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VASCULAR FLORA OF A PART OF THE PLANNED HRVATSKO ZAGORJE REGIONAL PARK (NORTHWESTERN CROATIA)

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The wild vascular flora of the area in the northwestern part of Croatia - Hrvatsko zagorje (near the settlements of Cerje Jesenjsko, Šaša, Pašnik, Vrbno and Ježovec, along with the related hamlets) was explored during the vegetation season of 2011. So far, no floristic data have been recorded for this area, planned to be a part of the future Hrvatsko zagorje Regional Park. On the area of about 4 km^2, 389 vascular plant species (which belong to 77 families) were noticed. The most abundant families are Fabaceae (9.3%), Poaceae (7.7%), Asteraceae (7.5%), Lamiaceae (6.2%) and Rosaceae (5.1%). The spectrum of life forms indicates the dominance of hemicryptophytes (50.4%), and the most prominent chorological type is Eurasian (55.0%). The share of urbanophobic and invasive taxa as well as the values of indicators of anthropogenic changes in the researched flora indicate that the investigated area shows semi-natural character, with weak to moderate anthropogenic pressure. Although the share of endemic, endangered and protected taxa is low, the diversity of other native plants justifies protection of the researched area at the level of a regional park.

Keywords: floristic analysis, indicators of anthropogenic changes

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Samonikla vaskularna flora dijela Hrvatskog zagorja (okolica naselja Cerje Jesenjsko, Šaša, Pašnik, Vrbno i Ježovec s pripadajućim zaselcima) u sjeverozapadnom dijelu Hrvatske istražena je tijekom vegetacijske sezone 2011. godine. Za ovo područje, koje se nalazi unutar planiranog Regionalnog parka Hrvatsko zagorje, nisu do sada bili zabilježeni nikakvi floristički podaci. Na području veličine oko 4 km^2 zabilježeno je ukupno 389 svojti vaskularne flore, svrstanih u 77 porodica. Najzastupljenije porodice su Fabaceae (9,3%), Poaceae (7,7%), Asteraceae (7,5%), Lamiaceae (6,2%) te Rosaceae (5,1%). Spektar životnih oblika ukazuje na dominantnost hemikriptofita (50,4%), a najzastupljeniji geoelement je euroazijski (55,0%). Udio urbanofobnih i invazivnih svojti, kao i vrijednosti indikatora antropogenih promjena flore ukazuju da istraživano područje pokazuje poluprirodni karakter sa slabim do umjerenim antropogenim pritiskom. Iako je udio endemičnih, ugroženih i zaštićenih svojti nizak, raznolikost ostalih autohtonih biljaka opravdava zaštitu istraživanog područja na nivou regionalnog parka.

Ključne riječi: florističke analize, indikatori antropogenih promjena

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INTRODUCTION

Hrvatsko zagorje is a hilly area in the northwestern part of Croatia. Although the borders of this region are not clearly defined either geographically or administratively, the opinion of most experts as well as of the population of this area is that Hrvatsko zagorje extends between the Sutla River and the Mountains of Medvednica, Kalnik, Varaždin and Macelj (Poljak, 2007). Most of this area is covered with fields, vineyards and scattered villages, with forests stretched around. On the hill slopes there are relatively small areas of lawns, while in the river valleys there are much larger areas covered with meadow vegetation (Stančić, 2000). Around 400 m above the sea level are areas of large forests without settlements (Čaplar, 2011). Based on its natural and cultural richness, this area is included in the Strategy and Action Plan for the Protection of Biological and Landscape Diversity of the Republic of Croatia. It is also planned that it become a part of the Hrvatsko Zagorje Regional Park (Anonymous, 2007).

Although according to the Flora Croatica Database (Nikolić, 2018) no floristic data have been recorded for the researched area, Croatian Zagorje is more or less well-researched in this respect, especially the areas of Strahinščica and Krapina. However, most of these data are quite old, so any new research is very desirable, especially because of the plan to proclaim part of Hrvatsko Zagorje a regional park. Older floristic data are provided by Ljudevit Gaj (list of plant species for the wider area of Krapina in 1826), Schlosser and Vukotinović (botanical observations in the area of Krapina, Macelj and Trakošćan in 1853), while Hirc (during the years 1915 and 1916) elaborated in detail the flora of Krapina and its surroundings, Strahinščica, Maceljsko gorje, Trakošćan and Ravna gora (all previous quotes according to Hirc, 1917). After World War I, a contribution to the flora of Hrvatsko zagorje was given by Horvat (1929) and Horvatić (1931). Furthermore, Regula-Bevilacqua (1978) recorded a total of 1085 plant species for the Strahinščica area, and the same author returned to floristic research into Zagorje throughout the second half of the 20th century (Regula-Bevilacqua, 1985, 1986, 1991, Regula-Bevilacqua & Šegulja, 2000). Thereafter further floristic researches were conducted in the areas of: Konjščina (Stančić, 1994), Krapinske toplice (Šoštarić & Marković, 1998), Ivančica and Ravna gora (Šincek, 2003) and Ludbreg (Horvat, 2017). Also, research into orchids in Strahinščica and the surrounding area resulted in the finding of the new species *Epipactis nordeniorum* Robatsch (Borovečki-Voska, 2010). Floristic research continues in the second decade of the 21st century (eg, Šincek *et al*., 2012; Veić, 2015), and the flora of another area that should also be included in the planned Regional Park (the villages of Gornje and Donje Jesenje) was analysed by Salkić (2012).

The aims of our work were: (1) the inventorying of the vascular flora of a part of the planned Hrvatsko zagorje Regional Park (near the settlements of Cerje Jesenjsko, Šaša, Pašnik, Vrbno and Ježovec with the accompanying villages); (2) the analysis of the recorded flora according to: taxonomic preferences, life forms, chorological types, indicators of anthropogenic influence on plants (urbanophobia / indifference / urbanophilia), chronoelement and origin (native / endemic and endangered or protected vs. alien / invasive taxa), indicators of anthropogenic changes in flora; (3) the comparison of the results with those of floristic analyses of other urban and suburban areas (if possible).

Study area

The district investigated (Fig. 1) is about 4 km^2 in area, 12 km north of the city of Krapina, and it encompasses the surrounding area of the settlements Cerje Jesenjsko, Šaša, Pašnik, Vrbno and Ježovec, as well as the hamlets of Kuhari, Gamilec, Horvateki, Sambolići, Brački, Juretići, Banički, Smrečki, Brezni and Strmečki. Most of it is in Varaždin County, while a smaller part belongs to Krapina-Zagorje County (Anonymous, 2014). A large part of the area is under anthropogenic influence, with a lot of cultivated areas and grazing grasslands, while the surrounding hills are covered with forest vegetation.

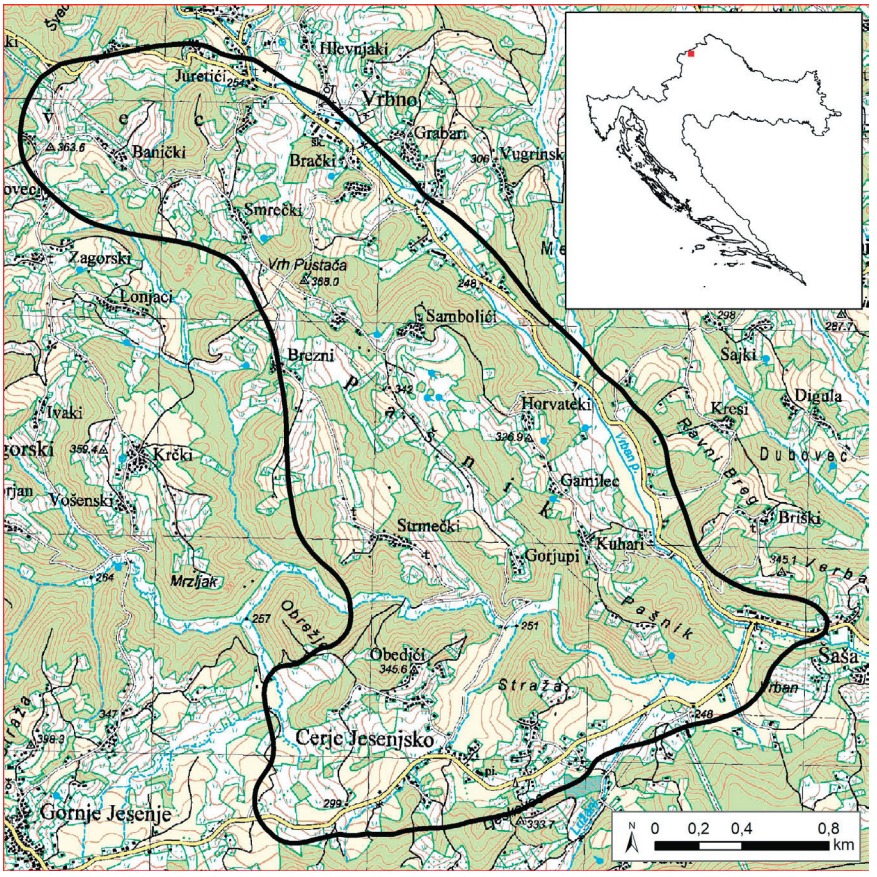

Fig. 1. Geographic position and detailed map of the researched area (a part of the planned Hrvatsko zagorje Regional park, northwest Croatia).

According to the geographical distribution of climatic types by Köppen, the climate type prevailing in the exploration area is Cfb - a temperate climate without dry season and with a warm summer (Filipčić, 1998). The coldest month of the year (January) is above -3 °C, while the summers are fresh with the average monthly temperature of the hottest month below 22 °C (Šegota & Filipčić, 2003). The average annual precipitation volume in the northwestern part of Croatia ranges between 900 and 1000 mm (Anonymous, 2008).

METHODS

The research was carried out during the 2011 vegetation season over an area of approximately 4 km^2. Findings of taxa were geocoded by a GPS device (Garmin eTrex Vista HCx). The largest number of species was determined in the field; one part of the plant material was photographed, and one part was collected for additional verification or for determination that is more precise. For this purpose, standard and specialized determination keys and iconography were used: Jermy & Tutin (1982), Tutin *et al*. (1968-1980, 1993), Jávorka & Csapody (1991), Hubbard (1992), Martinčić *et al*. (1999), Domac (2002), Alegro & Bogdanović (2003) and Rothmaler & Jäger (2007). Nomenclature of plants follows the Flora Croatica Database (Nikolić, 2018), and taxonomy is in accordance with Nikolić (2013). Next, data were attributed to each recorded taxon (Appendix 1): life forms, chorological types, indicators of anthropogenic influence, chronoelements, origin and endemism/threat/protection, if any. The abbreviations and marks used in the Appendix 1, Figs 2-5 and Tab. 1, are explained in this chapter.

Raunkier´s life forms were taken from Landolt *et al*. (2010): Ch - chamaephytes, G - geophytes, H - hemicryptophytes, Hy - hydrophytes, P - phanerophytes, T - therophytes.

Chorological analysis was also based on Landolt *et al*. (2010), and chorological types were then grouped into one of twelve categories, according to Horvatić (1963) and Horvatić *et al*. (1967-1968): 1. med - *Mediterranean*, 2. illyr-balk – *Illyrian-Balkan*, 3. S-eu – *South European*, 4. atl - *Atlantic*, 5. E-eu-pont – *East-European-Pontic*, 6. SE-eu - *Southeast European*, 7. C-eu - *Central European*, 8. eu - *European*, 9. eu-as - *Euro-Asian*, 10. circ-holoarct - *Circumholoarctic*, 11. cosmop - *Cosmopolites*, 12. adv - *Adventive and cultivated taxa*.

Analysis of indicators of anthropogenic influence on plants i.e. of the share of plant taxa in relation to natural or anthropogenic habitats also follows Landolt *et al*. (2010). Based on the relationship between anthropogenic pressure and plant growth conditions we distinguish the following categories of plants: 1. extremely urbanophobic, 2. moderately urbanophobic, 3. indifferent, 4. moderately urbanophilic, 5. extremely urbanophilic.

The chronoelement / origin of taxa (type and time of immigration) was based on Mitić *et al*. (2008), and terminologically modified according to Kornaś (1981), Mirek (1981) and Jackowiak (1990). The analysis of the chronoelements is based on Medvecká *et al*. (2012), whereas neophytes originating in Europe in our research are treated as native taxa (more precisely, *Cyclamen purpurascens*, *Malva moschata* and *Rumex patientia*). According to origin and chronoelement we distinguish the following groups: sp - spontaneophytes (spontaneous, native taxa), ar - archaeophytes (alien plants introduced before 1500 AD), kn - kenophytes (neophytes, alien plants introduced after 1500 AD) and df - diaphytes (casual alien taxa with occasional / temporary occurrence). The invasiveness of alien taxa follows Boršić *et al*. (2008), and is abbreviated with the mark "inv". The geographical origin of alien taxa was marked as follows: E - Europe, Af - Africa, As - Asia, N Am - North America, C AM - Central America, S Am - South America.

Data on endemic taxa were taken from Nikolić (2018), and those on endangered taxa from Nikolić & Topić (2005). The legal protection status in Croatia is in accordance with the Ordinance on strictly protected species (NN 144/13, 73/16), and is marked by an asterisk (*).

Indicators of anthropogenic changes in the researched flora were calculated and determined according to Jackowiak (1990, 2006) as follows:

1. Indicators of anthropisation: 1.1. . IAn_t – indicator of total anthropisation, IAn_t = (An / (Sp + An)) * 100, 1.2. IAn_p – indicator of permanent anthropisation, IAn_p = (Mt / (Sp + Mt) * 100);
2. Indicators of archeophytisation: 2.1 IAr_t – indicator of total archeophytisation, IAr_t = (Ar / (Sp + An) * 100;

2.2 IAr_p - indicator of permanent archeophytisation, IAr_p = (Ar / (Sp + Mt) * 100;

3. Indicators of kenophytisation: 3.1 IKn_t – indicator of total kenophytisation, IKn_t = (Kn / (Sp + An) * 100, 3.2 IKn_p – indicator of permanent kenophytisation, IKn_p = (Kn / (Sp + Mt) * 100
4. IM - indicator of modernisation, IM = (Kn / Mt) * 100;
5. IF - indicator of fluctuation change; IF = (Df / (Sp + An), (An represents the number of alien taxa, i.e. An = Ar + Kn + Df; Mt is the number of metaphytes – populations of permanently present alien taxa on a specific area, i.e. Mt = Ar + Kn).

For comparative analysis with other areas the indicator values of anthropogenic changes for Savica were taken from Alegro *et al*. (2013), and for Jarun were calculated from Vuković *et al.* (2013).

RESULTS

In the researched area a total of 389 vascular plant taxa were observed, and classified into 77 families (Appendix 1). The taxonomic analysis showed that the phylum Monilophyta (Pteridophyta) is represented by nine species that belong to five families (2.3%). The phylum Spermatophyta is represented by 381 taxa, which belong to 72 families (97.7%). Among them only four taxa (within two families) belong to the Gymnospermae (1.0%). Within the Angiospermae both ANITA and Magnolianae are represented with one taxon each (0.3%). Furthermore, the monocots (Lilianae) are represented by 62 taxa within nine families (15.9%), and the dicots (Eudicotyledones) with 312 taxa within 59 families (80.2%).

The most common plant families are (Appendix 1) Fabaceae (36 taxa), Poaceae (30 taxa) Asteraceae (29 taxa), Lamiaceae (24 taxa) and Rosaceae (20 taxa). Since a large

Tab. 1. Comparison of indicators of anthropogenic changes in the flora of the investigated area of Hrvatsko zagorje with the flora of Jarun (Vuković *et al*., 2013) and Savica (Alegro *et al*., 2013), (abbreviations are explained in the chapter Methods).

Indicators of anthropogenic changes	Researched area (Hrv. zagorje)	Jarun	Savica
Indicator of total anthropisation (IAn_t)	**16.45**	25.38	27.78
Indicator of permanent anthropisation (IAn_p)	**14.92**	24.21	26.76
Indicator of total archeophytisation (IAr_t)	**10.03**	13.93	16.67
Indicator of permanent archeophytisation (IAr_p)	**10.21**	14.15	16.90
Indicator of total kenophytisation (IKn_t)	**4.63**	9.91	9.72
Indicator of permanent kenophytisation (IKn_p)	**4.71**	10.06	9.86
Indicator of modernisation (IM)	**31.58**	41.56	36.84
Indicator of fluctuation change (IF)	**1.80**	1.55	1.39

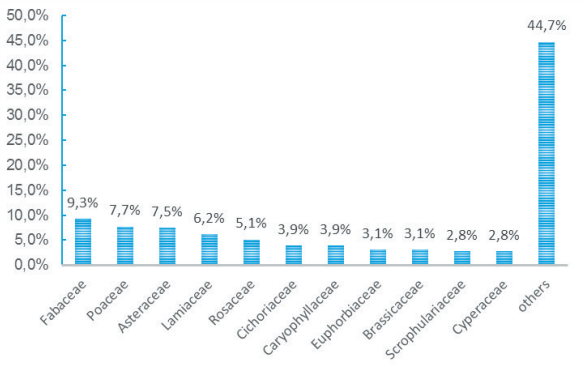

Fig. 2. The most common families in the investigated area of Hrvatsko zagorje.

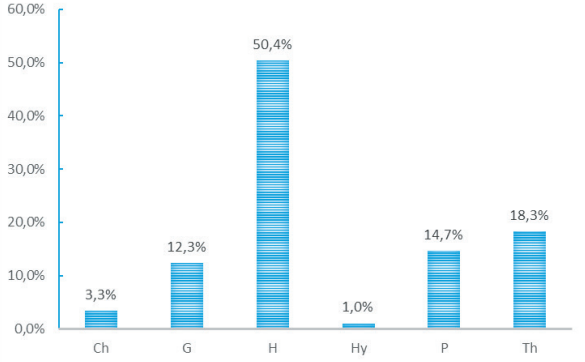

Fig. 3. The share of life forms in the investigated area of Hrvatsko zagorje (abbreviations are explained in the chapter Methods).

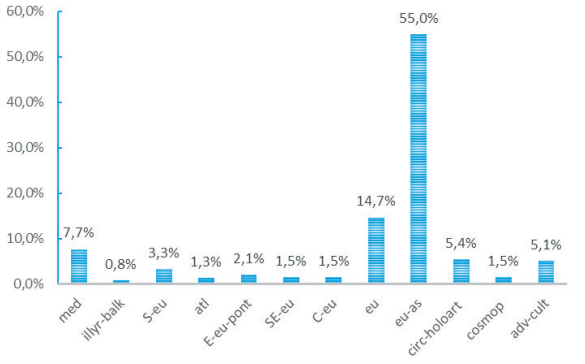

Fig. 4. The share of chorological types in the investigated area of Hrvatsko zagorje (abbreviations are explained in the chapter Methods).

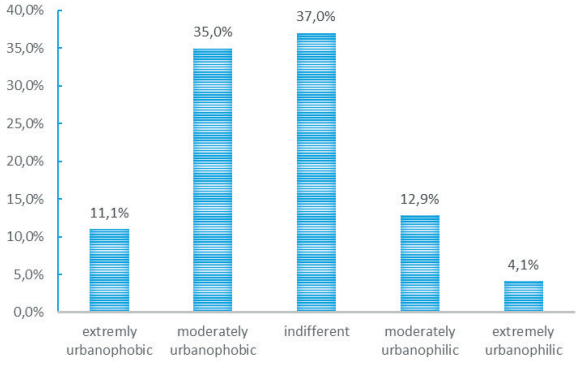

Fig. 5. The share of urbanophobic, indifferent and urbanophilic plants in the investigated area of Hrvatsko zagorje.

number of families have been reported, of which 29 are represented by only one taxon, only families with more than 10 taxa were taken for a more transparent graphical representation, and all other families were classified as "others" (Fig. 2).

The analysis of life forms (App. 1, Fig. 3) showed that the most common were hemicryptophytes (196 taxa), followed by therophytes (71 taxa), phanerophytes (57 taxa), geophytes (48 taxa), chamaephytes (13 taxa) and only four hydrophytes.

Chorological analysis (App. 1, Fig. 4) points to the absolute dominance of the Eurasian chorological type (214 taxa), followed by European (57 taxa), Mediterranean (30 taxa), circumholarctic (21 taxa), and the adventive and cultivated chorological type (20 taxa). Least represented is the Illyrian-Balkan chorological type (only three plants).

Considering the tolerance of plants to anthropogenic influence in the research area, the most numerous are indifferent plants (37.0%). Furthermore, the moderately urbanophobic and extremely urbanophobic plants are significantly more numerous than moderately urbanophilic and extremely urbanophilic (App. 1, Fig. 5).

Native taxa make up the majority of flora (83.3%) of the exploration area. Archaeophytes prevail among alien plants (39 taxa), followed by kenophytes (neophytes, 18 taxa) and diaphytes (7 taxa) (App. 1). Eleven plants (2.8%) represent invasive alien taxa.

Only one species, *Cardamine waldsteinii* Dyer, was recorded as endemic taxon. *Glyceria plicata* (Fr.) Fr. is the only species found in one of the high-risk IUCN categories (vulnerable taxa, VU). Eight taxa are strictly protected (App. 1).

Analysis of indicators of anthropogenic changes (Tab. 1) showed small differences between the total and the permanent values of the investigated indicators of anthropogenic changes, as well as the low value of the indicator of fluctuating changes, which indicate that the existing populations have usually established permanent populations. It also showed that the researched flora is more affected by archaeophytes than by kenophytes, for although the indicator of modernization is relatively high (31.58%), it refers to a relatively small number of kenophytes (18 taxa), and larger number of established archaeophytes (39 taxa).

DISCUSSION

In all, 389 vascular flora species, classified into 77 families, were recorded over an area of about four km^2. There are 34 geocoded sites associated with the listed species, which are a good basis for both understanding the present floristic diversity and monitoring future vascular flora changes in the area of the planned Regional Park. The relatively large floristic diversity of the explored area is probably the result of heterogeneous habitats (forest areas, grasslands, ponds, cultivated and inhabited areas). However, extreme weather conditions (high temperatures and pronounced drought during the vegetation season of 2011), as well as the practice of burning off fields by the local population, may have contributed to the 'invisibility' of some species, especially annuals. In that sense, floristic research over a longer period of time would certainly contribute to a more valuable evaluation of the floristic diversity of the exploration area and the whole area of the planned Hrvatsko zagorje Regional Park.

The most common plant families in our research are Fabaceae, Poaceae, Asteraceae, Lamiaceae and Rosaceae. If we incorporate the families Asteraceae and Cichoriaceae within the unique Compositae family, as is commonly done, then this is the most common family (44 taxa) in the investigated area. This kind of pattern layout of plant

families is expected for the territory of the Republic of Croatia (Nikolić & Topić, 2005), with the exception of the Lamiaceae and Rosaceae families that are richer with species in our research than on the national level. Nevertheless, floristic researche in the continental biogeographical region regularly classifies the Lamiaceae and Rosaceae families within the five richest families, in terms of species number (e.g. Mitić *et al*., 2007; Hruševar, 2009; Hudina *et al*., 2012). Different types of Lamiaceae taxa occupy different ecological niches, and heterogeneous habitats obviously increase their share. On the other hand, the increased presence of the Rosaceae family is partially related to humankind, because some of them probably often escape from cultivation, e.g. *Malus pumila*, *Prunus cerasifera*, *Prunus domestica*, etc.

The analysis of life forms shows the absolute dominance of hemicryptophytes (50.4%), which is to be expected for an area with a moderate climate (Horvat, 1949). Therophytes are the second most common form of life, and their share of 18.3% tends to suggest a low to moderate intensity of anthropogenic pressure. Namely, a large number of alien species survive unfavourable conditions in the form of seeds (e.g. Silva & Smith, 2005; Medvecká *et al*., 2012; Pyšek *et al*., 2012). An increase in the share of this life form indicates anthropogenic pressure (Pilková, 2015), which has been used as an indicator of human influence on the flora of Central Europe since the end of the 20th century (Sukopp & Werner, 1983; Sudnik-Wojcikowska, 1988; Pyšek & Pyšek, 1990, 1991). Compared with the flora of (sub)urban areas of the continental biogeographical region of Croatia (Hudina *et al*., 2012; Alegro *et al*., 2013; Vuković *et al*., 2013), the flora of the investigated area shows a smaller share of taxa of this life form and thus indirectly points to a better preservation of habitats. Even more in favour of this are the shares of urbanophobic vs. urbanophilic taxa (46.0% vs. 17.0%). Although Landolt's indicator (Landolt *et al*., 2010) referring to the 'naturalness' or 'artificiality' of plant cover, has not been used in past floristic research in Croatia, we consider it a good indicator of anthropogenic influence and in our research its indicative value points to weak anthropogenic pressure. Since the research area is sparsely inhabited (small villages with typical old houses and gardens and numerous cottages that are not permanently inhabited) the anthropogenic pressure, although present, is significantly alleviated.

Although there are no standardised criteria in chorological type assessment, we adopted the more recent approach of Alegro *et al*. (2013), Vuković *et al*. (2013) and Budisavljević *et al*. (2017), based on Landolt *et al*. (2010). Consequently, the chorological types from our research are not comparable to older works (before 2010), and are partly comparable with the results from the analysis of chorological type of Dotršćina (due to the homogeneity of the habitat; Budisavljević *et al*., 2017), as well as those of Jarun (due to the anthropogenic influences; Vuković *et al*., 2013). The most relevant is the comparison of our investigated area with Savica (Alegro *et al*., 2013). Differences in the proportions of the chorological types arise, as previously pointed out by Vuković *et al*. (2013), from the fact that a large number of species considered cosmopolitan in earlier works are now referred to as Eurasian or Mediterranean. In this respect, the share of the Euro-Asian chorological type of 55.0% in our research is not surprising, and is not significantly higher than the foreseen share for Savica - 48.3%, although it differs somewhat from data for Dotršćina and Jarun (44.1%) (Budisavljević *et al*., 2017). In support of the fact of nature preservation in the area of the planned Regional Park, the share of adventive and cultivated plants (5.1%) is also very important, for it is twice as low as that of Savica (Alegro *et al*., 2013), almost twice as low as Jarun (Vuković *et al*., 2013) and somewhat lower than Dotršćina (Budisavljević *et al*., 2017). Similar results were noted for the Mediterranean chorological

type, which encompasses a large number of pioneering or weed species, whose share in the researched area of the planned Regional Park is several percent lower than at Dotršćina, Jarun or Savica. The Illyrian-Balkan chorological type is represented by only three species: *Cardamine waldsteinii, Euphorbia carniolica* and *Lamium orvala*; this chorological type is strictly related to climate-zonal forest vegetation (Alegro *et al*., 2006), so a small number of species could be explained by the fragmentation of the habitat and probably by the secondary character of a part of the forest stands. Plants of the Atlantic chorological type are rare in the flora of Croatia (Nikolić & Topić, 2005), and therefore their low share in our research is expected. The analysis of alien flora indicates the domination of archaeophyta, most of them representing weed and ruderal species (e.g. *Anagallis arvensis, Capsella bursa-pastoris, Convolvulus arvensis, Cichorium intybus, Sonchus asper* etc.), while some also belong to the azonal forest vegetation, for example *Castanea sativa* in acidic soils. Frequent diaphytes in the investigated area are *Juglans regia* and *Helianthus annua* that easily escape from cultivation, but in the researched area, they do not form (self) sustainable populations. Although the new taxa are not always competitive enough in the continental biogeographical region, the Mediterranean chorological type is increasingly more observed (Hruševar *et al*., 2014), probably due to the already mentioned modern approach to chorological analysis, and partly due to frequent planting and breeding of plants originating from the Mediterranean, as well (Šiljković & Rimanić, 2005; Pohajda, 2014; Đurić, 2016). Specifically, the Mediterranean plants are distinguished by a higher proportion of alien species in the investigated area, with the share of 36.7% of archaeophytes, 10.0% of kenophytes (neophytes) and 6.7% of diaphytes. Most of the neophytes are simultaneously invasive taxa, originating mainly from North America and according to lifeform type are therophytes. Of the total of 38 invasive taxa recorded for the area of Hrvatsko Zagorje (Veić, 2015), a relatively low amount of invasive plants (11 taxa; three invasive taxa per km^2) in our research reflects a relatively good ecological balance and weak or moderate anthropogenic pressure on the area proposed for the future Regional Park.

On the investigated area, only the *Glyceria plicata* belongs to one of the IUCN threatened categories, being classified as vulnerable (VU), while Salkić (2012) recorded two more taxa within the same category (VU) - *Carex panicea* L. and *Platanthera bifolia* (L.) Rich. in the nearby area, which should also be included in the planned Regional Park. The new legislation (Anonymous, 2013, 2016) significantly altered the list of protected species and it is impossible to compare our data with the results of older floristic researches. We found eight strictly protected plants, including the only recorded endemic species - *Cardamine waldsteinii*. Since the centres of endemism for the territory of the Republic of Croatia are located in the Mediterranean and Alpine biogeographical regions (Nikolić *et al*., 2015), a larger number of endemic taxa were not expected to be observed at the researched area. Indices of anthropisation for the area of the planned Regional Park show a value of ten units lower than the value for Zagreb settlements (Tab. 1), undoubtedly confirming the (semi)natural character of the investigated area. Large differences in archaeophytic and kenophytic indices arise from significant differences in the constituents of the chronoelement of the established alien taxa, while the slight differences between the total and permanent values of the index are the result of the low proportion of diaphytes. The modernization index (IM) is also lower than for Savica and Jarun, but the fluctuation index (IF) is somewhat higher, due to the smaller number of diaphytes in the total number of species.

To conclude, our floristic research shows the semi-natural character of the investigated part of the planned Regional Park, which is under weak to moderate anthropogenic pressure. Although the share of endangered, protected and endemic plant species is low, the diversity of other native plants of the area, as well as small number of alien plants, justify planning the protection of this part of the Hrvatsko zagorje at the level of a regional park.

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Appendix 1. Vascular flora of the researched part of the planned Regional park „Hrvatsko zagorje" (CHOROTYPE – chorological type; URB INFL- indicators of anthropogenic influence on plants (urbanophobia / indifference / urbanophilia); GEO ORIGIN – geographical origin; END / TH / PROTECT – endemic / threatened / protected taxa; other abbreviations and marks are explained in the chapter Methods).

Family	Taxon	LIFE FORM	CHORO-TYPE	URB INFL	ORIGIN	GEO ORIGIN	END / TH / PROTECT
MONILOPHYTA (PTERIDOPHYTA)							
Dryopteridaceae	*Dryopteris carthusiana* (Vill.) H. P. Fuchs	H	11	1	sp		
Dryopteridaceae	*Dryopteris filix-mas* (L.) Schott	G	10	3	sp		
Equisetaceae	*Equisetum arvense* L.	G	10	3	sp		
Equisetaceae	*Equisetum palustre* L.	G	10	2	sp		
Equisetaceae	*Equisetum pratense* Ehrh.	G	10	2	sp		
Equisetaceae	*Equisetum telmateia* Ehrh.	G	10	2	sp		
Hypolepidaceae	*Pteridium aquilinum* (L.) Kuhn	G	11	2	sp		
Polypodiaceae	*Polypodium vulgare* L.	H	9	1	sp		
Woodsiaceae	*Athyrium filix-femina* (L.) Roth	H	9	1	sp		
SPERMATOPHYTA - GYMNOSPERMAE							
Cupressaceae	*Juniperus communis* L.	P	9	2	sp		
Pinaceae	*Abies alba* Mill.	P	7	2	sp		
Pinaceae	*Picea abies* (L.) Karsten	P	8	2	sp		
Pinaceae	*Pinus sylvestris* L.	P	10	1	sp		
SPERMATOPHYTA - ANGIOSPERMAE							
ANITA							
Nymphaeaceae	*Nymphaea alba* L.	Hy	8	2	sp		
MAGNOLIANAE							
Aristolochiaceae	*Asarum europaeum* L.	H	9	1	sp		
LILIANAE							
Cyperaceae	*Carex acuta* L.	H	9	2	sp		
Cyperaceae	*Carex caryophyllea* Latourr.	G	9	3	sp		
Cyperaceae	*Carex digitata* L.	H	9	2	sp		
Cyperaceae	*Carex flacca* Schreb.	G	9	2	sp		
Cyperaceae	*Carex hirta* L.	G	8	3	sp		
Cyperaceae	*Carex otrubae* Podp.	H	1	2	sp		
Cyperaceae	*Carex pallescens* L.	H	9	2	sp		
Cyperaceae	*Carex spicata* Huds.	H	9	3	sp		
Cyperaceae	*Carex sylvatica* Huds.	H	9	3	sp		
Cyperaceae	*Carex vulpina* L.	H	9	2	sp		
Cyperaceae	*Scirpus sylvaticus* L.	G	9	2	sp		
Dioscoreaceae	*Tamus communis* L.	G	1	1	sp		
Iridaceae	*Iris pseudacorus* L.	G	9	2	sp		*
Juncaceae	*Juncus compressus* Jacq.	G	9	2	sp		
Juncaceae	*Juncus effusus* L.	H	10	3	sp		
Juncaceae	*Juncus inflexus* L.	H	10	3	sp		
Juncaceae	*Luzula campestris* (L.) DC.	H	9	2	sp		
Juncaceae	*Luzula forsteri* (Sm.) DC.	H	1	2	sp		

Appendix 1. continued

Family	Taxon	LIFE FORM	CHORO-TYPE	URB INFL	ORIGIN	GEO ORIGIN	END / TH / PROTECT
Juncaceae	*Luzula luzuloides* (Lam.) Dandy et Wilmott	H	8	1	sp		
Juncaceae	*Luzula multiflora* (Retz.) Lej.	H	10	2	sp		
Juncaceae	*Luzula pilosa* (L.) Willd.	H	9	1	sp		
Liliaceae	*Allium ursinum* L.	G	9	2	sp		
Liliaceae	*Convallaria majalis* L.	G	8	3	sp		
Liliaceae	*Ornithogalum pyramidale* L.	G	1	3	sp		
Liliaceae	*Ornithogalum sphaerocarpum* A. Kern.	G	1	2	sp		
Liliaceae	*Ornithogalum umbellatum* L.	G	3	3	sp		
Liliaceae	*Polygonatum multiflorum* (L.) All.	G	9	1	sp		
Orchidaceae	*Cephalanthera longifolia* (L.) Fritsch	G	9	1	sp		*
Orchidaceae	*Neottia nidus-avis* (L.) Rich.	G	9	1	sp		*
Poaceae	*Agrostis capillaris* L.	H	9	2	sp		
Poaceae	*Agrostis stolonifera* L.	H	9	3	sp		
Poaceae	*Alopecurus pratensis* L.	H	9	3	sp		
Poaceae	*Anthoxanthum odoratum* L.	H	9	3	sp		
Poaceae	*Arrhenatherum elatius* (L.) J.Presl et C.Presl	H	9	4	sp		
Poaceae	*Avenula pubescens* (Dumort.) Dumort.	H	9	2	sp		
Poaceae	*Brachypodium pinnatum* (L.) P.Beauv. ssp. *pinnatum*	H	9	2	ar	E	
Poaceae	*Brachypodium sylvaticum* (Huds.) P.Beauv.	H	9	3	sp		
Poaceae	*Briza media* L.	H	9	2	sp		
Poaceae	*Bromus erectus* Huds.	H	9	2	sp		
Poaceae	*Bromus hordaceus* L.	T	9	4	sp		
Poaceae	*Bromus sterilis* L.	T	9	4	ar	E As	
Poaceae	*Calamagrostis epigejos* (L.) Roth	H	9	3	sp		
Poaceae	*Dactylis glomerata* L.	H	9	3	sp		
Poaceae	*Digitaria sanguinalis* (L.) Scop.	T	9	5	ar	E As Af	
Poaceae	*Echinochloa crus-galli* (L.) P.Beauv.	T	12	5	ar	E As	
Poaceae	*Festuca altissima* All.	H	9	1	sp		
Poaceae	*Festuca gigantea* (L.) Vill.	H	9	2	sp		
Poaceae	*Glyceria plicata* (Fr.) Fr.	Hy	9	2	sp		VU *
Poaceae	*Holcus lanatus* L.	H	8	3	sp		
Poaceae	*Lolium multiflorum* Lam.	T	1	4	kn	E As Af	
Poaceae	*Lolium perenne* L.	H	9	3	sp		
Poaceae	*Phalaris arundinacea* L.	G	11	2	sp		
Poaceae	*Phleum pratense* L.	H	9	3	sp		
Poaceae	*Phragmites australis* (Cav.) Trin. ex Steud.	G	11	2	sp		
Poaceae	*Poa pratensis* L.	H	10	3	sp		
Poaceae	*Poa trivialis* L.	H	10	3	sp		
Poaceae	*Setaria pumila* (Poir.) Schult.	T	12	4	ar	E As	
Poaceae	*Trisetum flavescens* (L.) P.Beauv.	H	9	3	sp		
Poaceae	*Zea mays* L.	T	12	4	df	C Am	

Appendix 1. continued

Family	Taxon	LIFE FORM	CHORO-TYPE	URB INFL	ORIGIN	GEO ORIGIN	END / TH / PROTECT
Potamogetonaceae	*Potamogeton crispus* L.	Hy	9	2	sp		
Potamogetonaceae	*Potamogeton natans* L.	Hy	11	1	sp		
Typhaceae	*Typha latifolia* L.	G	10	2	sp		
EUDICOTYLEDONES							
Aceraceae	*Acer campestre* L.	P	9	1	sp		
Aceraceae	*Acer platanoides* L.	P	8	3	sp		
Aceraceae	*Acer pseudolatanus* L.	P	7	3	sp		
Amaranthaceae	*Amaranthus hybridus* L.	T	12	5	kn	NC Am	
Apiaceae	*Aegopodium podagraria* L.	G	9	3	sp		
Apiaceae	*Angelica sylvestris* L.	H	9	2	sp		
Apiaceae	*Carum carvi* L.	T	9	3	sp		
Apiaceae	*Chaerophyllum hirsutum* L.	H	7	2	sp		
Apiaceae	*Daucus carota* L.	H	1	3	sp		
Apiaceae	*Foeniculum vulgare* Mill.	T	9	4	sp		
Apiaceae	*Heracleum sphondylium* L.	H	8	3	sp		
Apiaceae	*Pastinaca sativa* L.	H	9	5	sp		
Apiaceae	*Torilis arvensis* (Huds.) Link	T	1	4	ar	E	
Apiaceae	*Torilis japonica* (Houtt.) DC.	T	9	3	sp		
Apocynaceae	*Vinca minor* L.	Ch	9	3	sp		
Araliaceae	*Hedera helix* L.	P	8	3	sp		
Asclepiadaceae	*Vincetoxicum hirundinaria* Medik.	H	9	2	sp		
Asteraceae	*Achillea millefolium* L.	H	9	3	sp		
Asteraceae	*Ambrosia artemisiifolia* L.	T	12	5	kn (inv)	N Am	
Asteraceae	*Artemisia vulgaris* L.	H	9	4	sp		
Asteraceae	*Aster novi-belgii* L.	H	12	4	kn	N Am	
Asteraceae	*Bellis perennis* L.	H	9	3	sp		
Asteraceae	*Bidens frondosa* L.	T	12	3	kn (inv)	N Am	
Asteraceae	*Calendula officinalis* L.	T	1	5	df	kultivar	
Asteraceae	*Centaurea jacea* L.	H	8	3	sp		
Asteraceae	*Cirsium arvense* (L.) Scop.	G	9	3	sp		
Asteraceae	*Cirsium oleraceum* (L.) Scop.	H	9	2	sp		
Asteraceae	*Cirsium vulgare* (Savi) Ten.	H	9	3	sp		
Asteraceae	*Conyza canadensis* (L.) Cronquist	T	12	5	kn (inv)	N Am	
Asteraceae	*Doronicum austriacum* Jacq.	G	7	1	sp		
Asteraceae	*Erigeron annuus* (L.) Pers.	T	12	3	kn (inv)	N Am	
Asteraceae	*Eupatorium cannabinum* L.	H	9	2	sp		
Asteraceae	*Galinsoga ciliata* (Raf.) S.F.Blake	T	12	4	kn (inv)	CS Am	
Asteraceae	*Galinsoga parviflora* Cav.	T	12	4	kn (inv)	S Am	
Asteraceae	*Helianthus annuus* L.	T	12	4	df	N Am	
Asteraceae	*Inula conyza* DC.	H	9	2	sp		
Asteraceae	*Leucanthemum vulgare* Lam.	H	9	4	sp		
Asteraceae	*Matricaria perforata* Merat	T	9	4	sp		
Asteraceae	*Petasites hybridus* (L.) P.Gaertn, B.Mey. et Schreb.	G	9	2	sp		
Asteraceae	*Pulicaria dysenterica* (L.) Bernh.	T	9	3	sp		
Asteraceae	*Rudbeckia laciniata* L.	G	12	4	kn (inv)	N Am	
Asteraceae	*Senecio jacobaea* L.	H	9	3	sp		

Appendix 1. continued

Family	Taxon	LIFE FORM	CHORO-TYPE	URB INFL	ORIGIN	GEO ORIGIN	END / TH / PROTECT
Asteraceae	*Serratula tinctoria* L.	H	9	2	sp		
Asteraceae	*Solidago gigantea* Aiton	H	12	3	kn (inv)	N Am	
Asteraceae	*Solidago virgaurea* L.	H	9	2	sp		
Asteraceae	*Tanacetum vulgare* L.	H	9	3	sp		
Asteraceae	*Tussilago farfara* L.	G	9	3	sp		
Berberidaceae	*Berberis vulgaris* L.	P	8	3	sp		
Betulaceae	*Alnus glutinosa* (L.) Gaertner	P	9	1	sp		
Betulaceae	*Betula pendula* Roth.	P	9	3	sp		
Boraginaceae	*Cerinthe minor* L.	T	1	4	sp		
Boraginaceae	*Echium vulgare* L.	H	9	3	sp		
Boraginaceae	*Myosotis arvensis* Hill	T	9	4	ar	E As Af	
Boraginaceae	*Myosotis ramosissima* Rochel	T	9	3	sp		
Boraginaceae	*Myosotis scorpioides* L	H	9	2	sp		
Boraginaceae	*Pulmonaria officinalis* L.	H	8	1	sp		
Boraginaceae	*Symphytum officinale* L.	H	9	3	sp		
Boraginaceae	*Symphytum tuberosum* L.	G	4	2	sp		
Brassicaceae	*Cardamine waldsteinii* Dyer	G	2	2	sp		endemic *
Brassicaceae	*Barbarea vulgaris* R. Br.	H	9	3	sp		
Brassicaceae	*Brassica rapa* L.	T	1	5	ar	E As Af	
Brassicaceae	*Capsella bursa-pastoris* (L.) Medik.	T	9	3	ar	E	
Brassicaceae	*Cardamine bulbifera* (L.) Crantz	G	8	2	sp		
Brassicaceae	*Cardamine hirsuta* L.	T	9	4	ar	E As	
Brassicaceae	*Cardamine impatiens* L.	H	9	2	sp		
Brassicaceae	*Cardamine pratensis* L.	H	8	3	sp		
Brassicaceae	*Cardamine trifolia* L.	G	3	2	sp		
Brassicaceae	*Lepidium campestre* (L.) R. Br.	T	9	4	ar	E As	
Brassicaceae	*Lunaria rediviva* L.	H	8	1	sp		
Brassicaceae	*Rorippa sylvestris* (L.) Besser	H	8	3	sp		
Campanulaceae	*Campanula patula* L.	H	8	3	sp		
Campanulaceae	*Campanula persicifolia* L.	H	8	3	sp		
Campanulaceae	*Campanula trachelium* L.	H	9	2	sp		
Cannabaceae	*Humulus lupulus* L.	H	9	3	sp		
Caprifoliaceae	*Sambucus ebulus* L.	H	9	2	sp		
Caprifoliaceae	*Sambucus nigra* L.	P	8	3	sp		
Caryophyllaceae	*Cerastium fontanum* Baumg. ssp. *vulgare* (Hartman) Greuter et Burdet	H	9	3	sp		
Caryophyllaceae	*Cerastium glomeratum* Thuill.	T	9	5	sp		
Caryophyllaceae	*Cerastium sylvaticum* Waldst. et Kit.	H	5	2	sp		
Caryophyllaceae	*Dianthus armeria* L.	H	9	5	sp		*
Caryophyllaceae	*Dianthus barbatus* L.	H	3	3	sp		*
Caryophyllaceae	*Lychnis flos-cuculi* L.	H	9	2	sp		
Caryophyllaceae	*Moehringia trinervia* (L.) Clairv.	H	9	2	sp		
Caryophyllaceae	*Myosoton aquaticum* (L.) Moench	H	9	3	sp		
Caryophyllaceae	*Silene dioica* (L.) Clairv.	H	8	3	sp		
Caryophyllaceae	*Silene latifolia* Poir.	T	1	2	sp		

Appendix 1. continued

Family	Taxon	LIFE FORM	CHORO-TYPE	URB INFL	ORIGIN	GEO ORIGIN	END / TH / PROTECT
Caryophyllaceae	*Silene latifolia* Poir. ssp. *alba* (Mill.) Greuter et Bourdet	H	9	4	ar	E As Af	
Caryophyllaceae	*Silene vulgaris* (Moench.) Garcke	H	8	3	sp		
Caryophyllaceae	*Stellaria graminea* L.	H	9	2	sp		
Caryophyllaceae	*Stellaria holostea* L.	Ch	9	1	sp		
Caryophyllaceae	*Stellaria media* (L.) Vill.	T	9	4	sp		
Celastraceae	*Euonymus europaea* L.	P	9	2	sp		
Celastraceae	*Euonymus latifolius* (L.) Mill.	P	3	2	sp		
Chenopodiaceae	*Chenopodium album* L.	T	9	5	sp		
Cichoriaceae	*Aposeris foetida* (L.) Less.	H	3	2	sp		
Cichoriaceae	*Cichorium intybus* L.	H	9	3	ar	E As Af	
Cichoriaceae	*Crepis tectorum* L.	T	9	5	sp		
Cichoriaceae	*Crepis vesicaria* L. ssp. *taraxacifolia* (Thuill.) Thell.	T	1	3	sp		
Cichoriaceae	*Hieracium murorum* L.	H	9	3	sp		
Cichoriaceae	*Hieracium racemosum* Waldst. et Kit. ex Willd.	H	3	2	sp		
Cichoriaceae	*Hieracium sabaudum* L.	H	8	3	sp		
Cichoriaceae	*Lactuca serriola* L.	T	9	4	ar	E As Af	
Cichoriaceae	*Leontodon hispidus* L. ssp. *danubialis* (Jacq.) Simonk.	H	8	2	sp		
Cichoriaceae	*Mycelis muralis* (L.) Dumort.	H	9	3	sp		
Cichoriaceae	*Picris hieracioides* L.	H	9	3	sp		
Cichoriaceae	*Sonchus asper* (L.) Hill	T	9	3	ar	E As Af	
Cichoriaceae	*Taraxacum officinale* Weber	H	9	3	sp		
Cichoriaceae	*Tragopogon pratensis* L.	H	4	3	sp		
Clusiaceae	*Hypericum perforatum* L.	H	9	3	sp		
Convolvulaceae	*Calystegia sepium* (L.) R. Br	H	9	3	sp		
Convolvulaceae	*Convolvulus arvensis* L.	G	9	4	ar	E As Af	
Cornaceae	*Cornus sanguinea* L.	P	8	4	sp		
Corylaceae	*Carpinus betulus* L.	P	9	2	sp		
Corylaceae	*Corylus avellana* L.	P	8	3	sp		
Corylaceae	*Ostrya carpinifolia* Scop.	P	3	1	sp		
Cucurbitaceae	*Echinocystis lobata* (Michx.) Torr. et Gray	T	12	5	kn (inv)	N Am	
Dipsacaceae	*Dipsacus fullonum* L.	H	9	4	sp		
Dipsacaceae	*Knautia arvensis* (L.) Coult.	H	9	3	sp		
Dipsacaceae	*Knautia drymeia* Heuff.	H	3	2	sp		
Ericaceae	*Calluna vulgaris* (L.) Hull	Ch	9	2	sp		
Ericaceae	*Vaccinium myrtillus* L.	Ch	9	2	sp		
Euphorbiaceae	*Euphorbia amygdaloides* L.	Ch	8	1	sp		
Euphorbiaceae	*Euphorbia angulata* Jacq.	G	3	1	sp		
Euphorbiaceae	*Euphorbia carniolica* Jacq.	H	2	1	sp		
Euphorbiaceae	*Euphorbia chamaesyce* L.	T	9	5	sp		
Euphorbiaceae	*Euphorbia cyparissias* L.	H	9	2	sp		
Euphorbiaceae	*Euphorbia dulcis* L.	G	5	1	sp		
Euphorbiaceae	*Euphorbia epithymoides* Kern.	H	6	1	sp		

Appendix 1. continued

Family	Taxon	LIFE FORM	CHORO-TYPE	URB INFL	ORIGIN	GEO ORIGIN	END / TH / PROTECT
Euphorbiaceae	*Euphorbia helioscopia* L.	T	1	4	ar	E As Af	
Euphorbiaceae	*Euphorbia platyphyllos* L.	T	1	3	ar	E As	
Euphorbiaceae	*Euphorbia serrulata* Thuill.	T	9	2	sp		
Euphorbiaceae	*Euphorbia verrucosa* L.	H	3	2	sp		
Euphorbiaceae	*Mercurialis perennis* L.	H	9	1	sp		
Fabaceae	*Anthyllis vulneraria* L.	H	4	3	sp		
Fabaceae	*Astragalus glycyphyllos* L.	H	9	2	sp		
Fabaceae	*Chamaecytisus supinus* (L.) Link	Ch	9	2	sp		
Fabaceae	*Coronilla varia* L.	H	9	3	sp		
Fabaceae	*Dorycnium germanicum* (Gremli) Rikli	Ch	6	2	sp		
Fabaceae	*Dorycnium herbaceum* Vill.	H	6	2	sp		
Fabaceae	*Galega officinalis* L.	H	1	4	ar	E	
Fabaceae	*Genista germanica* L.	Ch	8	2	sp		
Fabaceae	*Genista tinctoria* L.	Ch	9	2	sp		
Fabaceae	*Lathyrus linifolius* (Reichard) Bässler	H	8	1	sp		
Fabaceae	*Lathyrus palustris* L.	G	10	2	sp		*
Fabaceae	*Lathyrus pratensis* L.	H	9	3	sp		
Fabaceae	*Lathyrus sylvestris* L.	G	8	3	sp		
Fabaceae	*Lathyrus tuberosus* L.	H	9	5	ar	E As	
Fabaceae	*Lathyrus vernus* (L.) Bernhardt	G	9	1	sp		
Fabaceae	*Lembotropis nigricans* (L.) Griseb.	P	5	3	sp		
Fabaceae	*Lotus corniculatus* L.	H	9	3	sp		
Fabaceae	*Medicago falcata* L.	H	9	3	sp		
Fabaceae	*Medicago lupulina* L.	T	9	3	sp		
Fabaceae	*Medicago sativa* L.	H	1	3	kn	As	
Fabaceae	*Melilotus albus* Medik.	T	9	3	ar	E As	
Fabaceae	*Melilotus officinalis* (L.) Lam.	H	9	4	ar	E As	
Fabaceae	*Ononis arvensis* L.	H	5	2	sp		
Fabaceae	*Robinia pseudoacacia* L.	P	12	3	kn (inv)	N Am	
Fabaceae	*Trifolium campestre* Schreber	T	1	2	sp		
Fabaceae	*Trifolium hybridum* L.	H	1	3	kn	E As	
Fabaceae	*Trifolium medium* L.	H	9	2	sp		
Fabaceae	*Trifolium pratense* L.	H	9	3	sp		
Fabaceae	*Trifolium repens* L.	H	9	4	sp		
Fabaceae	*Vicia angustifolia* L.	T	9	2	ar	E As Af	
Fabaceae	*Vicia cassubica* L.	H	9	2	sp		
Fabaceae	*Vicia cracca* L.	H	9	2	sp		
Fabaceae	*Vicia dumetorum* L.	H	8	1	sp		
Fabaceae	*Vicia hirsuta* (L.) Gray	T	9	4	ar	E As Af	
Fabaceae	*Vicia sepium* L.	H	8	3	sp		
Fabaceae	*Vicia villosa* Roth	T	1	4	ar	E As	
Fagaceae	*Castanea sativa* Miller	P	1	2	ar	E As	

Appendix 1. continued

Family	Taxon	LIFE FORM	CHORO-TYPE	URB INFL	ORIGIN	GEO ORIGIN	END / TH / PROTECT
Fagaceae	*Fagus sylvatica* L.	P	8	1	sp		
Fagaceae	*Quercus cerris* L.	P	6	1	sp		
Fagaceae	*Quercus petraea* (Mattuschka) Liebl.	P	8	1	sp		
Fagaceae	*Quercus rubra* L.	P	12	2	df	N Am	
Gentianaceae	*Centaurium erythraea* Rafn	T	9	2	sp		
Gentianaceae	*Centaurium pulchellum* (Sw.) Druce	T	9	3	sp		
Gentianaceae	*Gentiana asclepiadea* L.	H	7	2	sp		
Geraniaceae	*Geranium columbinum* L.	T	9	4	sp		
Geraniaceae	*Geranium phaeum* L.	H	7	2	sp		
Geraniaceae	*Geranium pusillum* Burm. f.	T	9	4	ar	E As	
Geraniaceae	*Geranium robertianum* L.	T	10	3	sp		
Juglandaceae	*Juglans regia* L.	P	1	2	df	E As	
Lamiaceae	*Ajuga reptans* L.	H	9	3	sp		
Lamiaceae	*Ballota nigra* L.	H	1	3	ar	E As Af	
Lamiaceae	*Betonica officinalis* L.	H	1	2	sp		
Lamiaceae	*Clinopodium vulgare* L.	H	9	2	sp		
Lamiaceae	*Galeopsis speciosa* Mill.	T	5	3	sp		
Lamiaceae	*Glechoma hirsuta* Waldst. et Kit.	H	6	3	sp		
Lamiaceae	*Lamium galeobdolon* (L.) L.	H	5	2	sp		
Lamiaceae	*Lamium maculatum* L.	H	8	3	sp		
Lamiaceae	*Lamium orvala* L.	H	2	1	sp		
Lamiaceae	*Lamium purpureum* L.	T	1	4	ar	E As Af	
Lamiaceae	*Lycopus europaeus* L.	G	9	2	sp		
Lamiaceae	*Melittis melissophyllum* L.	H	8	2	sp		
Lamiaceae	*Mentha aquatica* L.	G	9	2	sp		
Lamiaceae	*Mentha arvensis* L.	H	10	3	sp		
Lamiaceae	*Mentha longifolia* (L.) Huds.	H	9	2	sp		
Lamiaceae	*Mentha spicata* L.	H	3	4	sp		
Lamiaceae	*Origanum vulgare* L.	H	9	2	sp		
Lamiaceae	*Prunella vulgaris* L.	H	10	3	sp		
Lamiaceae	*Salvia glutinosa* L.	H	9	1	sp		
Lamiaceae	*Salvia pratensis* L.	H	9	2	sp		
Lamiaceae	*Stachys palustris* L.	H	10	2	sp		
Lamiaceae	*Stachys sylvatica* L.	H	9	3	sp		
Lamiaceae	*Teucrium chamaedrys* L.	Ch	9	2	sp		
Lamiaceae	*Thymus pulegioides* L.	Ch	9	2	sp		
Linaceae	*Linum catharticum* L.	T	9	2	sp		
Loranthaceae	*Viscum album* L.	P	8	2	sp		
Lythraceae	*Lythrum salicaria* L.	H	9	3	sp		
Malvaceae	*Malva sylvestris* L.	H	9	3	ar	E As	
Malvaceae	*Malva moschata* L.	H	1	3	sp		
Malvaceae	*Malva alcea* L.	H	3	3	sp		

Appendix 1. continued

Family	Taxon	LIFE FORM	CHORO-TYPE	URB INFL	ORIGIN	GEO ORIGIN	END / TH / PROTECT
Oleaceae	*Ligustrum vulgare* L.	P	9	2	sp		
Oleaceae	*Fraxinus ornus* L.	P	9	2	sp		
Onagraceae	*Circaea lutetiana* L.	G	9	3	sp		
Onagraceae	*Epilobium tetragonum* L. ssp. *lamyi* (F. W. Schultz) Nyman	H	8	2	sp		
Onagraceae	*Epilobium tetragonum* L.	H	9	3	sp		
Onagraceae	*Epilobium hirsutum* L.	H	9	3	sp		
Onagraceae	*Epilobium montanum* L.	H	9	3	sp		
Onagraceae	*Epilobium lanceolatum* Sebast. et Mauri	H	9	3	sp		
Onagraceae	*Epilobium parviflorum* Schreber	H	8	3	sp		
Orobanchaceae	*Orobanche lutea* Baumg.	T	9	3	sp		
Orobanchaceae	*Orobanche major* L.	T	9	2	sp		
Oxalidaceae	*Oxalis acetosella* L.	H	9	1	sp		
Oxalidaceae	*Oxalis dillenii* Jacq.	T	12	4	kn	N Am	
Papaveraceae	*Chelidonium majus* L.	H	9	3	ar	E As	
Papaveraceae	*Papaver rhoeas* L.	T	9	4	ar	E As Af	
Plantaginaceae	*Plantago lanceolata* L.	H	9	3	sp		
Plantaginaceae	*Plantago major* L.	H	9	3	sp		
Polygalaceae	*Polygala vulgaris* L.	H	8	2	sp		
Polygonaceae	*Polygonum mite* Schrank	T	8	2	sp		
Polygonaceae	*Polygonum persicaria* L.	T	11	3	sp		
Polygonaceae	*Rumex acetosa* L.	H	9	3	sp		
Polygonaceae	*Rumex acetosella* L.	H	10	3	sp		
Polygonaceae	*Rumex conglomeratus* Murray	H	9	2	sp		
Polygonaceae	*Rumex crispus* L.	H	9	4	sp		
Polygonaceae	*Rumex obtusifolius* L.	H	8	3	sp		
Polygonaceae	*Rumex patientia* L.	H	1	4	sp		
Polygonaceae	*Rumex sanguineus* L.	H	9	2	sp		
Primulaceae	*Anagallis arvensis* L.	T	1	4	ar	E As Af	
Primulaceae	*Cyclamen purpurascens* Mill.	G	3	2	sp		
Primulaceae	*Lysimachia nummularia* L.	Ch	8	2	sp		
Primulaceae	*Lysimachia punctata* L.	H	5	3	sp		
Primulaceae	*Lysimachia vulgaris* L.	H	9	2	sp		
Primulaceae	*Primula vulgaris* Huds.	H	9	3	sp		
Ranunculaceae	*Anemone nemorosa* L.	G	8	2	sp		
Ranunculaceae	*Caltha palustris* L.	H	10	2	sp		
Ranunculaceae	*Clematis vitalba* L.	P	8	2	sp		
Ranunculaceae	*Hepatica nobilis* Schreber	H	8	2	sp		
Ranunculaceae	*Ranunculus acris* L.	H	9	3	sp		
Ranunculaceae	*Ranunculus arvensis* L.	T	1	4	ar	E As Af	
Ranunculaceae	*Ranunculus bulbosus* L.	H	9	3	sp		
Ranunculaceae	*Ranunculus repens* L.	H	9	3	sp		
Ranunculaceae	*Thalictrum flavum* L.	H	8	2	sp		
Rhamnaceae	*Frangula alnus* Mill.	P	9	1	sp		

Appendix 1. continued

Family	Taxon	LIFE FORM	CHORO-TYPE	URB INFL	ORIGIN	GEO ORIGIN	END / TH / PROTECT
Rosaceae	*Agrimonia eupatoria* L.	H	9	2	sp		
Rosaceae	*Aruncus dioicus* (Walter) Fernald	H	10	2	sp		
Rosaceae	*Crataegus monogyna* Jacq.	P	9	2	sp		
Rosaceae	*Filipendula ulmaria* (L.) Maxim.	H	9	2	sp		
Rosaceae	*Fragaria moschata* Duchesne	H	8	3	sp		
Rosaceae	*Fragaria vesca* L.	H	9	3	sp		
Rosaceae	*Geum urbanum* L.	H	9	3	sp		
Rosaceae	*Malus pumila* Mill.	P	12	5	df	kultivar	
Rosaceae	*Malus sylvestris* Mill.	P	8	3			
Rosaceae	*Potentila reptans* L.	H	9	3	sp		
Rosaceae	*Potentilla erecta* (L.) Raeuschel	H	9	2	sp		
Rosaceae	*Prunus avium* L.	P	9	3	sp		
Rosaceae	*Prunus cerasifera* Ehrh.	P	9	3	kn	E As	
Rosaceae	*Prunus domestica* L.	P	9	4	ar	E As	
Rosaceae	*Pyrus pyraster* Burgsd.	P	9	1	sp		
Rosaceae	*Rosa canina* L.	P	9	2	sp		
Rosaceae	*Rubus idaeus* L.	P	9	3	sp		
Rosaceae	*Rubus plicatus* Weihe et Nees	P	4	1	sp		
Rosaceae	*Sorbus aria* (L.) Crantz	P	8	2	sp		
Rosaceae	*Sorbus torminalis* (L.) Crantz	P	9	1	sp		
Rubiaceae	*Crutiata laevipes* Opiz.	H	8	3	sp		
Rubiaceae	*Galium album* Mill.	H	9	3	sp		
Rubiaceae	*Galium aparine* L.	T	9	3	sp		
Rubiaceae	*Galium mollugo* L.	H	8	2	sp		
Rubiaceae	*Galium odoratum* (L.) Scop.	G	9	1	sp		
Rubiaceae	*Galium sylvaticum* L.	G	8	1	sp		
Rubiaceae	*Galium verum* L.	H	9	3	sp		
Salicaceae	*Populus nigra* L.	P	9	2	sp		
Salicaceae	*Populus tremula* L	P	9	2	sp		
Salicaceae	*Salix alba* L.	P	9	3	sp		
Salicaceae	*Salix caprea* L.	P	9	3	sp		
Salicaceae	*Salix cinerea* L	P	9	2	sp		
Salicaceae	*Salix purpurea* L.	P	9	2	sp		
Salicaceae	*Salix triandra* L.	P	8	2	sp		
Scrophulariaceae	*Digitalis grandiflora* Mill.	G	9	2	sp		
Scrophulariaceae	*Linaria vulgaris* Mill.	H	9	4	sp		
Scrophulariaceae	*Melampyrum pratense* L	T	9	2	sp		
Scrophulariaceae	*Odontites vulgaris* Moench	T	9	3	sp		
Scrophulariaceae	*Rhinanthus minor* L.	T	9	2	sp		
Scrophulariaceae	*Verbascum blattaria* L.	H	9	3	sp		
Scrophulariaceae	*Verbascum nigrum* L.	H	9	3	sp		
Scrophulariaceae	*Veronica chamaedrys* L.	H	9	3	sp		
Scrophulariaceae	*Veronica officinalis* L.	Ch	8	2	sp		
Scrophulariaceae	*Veronica persica* Poir.	T	12	4	kn (inv)	As	

Appendix 1. continued

Family	Taxon	LIFE FORM	CHORO-TYPE	URB INFL	ORIGIN	GEO ORIGIN	END / TH / PROTECT
Scrophulariaceae	*Veronica polita* Fr.	T	1	4	ar	E As Af	
Solanaceae	*Solanum nigrum* L.	T	10	4	ar	E	
Thymelaeaceae	*Daphne laureola* L.	P	4	1	sp		
Thymelaeaceae	*Daphne mezereum* L.	P	9	1	sp		
Tiliaceae	*Tilia cordata* Mill.	P	8	2	sp		
Tiliaceae	*Tilia platyphyllos* Scop.	P	8	2	sp		
Tiliaceae	*Tilia tomentosa* Moench	P	6	4	sp		
Urticaceae	*Urtica dioica* L.	H	9	3	sp		
Valerianaceae	*Valeriana officinalis* L.	H	5	2	sp		
Verbenaceae	*Verbena officinalis* L.	H	9	4	ar	E As Af	
Violaceae	*Viola reichenbachiana* Jord. ex Boreau	H	8	3	sp		
Vitaceae	*Vitis vinifera* L. ssp. *sylvestris* (C. C. Gmel.) Hegi	P	9	3	ar	E As	
Vitaceae	*Vitis vinifera* L.	P	9	4	df	E As	