.	2	2	.	.	.	.

Species occur no more than two plots: *Achillea millefolium* (19: r), *Adoxa moschatellina* (12: +), *Agrostis canina* (14: 1), *Ambrosia artemisiifolia* (9: 1), *Arabidopsis halleri* (18: +), *Arctium lappa* (5: +; 15: +), *A. minus* (2: +), *A. tomentosum* (4: +; 24: r), *Aristolochia clematitis* (5: +), *Aruncus dioicus* (12: r), *Astrantia major* (10: r), *Bryonia dioica* (2: +), *Calamagrostis epigejos* (19: r), *Campanula rapunculoides* (18: +; 22: +), *Cardamine amara* (24: +), *Carduus personata* (12: r; 18: r), *Carex acuta* (1: +; 9: +), *C. brizoides* (12: +; 19: +), *Carpinus betulus* (12: +; 26: r), *Cerasus vulgaris* (3: r; 26: r), *Chaerophyllum hirsutum* (12: 1; 18: 1), *Chaenorrhinum minus* (1: +), *Cirriphyllum piliferum* (17: 2), *Cirsium oleraceum* (22: +), *Clematis recta* (6: r), *Conium*

maculatum (26: +), *Cyperus fuscus* (20: +), *Dentaria glandulosa* (12: +), *Deschampsia cespitosa* (2: +; 21: +), *Dipsacus pilosus* (7: +), *D. sylvestris* (3: r), *Echinochloa crus-galli* (9: 1; 20:+), *Epilobium hirsutum* (19: r), *E. parviflorum* (2: +; 20: +), *Epipactis helleborine* (15: +; 26: +), *Fragaria vesca* (17: +; 21: +), *Frangula alnus* (17: r; 21: +), *Fraxinus angustifolia* (24: 4), *F. pennsylvanica* (16: +), *Galium mollugo* (20: +), *G. odoratum* (22: +), *Geranium robertianum* (12: +; 18: +), *Geum rivale* (18: r; 21: +), *Glyceria notata* (20: 1), *Hedera helix* (24: 1), *Heracleum mantegazzianum* (4: +), *Hesperis matronalis* (10: r; 18: r), *Holcus lanatus* (20: +), *Hypericum maculatum* (18: r), *Hypericum perforatum* (19: +), *Hypnum cupressiforme* (23: 1), *Juncus effusus* (20: +), *Iris pseudacorus* (15: r), *Iva xanthiifolia* (9: +), *Leonurus cardiaca* (26: +), *Lolium perenne* (2: +), *Lonicera xylosteum* (18: 1), *Lotus corniculatus* (3: +), *Luzula sylvatica* (12: r), *Malus domestica* (17: r), *Melandrium album* (14: +), *Melampyrum nemorosum* (19: +), *Mercurialis perennis* (18: +), *Milium effusum* (12: r; 26: +), *Morus nigra* (5: r; 15: r), *Oxalis acetosella* (12: +; 18: +), *Parthenocissus quinquefolia* (14: 1), *Picea abies* (12: r; 18:1), *Plantago major* (20: +), *Poa palustris* (20: +), *Primula elatior* (12: +), *Prunus divaricata* (14: r; 15: r), *P. spinosa* (21: +), *Ranunculus cassubicus* (12: r), *R. lanuginosus* (10: r; 12: r), *Robinia pseudoacacia* (4: r; 17: +), *Rorippa palustris* (20: +), *R. sylvestris* (9: +), *Rumex conglomeratus* (2: +), *R. obtusifolius* (20: +), *Salix cinerea* (12: r), *S. pentandra* (1: +), *Scrophularia nodosa* (12: r; 15: +), *S. umbrosa* (20: r; 21: +), *Scutellaria galericulata* (14: +; 20: 1), *Senecio nemorensis* (18: r), *Setaria pumila* (9: +), *Solidago canadensis* (14: +; 22: +), *Sorbus aucuparia* (18: r), *Stellaria media* (24: +), *Symphytum cordatum* (10: r; 12: +), *S. officinale* (14: +; 15: +), *Plagiomnium ellipticum* (17: 2), *Pulmonaria obscura* (26: 2), *Tanacetum vulgare* (14: r), *Telekia speciosa* (10: +), *Thalictrum aquilegiifolium* (18: r), *Thuidium delicatulum* (12: 1), *Tilia cordata* (12: +; 26: r), *Veronica beccabunga* (20: +), *V. chamaedrys* (18: +), *V. filiformis* (4: 1; 11: +), *V. urticifolia* (21: r), *Vicia cracca* (10: +; 19: +), *V. dumetorum* (10: +), *Viola reichenbachiana* (12: +; 22: +), *Xanthium strumarium* (1: 2).

Localities: 1, 18 – Ivano-Frankivsk region, Kolomyia district, Pistynka river near Spas village; 2 – Ivano-Frankivsk region, Kosiv district, bank of the Pistynka river near Sheshory village; 3– Khmel'nyts'k region, Kam'yanets'-Podil's'kyi district, Ternava river near Surzyntsi village; 4 – Zakarpattya region, Vynogradiv district, Tysa river near Tysobyken village; 5, 7, 24 – Zakarpattya region, Hust district, Tysa river near Steblivka village; 6 – Zakarpattya region, Vynogradiv district, Tysa river near Pijterfolvo village; 8, 10 – Zakarpattya region, Hust district, Tysa river near Hust; 9 – Zakarpattya region, Volovets district, Latorytsia river near Pidpolozzia village; 11 – Ivano-Frankivsk region, Rozniatin district, Chechva river near Pidsuhy village; 12 – Zakarpattya region, Vynohradiv district, the bank of the Tisa river, near the village Velyka Kopanja; 13 – Zakarpattya region, Uzhgorod district, on the west of the village Orichovyca, bank of the Uzh river; 14 – Zakarpattya region, Vynogradiv district, Tysa river near Getynia village; 15 – Zakarpattya region, Vynogradiv district, Tysa river near Mala Kopania; 16, 26 – Zakarpattya region, Irshava rajon, Kushnytsia river near Kushnytsia village; 17 – Lviv region, Skole district, Rozhanka river near Slavsk; 19, 20, 21 – Zakarpattya region, Irshava district, the left bank of the river Borzhava, between villages Dovge and Bronka; 22 – Zakarpattya region, Hust district, Hustec river near Nyznie Selyshche village; 23 – Zakarpattya region, Uzhgorod district, Latorytsia river near Velyka Dobron'; 25 – Khmel'nyts'k region, Kam'yanets'-Podil's'kyi district, Ternava river near Kniazpil village (author of the relevés – L. Borsukevych).

Tab. 3 Phytosociological relevés of anthropogenic habitats with *R. japonica* occurrences.

Plot number	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
Relevé area (m^2)	10	8	6	10	10	8	8	10	16	8	10	6	100	100	100	100	16	16						
Cover total (%)	60	60	70	60	100	80	80	50	100	60	80	90	100	100	100	100	100	100	100	90	100	100	100	100
Cover herb layer (%)	60	60	70	60	100	80	80	50	100	60	80	90	100	100	100	100	100	100	100	90	70	100	100	100
EUNIS Code	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39	V39
Reynoutria japonica	**5**	**5**	**5**	**2**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**5**	**r**	**5**	**5**	**5**
Taraxacum sect. *Taraxacum*	.	.	.	.	+	+	+	.	+	+	+	+	.	.	.	.	.	.	.	.	.	r	.	r
Elytrigia repens	+	+	+	1	2	.	.	.	.	.	.	.	.	.	.	r	.	+	.	.	.	.	.	.
Artemisia vulgaris	+	.	+	+	+	+	+	.	.	.	+	+	.	r	.	r	.	.	.	.	.	.	.	r
Solidago canadensis	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	+	.	+	r	r	+	r
Chenopodium album	+	.	.	1	+	+	.	.	.	.	+	+	.	.	.	r	.	.	.	.	.	.	.	r
Lolium perenne	+	.	+	.	+	.	+	.	+	+	+	+	.	.	.	.	.	.	.	.	.	.	.	.
Calamagrostis epigejos	.	+	.	.	.	.	.	.	.	.	.	.	r	.	.	r	.	.	.	2	.	.	.	.
Ballota nigra	.	+	.	.	.	+	.	.	+	1	.	.	.	.	.	.	.	.	.	.	.	.	.	.
Glechoma hederacea	.	+	+	.	+	.	+	.	.	+	+	+	.	.	.	.	.	.	.	r	.	.	r	.
Rubus caesius	2	.	.	.	.	.	.	+	.	.	.	.	r	.	.	.	1	.	.	+	+	.	.	.
Aegopodium podagraria	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	2	.	r	.	.	.	.	.
Urtica dioica	.	+	.	.	.	+	+	+	+	.	+	+	.	.	.	.	+	1	+	2	+	.	+	r
Galium aparine	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	r	.	2	.	.	.
Calystegia sepium	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	.	r	.	.	+	.
Impatiens parviflora	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	+	.	r	.	3	.	.	r
Erigeron annuus	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	.	r	.	.	r
Geum urbanum	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	.	.	.	r	+	r	.	.
Acer negundo	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r	.	.	r	2	r	r	.	.
Anthriscus sylvestris	.	.	.	.	.	.	.	.	.	.	.	.	r	.	.	.	r	.	.	.	+	.	.	.
Chelidonium majus	.	.	.	.	.	.	2	+	.	.	.	.	.	r	.	.	.	.	.	.	.	.	.	r
Erigeron canadensis	.	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	+	.	.	.	.	.	.
Acer platanoides	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	r	r	+	.	.	.
Arctium lappa	+	.	.	.	.	.	.	.	.	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.
Bryophytes																								
Bryum argenteum	.	.	.	.	.	+	+	.	+	+	.	.	.	.	.	.	.	.	.	.	.	.	.	.

Species occur no more than two plots: *Acer campestre* (21: +), *Acer pseudoplatanus* (21: r), *Achillea collina* (20: r), *Agrostis stolonifera* (13: r), *Alliaria petiolata* (21: r), *Ambrosia artemisiifolia* (14: r; 15: 1), *Arctium tomentosum* (1: +; 3: +), *Atriplex hortensis* (16: r), *Atriplex tatarica* (14: r), *Ballota nigra* subsp. *nigra* (16: 1; 20: r), *Berteroa incana* (16: r), *Betula pendula* (13: r), *Brachypodium sylvaticum* (21: +), *Bromus inermis* (15: r), *Carex hirta* (13: r; 18: +), *Convallaria maialis* (13: r), *Chaerophyllum hirsutum* (20: 2), *Chamomilla suaveolens* (5: +), *Cynodon dactylon* (14: 1), *Convolvulus arvensis* (2: +; 20: r), *Dactylis glomerata* (20: r), *Daucus carota* (15: r), *Echinocystis lobata* (19: 2; 21: r), *Elytrigia intermedia* (20: r), *Fallopia convolvulus* (1: +; 2: +), *Fraxinus excelsior* (20: r), *Galeopsis speciosa* (8: +), *Galium verticillatum* (13: r), *Galium verum* (16: r), *Geranium sibiricum* (20: +), *Humulus lupulus* (7: +), *Impatiens glandulifera* (20: r), *Iva xanthiifolia* (4: 1; 5: +), *Juglans regia* (20: r), *Lamium album* (23: r), *Lamium maculatum* (19: r; 21: r), *Lysimachia vulgaris* (13: r), *Malva neglecta* (10: +), *Medicago sativa* (20: r), *Melilotus alba* (14: r), *Mentha longifolia* (23: r), *Parthenocissus quinquefolia* (21: +), *Pastinaca sativa* (20: +; 23: r), *Physocarpus opulifolius* (20: r), *Plantago major* (5: +; 20: r), *Poa angustifolia* (18: +), *Poa pratensis* (23: +), *Polygonum aviculare* (4: +), *Polygonum persicaria* (4: +; 5: +), *Potentilla anserina* (23: r), *Prunus avium* (21: r), *Pulmonaria obscura* (21: r), *Ranunculus repens* (19: r), *Rhamnus cathartica* (13: r), *Robinia pseudoacacia* (15: r; 21: 5), *Rumex confertus* (23: r), *Salix purpurea* (8: r), *Sambucus ebulus* (20: r), *Sambucus nigra* (20: r; 21: +), *Scabiosa ochroleuca* (16: r), *Schedonorus arundinaceus* (13: r), *Setaria viridis* (15: r), *Sisymbrium officinale* (14: r), *Solidago gigantea* (1: +), *Solidago virgaurea* (16: r), *Sonchus arvensis* (5: +), *Stachys annua* (20: +), *Tanacetum vulgare* (4: +), *Tilia cordata* (21: +), *Torilis arvensis* (20: r; 24: r), *Tussilago farfara* (20: r), *Urtica urens* (19: r), *Verbascum ovalifolium* subsp. *thracicum* (16: r), *Viola odorata* (21: r; 22: r), *Xanthium strumarium* subsp. *strumarium* (15: r).

Localities: 1 – Lviv region, Yavorivs'kyi district, Nemyriv village, roadside near health resort; 2 - Lviv region, Yavorivs'kyi district, Velykopole village, roadside; 3 – Lviv region, Yavorivs'kyi district, Shklo village, near health resort; 4, 5 – Lviv, Frantisheka Street; 6, 7 – Lviv region, Yavorivs'kyi district, Starychi village, roadside; 8 – Lviv, Traktorystiv Street; 9 – Zakarpattya region, Perechyn district, in vicinity to the Kushnycja village, river bank; 10 – Lviv, Shevchenka Street; 11 – Lviv, Klepariv district; 12 – Lviv, Promyslova Street; 13 – Rivne region, near Sarny, roadside; 14, 15 – Kyiv, Sviatoshyno district, Robocha Street; 16 –Kyiv, Sviatoshyno district, Pidlisna Street; 17 – Ivano-Frankivsk region, Kosiv district, near the Pistyn village, wet forest edge; 18 – Rivne region, Kostopil district, the ruderal roadside near Kostopil; 19 – Chernivtsi, Zelena Street, roadside; 20 – Chenivtsi, river bank of Mol'nytsia; 21 – Chernivtsi, Zelena Street, artificial forest belt; 22 – Chernivtsi, Chervonoarmiyska Street, lawn; 23 – Chernivtsi, Maksyma Zalizniaka Street, roadside; 24 – Chernivtsi, Maksyma Zalizniaka Street, roadside. (author of the relevés – 1–8, 10–12: (Soroka 2008); 9, 17: L. Borsukevych; 13–16: D. Dubyna; 19–24: (Tokaryuk et al. 2015).

Tab. 4 Phytosociological relevés of shrub habitat types with *R. japonica* occurrences.

Plot number	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Relevé area (m^2)	200	100	200	200	100	200	200	200	200	100	100	100	100	100
Altitude (m)	282	630	171	319	401	523	404	209	213	171	278	118	310	265
Cover total (%)	100	90	95	100	100	100	100	100	100	90	100	90	80	100
Cover tree layer (%)	40	3	60	60	-	90	95	70	70	-	-	-	-	-
Cover shrub layer (%)	80	80	10	70	95	5	10	20	-	80	85	80	80	95
Cover herb layer (%)	90	70	80	95	100	100	100	100	100	80	100	40	30	100
Cover moss layer (%)	5	60	3	-	-	80	1	10	20	5	-	-	2	-
Cover litter layer (%)	100	70	30	30	-	70	60	-	100	-	20	5	-	80
Mosses identified (y/n)	Y	Y	Y	N	N	Y	Y	Y	Y	Y	N	N	Y	N
EUNIS Code	Sa	Sa	Sa	Sa	Sa	S32	S32	S32	S32	S32	S32	S91	S91	S91
Reynoutria japonica	**1**	**+**	**+**	**+**	**2**	**+**	**+**	**2**	**2**	**1**	**1**	**+**	**+**	**+**
Rubus caesius	1	3	.	4	5	1	4	5	4	4	4	5	2	2
Urtica dioica	3	.	+	.	+	2	+	2	5	2	1	.	.	.
Dactylis glomerata	.	.	+	+	.	.	.	.	+	+	+	+	.	r
Poa trivialis	2	1	1	1	.	.	.	.	+	+	+	1	.	.
Calystegia sepium	2	.	.	+	.	.	+	.	1	+	.	.	+	+
Salix purpurea	.	3	4	+	.	.	1	1	.	.	3	5	+	4
Salix triandra	+	.	1	.	.	.	+	.	1	.	.	.	5	1
Salix ×rubens	4	3	.	4	3	4	5	5	4	4	1	+	.	.
Aegopodium podagraria	+	4	2	1	2	4	4	2	2	3	2	2	.	.
Cornus sanguinea	.	3	.	2	4	2	.	2	2	+	4	1	+	+
Humulus lupulus	+	.	.	1	1	+	2	2	1	2	2	+	+	r
Glechoma hederacea	+	.	1	1	.	2	.	.	.	2	.	.	.	.
Brachypodium sylvaticum	.	2	.	2	.	.	2	.	+	+	1	+	.	.
Galium aparine	.	1	.	+	1	3	.	.	.	3	.	+	.	.
Schedonorus giganteus	1	.	+	1	.	+	.	.	+	.	+	.	.	r
Echinocystis lobata	.	.	.	+	.	.	.	.	2	+	1	.	.	.
Impatiens parviflora	1	.	.	.	+	.	.	.	+	.	2	.	.	+
Erigeron annuus	+	+	.	1	.	.	+	.	.	+	+	+	.	.
Geum urbanum	.	.	.	1	.	1	.	.	+	+	+	.	.	.
Eupatorium cannabinum	.	+	.	+	.	.	.	+	+	.	.	+	.	.
Elymus caninus	.	.	+	1	+	.	.	+	+	+	.	.	.	.
Lamium maculatum	.	.	+	.	1	3	.	+	.	1	+	.	.	.
Chaerophyllum aromaticum	.	+	.	.	.	1	.	.	1	1	2	.	.	.
Sambucus nigra	.	.	.	.	+	+	.	.	+	.	.	.	.	.
Lysimachia nummularia	.	1	.	.	.	.	2	.	.	.	.	2	.	.
Lycopus europaeus	+	.	+	.	.	.	.	.	.	.	+	.	+	+
Stellaria nemorum	.	.	.	1	1	.	.	.	.	1	+	.	.	.

Tab. 4 - cont.

Bidens frondosa	+	.	.	+	.	.	.	.	.	.	+	.	2	1
Fraxinus excelsior	.	r	.	.	.	1	.	.	r	.	r	.	.	.
Alnus incana	.	.	1	.	2	.	+	+	.	.	.	.	.	1
Ranunculus repens	.	.	1	.	.	.	.	.	.	.	.	.	1	1
Onoclea struthiopteris	.	.	.	r	+	.	3	.	.	1	.	.	.	.
Equisetum arvense	.	+	.	.	.	.	.	+	.	.	.	+	+	1
Solidago gigantea	1	.	.	+	.	.	.	.	.	+	+	.	.	.
Myosoton aquaticum	1	.	.	1	.	.	.	.	.	+	.	+	.	+
Impatiens noli-tangere	.	.	.	.	+	.	.	.	+	+	+	.	.	.
Corylus avellana	.	.	.	.	+	.	.	.	r	+	+	.	.	.
Anthriscus sylvestris	.	r	+	.	.	.	.	.	.	1	.	.	.	.
Tussilago farfara	.	.	2	.	.	.	.	.	.	.	+	.	.	1
Alnus glutinosa	.	.	+	.	.	+	.	.	+	.	+	.	.	.
Phalaroides arundinacea	1	.	.	.	.	.	+	.	.	.	.	+	1	.
Alliaria petiolata	.	+	.	+	.	+	.	.	1	2	2	.	.	.
Carex sylvatica	.	+	+	.	.	.	.	.	+	.	.	.	.	.
Euonymus europeaus	.	r	.	.	.	2	.	+	.	.	+	.	.	.
Lamium galeobdolon	.	.	.	.	1	.	.	.	.	1	+	.	.	.
Helianthus tuberosus	1	.	.	1	.	.	.	.	1	5	1	.	.	.
Aethusa cynapium	+	r	.	+	.	+	.	.	.	.	.	.	.	.
Angelica sylvestris	+	.	2	.	.	.	r	.	.	.	.	.	.	.
Cerastium sylvaticum	.	.	.	.	+	.	.	.	+	1	.	.	.	.
Agrostis stolonifera	.	.	.	.	.	.	+	.	.	.	.	2	2	.
Oxyrrhynchium hians	.	.	1	.	.	2	.	.	2	2	1	.	.	.
Filipendula ulmaria	.	.	1	.	.	.	+	+	.	+	.	r	.	.
Glechoma hirsuta	.	3	.	.	1	.	3	.	.	.	.	.	.	.
Persicaria maculosa	2	.	.	.	.	.	.	.	.	.	.	.	1	2
Stachys sylvatica	.	+	1	.	+	2	+	.	+	.	.	.	.	.
Moehringia trinervia	.	.	.	.	+	.	+	.	.	+	+	.	.	.
Frangula alnus	.	r	.	.	+	.	+	.	r	.	.	.	.	.
Mentha arvensis	.	.	+	+	.	.	.	.	.	.	.	.	1	.
Silene baccifera	.	.	.	+	+	.	.	.	+	.	.	.	+	.
Impatiens glandulifera	1	.	.	+	.	.	.	.	+	.	1	.	.	.
Cardamine flexuosa	.	.	.	.	.	.	.	.	.	+	+	.	.	+
Lythrum salicaria	.	.	+	.	.	.	.	.	.	.	.	+	+	.
Cirsium oleraceum	+	r	+	.	.	.	.	.	.	.	.	.	.	.
Artemisia vulgaris	1	.	.	+	.	.	.	.	.	+	.	.	.	.
Galium sylvaticum	.	.	.	.	+	.	+	.	.	.	.	1	.	.
Cruciata glabra	.	.	.	.	.	.	+	.	.	.	+	+	.	.

Tab. 4 - cont.

Poa nemoralis	.	r	.	1	.	.	.	r	.	.	.	.	.	.
Prunus padus subsp. *padus*	.	.	.	.	+	.	.	r	.	.	r	.	.	.
Athyrium filix-femina	.	.	+	.	.	.	+	.	.	+	.	.	.	.
Saponaria officinalis	+	.	.	.	.	.	+	.	.	.	.	+	.	.
Carpinus betulus	.	.	.	.	.	+	+	r	.	.	.	.	.	.
Stellaria holostea	.	.	+	.	.	.	+	.	.	.	+	.	.	.
Veronica chamaedrys	.	.	+	1	.	.	+	.	.	.	.	+	.	.
Persicaria hydropiper	.	.	.	.	.	.	.	.	+	.	1	.	.	1
Leucanthemum vulgare	.	.	+	.	.	.	+	.	.	.	.	+	.	.
Rumex conglomeratus	+	.	.	.	.	.	.	.	.	.	.	.	+	+
Urtica dioica subsp. galeopsifolia	.	2	.	1	.	.	.	.	.	.	.	.	1	.
Bryophytes														
Plagiomnium undulatum	.	2	2	.	.	.	3	+	1	.	+	.	.	.
Plagiomnium affine	.	.	2	.	.	.	2	.	1	.	.	.	.	.
Brachythecium rutabulum	.	.	.	1	.	.	.	.	1	.	1	.	.	.

Species occur no more than two plots: *Acer campestre* (6: 2; 11: +), *A. negundo* (6: 2; 9: 2), *A. pseudoplatanus* (2: r; 8: +), *Achillea millefolium* (3: +; 7: +), *Adoxa moschatellina* (10: +), *Ajuga reptans* (7: +; 9: +), *Ambrosia artemisiifolia* (4: +), *Arabidopsis halleri* (3: 2), *Asarum europaeum* (2: +; 5: +), *Aster novi-belgii* (2: 2), *Astragalus glycyphyllos* (6: +), *Atrichum undulatum* (13: 1), *Atriplex sagittata* (14: r), *Bryonia dioica* (1: +), *Calamagrostis epigejos* (8: +), *C. pseudophragmites* (3: 1; 12: 1), *Calliergonella cuspidata* (3: 2), *Campanula rapunculoides* (5: +), *Cardamine impatiens* (4: +), *Carduus crispus* (1: r), *Carex acuta* (3: 1), *C. brizoides* (7: 1), *C. hirta* (9: +; 12: +), *C. pilosa* (7: +), *C. remota* (1: r; 3: 1), *C. riparia* (9: +), *Centaurea jacea* (7: +; 12: r), *C. phrygia* subsp. *carpatica* (7: r), *Cerastium holosteoides* (3: +), *Cerasus avium* (7: r; 12: r), *Chaerophyllum temulum* (6: +), *Chrysosplenium alternifolium* (6: +; 10: 2), *Circaea lutetiana* (6: 1; 11: +), *Cirsium arvense* (3: +), *C. palustre* (3: +), *Chelidonium majus* (1: +; 9: +), *Clematis vitalba* (4: +), *Climacium dendroides* (3: 1), *Conium maculatum* (6: +), *Cyperus fuscus* (13: +), *Daucus carota* (4: +; 14: +), *Dentaria bulbifera* (7: r), *Deschampsia cespitosa* (2: r; 3: +), *Dipsacus pilosus* (9: +), *Dryopteris carthusiana* (7: r), *Echinochloa crus-galli* (13: 1; 14: +), *Elytrigia repens* (12: 2), *Epilobium parviflorum* (1: +; 3: +), *Equisetum hyemale* (12: +), *E. palustre* (13: 1), *Erigeron canadensis* (4: +), *Fallopia convolvulus* (2: r), *Festuca rubra* (3: 1; 12: 1), *Ficaria verna* (6: 2; 10: 2), *Fragaria vesca* (7: +), *Galeopsis pubescens* (1: +), *G. speciosa* (9: +; 11: +), *Galium album* (4: +), *G. palustre* (3: +), *Geum rivale* (3: +), *Geranium phaeum* (2: r; 6: 1), *Grossularia uva-crispa* subsp. *reclinata* (5: r), *Heracleum mantegazzianum* (10: 1; 11: +), *H. pubescens* (1: 1; 4: +), *H. sphondylium* (11: 1), *Holcus lanatus* (3: +; 4: +), *Hypericum perforatum* (3: +; 7: +), *Iva xanthiifolia* (13: +), *Juglans regia* (8: r; 11: r), *Juncus articulatus* (13: +), *J. effusus* (3: +), *Knautia maxima* (3: +), *Lapsana communis* (7: +; 9: +), *Leersia oryzoides* (1: 1; 13: 2), *Luzula luzuloides* (7: r), *L. pilosa* (3: +), *Lycopodium annotinum* (7: r), *Lysimachia vulgaris* (7: +; 12: +), *Melampyrum nemorosum* (7: +; 12: +), *Melilotus officinalis* (14: +), *Mentha longifolia* (3: 1), *Mercurialis perennis* (7: +), *Myosotis scorpioides* (3: +; 14: +), *Oxalis dillenii* (4: +; 11: +), *Parthenocissus quinquefolia* (2: 1; 9: +), *Petasites hybridus* (6: +; 7: +), *Phragmites australis* (3: +), *Plagiomnium ellipticum* (3: 1), *P. rostratum* (9: 1), *Plantago lanceolata* (14: r), *Poa palustris* (3: 2), *Populus nigra* (4: 2),

Potentilla erecta (7: +), *P. reptans* (12: +), *Primula elatior* (2: r; 5: +), *Prunella vulgaris* (3: 2), *Prunus divaricata* (2: +), *Pulmonaria obscura* (6: 2; 9: +), *Quercus robur* (2: r; 12: +), *Ribes nigrum* (14: r), *Rorippa amphibia* (13: +), *R. sylvestris* (13: +; 14: +), *Rosa canina* (7: +; 12: +), *Rubus idaeus* (7: 1), *R. nessensis* (7: 1), *Rumex obtusifolius* (3: +), *Salix alba* (13: +), *S. caprea* (3: 1), *S. elaeagnos* (14: 2), *S. euxina* (3: 1), *S. pentandra* (3: 3), *S. viminalis* (13: +), *Salvia glutinosa* (7: +), *Sarothamnus scoparius* (8: r), *Scirpus sylvaticus* (3: 2; 14: +), *Schedonorus pratensis* (12: +), *Scrophularia nodosa* (1: r), *Scutellaria galericulata* (12: +; 13: +), *Silene dioica* (2: r; 7: +), *S. flos-cuculi* (7: +), *Solanum dulcamara* (13: 1), *Sorbus aucuparia* (7: r), *Sparganium erectum* (3: r), *Stachys palustris* (13: +), *Stellaria media* (14: +), *Symphytum cordatum* (2: r; 3: r), *S. officinale* (10: +; 14: +), *Taraxacum* sect. *Taraxacum* (3: +), *Thuidium delicatulum* (3: 2), *Tilia cordata* (6: 1), *Torilis japonica* (1: +; 4: +), *Trifolium repens* (14: +), *Ulmus glabra* (6: +), *Veronica filiformis* (7: 1), *Viburnum opulus* (5: r; 7: +), *Vicia cracca* (3: +; 12: +), *V. sepium* (7: +), *Viola reichenbachiana* (7: +).

Localities: 1, 2 – Zakarpattya region, Mukachevo, bank of the Latorytsia river; 3 – Lviv region, Starosambirskyi district, Vyrva river near Dobromyl village; 4 – Ivano-Frankivsk region, Dolyna district, Svicha river, on the east to the Myslivka village; 5 – Zakarpattya region, Chust district, the bank of the Rika river, in the vicinity of Chust; 6 – Ivano-Frankivsk region, Rozniativ district, Limnytsia river near Jasen' village; 7 – Ivano-Frankivsk region, Kosiv district, bank of the Pistynka river near Sheshory village; 8 – Zakarpattya region, Svaliava district, Svaliavka river near Chernyk village; 9 – Zakarpattya region, Perechyn district, Turia river near Turia Pasika; 10 – Zakarpattya region, Perechyn district, Turia river near Turii Remety; 11 – Ivano-Frankivsk region, Kalush district, Limnytsia river near Dobrovliany village; 12 – Zakarpattya region, Vynogradiv district, Tysa river near Tysobyken village; 13 – Ivano-Frankivsk region, Kolomyia district, Prut river near Kniazhdvir village; 14 – Zakarpattya region, Perechyn district, Shypit river near Turia Poliana (author of the relevés – L. Borsukevych).

Tab. 5 Phytosociological relevés with *R. japonica* occurrences of gravel bar habitat and unidentified by EUNIS-ESy.

Plot number	1	2	3	4	5	6	7	8	9	10	11	12	13
Relevé area (m^2)	-	100	100	100	200	100	200	200	200	200	200	100	100
Altitude (m)	-	300	347	418	238	231	203	334	374	347	125	374	294
Cover total (%)	70	90	90	95	100	90	100	100	100	100	100	85	70
Cover tree layer (%)	-	2	-	-	90	-	95	70	70	80	95	-	-
Cover shrub layer (%)	-	70	80	95	5	80	3	70	20	5	5	70	70
Cover herb layer (%)	70	50	80	80	90	90	100	95	100	100	80	60	20
Cover moss layer (%)	-	60	-	40	2	30	-	40	20	5	20	5	5
Cover litter layer (%)	-	30	5	-	30	60	20	80	-	100	40	60	-
Mosses identified (y/n)	-	Y	N	Y	Y	Y	N	N	Y	Y	Y	Y	Y
EUNIS Code	U79	?	?	?	?	?	?	?	?	?	?	?	?
Reynoutria japonica	**r**	**r**	**r**	**+**	**+**	**+**	**2**	**2**	**+**	**1**	**1**	**2**	**+**
Glechoma hederacea	.	.	.	.	.	2	.	1	3	3	4	1	.
Rubus caesius	+	+	1	+	.	3	2	+	2	3	2	2	2
Aegopodium podagraria	r	5	.	.	.	4	2	4	5	3	4	4	.
Urtica dioica	.	1	r	.	2	.	+	.	.	3	1	+	.
Cornus sanguinea	+	.	2	.	.	1	2	+	4	2	.	1	+
Humulus lupulus	.	.	.	.	1	2	2	+	+	+	2	+	.
Brachypodium sylvaticum	.	.	2	.	2	+	2	3	.	.	1	+	1
Galium aparine	.	+	.	.	.	.	+	.	.	1	2	1	.
Calystegia sepium	+	+	+	+	1	.	.	.	+	+	.	.	+
Salix ×rubens	.	5	.	2	4	4	4	5	4	4	2	.	+
Schedonorus giganteus	.	+	1	.	+	.	1	+	.	+	+	+	.
Salix purpurea	.	2	2	2	+	.	2	+	.	+	.	.	1
Echinocystis lobata	.	.	.	.	.	+	+	1	.	.	.	.	.
Impatiens parviflora	.	.	.	.	2	+	.	.	.	+	.	1	.
Erigeron annuus	.	.	.	+	1	.	1	+	+	.	+	.	1
Geum urbanum	.	+	+	.	1	.	.	+	.	+	.	.	.
Eupatorium cannabinum	.	.	.	.	.	.	+	+	.	+	.	.	1
Dactylis glomerata	r	.	.	r	+	.	.	.	.	.	+	.	+
Elymus caninus	r	+	+	.	.	.	.	+	.	.	1	+	1
Lamium maculatum	.	.	.	.	.	1	.	1	.	+	1	.	.
Chaerophyllum aromaticum	.	.	+	.	1	2	2	1	.	2	+	.	.
Sambucus nigra	.	.	.	.	.	1	.	.	.	1	1	1	.
Lysimachia nummularia	+	1	.	.	.	.	1	1	2	1	.	+	+
Ranunculus repens	.	+	1	+	+	.	.	.	.	.	+	.	2
Stellaria nemorum	.	.	+	.	+	+	+	.	.	1	.	1	.
Salix triandra	.	2	+	.	3	.	.	+	.	1	.	.	.
Bidens frondosa	.	.	+	1	.	.	+	+	.	.	.	.	1

Tab. 5 - cont.

Fraxinus excelsior	.	+	+	.	r	2	r	.	.	.	.	.	.
Poa trivialis	.	+	.	.	2	.	.	+	.	.	.	.	+
Alnus incana	+	+	2	.	2	.	+	.	.	.	.	.	+
Onoclea struthiopteris	.	+	+	.	.	.	.	.	+	4	.	r	.
Equisetum arvense	.	+	.	+	.	.	.	+	.	+	.	.	+
Myosoton aquaticum	.	.	.	.	.	.	.	+	.	.	1	.	+
Impatiens noli-tangere	.	.	.	.	1	+	+	+	.	+	+	.	.
Corylus avellana	.	.	+	.	.	r	+	r	+	.	.	.	.
Anthriscus sylvestris	.	.	.	.	+	+	+	+	.	.	.	.	.
Tussilago farfara	2	.	2	.	1	.	+	+	.	.	.	.	2
Oxyrrhynchium hians	.	1	2	.	2	.	2	.	.	.	.	.	.
Agrostis stolonifera	+	.	2	4	.	.	.	1	.	.	.	.	2
Alnus glutinosa	.	.	.	.	.	1	1	2	.	.	.	.	.
Alliaria petiolata	.	.	.	.	1	1	1	.	.	.	2	.	.
Carex sylvatica	.	+	.	.	+	+	.	.	1	.	.	.	.
Euonymus europeaus	.	.	.	.	.	2	.	.	2	1	+	.	.
Lamium galeobdolon	.	1	.	.	2	2	1	.	.	+	.	.	.
Angelica sylvestris	.	.	.	.	+	.	+	.	.	.	.	.	r
Cerastium sylvaticum	.	.	.	.	.	1	1	+	.	.	2	.	.
Carex hirta	+	.	+	.	.	.	+	.	.	.	.	.	.
Filipendula ulmaria	.	+	.	.	+	+	.	.	.	.	+	.	.
Glechoma hirsuta	.	2	.	.	2	.	2	.	.	.	.	.	.
Lysimachia vulgaris	.	+	+	.	.	.	.	.	.	.	.	.	+
Mentha longifolia	+	.	.	.	+	.	.	+	.	.	.	.	1
Persicaria maculosa	.	.	2	1	.	.	.	.	.	.	.	.	1
Galeopsis speciosa	.	.	.	.	+	+	+	+	.	.	.	+	.
Heracleum pubescens	.	.	2	+	.	.	.	.	r	.	+	.	.
Petasites hybridus	.	1	1	.	.	.	+	.	.	.	.	.	.
Chrysosplenium alternifolium	.	+	.	.	.	1	.	.	1	.	2	.	.
Oxalis dillenii	.	.	+	.	1	.	+	+	.	.	.	.	.
Asarum europaeum	.	.	.	.	+	+	+	.	2	.	.	.	.
Frangula alnus	.	.	r	.	+	.	1	.	.	.	.	.	+
Poa nemoralis	.	r	+	.	.	.	+	.	.	.	.	.	.
Heracleum sphondylium	.	.	.	.	+	.	.	+	.	.	r	.	.
Salvia glutinosa	.	+	.	.	3	.	.	+	r	.	.	.	.
Salix elaeagnos	.	.	4	3	1	.	.	.	+	.	4	.	4
Cardamine flexuosa	.	.	.	.	+	.	.	.	.	+	r	.	.
Prunus padus subsp. *padus*	.	.	r	.	.	+	.	.	2	.	.	.	.
Vicia cracca	r	.	.	.	+	.	+	+	.	.	.	.	1

Tab. 5 - cont.

Prunella vulgaris	+	.	2	.	1	.	.	.	.	.	.	.	1
Scrophularia nodosa	.	.	+	.	+	.	+	+	.	.	.	.	+
Viburnum opulus	.	+	.	.	.	.	.	.	1	+	.	.	.
Silene dioica	.	+	.	.	+	.	.	.	.	.	r	.	.
Symphytum officinale	r	.	+	.	.	.	.	.	.	.	.	.	r
Taraxacum sect. *Taraxacum*	.	.	+	.	.	.	.	+	.	.	.	.	1
Geranium robertianum	r	+	.	.	1	.	1	.	.	.	.	.	.
Astragalus glycyphyllos	r	.	.	.	.	.	+	+	.	.	.	.	.
Persicaria hydropiper	.	.	.	.	2	+	1	1	.	.	.	.	.
Calamagrostis pseudophragmites	3	.	+	1	.	.	.	.	.	.	.	.	1
Veronica filiformis	.	.	+	.	.	.	1	.	+	.	.	.	.
Melampyrum nemorosum	.	.	.	.	.	.	+	+	.	.	.	.	1
Leucanthemum vulgare	+	.	+	.	.	.	.	.	.	.	.	.	1
Plantago lanceolata	+	.	+	.	.	.	+	.	.	.	.	.	1
Trifolium pratense	r	.	+	.	.	.	+	.	.	.	.	.	+
Primula elatior	.	r	.	.	.	.	.	.	r	.	r	.	.
Bryophytes													
Plagiomnium undulatum	.	1	2	.	.	1	3	.	2	2	1	2	.

Species occur no more than two plots: *Acer campestre* (6: +; 7: +), *Acer negundo* (12: 4), *Acer platanoides* (3: r), *Acer pseudoplatanus* (3: +; 5: +), *Acer saccharinum* (8: +), *Achillea collina* (1: r), *Achillea millefolium* (5: +), *Aethusa cynapium* (11: r), *Ajuga reptans* (7: +), *Ambrosia artemisiifolia* (8: +), *Anthriscus nitida* (3: 1), *Armoracia rusticana* (1: r; 3: +), *Artemisia vulgaris* (8: 1), *Athyrium filix-femina* (3: r; 11: r), *Betula pendula* (5: r), *Brachythecium rutabulum* (3: 2), *Calliergonella lindbergii* (3: 1), *Campanula patula* (1: r), *Campanula rapunculoides* (9: +), *Campanula trachelium* (3: +; 7: +), *Cardamine impatiens* (3: +), *Carduus crispus* (11: r), *Carduus personata* subsp. *albidus* (1: r), *Carex acutiformis* (3: 2), *Carex brizoides* (9: 1), *Carex remota* (2: +), *Carpinus betulus* (5: +; 7: 2), *Centaurea jacea* (13: 1), *Chaerophyllum hirsutum* (2: 1), *Chaerophyllum temulum* (5: 1), *Chelidonium majus* (5: +), *Chenopodium album* (8: +), *Cichorium intybus* (1: r), *Circaea lutetiana* (5: +; 12: +), *Cirsium arvense* (13: +), *Cirsium oleraceum* (7: +), *Clematis vitalba* (3: +), *Crataegus monogyna* (2: +; 9: +), *Daucus carota* (3: +; 13: +), *Deschampsia cespitosa* (1: r), *Dipsacus sylvestris* (13: r), *Elytrigia repens* (5: +; 8: +), *Epilobium dodonaei* (8: +), *Epilobium hirsutum* (8: +; 13: +), *Equisetum palustre* (3: +), *Equisetum pratense* (1: +), *Erigeron canadensis* (3: +), *Euphorbia cyparissias* (5: +), *Fragaria vesca* (5: +), *Galeopsis pubescens* (5: +), *Galium mollugo* (13: 2), *Geranium phaeum* (6: +; 11: r), *Helianthus tuberosus* (6: 1; 7: +), *Helleborus purpurascens* (6: r), *Heracleum mantegazzianum* (7: 1), *Holcus lanatus* (1: 2; 13: 1), *Hygroamblystegium varium* (3: 1), *Hypericum perforatum* (13: 1), *Impatiens glandulifera* (3: +; 6: +), *Juglans regia* (7: r; 12: r), *Knautia arvensis* (8: +), *Lactuca serriola* (13: 1), *Lapsana communis* (8: +), *Lathyrus sylvestris* (13: +), *Linaria vulgaris* (13: +), *Lonicera xylosteum* (9: 1), *Lotus corniculatus* (1: +; 3: r), *Lycopus europaeus* (5: +; 8: +), *Lythrum salicaria* (13: +), *Malus domestica* (7: +), *Medicago lupulina* (1: +; 3: 1), *Medicago sativa* subsp. *falcata* (1: r), *Melandrium album* (8: +; 13: +), *Melilotus alba* (1: r; 3: +), *Melilotus officinalis* (1: +), *Mentha arvensis* (3: +; 4: +), *Moehringia trinervia* (5: 1; 8: +), *Myricaria germanica* (1: +), *Ononis arvensis* (1: +), *Oxalis acetosella* (2: +), *Pastinaca sativa* (8: +), *Petasites kablikianus* (5: +; 8: 1), *Phalaroides arundinacea* (4: +; 13: +), *Phragmites australis* (13: +), *Plagiomnium affine* (12: 1), *Plantago major* subsp. *intermedia* (6: +; 8: r), *Plantago media* (1: r), *Poa annua* (1: r), *P. compressa* (13: +), *Populus*

nigra (3: +), *Populus tremula* (9: r), *Potentilla recta* (1: +), *P. reptans* (3: +; 13: 1), *Prunus divaricata* (9: r), *Pulmonaria obscura* (5: +), *Quercus robur* (9: +), *Ranunculus acris* (7: 1), *Robinia pseudoacacia* (3: 2), *Rorippa sylvestris* (4: +), *Rosa canina* (10: r), *Rumex confertus* (1: +), *R. obtusifolius* (3: +), *R. obtusifolius* subsp. *sylvestris* (5: +), *R. sanguineus* (4: +), *Salix alba* (12: 4), *S. euxina* (3: r), *S. viminalis* (1: +), *Salvia officinalis* (5: +), *Saponaria officinalis* (8: +; 13: +), *Schedonorus pratensis* (13: +), *Scrophularia umbrosa* (1: r), *Scutellaria galericulata* (7: +), *Silene baccifera* (8: +), *Silene flos-cuculi* (1: r; 7: +), *Solidago gigantea* (6: +; 7: +), *Sonchus asper* (13: +), *Stachys sylvatica* (10: +; 11: 1), *Stellaria alsine* (13: +), *Stellaria graminea* (1: +), *Stellaria holostea* (7: +), *Stellaria media* (13: +), *Symphytum cordatum* (2: r), *Tanacetum vulgare* (4: +; 13: +), *Thuidium delicatulum* (2: +), *Tilia cordata* (7: r), *Torilis japonica* (5: +; 8: +), *Trifolium repens* (1: +; 13: 1), *Ulmus glabra* (7: +), *Ulmus laevis* (11: +), *Verbascum nigrum* (8: r), *Veronica chamaedrys* (5: +; 13: +), *Vicia sepium* (9: +), *Viola odorata* (5: +), *Viola reichenbachiana* (9: +), *Vitis vinifera* (2: 1)

Localities: 1 – Ivano-Frankivsk region, Kosovo district, Tekucha village, Akra river; 2 – Zakarpattya region, Chust district, Nyzni Bystryi village, left bank of the Rika river; 3 – Lviv region, Stryi district, Rozgirche village, Stryi river; 4 – Zakarpattya region, Hust district, Zabrod village, Tereblia river; 5 – Zakarpattya region, Svaliava district, Lopushanka village, Dusynka river; 6 – Zakarpattya region, Perechyn district, Poroshkovo village, Turia river; 7 – Zakarpattya region, Irshava district, Kushnytsia village, Borzhava river; 8 – Lviv region, Stryi district, Girne village, Stryi river; 9, 12 – Ivano-Frankivsk region, Rozniativ region, Rivnia village, Limnytsia river; 10 – Lviv region, Stryi district, Rozgirche village, Stryi river; 11 – Zakarpattya region, Vynogradiv district, Piiterfolvo village, Tysa river; 13 – Lviv region, Stryi district, Stryi, stone watercourse of the river Stryi (author of the relevés – 1: D. Iakushenko, S. Yusyp, 2–13: L. Borsukevych).