

Occurrence of Rare Tree and Shrub Species in Hungary

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Abstract – The Department of Botany has been focusing on investigating rare taxa of the Hungarian dendroflora since 1989. The research dealt with nearly 50 species regarding conditions of occurrence, habitat preference, reproduction and possible conservational management up to 2003. In the investigation of species, chorology was of primary importance. Since 1993 occurrence data have been systematically collected. As a first result, CEU grid-maps of 142 species, including all the rare dendrotaxa in Hungary, were published (Bartha – Mátyás 1995) using grid squares of 10' long. × 6' lat. equalling approx. 12 × 11 km. With organizational and methodological experience, focuses have moved to processing, correction and mapping of reference, herbaria and new field records. A detailed evaluation of the distribution of 34 rare species in Hungary was made and published (Bartha et al 1999). The Department of Botany at the University of West Hungary has been project coordinator of 'Floristic Mapping of Hungary' since 2001. The present study describes actual distribution maps of 20 rare tree- and shrub species with short analyses of their conditions in Hungary.

Occurrence map / rare tree and shrub species / Hungary

Kivonat – Ritka fa- és cserjefajok magyarországi előfordulása. A Nyugat-Magyarországi Egyetem Növénytani Tanszéke 1989 óta kiemelten foglalkozik a hazai dendroflóra ritka taxonjaival. A kutatások 2003-ig mintegy 50 faj élőhelyi és előfordulási viszonyait, szaporodásbiológiáját, természetvédelmi kezelési lehetőségeit érintették. E tevékenységen belül a chorológiai vizsgálatok végig kiemelt fontosságot kaptak, 1993-tól szervezett keretek közt történt az előfordulási adatok gyűjtése, melyek első eredményeként 142 fajról (ezen belül az összes ritka hazai dendrotaxonról) jelent meg térkép a közép-európai flóratérképezési rendszer alapmezőinek (kb. 12×11 km) bontásában (Bartha – Mátyás 1995). E felmérés szervezési és módszertani tapasztalatainak felhasználásával az 1990-es évek közepétől az irodalmi és herbáriumi, valamint az újabb terepi adatok feldolgozására, ezen belül pontosításukra és térképi ábrázolására helyeződött át a hangsúly. Ennek keretében 34 ritka faj magyarországi előfordulásáról adtunk részletes elemzést (Bartha et al. 1999). 2001-től a NYME Növénytani Tanszék a Magyarországi Hálótérképezési Program koordinátor intézménye. Jelen tanulmányunkban 20 ritka fa- és cserjefaj aktualizált előfordulási térképét, illetve a fajok hazai helyzetének rövid elemzését közöljük.

Előfordulási térkép / ritka fa- és cserjefajok / Magyarország

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1 INTRODUCTION

In the course of floristic mapping distribution pattern of a particular taxon or taxa is investigated in a given area. Most of the examined taxa are of species rank, but in certain cases subspecies or other taxonomic categories are also mapped. Besides drawing distribution maps, rendering database to the maps can also be targeted.

Grid maps have a regular grid system, which show the presence or absence of taxa; furthermore, the frequency and the quality of data can also be displayed on a rough scale. Currently this is one of the most frequently applied methods for floristic mapping, utilized for the first time in the Netherlands (Mennema et al. 1989). Floristic mapping carried out in Great-Britain (Perring – Walters 1962) was considered as a prime example, and was followed by European research. The present, continuing floristic atlas series (Jalas – Suominen 1972-1994, Jalas et al. 1996, 1999) is related to the great European flora work (Tutin et al. 1964-1980). It applies a 50 × 50 square kilometre UTM grid to display the distribution of species (and certain subspecies) in Europe. In Central Europe Ehrendorfer – Hamann (1965) were the first to recommend grid based floristic mapping where a grid of geographic longitudes and latitudes serves as topographic reference, which can have a common application. The extension of Central European ‘base-squares’ is 10' longitude × 6' latitude. By dividing them into four parts, the quarters of ‘base-squares’ or the ‘quadrates’ are obtained (5' long. × 3' lat). Depending on the purpose of the research, the basis of floristic mapping can be either the ‘base-squares’ or the ‘quadrates’ (Niklfeld 1971). Several regional projects have already been carried out in West Germany: Haeupler – Schönfelder 1989; East Germany: Benkert et al. 1996; Belgium and Luxemburg: Rompaey – Delvosalle 1979, Czech Republic: Slavík 1986, 1990, 1998; Poland: Zajac – Zajac 1997. They use the methods of the project Mapping Flora of Central Europe, and several local flora atlases have been completed so far. In 1972 Hungary joined the floristic mapping of Central Europe. A database was compiled by processing about 40 floraworks, but only a small amount of the results was published (Borhidi 1984).

Preliminary Research in Hungary

There is only a small number of studies demonstrating distributions of regional dendroflora in Europe. In Slovakia a considerable database about the occurrence data of tree and shrub species (Blattný – Štastný 1959) was completed, but only a patch map of four coniferous species (*Picea abies*, *Abies alba*, *Pinus sylvestris*, *Larix decidua*) and a dot map of two rare Gymnosperms (*Pinus cembra*, *Taxus baccata*) were drawn. All species of dendroflora were mapped in Poland (Browicz 1963-81) and in France (Rameau et al. 1989, 1993) and displayed on patch maps. Furthermore, in France the frequency was shown by a two-degree scale. The most detailed grid maps of tree species significant for forestry were published in Spain (León et al. 1993). There are many publications on rare and endangered tree and shrub species (and also other plant species) considering local scales. On a regional scale an atlas of 61 species in Bavaria (Anon. 1986) represents the occurrence in quadrates and the status of the species as well.

In Hungary the first publication dealing with the distribution of trees and shrubs is a study by Fekete – Blattny (1913, 1914). At the statutory meeting of the International Union of Forest Research Organizations held in Vienna in 1893, elaboration of this work was envisaged. It has frequently been, in international references, and has become an essential source book. Occurrence records of 57 dendrotaxa were displayed within the former borders of Hungary (including nearly the entire Carpathian Basin). It should be noted that localization of species in the vertical zones was given more emphasis than that of their horizontal distribution. Species localities have detailed lists in 14 main geographical units, and 4 maps are enclosed, on which there are dot and/or patch maps of 23 dendrotaxa (such as *Picea abies*, *Abies alba*, *Pinus sylvestris*, *P. nigra*,

P. cembra, *Larix decidua*, *Taxus baccata*, *Fagus sylvatica*, *Quercus pubescens* s. l., *Q. frainetto*, *Q. cerris*, *Castanea sativa*, *Carpinus orientalis*, *Ostrya carpinifolia*, *Alnus viridis*, *Tilia tomentosa*, *Fraxinus ornus*, *Acer obtusatum*, *A. monspessulanum*, *A. tataricum*, *Ilex aquifolium*, *Syringa vulgaris*, *S. josikaea*). At the end of the 1950's occurrence records of 11 important stand-forming tree species (*Pinus sylvestris*, *P. nigra*, *Picea abies*, *Larix decidua*, *Robinia pseudoacacia*, *Fagus sylvatica*, *Carpinus betulus*, *Quercus cerris*, *Q. robur*, *Q. petraea*, *Q. pubescens*) were collected on the basis of the forestry management plans (Járó 1962, 1966). These maps can be considered as special dot maps, in which the frequency of the species is shown by a six-degree scale within communal borders. A note is added to each of the species indicating the focal point of its occurrence, the site requirements and whether it is indigenous. Distribution of all species of the dendroflora in Hungary – except Genus *Rosa* – are shown in a study by Bartha – Mátyás (1995) containing dot maps and patch maps. Concerning 36 important stand-forming and admixed tree species dot maps were drawn, where each dot represents a 1500-hectare-area of forest. The territory of the country was covered by 1,000 dots. This method made frequency demonstration possible using a five-degree scale. These maps are based on the database of the State Forest Service. Methods of Mapping the Flora of Central Europe were applied in case of 106 more rare tree and shrub species. The grid extension was approximately 12.8 × 11.1 km (Central European 'base-squares'). In the maps, different signs mark the natural occurrence, extinction, sub-spontaneous occurrence and uncertain occurrence. The book contains further 11 adventive species, but due to insufficient knowledge no maps were presented. The State Forest Service compiled grid maps of six species and group of species (oak, Turkey oak, beech, black locust, poplar and pine) on the basis of their own database (Szabó 1997, Bán et al. 2002). In these maps the grid units represent 287.5 hectares (1,896 m x 1,517 m). To display frequency, a five-degree scale was used.

2 MATERIALS AND METHODS

In Hungary the plan of drawing grid-based floristic maps for the entire vascular flora was raised again at the turn of the Millennium. Methods were elaborated in detail (Király – Horváth 2000). The inventory of the about 2,800 quadrates covering the country between 2002-2005 is financed by a National Research and Development (R&D) Project (Bartha et al. 2002). The investigation of rare dendrotaxa worthy of protection in Hungary has been one of the main research topics of the Department of Botany. The compilation of Bartha – Mátyás (1995) was pioneer in showing how essential it is to get reference and herbaria records up-to-date and to use refined scale maps. Research workers of the Department of Botany have collected data of nearly 50 protected or rare dendrotaxa, involving evaluation of reference data and herbaria sources, and new field data for the years 1995-1998. Unpublished data, such as manuscripts, were also processed. A description of the database of 34 species was published by Bartha et al. (1999), but due to technical problems, no accurate maps were issued. Between the years of 1998-2002 database development was continued, and a number of new records were added. In the meantime, the use of the GIS was being improved. The present study includes grid maps of 20 species and adopts methods applied for Mapping the Flora of Central Europe. So far no distribution maps of these species have been drawn in such a refined scale (6.4 x 5.5 km) in Hungary. In selecting species from the database, besides the especially rare taxa (such as *Carpinus orientalis*), species having more regional records (such as *Salix pentandra*) and species with a large number of records (such as *Alnus incana*) had the preference. The paper presents also examples for different levels of endangered status within one genus. For this reason distribution maps of several species of one genus (such as *Alnus* spp., *Ribes* spp.) are displayed together.

3 RESULTS

Occurrence records are divided into two parts. Data before and after 1990 are separated in the database of rare dendrotaxa and also on the maps. 1990 is the year of reference, because it is the time when botanical field studies intensified, and changed attitudes in forestry and nature conservation in Hungary. For some taxa, plantation or spontaneous occurrences also have map representation. For only a few species occurrences described earlier proved to be extinct, or the records are unconfirmed, however the category of ‘extinct’ is applied only in verified instances. The maps demonstrated in the paper provide opportunities to computer data and to investigate reasons of regression of some species on the basis of the old unconfirmed records. Many new occurrences were found after 1990. As additional information, a short description is accompanying the map of each species. The maps and the database provide essential information for scientists and forest managers investigating biological bases of forest management, and also, for nature conservation experts.

Applied abbreviations:

- 1990 onwards, indigenous occurrence
- Before 1990, indigenous occurrence, not confirmed since 1990
- 1990 onwards, planted or escaped species occurrence
- Before 1990, planted or escaped occurrence, not confirmed since 1990
- + Locality, from where a taxon has certainly become extinct
- Occurrences of uncertain locality (mainly data before 1990, covering possible quadrates)
- ▲ Occurrence of *Cotoneaster* spp. (undefined, either *C. niger* or *C. integerrimus*) (only in Figure 6)

Grey alder [*Alnus incana* (L.) MOENCH] (Figure 1)

Proving the dealpine character of this species, it is more frequent along the rivers originating in the Alps (Danube, Rába, Mura, Dráva), and in the valleys of Hernád and Bodrog rivers, which rise in the Carpathians. In other parts of Hungary only planted stands are known.

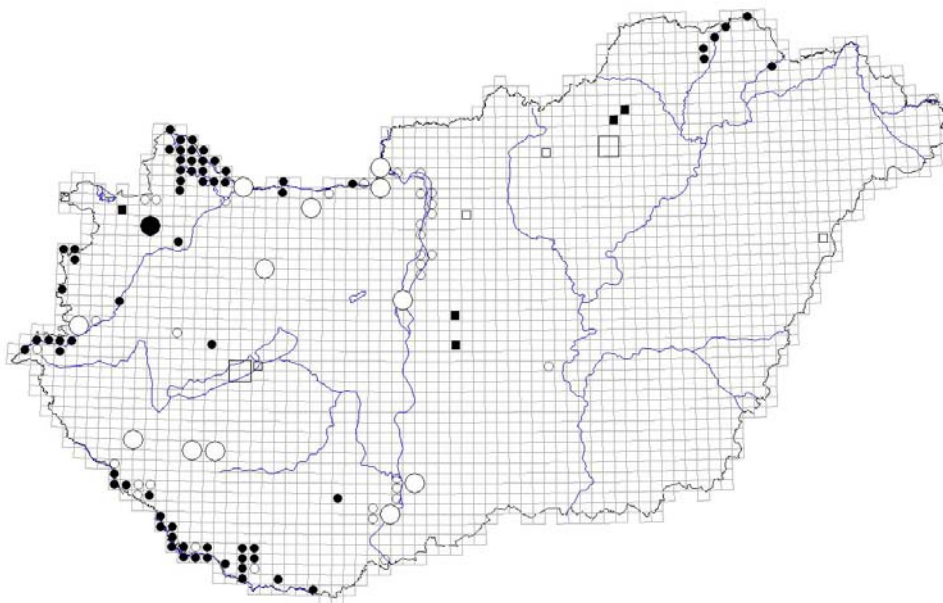


Figure 1. Occurrences of grey alder [*Alnus incana* (L.) MOENCH] in Hungary

Green alder [*Alnus viridis* (CHAIX) DC.] (Figure 2)

In the western part of Órség and in Vendvidék stable populations exist, but records from the bordering areas have not been confirmed recently. Occurrences in the Sopron Hills and Kőszeg Mountains mentioned in other sources are faulty or do not refer to Hungary.

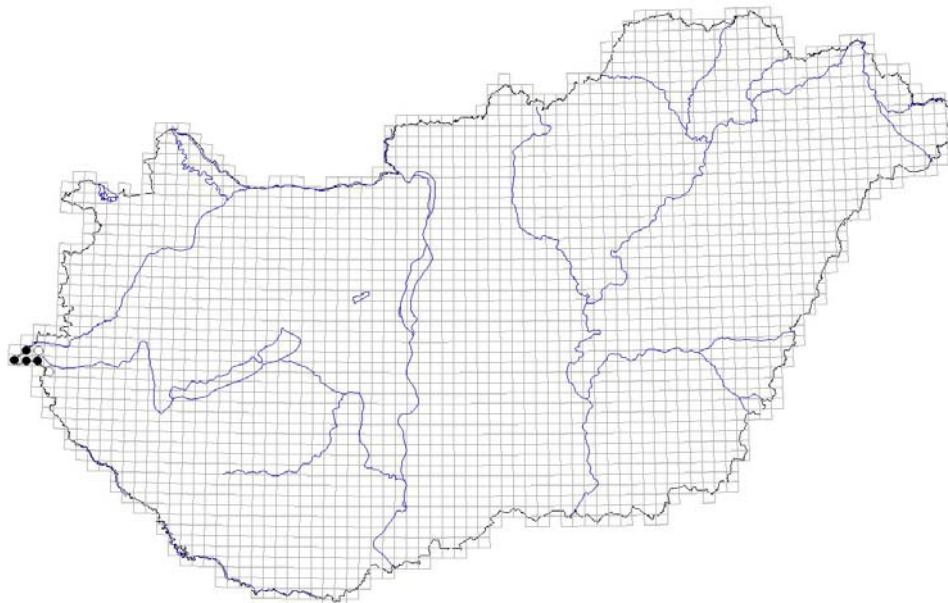


Figure 2. Occurrences of green alder [*Alnus viridis* (CHAIX) DC.] in Hungary

Snowy mespilus [*Amelanchier ovalis* MEDICUS] (Figure 3)

This species exists on dolomite hills of strong sub-Mediterranean character in the Transdanubian Mountains. The main part of its range is in the Bakony and Vértes Mountains. Only two more isolated occurrence sites are known, one in the Keszthely Mountains and the other in the Gerecse Mountains. Since 1990 several new localities of this species have been found owing to intensive research.

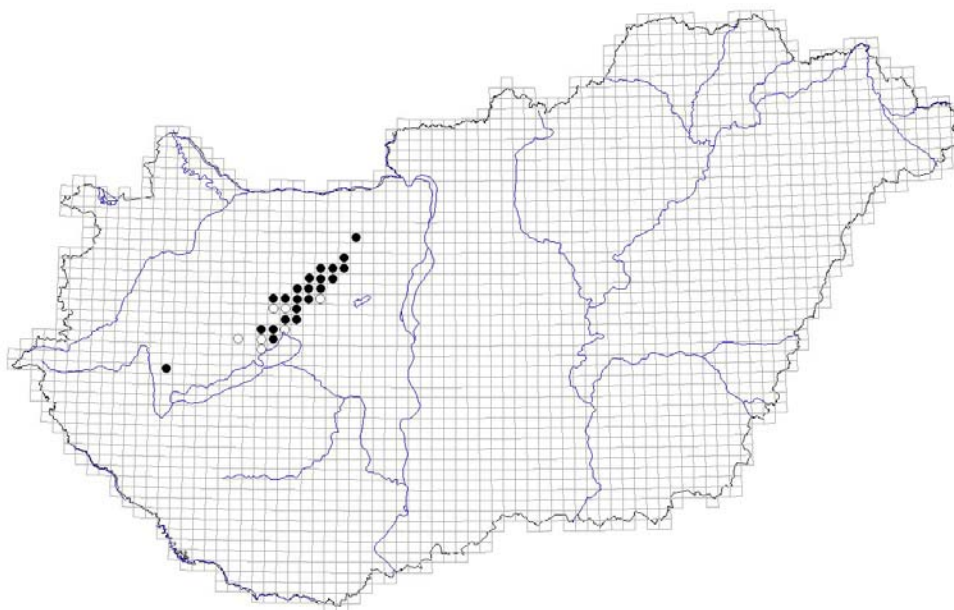


Figure 3. Occurrences of snowy mespilus [*Amelanchier ovalis* MEDICUS] in Hungary

Oriental hornbeam [*Carpinus orientalis* MILL.] (Figure 4)

This periglacial relic species occurs indigenously in the Vértes Mountains (Haraszt-Peak), where it is found in great abundance; while there are planted stands in the Csaplár-forest near Alcsútdoboz.

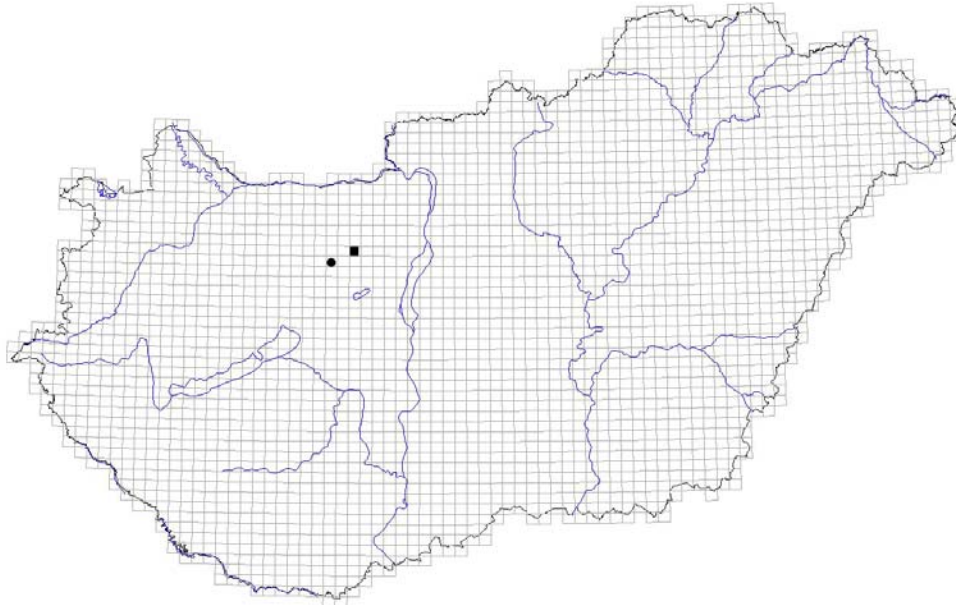


Figure 4. Occurrences of oriental hornbeam [*Carpinus orientalis* MILL.] in Hungary

Scorpion senna [*Coronilla emerus* L.] (Figure 5)

This shrub species is found in calcareous woodlands of the Transdanubian Mountains of sub-Mediterranean character. The number of localities, where it has been found, multiplied after 1990. It was found at many spots in the Bakony Mountains. No records in the Külső-Somogy region has been confirmed since the 1960's.

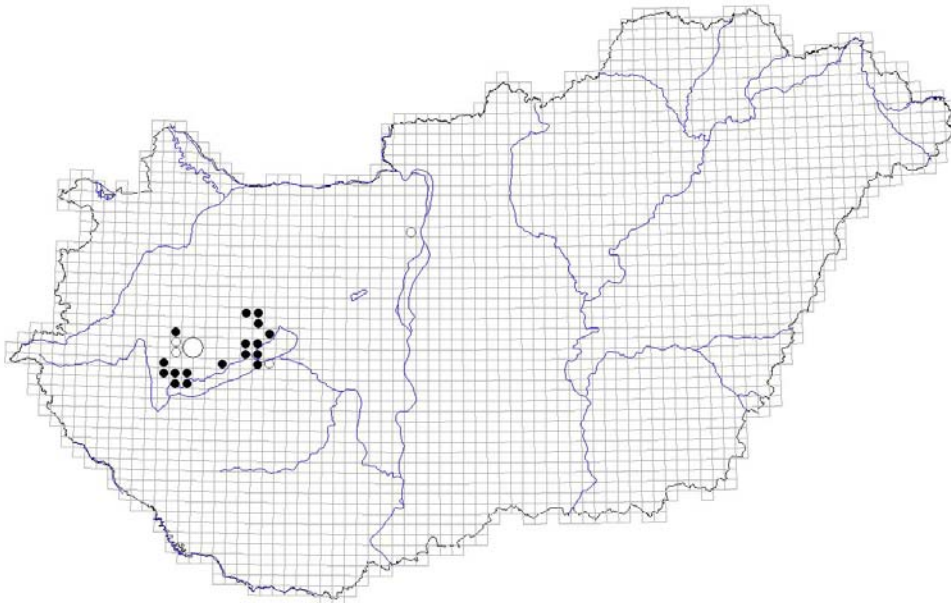


Figure 5. Occurrences of scorpion senna [*Coronilla emerus* L.] in Hungary

Wild common medlar [*Cotoneaster integerrimus* MEDICUS] and black medlar [*Cotoneaster niger* (WAHLBERG) FRIES] (Figure 6 - Figure 7)

This is a pair of species with difficult taxonomy. There is an intermediate form (*C. matrensis* DOMOKOS), which occurs in several literature sources. On the maps only records which were checked after 1990 are shown, for the former reference data or fragmentary herbarium specimens cannot be identified correctly. The so far unchecked records of *C. integerrimus* – *C. niger* are displayed as a separate category.

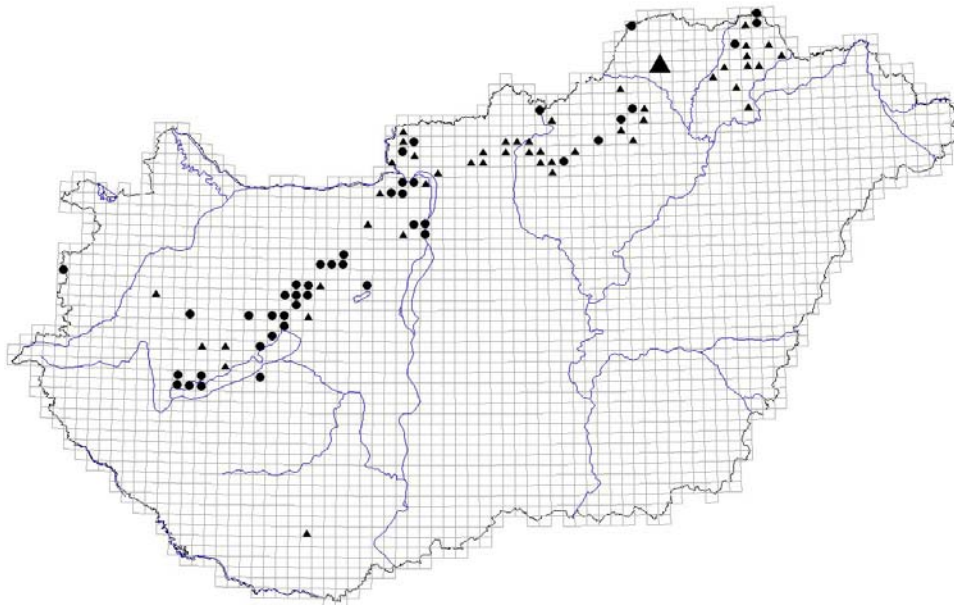


Figure 6. Occurrences of wild common medlar [*Cotoneaster integerrimus* MEDICUS] in Hungary

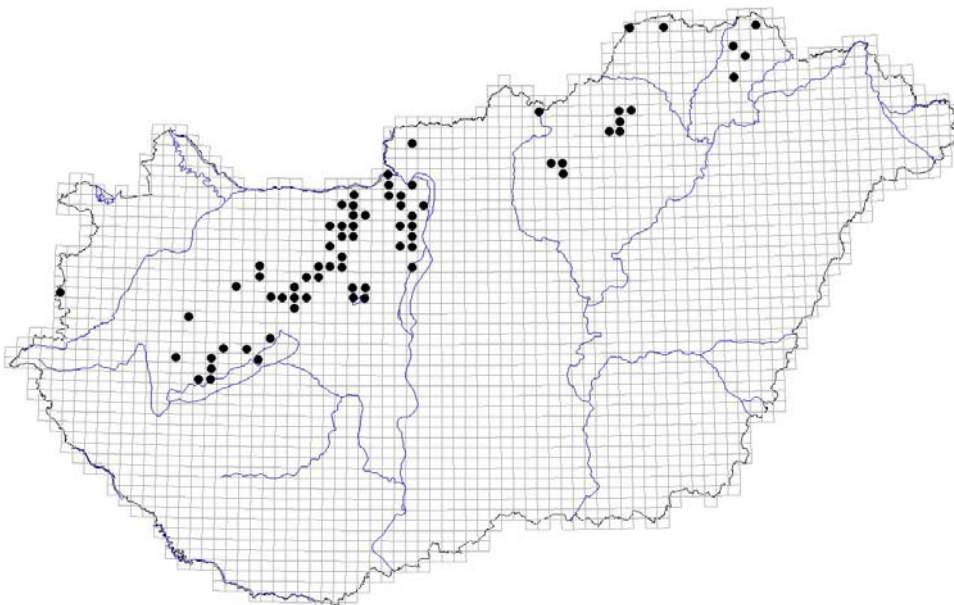


Figure 7. Occurrences of black medlar [*Cotoneaster niger* (WAHLBERG) FRIES] in Hungary

Downy medlar [*Cotoneaster tomentosus* (AITON) LINDLEY] (Figure 8)

Species occur mainly on dolomite bedrock of sub-Mediterranean character of the Transdanubian Mountains. They have not been found lately in the eastern part of the Balaton Uplands. Records of occurrence in the Mecsek Mountains are more than one and a half centuries old. Records from Somogy region, mentioned in other sources, are probably faulty.

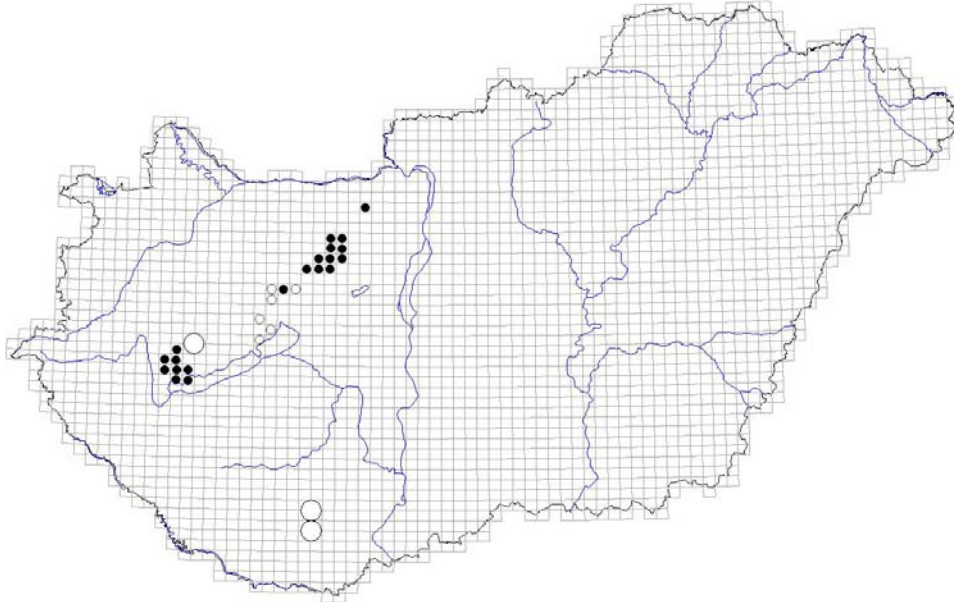


Figure 8. Occurrences of downy medlar [*Cotoneaster tomentosus* (AITON) LINDLEY] in Hungary

Garland flower (*Daphne cneorum* L.) (Figure 9)

Occurrences of the basophilous form have decreased in the Transdanubian Mountains, and new localities have rarely been found since 1990. The acidophilous form (subsp. *arbusculoides* (TUZSON) JÁV.) has stable stands in Órség region, but several disperse populations have already disappeared.

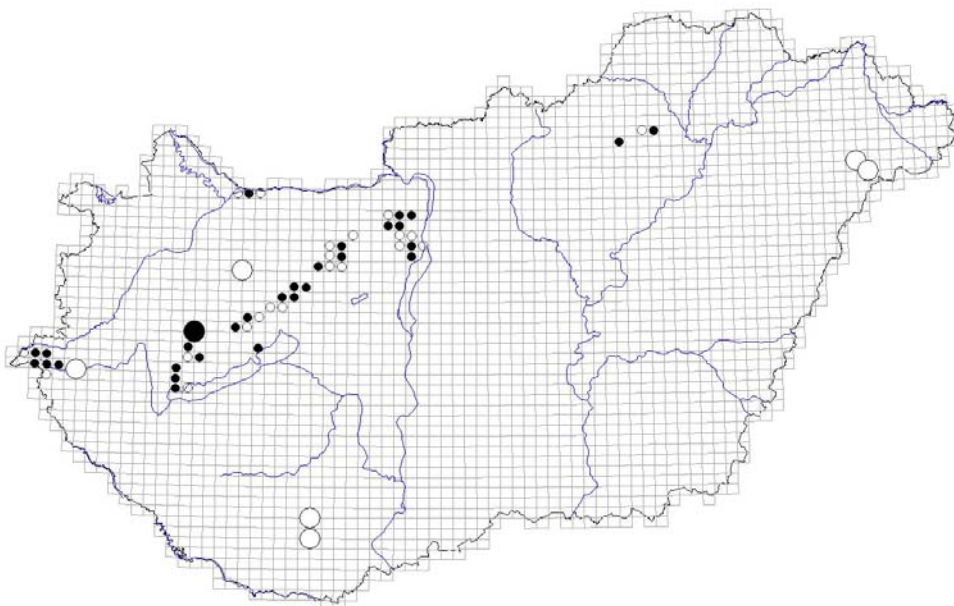


Figure 9. Occurrences of garland laurel [*Daphne cneorum* L.] in Hungary

Sprunge laurel [*Daphne laureola* L.] (Figure 10)

This species can be found at higher elevations of the Transdanubian Mountains of sub-Atlantic, sub-Mediterranean character, and there are stable stands in the Bakony Mountains and Vértes Mountains. The population in the Keszthely Mountains is vulnerable, and the species became extinct from the Börzsöny Mountains long ago.

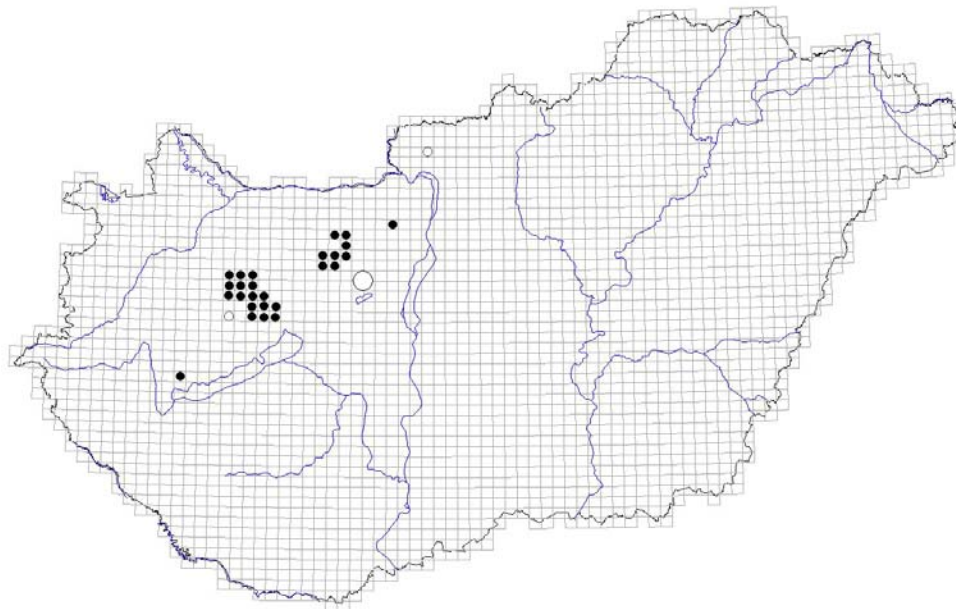


Figure 10. Occurrences of sprunge laurel [*Daphne laureola* L.] in Hungary

Sea grape [*Ephedra distachya* L.] (Figure 11)

It occurs in the sub-Mediterranean forest steppe areas, primarily in the area between the Duna and the Tisza rivers. Some of its former localities, mainly near the capital are disappearing rapidly and the few new localities found after 1990 cannot compensate for losses.

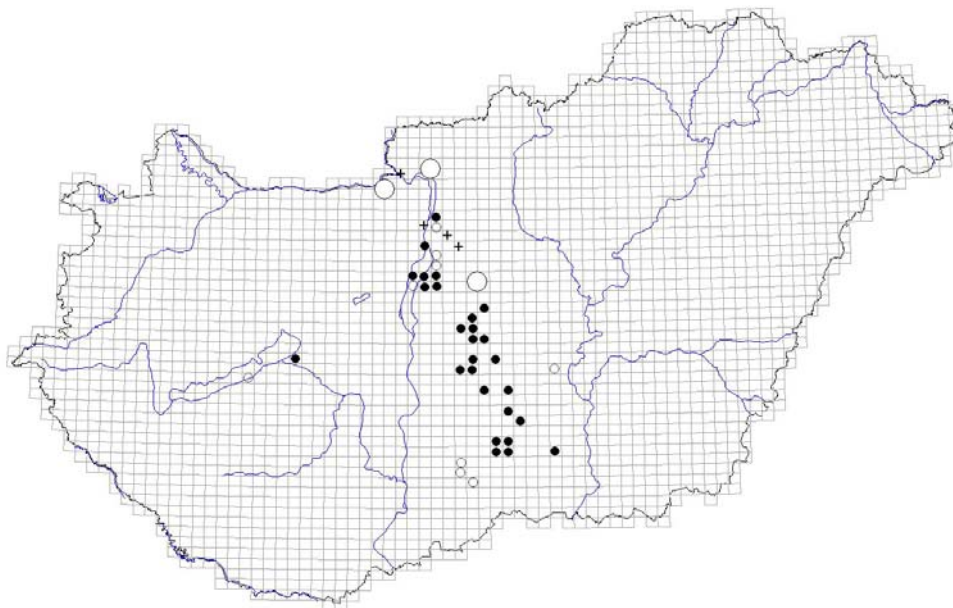


Figure 11. Occurrences of sea grape [*Ephedra distachya* L.] in Hungary

Austrian pear [*Pyrus austriaca* KERNER] (Figure 12)

This taxon has been cultivated for a long time, its localities are situated in the western margin of Transdanubia, and its specimens survived due to cultivation. This species might become much more rare because of the decrease of extensively managed orchards.

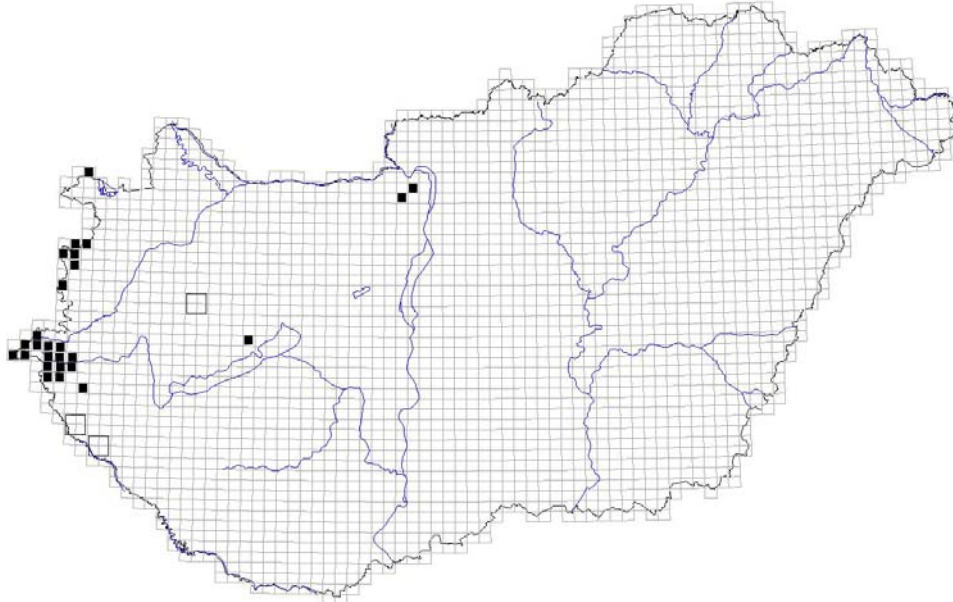


Figure 12. Occurrences of Austrian pear [*Pyrus austriaca* KERNER] in Hungary

Hungarian pear [*Pyrus magyarica* TERPÓ] (Figure 13)

It is a hardly known endemic species of the Hungarian flora, which became known no more than half a century ago. More than half of its former records cannot be confirmed presently, at the same time recent occurrences consist of quite a few individuals.

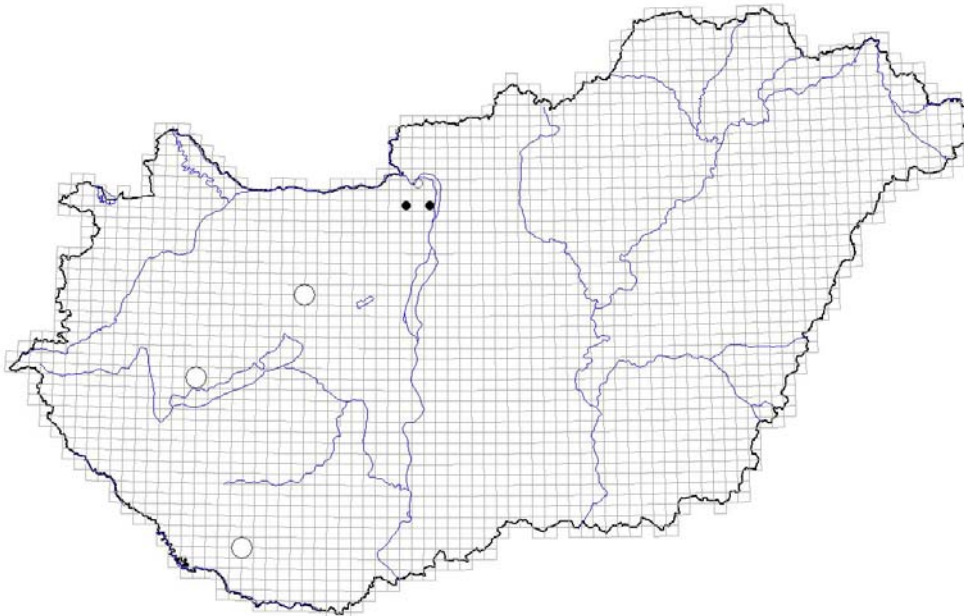


Figure 13. Occurrences of Hungarian pear [*Pyrus magyarica* TERPÓ] in Hungary

Snow pear [*Pyrus nivalis* JACQ.] (Figure 14)

This is a cultural relic species, which had large populations on some spots of the southern sides of the Northern and Transdanubian Mountains in the 1950's. As a result of intensive viticulture and construction work by the 1990's, only a small part of its former records could have been confirmed. The other endangering factor is the introgression with wild pear (*P. pyraster* BURGSD.). On most of its habitats only hybrid individuals (*P. × pannonica* TERPÓ) can be found.

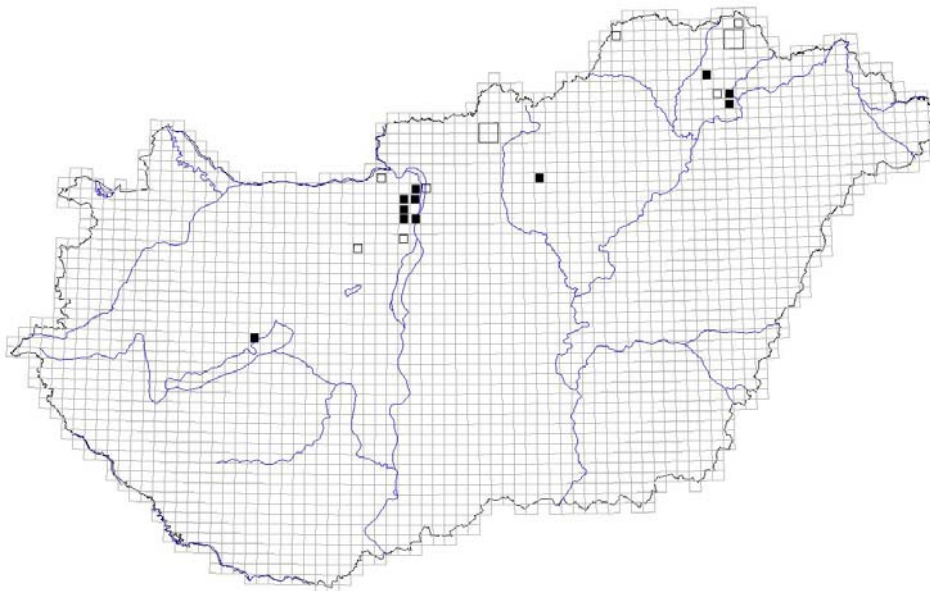


Figure 14. Occurrences of snow pear [*Pyrus nivalis* JACQ.] in Hungary

Rock buckthorn [*Rhamnus saxatilis* JACQ.] (Figure 15)

Having descended from the limestone range of the eastern Alps, it has one occurrence near Sopron, which is the only area of calciferous character in West-Transdanubia. In the inner part of this locality some new subpopulations have been found since 1990, but its marginal stands (in Sopron Hills) have disappeared.

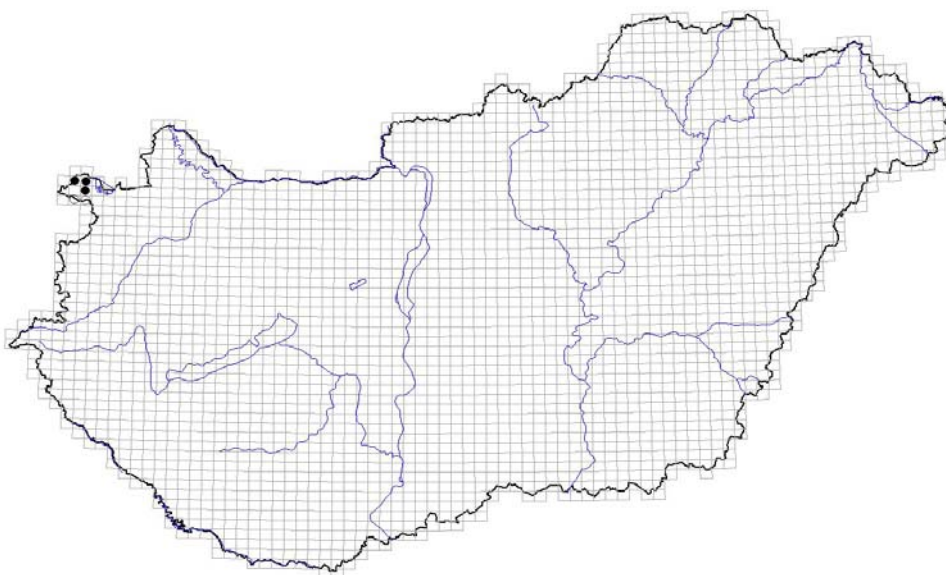


Figure 15. Occurrences of rock buckthorn [*Rhamnus saxatilis* JACQ.] in Hungary

Alpine currant [*Ribes alpinum* L.] (Figure 16)

This glacial relic species survived in the mountainous area of Hungarian Mountains. In the last one and a half decades the number of known localities has doubled, and it was found also in some new areas (such as Mátra Mountains, Torna Karsts).

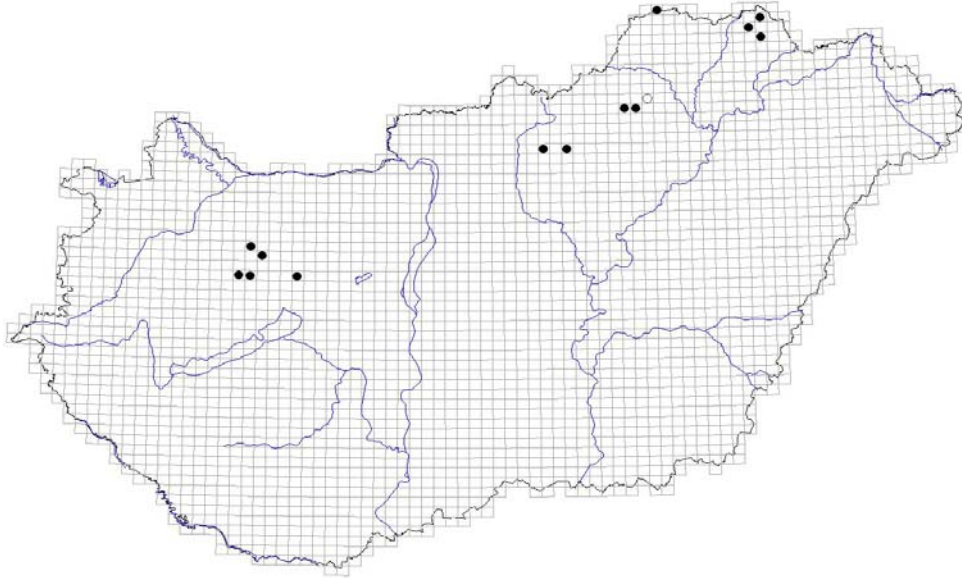


Figure 16. Occurrences of Alpine currant [*Ribes alpinum* L.] in Hungary

Black currant [*Ribes nigrum* L.] (Figure 17)

This species is possibly indigenous along the Danube and in Hanság, several new localities were found after 1990, mainly in Transdanubia. These new occurrences can be explained partly by more detailed field research and partly by the spontaneous expansion of its area. Although in some cases localities of human origin cannot be excluded, on the map all the records are marked as indigenous because of the difficult status estimation.

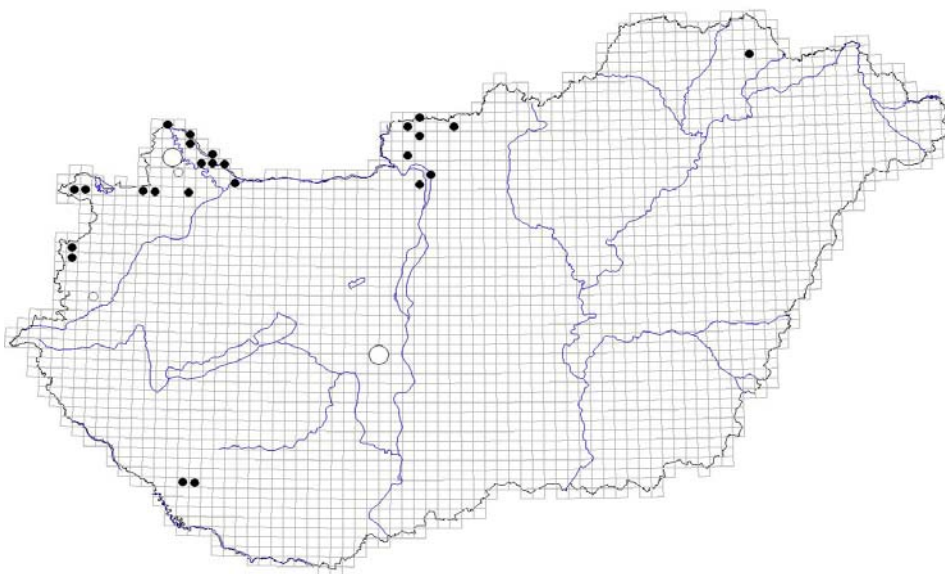


Figure 17. Occurrences of black currant [*Ribes nigrum* L.] in Hungary

Red currant [*Ribes rubrum* L. agg.] (Figure 18)

A northeastern European species, which was established at the beginning of the 20th century as sub-spontaneous introduction, and became a seemingly indigenous element of natural forest associations. Owing to its capability to adapt, *Ribes rubrum* was entered into the Red List of endangered species. During recent research, several new localities were found, so the expansion of this species is still going on.

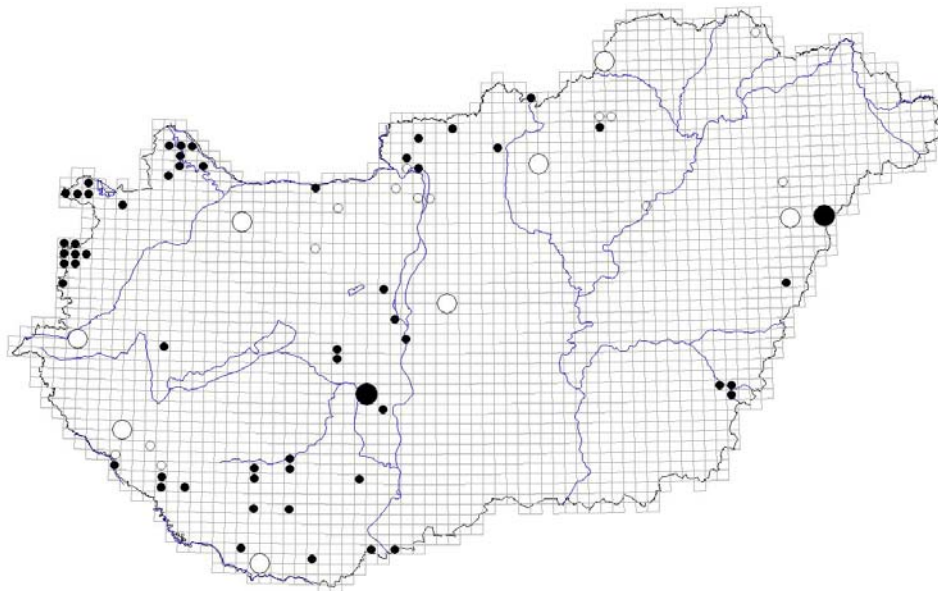


Figure 18. Occurrences of red currant [*Ribes rubrum* L. agg.] in Hungary

Bay willow [*Salix pentandra* L.] (Figure 19)

Populations being relics of colder ages are known on the mires of Eastern Nyírség and Szatmár-Bereg Plain. Some new subpopulations have been found after 1990. All its former occurrences have disappeared on the western side of the Tisza River. Only one locality was discovered, though its indigenous character is questionable. The species might occur in Hanság as well.

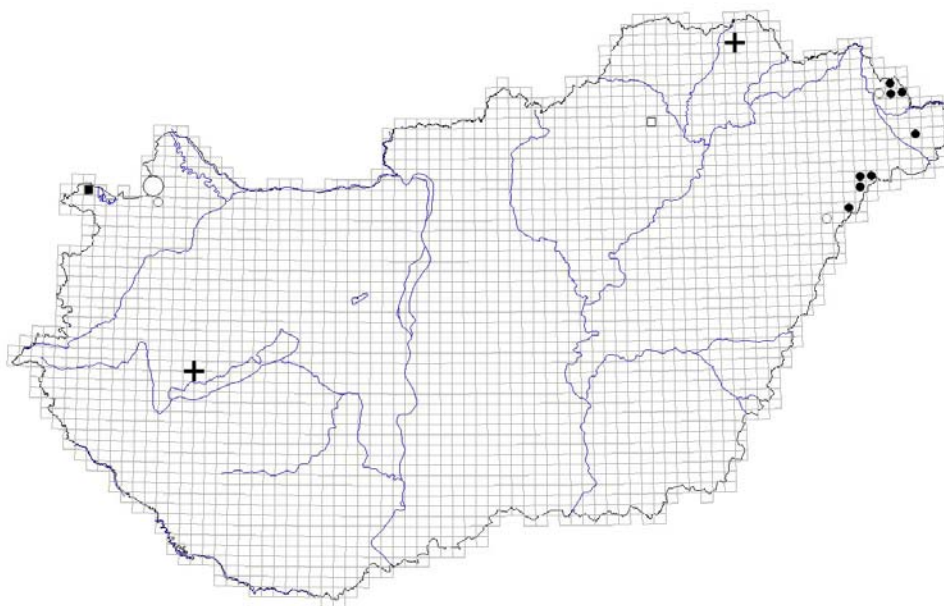


Figure 19. Occurrences of bay willow [*Salix pentandra* L.] in Hungary

Common yew [*Taxus baccata* L.] (Figure 20)

This species has two indigenous occurrences in the Bükk Mountains and in the Southern Bakony Mountains. The latter one belongs to the largest stands of this species in Central Europe. Other records representing few individuals should be considered as subspontaneous.

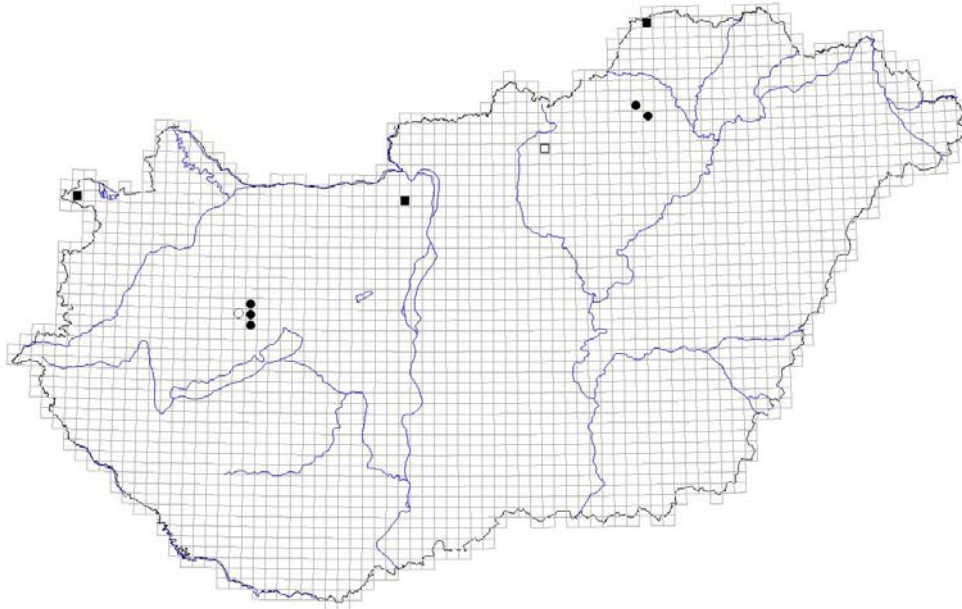


Figure 20. Occurrences of common yew [*Taxus baccata* L.] in Hungary

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