10.2478/v10067-010-0004-y

ANNALES
UNIVERSITATIS MARIAE CURIE-SKŁODOWSKA
LUBLIN – POLONIA

VOL. LXIV,1 SECTIO C 2009

GRZEGORZ BZDON

Department of Botany, Institute of Biology, University of Podlasie,
Prusa 12, 08-110 Siedlce, Poland

Floristic diversity of gravel-pits of the Siedlce Plateau – an analysis of the flora

Różnorodność florystyczna żwirowni Wysoczyzny Siedleckiej – analiza flory

SUMMARY

Excavations formed as a result of natural resources exploitation belong to the most poorly floristically investigated ecological margins. They are anthropogenic sites distinguishable by specific habitat and ecological features, that is a result of differentiation of soil conditions, diversified relief and human activity. All that factors affect a large floristic biodiversity of these objects.

The flora of 65 post-exploitation excavations of the Siedlce Plateau includes 599 vascular plant species belonging to 323 genera and 82 families. Almost 73% of the analysed flora consists of native species, nearly 28% belong to anthropophytes, whereas 36 species (almost 6% of total flora) are diaphytes. A large share of terophytes (28.1%) indicates that the studied excavations are subject to a strong anthropopressure. Forest and shrub species (20.7%) play the most important role in the vegetation composition of gravel pits of the Siedlce Plateau. Meadow species are slightly less frequent (above 16%). A large share of xerothermic sward and forest margin species (8,2%) and psammophilous plants (6.9%) is also noteworthy. Alien-seed plants (95.5%) prevail over autochoric ones in the flora of the studied gravel pits. A distinct domination of anemochoric taxa (265 species – 44%) was observed among them. Less numerous are zoochoric species – 92 (15%). Some plants belong to polichoric ones – 200 species (32.4% of the total flora).

The aim of the paper is to estimate a floristic biodiversity of post-exploitation excavations of the Siedlce Plateau as well as demonstration of specific character and differentiation of the vascular flora of such habitats.

STRESZCZENIE

Wyrobiska powstałe w wyniku eksploatacji kruszyw należą do najsłabiej zbadanych florystycznie środowisk marginalnych. To antropogeniczne obszary wyróżniające się specyficznymi cechami siedliskowymi i ekologicznymi. Spowodowane jest to zróżnicowaniem warunków glebo-

wych, skomplikowaną rzeźbą terenu oraz działalnością człowieka. Wszystko to ma bezpośrednie odbicie w znacznej różnorodności florystycznej tych obiektów.

Flora 65 wyrobisk poeksploatacyjnych Wysoczyzny Siedleckiej liczy 599 gatunków roślin naczyniowych należących do 323 rodzajów i 82 rodzin. Niecałe 73% analizowanej flory stanowią gatunki rodzimego pochodzenia, prawie 28% to antropofity, a do diafitów zaliczono 36 gatunków, czyli nieco ponad 6% flory. W badanej florze nadreprezentowane są terofity (28,1%), których liczna obecność świadczy o związku tej grupy gatunków z początkowymi etapami sukcesji i o nasileniu antropopresji, jakiej poddane są wyrobiska. Najważniejszą rolę w szacie roślinnej żwirowni Wysoczyzny Siedleckiej odgrywają gatunki leśne i zaroślowe, których udział wyniósł 20,7%. Nieco mniej licznie reprezentowane są gatunki łąkowe – ponad 16%. Z pozostałych grup na uwagę zasługują rośliny kserotermicznych muraw i okrajków – (8,2%) oraz muraw psammofilnych – (6,9%). We florze badanych żwirowni można stwierdzić wyraźną dominację roślin obcosiewnych – 95,5%. Wśród nich odnotowano przewagę taksonów anemochorycznych – 265 gatunków (44%). Mniej liczne są gatunki zoochoryczne – 92 (15%). Duża część roślin to taksony polichoryczne – 200 gatunków (32,4% flory ogólnej).

Wyniki pracy próbują ocenić bogactwo florystyczne wyrobisk poeksploatacyjnych Wysoczyzny Siedleckiej oraz wykazują specyfikę i zróżnicowanie flory naczyniowej tego typu siedlisk.

K e y w o r d s: floristic diversity, gravel-pits, Siedlce Plateau

INTRODUCTION

Gravel and sand are being excavated in all administration units of Poland with various intensity determined by the occurrence and management of these resources (Dwucet et al. 1992). Excavated material is mainly used in building industry. Gravel pits formed after exploitation of aggre-gate materials are the areas of specific habitat and ecological properties due to diverse soil conditions and complicated land relief. Species composition of plant communities and their internal struc-ture is also affected by human activity. All this is reflected by large floristic diversity of these objects.

Excavations left after exploitation of aggregate are the least floristically studied ecological margins. A group of gravel pits interesting from the floristic point of view was studied in Sweden (Lindström 1999; Windgren 2005). Effects of surrounding vegetation, substrate and regionality on vegetation development in abandoned gravel pits were analysed by Borgegård (1990). The role of local site and landscape factors in the succession of spontaneous vegetation in abandoned gravel--sand pits in the Czech Republic is presented in the paper by Řehounková and Prach (2006).

More detailed floristic and phytosociological studies of such areas in Poland were carried out in Silesia (Furdyna 1974; Kompała 1997; Czylok 1997; Bąba, Kompała 2003; Bąba et al. 2003) and Western Pomerania (Młynkowiak, Kutyna 1999). Gravel pits as secondary sites of *Lycopodiella inundata* were described by Cieszko and Kucharczyk (1997) and by Czarnecka (2000). The same problem in reference to *Liparis loeselli* was dealt with by Bzdon and Ciosek (2006). Bzdon (2003; 2008) described the occurrence of grasses in gravel pits of the Siedlce Plateau considering the gravel pits as "habitat islands".

It thus appears that knowledge of post-exploitation gravel pits is far unsatisfactory. This paper on plant cover in post-exploitation sand and gravel pits in the Siedlce Plateau is the first stage of a broader study covering such habitats and carried out within the research project 2PO4G 10528.

Aims of this paper:

1. an assessment of floristic richness in abandoned gravel pits in the Siedlce Plateau,
2. demonstration of specific properties and differentiation of vascular flora in habitats of such type.

STUDY AREA

Siedlce Plateau is situated in mid-eastern part of Poland (52°00' – 52°45'N and 22°10' – 23°10'E). It covers an area of 2502 km^2. According to the physiographic division of Kondracki (1994) the mesoregion Siedlce Plateau belongs to the Mid-European Lowland province, to the Mid-Poland Lowlands sub-province and to the South-Podlasian Lowland macroregion. According to the gebotanical division by J. M. Matuszkiewicz (1993) study area is situated in Southpodlasian Subregion, Southpodlasian-Masovian Region, Masovian Subdivision, Masovian-Polesie Division and Mid-European Province. Main types of landscapes in the area are: deciduous forests, deciduous and mixed coniferous forests, coniferous and mixed coniferous forests and the landscape of oak forests and deciduous forests (Matuszkiewicz J. M. 1993). Study area is situated within administration borders of Masovian Voivodeship.

Table 1 presents characteristics of all 65 studied excavations in the Siedlce Plateau. Location of studied objects is shown in Figure 1.

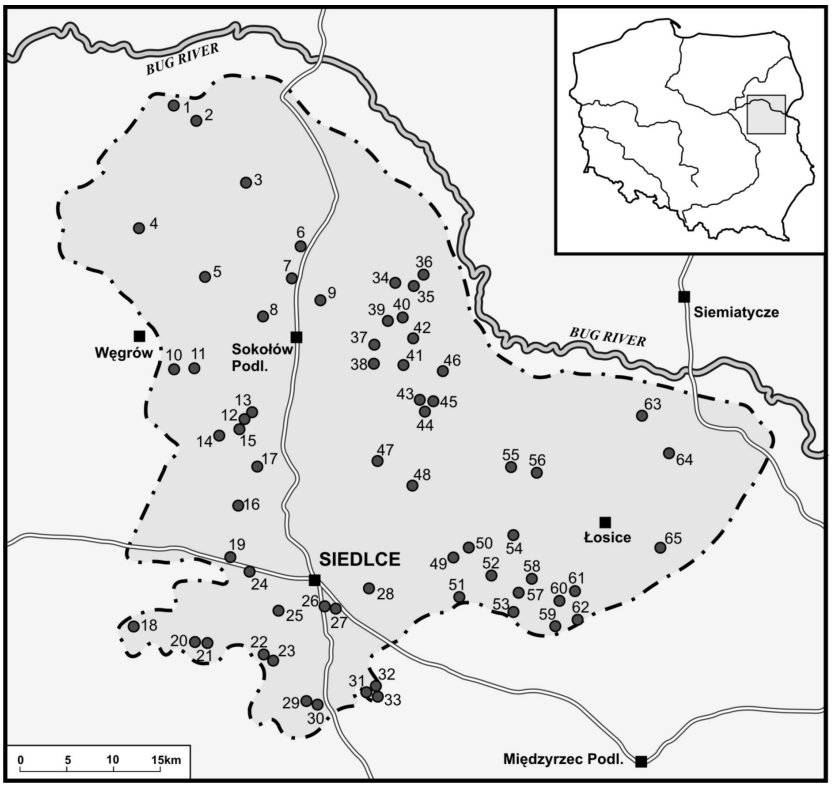

Figure 1. Distribution of study gravel pits (1–65) in the Siedlce Plateau

Table 1. Characteristics of gravel pits of the Siedlce Plateau

Gravel pits No	Locality	Nr of ATPOL square	Area of gravel pits	Exploitation intensity (area of exploitation in %)	Surrounding	Humidity
1	Wólka Okrąglik	FC73	0.2 ha	disused (since 30 years)	pine forest	dry
2	Guty	FC73	3 ha	extensive (5%)	heterogeneous	wet
3	Telaki	FC84	1.8 ha	intensive (65%)	heterogeneous	dry
4	Międzyleś	FC93	0.2 ha	disused (since 15 years)	cultivated fields	dry
5	Kolonia Miedzna	FC94	3.8 ha	extensive (20%)	cultivated fields	water
6	Suchodół Włościański	FC95	3.5 ha	intensive (55%)	heterogeneous	water
7	Kupiętyn	FC94	0.9 ha	extensive (15%)	heterogeneous	dry
8	Przeździatka	FD04	1.6 ha	disused (since 10 years)	cultivated fields	water
9	Wyrąb	FC95	0.2 ha	extensive (30%)	heterogeneous	water
10	Ruchna	FD03	2.2 ha	extensive (20%)	heterogeneous	water
11	Ruchenka	FD03	0.2 ha	disused (since 20 years)	pine forest	dry
12	Trebień	FD14	0.2 ha	extensive (25%)	cultivated fields	dry
13	Wiechetki	FD14	0.4 ha	extensive (20%)	cultivated fields	water
14	Zemły	FD14	0.5 ha	extensive (15%)	heterogeneous	dry
15	Świniary	FD14	0.2 ha	disused (since 15 years)	pine forest	dry
16	Bale	FD24	0.5 ha	extensive (20%)	pine forest	dry
17	Osiny Dolne	FD14	0.8 ha	disused (since 10 years)	heterogeneous	wet
18	Żeliszew Duży Kolonia	FD33	0.9 ha	extensive (15%)	heterogeneous	water
19	Grzęzów	FD24	3.3 ha	intensive (90%)	cultivated fields	dry
20	Dąbrówka Stany 1	FD34	2 ha	extensive (30%)	heterogeneous	water
21	Dąbrówka Stany 2	FD34	0.6 ha	intensive (80%)	heterogeneous	dry
22	Gołąbek 2	FD35	0.2 ha	intensive (70%)	pine forest	dry
23	Gołąbek 1	FD35	1.0 ha	intensive (70%)	pine forest	dry
24	Opole Stare	FD24	0.2 ha	extensive (40%)	heterogeneous	dry

Table 1 – continued.

25	Żelków	FD34	0.1 ha	extensive (25%)	pine forest	dry
26	Siedlce-Taradajki	FD35	1.6 ha	extensive (20%)	heterogeneous	water
27	Ujrzanów	FD35	2.2 ha	extensive (5%)	heterogeneous	water
28	Stok Lacki	FD25	0.2 ha	disused (since 15 years)	heterogeneous	water
29	Kaczory 1	FD35	0.9 ha	intensive (60%)	cultivated fields	water
30	Kaczory 2	FD35	0.7 ha	intensive (70%)	cultivated fields	dry
31	Okniny Podzdrój 1	FD46	2.6 ha	extensive (10%)	cultivated fields	wet
32	Okniny Podzdrój 3	FD46	1.0 ha	extensive (10%)	pine forest	wet
33	Okniny Podzdrój 2	FD46	1.4 ha	disused (since 15 years)	heterogeneous	wet
34	Władysławów	FC95	0.1 ha	disused (since 15 years)	heterogeneous	dry
35	Łuzki I	FC96	0.3 ha	disused (since 5 years)	cultivated fields	wet
36	Niemirki	FC96	2.1 ha	extensive (15%)	heterogeneous	water
37	Repki	FD05	1.2 ha	disused (since 20 years)	cultivated fields	wet
38	Repki-Skorupki	FD05	2 ha	extensive (10%)	cultivated fields	wet
39	Kamianka	FD06	0.2 ha	disused (since 10 years)	cultivated fields	wet
40	Kolonia Kamianka	FD06	0.2 ha	disused (since 10 years)	cultivated fields	dry
41	Szkopy	FD06	1.8 ha	extensive (20%)	cultivated fields	water
42	Mołomotki	FC96	0.6 ha	extensive (40%)	pine forest	dry
43	Wyrozęby-Podawce	FD06	0.2 ha	extensive (40%)	heterogeneous	dry
44	Skwierczyn	FD06	1.4 ha	extensive (10%)	heterogeneous	wet
45	Sawice Kościelne	FD06	1.3 ha	disused (since 15 years)	pine forest	wet
46	Ostrowiec	FD06	0.9 ha	extensive (10%)	heterogeneous	water
47	Rzeszotków	FD15	1.0 ha	extensive (10%)	cultivated fields	water
48	Stasin	FD16	0.6 ha	extensive (10%)	heterogeneous	water
49	Mordy 1	FD27	1.0 ha	disused (since 10 years)	heterogeneous	wet
50	Mordy 2	FD27	3.0 ha	intensive (60%)	heterogeneous	water
51	Radzików-Kornica	FD37	0.8 ha	disused (since 10 years)	cultivated fields	dry

Table 1 – continued.

52	Wólka Soseńska	FD26	0.4 ha	extensive (20%)	heterogeneous	dry
53	Pióry-Pytki	FD37	1.0	extensive (20%)	heterogeneous	wet
54	Wólka Biernaty	FD27	0.6 ha	extensive (10%)	pine forest	wet
55	Przesmyki	FD17	0.1 ha	extensive (25%)	cultivated fields	wet
56	Raczyny	FD17	0.4 ha	disused (since 10 years)	cultivated fields	wet
57	Klimy	FD27	0.8 ha	disused (since 20 years)	cultivated fields	wet
58	Bejdy	FD35	0.9 ha	disused (since 30 years)	pine forest	wet
59	Prochenki	FD38	1.9 ha	extensive (30%)	heterogeneous	wet
60	Olszanka 1	FD28	0.2 ha	intensive (60%)	cultivated fields	dry
61	Olszanka 2	FD28	0.2 ha	extensive (30%)	cultivated fields	dry
62	Korczówka	FD38	0.5 ha	extensive 10%	heterogeneous	wet
63	Kisielew-Dębniak	FD08	0.2 ha	disused (since 10 years)	cultivated fields	dry
64	Ostromęczyn	FD19	1.4 ha	extensive (5%)	cultivated fields	wet
65	Łuzki II	FD29	1.8 ha	disused (since 10 years)	cultivated fields	water

MATERIAL AND METHODS

Field studies were carried out in the years 2001–2004 in the whole area of the Siedlce Plateau. Sixty-five objects were selected and characterised. In every object phytosociological relevés were made in the optimum period of vegetation season. The lists were supplemented in other phases of phenologic cycle of plant development.

Species nomenclature (in the alphabetic order) and names of classes and families used in the paper were adopted after Mirek et al. (2002). The degree of species distribution was estimated based on now frequently used (e. g. Jackowiak 1990, Chmiel 1993) percentage scale. Six-degree scale of frequency of species occurrence was adopted (Tab. 2). Historical-geographic division was based on a concept elaborated by Thellung (1915) and modified by Kornaś (1968).

Post-exploitation excavations are the totally anthropogenic objects. Therefore, we resigned of dividing native species into non-synanthropic spontaneophytes and apophytes proposed by Jackowiak (1990). Based on mentioned concepts and the papers by Rostański and Sowa (1986), Zając et al. (1998), Rutkowski (1998) and considering specific character of the local flora the species were attributed to the following historical-geographic groups:

Table 2. Scale of occurrence frequency of species applied in the paper

Frequency class	Frequency definition	Number of localities	%
I	very rare	1–2	≤ 3%
II	rare	3–6	4–10%
III	quite frequent	7–13	11–20%
IV	frequent	14–26	21–40%
V	very frequent	27–39	41–60%
VI	common	40–65	61–100%

1. Native species (Na)
2. Anthropophytes
   2.1. Metaphytes
      − archeophytes (Ar)
      − kenophytes (Kn)
   2.2. Diaphytes (Df).

Classification of life forms was adopted after Lindacher (1995), Zarzycki et al. (2002) and Rutkowski (1998). Groups of life forms are given after Kornaś and Medwecka-Kornaś (1996). When the species could have several alternative life forms, all of them were mentioned but the first from those given by authors was taken for analysis.

Socio-ecological groups were adopted after the modified system of Jackowiak (1990). Sixteen such groups were distinguished:

1. Fertile deciduous forests and shrub communities (Cl. *Querco-Fagetea; Rhamno-Prunetea*),
2. Coniferous forests, mixed coniferous forests and substitute clearing communities (Cl. *Vaccinio-Piceetea; Quercetea robori-petraeae*; All. *Epilobion angustifolii*; Cl. *Nardo-Callunetea*),
3. Nitrophilous scrub and margin communities (All. *Sambuco-Salicion*; O. *Glechometalia hederaceae*),
4. Dry grasslands and margin communities (Cl. *Festuco-Brometea; Trifolio-Geranietea sanguinei*),
5. Xeric sand grasslands (Cl. *Koelerio glaucae-Corynephoretea canescentis*),
6. Alder woods and peatlands (Cl. *Alnetea glutinosae; Scheuchzerio-Caricetea nigrae; Oxycocco-Sphagnetea*),
7. Alluvial forests, rush and aquatic communities (Cl. *Salicetea purpureae; Lemnetea minoris; Potametea*; All. *Phragmition*; Cl. *Utricularietea intermedio-minoris*),
8. Moist meadows and herb communities (O. *Molinietalia*),
9. Fresh and moderately moist meadows (O. *Arrhenatheretalia*; species characteristic of the Cl. *Molinio-Arrhenatheretea*),
10. Nitrophilous flooded meadows and trampled communities (O. *Trifolio fragiferae-Agrostietalia stoloniferae; Plantaginetalia majoris*),
11. Terophyte communities in moist and wet sites (Cl. *Bidentetea tripartiti; Isoëto-Nanojuncetea*),
12. Mesophilous communities of tall perennials (O. *Artemisietalia vulgaris; Convolvuletalia sepium*),

13. Thermophilic perennial ruderal communities (O. *Onopordetalia acanthi*; Cl. *Agropyretea intermedio-repentis*),
14. Pioneer ruderal communities (O. *Sisymbrietalia; Eragrostietalia*),
15. Segetal communities (O. *Centauretalia cyani; Polygono-Chenopodietalia*; species characteristic of the Cl. *Stellarietea mediae*),
16. Species of unidentified phytosociological affiliation (mainly diaphytes).

Affiliation of taxa to particular groups was determined based on own observations and phytosociological classification of Matuszkiewicz (2001). Papers by Jackowiak (1990) and Chmiel (1993) were also used.

The way of diaspore dispersal is extremely important for the rate and intensity of colonisation of new areas by particular plant species. Affiliation to particular types of dispersal was estimated using study of Moraczewski et al. (2004).

The following types of dispersal were distinguished:

1. autochory (blastochory, ballochory, herpochory);
2. allochory:
   a) anemochory,
   b) zoochory,
   c) hydrochory,
   d) barochory,
   e) anthropochory.

Large number of species realises two (dichory) or more (polychory) types of diaspore dispersal which affects their competitive abilities. They were classified to the group of di- or polychory species.

RESULTS AND DISCUSSION

Taxonomic composition of the flora

The flora of post-exploitation excavations of the Siedlce Plateau includes 599 species of vascular plants which equals 20–26% of the Polish flora (Pawłowska 1977; Mirek et al. 2002) and c. 40% of the estimated flora of the mesoregion.

Found species belonged to 322 genera and 83 families. The families most numerous in species were *Asteracea*e (86 species – 14.4% of the flora) and *Poaceae* (60 species – 10.0% of the flora). This finding is obvious since the two families are most numerous in the flora of Poland. Families of rather large contribution were also *Fabaceae* (41 species – 6.8% of the flora), *Caryophyllaceae* (30 species – 5.0% of the flora) and *Rosaceae* (28 species – 4.7% of the flora). Eight families most rich in species, whose share exceeded 3% of the flora, grouped 316 species, i.e. almost 53% of the species composition of gravel pits.

Similar results were obtained by Młynkowiak and Kutyna (1999) and by Bąba and Kompała (2003) in their studies of gravel and sand pits. Surprisingly high rank was found there for the family *Fabaceae* as compared with the flora of Poland. It is the family whose representatives quickly invade anthropogenic habitats (as do representatives of the family *Poaceae*) and are able to remain there despite strong competition of other species. Maybe it is associated with their ability to fix atmospheric nitrogen, to produce large plant biomass and to overcome

the barrier of compact ground surface by plant seedlings (Bąba, Kompała 2003). Compared with the most numerous families of the analogous habitat of the sand pit in Kuźnica Warężyńska, *Cyperaceae, Salicaceae* oraz *Juncaceae* were missing in the top eight families (Tab. 3). Area of the mentioned sand pit is cut by ditches, draining channels and numerous overflowings which make favourable conditions for species of these families more or less associated with aquatic habitats (Bąba, Kompała 2003).

Most numerous in the analysed floras were the genera: *Salix* – 11, *Carex* – 9, *Trifolium* – 9, *Vicia* – 9 and *Veronica* – 8 species.

Table 3. The most species-abundant families in post-exploitation excavations (3 regions of Poland) in comparison with the total Polish flora

S.n.	Gravel pits on the Siedlce Plateau			Sandpit in Kuźnica Warężyńska (Bąba, Kąpała 2003)		Gravel pits in the Drawskie Lakeland (Młynkowiak, Kutyna 1999)		Flora of Poland (Pawłowska 1977)
	family	number of species	%	family	%	family	%	family
1	*Asteraceae*	86	14.4	*Asteraceae*	13	*Asteraceae*	16	*Asteraceae*
2	*Poaceae*	60	10.0	*Poaceae*	12	*Fabaceae*	11	*Poaceae*
3	*Fabaceae*	41	6.8	*Fabaceae*	7	*Poaceae*	10	*Roseaceae*
4	*Caryophyllaceae*	30	5.0	*Cyperaceae*	7	*Caryophyllaceae*	7	*Cyperaceae*
5	*Roseaceae*	28	4.7	*Caryophyllaceae*	5	*Roseaceae*	6	*Caryophyllaceae*
6	*Lamiaceae*	27	4.5	*Roseaceae*	5	*Brassicaceae*	6	*Scrophulariaceae*
7	*Brassicaceae*	25	4.2	*Salicaceae*	4	*Lamiaceae*	5	*Fabaceae*
8	*Scrophulariaceae*	19	3.2	*Juncaceae*	3	*Scrophulariaceae*	5	*Brassicaceae*

Frequency of species occurrence

The greatest share of over 28% in the flora of post-exploitation excavations in the Siedlce Plateau had very rare species, which together with rare species (24.9%) grouped 53% of analysed flora. Only 70 species, i.e. less than 12% were considered very frequent and common in the studied objects (Tab. 4).

The group of rare and very rare species included a large part of typical segetal weeds (i.a. *Anagallis arvensis, Veronica persica, Vicia tetrasperma*), species that have gone wild from field crops (*Triticum aestivum, Zea mays*) and from home gardens (*Ligustrum vulgare, Syringa vulgaris, Cucurbita pepo* and others). Many taxa noted in this group were the native species of natural habitats: deciduous forests (e.g. *Anemone nemorosa, Campanula persicifolia, Impatiens noli-tangere*), xeric meadows and margin communities (*Ajuga genevensis, Campanula*

Table 4. Occurrence frequency of species in the flora of gravel pits of the Siedlce Plateau

Frequency class	Frequency definition	Number of species	%
I	very rare	169	28.2
II	rare	149	24.9
III	quite frequent	119	19.9
IV	frequent	92	15.4
V	very frequent	41	6.8
VI	common	29	4.8
in total		599	100.0

rapunculoides or *Lathyrus sylvestris*) and even alder woods and peatlands (i.a. *Carex nigra, Liparis loeselii, Solanum dulcamara*).

To most often found elements of the analysed flora (very frequent and common species) belonged the native, eurytopic species able to colonise habitats disturbed by man such as: *Artemisia vulgaris, Rubus caesius, Urtica dioica* and *Fallopia convolvulus*. These classes of frequency also involved the species from fresh and moderately moist meadows like e.g. *Arrhenatherum elatius, Trifolium pratense*, *Poa pratensis* and ubiquitous *Taraxacum* sect. *Ruderalia*. Some mega- and nanofanerophytes such as *Sambucus nigra, Pinus sylvestris, Populus tremula* or *Salix caprea* were also common and very frequent.

Geographic-historical composition of the total flora

Anthropogenic origin of excavations was reflected in the composition of vascular plants associated with these objects. Nearly 73% of the flora of the Siedlce Plateau was formed by native species (non-synanthropic species and apophytes). It is slightly less than in other objects of this type. Młynkowiak and Kutyna (1999) estimated the share of native species in gravel pits of the Drawskie Lakeland at 82% and Bąba and Kompała (2003) found 87.5% share of native species in a sand pit in Kuźnica Warężyńska. Almost 28% of species in excavations of the Siedlce Plateau were anthropophytes (Tab. 5). In the latter group archeophytes dominated over kenophytes (11.2% and 8.7%, respectively). Diaphytes included 36 species, i.e. slightly over 6% of the flora. In relation to the whole flora of our country metaphytes were slightly overrepresented by 20.9% of species while in the flora of Poland they constitute from 13 (Kornaś 1977) to 16% (Mirek et al. 2002). This is due to the fact that many gravel pits are still penetrated and exploited by man, which results in the increasing of the share of alien species in the flora of the studied objects. Final effect depends also on the close surrounding of gravel pits.

Native species dominated in all classes of species frequency. The share of anthropophytes was the highest among very rare species (class I of frequency) where it exceeded 33% and decreased in subsequent classes to achieve 6.9% in class VI of frequency (Tab. 5). Among very frequent and common plants (frequency classes V and VI) vast majority (over 85%) were the native taxa. Archeophytes contributed in 15% to the group of very frequent species. Other groups either did not have their representatives in the mentioned frequency classes or their presence was negligible.

Table 5. Share of historical-geographic groups in frequency classes of gravel pits flora of the Siedlce Plateau

Historical-geographic division	Frequency class						Σ	
	I	II	III	IV	V	VI	number of species	%
Native species (Na)	113	104	88	69	35	27	436	72.8
Anthropophytes	56	45	31	23	6	2	163	27.2
Archeophytes (Ar)	19	17	16	14	6	1	73	12.2
Kenophytes (Kn)	16	19	10	6	0	1	52	8.7
Diaphytes (Df)	21	9	5	3	0	0	38	6.3
Σ	169	149	119	92	41	29	599	100

Groups of life forms

The majority of hemicryptophytes (42.3%) over other groups of life forms was found in the analysed flora. This result is almost identical with that reported for the gravel pit in Drawskie Lakeland (42.4%) (Młynkowiak, Kutyna 1999). In both cases perennials, i.e. hemicryptophytes together with geophytes and hydro- and helophytes, constituted c. 54% of species. It is slightly less than the contribution of that group of plants to the flora of Poland (c. 67%, Tab. 6). Overrepresented in the studied flora were the terophytes (28.1%), whose large number evidenced human impact affecting excavations. Terophytes are poor competitors but easily colonise open areas like dunes, croplands and ruderal sites. Similar results were obtained by Młynkowiak and Kutyna (1999). Similarly high proportion of hemicryptophytes and terophytes in the flora of external dumping site Pątnów–Jóźwin was reported by Balcerkiewicz et al. (1985), which indicates the ruderal character of such type of biocoenoses. Percent of megafanerophytes (5.7%) in the flora of gravel pits in the Siedlce Plateau is almost three times higher than the country mean (Pawłowska 1977). One species of the liana *Parthenocissus inserta* was also found in the flora of the studied objects.

Table 6. Share of life forms in gravel pits flora of the Siedlce Plateau. The Drawskie Lakeland region and Polish flora in total

Gravel pits in the Siedlce Plateau			Gravel pits in the Drawskie Lakeland (Młynkowiak, Kutyna 1999)	Flora of Poland (Pawłowska 1977)
life forms	number of species	%	%	%
Phanerophytes	70	11.7	9.2	about 9
Megaphanerophytes	34	5.7	4.9	about 2
Nanophanerophytes	36	6.0	4.3	about 7
Chamephytes	35	5.9	2.3	about 2
Hemicryptophytes	253	42.3	42.4	about 67
Cryptophytes	71	11.9	11.3	
Geophytes	47	7.8	10.0	
Helo- and hydrophytes	25	4.1	1.3	
Terophytes	168	28.1	34.8	about 22
Lianes	1	0.2	0.0	0
Σ	599	100.0	100.0	100

Socio-ecological groups

Species distribution among socio-ecological groups (Tab. 7) indicate that most important in plant cover of gravel pits in the Siedlce Plateau were the forest and scrub species (groups 1, 2 and 3) whose common share was 20.7% (124 species). Among these plants the most numerous (over 9%) species were those of deciduous forests and scrubs of the class *Rhamno-Prunetea* (group 1), slightly less – species of coniferous forests and substitute communities. Less frequently were represented the meadow species from the broadly understood class *Molinio-Arrhenatheretea* (groups 8, 9, 10), whose combined share was, however, high and exceeded 16% (97 species). The latter were definitely dominated by the species of fresh and moderately moist meadows – 7.4%, i.e. 44 species. Bąba and Kompała (2003) noted 21% of species from the class *Molinio-Arrhenatheretea*, in the flora of excavations, but Młynkowiak and Kutyna (1999) – only 12%.

From among other relatively numerous species in the flora of gravel pits in the Siedlce Plateau noteworthy were the species of xeric meadows and margin communities (group 4) represented by 49 species (8.2%) and of sandy grasslands (group 5) represented by 41 species (6.9%) whose large contribution was also underlined by the cited authors. Due to anthropogenic origin of the studied objects

Table 7. Socio-ecological groups in flora of gravel pits of the Siedlce Plateau

No	Socio-ecological groups	Number of species	%
1	Fertile deciduous forests and shrub communities (Cl. *Querco-Fagetea; Rhamno-Prunetea*)	55	9.2
2	Coniferous forests, mixed coniferous forests and substitute clearing communities (Cl. *Vaccinio-Piceetea*; *Quercetea robori-petraeae*; All. *Epilobion angustifolii*; Cl. *Nardo-Callunetea*)	52	8.7
3	Nitrophilous scrub and margin communities (All. *Sambuco-Salicion*; O. *Glechometalia hederaceae*)	17	2.8
4	Dry grasslands and margin communities (Cl. *Festuco-Brometea*; *Trifolio-Geranietea sanguinei*)	49	8.2
5	Xeric sand grasslands (Cl. *Koelerio glaucae-Corynephoretea canescentis*)	41	6.8
6	Alder woods and peatlands (Cl. *Alnetea glutinosae; Scheuchzerio-Caricetea nigrae*; *Oxycocco-Sphagnetea*)	28	4.7
7	Alluvial forests. rush and aquatic communities (Cl. *Salicetea purpureae*; *Lemnetea minoris; Potametea*; All. *Phragmition*; Cl. *Utricularietea intermedio-minoris*)	32	5.3
8	Moist meadows and herb communities (O. *Molinietalia*)	33	5.5
9	Fresh and moderately moist meadows (O. *Arrhenatheretalia*; species characteristic of the Cl. *Molinio-Arrhenatheretea*)	44	7.3
10	Nitrophilous flooded meadows and trampled communities (O. *Trifolio fragiferae-Agrostietalia stoloniferae*; *Plantaginetalia majoris*)	20	3.3
11	Terophyte communities in moist and wet sites (Cl. *Bidentetea tripartiti*; *Isoëto-Nanojuncetea*)	18	3.0
12	Mesophilous communities of tall perennials (O. *Artemisietalia vulgaris*; *Convolvuletalia sepium*)	28	4.7
13	Thermophilic perennial ruderal communities (O. *Onopordetalia acanthi*; Cl. *Agropyretea intermedio-repentis*)	42	7.0
14	Pioneer ruderal communities (O. *Sisymbrietalia*; *Eragrostietalia*)	26	4.3
15	Segetal communities (O. *Centauretalia cyani*; *Polygono-Chenopodietalia*; species characteristic of the Cl. *Stellarietea mediae*)	65	10.8
16	Species of unidentified phytosociological affiliation (mainly diaphytes)	50	8.4
Σ		599	100.0

an important role in their flora was played by ruderal species (groups 13 and 14) represented by 68 species (over 11% of the flora). Similar share (10%) of ruderal species was found in sand pit Kuźnica Warężyńska (Bąba, Kompała 2003). Segetal species (group 15) were also numerous (65 taxa or 10.9% of the flora). This was obviously associated with direct contact of most studied objects with agrophytocoenoses.

The flora of the studied objects contained also the species of alder woods and peatlands (group 6, nearly 5%), of alluvial forests, rush and aquatic communities (group 7, over 5%) and of a small group representing the classes *Bidentetea tripartiti* and *Isoëto-Nanojuncetea* (group 11.3%). These communities developed exclusively on the bottoms of excavations permanently or periodically flooded.

Table 8. Types of diaspores dispersal of species occurring in gravel pits of the Siedlce Plateau

Dispersal type	Number of species	%
Autochory	27	4.5
Allochory	371	61.9
Anemochory	265	44.2
Zoochory	92	15.4
Hydrochory	9	1.5
Anthropochory	6	1.0
Dichory	183	30.6
Polychory	17	2.9
Σ	599	100.0

Types of dispersal

As for the type of dispersal, plants of post-exploitation excavations of the Siedlce Plateau were dominated in 95.5% by allochoric species (Tab. 8). Among these species most numerous were anemochoric (including boleochoric) taxa represented by 265 species which made over 44% of the flora. Most *Poaceae*, but also many synanthropic species, both ruderal (e.g. *Conyza canadensis, Crepis tectorum, Lactuca serriola*) and segetal (e.g. *Anagallis arvensis, Arabidopsis thaliana, Veronica persica*) belonged to that group. This way of seed dispersion allows for transporting diaspores on large distances, e.g. *Tusillago farfara* up to 4000 m and *Abies alba* up to 7000 m (Vittoz, Engler 2007), which undoubtedly is a factor beneficial for migration and colonisation of new habitats. Boleochores, species characteristic of a little dispersion distance – usually less than 1 m, e.g., *Achillea millefolium, Campanula rotundifolia, Papaver sp.* are exceptions (Vittoz,

Engler 2007). Much less frequent were the taxa, which use animals to transport their diaspores (zoochory in e.g. *Ajuga reptans, Fragaria vesca and Pyrus pyraster*) – they were represented by 92 species, i.e. over 15% of the flora. Distances covered by these diaspores are usually equal to the range of animal's activity being usually smaller than those in anemochory. The exception from this rule is ornithochoric species like *Sorbus aucuparia, Prunus spinosa* or *Corylus avellana*, with dispersion range reaching 15,000 m (Vittoz, Engler 2007).

Many plants inhabiting the studied gravel pits (200 species i.e. 32.4% of the flora) occupy new areas using two or more ways of seed dispersal. Small number of these taxa (17) was attributed to polychoric species that use more than two ways of seed dispersal like, for example *Alnus glutinosa, Centaurea cyanus* or *Lycopus europaeus*. Most di- and polychoric species also use animals for colonisation of new areas. Immediate observations of dispersion routes, indicate a considerably larger participation of animals (usually birds) in formation of floristic composition (Vittoz, Engler 2007), in that case of gravel-pits' vegetation.

ACKNOWLEDGEMENTS

This work was partially supported by the Polish Committee for Scientific Research (grant No. 2 P04 G 10528)

REFERENCES

1. Balcerkiewicz S., Brzeg A., Pawlak G. 1985. Rośliny naczyniowe zwałowiska zewnętrznego Pątnów-Jóźwin (Vascular plants of the Pątnów-Jóźwin outer-dump). Bad. Fizjogr. Pol. Zach., Ser. B 35, 35–52.
2. Bąba W., Kompała A. 2003. Piaskownie – jako centra bioróżnorodności (Sandpits – as centres of biodiversity). Środowisko i rozwój 7 (1), 85–101.
3. Bąba W., Błońska A., Kompała A. 2003. Grasses in plant communities of the sand-pits. [w:] L. Frey (red.). Problems of Grass Biology. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków, 547–563.
4. BorgegÍrd S.-O. 1990. Vegetation development in abandoned gravel pits: effects of surrounding vegetation, substrate and regionality. J. Veg. Sci. 1, 675–682.
5. Bzdon G. 2003. Participation of grasses (*Poaceae*) in flora of selected sand-pits and gravel-pits exploitations of the Siedlecka Upland. In: L. Frey (red.). Problems of grass biology. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków, 563–568.
6. Bzdon G. 2008. Gravel pits as habitat islands: Floristic diversity and vegetation analysis. Pol. J. Ecol. 56 (2), 239–250.
7. Bzdon G., Ciosek M. T. 2006. Fen orchid *Liparis loeselii* (L.) Rich. in abandoned gravel-pit in Dąbrówka Stany near Siedlce. Biodiversity Research and Conservation. Poznań. 1 (16), 193–195.
8. Chmiel J. 1993. Flora roślin naczyniowych wschodniej części Pojezierza Gnieźnieńskiego i jej antropogeniczne przekształcenia w wieku XIX i XX. Część 1 i 2 (Vascular plant flora of the Eastern part of the Pojezierze Gnieźnieńskie and its anthropogenic changes in XIX and XX centuries. Part 1 and 2). Prace Zakł. Taks. Roślin UAM w Poznaniu. 1: 1–201; 2, 1–212.

9. Cieszko J., Kucharczyk M. 1997. Nieczynne piaskownie jako wtórne siedliska występowania widłaczka torfowego *Lycopodiella inundata* (L.) Holub. (Closed sandpits as secondary biotopes of marsh clubmoss *Lycopodiella inundata* (L.) Holub. Occurrence) In: S. Wika (red.). Roślinność obszarów piaszczystych (Vegetation of sand areas). Wydz. Biol. i Ochr. Środ. Uniw. Śląsk., Katowice-Dąbrowa Górnicza, 50–60.
10. Czarnecka J. 2000. Obszary silnie przekształcone – szansą dla widłaczka torfowego *Lycopodiella inundata* (Hevily transformed areas – chance for marsh club moss *Lycopodiella inundata*). Przegląd Przyr. 11 (2–3), 65–72.
11. Czylok A. 1997. Pionierskie zbiorowiska ze skrzypem pstrym *Equisetum variegatum* Schleich w wyrobiskach po eksploatacji piasku (Pioneering plant communities with variegated horsetail *Equisetum variegatum* Schleich. in the areas of sandpits). In: S. Wika (red.). Roślinność obszarów piaszczystych (Vegetation of sand areas). Wydz. Biol. i Ochr. Środ. Uniw. Śląsk., Katowice-Dąbrowa Górnicza, 61–66.
12. Dwucet K., Krajewski W., Wach J. 1992. Rekultywacja i rewaloryzacja środowiska przyrodniczego (Recultivation and revalorization of natural environment). Skrypty Uniw. Śląsk. 478, 1–150.
13. Furdyna L. 1974. Roślinność pionierska na obszarach objętych eksploatacją piasku podsadzkowego (Pioneer vegetation on areas affected by the exploitation of backfilling sand). Sylwan 2, 58–63.
14. Jackowiak B. 1990. Antropogeniczne przemiany flory roślin naczyniowych Poznania (Anthropogenic changes in the flora of vascular plants in Poznań). Wyd. Nauk. UAM w Poznaniu, Ser. Biol. 42, 1–232.
15. Kompała A. 1997. Spontaniczne procesy sukcesji na terenach po eksploatacji piasku na obszarze województwa katowickiego (Spontaneous processes of succession on the areas after exploitation of backfilling sand observing in the Katowice voivodship). Przegl. Przyr. 8 (1), 163–168.
16. Kondracki J. 1994. Geografia Polski, Mezoregiony fizycznogeograficzne (Geography of Poland, Physical-geographic mesoregions). PWN, Warszawa.
17. Kornaś J. 1968. Geograficzno-historyczna klasyfikacja roślin synantropijnych (Geographic-historical classification of synanthropic plants). Mat. Zakł. Fitosoc. Stos. UW 25, 33–41.
18. Kornaś J. 1977. Wpływ człowieka i jego gospodarki na szatę roślinną Polski. Flora synantropijna (Effect of human management on vegetation. Synanthropic flora) In: W. Szafer, K. Zarzycki (red.) Szata roślinna Polski (Vegetation of Poland), Vol. 1. PWN, Warszawa, 95–128.
19. Kornaś J., Medwecka-Kornaś A. 1986. Geografia roślin (Plant geography). PWN, Warszawa.
20. Lindacher R. (ed.). 1995. Phanart. Datebank der Gefässpflanzen Mitteleuropas. Erklärung der Kennzahlen, Aufbau und Inhalt. Veröffentlichungen des Geobotanischen Institutes EIDG tech. Hochschule, Stiftung Rübel, Zürich 125, 1–436.
21. Lindström Ĺ. 1999. Contributions to the flora of Orebro, south-central Sweden. 2. Areas with sandpits and gravel pits. Svensk Botanisk Tidskrift. 93, 265–278.
22. Matuszkiewicz J.M. 1993. Krajobrazy roślinne i regiony geobotaniczne Polski (Vegetation landscape and geobotanical regions of Poland). Prace Geogr. 158, 5–107.
23. Matuszkiewicz W. 2001. Przewodnik do oznaczania zbiorowisk roślinnych Polski (Guidebook to plant communities of Poland). Wyd. Nauk. PWN, Warszawa, 11–537.
24. Mirek Z., Piękoś-Mirkowa H., Zając A., Zając M., 2002: Flowering plants and pteridophytes of Poland. A checklist. W. Szafer Inst. Botany, Polish Acad. of Sciences, Kraków.
25. Młynkowiak E., Kutyna I. 1999. Wyrobiska po eksploatacji piasku i żwiru jako cenne biotopy śródpolne w zachodniej części Pojezierza Drawskiego (Sand-pit and gravel-pit exploitation hollows as valuable field biotopes in Western part of Drawskie Lake District). Przegl. Przyr. 10 (3–4), 85–110.

26. Moraczewski I. R., Sudnik-Wójcikowska B., Nowak K. A., Rutkowski L., Galera H. 2004. Flora ojczysta (Native flora). [CD-ROM]. Wyd. Cortex Nova. Bydgoszcz.
27. Pawłowska S. 1977. Charakterystyka statystyczna i elementy flory polskiej (Statistical characteristics and elements of Polish flora), In: W. Szafer, K. Zarzycki (red.) Szata roślinna Polski (Vegetation of Poland). Vol. 1. PWN, Warszawa, 129–206.
28. Rostański K., Sowa R. 1986. Alfabetyczny wykaz efemerofitów Polski (Alphabetical list of the ephemerophytes of Poland). Fragm. Flor. Geobot. 31–32 (1–2), 151–205.
29. Rutkowski L. 1998. Klucz do oznaczania roślin naczyniowych Polski niżowej (Guidebook to vascular plants of Polish Lowlands). Wyd. Nauk. PWN, Warszawa.
30. Řehounková K., Prach K. 2006. Spontaneous vegetation succession in disused gravel-sand pits: Role of local site and landscape factors. J. Veg. Sci. 17, 583–590.
31. Thellung A. 1915. Pflanzenwanderungen unter dem Einfluss des Menschen. Engler Bot. Jahrb., Leipzig 53 (3–5), Beibl. 116, 37–68.
32. Windgren Ĺ. 2005 Gravel pit becomes nature reserve for its botanical qualities. Svensk Botanisk Tidskrift. 99, 265–268.
33. Zając A., Zając M., Tokarska-Guzik B. 1998. Kenophytes in the flora of Poland: list, status and origin. Phytocenosis 10, Suppl. Cartogr. Geobot. 9, 107–116.
34. Zarzycki K., Trzcińska-Tacik H., Różański W., Szeląg Z., Wołek J., Korzeniak U., 2002. Ecological indicator values of vascular plants of Poland. W. Szafer Institute of Botany, Polish Academy of Sciences, Kraków, 1–183.

ANNEX. List of vascular plants species of gravel pits situated in the Siedlce Plateau

S.n.	Species	Family	Number of localities	Historical-geographic groups	Life forms	Socio-ecological groups	Types of dispersal
1	2	3	4	5	6	7	8
1	*Acer negundo* L.	*Aceraceae*	14	Kn	M	1	ane
2	*Acer platanoides* L.	*Aceraceae*	13	Na	M	1	ane
3	*Acer pseudoplatanus* L.	*Aceraceae*	5	Na	M	1	ane
4	*Achillea millefolium* L.	*Asteraceae*	62	Na	H	9	ane\zoo
5	*Achillea salicifolia* BESSER	*Asteraceae*	2	Na	H	8	ane\zoo
6	*Acinos arvensis* (LAM.) DANDY	*Lamiaceae*	11	Na	T	4	ane
7	*Acorus calamus* L.	*Araceae*	1	Kn	Hy	7	hyd
8	*Aegopodium podagraria* L.	*Apiaceae*	17	Na	H	1	ane
9	*Aesculus hippocastanum* L.	*Hippocastanaceae*	9	Kn	M	16	bar\zoo
10	*Aethusa cynapium* L.	*Apiaceae*	2	Ar	T	15	ane\ant
11	*Agrimonia eupatoria* L.	*Rosaceae*	14	Na	H	4	zoo
12	*Agrostemma githago* L.	*Caryophyllaceae*	1	Ar	T	15	zoo\ant
13	*Agrostis capillaris* L.	*Poaceae*	34	Na	H	2	ane
14	*Agrostis stolonifera* L.	*Poaceae*	11	Na	H	10	ane
15	*Ajuga genevensis* L.	*Lamiaceae*	1	Na	H	4	zoo
16	*Ajuga reptans* L.	*Lamiaceae*	3	Na	H	1	zoo
17	*Alisma plantago-aquatica* L.	*Alismataceae*	12	Na	Hy	7	hyd\zoo
18	*Allium oleraceum* L.	*Liliaceae*	3	Na	G	4	ane
19	*Allium vineale* L.	*Liliaceae*	3	Na	G	4	ane
20	*Alnus glutinosa* (L.) GAERTN.	*Betulaceae*	23	Na	M	6	ane\hyd\zoo
21	*Alopecurus geniculatus* L.	*Poaceae*	16	Na	H	10	ane
22	*Alopecurus pratensis* L.	*Poaceae*	18	Na	H	9	ane
23	*Amaranthus albus* L.	*Amaranthaceae*	1	Kn	T	14	ane
24	*Amaranthus caudatus* L.	*Amaranthaceae*	1	Df	T	16	ane
25	*Amaranthus retroflexus* L.	*Amaranthaceae*	15	Kn	T	14	ant
26	*Anagallis arvensis* L.	*Primulaceae*	3	Ar	T	15	ane
27	*Anchusa arvensis* (L.) M. BIEB.	*Boraginaceae*	12	Ar	T	15	zoo
28	*Anchusa officinalis* L.	*Boraginaceae*	12	Na	H	13	zoo
29	*Anemone nemorosa* L.	*Ranunculaceae*	1	Na	G	1	zoo
30	*Anethum graveolens* L.	*Apiaceae*	1	Df	T	16	ane\ant
31	*Angelica sylvestris* L.	*Apiaceae*	1	Na	H	8	ane
32	*Anthemis arvensis* L.	*Asteraceae*	19	Ar	T	15	ane\zoo
33	*Anthemis cotula* L.	*Asteraceae*	2	Ar	T	15	ane\ant
34	*Anthemis tinctoria* L.	*Asteraceae*	8	Na	H	4	ane
35	*Anthoxanthum odoratum* L.	*Poaceae*	19	Na	H	9	ane
36	*Anthriscus sylvestris* (L.) HOFFM.	*Apiaceae*	25	Na	H	3	ane
37	*Anthyllis vulneraria* L.	*Fabaceae*	7	Na	H	4	ane
38	*Apera spica-venti* (L.) P. BEAUV.	*Poaceae*	20	Ar	T	15	ane
39	*Arabidopsis thaliana* (L.) HEYNH.	*Brassicaceae*	5	Na	H (T)	15	ane
40	*Arabis glabra* (L.) BERNH.	*Brassicaceae*	1	Na	H	4	ane
41	*Arctium lappa* L.	*Asteraceae*	16	Na	H	12	zoo

42	*Arctium minus* (HILL) BERNH.	*Asteraceae*	11	Na	H	12	zoo
43	*Arctium tomentosum* MILL.	*Asteraceae*	24	Na	H	12	zoo
44	*Arenaria serpyllifolia* L.	*Caryophyllaceae*	18	Na	T	5	ane
45	*Armeria maritima* subsp. *elongata* (HOFFM.) BONNIER	*Plumbaginaceae*	3	Na	H	5	ane
46	*Armoracia rusticana* P. GAERTN., B. MEY. & SCHERB.	*Brassicaceae*	23	Ar	G	12	ane
47	*Arnoseris minima* (L.) SCHWEIGG. & KÖRTE	*Asteraceae*	2	Na	T	15	ane
48	*Arrhenatherum elatius* (L.) P. BEAUV. ex J. PRESL & C. PRESL	*Poaceae*	62	Na	H	9	ane
49	*Artemisia absinthium* L.	*Asteraceae*	26	Ar	Ch	13	ane\zoo
50	*Artemisia austriaca* JACQ.	*Asteraceae*	2	Kn	Ch	16	ane\zoo
51	*Artemisia campestris* L. subsp. *campestris*	*Asteraceae*	57	Na	Ch	4	ane\zoo
52	*Artemisia vulgaris* L.	*Asteraceae*	60	Na	Ch	13	ane\zoo
53	*Asparagus officinalis* L.	*Liliaceae*	5	Na	G	5	ane\zoo
54	*Aster lanceolatus* WILLD.	*Asteraceae*	6	Kn	H	12	ane
55	*Aster novi-belgii* L.	*Asteraceae*	1	Kn	H	12	ane
56	*Astragalus arenarius* L.	*Fabaceae*	2	Na	H	5	auto
57	*Astragalus cicer* L.	*Fabaceae*	2	Na	H	4	auto
58	*Astragalus glycyphyllos* L.	*Fabaceae*	4	Na	H	4	auto
59	*Athyrium filix-femina* (L.) ROTH	*Athyriaceae*	1	Na	H	1	ane
60	*Atriplex hortensis* L.	*Chenopodiaceae*	3	Df	T	14	ane\ant
61	*Atriplex nitens* SCHKUHR	*Chenopodiaceae*	1	Ar	T	14	ane\ant
62	*Atriplex oblongifolia* WALDST. & KIT.	*Chenopodiaceae*	4	Kn	T	14	ane\ant
63	*Atriplex patula* L.	*Chenopodiaceae*	11	Na	T	15	ane\ant
64	*Atriplex prostrata* BOUCHER ex DC.	*Chenopodiaceae*	3	Na	T	11	ane\hyd\ ant
65	*Atriplex rosea* L.	*Chenopodiaceae*	1	Ar	T	14	ane\ant
66	*Avena fatua* L.	*Poaceae*	1	Ar	T	15	ane\ant
67	*Avena sativa* L.	*Poaceae*	19	Df	T	16	ane
68	*Avenula pubescens* (HUDS.) DUMORT.	*Poaceae*	2	Na	H	9	auto\ane
69	*Ballota nigra* L.	*Lamiaceae*	41	Ar	C (H)	12	ane\zoo
70	*Batrachium circinatum* (SIBTH.) FR.	*Ranunculaceae*	1	Na	Hy	7	hyd\zoo
71	*Bellis perennis* L.	*Asteraceae*	1	Na	H	9	ane\zoo
72	*Berteroa incana* (L.) DC.	*Brassicaceae*	40	Na	H (T)	13	ane
73	*Betula pendula* ROTH	*Betulaceae*	50	Na	M	2	ane\zoo
74	*Betula pubescens* EHRH.	*Betulaceae*	4	Na	M	6	ane\zoo
75	*Bidens cernua* L.	*Asteraceae*	6	Na	T	11	hyd\zoo
76	*Bidens tripartita* L.	*Asteraceae*	8	Na	T	11	hyd\zoo
77	*Borago officinalis* L.	*Boraginaceae*	1	Df	T	16	zoo
78	*Brassica napus* subsp. *napus* L.	*Brassicaceae*	1	Df	T	16	ane\ant
79	*Brassica oleracea* subsp. *capitata* (L.) DUCHEARE	*Brassicaceae*	2	Df	T	16	ant
80	*Briza media* L.	*Poaceae*	1	Na	H	9	ane
81	*Bromus hordeaceus* L.	*Poaceae*	20	Na	T	9	ane

1	2	3	4	5	6	7	8
82	*Bromus inermis* LEYSS.	*Poaceae*	13	Na	H	13	ane
83	*Bromus tectorum* L.	*Poaceae*	10	Ar	T	13	ane
84	*Bryonia alba* L.	*Cucurbitaceae*	12	Kn	H	3	zoo
85	*Calamagrostis arundinacea* (L.) ROTH	*Poaceae*	2	Na	H	2	ane
86	*Calamagrostis epigejos* (L.) ROTH	*Poaceae*	32	Na	G	2	ane
87	*Calendula officinalis* L.	*Asteraceae*	6	Df	T	16	ane\zoo
88	*Calluna vulgaris* (L.) HULL	*Ericaceae*	5	Na	Ch	2	ane
89	*Caltha palustris* L. subsp. *palustris*	*Ranunculaceae*	1	Na	H	8	hyd
90	*Calystegia sepium* (L.) R. BR.	*Convolvulaceae*	10	Na	G (H) (li)	12	bar\hyd
91	*Camelina microcarpa* ANDRZ.	*Brassicaceae*	1	Na	T	15	ane\ant
92	*Campanula glomerata* L.	*Campanulaceae*	2	Na	H	4	ane
93	*Campanula patula* L. s. s.	*Campanulaceae*	4	Na	H	9	ane
94	*Campanula persicifolia* L.	*Campanulaceae*	1	Na	H	1	ane
95	*Campanula rapunculoides* L.	*Campanulaceae*	1	Na	H	4	ane
96	*Campanula rotundifolia* L.	*Campanulaceae*	1	Na	H	4	ane
97	*Capsella bursa-pastoris* (L.) MEDIK.	*Brassicaceae*	18	Ar	T	15	ane\ant
98	*Caragana arborescens* LAM.	*Fabaceae*	1	Df	N	16	auto
99	*Cardaminopsis arenosa* (L.) HAYEK	*Brassicaceae*	4	Na	H	9	ane
100	*Carduus acanthoides* L.	*Asteraceae*	22	Ar	H	13	ane\zoo
101	*Carduus crispus* L.	*Asteraceae*	4	Na	H	12	ane
102	*Carex digitata* L.	*Cyperaceae*	2	Na	H	1	ane
103	*Carex echinata* MURRAY	*Cyperaceae*	1	Na	H	6	ane
104	*Carex ericetorum* POLLICH	*Cyperaceae*	3	Na	G	2	ane
105	*Carex gracilis* CURTIS	*Cyperaceae*	11	Na	H	6	ane\hyd
106	*Carex hirta* L.	*Cyperaceae*	36	Na	G	10	ane
107	*Carex nigra* REICHARD	*Cyperaceae*	4	Na	G	6	ane\hyd
108	*Carex praecox* SCHREB.	*Cyperaceae*	3	Na	Hy (G)	4	ane
109	*Carex rostrata* STOKES	*Cyperaceae*	1	Na	Hy (H)	6	ane\hyd
110	*Carex vulpina* L.	*Cyperaceae*	9	Na	H (G)	6	ane
111	*Carlina vulgaris* L.	*Asteraceae*	1	Na	H	4	ane
112	*Carpinus betulus* L.	*Corylaceae*	15	Na	M	1	ane\zoo
113	*Centaurea cyanus* L.	*Asteraceae*	28	Ar	T	15	ane\zoo\ ant
114	*Centaurea jacea* L.	*Asteraceae*	21	Na	H	9	ane
115	*Centaurea scabiosa* L.	*Asteraceae*	18	Na	H	4	ane\zoo
116	*Centaurea stoebe* L.	*Asteraceae*	26	Na	H	4	ane
117	*Centaurium pulchellum* (SW.) DRUCE	*Gentianaceae*	1	Na	T	11	ane
118	*Cerastium arvense* L. s. s.	*Caryophyllaceae*	10	Na	C	13	ane\zoo
119	*Cerastium holosteoides* FR. em. HYL.	*Caryophyllaceae*	9	Na	C	9	ane\zoo
120	*Cerastium semidecandrum* L.	*Caryophyllaceae*	3	Na	T (H)	5	ane\zoo
121	*Cerasus avium* (L.) MOENCH	*Rosaceae*	1	Na	M	1	zoo
122	*Cerasus vulgaris* MILL.	*Rosaceae*	2	Df	M	16	zoo
123	*Ceratophyllum demersum* L. s. l.	*Ceratophyllaceae*	2	Na	Hy	7	hyd

124	*Chamaecytisus ratisbonensis* (SCHAEFF.) ROTHM.	*Fabaceae*	4	Na	Ch/N	2	auto\zoo
125	*Chamaecytisus ruthenicus* (FISCH. ex WOŁ.) KLÁSK.	*Fabaceae*	15	Na	N/Ch	2	auto\zoo
126	*Chamaenerion angustifolium* (L.) SCOP.	*Onagraceae*	16	Na	H	2	ane
127	*Chamomilla recutita* (L.) RAUSCHERT	*Asteraceae*	9	Ar	T	15	zoo
128	*Chamomilla suaveolens* (PURSH) RYDB.	*Asteraceae*	6	Kn	T	10	zoo\ant
129	*Chelidonium majus* L.	*Papaveraceae*	23	Na	H	3	zoo
130	*Chenopodium album* L.	*Chenopodiaceae*	45	Na	T	15	ane\zoo\ ant
131	*Chenopodium glaucum* L.	*Chenopodiaceae*	1	Na	T	11	ane\hyd\ ant
132	*Chenopodium hybridum* L.	*Chenopodiaceae*	6	Ar	T	15	ane\ant
133	*Chenopodium polyspermum* L.	*Chenopodiaceae*	5	Na	T	11	ane\ant
134	*Chenopodium rubrum* L.	*Chenopodiaceae*	9	Na	T	11	ane\hyd\ ant
135	*Chenopodium strictum* ROTH	*Chenopodiaceae*	6	Kn	T	14	ane\ant
136	*Chenopodium suecicum* MURR	*Chenopodiaceae*	3	Kn	T	14	ane\zoo\ ant
137	*Chimaphila umbellata* (L.) W. P. C. BARTON	*Pyrolaceae*	1	Na	H	2	ane
138	*Chondrilla juncea* L.	*Asteraceae*	2	Na	H	5	ane
139	*Cichorium intybus* L.	*Asteraceae*	38	Ar	H	13	ane\zoo
140	*Cirsium arvense* (L.) SCOP.	*Asteraceae*	44	Na	G	12	ane\zoo\ ant
141	*Cirsium oleraceum* (L.) SCOP.	*Asteraceae*	1	Na	H	8	ane
142	*Cirsium palustre* (L.) SCOP.	*Asteraceae*	8	Na	H	8	ane
143	*Cirsium rivulare* (JACQ.) ALL.	*Asteraceae*	6	Na	H	8	ane
144	*Cirsium vulgare* (SAVI) TEN.	*Asteraceae*	12	Na	H	12	ane\zoo\ ant
145	*Citrullus lanatus* (THUNB.) MANSFELD	*Cucurbitaceae*	1	Df	T	16	ant
146	*Clematis vitalba* L.	*Ranunculaceae*	1	Kn	N (li)	1	ane\zoo
147	*Clinopodium vulgare* L.	*Lamiaceae*	6	Na	H	4	ane\zoo
148	*Conium maculatum* L.	*Apiaceae*	3	Ar	T (H)	12	ane
149	*Consolida regalis* GRAY	*Ranunculaceae*	19	Ar	T	15	auto\ant
150	*Convallaria majalis* L.	*Liliaceae*	4	Na	G	2	zoo
151	*Convolvulus arvensis* L.	*Convolvulaceae*	57	Na	G (H) (li)	13	ant
152	*Conyza canadensis* (L.) CRONQUIST	*Asteraceae*	55	Kn	T (H)	14	ane
153	*Cornus sanguinea* L.	*Cornaceae*	11	Na	N	1	zoo
154	*Coronilla varia* L.	*Fabaceae*	24	Na	H	4	ane
155	*Corylus avellana* L.	*Corylaceae*	14	Na	N	1	zoo
156	*Corynephorus canescens* (L.) P. BEAUV.	*Poaceae*	35	Na	H	5	auto\ane
157	*Crataegus monogyna* JACQ.	*Rosaceae*	11	Na	N (M)	1	zoo
158	*Crepis biennis* L.	*Asteraceae*	1	Na	H	9	ane
159	*Crepis tectorum* L.	*Asteraceae*	10	Na	T (H)	14	ane

1	2	3	4	5	6	7	8
160	*Cucurbita pepo* L.	*Cucurbitaceae*	2	Df	T	16	ant
161	*Cynosurus cristatus* L.	*Poaceae*	3	Na	H	9	ane
162	*Cyperus fuscus* L.	*Cyperaceae*	2	Na	T	11	ane\hyd
163	*Dactylis glomerata* L. subsp. *glomerata*	*Poaceae*	60	Na	H	9	ane
164	*Dactylorhiza incarnata* (L.) SOÓ subsp. *incarnata*	*Orchidaceae*	3	Na	G	6	ane
165	*Danthonia decumbens* DC.	*Poaceae*	7	Na	H	2	ane
166	*Datura stramonium* L.	*Solanaceae*	4	Kn	T	14	ane
167	*Daucus carota* L.	*Apiaceae*	41	Na	H	9	ane\ant
168	*Deschampsia caespitosa* (L.) P. BEAUV.	*Poaceae*	19	Na	H	8	ane
169	*Deschampsia flexuosa* (L.) TRIN.	*Poaceae*	11	Na	H	2	ane
170	*Descurainia sophia* (L.) WEBB ex PRANTL	*Brassicaceae*	7	Ar	T	14	ane\ant
171	*Dianthus carthusianorum* L.	*Caryophyllaceae*	3	Na	C	5	ane
172	*Dianthus deltoides* L.	*Caryophyllaceae*	1	Na	C (H)	5	ane
173	*Digitaria ischaemum* (SCHREB.) H. L. MÜHL.	*Poaceae*	2	Ar	T	15	ane
174	*Digitaria sanguinalis* (L.) SCOP.	*Poaceae*	3	Ar	T	15	ane
175	*Dipsacus sylvestris* HUDS.	*Dipsacaceae*	8	Df	H	16	zoo
176	*Dryopteris carthusiana* (VILL.) H. P. FUCHS	*Aspidiaceae*	12	Na	H	1	ane
177	*Dryopteris filix-mas* (L.) SCHOTT	*Aspidiaceae*	12	Na	H	1	ane
178	*Echinochloa crus-galli* (L.) P. BEAUV.	*Poaceae*	32	Ar	T	15	ane
179	*Echinocystis lobata* (MICHX) TORR. et A. GRAY	*Cucurbitaceae*	2	Kn	T	12	hyd\zoo
180	*Echinops sphaerocephalus* L.	*Asteraceae*	1	Kn	H	13	zoo
181	*Echium vulgare* L.	*Boraginaceae*	26	Na	H	13	ane\zoo
182	*Eleocharis palustris* (L.) ROEM. & SCHULT.	*Cyperaceae*	11	Na	G (Hy)	7	ane\hyd
183	*Eleocharis uniglumis* (LINK) SCHULT.	*Cyperaceae*	5	Na	H (Hy) (T)	6	ane\hyd
184	*Elodea canadensis* MICHX.	*Hydrocharitaceae*	1	Kn	Hy	7	hyd
185	*Elymus caninus* (L.) L.	*Poaceae*	23	Na	H	1	ane
186	*Elymus hispidus* (OPIZ) MELDERIS	*Poaceae*	4	Na	G	4	ane
187	*Elymus repens* (L.) GOULD.	*Poaceae*	52	Na	G	13	ane
188	*Epilobium hirsutum* L.	*Onagraceae*	21	Na	H	12	ane
189	*Epilobium palustre* L.	*Onagraceae*	4	Na	H	8	ane\hyd
190	*Epilobium parviflorum* SCHREB.	*Onagraceae*	28	Na	H	12	ane
191	*Epilobium roseum* SCHREB.	*Onagraceae*	3	Na	H	12	ane
192	*Epipactis helleborine* (L.) CRANTZ s. s.	*Orchidaceae*	2	Na	G	1	ane
193	*Epipactis palustris* (L.) CRANTZ	*Orchidaceae*	2	Na	G	6	ane
194	*Equisetum arvense* L.	*Equisetaceae*	40	Na	G	13	ane\ant
195	*Equisetum fluviatile* L.	*Equisetaceae*	3	Na	Hy (G)	7	ane
196	*Equisetum hyemale* L.	*Equisetaceae*	3	Na	C	1	ane
197	*Equisetum palustre* L.	*Equisetaceae*	15	Na	G	8	ane

198	*Equisetum pratense* EHRH.	*Equisetaceae*	12	Na	G	1	ane
199	*Equisetum sylvaticum* L.	*Equisetaceae*	3	Na	G	1	ane
200	*Equisetum variegatum* SCHLEICH.	*Equisetaceae*	1	Na	C	6	ane
201	*Eragrostis minor* HOST	*Poaceae*	3	Kn	T	14	ane
202	*Erigeron acris* L.	*Asteraceae*	26	Na	T (H)	5	ane
203	*Erigeron annuus* (L.) PERS.	*Asteraceae*	7	Kn	T (H)	14	ane
204	*Erigeron ramosus* (WALTERS) BRITTON, STERNS & POGGENB.	*Asteraceae*	8	Kn	H	13	ane
205	*Erodium cicutarium* (L.) L'HÉR.	*Geraniaceae*	14	Na	T (H)	15	auto\zoo
206	*Erophila verna* (L.) CHEVALL.	*Brassicaceae*	16	Na	T	5	ane
207	*Eryngium planum* L.	*Apiaceae*	1	Na	H	4	ane\zoo
208	*Erysimum cheiranthoides* L.	*Brassicaceae*	9	Na	T	13	ane
209	*Euonymus europaeus* L.	*Celastraceae*	3	Na	N	1	zoo
210	*Euonymus verrucosus* SCOP.	*Celastraceae*	5	Na	N	1	zoo
211	*Eupatorium cannabinum* L.	*Asteraceae*	3	Na	H	3	ane
212	*Euphorbia cyparissias* L.	*Euphorbiaceae*	1	Na	H (G)	4	auto\zoo
213	*Euphorbia esula* L.	*Euphorbiaceae*	2	Na	H	4	auto\zoo
214	*Euphorbia helioscopia* L.	*Euphorbiaceae*	3	Ar	T	15	auto\zoo
215	*Euphorbia marginata* PURSH.	*Euphorbiaceae*	1	Df	T	16	auto\zoo
216	*Euphorbia peplus* L.	*Euphorbiaceae*	2	Ar	T	15	auto\zoo
217	*Euphrasia rostkoviana* HAYNE	*Scrophulariaceae*	4	Na	T	9	ane
218	*Fallopia convolvulus* (L.) Á. LÖVE	*Polygonaceae*	38	Ar	T	15	ane\zoo
219	*Fallopia dumetorum* (L.) HOLUB	*Polygonaceae*	14	Na	T	12	ane\zoo
220	*Festuca gigantea* (L.) VILL.	*Poaceae*	4	Na	H	1	ane
221	*Festuca ovina* L. s. l.	*Poaceae*	24	Na	H	5	ane
222	*Festuca pratensis* HUDS.	*Poaceae*	13	Na	H	9	ane
223	*Festuca rubra* L. s. l.	*Poaceae*	45	Na	H	9	ane
224	*Filago arvensis* L.	*Asteraceae*	11	Na	T	5	ane
225	*Filago minima* (SM.) PERS.	*Asteraceae*	2	Na	T	5	ane
226	*Filipendula ulmaria* (L.) MAXIM.	*Rosaceae*	1	Na	H	8	ane\hyd
227	*Fragaria vesca* L.	*Rosaceae*	28	Na	H	2	zoo
228	*Fragaria viridis* DUCHEAPE	*Rosaceae*	5	Na	H	4	zoo
229	*Fragaria x ananassa* DUCHEAPE	*Rosaceae*	8	Df	H	16	zoo
230	*Frangula alnus* MILL.	*Rhamnaceae*	25	Na	N	6	zoo
231	*Fraxinus excelsior* L.	*Oleaceae*	20	Na	M	1	ane\hyd
232	*Fumaria officinalis* L.	*Fumariaceae*	5	Ar	T	15	zoo
233	*Galeobdolon luteum* HUDS.	*Lamiaceae*	1	Na	C	1	zoo
234	*Galeopsis angustifolia* (EHRH.) HOFFM.	*Lamiaceae*	5	Na	T	16	zoo
235	*Galeopsis bifida* BOENN.	*Lamiaceae*	1	Na	T	2	zoo
236	*Galeopsis ladanum* L.	*Lamiaceae*	5	Ar	T	16	zoo
237	*Galeopsis pubescens* BESSER	*Lamiaceae*	9	Na	T	12	zoo
238	*Galeopsis speciosa* MILL.	*Lamiaceae*	2	Na	T	2	zoo
239	*Galeopsis tetrahit* L.	*Lamiaceae*	16	Na	T	2	zoo
240	*Galinsoga ciliata* (RAF.) S. F. BLAKE	*Asteraceae*	13	Kn	T	15	zoo\ant
241	*Galinsoga parviflora* CAV.	*Asteraceae*	12	Kn	T	15	zoo\ant
242	*Galium aparine* L.	*Rubiaceae*	21	Na	T	12	zoo

1	2	3	4	5	6	7	8
243	*Galium boreale* L.	*Rubiaceae*	1	Na	H	8	ane\zoo
244	*Galium mollugo* L. s. s.	*Rubiaceae*	33	Na	H	9	ane
245	*Galium palustre* L.	*Rubiaceae*	5	Na	H	6	ane\hyd\ zoo
246	*Galium spurium* L. s. l.	*Rubiaceae*	1	Ar	T	15	zoo
247	*Galium uliginosum* L.	*Rubiaceae*	4	Na	H	8	ane\zoo
248	*Galium verum* L. s. s.	*Rubiaceae*	17	Na	H	5	ane
249	*Genista tinctoria* L.	*Fabaceae*	6	Na	Ch	2	auto
250	*Geranium palustre* L.	*Geraniaceae*	2	Na	H	8	auto
251	*Geranium pratense* L.	*Geraniaceae*	5	Na	H	9	auto
252	*Geranium pusillum* BURM. f. ex L.	*Geraniaceae*	5	Ar	T	15	auto\zoo
253	*Geranium pyrenaicum* BURM. f.	*Geraniaceae*	1	Kn	H	13	auto\zoo
254	*Geranium robertianum* L.	*Geraniaceae*	8	Na	T (H)	3	auto
255	*Geranium sanguineum* L.	*Geraniaceae*	1	Na	H	4	auto
256	*Geum rivale* L.	*Rosaceae*	2	Na	H	8	zoo
257	*Geum urbanum* L.	*Rosaceae*	27	Na	H	3	zoo
258	*Glechoma hederacea* L.	*Lamiaceae*	22	Na	G (H)	3	zoo
259	*Glyceria fluitans* (L.) R. BR.	*Poaceae*	6	Na	Hy	7	ane
260	*Glyceria maxima* (HARTM.) HOLMB.	*Poaceae*	2	Na	Hy	7	ane
261	*Gnaphalium luteo-album* L.	*Asteraceae*	2	Na	T	11	ane
262	*Gnaphalium sylvaticum* L.	*Asteraceae*	7	Na	H	2	ane
263	*Gnaphalium uliginosum* L.	*Asteraceae*	5	Na	T	11	ane
264	*Gypsophila muralis* L.	*Caryophyllaceae*	1	Na	T	11	ane
265	*Helianthus annuus* L.	*Asteraceae*	10	Df	T	16	ane\zoo\ ant
266	*Helianthus tuberosus* L.	*Asteraceae*	12	Kn	G	12	ane\zoo
267	*Helichrysum arenarium* (L.) MOENCH	*Asteraceae*	22	Na	H	5	ane
268	*Heracleum sibiricum* L.	*Apiaceae*	15	Na	H	9	ane
269	*Heracleum sphondylium* L.	*Apiaceae*	6	Na	H	9	ane
270	*Herniaria glabra* L.	*Caryophyllaceae*	9	Na	H	5	ane
271	*Hesperis matronalis* L. subsp. *matronalis*	*Brassicaceae*	1	Df	H	16	ane
272	*Hieracium lachenalii* C. C. GMEL.	*Asteraceae*	6	Na	H	2	ane
273	*Hieracium murorum* L.	*Asteraceae*	4	Na	H	2	ane
274	*Hieracium pilosella* L.	*Asteraceae*	44	Na	H	2	ane
275	*Hieracium umbellatum* L.	*Asteraceae*	14	Na	T	2	ane
276	*Holcus lanatus* L.	*Poaceae*	6	Na	H	9	ane
277	*Holcus mollis* L.	*Poaceae*	5	Na	G (H)	2	ane
278	*Hordeum vulgare* L.	*Poaceae*	9	Df	T	16	ane
279	*Hottonia palustris* L.	*Primulaceae*	1	Na	Hy	7	hyd\zoo
280	*Humulus lupulus* L.	*Cannabaceae*	12	Na	H (li)	3	ane
281	*Hydrocharis morsus-ranae* L.	*Hydrocharitaceae*	1	Na	Hy	7	hyd
282	*Hyoscyamus niger* L.	*Solanaceae*	1	Ar	T (H)	13	ane\ant
283	*Hypericum maculatum* CRANTZ	*Clusiaceae*	7	Na	H	2	ane
284	*Hypericum montanum* L.	*Clusiaceae*	1	Na	H	1	ane

285	*Hypericum perforatum* L.	*Clusiaceae*	49	Na	H	4	ane\zoo
286	*Hypochoeris radicata* L.	*Asteraceae*	18	Na	H	5	ane
287	*Impatiens noli-tangere* L.	*Balsaminaceae*	2	Na	T	1	auto
288	*Impatiens parviflora* DC.	*Balsaminaceae*	8	Kn	T	3	auto
289	*Inula britannica* L.	*Asteraceae*	9	Na	H	10	ane
290	*Inula salicina* L.	*Asteraceae*	1	Na	H	8	ane
291	*Iris germanica* L.	*Iridaceae*	1	Df	H	16	ane
292	*Iris pseudacorus* L.	*Iridaceae*	4	Na	Hy (G)	6	ane\hyd
293	*Iva xanthiifolia* NUTT.	*Asteraceae*	1	Kn	T	13	ane\ant
294	*Jasione montana* L.	*Campanulaceae*	26	Na	H	5	ane
295	*Juglans regia* L.	*Juglandaceae*	2	Df	M	16	bar\zoo
296	*Juncus articulatus* L. em. K. RICHT.	*Juncaceae*	9	Na	H	6	ane\zoo
297	*Juncus bufonius* L.	*Juncaceae*	13	Na	T	11	ane\zoo
298	*Juncus compressus* JACQ.	*Juncaceae*	7	Na	G	10	ane
299	*Juncus conglomeratus* L. em. LEERS	*Juncaceae*	9	Na	H	8	ane\zoo
300	*Juncus effusus* L.	*Juncaceae*	13	Na	H	8	ane\zoo
301	*Juncus inflexus* L.	*Juncaceae*	6	Na	H	10	ane\zoo
302	*Juniperus communis* L. subsp. *communis*	*Cupressaceae*	21	Na	N	2	zoo
303	*Knautia arvensis* (L.) J. M. COULT.	*Dipsacaceae*	47	Na	H	9	zoo
304	*Kochia scoparia* (L.) SCHRAD.	*Chenopodiaceae*	7	Kn	T	16	ane
305	*Koeleria glauca* (SPRENG.) DC.	*Poaceae*	3	Na	H	5	ane
306	*Lactuca serriola* L.	*Asteraceae*	23	Ar	H	14	ane
307	*Lamium amplexicaule* L.	*Lamiaceae*	6	Ar	T	15	zoo
308	*Lamium maculatum* L.	*Lamiaceae*	1	Na	H	1	zoo
309	*Lamium purpureum* L.	*Lamiaceae*	3	Ar	T (H)	15	zoo
310	*Lapsana communis* L. s. s.	*Asteraceae*	7	Na	H (T)	3	ane
311	*Larix decidua* MILL. subsp. *decidua*	*Pinaceae*	4	Df	M	16	ane\zoo
312	*Lathyrus pratensis* L.	*Fabaceae*	1	Na	H	9	auto
313	*Lathyrus sylvestris* L.	*Fabaceae*	2	Na	H	4	auto
314	*Lemna minor* L.	*Lemnaceae*	10	Na	Hy	7	hyd\zoo
315	*Lemna trisulca* L.	*Lemnaceae*	2	Na	Hy	7	hyd\zoo
316	*Leontodon autumnalis* L. s. l.	*Asteraceae*	26	Na	H	9	ane
317	*Leontodon hispidus* L. s. l.	*Asteraceae*	3	Na	H	9	ane
318	*Leonurus cardiaca* L.	*Lamiaceae*	20	Ar	H	12	ane\zoo
319	*Lepidium campestre* (L.) R. BR.	*Brassicaceae*	1	Ar	T	14	ane\ant
320	*Lepidium ruderale* L.	*Brassicaceae*	8	Ar	T (H)	14	ane\ant
321	*Leucanthemum vulgare* LAM. s. s.	*Asteraceae*	4	Na	H	9	ane
322	*Ligustrum vulgare* L.	*Oleaceae*	4	Df	N	16	zoo
323	*Linaria vulgaris* MILL.	*Scrophulariaceae*	15	Na	G	13	ane\zoo\ ant
324	*Liparis loeselii* (L.) RICH.	*Orchidaceae*	1	Na	G (H)	6	ane
325	*Lolium multiflorum* LAM.	*Poaceae*	5	Kn	H (T)	14	ane
326	*Lolium perenne* L.	*Poaceae*	28	Na	H	10	ane
327	*Lonicera xylosteum* L.	*Caprifoliaceae*	3	Na	N	1	zoo
328	*Lotus corniculatus* L.	*Fabaceae*	28	Na	H	9	auto
329	*Lotus uliginosus* SCHKUHR	*Fabaceae*	2	Na	H	8	auto

1	2	3	4	5	6	7	8
330	*Lupinus polyphyllus* LINDL.	*Fabaceae*	7	Kn	H	16	auto
331	*Luzula campestris* (L.) DC.	*Juncaceae*	2	Na	H	2	ane\zoo
332	*Luzula pilosa* (L.) WILLD.	*Juncaceae*	8	Na	H	2	ane\zoo
333	*Lychnis flos-cuculi* L.	*Caryophyllaceae*	2	Na	H	8	ane
334	*Lycopersicon esculentum* MILL.	*Solanaceae*	2	Df	T	16	zoo\ant
335	*Lycopodium clavatum* L.	*Lycopodiaceae*	1	Na	C	2	ane
336	*Lycopus europaeus* L.	*Lamiaceae*	19	Na	H (Hy)	6	ane\hyd\ zoo
337	*Lysimachia nummularia* L.	*Primulaceae*	3	Na	C	10	ane
338	*Lysimachia vulgaris* L.	*Primulaceae*	12	Na	H	8	ane
339	*Lythrum salicaria* L.	*Lythraceae*	7	Na	H	8	ane\hyd\ zoo
340	*Maianthemum bifolium* (L.) F. W. SCHMIDT	*Liliaceae*	4	Na	C	1	zoo
341	*Malus domestica* BORKH.	*Rosaceae*	19	Df	M	16	zoo
342	*Malva alcea* L.	*Malvaceae*	4	Ar	H	13	ane
343	*Malva neglecta* WALLR.	*Malvaceae*	10	Ar	H (T)	14	ane
344	*Malva pusilla* SM.	*Malvaceae*	3	Ar	T	14	ane
345	*Malva sylvestris* L.	*Malvaceae*	7	Ar	T (H)	13	ane
346	*Matricaria maritima* subsp. *inodora* (L.) DOSTÁL	*Asteraceae*	28	Ar	T (H)	15	ane\zoo\ ant
347	*Medicago falcata* L.	*Fabaceae*	32	Na	H	4	ane\zoo
348	*Medicago lupulina* L.	*Fabaceae*	37	Na	T (H)	13	ane\zoo
349	*Medicago sativa* L. s. s.	*Fabaceae*	6	Kn	H	13	ane\zoo
350	*Medicago x varia* MARTYN	*Fabaceae*	6	Kn	H	16	ane\zoo
351	*Melampyrum nemorosum* L.	*Scrophulariaceae*	2	Na	T (pp)	4	zoo
352	*Melampyrum pratense* L.	*Scrophulariaceae*	10	Na	T (pp)	2	zoo
353	*Melandrium album* (MILL.) GARCKE	*Caryophyllaceae*	38	Na	T	13	ane\ant
354	*Melica nutans* L.	*Poaceae*	1	Na	G	1	ane\zoo
355	*Melilotus alba* MEDIK.	*Fabaceae*	29	Na	T	13	ane
356	*Melilotus officinalis* (L.) PALL.	*Fabaceae*	9	Na	T	13	ane
357	*Mentha aquatica* L.	*Lamiaceae*	3	Na	H (Hy)	7	ane\hyd
358	*Mentha arvensis* L.	*Lamiaceae*	12	Na	G (Hy)	11	ane
359	*Menyanthes trifoliata* L.	*Menyanthaceae*	2	Na	Hy (G)	6	hyd\zoo
360	*Mercurialis perennis* L.	*Euphorbiaceae*	2	Na	G (H)	1	ane\zoo
361	*Moehringia trinervia* (L.) CLAIRV.	*Caryophyllaceae*	8	Na	T (H)	1	zoo
362	*Molinia caerulea* (L.) MOENCH s. s.	*Poaceae*	3	Na	H	8	ane
363	*Mycelis muralis* (L.) DUMORT.	*Asteraceae*	3	Na	H	1	ane
364	*Myosotis arvensis* (L.) HILL	*Boraginaceae*	16	Ar	T (H)	15	zoo
365	*Myosotis palustris* (L.) L. em. RCHB. s. l.	*Boraginaceae*	3	Na	H	8	hyd\zoo
366	*Myosotis stricta* LINK ex ROEM. & SCHULT.	*Boraginaceae*	5	Na	T	5	zoo
367	*Myosoton aquaticum* (L.) MOENCH	*Caryophyllaceae*	1	Na	G (H)	12	ane
368	*Nepeta cataria* L.	*Lamiaceae*	1	Ar	H (C)	13	ane
369	*Neslia paniculata* (L.) DESV.	*Brassicaceae*	1	Ar	T	15	ane\ant

370	*Odontites serotina* (LAM.) RCHB. s. l.	*Scrophulariaceae*	7	Na	T (pp)	10	ane
371	*Oenothera biennis* L. s. l.	*Onagraceae*	34	Na	H	13	ane
372	*Oenothera rubricaulis* KLEB.	*Onagraceae*	3	Na	H	13	ane
373	*Ononis arvensis* L.	*Fabaceae*	2	Na	H (N)	4	ane
374	*Onopordon acanthium* L.	*Asteraceae*	2	Ar	H	13	ane\ant
375	*Origanum vulgare* L.	*Lamiaceae*	1	Na	H (C)	4	ane
376	*Orthilia secunda* (L.) HOUSE	*Pyrolaceae*	7	Na	Ch	2	ane
377	*Oxalis acetosella* L.	*Oxalidaceae*	5	Na	G (H)	1	auto
378	*Oxalis fontana* BUNGE	*Oxalidaceae*	5	Kn	G	15	auto
379	*Padus avium* MILL.	*Rosaceae*	18	Na	M	1	zoo
380	*Padus serotina* (EHRH.) BORKH.	*Rosaceae*	2	Kn	M	2	zoo
381	*Panicum miliaceum* L.	*Poaceae*	2	Df	T	16	ane
382	*Papaver argemone* L.	*Papaveraceae*	8	Ar	T	15	ane
383	*Papaver dubium* L.	*Papaveraceae*	1	Ar	T	15	ane
384	*Papaver rhoeas* L.	*Papaveraceae*	10	Ar	T	15	ane
385	*Papaver somniferum* L.	*Papaveraceae*	1	Df	T	15	ane
386	*Parthenocissus inserta* (A. KERN.) FRITSCH	*Vitaceae*	3	Kn	li	16	zoo
387	*Pastinaca sativa* L. s. l.	*Apiaceae*	6	Na	H	9	ane
388	*Peucedanum oreoselinum* (L.) MOENCH	*Apiaceae*	10	Na	H	4	ane
389	*Phalaris arundinacea var. arundinacea* L.	*Poaceae*	8	Na	G (H)	6	ane
390	*Phalaris arundinacea* var. *picta* L.	*Poaceae*	1	Df	H	16	ane
391	*Philadelphus coronarius* L.	*Hydrangeaceae*	3	Df	N	16	ane
392	*Phleum phleoides* (L.) H. KARST.	*Poaceae*	2	Na	H	4	ane
393	*Phleum pratense* L.	*Poaceae*	39	Na	H	9	ane
394	*Phragmites australis* (CAV.) TRIN. ex STEUD.	*Poaceae*	13	Na	G (Hy)	7	ane
395	*Picea abies* (L.) H. KARST.	*Pinaceae*	2	Kn	M	2	ane\zoo
396	*Pimpinella saxifraga* L.	*Apiaceae*	37	Na	H	13	ane
397	*Pinus sylvestris* L.	*Pinaceae*	53	Na	M	2	ane\zoo
398	*Plantago arenaria* WALDST. & KIT.	*Plantaginaceae*	2	Na	T	5	zoo
399	*Plantago intermedia* GILIB.	*Plantaginaceae*	10	Na	H (T)	11	zoo
400	*Plantago lanceolata* L.	*Plantaginaceae*	42	Na	H	10	zoo
401	*Plantago major* L.	*Plantaginaceae*	33	Na	H	10	zoo
402	*Plantago media* L.	*Plantaginaceae*	21	Na	H	4	zoo
403	*Poa angustifolia* L.	*Poaceae*	2	Na	H	13	ane
404	*Poa annua* L.	*Poaceae*	10	Na	T (H)	10	ane
405	*Poa compressa* L. s. l.	*Poaceae*	5	Na	H	13	ane
406	*Poa palustris* L.	*Poaceae*	10	Na	H	8	ane
407	*Poa pratensis* L. s. l.	*Poaceae*	32	Na	H	9	ane
408	*Poa trivialis* L.	*Poaceae*	12	Na	H	9	ane
409	*Polycnemum arvense* L.	*Chenopodiaceae*	8	Ar	T	15	ane
410	*Polygonum amphibium* L.	*Polygonaceae*	4	Na	G (Hy)	10	ane\hyd
411	*Polygonum aviculare* L.	*Polygonaceae*	22	Na	T	10	zoo\ant
412	*Polygonum hydropiper* L.	*Polygonaceae*	4	Na	T	11	ane

1	2	3	4	5	6	7	8
413	*Polygonum lapathifolium* L. subsp. *lapathifolium*	*Polygonaceae*	3	Na	T	11	ane\ant
414	*Polygonum lapathifolium* L. subsp. *pallidum* (WITH.) FR.	*Polygonaceae*	21	Na	T	15	ane\ant
415	*Polygonum persicaria* L.	*Polygonaceae*	9	Na	T	15	ane\ant
416	*Populus alba* L.	*Salicaceae*	7	Na	M	1	ane
417	*Populus nigra* L.	*Salicaceae*	5	Na	M	16	ane
418	*Populus tremula* L.	*Salicaceae*	48	Na	M	2	ane
419	*Potamogeton natans* L.	*Potamogetonaceae*	3	Na	Hy	7	hyd\zoo
420	*Potentilla anserina* L.	*Rosaceae*	34	Na	H	10	ane
421	*Potentilla arenaria* BORKH.	*Rosaceae*	7	Na	H	4	ane
422	*Potentilla argentea* L. s. l.	*Rosaceae*	38	Na	H	5	ane
423	*Potentilla collina* WIBEL s. s.	*Rosaceae*	11	Na	H	5	ane
424	*Potentilla erecta* (L.) RAEUSCH.	*Rosaceae*	14	Na	H	2	ane\zoo
425	*Potentilla reptans* L.	*Rosaceae*	1	Na	H	10	ane\zoo
426	*Primula veris* L.	*Primulaceae*	1	Na	H	4	ane\zoo
427	*Prunella vulgaris* HUDS.	*Lamiaceae*	7	Na	H	9	hyd\zoo
428	*Prunus cerasifera* EHRH.	*Rosaceae*	25	Kn	M	16	zoo
429	*Prunus spinosa* L.	*Rosaceae*	20	Na	N	1	zoo
430	*Pteridium aquilinum* (L.) KUHN	*Hypolepidaceae*	3	Na	G	2	ane
431	*Pyrola media* SW.	*Pyrolaceae*	2	Na	H	2	ane
432	*Pyrola minor* L.	*Pyrolaceae*	2	Na	H	2	ane
433	*Pyrola rotundifolia* L.	*Pyrolaceae*	3	Na	H	2	ane
434	*Pyrus communis* L.	*Rosaceae*	7	Df	M	16	zoo
435	*Pyrus pyraster* (L.) BURGSD.	*Rosaceae*	31	Na	M	1	zoo
436	*Quercus petraea* (MATT.) LIEBL.	*Fagaceae*	6	Na	M	2	bar\zoo
437	*Quercus robur* L.	*Fagaceae*	44	Na	M	1	bar\zoo
438	*Quercus rubra* L.	*Fagaceae*	2	Kn	M	2	bar\zoo
439	*Ranunculus acris* L. s. s.	*Ranunculaceae*	10	Na	H	9	ane\zoo
440	*Ranunculus auricomus* L. s. l.	*Ranunculaceae*	6	Na	H	1	zoo
441	*Ranunculus flammula* L.	*Ranunculaceae*	3	Na	H	6	hyd\zoo
442	*Ranunculus polyanthemos* L.	*Ranunculaceae*	3	Na	H	4	ane
443	*Ranunculus repens* L.	*Ranunculaceae*	20	Na	H	10	ane
444	*Ranunculus sceleratus* L.	*Ranunculaceae*	8	Na	T	11	ane
445	*Raphanus raphanistrum* L.	*Brassicaceae*	22	Ar	T	15	ane\ant
446	*Raphanus sativus* L.	*Brassicaceae*	1	Df	T	16	ane\ant
447	*Reseda lutea* L.	*Resedaceae*	1	Kn	H	13	ane\zoo
448	*Rhamnus catharticus* L.	*Rhamnaceae*	3	Na	N	1	ane
449	*Rhinanthus serotinus* (SCHÖNH.) OBORNÝ s. l.	*Scrophulariaceae*	3	Na	T	15	ane
450	*Rhus typhina* L.	*Anacardiaceae*	1	Df	N (M)	16	zoo
451	*Ribes nigrum* L.	*Grossulariaceae*	14	Na	N	6	zoo
452	*Ribes spicatum* E. ROBSON	*Grossulariaceae*	13	Na	N	1	zoo
453	*Robinia pseudacacia* L.	*Fabaceae*	18	Kn	M	3	ane\zoo
454	*Rorippa amphibia* (L.) BESSER	*Brassicaceae*	3	Na	Hy (H)	7	ane\hyd
455	*Rosa canina* L.	*Rosaceae*	13	Na	N	1	zoo
456	*Rubus caesius* L.	*Rosaceae*	34	Na	Ch (N)	12	zoo

457	*Rubus idaeus* L.	*Rosaceae*	15	Na	N	3	zoo
458	*Rubus saxatilis* L.	*Rosaceae*	2	Na	N	2	zoo
459	*Rudbeckia laciniata* L.	*Asteraceae*	1	Df	H (T)	16	ane\ant
460	*Rumex acetosa* L.	*Polygonaceae*	33	Na	H	9	ane
461	*Rumex acetosella* L.	*Polygonaceae*	52	Na	G (H)	5	ane\ant
462	*Rumex confertus* WILLD.	*Polygonaceae*	2	Kn	H	13	ane\hyd
463	*Rumex crispus* L.	*Polygonaceae*	28	Na	H	10	ane\hyd\ ant
464	*Rumex hydrolapathum* HUDS.	*Polygonaceae*	4	Na	Hy (H)	7	ane\hyd
465	*Rumex obtusifolius* L.	*Polygonaceae*	2	Na	H	12	ane\zoo
466	*Rumex thyrsiflorus* FINGERH.	*Polygonaceae*	14	Na	H	13	ane
467	*Salix alba* L.	*Salicaceae*	36	Na	M	7	ane
468	*Salix aurita* L.	*Salicaceae*	33	Na	N	6	ane
469	*Salix caprea* L.	*Salicaceae*	42	Na	N (M)	3	ane
470	*Salix cinerea* L.	*Salicaceae*	39	Na	N	6	ane
471	*Salix fragilis* L.	*Salicaceae*	34	Na	M	7	ane
472	*Salix myrsinifolia* SALISB.	*Salicaceae*	6	Na	N	7	ane
473	*Salix pentandra* L.	*Salicaceae*	4	Na	M (N)	6	ane
474	*Salix purpurea* L.	*Salicaceae*	18	Na	N	7	ane
475	*Salix repens* L. subsp. *rosmarinifolia* (L.) HARTM.	*Salicaceae*	12	Na	N (Ch)	2	ane
476	*Salix triandra* L.	*Salicaceae*	6	Na	N	7	ane
477	*Salix viminalis* L.	*Salicaceae*	10	Na	N	7	ane
478	*Sambucus nigra* L.	*Caprifoliaceae*	35	Na	N	3	zoo
479	*Sambucus racemosa* L.	*Caprifoliaceae*	1	Na	N	3	zoo
480	*Saponaria officinalis* L.	*Caryophyllaceae*	19	Na	H	12	ane
481	*Sarothamnus scoparius* (L.) WIMM.	*Fabaceae*	4	Na	N	2	ane\zoo
482	*Scabiosa ochroleuca* L.	*Dipsacaceae*	7	Na	H	4	ane
483	*Scirpus sylvaticus* L.	*Cyperaceae*	3	Na	G	8	ane\hyd
484	*Scleranthus annuus* L.	*Caryophyllaceae*	7	Ar	T	15	zoo
485	*Scleranthus perennis* L.	*Caryophyllaceae*	12	Na	C (H)	5	zoo
486	*Scleranthus polycarpos* L.	*Caryophyllaceae*	1	Na	T	5	zoo
487	*Scrophularia nodosa* L.	*Scrophulariaceae*	4	Na	H	1	ane
488	*Scutellaria galericulata* L.	*Lamiaceae*	1	Na	H	6	ane\hyd
489	*Secale cereale* L.	*Poaceae*	23	Df	T	16	ane
490	*Sedum acre* L.	*Crassulaceae*	19	Na	C	5	hyd\zoo
491	*Sedum maximum* (L.) HOFFM.	*Crassulaceae*	8	Na	H (G)	5	hyd\zoo
492	*Sedum sexangulare* L.	*Crassulaceae*	17	Na	C	5	hyd\zoo
493	*Sedum spurium* M. BIEB.	*Crassulaceae*	3	Kn	C	16	hyd\zoo
494	*Selinum carvifolia* (L.) L.	*Apiaceae*	3	Na	H	8	ane
495	*Senecio jacobaea* L.	*Asteraceae*	12	Na	H	4	ane
496	*Senecio vernalis* WALDST. & KIT.	*Asteraceae*	16	Kn	T	5	ane
497	*Senecio viscosus* L.	*Asteraceae*	1	Na	T	14	ane
498	*Senecio vulgaris* L.	*Asteraceae*	2	Ar	H (T)	15	ane\zoo
499	*Serratula tinctoria* L.	*Asteraceae*	1	Na	G (H)	8	ane

1	2	3	4	5	6	7	8
500	*Setaria pumila* (POIR.) ROEM. & SCHULT.	*Poaceae*	18	Ar	T	15	ane\ant
501	*Setaria viridis* (L.) P. BEAUV.	*Poaceae*	29	Ar	T	15	ane\ant
502	*Silene nutans* L. s. l.	*Caryophyllaceae*	1	Na	H	4	ane
503	*Silene otites* (L.) WIBEL	*Caryophyllaceae*	4	Na	H	5	ane
504	*Silene tatarica* (L.) PERS.	*Caryophyllaceae*	1	Na	H	5	ane
505	*Silene vulgaris* (MOENCH) GARCKE	*Caryophyllaceae*	31	Na	H (C)	13	ane
506	*Sinapis arvensis* L.	*Brassicaceae*	3	Ar	T	15	ane\ant
507	*Sisymbrium altissimum* L.	*Brassicaceae*	4	Kn	T (H)	14	ane\ant
508	*Sisymbrium loeselii* L.	*Brassicaceae*	4	Kn	H (T)	14	ane\ant
509	*Sisymbrium officinale* (L.) SCOP.	*Brassicaceae*	10	Ar	T	14	ane\ant
510	*Solanum dulcamara* L.	*Solanaceae*	2	Na	Ch (N)	6	zoo
511	*Solanum nigrum* L. em. MILL.	*Solanaceae*	2	Ar	T	15	zoo\ant
512	*Solanum tuberosum* L.	*Solanaceae*	6	Df	G	16	ant
513	*Solidago canadensis* L.	*Asteraceae*	14	Kn	H (G)	12	ane
514	*Solidago gigantea* AITON	*Asteraceae*	4	Kn	H (G)	12	ane
515	*Solidago virgaurea* L. s. s.	*Asteraceae*	25	Na	H	2	ane
516	*Sonchus arvensis* L. subsp. *arvensis*	*Asteraceae*	21	Na	G (H)	15	ane\ant
517	*Sonchus asper* (L.) HILL	*Asteraceae*	12	Ar	T	15	ane\zoo\ ant
518	*Sonchus oleraceus* L.	*Asteraceae*	6	Ar	T	15	ane\ant
519	*Sorbus aucuparia* L. em. HEDL.	*Rosaceae*	35	Na	N (M)	2	zoo
520	*Sparganium emersum* REHMANN	*Sparganiaceae*	2	Na	Hy	7	hyd
521	*Sparganium erectum* L. em. RCHB. s. s.	*Sparganiaceae*	2	Na	Hy	7	hyd
522	*Spergula arvensis* L.	*Caryophyllaceae*	4	Ar	T	15	ane
523	*Spergula morisonii* BOREAU	*Caryophyllaceae*	2	Na	T	5	ane
524	*Spergularia rubra* (L.) J. PRESL & C. PRESL	*Caryophyllaceae*	1	Na	T (H)	11	zoo
525	*Spirodela polyrhiza* (L.) SCHLEID.	*Lemnaceae*	1	Na	Hy	7	hyd\zoo
526	*Stachys palustris* L.	*Lamiaceae*	6	Na	G	8	ane\zoo
527	*Stellaria graminea* L.	*Caryophyllaceae*	4	Na	H	9	ane
528	*Stellaria holostea* L.	*Caryophyllaceae*	1	Na	C	1	ane
529	*Stellaria media* (L.) VILL.	*Caryophyllaceae*	8	Na	T	15	ane\ant
530	*Stellaria nemorum* L.	*Caryophyllaceae*	2	Na	H	1	ane
531	*Stellaria palustris* RETZ.	*Caryophyllaceae*	1	Na	H	8	ane\hyd
532	*Succisa pratensis* MOENCH	*Dipsacaceae*	3	Na	H	8	zoo
533	*Symphoricarpos albus* (L.) S. F. BLAKE	*Caprifoliaceae*	3	Kn	N	16	zoo
534	*Symphytum officinale* L.	*Boraginaceae*	3	Na	H (G)	8	zoo
535	*Syringa vulgaris* L.	*Oleaceae*	4	Kn	N	16	auto
536	*Tanacetum vulgare* L.	*Asteraceae*	25	Na	H	13	ane
537	*Taraxacum sect. Ruderalia* KIRSCH., H. ŘLLG. & ŠTĚPÁN.	*Asteraceae*	63	Na	H	9	ane\zoo
538	*Teesdalea nudicaulis* (L.) R. BR.	*Brassicaceae*	2	Na	T (H)	5	ane\ant
539	*Thalictrum aquilegiifolium* L.	*Ranunculaceae*	1	Na	H	1	ane
540	*Thalictrum minus* L. subsp. *minus*	*Ranunculaceae*	1	Na	H	4	ane

541	*Thlaspi arvense* L.	*Brassicaceae*	7	Ar	T	15	ane\ant
542	*Thymus pulegioides* L.	*Lamiaceae*	8	Na	C	5	zoo
543	*Thymus serpyllum* L. em. FR.	*Lamiaceae*	14	Na	C	5	zoo
544	*Tilia cordata* MILL.	*Tiliaceae*	5	Na	M	1	ane
545	*Tilia platyphyllos* SCOP.	*Tiliaceae*	3	Df	M	16	ane
546	*Torilis japonica* (HOUTT.) DC.	*Apiaceae*	17	Na	T (H)	3	ane
547	*Tragopogon dubius* SCOP.	*Asteraceae*	3	Kn	H	13	ane
548	*Tragopogon pratensis* L. s. s.	*Asteraceae*	7	Na	H	9	ane
549	*Trientalis europaea* L.	*Primulaceae*	1	Na	G	2	ane
550	*Trifolium alpestre* L.	*Fabaceae*	1	Na	H	4	ane\zoo
551	*Trifolium arvense* L.	*Fabaceae*	43	Na	T	5	ane\zoo
552	*Trifolium aureum* POLLICH	*Fabaceae*	11	Na	H (T)	5	ane\zoo
553	*Trifolium campestre* SCHREB.	*Fabaceae*	2	Na	T	5	ane\zoo
554	*Trifolium dubium* SIBTH.	*Fabaceae*	12	Na	T	9	ane\zoo
555	*Trifolium hybridum* L. subsp. *hybridum*	*Fabaceae*	14	Na	H	8	ane\zoo
556	*Trifolium medium* L.	*Fabaceae*	22	Na	H	4	ane\zoo
557	*Trifolium pratense* L.	*Fabaceae*	39	Na	H	9	ane\zoo
558	*Trifolium repens* L. subsp. *repens*	*Fabaceae*	44	Na	C (H)	10	ane\zoo
559	*Triticum aestivum* L.	*Poaceae*	6	Df	T	16	ane
560	*Tussilago farfara* L.	*Asteraceae*	30	Na	G	14	ane
561	*Typha angustifolia* L.	*Typhaceae*	20	Na	Hy (H)	7	ane
562	*Typha latifolia* L.	*Typhaceae*	12	Na	Hy (H)	7	ane
563	*Ulmus laevis* PALL.	*Ulmaceae*	17	Na	M	1	ane
564	*Urtica dioica* L.	*Urticaceae*	59	Na	H	12	ane\zoo
565	*Urtica urens* L.	*Urticaceae*	6	Ar	T	14	ane\zoo
566	*Utricularia vulgaris* L.	*Lentibulariaceae*	1	Na	Hy	7	hyd
567	*Vaccinium myrtillus* L.	*Ericaceae*	11	Na	Ch	2	zoo
568	*Vaccinium vitis-idaea* L.	*Ericaceae*	2	Na	Ch	2	zoo
569	*Valeriana officinalis* L.	*Valerianaceae*	3	Na	H	8	ane
570	*Verbascum densiflorum* BERTOL.	*Scrophulariaceae*	11	Na	H	13	ane
571	*Verbascum nigrum* L.	*Scrophulariaceae*	14	Na	H	3	ane
572	*Verbascum phlomoides* L.	*Scrophulariaceae*	5	Na	H	13	ane
573	*Verbascum phoeniceum* L.	*Scrophulariaceae*	2	Na	H	4	ane
574	*Veronica anagallis-aquatica* L.	*Scrophulariaceae*	3	Na	H	7	ane\hyd
575	*Veronica chamaedrys* L. s. l.	*Scrophulariaceae*	10	Na	C	9	ane\zoo
576	*Veronica officinalis* L.	*Scrophulariaceae*	11	Na	C	2	zoo
577	*Veronica persica* POIR.	*Scrophulariaceae*	1	Kn	T	15	ane
578	*Veronica scutellata* L.	*Scrophulariaceae*	1	Na	H	6	hyd
579	*Veronica spicata* L.	*Scrophulariaceae*	7	Na	H (C)	4	ane
580	*Veronica triphyllos* L.	*Scrophulariaceae*	9	Ar	T	15	ane
581	*Veronica verna* L.	*Scrophulariaceae*	1	Na	T	5	ane

1	2	3	4	5	6	7	8
582	*Viburnum opulus* L.	*Caprifoliaceae*	6	Na	N	1	zoo
583	*Vicia angustifolia* L.	*Fabaceae*	3	Ar	T	15	auto
584	*Vicia cracca* L.	*Fabaceae*	31	Na	H	9	auto
585	*Vicia faba* L.	*Fabaceae*	1	Df	T	16	bar\zoo
586	*Vicia hirsuta* (L.) S. F. GRAY	*Fabaceae*	17	Ar	T	15	auto
587	*Vicia sativa* L.	*Fabaceae*	1	Ar	T	15	auto
588	*Vicia sepium* L.	*Fabaceae*	7	Na	H	4	auto
589	*Vicia tenuifolia* ROTH	*Fabaceae*	1	Na	H	4	auto
590	*Vicia tetrasperma* (L.) SCHREB.	*Fabaceae*	1	Ar	T	15	auto
591	*Vicia villosa* ROTH	*Fabaceae*	11	Ar	T	15	auto
592	*Vinca minor* L.	*Apocynaceae*	1	Na	C	16	zoo
593	*Viola arvensis* MURRAY	*Violaceae*	25	Ar	T	15	auto\zoo
594	*Viola canina* L. s. l.	*Violaceae*	3	Na	H	2	auto\zoo
595	*Viola palustris* L.	*Violaceae*	1	Na	H	6	auto\zoo
596	*Viola reichenbachiana* JORD. ex BOREAU	*Violaceae*	4	Na	H	1	auto\zoo
597	*Viola riviniana* RCHB.	*Violaceae*	2	Na	H	1	auto\zoo
598	*Viscaria vulgaris* RÖHL.	*Caryophyllaceae*	4	Na	C (H)	4	ane
599	*Zea mays* L.	*Poaceae*	3	Df	T	16	zoo\ant