

## SPREAD OF INVASIVE PHANEROPHYTES AND FURTHER RECORDS TO THE DISTRIBUTION OF WOODY SPECIES IN HUNGARY

PÉTER CSONTOS<sup>1</sup>, JÚLIA TAMÁS<sup>2</sup>

<sup>1</sup>MTA-ELTE Res. Group in Theoretical Biology and Ecology  
Pázmány P. stny. 1/c., Budapest, H-1117, Hungary e-mail: cspeter@ludens.elte.hu

<sup>2</sup>Botanical Department of the Hungarian Natural History Museum  
P. O. Box 222., Budapest, H-1476, Hungary e-mail: tjuli@bot.nhmus.hu

### Abstract

A pilot survey on the distribution of woody species of Hungary was carried out based on the Niklfeld's grid system. 114 new records belonging to 41 species are reported, indicating the incomplete knowledge on the present distribution of woody species in Hungary. *Ailanthus altissima*, *Lycium barbarum* and *Celtis occidentalis* were the most frequently found, indicating the expanding range of these naturalized alien species. The highest concentration of new records occurred in cells near to or divided by the state border. The average number of new records per species (nr. of records/nr. of species) was higher for naturalized alien species than that of native species. A remarkable proportion of new records originated from semi-natural and disturbed areas, therefore a great number of new records can be predicted for our trees and shrubs in an extensive survey of these habitat types. Particularly high number of new records is expected for hedge forming shrubs.

**Key words:** alien plants, distribution map, habitat disturbance, shrubs, trees, woody species

### Introduction

The importance of detailed knowledge on the distribution of woody species has been early recognized by Hungarian botanists and foresters (FEKETE and BLATTNY 1913). Regional floristic surveys always paid attention to list the occurrences of trees and shrubs in details (SOÓ and MÁTHÉ 1938, POLGÁR 1941). Beside the continued floristic studies – like the „national parks series” by the Hungarian Natural History Museum (SZUJKÓ-LACZA 1982, SZUJKÓ-LACZA and KOVÁCS 1993) – phytosociological research and vegetation mapping become the major source of data in the second half of the 20th century. The thousands of relevés in the monographs produced according to the paradigm of Central European school of phytosociology contain spatially precise distribution records of stand forming trees as well as accompanying tree and shrub species associated to the given communities (SIMON 1957, PÓCS et al. 1958, HORÁNSZKY 1964, FEKETE 1965, BORHIDI 1984).

Both the floristic and the phytosociological approach were focused on regions of high botanical values. Areas with semi-natural vegetation and lands of intensive human impacts received less attention, thus considerably large parts of the country remained practically uninvestigated, at least regarding woody species.

The first attempt to nationwide synthesis of the huge amount of accumulated floristic records was carried out at the end of the 20<sup>th</sup> century, and resulted the distribution maps

of 142 trees and shrubs of the Hungarian flora (BARTHA and MÁTYÁS 1995). This fundamental work enables us to know which species should be looked for, and where.

The idea of our paper is to provide some new records, thus contributing to the complete chorological description of the Hungarian woody species.

### Materials and Methods

We organized several field trips to various parts of Hungary. Most of these field trips were principally dedicated to harvest seeds for the SEED database (CSONTOS 1998). We always prepared the actual lists of missing species – based on BARTHA and MÁTYÁS (1995) – for each mapping cells that were planned to visit. The grid of mapping cells followed NIKLFELD's (1971) system. This grid system was projected onto detailed regional maps with 1 : 40 000 or 1:60 000 resolution for precise localization of sites. In some cases maps of higher (1:10 000) or lower (1:150 000) resolutions were used. New occurrences of each species were only considered if direct planting of the given individuals, or man-made support for their successful establishment could be excluded. If spontaneity of specimens were judged to be uncertain or doubtful, data were omitted. For the accepted occurrences precise locality were always recorded with remarks on the number and approximate age of individuals where appropriate. Beside field observations literature data were also considered in some cases.

### Results

Altogether 114 new floristic records, belonging to 41 woody species of Hungary are reported (see Appendix). The share of records according to life forms (tree or shrub) and origin (native or naturalized) of species are summarized in Table 1. The first eight most frequently found species were (with numbers of new records): *Ailanthus altissima* (18), *Lycium barbarum* (12), *Celtis occidentalis* (8), *Crataegus monogyna* (7), *Amorpha fruticosa* (4), *Prunus spinosa* (4), *Rubus canescens* (4) and *Salix cinerea* (4). For *Ailanthus altissima* the exact locations are also shown according to the Central European flora mapping grid (Fig. 1).

The 114 new records originated from 46 grid cells, thus 2.5 new species per cell were found in average. Twenty-three grid cells served new records for single species only, whereas – at the other end of the scale – in grid cells nr. 7697, 7588 and 8275 the new records involved 16, 15 and 7 species, respectively.

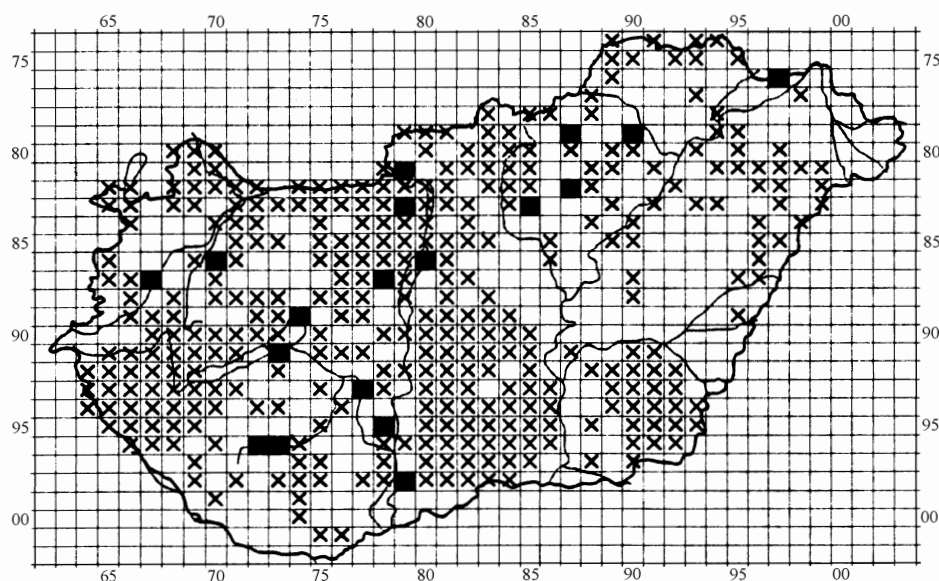
Considering habitat types, major sources of new records were forested areas (48), disturbed sites in and around settlements (20), railways (incl. railway stations) (17), wetlands (16) and road sides (14).

Table 1. Distribution of new floristic records among species groups  
 1. táblázat. Az új florisztikai adatok megoszlása az egyes fajcsoportok szerint

Species group	Nr. of species (S)	Nr. of records (R)	R/S
Native trees	7	10	1.43
Native shrubs	27	58	2.15
Native species total	34	68	2.00
Naturalized trees	4	29	7.25
Naturalized shrubs	3	17	5.67
Naturalized species total	7	46	6.57

Figure 1. Distribution of *Ailanthus altissima* in Hungary. After BARTHA and MÁTYÁS (1995), improved with new records (= known records in 1995, - = new records).

1. ábra. A bálványfa elterjedése Magyarországon. BARTHA és MÁTYÁS (1995) nyomán, az új adatokkal kiegészítve (= 1995-ben már ismert adat, - = új adat).



### Discussion

Our pilot survey resulted 2–3 new records of woody species in average, in each visited grid cells. Considering that the total number of grid cells covering Hungary is 2863, the expected number of new records can be above 7000 in a complete survey of the whole country. It indicates that our knowledge on the distribution of tree and shrub species is still incomplete. In the search of main reasons responsible for this incompleteness two points seemed to be important: 1) spatial unevenness of floristic studies, and 2) the continuous spreading of alien species (especially those of invasive nature).

Regarding spatial unevenness of records the group of native trees seems to be less involved by this bias. It is because regularly updated records are available at regional forest inventories on the occurrences of trees, especially on species having economic importance. Much less is known about the distribution of native shrubs. Within the group of native species about 85% of new data are related to shrubs (Table 1). We think that high numbers of new records of woody species will originate in the future from non-forested areas, i.e. outside the territories of forest inventories.

Another considerable amount of new floristic records is expected from grid cells near to or divided by the state border of Hungary. Access to these cells is generally difficult because of their poor traffic connections, and in case of bordering cells for long time it was further hindered by the need of special permission for visiting them. Therefore, these cells contribute a lot in the unevenness of floristic records of the country, and not surprisingly the three cells with outstandingly high number of new records in our survey were incomplete cells divided by the state border.

The record/species ratio of the group of naturalized alien trees is about five-times higher than the corresponding value for the group of native trees (Table 1). It demonstrates clearly our incomplete knowledge on the actual range of distribution of alien trees in Hungary. Practically the same holds – though less pronounced – for shrubs where the R/S values are 5.67 and 2.15 for the group of alien and native species, respectively.

The natural history of *Robinia pseudoacacia* in Hungary calls the attention to the unexpected success and spread of alien trees. Black locust was introduced to the country between 1710 and 1720 and today it is the most frequent tree (RÉDEI 1997, SZABÓ 1997).

According to our observations and the results of CALL and NILSEN (2003) *Ailanthus altissima* is expected to become the next candidate of alien trees performing an expansion comparable to that of black locust. Tree-of-heaven was introduced to Hungary around 1840 and is continuously spreading since then (UDVARDY 1998a). By now its range includes all climatic regions of Hungary and vigorous populations can be found in both urban and rural habitats. Its recent spread was also reported from other countries of Central Europe (WALTER et al. 2005, MÖLLEROVÁ 2005). Considering that tree-of-heaven is a thermophilous species (seedlings and young saplings are often damaged by frost in Hungary) its expansion in the latest decades is possibly enhanced by the accelerated global warming (FEKETE and MOLNÁR 2005), and this explains its success in countries north of Hungary.

A further tree with remarkable expansion is *Celtis occidentalis*, for which we found eight new records. The major threat of hackberry seems to be its increasing tolerance to dry habitats. Some decades ago its range of distribution was principally known from riverine habitats with emphasis on *Salicetum albae-fragilis* forests (SOÓ 1970). Later, its spread in Budapest and in the Great Hungarian Plain was reported (UDVARDY 1998b, BORHIDI and SÁNTA 1999), and some of our data already reflects to dry habitats of hilly regions (see Appendix). It underlines the urgent need to describe the habitat preference and phytosociological affinity of *Celtis occidentalis*, and the same holds for the other alien woody species. In this respect case studies for various species can be found in the literature (UDVARDY 1998a, ZAVAGNO and D'AURIA 2001, CHMURA et al. 2004).

Among shrub species *Lycium barbarum* seems to be the most invasive, especially preferring disturbed areas along roads, railways and around settlements. BARTHA and

MÁTYÁS (1995) considered this species as achieving its potential range of distribution and stopped expanding. Results of our pilot survey contradict to this, because twelve new grid cells proved to be newly infected and these cells represents 7 distinct phytogeographical district of the country (*sensu* PÓCS 1981).

Taking into account the habitat relations of new records, the remarkable proportion of semi-natural and disturbed areas (cultivated lands, road sides, railways, settlements and their surroundings) can be mentioned. CHMURA (2004) also emphasized the importance of roads and railways in the distribution of alien species in the Silezian Upland. Since semi-natural and disturbed areas form the major part of the country an extensive survey of them will definitely result a great number of new floristic records for our trees and shrubs. In this respect studying the Great Hungarian Plain has key importance. Particularly high number of new records is expected for hedge forming shrubs (*Crataegus monogyna*, *Prunus spinosa*, *Rubus* spp.) preferring road sides, and for the nitrophilous *Sambucus nigra* that benefits access via bird dispersal to even the smallest spontaneously vegetated spots of agricultural landscapes. River banks and drainage channels that are followed by narrow strips of land unploughed (though most of them are subjected to recurrent disturbance) still can offer refuge for species of riverine habitats (PENKSZA and KAPOCSI 1998, PENKSZA et al. 1999, MJAZOVSKY and TAMÁS 2002). Species of high botanical value can also be expected from certain parts of the Great Hungarian Plain, especially from traditional, longitudinal landscape units (e.g. the borders of counties) that has long been free from human intervention (CSATHÓ 2005).

### Summary

As a result of a pilot survey on the distribution of woody species of Hungary 114 new records belonging to 41 species are reported, on the basis of Niklfeld's grid system. The first three most frequently found species were: *Ailanthus altissima*, *Lycium barbarum* and *Celtis occidentalis*, these are alien plants in Hungary.

The calculated value of 2.5 derived from our survey for average number of new species per visited cells highlights the incomplete knowledge of the present distribution of woody species in Hungary. The highest concentration of new records occurred in cells near to or divided by the state border of Hungary.

The average number of new records per species (nr. of records/nr. of species) was higher for naturalized alien species than native species, 6.57 and 2.0, respectively, thus indicating the expanding range of the former group.

A remarkable proportion of new records originated from semi-natural and disturbed areas. Since these habitat types are widespread in the country, and especially common on the Great Hungarian Plain, a great number of new records can be predicted for our trees and shrubs in an extensive survey of these terrains. Particularly high number of new records are expected for hedge forming shrubs, as they can find space along roads even if the landscape is intensively cultivated.

### Acknowledgements

We are grateful to Lajos Balogh (Savaria Museum, Hungary) for remarks and suggestions on the manuscript.

### References

- BARTHA D., MÁTYÁS Cs. 1995: Erdei fa- és cserjefajok előfordulása Magyarországon. Sopron.
- BORHIDI A. 1984: A Zselic erdei. - Dunántúli Dolg. Term. tud. Sor. 4: 1–145.
- BORHIDI A., SÁNTA A. (eds.) 1999: Vörös könyv Magyarország növénytársulásairól II. TermészetBúvár Alapítványi Kiadó, Budapest.
- CALL L. J., NILSEN E. T. 2003: Analysis of spatial patterns and spatial association between the invasive tree-of-heaven (*Ailanthus altissima*) and the native black locust (*Robinia pseudoacacia*) American Midland Naturalist 150: 1–14.
- CHMURA D. 2004: Penetration and naturalization of invasive alien plant species (neophytes) in woodlands of the Silesian upland (Southern Poland). Nature Conservation 60: 3–11.
- CHMURA D., WOZNIAK G., SLIWINSKA-WYRZYCHOWSKA A. 2004: The participation of invasive alien plants in the degeneration of coniferous forests of the Silesian Upland. In: Brzeg A., Wojterska M. (eds.): Coniferous forests vegetation – differentiation, dynamics and transformations. Wydawnictwo Naukowe UAM, Seria Biologia 20: 339–342.
- CSATHÓ A. I. 2005: A mezsgyék természetvédelmi jelentősége az Alföld löszvidékein. Tájökológiai Lapok 3: 193–194.
- CSONTOS P. 1994: Az aljnövényzet állapotváltozásai cseres-tölgyes erdők vágást követő szukcessziója során, a Visegrádi-hegységben. (Herb-layer changes during regeneration succession on sessile oak – turkey oak forest clearings, in the Visegrádi Mts.) Ph.D. Theses, ELTE, Budapest.
- CSONTOS P. 1998: The applicability of a seed ecological database (SEED) in botanical research. Seed Science Research 8: 47–52
- FEKETE G. 1965: Die Waldvegetation im Gödöllőer Hügelland. Akadémiai Kiadó, Budapest, 223 pp.
- FEKETE G., MOLNÁR E. 2005: Természetes életközösségek, növénypopulációk válasza a klímaváltozásra. Bot. Közlem. 92: 173–187.
- FEKETE L., BLATTNY T. 1913: Az erdészeti jelentőségű fák és cserjék elterjedése a Magyar Állam területén I–II. Joerges Ágost özvegye és fia, Selmezbánya.
- HORÁNSZKY A. 1964: Die Wälder des Szentendre-Visegráder Gebirges. Akadémiai Kiadó, Budapest.
- LENCSES G. 1996: A várpalotai Baglyas-hegy természeti értékei és növényvilága. Bio-Gero Ökocsoport, Várpalota - Nagykanizsa.
- MJAZOVSZKY Á., TAMÁS J. 2002: A Váli-víz leggyakoribb higrofil növényzeti típusainak jellemzése. Folia Hist.-Nat. Mus. Matraensis 26: 85–103.
- MÖLLEROVÁ, J. 2005: Notes on invasive and expansive trees and shrubs. Journal of Forest Science 51 (Special Issue): 19–23.
- NIKLFIELD H. 1971: Bericht über die Kartierung der Flora Mitteleuropas. Taxon 20: 545–571.
- PENKSZA K., KAPOCSI J. 1998: A Maros-völgy edényes növényei I. Crisicum 1: 35–74.
- PENKSZA K., ENGLONER A., ASZTALOS J., GUBCSÓ G., SZEGEDI E. 1999: Adatok a Körös menti „szentély” jellegű holtmedrek flórájához és vegetációjához. Crisicum 2: 51–65.
- POLGÁR, S. 1941: Győrmege flórája. Bot. Közlem. 38: 201–352.
- PÓCS T., DOMOKOS-NAGY É., PÓCS-GELENCÉR I., VIDA G. 1958: Vegetationsstudien im Őrség. Akadémiai Kiadó, Budapest.
- PÓCS T. 1981: Növényföldrajz. In: Hortobágyi, T., Simon, T. Növényföldrajz, társulástan és ökológia. Tankönyvkiadó, Budapest, pp. 27–166.
- RÉDEI K. (ed.) 1997: Az akáctermetésztés kézikönyve. Erdészeti Tudományos Intézet, Budapest.
- SIMON T. 1957: Die Wälder des Nördlichen Alföld. Akadémiai Kiadó, Budapest.
- SOÓ R. 1970: Synopsis Systematico-Geobotanica Florae Vegetationisque Hungariae IV. Akadémiai Kiadó, Budapest.
- SOÓ, R., MÁTHÉ, I. 1938: A Tiszántúl flórája. (Flora planitie Hungariae Transtibiscensis) – Magyar Flóraművek II. Editio Instituti botanici Universitatis Debreceniensis, Debrecen.
- SZABÓ, P. (ed.) 1997: Magyarország erdőállományainak főbb adatai, 1996. Állami Erdészeti Szolgálat, Budapest.

- SZUIKÓ-LACZA J. (ed.) 1982: The flora of the Hortobágy National Park. Natural history of the national parks of Hungary, 3. Akadémiai Kiadó, Budapest.
- SZUIKÓ-LACZA J., KOVÁCS D. (eds): 1993: The flora of the Kiskunság National Park, Vol.1. The flowering plants. Magyar Természettudományi Múzeum, Budapest.
- UDVARDY L. 1998a: Spreading and coenological circumstances of the tree of heaven (*Ailanthus altissima*) in Hungary. Acta Bot. Hung. 41: 299–314.
- UDVARDY L. 1998b: Classification of adventives dangerous to the Hungarian natural flora. Acta Bot. Hung. 41: 315–331.
- WALTER J., ESSL, F., ENGLISCH T., KIEHN M. 2005: Neophytes in Austria: Habitat preferences and ecological effects. In: Nentwig, W. et al. (eds.) Biological invasions – from ecology to control. NEOBIOTA 6: 13–25.
- ZAVAGNO F., D’AURIA G. 2001: Synecology and dynamics of *Amorpha fruticosa* communities in the Po plain (Italy). In: BRUNDU G., BROCK J., CAMARDA I., CHILD L., WADE M. (eds.): Plant invasions: Species ecology and ecosystem management. Backhuys Publishers, Leiden, pp. 175–182.

INVÁZIÓS FÁSSZÁRÚAK TERJEDÉSE, VALAMINT TOVÁBBI ADATOK  
A MAGYARORSZÁGI FA- ÉS CSERJEFAJOK ELTERJEDÉSÉRŐL

P. CSONTOS<sup>1</sup>, J.TAMÁS<sup>2</sup>

<sup>1</sup>MTA-ELTE Elméleti Biológiai és Ökológiai Ktcs.

Pázmány P. stny. 1/c., H-1117 Budapest, e-mail: cspeter@ludens.elte.hu

<sup>2</sup>Magyar Természettudományi Múzeum, Növénytár

P. O. Box 222., H-1476 Budapest, e-mail: tjuli@bot.nhmus.hu

**Kulcsszavak:** bolygatott élőhelyek, cserjék, elterjedési térkép, fák, fásszárú fajok, inváziós növények

**Összefoglaló:** Jelen tanulmány a magyarországi fa- és cserjefajok elterjedésére vonatkozóan közöl adatokat a Niklfeld-féle térképezési háló használata mellett. A tájékozódó jellegű felmérés eredményeként 41 faj összesen 114 új előfordulását tártuk fel, ami jelzi, hogy a hazai fásszárú fajok elterjedtségére vonatkozóan a korábbi ismereteink még nem teljesekek. A legtöbb új adat a bálványfára (*Ailanthus altissima*), az ördögcérnára (*Lycium barbarum*) és az ostorfára (*Celtis occidentalis*) vonatkozott, jelezve e meghonosodott inváziós fajok áréájának további bővülését. A legtöbb új adatot az államhatár közelében fekvő négyzetekben találtuk, sőt e tekintetben az államhatár miatt csak részleges területtel bíró négyzetek is kiemelt szerepűek voltak. A meghonosodott tájidegen fajok esetében az új adatok átlagos száma magasabb volt, mint ugyanezen mutató értéke az őshonos fásszárúakra vonatkoztatva. Az új adatoknak egy jelentős része féltérmeztes vagy kimondottan bolygatott területekről származott, ami azt jelzi, hogy az ilyen jellegű élőhelyek extenzív vizsgálata további nagy mennyiségű új adatot szolgáltathat fa- és cserjefajaink elterjedtségének megismeréséhez. Különösen nagy számú új adat feltárása várható a sövényképző cserjefajok esetében.

Appendix. New occurrences of woody species native or naturalized  
in the Hungarian flora.

<i>Species name</i>	<b>Grid Nr.</b>	<b>Details of the occurrences</b>
<i>Acer tataricum</i> L.	7697	Close to Pácin, along the Karcsa-lake and in the Mosonnai-forest; several specimens at several places.
<i>A. tataricum</i> L.	8080	North from Diósjenő about 1 km distance on the footpath signed by blue, under thinned oak forest; few individuals.
<i>Ailanthus altissima</i> (P. Mill.) Swingle	7697	Between villages Semjén and Ricse, in road-sides and garden boundaries.
<i>A. altissima</i>	7987	At the northern edge of Egercsehi, near the road that leads to Borsodnádásd; some specimens.
<i>A. altissima</i>	7990	Miskolc, Tiszai-railway-station, some individuals.
<i>A. altissima</i>	8179	Between the high road and the river Ipoly at the western edge of Szob, and also at the railway station of Szob.
<i>A. altissima</i>	8287	On the railway station of Kál-Kápolna.
<i>A. altissima</i>	8379	In the upper part of „Pázsity“ near the village Pilisszántó; 10–15 old tree and several sapling in their surroundings. Also found within the border of Pilisszántó at some disturbed places.
<i>A. altissima</i>	8385	On the railway station of Vámosgyörk, 1 fruiting tree.
<i>A. altissima</i>	8670	On the plateau of Öreg-hegy near the SE edge of Pápa; few established fruiting specimens and also young saplings in some nearby places.
<i>A. altissima</i>	8680	Several specimens along the riverside of Danube opposite to Háros-island.
<i>A. altissima</i>	8767	In a spontaneous grove on the flood area of river Rába, near the north-east edge of Sárvár; some flowering individuals.
<i>A. altissima</i>	8778	Within the boundary of Kápolnásnyék, at roadside position, some fruiting specimens and numerous saplings.
<i>A. altissima</i>	8974	On the Nyerges-hill south from the village Litér, several scattered individuals along the edge of <i>Pinus nigra</i> plantations.
<i>A. altissima</i>	9173	In forest edges at several places between Zamárdi and Balatonendréd, e.g. a dozen of developed individuals alongside the edge of the „Vaskereszt“ clearing and also several saplings under the oak forest in its surroundings.
<i>A. altissima</i>	9377	Along the railway north from Nagydorog, several individuals.
<i>A. altissima</i>	9578	In the edges of black locust forests and also along the railway between rw.-stations of settlements Tengelic and Szedres; several specimens. In a 10 m wide strip of neglected area bordered by the railway and a large maize field between rw.-stations of Fácánkert and Tolna. About 30-40 individuals.
<i>A. altissima</i>	9672	Kaposvár, main railway station, next to a stone-wall.
<i>A. altissima</i>	9673	On the railway station of Baté (Somogy County); in high number.
<i>A. altissima</i>	9879	Between Bátmonostor and Vaskút, at the edge of a <i>Pinus silvestris</i> plantation; some specimens.



<i>Alnus glutinosa</i> (L.) Gaertner	7697	Several trees along „Karcsa-ér” and also some individuals in wet depressions of the adjoining forest.
<i>Amorpha fruticosa</i> L.	8188	In the railway station of Maklár and its surroundings; very high number of individuals.
<i>A. fruticosa</i>	8384	Between railway station of Hatvan and railway station of Mátravidéki Erőmű in a long strip of land bordered by the railway substructure and the river Zagyva; several hundreds of individuals.
<i>A. fruticosa</i>	9673	On the railway station of Baté and its vicinity; several individuals.
<i>A. fruticosa</i>	9767	Along the railway between Órtilos and Zákány; some specimens.
<i>Celtis occidentalis</i> L.	7697	On a sand hill at the edge of village Nagyzósvágy; one specimen in a group of <i>Robinia pseudoacacia</i> trees.
<i>C. occidentalis</i> L.	8379	Between Kopár Csárda and Vörös-hegy in Zajnáthegyek (in Budai-Mts.); frequent.
<i>C. occidentalis</i>	8670	On Öreg-hegy near the SE edge of Pápa; young individuals at 3 localities along the earth-covered road.
<i>C. occidentalis</i>	8765	(Sub)spontaneously growing specimens at the foot of stone walls and in managed hedges of different species around the VOLÁN bus station and the Bartók Béla boulevard in Szombathely; some specimens.
<i>C. occidentalis</i>	8777	Xeromorph individuals on the rocky plateau of Pázmándi-sziklák. Between Nadap and Bence-hegy along the footpath signed by yellow; 1 young specimen.
<i>C. occidentalis</i>	8778	Near village Baracska, in spontaneous shrub vegetation on the slope of the railway embankment; 1 specimen with height of 3–4 m. In <i>Quercus robur</i> forest near the water-basin of Ráckeresztúr; 1 young spontaneous individual.
<i>C. occidentalis</i>	9678	At the foot of the railway embankment near the rw.-station of Szekszárd-Palánk, one young individual among several spontaneously growing <i>Acer negundo</i> saplings.
<i>C. occidentalis</i>	9879	Between Bátmonostor and Vaskút, at the edge of a <i>Pinus sylvestris</i> plantation; few specimens.
<i>Cerasus avium</i> (L.) Moench	7697	Several saplings and few mature trees in the Pácín-forest.
<i>Clematis vitalba</i> L.	8766	On the road-side of an improved earth-covered road near Köles-tető in the forested area between villages Vép and Porpác.
<i>C. vitalba</i>	8777	On ditch bank at Bence-hegy between villages Sukoró and Velence; some large individuals. As climber in a black locust plantation at the hill-foot of Pázmándi szőlőhegy; few specimens.
<i>Colutea arborescens</i> L.	9777	South of village Hidas (Baranya County), between „Kereszt-dűlő” and „Krinolin”.
<i>Cornus mas</i> L.	7588	In sessile oak-Turkey oak forest between village Trizs and the border of Hungary.
<i>Cornus sanguinea</i> L.	7588	In humid sessile oak-Turkey oak forest between village Trizs and the border of Hungary.
<i>Cornus sanguinea</i> L.	8178	At the northern edge of Ipolydamásd, along the high road that leads to Letkés.

<i>C. sanguinea</i>	8580	Budapest, IX <sup>th</sup> district, in a neglected area along the fence of Warehouses on the side facing to the Danube (north of the Nehru Park), some individuals including few old ones.
<i>Corylus avellana</i> L.	7588	In oak-hornbeam forest between village Trizs and the border of Hungary.
<i>C. avellana</i>	7697	Scattered individuals in the Pácin-forest.
<i>C. avellana</i>	8670	South-east of Pápa, in <i>Alnus glutinosa</i> forest along the Jári-stream; some developed shrubs.
<i>Crataegus laevigata</i> (Poir.) DC.	7588	In humid oak-hornbeam forest between village Trizs and the border of Hungary.
<i>Crataegus monogyna</i> Jacq.	7588	In oak-hornbeam forest between village Trizs and the border of Hungary.
<i>C. monogyna</i>	7697	In Mosonnai-forest, near village Pácin.
<i>C. monogyna</i>	8079	Along the footpath signed by blue that leads from village Nógrád to the peak Csóványos, in oak forest on the area of „Három hányás“; several specimens.
<i>C. monogyna</i>	8083	Hollókő, at several places on the castle hill.
<i>C. monogyna</i>	8275	Several individuals under clump of trees in a triangle shaped agricultural field bordered by the roads nr. 10, nr. 100 and the one leads from Naszály to Dunaalmás; also in scrubs along earth-roads crossing the field
<i>C. monogyna</i>	8680	Several specimens along the riverside of Danube opposite to Háros-island.
<i>C. monogyna</i>	8778	In the <i>Quercus robur</i> forest near the water-basin of Ráckeresztúr; some individuals.
<i>Euonymus europaeus</i> L.	7588	At NW edge of village Trizs in successional scrub, and in oak forest nearby Trizs.
<i>E. europaeus</i>	7697	Scattered individuals in the forest adjoining „Karcsa-ér“.
<i>Euonymus verrucosus</i> Scop.	8775	Baglyas-hill near Várpalota; reference: Lencsés 1996.
<i>Frangula alnus</i> Miller	7588	In humid oak forest between village Trizs and the border of Hungary.
<i>F. alnus</i>	7697	Several individuals in Mosonnai-forest, near village Pácin.
<i>F. alnus</i>	8767	In a wet depression under <i>Salix</i> trees near the railway station of Porpác; few individuals.
<i>Juniperus communis</i> L.	7588	In sessile oak-Turkey oak forest north-west of village Trizs, as well as at forest margins.
<i>J. communis</i>	8974	On the Nyerges-hill south from the village Litér, some scattered individuals along the edge of <i>Pinus nigra</i> plantations.
<i>Laburnum anagyroides</i> Medicus	8478	In a forest edge on the Kakukk-hegy near Szomor; two individuals.
<i>Ligustrum vulgare</i> L.	7588	Several specimens at north-west of village Trizs in humid oak forests.
<i>Lonicera caprifolium</i> L.	9876	Flowering individuals in some places at the forest margin close to Pécsvárad along the footpath signed by yellow.
<i>Lonicera xylostium</i> L.	8478	In a loess valley on the north slope of Nyakas-hegy at village Zsámbék; several specimens.
<i>Loranthus europaeus</i> Jacq.	7697	On old <i>Quercus robur</i> trees in the Pácin-forest.

<i>L. europaeus</i>	9767	Along the road that leads from village Órtilos to the railway station of Órtilos; on a <i>Quercus rubra</i> tree.
<i>Lycium barbarum</i> L.	8275	Along the thoroughfare (nr. 10) connecting Dunaalmás and Almásfüzitő in roadside scrub.
<i>L. barbarum</i>	8371	In a neglected area at the western edge of the railway station of Győr; several specimens in some groups.
<i>L. barbarum</i>	8382	Bag (Pest County) at the railway station.
<i>L. barbarum</i>	8578	Some fruiting individuals at the old stone-bridge that crosses the Benta-creek 1.5 km above Sóskút.
<i>L. barbarum</i>	8580	Budapest, VIII <sup>th</sup> district, in gaps of a stone-wall at Orczy-kert; some specimens.
<i>L. barbarum</i>	8680	Numerous individuals along the bicycle road from Horgásztelep (Budapest, XXII <sup>nd</sup> district) to Budafok-Háros railway station.
<i>L. barbarum</i>	8765	At a bridge on the Perint-creek in the Herény district of Szombathely; one individual.
<i>L. barbarum</i>	8778	Several individuals along the road leading to the railway station of Baracska.
<i>L. barbarum</i>	9173	At the foot of poles supporting electric wires in the surroundings of Zamárdi; few obviously spontaneous specimens.
<i>L. barbarum</i>	9778	Near Bátaszék in the roadside vegetation of the high road from Bátaszék to Mórág; several individuals.
<i>L. barbarum</i>	9880	At the eastern edge of village Csávoly, at road sides; several specimens.
<i>L. barbarum</i>	9881	Between Csávoly and Felsőszentiván along the high road at several places. At the western edge of Felsőszentiván; numerous individuals.
<i>Padus avium</i> (L.) Miller	8778	In the south-east part of the <i>Quercus robur</i> forest near the water-basin of Ráckeresztúr; 1 fruiting individual.
<i>Padus serotina</i> (Ehrh.) Borkh.	8478	At the edge of a pine plantation at the northern hill-foot of Nyakas-hegy near village Zsámbék; few specimens.
<i>P. serotina</i>	8767	Along the shore of the boating lake in the recreation area at the south edge of Sárvár; several young specimens.
<i>Prunus spinosa</i> L.	7588	Several specimens along earth-roads and also in oak forest between village Trizs and the border of Hungary.
<i>P. spinosa</i>	7697	Some spontaneously developed hedgerows were found along cart-roads.
<i>P. spinosa</i>	8275	Several individuals under clump of trees in a triangle shaped agricultural field bordered by the roads nr. 10, nr. 100 and the one leads from Naszály to Dunaalmás; also in scrubs along earth-roads crossing the field.
<i>P. spinosa</i>	9778	Between Kövesd and Kiskövesd (W of Bátaszék) along the depressed loess track; several individuals.
<i>Ptelea trifoliata</i> L.	8380	On the Szentendrei-island, south from the ferry port to Szentendre, in a multi-species deciduous forest; several dozens of seedlings and saplings (fruiting trees were not seen).
<i>Pyrus pyraeaster</i> Burgsd.	7588	At forest edge in the midway of the earthroad with blue footpath sign between villages Trizs and Aggtelek.

<i>P. pyraeaster</i>	8275	Between the railway and the thoroughfare (nr. 10) connecting Dunaalmás and Almásfüzitő in a wooded ditch.
<i>P. pyraeaster</i>	8766	In Plébánia-dűlő of Vép; few scattered trees with fruits.
<i>Rhamnus catharticus</i> L.	7588	North-west of village Trizs at road-side.
<i>Rh. catharticus</i>	8775	Baglyas-hill near Várpalota; reference: Lencsés 1996.
<i>Rubus caesius</i> L.	8275	Between the railway and the thoroughfare (nr. 10) connecting Dunaalmás and Almásfüzitő in a wooded ditch, several individuals; and south of the thoroughfare, in the ground layer of a clump of trees surrounded by agricultural fields.
<i>Rubus canescens</i> DC.	8079	Large polycorm at Semmelweis lay-by near Boros-creek in Börzsöny Mts.
<i>R. canescens</i>	8083	Between Hollókő and Nógrádsipek along the footpath signed by blue near Földvár-hegy.
<i>R. canescens</i>	8280	In watersheds nr. 28B, 29A és 30A of the Szentendre forest district, (between Hegytető and Kapitány Mountain) in the Visegrádi-Mountains, ref.: Csontos 1994; several specimens.
<i>R. canescens</i>	8478	At the edge of forest fragments on the Nyakas-hegy near Zsámbék; several individuals in few patches.
<i>Rubus fruticosus</i> L. agg.	7588	North-west of village Trizs at forest edge.
<i>R. fruticosus</i>	9173	On the road-side in Csikászói-völgy, south of Szántódpusztá.
<i>Rubus idaeus</i> L.	7588	Between village Trizs and the border of Hungary, scattered individuals in the forest.
<i>Salix cinerea</i> L.	7697	Some individuals in Mosonnai-forest, near village Pácin.
<i>Salix cinerea</i> L.	8275	Between the railway and the thoroughfare (nr. 10) connecting Dunaalmás and Almásfüzitő in a wooded ditch.
<i>Salix cinerea</i> L.	8478	Along the Békás-creek downstream of Zsámbék; several individuals.
<i>S. cinerea</i>	8577	Along the stream Váli-víz between Alcsútdoboz and Tabajd; several specimens. (Also mentioned in Mjazovszky and Tamás 2002.)
<i>Salix purpurea</i> L.	8577	Several specimens along the stream Váli-víz. (Also mentioned in Mjazovszky and Tamás 2002.)
<i>S. purpurea</i>	8677	Several specimens along the stream Váli-víz. (Also mentioned in Mjazovszky and Tamás 2002.)
<i>Sambucus nigra</i> L.	7697	Frequent everywhere in forest stands, at forest edges and in wet places.
<i>Sorbus torminalis</i> (L.) Crantz	7588	Between village Trizs and the border of Hungary, in humid oak forest.
<i>Staphylea pinnata</i> L.	7697	Several shrub along „Karcza-ér” and also in Mosonnai-forest.
<i>Viburnum lantana</i> L.	8775	Baglyas-hill near Várpalota; reference: Lencsés 1996.
<i>Viburnum opulus</i> L.	7697	In Mosonnai-forest, near village Pácin.
<i>V. opulus</i>	8577	One flowering tree at the stream Váli-víz near Alcsútdoboz.
<i>Viscum album</i> L.	7697	At several places on poplar and black locust trees; several individuals.
<i>V. album</i>	8275	Few individuals on <i>Populus</i> trees near the roads nr. 10 and nr. 100.
<i>V. album</i>	8580	Budapest, VIII <sup>th</sup> district, Ludovika square, on a <i>Celtis</i> tree.