

Introduction

In ten consecutive volumes of "Chorology of Trees and Shrubs in South-West Asia and adjacent regions", published in years 1982–1994 as well as in "Supplement" of 1996, 575 point range maps were worked up. They comprised both species of strongly expanded ranges, covering substantial areas of Europe and Asia, e.g. *Rosa canina* L. or *Capparis spinosa* L. as well as those of very limited ranges or even represented only by few stations.

Unfortunately, those volumes do not cover all woody species occurring in south-west Asia, for drawing of such maps by the point method is for various reasons, at least currently, almost impossible. It concerns, among others, the species whose systematic location is still unclear, e.g. some species of such genera as *Rhamnus* (Turkey), *Sorbus* and *Crataegus* (Turkey, Iran) or *Cotoneaster* (Iran, Afghanistan, Pakistan). In addition, there are some species which still lack sufficiently reliable data concerning their stations – e.g. shrubby species of *Tamarix* and *Caragana*, or those from the family of Chenopodiaceae. The species that are found in south-east Europe, but not represented in at least one locality in south-west Asia, or Pakistani species unknown in Afghanistan were not taken into consideration either.

However, it seems that the number of maps elaborated is sufficiently representative, and the number of localities significant enough for making a phytogeographical analysis of woody species on their bases. Moreover, the number of 575 maps was increased to 600, for I added 25 further, unpublished maps of small, endemic species that are known from one or a few stations. Below, I present a list of those species in the alphabetical order, specifying the country of origin for each of them.

1. *Acer undulatum* Pojark. (Turkey)
2. *Amygdalus jugata* Browicz (Afghanistan)
3. *Amygdalus koelzii* Browicz (Afghanistan)
4. *Amygdalus pabotti* Browicz (Iran)
5. *Amygdalus zielinskii* Browicz (Iran)
6. *Betula browicziana* A. Güner (Turkey)
7. *Cerasus hippophaeoides* Bornm./Bornm. (Turkey)
8. *Cerasus turcomanica* Pojark. (Iran, Turkmenistan)
9. *Chronanthus orientalis* (Lois.) Heywood et Frodin (Turkey)
10. *Colutea gifana* Parsa (Iran)
11. *Cotoneaster nebrodensis* (Guss.) K. Koch (Europe, Turkey)
12. *Fluggea anatolica* Gemici (Turkey)
13. *Genista sandrica* Hartvig et Strid (Turkey)
14. *Gonocytisus dirmilensis* Hub.-Mor. (Turkey)
15. *Ilex aquifolium* L. (Europe, Turkey)
16. *Lycium edgeworthii* Dun. (Iran, Pakistan, India)
17. *Philadelphus caucasicus* Koehne (Caucasus, Turkey)
18. *Prunus kurdica* Fenzl. ex Fritsch (Turkey)
19. *Pyrus anatolica* Browicz (Turkey)
20. *Pyrus farsistanica* Browicz (Iran)
22. *Pyrus serikensis* A. Güner et H. Duman (Turkey)
23. *Pyrus yaltiriki* Browicz (Turkey)
24. *Quercus vulcanica* Boiss. et Heldr. ex Kotschy (Turkey)
25. *Salix rizeensis* A. Güner et J. Zieliński (Turkey)

In recent 30–40 years, along with the growth of floristic explorations on the said territory and publications of fully completed Floras, such as "Flora of Turkey", "Flora of Cyprus", "Flora of Palestine", "Flora of Tadzhikistan" and "Nouvelle Flore du Liban et de la Syrie" as well as not completed yet, but to be finished very soon, such as: "Flora Iranica", "Flora of Iraq" and "Flora of Pakistan", the interest in chorology and phytogeographical division of

south-west Asia area into regions (phytochoria) has definitely increased. A number of papers in this scope has appeared, but they are rather of fragmentary character and mainly concern one country. There are no exhaustively exact point maps of whole ranges of all, or at least most, of the species, and yet there are about 15 thousand of them in the said area.

In 1931, Eig distinguished 5 regions for contemporary Palestine: Saharo-sindienne, irano-touranienne, mediterrannée, eoro-siberienne-boreoamericaïne and Soudano-deccanienne. In each of those regions, he separated a series of groups, depending on the geographical similarities, and allocated individual species to appropriate regions and groups. This Eig's concept, with some modifications, was then adopted by Zohary (1962, 1963, 1971) who also published a detailed map "Plant Geographical Territories of Palestine" (1962, 1966, 1982) and then, the maps of the whole area of south-west Asia with some reference to the previous map: "Plant Geographical Regions" and "Natural Districts of the Middle Eastern Countries". The latter map does not cover, however, either Afghanistan or Pakistan. Those maps influenced significantly the concepts of other authors.

Some wider elaboration of the regions was presented by Takhtajan (1978) as well as Meusel, Jäger and Weinert (1965), but they distinguished sub-regions, provinces, sub-provinces, districts and sectors in some of the regions. Such divisions are particularly developed in the publications of the last three authors which were drawn on such maps as: "Florenzonen und Florenregionen von Eurasien", "Florenregionen und Florenprovinzen von Eurasien" and "Florenregionen und Florenprovinzen von Europa" (Meusel, Jäger, 1992).

Such divisions are in general well evidenced, but the differences in names of individual phytogeographical units and some contradictions in their classification are often significant. For instance Meusel, Jäger and Weinert (1965) allocate Euxinische Provinz and Hyrcanische Provinz to Makaronesich-Mediterrane Region while, Takhtajan (1978) is of an opinion that Euxinian Province belongs to Circumboreal Region, and Hyrcanian Province to Irano-Turanian Region, which one cannot agree with.

In the above papers, as well as in a number of others, some distinct tendency to draw the borderlines of individual regions and smaller units on maps is noticeable. In the case of Turkey, Davis (1971) drew map "Approximate limits of the phytogeographical regions", distinguishing 1. Euro-Siberian Region (with Euxine Province) 2. Mediterranean Region (East Mediterranean Province) with a division into West Anatolian District, Taurus District and Amanus District) 3. Irano-Turanian Region, composed of two parts: Central Anatolia and East Anatolia. He also included Mesopotamia in the latter one. Guest (1966) separated only two regions in Iraq: Irano-Turanian with two sub-regions: Mesopotamian and Irano-Anatolian, as well as Saharo-Sindian Region. Leonard (1988), on the basis of analysis of 509 species occurring in Iranian deserts, drew borderlines for Irano-Turanian and Saharo-Sindian Regions in south-west Asia. Ali and Qaiser (1986) marked on the map of Pakistan and Kashmir, limits of four regions: Irano-Turanian, Sino-Japanese, Saharo-Sindian and Indian, but he divided Irano-Turanian Region into two sub-regions: Western and Eastern. And finally, Grubov (1963) developed a map of phytogeographical division of central Asia, but he dealt in details only with its eastern part.

The borderlines of individual regions are marked only approximately on the above maps, for plants do not recognise not only political or administrative borders, but even phytogeographical ones. Therefore, Hege and Wendelbo (1978) talking about three regions in the territory of Iran: Euro-Siberian, Irano-Turanian and Saharo-Sindian did not draw any border-lines in the territory of that country, and they write: "These three regions, however, should not be thought of a precise entities but rather as a useful framework for discussion".

It is commonly thought that in south-west Asia, 5 phytogeographical regions are distinguishable: Euro-Siberian, Mediterranean, Irano-Turanian, Sino-Japanese and Saharo-Sindian. In the case of the latter region, various names are applied. Adopting such division, I attempted to distribute all 600 species of trees and shrubs among these regions taking advantage, at the same time, of the opinion contained in 10-volume Davis's "Flora of Turkey" (1965–1988) as well as in 9-volume Zohary, Heyn and Heller's "Conspectus Florae Orientalis" (1980–1994). It turned out, however, that it was not such an easy task, for I could not always agree with the evaluations contained therein. The whole matter was complicated by the presence of linking species between individual regions, and they are quite numerous. In effect, many authors separated the whole series of bi- and pluriregional species. I tried to avoid such differentiation in this paper, though it was not always possible.

I recognised the species as belonging to a given region, most localities of which are concentrated right in the region discussed and participation of which in the plant communities of such region is significant. They may also

occur in the areas of other regions, but their localities are much rarer there and participation in the local vegetation is almost unnoticeable. The latter localities often have a relict character and survive in a given area thanks to the preservation of suitable ecological niches; such stations may gradually decline. On the other hand, they may be the localities of expansive species, expanding their ranges and penetrating bordering regions. In some cases, however, it turned out that it was very difficult to determine the occurrence priority in one region, and for that reason, I decided to distinguish a small group of bi- and pluriregional species. In the latter case, it concerned species of wide ranges. Perhaps, if such species, usually composed of a few subspecies, were to be treated as smaller but independent systematic entities (e.g. *Capparis spinosa*, *Acer monspessulanum*), this kind of distinction would not be necessary. Below, I present a list of the species belonging to two or more regions, in the alphabetical order – 33 species in all.

Biregional species

- Ephedra foliata* Boiss. (Irano-Turanian, Afro-Sindian)
- Fraxinus ornus* L. (Euro-Siberian, Mediterranean)
- Genista lydia* (Boiss.) (Euro-Siberian, Mediterranean)
- Jasminum fruticans* L. (Mediterranean, Euro-Siberian)
- Juniperus oxycedrus* L. (Euro-Siberian, Mediterranean)
- Monotheca buxifolia* (Falc.) A.DC. (Irano-Turanian, Afro-Sindian)
- Nerium indicum* Miller (Sino-Japanese, Afro-Sindian)
- Olea ferruginea* Royle (Sino-Japanese, Afro-Sindian)
- Periploca graeca* L. (Mediterranean, Euro-Siberian)
- Platanus orientalis* L. (Mediterranean, Irano-Turanian)
- Quercus pubescens* Willd. (Euro-Siberian, Mediterranean)
- Rosa pulverulenta* M.Bieb. (Euro-Siberian, Mediterranean)
- Ruscus aculeatus* L. (Euro-Siberian, Mediterranean)
- Salix amplexicaulis* Bory et Chaub. (Euro-Siberian, Mediterranean)
- Sorbus umbellata* (Desf.) Fritsch (Mediterranean, Euro-Siberian)
- Tamarix passerinoides* Delile ex Desv. (Irano-Turanian, Afro-Sindian)

Pluriregional species

- Acer monspessulanum* L. (Euro-Siberian, Mediterranean, Irano-Turanian)
- Arceuthobium oxycedrus* (DC.) M.Bieb. (Mediterranean, Irano-Turanian, Euro-Siberian)
- Capparis spinosa* L. (Mediterranean, Irano-Turanian, Afro-Sindian, Sino-Japanese)
- Cerasus mahaleb* (L.) Miller (Euro-Siberian, Mediterranean, Irano-Turanian)
- Cotinus coggygria* Scop (Euro-Siberian, Mediterranean, Sino-Japanese)
- Dodonea viscosa* (L.) Jacq. (Afro-Sindian, Australia, SC America)
- Fraxinus angustifolia* Vahl. (Euro-Siberian, Mediterranean, Irano-Turanian)
- Hippophaë rhamnoides* L. (Euro-Siberian, Irano-Turanian, Sino-Japanese)
- Juglans regia* L. (Euro-Siberian, Irano-Turanian, Sino-Japanese)
- Myricaria germanica* (L.) Desv. (Euro-Siberian, Irano-Turanian, Sino-Japanese)
- Paliurus spina-christi* Miller (Mediterranean, Euro-Siberian, Irano-Turanian)
- Prunus cerasifera* Ehrh. (Euro-Siberian, Mediterranean, Irano-Turanian)
- Punica granatum* L. (Euro-Siberian, Mediterranean, Irano-Turanian)
- Rhus coriaria* L. (Mediterranean, Irano-Turanian, Euro-Siberian)
- Rosa canina* L. (Euro-Siberian, Mediterranean, Irano-Turanian, Sino-Japanese)
- Rubus ulmifolius* Schott. (Euro-Siberian, Mediterranean, Irano-Turanian)
- Sageretia thea* (Osbeck) M. Johnston (Irano-Turanian, Afro-Sindian, Sino-Japanese, Mediterranean)

In order to illustrate the distribution and condensation degree of species ranges in a given region, I elaborated some collective maps on which all the stations are marked within the square of 0.5° geographical degree sides.

Those data were then put into squares of 1 degree sides. The number of species in each square was then presented in the form of circles of varied diameter. The collective map drawn in this way allows for better understanding of the influence exerted by a given region on bordering regions, on the penetration range of species. For that purpose, I used only 534 point maps, since I excluded the bi- and pluriregional species named above, two species belonging to Indian Region: *Acacia modesta* Wallich and *Tamarix dioica* Roxb. ex Roth. and *Avicennia marina* (Forsskal) Vierh. The number of species classified into five consecutive regions is as follows:

Euro-Siberian Region – 146 (25.9%) species, including 65 Euxino-Hyrcanian

Mediterranean Region – 142 (25.2%) species

Irano-Turanian Region – 192 (34%) species

Sino-Japanese Region – 47 (8.3%) species

Afro-Sindian Region – 37 (6.6%) species.