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The occurrence of alien species in the settlement areas of the Kampinos National Park and its vicinity (Central Poland)

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Abstract: Studies aimed at the identification of the range and method of spread of alien plant species in settlement areas in Kampinos National Park (KNP) and its immediate vicinity were carried out in years 2012-2014. Special emphasis was put on surveying the sites of invasive alien species (IAS), and diagnosing potential threats posed to the natural and semi-natural vegetation of the national park by the IAS present in rural areas. We found 53 alien vascular plant species, including 40 invasive taxa which may potentially pose a threat to the ecosystems of KNP. Species encroaching from settlement areas to semi-natural and natural communities included: *Bidens frondosa*, *Echinocystis lobata*, *Impatiens glandulifera*, *I. parviflora*, *Juncus tenuis*, *Lupinus polyphyllus*, *Reunoutria japonica* and *Solidago gigantea*. Most of them were species from the highest invasiveness (IV and III) classes in Poland. Similarity analysis carried out for all investigated localities with regard to all alien species, and only for invasive ones showed a clear division into separate groups: villages within the boundaries of the national park and villages outside the park.

Key words: synanthropic habitats, protected area, invasive plants, rural areas

1. Introduction

Presence of alien plant species in a specific area is largely attributed to direct or indirect human activity. This particularly concerns kenophytes, which are alien species introduced in Poland after the 15th century and now permanently established in habitats (Kornaś 1981; Sudnik-Wójcikowska & Koźniewska 1988; Tokarska-Guzik 2005). This group of plants includes taxa characterised by strong expansive potentials, easy colonization of new areas, and encroachment from anthropogenic habitats to semi-natural or natural habitats. This group also includes invasive alien species (IAS) that pose a threat to biological diversity by causing permanent changes in ecosystems (e.g. Richardson *et al*. 2000; Pyšek *et al*. 2004; Tokarska-Guzik 2005; Tokarska-Guzik *et al*. 2009, 2012; Woziwoda 2012) .

KNP, like other protected areas in Poland or in other countries (e.g. De Poorter *et al*. 2007; Najberek & Solarz 2011; Solarz 2012; Foxcroft *et al*. 2013), is not free from alien species. In particular, anthropogenic habitats in KNP are characterised by a considerable number of well-established alien species (Ferchmin 1979; Kirpluk 1996, 1998, 2003, 2009a, 2009b, 2012; Bomanowska 2006a, 2006b, 2009; Otręba 2008; Bomanowska *et al*. 2014a, 2014b). The encroachment and spreading of alien species in Kampinos Forest was facilitated by early development of settlements, then forest management (deliberate introduction of certain trees and shrubs) and, currently, tourism and development of residential areas on the periphery of KNP.

Buyouts of buildings and agricultural land in villages in KNP has been carried out since mid-1970s. Some former settlements located in KNP are partly or completely abandoned and actions to accelerate restoration of natural environment are being carried out in depopulated areas (Markowski 2009a, 2009b). Because the effects of everyday human activity only recently

ceased in these habitats, the problem of alien species in this area still persists and remains unresolved. This, particularly, concerns invasive alien species.

The objective of the study was to present the floristic composition of alien plant species (with particular emphasis on IAS) occurring in settlement areas located within the limits of KNP and its immediate vicinity, and to identify their spread and potential threats posed by them to the natural and semi-natural vegetation of KNP.

2. Material and methods

Detailed floristic studies on the alien vascular flora of the rural areas were carried out between 2012 and 2014. They covered most of the settlement areas of Kampinos Forest, i.e. 118 villages of various size: 33 villages within the limits of KNP – populated, either partialy or completely depopulated, and 85 villages in the immediate vicinity of KNP, in its buffer zone, frequently near the border of KNP. A site was defined as a single village where a specific species was recorded. The location of plant sites was described by coordinates displayed by a GPS device (see Appendix 1).

In the study, we analysed alien species (anthropophytes) established in the flora of Poland, i.e. archaeophytes and kenophytes, according to the geographical-historical classification of flora proposed by Kornaś (1981).

Based on the floristic data derived from field studies, a complete list of alien species occurring in the settlement areas was prepared (Appendices 2-3). We considered those species that currently pose a threat to the natural and semi-natural ecosystems of KNP, and those that, because of their common occurrence in the settlement areas of the park and their uncontrolled growth, may pose such a threat in future. For this reason, we also listed common and expansively growing shrubs and trees which are tolerant of various habitat conditions in KNP but are not considered to be invasive in Poland (Tokarska-Guzik *et al*. 2012). In our list, we included species fulfilling the following criteria:

- invasive species in Poland according to the Regulation of the Minister of the Environment of the 9th September 2011 on the list of alien plant and animal species which, when introduced into the natural environment, pose a threat to native biodiversity or natural habitats (Regulation 2011),
- species listed as "invasive alien species in Poland (Tokarska-Guzik *et al*. 2012), regardless of the occurrence of the taxon in KNP,
- species listed as "invasive alien species on a regional scale" (Tokarska-Guzik *et al.* 2012), if the acreage of a specific species is increasing, posing a threat to the natural environment of KNP,
- species spontaneously encroaching from cultivation and settled on synanthropic habitats in KNP (Kirpluk 2012).

Similarity of alien flora in individual villages was determined using cluster analysis (a single linkage method based on Euclidean distance; van Emden 2008).

Classes of invasiveness were presented according to Tokarska-Guzik *et al.* (2012). Plant names were adopted from Mirek *et al.* (2002).

3. Results

During the studies in the settlement areas in KNP, we identified 53 alien plant species, including 40 invasive taxa (Tokarska-Guzik *et al*. 2012) (Appendices 2-3). In individual sites (villages), we identified from 5 to 34 species. Considering the distribution of IAS alone, we recognized from 4 to 28 species. In the villages located within park boundaries, there were 6 to 28 invasive taxa, and 4 to 23 - in villages neighbouring the park. Most IAS (over 20) were recorded in the villages located within the limits of KNP: in 11 partly depopulated villages (Buda, Cisowe, Górki, Granica, Janówek, Józefów, Nowa Dąbrowa, Rybitew, Sieraków, Stara Dąbrowa), in one depopulated, completely abandoned village (Nowe Budy), and in 8 villages in the immediate vicinity of KNP (including as many as 6 villages near the park border: Kampinos, Korfowe, Lasocin, Lipków, Sadowa, Sowia Wola).

The most common tree and shrub species in all the analysed villages were: *Rhus typhina* (102 sites), *Syringa vulgaris* (97), *Acer negundo* (94), *Robinia pseudoacacia* (88), *Parthenocissus inserta* (71) and *Rosa rugosa* (60). The most common herbaceous species comprised: *Conyza canadensis* (103), *Solidago gigantea* (100), *Setaria viridis* (74), *Solidago canadensis* (71), *Echinochloa crus-galli* (70), *Galinsoga parviflora* (69), *Helianthus tuberosus* (68), *Amaranthus retrofexus* (67), *Erigeron annuus* (66), *Anthoxanthum aristatum* (62), *Asparagus officinalis* (61), *Echinocystis lobata* (60) and *Rudbeckia laciniata* (60). In the second group, field weeds formed a large grouping, persisted only on anthropogenic habitats and posed no serious threat to the natural ecosystems of KNP (Bomanowska *et al*. 2014a, 2014b). The only exception was *Anthoxanthum aristatum,* which was encroaching to psammophilous grasslands covered gradually by pine trees in the village of Bromierzyk, in the south-western part of KNP (authors' personal observations).

Considering the distribution of invasive species alone (Tokarska-Guzik *et al*. 2012), the most common species found within the park limits (Appendix 3) were: *Amaranthus retroflexus* (32 sites), *Conyza canadensis* (32), *Echinochloa crus-galli* (32), *Galinsoga parviflora* (30), *Anthoxanthum aristatum* (29), *Oxalis fontana* (29),

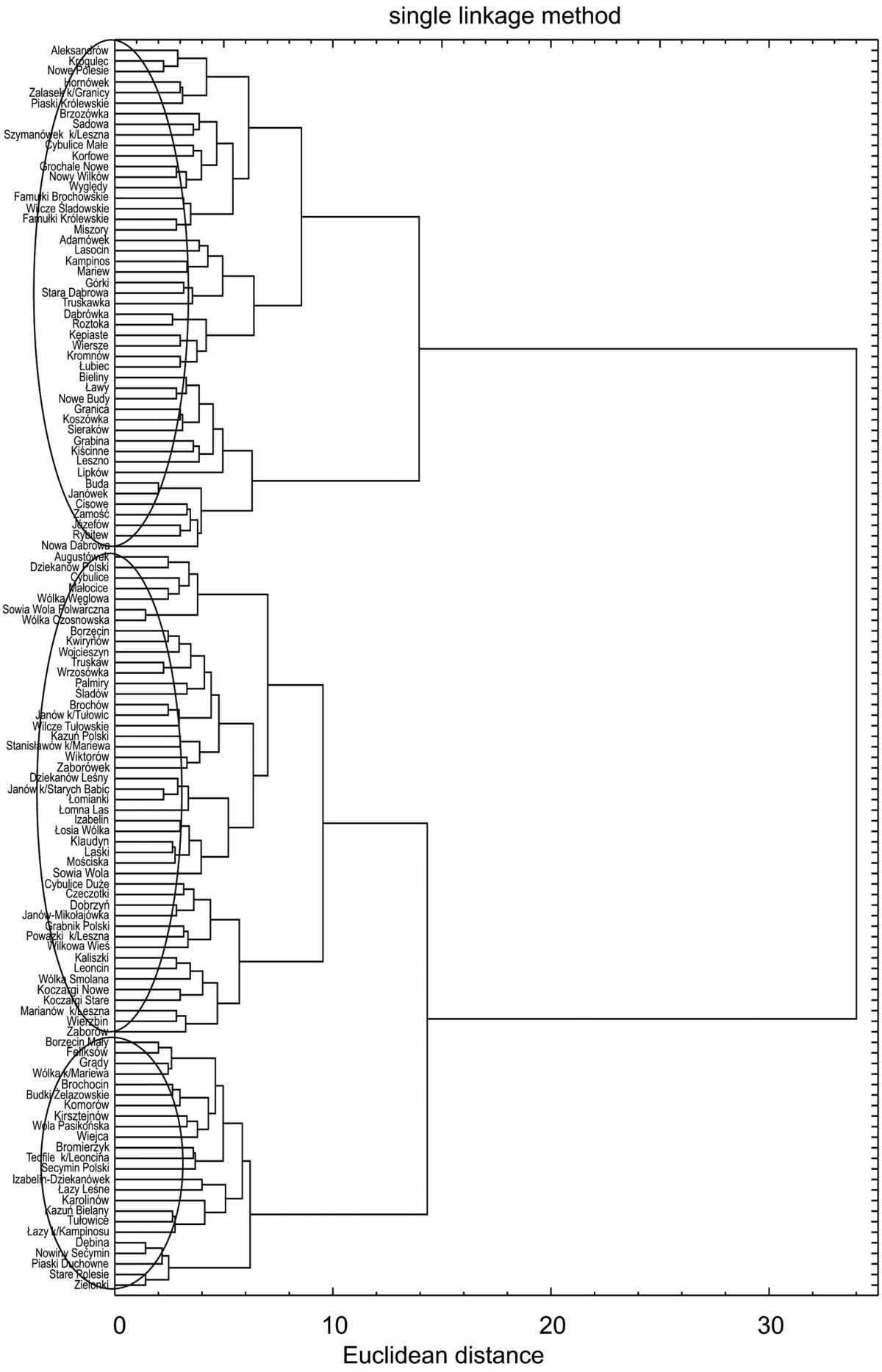

Fig. 1. Similarity of alien floras in the Kampinos villages (Euclidean distance)

Setaria viridis (29), *Robinia pseudoacacia* (28), *Setaria pumila* (27), *Solidago gigantea* (24), *Galinsoga ciliata* (23), *Rhus typhina* (22), *Veronica persica* (22), *Helianthus tuberosus* (21), *Rudbeckia laciniata* (21) and *Acer negundo* (18). These taxa were recorded in over 50% of the villages located within KNP. Remarkably, the most common invasive plants were field weeds, posing no threat to the natural ecosystems of KNP. However, in sites located within the park boundaries (Appendices 2-3) as many as 17 taxa out of 37 IAS, were those of the highest invasiveness (class IV or III). In the analysed villages located within the limits of KNP, we found

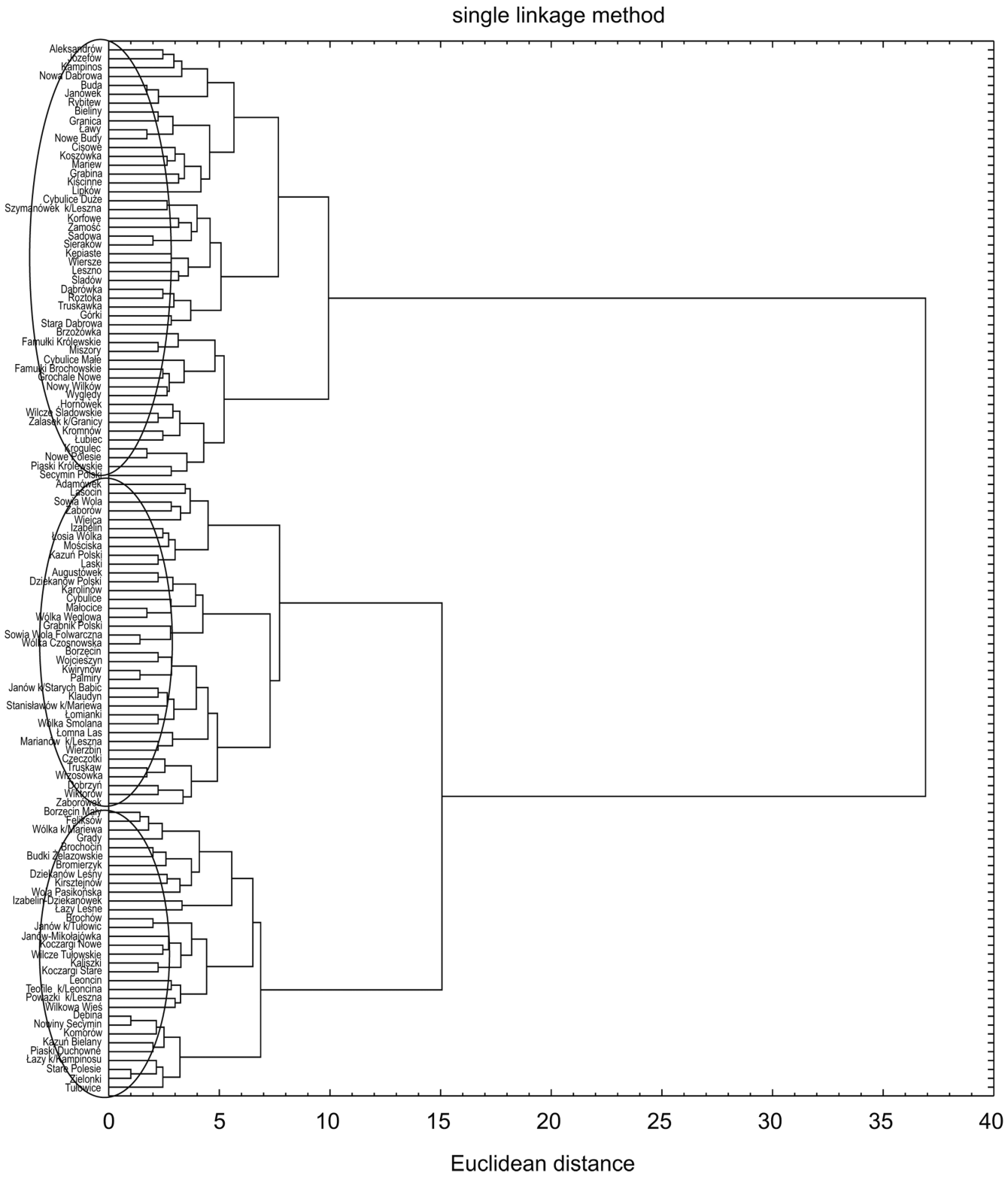

Fig. 2. Similarity of invasive alien floras in the Kampinos villages (Euclidean distance)

no *Asclepias syriaca*, *Padus serotina* or *Reynoutria sachalinensis*.

In villages located in the immediate vicinity of KNP (Appendix 3), the most common invasive plant species included (number of sites in brackets): *Rhus typhina* (80), *Acer negundo* (76), *Solidago gigantea* (76), *Conyza canadensis* (60), *Robinia pseudoacacia* (60), *Solidago canadensis* (57), *Parthenocissus inserta* (57), *Erigeron annuus* (48), *Helianthus tuberosus* (47), *Echinocystis lobata* (45), *Setaria viridis* (45), and *Rosa rugosa* (44). This group comprised mostly perennial species, including numerous trees and shrubs. Some of these taxa were shown to be very expansive in Polish forests (Żukowski *et al*. 1995; Tokarska-Guzik 2005; Otręba & Ferchmin 2007; Otręba 2008). In the villages outside KNP, as in villages within its limits, we found 17 taxa of the highest, i.e. class IV of invasiveness, except species such as *Heracleum sosnowskyi* and *Bromus carinatus*. There were also villages where we recorded presence of *Padus serotina* (16) and *Reynoutria sachalinensis* (3).

Similarity (cluster) analysis and classification conducted for the investigated localities with regard to all alien species, and for only IAS always led to the identification of two groups of objects: the first one was composed of villages within the park, the other one – of villages located in the protection zone. Villages located in KNP were floristically similar to each other and formed a separate group (Figs. 1-2). In these villages, more alien and invasive species occurred than in villages located outside the park (Appendices 2-3). Some of the analysed species (e.g. *Bromus carinatus* and *Physalis alkekengi*) emerged only in villages within the park. In both dendrograms, the only exceptions were three settlements inside KNP: Bromierzyk, Karolinów and Łazy Leśne. These villages were located peripherally, were difficult to access (especially Karolinów), and were partly or completely depopulated. Floristically, they were very similar to each other, but very different from the remaining villages of Kampinos Forest (Figs. 1-2). There were fewer species in them than in other villages inside the park. Villages located in the buffer zone of the park formed another group which, in both cases, could be floristically differentiated into two subgroups (Figs. 1-2). One subgroup (more numerous) comprised villages richer in alien an invasive species, whereas the other (less numerous) included floristically poorer ones (Appendix 3). Villages located near the border of KNP (e.g. Kampinos, Mariew, Lipków, Szymanówek near Leszno, Korfowe, Miszory) were more similar to villages located in KNP (Figs. 1-2). The group of villages outside the park was characterized by the occurrence of species such as: *Asclepias syriaca*, *Padus serotina* and *Reynoutria sachalinensis* (Appendix 3).

4. Discussion

The spreading and numerous sites of invasive taxa in park villages pose a serious threat to KNP ecosystems. Villages of Kampinos Forest, although located deep inside KNP and separated from each other by large patches of meadows and forest, were connected by numerous routes. Such conditions facilitated the dispersion of diaspores not only into neighbouring areas, but also for long distances, resulting in the colonization of new areas by invasive species (Adamowski *et al*. 2002; McKinney 2002; Pauchard & Alaback 2004; Otręba 2008; Foxcroft *et al*. 2013). Results from our study indicate that the natural environment of KNP is also exposed to serious external threats. From 85 analysed villages located in the immediate vicinity of KNP, numerous invasive species can easily migrate to different semi-natural and natural communities of the park, e.g. *Bidens frondosa*, *Echinocystis lobata, Impatiens glandulifera, I.parviflora, Juncus tenuis, Lupinus polyphyllus, Reynoutria japonica, Reynoutria sachalinensis* and *Solidago gigantea* (Otręba 2008; Bomanowska *et al*. 2014b; authors' personal observations). Additionally, strong tourism and increasing urbanisation pressures can be observed to occur in KNP peripheries. All these factors facilitate spreading of alien species, including numerous IAS (Otręba 2008; authors' personal observations).

The performed studies demonstrated that among alien species growing in rural settlements, those classified as the most invasive vascular plants in Poland (Regulation 2011; Tokarska-Guzik *et al*. 2012) can also be found. These include: *Acer negundo*, *Asclepias syriaca*, *Bromus carinatus*, *Echinocystis lobata*, *Heracleum sosnowskyi*, *Impatiens glandulifera*, *I. parviflora, Padus serotina*, *Reynoutria japonica*, *R. sachalinensis*, *Robinia pseudoacacia*, *Solidago canadensis*, *S. gigantea* and *Xanthium albinum*.

Unfortunately, since the middle of the 1990s, when the first floristic studies were carried out on the synanthropic habitats of KNP (e.g. Bomanowska 2006a, 2006b, 2009; Kirpluk 1996, 1998, 2003, 2009), the number of sites of invasive species has increased considerably. There are villages in KNP (e.g. Górki, Famułki Królewskie) and its buffer zone (e.g. Adamówek, Łomianki), where *Reynoutria japonica*, one of the most expansive taxa, has already formed enormous 'monocultures' (Kotowska 2003), and its range is increasing year by year (authors' personal observations).

The most infested village was Górki, located in the very centre of KNP, very well connected by a road network and nearby canals with other villages inside and outside KNP. In Górki, we recorded the highest number of alien species (34), the highest number of invasive species (28), and all taxa of the highest invasiveness

class (Appendices 2-3). It can be concluded that Górki is the central point for the distribution of alien and invasive taxa in KNP, but also the centre from which these plants are spreading. Górki is a village dating back to the mid-18th century, when the first settlements of tar makers were established in Kampinos (Kębłowska 2009). This is probably the site from where, in the early 20th century, alien species could have spread to other villages in the park (e.g. to Cisowe, Granica, Nowe Budy, Nowa Dąbrowa, Zamość and Józefów), and then outside the boundaries of KNP (e.g. to the Kampinos villages). However, the initial plant migration pathways in the area of Kampinos Primeval Forest are unknown. The first alien species found in this area were reported by Kobendza (1930), but conclusive information on the introduction of alien species to KNP dates back only to the 1950s (Nowak 1983; Otręba 2008; Bomanowska *et al*. 2014a, 2014b).

Short distance to Warsaw conurbation (Sudnik-Wójcikowska 1987), and the developed road network around KNP has certainly affected the number of alien species recorded in the analysed area. Developed lands neighbouring the park were also, and probably still are, a source from where alien plants dispersed to the protected area.

However, it seems that most alien species, including highly invasive taxa, escaped from intentional cultivation in cottage gardens in the analysed villages, although, as stated in Art. 120 clause 1 of the Nature Conservation Act of 16 April 2004 (Regulation 2009), "*it is forbidden to introduce and import alien plant species to the natural environment*".

Plants that escape from cultivation go through subsequent stages of establishment, and gain the status of epoecophyte or agriophyte (Kirpluk 2012). Some of the surveyed species (Appendix 3), not considered invasive in Poland (Tokarska-Guzik *et al*. 2012), are widely distributed in the park area, regardless of the conditions in which they currently grow. In partly or completely abandoned villages of Kampinos Forest, where the process of secondary succession is in progress, we simultaneously observe strong expansion of species such as *Symphoricarpos albus, Syringa vulgaris* and *Philadelphus coronarius*. Some taxa, e.g. *Caragana arborescens,* are more light-demanding (Zarzycki *et al*. 2002), but the encroachment of *Sarothamnus scoparius* from well-lit forest roadsides to forest clearings in KNP was also observed (authors' personal observations).

Not all the recorded alien species (Appendix 3) that now disperse seeds spontaneously and are found in anthropogenic and semi-natural habitats of the park will reach the status of invasive plants in the future. Nevertheless, they form a persistent, and most certainly anthropogenic, element of flora in these areas.

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Appendix 1. Names of studied localities with their coordinates

Aleksandrów 52,335510(N); 20,620441(E)
Adamówek 52,366352; 20,714308
Augustówek 52,374184; 20,699465
Bieliny 52,306778; 20,437246
Borzęcin 52,247044; 20,708767
Borzęcin Mały 52,247044; 20,708767
Brochocin 52,305067; 20,304193
Brochów 52,319180; 20,260780
Bromierzyk 52,308979; 20,387550
Brzozówka 52,348751; 20,659260
Buda 52,294308; 20,741314
Budki Żelazowskie 52,284721; 20,326666
Cisowe 52,334747; 20,491268
Cybulice 52,383106; 20,650299
Cybulice Duże 52,376366; 20,629017
Cybulice Małe 52,389435; 20,636955
Czeczotki 52,383492; 20,658243
Dąbrówka 52,35086; 20,601082
Dębina 52,391846;20,714924
Dobrzyń 52,373734; 20,718275
Dziekanów Leśny 52,341309; 20,847546
Dziekanów Polski 52,367538; 20,838736
Famułki Brochowskie 52,309536; 20,352934
Famułki Królewskie 52,335976; 20,370367
Feliksów 52,236732; 20,316566
Górki 52,324539; 20,519049
Grabina 52,289730; 20,569298
Grabnik Polski 52,278015; 20,415073
Granica 52,286903; 20,446985
Grądy 52,256020; 20,570793
Grochale Nowe 52,402657; 20,591759
Hornówek 52,287296;20,798208
Izabelin 52,284641; 20,831585
Izabelin-Dziekanówek 52,352584; 20,818534
Janów k/Starych Babic 52,265709; 20,843559
Janów k/Tułowic 52,328529; 20,271210
Janów-Mikołajówka 52,368820; 20,640808
Janówek 52,346401; 20,720144
Józefów 52,283741; 20,475399
Kaliszki 52,374107; 20,741743
Kampinos 52,267658; 20,460804
Karolinów 52,319151; 20,408588
Kazuń Bielany 52,402645; 20,682795
Kazuń Polski 52,402210; 20,653172
Kępiaste 52,286121; 20,605740
Kirsztajnów 52,283539; 20,335238
Kiścinne 52,326180; 20,630388
Klaudyn 52,279022; 20,853281
Koczargi Nowe 52,259251; 20,795284
Koczargi Stare 52,266197; 20,795797
Komorów 52,269260; 20,427988
Korfowe 52,271545; 20,516792
Koszówka 52,275188; 20,476233
Krogulec 52,322068; 20,640221
Kromnów 52,375809; 20,336048
Kwirynów 52,257381; 20,852139
Laski 52,292946; 20,846939
Lasocin 52,299625; 20,352921
Leoncin 52,396908; 20,539021
Leszno 52,257568; 20,590775
Lipków 52,275242; 20,804586
Ławy 52,294182; 20,677057
Łazy k/Kampinosu 52,293362; 20,411327
Łazy Leśne 52,293056; 20,412222
Łomianki 52,343151; 20,875471
Łomna Las 52,363611; 20,790833
Łosia Wólka 52,365643; 20,696569
Łubiec 52,293365; 20,594057
Małocice 52,373165; 20,674913
Marianów k/Leszna 52,265255; 20,560850
Mariew 52,284367; 20,731709
Miszory 52,341080; 20,322094
Mościska 52,287765; 20,868162
Nowa Dąbrowa 52,331585; 20,587837
Nowe Budy 52,319942; 20,544243
Nowe Polesie 52,373520; 20,474466
Nowy Secymin 52,386116; 20,451443
Nowy Wilków 52,384148; 20,508036
Palmiry 52,365677; 20,777781
Piaski Duchowne 52,370686; 20,398722
Piaski Królewskie 52,366667; 20,416667
Powązki k/Leszna 52,264393; 20,532202
Roztoka 52,312279; 20,614618
Rybitew 52,384487; 20,592506
Sadowa 52,347820; 20,827181
Secymin Polski 52,380268; 20,428782
Sieraków 52,311543; 20,813267
Sowia Wola 52,362679; 20,649366
Sowia Wola Folwarczna 52,365677; 20,629375
Stanisławów k/Mariewa 52,280315; 20,743351
Stara Dabrowa 52,341808; 20,563940
Stare Polesie 52,368206; 20,457035
Szymanówek k/Leszna 52,273968; 20,551867
Śladów 52,374485; 20,309931
Truskaw 52,306389; 20,770176
Teofile k/Leoncina 52,388119; 20,526344
Truskawka 52,330261; 20,674761
Tułowice 52,336548; 20,281645
Wiejca 52,261246; 20,503529
Wierzbin 52,260567; 20,735813
Wiersze 52,321285; 20,641640
Wiktorów 52,265766; 20,703299
Wilcze Śladowskie 52,35472; 20,301649
Wilcze Tułowskie 52,349183; 20,302863
Wilkowa Wieś 52,259369; 20,525467
Wojcieszyn 52,256435; 20,766598
Wola Pasikońska 52,265427; 20,382853
Wólka k/Mariewa 52,280132; 20,711632
Wólka Czosnowska 52,376930; 20,652651
Wólka Smolana 52,289742; 20,311230
Wólka Węglowa 52,300015; 20,883229
Wrzosówka 52,371963; 20,660917
Wyględy 52,260204; 20,689787
Zaborów 52,261589; 20,675035
Zaborówek 52,262016; 20,625542
Zamość 52,316685; 20,489849
Zalasek k/Granicy 52,296355; 20,428219
Zielonki 52,243511; 20,830933

Appendix 2. The number of alien species in individual villages

Village	No. of species
Aleksandrów (Al)	22
Adamówek (Ad)	22
Augustówek (Au)	14
Bieliny (Bi)	23
Borzęcin (Bo)	18
Borzęcin Mały (BM)	10
Brochocin (Br)	09
Brochów (Bro)	16
Bromierzyk (Brom)	10
Brzozówka (Brz)	17
Buda (Bu)	28
Budki Żelazowskie (BZ)	10
Cisowe (Ci)	32
Cybulice (Cy)	12
Cybulice Duże (CD)	22
Cybulice Małe (CM)	20
Czeczotki (Cz)	20
Dąbrówka (Da)	18
Dębina (De)	07
Dobrzyń (Do)	15
Dziekanów Leśny (DL)	14
Dziekanów Polski (DP)	18
Famułki Brochowskie (FB)	18
Famułki Królewskie (FK)	20
Feliksów (Fe)	8
Górki (Go)	34
Grabina (Gr)	22
Grabnik Polski (GP)	18
Granica (Gra)	29
Grądy (Grad)	12
Grochale Nowe (GN)	20
Hornówek (Ho)	12
Izabelin (Iz)	23
Izabelin-Dziekanówek (ID)	13
Janów k/Starych Babic (JSB)	16
Janów k/Tułowic (JT)	16
Janów-Mikołajówka (JM)	15
Janówek (Ja)	30
Józefów (Jo)	31
Kaliszki (Ka)	17
Kampinos (Kam)	24
Karolinów (Kar)	18
Kazuń Bielany (KB)	11
Kazuń Polski (KP)	21
Kępiaste (Ke)	23
Kirsztajnów (Ki)	10
Kiścinne (Kis)	23
Klaudyn (Kl)	21
Koczargi Nowe (KN)	12
Koczargi Stare (KS)	15
Komorów (Ko)	13
Korfowe (Kor)	21
Koszówka (Kos)	26
Krogulec (Kr)	19
Kromnów (Kro)	18
Kwirynów (Kw)	14
Laski (La)	20
Lasocin (Las)	27
Leoncin (Le)	19
Leszno (Les)	22
Lipków (Li)	27
Ławy (Law)	23
Łazy k/Kampinosu (LK)	13
Łazy Leśne (LL)	15
Łomianki (Lo)	21
Łomna Las (LoL)	16
Łosia Wólka (LW)	22
Łubiec (Lu)	19
Małocice (Ma)	15
Marianów k/Leszna (ML)	18
Mariew (Mar)	25
Miszory (Mi)	20
Mościska (Mo)	20
Nowa Dąbrowa (ND)	30
Nowe Budy (NB)	31
Nowe Polesie (NP)	16
Nowiny Secymin (NS)	05
Nowy Wilków (NW)	16
Palmiry (Pa)	19
Piaski Duchowne (PD)	10
Piaski Królewskie (PK)	14
Powązki k/Leszna (PL)	18
Roztoka (Ro)	19
Rybitew (Ry)	30
Sadowa (Sa)	25
Secymin Polski (SP)	14
Sieraków (Si)	30
Sowia Wola (SW)	26
Sowia Wola Folwarczna (SWF)	12
Stanisławów k/Mariewa (SM)	16
Stara Dąbrowa (SD)	26
Stare Polesie (StP)	5
Szymanówek k/Leszna (SL)	20
Śladów (Sl)	24
Teofile k/Leoncina (TL)	15
Truskaw (Tr)	17
Truskawka (Tru)	21
Tułowice (Tu)	12
Wiejca (Wi)	16
Wierzbin (Wie)	18
Wiersze (Wier)	22
Wiktorów (Wik)	21
Wilcze Śladowskie (WS)	14
Wilcze Tułowskie (WT)	13
Wilkowa Wieś (WW)	16
Wojcieszyn (Wo)	15
Wola Pasikońska (WP)	09
Wólka k/Mariewa (WM)	12
Wólka Czosnowska(WC)	10
Wólka Smolana (WSm)	22
Wólka Węglowa (WWe)	13
Wrzosówka (Wr)	16
Wyględy (Wy)	20
Zaborów (Za)	26
Zaborówek (Zab)	26
Zamość (Zam)	31
Zalasek k/Granicy (ZG)	15
Zielonki (Zi)	05

Explanations: the villages located within the borders of the Kampinos National Park are marked in bold

Appendix 3. The list of alien species occurring in the rural habitats in the Kampinos National Park and its closest vicinity

Explanations: the invasive species are underlined; the villages located within the borders of the Kampinos National Park are marked in bold; the abbreviations of village names – see Appendix 2

Acer negundo L. (94 sites): **Al**, Ad, Au, Bo, BM, Br, Bro, **Brom**, **Bu**, BZ, **Ci**, CD, CM, Cz, Do, DL, DP, **FB**, **FK**, Fe, **Gr**, GP, Grad, GN, Iz, ID, JSB, JT, JM, **Ja**, **Jo**, Ka, Kam, **Kar**, KB, KP, **Kis**, Kl, KN, KS, Ko, Kor, **Kos**, **Kr**, Kw, La, Las, Le, Les, Li, **Law**, LK, Lo, LoL, LW, Ma, ML, Mar, Mi, Mo, **NB**, NP, NW, Pa, PD, PL, **Ry**, Sa, **Si**, SW, SWF, SM, StP, Sl, TL, Tr, Tu, Wi, Wie, Wik, WT, WW, Wo, WP, WM, WC, WSm, WWe, Wr, Wy, Za, Zab, **Zam**, Zi. *Aesculus hippocastanum* L. (42): Bro, **Bu**, **Ci**, DL, Fe, **Gr**, **Gra**, Iz, JSB, **Ja**, **Jo**, Kam, **Kar**, KB, **Kis**, KN, **Kos**, **Kr**, Li, **Law**, LK, **LL**, Lo, Mar, **ND**, **NB**, Pa, **PK**, **Ro**, **Ry**, **Si**, SW, Sl, TL, Tu, Wie, Wo, WSm, Za, Zab, **Zam**, **ZG.** *Amaranthus retroflexus* L. (67): **Al**, Ad, Au, **Bi**, **Brom**, **Brz**, **Bu**, **Ci**, CD, CM, **Da**, Do, DP, **FB**, **FK**, **Go**, **Gr**, GP, **Gra**, GN, Ho, JSB, **Ja**, **Jo**, Kam, **Kar**, KP, **Ke**, **Kis**, Kl, Kor, **Kos**, **Kr**, Kro, Kw, La, Las, Le, Les, Li, **Law**, Lo, **Lu**, Mar, Mi, **ND**, **NB**, NP, Pa, **PK**, **Ro**, **Ry**, Sa, **Si**, SW, SM, **SD**, SL, **Tru**, **Wier**, Wik, WS, WM, Wy, Zab, **Zam**, **ZG.** *Anthoxanthum aristatum* Boiss. (62): **Al**, Ad, **Bi**, Br, Bro, **Brz**, **Bu**, BZ, **Ci**, CD, CM, **Da**, **FB**, **FK**, **Go**, **Gra**, GN, Ho, JT, **Ja**, **Jo**, Kam, **Ke**, Ki, **Kis**, Kl, KS, Ko, Kor, **Kos**, **Kr**, Kro, Las, Les, **Law**, **LL**, **Lu**, ML, Mar, Mi, **ND**, **NB**, NP, NW, PL, **Ro**, **Ry**, Sa, **Si**, SM, **SD**, SL, **Tru**, **Wier**, Wik, WS, WW, WSm, Wy, Zab, **Zam**, **ZG.** *Asclepias syriaca* L. (1): WP. *Asparagus officinalis* L. (61): Ad, **Bi**, Bo, Br, Bro, **Bu**, **Ci**, CD, Cz, **Da**, **FB**, **FK**, **Go**, GP, **Gra**, Iz, ID, JT, JM, **Ja**, **Jo**, Ka, **Kar**, KB, KP, **Ke**, **Kis**, KN, **Kos**, Kro, Le, Les, Li, **Law**, LK, **Lu**, Ma, ML, Mar, Mi, **ND**, **NB**, NW, Pa, **Ro**, **Si**, SM, **SD**, Sl, TL, Tr, Tu, Wie, **Wier**, WT, WW, WM, WSm, Za, Zab, **Zam.** *Aster novi-belgii* L. (35): **Al**, Ad, Au, Cy, **Da**, DP, **Go**, GP, Iz, **Jo**, KP, **Ke**, Kl, **Kr**, Las, **LL**, LW, **Lu**, Ma, Mo, **ND**, **Ro**, Sa, **Si**, SW, SWF, **SD**, Tr, **Tru**, **Wier**, WW, WC, WWe, Wr, Zab. *Avena fatua* L. (18): **Bu**, GP, **Ja**, **Ke**, **Kis**, Kor, Las, Les, **Lu**, **ND**, NW, PL, SP, SL, TL, **Wier**, **Zam**, **ZG.** *Avena strigosa Schreb*. (17): **Al**, **Bi**, **Brz**, **Ci**, CD, Cz, **Go**, GP, Kam, **Kis**, Las, **Lu**, Mar, **NB**, PL, **Ry**, SP. *Bidens frondosa* L. (19): **Al**, Ad, **Ci**, **Go**, **Gr**, Iz, ID, **Jo**, Kam, **Kis**, Las, **LL**, LoL, Mar, **ND**, **NB**, **Ry**, **SD, Tru.** *Bromus carinatus* Hook. & Arn. (1): **Ry.** *Caragana arborescens* Lam. (28): **Bu**, BZ, **Ci**, **FB**, **FK**, **Gra**, **Ja**, **Jo**, Ka, **Kar**, Ki, Ko, **Kos**, Kro, Le, Li, **Law**, LK, LW, Mi, **NB**, Pa, **Si**, SW, WS, WP, WSm, **Zam.** *Conyza canadensis* (L.) Cronquist (103): **Al**, Ad, Au, **Bi**, Bo, BM, Br, Bro, **Brom**, **Brz**, **Bu**, BZ, **Ci**, Cy, CD, CM, Cz, **Da**, Do, DL, DP, **FB**, **FK**, **Go**, **Gr**, GP, **Gra**, Grad, GN, Iz, ID, JSB, JT, JM, **Ja**, **Jo**, Ka, Kam, **Kar**, KP, **Ke**, Ki, **Kis**, Kl, Ko, Kor, **Kos**, **Kr**, Kro, Kw, La, Las, Le, Les, Li, **Law**, **LL**, Lo, LoL, LW, **Lu**, Ma, ML, Mar, Mi, Mo, **ND**, **NB**, NP, NW, Pa, **PK**, PL, **Ro**, **Ry**, Sa, SP, **Si**, SW, SWF, SM, **SD**, SL, Sl, TL, Tr, Tu, Wi, Wie, **Wier**, Wik, WS, WT, Wo, WM, WC, WSm, WWe, Wr, Za, Zab, **Zam**, **ZG.** *Echinochloa crus-galli* (L.) P. Beauv. (70): **Al**, Ad, **Bi**, Bo, Bro, **Brom**, **Brz**, **Bu**, **Ci**, CD, CM, Cz, **Da**, **FB**, **FK**, **Go**, **Gr**, **Gra**, GN, Ho, ID, JT, **Ja**, **Jo**, Kam, **Ke**, **Kis**, Kl, Kor, **Kos**, **Kr**, Kro, Kw, Las, Li, **Law**, **LL**, **Lu**, ML, Mar, Mi, Mo, **ND**, **NB**, NP, NW, Pa, **PK**, **Ro**, **Ry**, Sa, SP, **Si**, **SD**, SL, Sl, Tr, **Tru**, Wi, Wie, **Wier**, Wik, WS, Wo, Wr, Wy, Za, Zab, **Zam**, **ZG.** *Echinocystis lobata* (F. Michx.) Torr. & A. Gray (60): **Al**, Ad, Bo, **Ci**, Cy, CD, CM, Cz, **Da**, Do, **FK**, **Go**, GP, GN, Iz, ID, JSB, JM, **Ja**, **Jo**, Ka, Kam, KP, Kl, KN, KS, Kor, **Kos**, Kw, La, Le, Li, Lo, LW, Ma, Mar, **ND**, NW, PL, **Ro**, **Ry**, Sa, **Si**, SW, SWF, SL, **Tru**, Tu, Wi, **Wier**, Wik, WS, WW, Wo, WC, WSm, WWe, Wy, Za, **Zam.** *Epilobium ciliatum* Raf. (8): CD, CM, **Go**, Ho, Kor, Li, **ND**, SW. *Erigeron annuus* (L.) Pers. (66): Ad, **Bi**, Bo, BM, **Brz**, **Bu**, **Ci**, Cy, CD, Cz, Do, DL, DP, **FK**, Fe, **Go**, **Gr**, GP, **Gra**, Grad, Iz, JSB, JM, **Ja**, KP, **Ke**, Ki, Kl, Kor, **Kos**, Kw, La, Les, Li, **Law**, LK, **LL**, Lo, LoL, LW, Ma, Mar, Mi, Mo, **ND**, **NB**, Pa, **Ry**, Sa, **Si**, SW, SM, **SD**, Sl, Tr, Wi, Wie, Wik, WW, Wo, WP, WM, WSm, Wr, Za, Zab. *Galinsoga ciliata* (Raf.) S. F. Blake (35): **Al**, **Bi**, **Brz**, **Bu**, **Ci**, CD, CM, **Da**, **Go**, **Gr**, **Gra**, GN, **Ja**, **Jo**, Kam, **Ke**, **Kis**, **Kos**, Kro, Les, Li, **Law**, **Lu**, Mar, **ND**, **NB**, NP, **Ro**, **Ry**, Sa, **Si**, **SD**, SL, Sl, **Zam.** *Galinsoga parviflora* Cav. (69): **Al**, Ad, Au, **Bi**, **Brz**, **Bu**, **Ci**, Cy, CD, CM, **Da**, DP, **FB**, **FK**, **Go**, **Gr**, **Gra**, GN, Ho, JT, **Ja**, **Jo**, Kam, **Kar**, KP, **Ke**, **Kis**, Kl, Kor, **Kos**, **Kr**, Kro, La, Las, Les, Li, **Law**, LoL, LW, **Lu**, Ma, ML, Mar, Mi, Mo, **ND**, **NB**, NP, NW, PD, **PK**, **Ro**, **Ry**, Sa, **Si**, SW, **SD**, SL, Sl, Wi, Wie, **Wier**, WS, WWe, Wy, Za, Zab, **Zam**, **ZG.** *Helianthus tuberosus* L. (68): Ad, **Bi**, Bo, Bro, **Bu**, CD, CM, Cz, **Da**, DP, **FB**, **Go**, **Gr**, **Gra**, GN, Ho, Iz, JSB, JT, JM, **Ja**, **Jo**, Ka, Kam, KP, **Ke**, Kl, KN, KS, **Kr**, Kro, Kw, La, Las, Le, Les, Li, LK, Lo, LoL, LW, **Lu**, Ma, ML, Mar, Mo, **ND**, Pa, **Ro**, **Ry**, Sa, **Si**, SW, SM, **SD**, Sl, Tr, **Tru**, Wie, **Wier**, WT, Wo, WSm, WWe, Wr, Za, **Zam**, **ZG.** *Heracleum sosnowskyi* Manden (1): **Go.** *Impatiens glandulifera* Royle (26): **Brz**, **Bu**, **Ci**, CD, **Da**, **Go**, Iz, ID, JM, **Ja**, KN, Las, LW, Mo, Pa, PL, **Ry**, Sa, SW, **SD**, SL, **Tru**, WT, WW, Za, **Zam.** *Impatiens parviflora* DC. (42): **Ci**, CD, CM, Cz, Do, DL, **Go**, **Gr**, **Gra**, Ho, Iz, ID, JSB, JM, **Jo**, KP, **Ke**, Kl, KS, Kor, **Kos**, Las, Le, Li, **LL**, Lo, LoL, ML, Mar, Mo, **PK**, PL, **Si**, **SD**, SL, Tr, Wie, **Wier**, Wik, Za, Zab, **Zam.** *Iva xanthiifolia* Nutt. (8): Bo, DP, Ka, Li, **ND**, **NB**, WWe, Wy. *Juncus tenuis* Willd. (14): **Al**, **Bu**, **Ci**, **Go**, **Ja**, **Jo**, Kam, **Kar**, KS, **Kos**, **ND**, **Ry**, Zab, **Zam.** *Leymus arenarius* (L.) Hochst. (13): **Brom**, **Bu**, CM, **FB**, **FK, Go**, **Ja**, **Jo**, Las, ML, **Ry, Si**, **Tru.** *Lolium multiflorum* Lam. (7): **Brz**, Las, Li, Mi, **ND**, TL, Wi. *Lupinus polyphyllus* Lindl. (19): Ad, **Bi**, Bo, **Bu**, **Ci**, **Gr**, Grad, **Ja**, **Jo**, **Kar**, Li, **Law**, **LL**, LoL, Ma, **NB**, **Ry**, Wik, WP. *Lycium barbarum* L. (10): **Bu**, **Ci**, DL, **Gr**, Ki, **Kis**, Li, Tu, Za, Zab. *Oxalis fontana* Bunge (44): **Al**, **Bi**, **Brz**, **Bu**, **Ci**, CM, **Da**, **FK, Go**, **Gr**, **Gra**, GN, **Ja**, **Jo**, Kam, **Ke**, **Kis**, Kor, **Kos**, **Kr**, Kro, Les, **Law**, **Lu**, Mar, Mi, **ND**, **NB**, NP, NW, **PK**, **Ro**, **Ry**, Sa, SP, **Si**, **SD**, Sl, **Tru**, **Wier**, WS, Wy, **Zam**, **ZG.** *Padus serotina* (Ehrh.) Borkh. (16): Br, CM, Grad, Ka, KN, KS, Las, Le, Lo, LW, ML, SW, Wik, WSm, Wy, Za. *Parthenocissus inserta* (A. Kern.) Fritsch (71): Ad, Au, Bo, BM, Bro, BZ, **Ci**, Cy, CD, Cz, Do, DL, DP, Fe, **Go**, GP, **Gra**, Grad, Iz, JSB, JT, JM, **Ja**, Ka, Kam, **Kar**, KP, **Ke**, Kl, KN, KS, Kw, La, Las, **Law**, Lo, LoL, LW, **Lu**, Ma, ML, Mar, Mo, **NB**, Pa, PL, **Ro**, Sa, **Si**, SW, SWF, SM, **SD**, SL, Sl, Tr, **Tru**, Wi, Wie, **Wier**, Wik, WT, Wo, WP, WM, WC, WSm, WWe, Wr, Za, Zab. *Philadelphus coronarius* L. (39): **Bi**, BM, Br, BZ, **Ci**, **FK**, Fe, **Gr**, GP, **Gra**, Grad, **Ja**, **Jo, Kar**, KP, **Kis**, KN, KS, Ko, **Kos**, Les, **Law**, LK, ML, **ND**, **NB**, **Ry**, SM, SL, Wi, Wie, Wik, WW, Wo, WSm, Wy, Za, Zab, **Zam.** *Physalis alkekengi* L. (1): **Lu.** *Quercus rubra* L. (31): BZ, DP, **Gra**, Iz, ID, **Kar**, KB, KP, **Ke**, Kor, Kro, **Law**, LK, **LL**, Lo, LoL, LW, **NB**, PD, **Ro**, Sa, **Si**, SWF, SM, **SD**, Sl, Tr, Tu, WSm, Wy, **Zam.** *Reynoutria japonica* Houtt. (47): Ad, Bo, Bro, **Ci**, **Da**, DL, DP, **FK**, **Go**, **Gra**, Iz, ID, JSB, Ka, Kam, **Kar**, KB, KP, **Ke**, Ki, Kl, KS, Kor, Kw, La, Las, Les, Lo, LoL, LW, Mar, Mi, Mo, Pa, PL, SW, **SD**, Sl, **Tru**, Wi, Wie, **Wier**, WP, WSm, Za, Zab, **Zam.** *Reynoutria sachalinensis* (F. Schmidt) Nakai (3): Cz, La, SW. *Rhus typhina* L. (102): **Al**, Ad, Au, Bo, BM, Br, Bro, **Brom**, **Brz**, **Bu**, BZ, **Ci**, Cy, CD, CM, Cz, **Da**, De, Do, DL, DP, **FB**, **FK**, **Go**, GP, Grad, GN, Iz, JSB, JT, JM, **Ja**, **Jo**, Ka, Kam, KB, KP, **Ke**, Ki, Kl, KN, KS, Ko, Kor, **Kr**, Kro, Kw, La, Las, Le, Les, LK, Lo, LoL, LW, **Lu**, Ma, ML, Mi, Mo, **ND**, NP, NS, NW, Pa, PD, PL, **Ro**, **Ry**, Sa, SP, **Si**, SW, SWF, SM, **SD**, StP, SL, Sl, TL, Tr, **Tru**, Tu, Wi, Wie, **Wier**, Wik, WS, WT, WW, Wo, WP, WM, WC, WSm, WWe, Wr, Wy, Za, Zab, **Zam**, Zi. *Robinia pseudoacacia* L. (88): **Al**, Au, **Bi**, Bo, BM, Bro, **Bu**, BZ, **Ci**, Cz, De, Do, DL, DP, **FB**, **FK**, Fe, **Go**, **Gr**, **Gra**, Grad, Ho, Iz, JSB, JT, **Ja**, **Jo**, Ka, Kam, **Kar**, KB, KP, **Ke**, Ki, **Kis**, Kl, KS, Ko, Kor, **Kos**, **Kr**, Kro, La, Las, Le, Les, Li, **Law**, LK, Lo, LW, **Lu**, Ma, Mi, **ND**, **NB**, NP, NS, PD, **PK**, **Ry**, Sa, SP, **Si**, SW, SM, **SD**, Sl, TL, Tr, **Tru**, Tu, Wi, **Wier**, Wik, WS, WT, WW, WM, WSm, WWe, Wr, Wy, Za, Zab, **Zam**, **ZG**, Zi. *Rosa rugosa* Thunb. (60): **Bi**, Bo, **Brz**, **Bu**, CM, Cz, **FB**, **FK**, **Gr**, GP, **Gra**, Grad, GN, Iz, JSB, **Ja**, **Jo**, Kam, **Ke**, Ki, Kl, **Kos**, Kw, La, Las, Le,

Les, Li, Lo, LoL, LW, ML, Mar, Mo, **ND**, **NB**, Pa, PL, **Ry**, Sa, SP, **Si**, SW, SWF, SM, Sl, TL, Tr, Wi, Wie, Wik, WT, WW, WM, WSm, Wr, Wy, Za, Zab, **Zam.** *Rudbeckia laciniata* L. (60): **Bi**, Bro, **Bu**, **Ci**, Cy, CD, CM, Cz, **Da**, De, Do, **Go**, **Gr**, **Gra**, GN, JT, JM, **Ja**, **Jo**, Ka, Kam, KB, KP, **Kis**, Ko, **Kos**, Kro, La, Las, Le, Les, Li, **Law**, **LL**, LW, **Lu**, Mar, Mo, **ND**, **NB**, NS, NW, PD, PL, **Ry**, **Si**, SW, **SD**, TL, **Tru**, Wi, **Wier**, Wik, WT, WW, Wr, Wy, Za, Zab, **Zam.** *Rumex confertus* Willd. (32): **Al**, Ad, Au, Cy, De, **Go**, GN, Iz, JT, JM, KP, **Ke**, Ko, **Kr**, La, Las, Li, LW, Mi, Mo, NP, PD, **PK**, SP, SW, Sl, Wi, Wo, WP, Za, Zab, **ZG.** *Sarothamnus scoparius* (L.) W. D. J. Koch (12): **Brom**, **Gra**, **Kis**, **Kos**, **Kr**, Le, Les, **LL**, **NB**, Pa, **Si**, Sl. *Setaria pumila* (Poir.) Roem. & Schult. (50): **Al**, Ad, **Bi**, **Brz**, **Bu**, **Ci**, CD, Cz, **Da**, **FB**, **FK**, **Go**, GP, **Gra**, GN, **Ja**, **Jo**, Kam, **Ke**, **Kis**, Kor, **Kos**, Las, Le, Les, **Law**, **LL**, Lo, Mar, Mi, **ND**, **NB**, NW, **PK**, PL, **Ro**, **Ry**, SP, **Si**, SW, **SD**, SL, TL, **Tru**, Wi, Wie, **Wier**, Wy, Za, **Zam.** *Setaria viridis* (L.) P. Beauv. (74): **Al**, Au, **Bi**, Bo, Bro, **Brz**, **Bu**, **Ci**, Cy, CD, Cz, **Da**, Do, DL, DP, **FB**, **FK**, **Go**, **Gra**, GN, Ho, Iz, ID, **Ja**, **Jo**, **Kar**, KB, KP, **Kis**, Kl, Kor, **Kos**, **Kr**, Kro, Kw, La, Li, **Law**, Lo, LW, **Lu**, Ma, Mar, Mi, Mo, **ND**, **NB**, NP, NW, Pa, **PK**, **Ro**, **Ry**, Sa, **Si**, SW, SWF, SM, **SD**, SL, Sl, Tr, **Tru**, **Wier**, Wik, WS, Wo, WC, WWe, Wr, Wy, Zab, **Zam**, **ZG.** *Solidago canadensis* L. (71): **Al**, Ad, Au, **Bi**, Bo, BM, Bro, **Brom**, CD, CM, Cz, De, Do, DP, **FB**, Fe, **Go**, GP, **Gra**, GN, Ho, JT, JM, **Jo**, Ka, Kam, **Kar**, KB, **Ke**, KS, Ko, Kor, **Kr**, Kro, Le, Les, Li, LK, Lo, ML, **NB**, NP, NS, NW, PD, **PK**, PL, Sa, SP, **Si**, SW, SWF, StP, SL, Sl, TL, Tr, Tu, Wie, **Wier**, Wik, WW, Wo, WM, WC, WSm, Wr, Wy, Za, Zab, Zi. *Solidago gigantea* Aiton (100): **Al**, Ad, Au, **Bi**, Bo, BM, Bro, **Bu**, **Ci**, Cy, CD, CM, Cz, **Da**, De, Do, DL, DP, **FB**, Fe, **Go**, **Gr**, GP, **Gra**, Grad, GN, Ho, Iz, ID, JSB, JT, JM, **Ja**, **Jo**, Ka, KB, KP, **Kis**, Kl, KN, KS, Ko, Kor, **Kos**, **Kr**, Kro, Kw, La, Las, Le, Les, Li, **Law**, LK, **LL**, Lo, LoL, ML, Mar, Mi, Mo, **ND**, **NB**, NP, NS, NW, Pa, PD, PL, **Ro**, **Ry**, Sa, SP, **Si**, SW, SWF, SM, StP, SL, Sl, Tr, **Tru**, Tu, Wie, Wik, WS, WT, WW, Wo, WM, WC, WSm, WWe, Wr, Wy, Za, Zab, **Zam**, **ZG**, Zi. *Sorbaria sorbifolia* (L.) A. Braun (2): **NB**, Sl. *Spiraea chamaedryfolia* L. emend. Jacq. (30): Ad, Cz, Do, **Go**, GP, **Gra**, GN, Iz, Ka, Kl, Ko, La, Las, Le, LW, ML, Mar, Mo, NW, PL, Sa, **SD**, SL, TL, **Wier**, WS, WW, WSm, Wy, Za. *Symphoricarpos albus* (L.) S. F. Blake (48): Au, **Bi**, Br, **Brom**, **Brz**, **Ci**, DL, DP, **FK**, **Go**, **Gr**, **Gra**, Iz, JSB, JT, **Jo**, **Kar**, **Ke**, **Kis**, Kl, **Kos**, Kro, La, **LL**, Lo, LoL, LW, **Lu**, Ma, Mi, Mo, **ND**, **NB**, Pa, **Ry**, Sa, **SD**, Sl, TL, **Tru**, **Wier**, Wik, WT, WSm, Wr, Zab, **Zam**, **ZG.** *Syringa vulgaris* L. (97): **Al**, Ad, Au, **Bi**, Bo, BM, Br, Bro, **Brom**, **Bu**, BZ, **Ci**, Cy, De, Do, DL, DP, **FB**, **Go**, **Gr**, GP, **Gra**, Grad, GN, Ho, Iz, ID, JSB, JT, JM, **Ja**, **Jo**, Ka, Kam, **Kar**, KP, Ki, **Kis**, Kl, KN, KS, Ko, **Kos**, **Kr**, Kw, La, Las, Le, Les, Li, **Law**, LK, Lo, LoL, LW, Ma, ML, Mar, Mi, Mo, **ND**, **NB**, NP, Pa, PD, **PK**, PL, **Ry**, Sa, SP, **Si**, SW, SWF, SM, **SD**, StP, SL, Sl, TL, Tr, **Tru**, Tu, Wie, Wik, WS, WT, WW, Wo, WM, WC, WSm, WWe, Wr, Za, Zab, **Zam**, **ZG.** *Veronica persica* Poir. (29): **Al**, **Bi**, **Brz**, **Bu**, **Ci**, CM, **Go**, **Gr**, **Gra**, **Ja**, **Jo**, Kam, Kor, **Kos**, **Kr**, **Law**, **ND**, **NB**, NP, **PK**, **Ro**, **Ry**, Sa, SP, **Si**, **SD**, SL, **Tru**, **Zam.** *Xanthium albinum* (Widder) H. Scholz (2): Li, **Zam.**