

Review of regions

1. EURO-SIBERIAN REGION (Fig. 1)

I assumed the geographical range of this region in accordance with Zohary's map (1980) "Plant Geographical Regions". Most area of this region falls on middle, Atlantic and boreal Europe, and in south-west Asia, it is represented by one province – Euxino-Hyrcanian. This region is limited to North Anatolia and northern by-Caspian part of Iran. Several species from the latter province appear also in isolation in South Anatolia (mainly Amanus Mts.), in West Syria, and West Lebanon, as e.g. *Fagus orientalis*, *Daphne pontica*, *Rhododendron ponticum*, *Laurocerasus officinalis*, *Ilex colchica*, *Hypericum androseumum*.

Penetration of Euro-Siberian species towards the South takes place far beyond Euxino-Hyrcanian Province, both towards Mediterranean and Irano-Turanian regions. Similarly, in the Balkan Peninsula, such species appear almost in whole Anatolia, except small areas in its middle part classified as Irano-Turanian Region. Penetration of Euro-Siberian species on one side, and of Mediterranean species on the other used to take place quite freely, but in result of deepening dryness of the climate and destructive influence of the human-being on vegetation, such link was interrupted and broken. Very few and relict stations in middle Anatolia are the only witnesses today of Euro-Siberian species withdrawal to the North.

In the Asiatic part of Euro-Siberian Region, or even more precisely in Euxino-Hyrcanian Province, some endemic genera are known, such as: *Parrotia* with one species *Parrotia persica*, *Mespilus* with one species *Mespilus germanica*, *Cydonia* with one species *Cydonia oblonga*, and *Danaë* with one species *Danaë racemosa* – the latter species is also known in South Anatolia, with Amanus Mts.

On the map of Euro-Siberian Region (Fig. 1), I did not take into consideration Euxino-Hyrcanian species, more mesophyllic ones. The said province is so characteristic, both for its composition of species and geographical situation, that I drew a separate map for it (Fig. 2). I worked up such a map a few years ago (Browicz, 1989), but I based then on different principles, i.e. on overlapping the patches of whole ranges of Euxino-Hyrcanian Province.

Coniferous and leafy forests, or mixed ones, are characteristic for that region, while Euxino-Hyrcanian Province is characterised by evergreen species.

2. MEDITERRANEAN REGION (Fig. 3)

The second region after Euro-Siberian that combines distinctly South Europe with south-west Asia is Mediterranean Region. Beside Sino-Japanese Region, it is situated very concretely, geographically, which means that it is in the direct contact with the Mediterranean Sea and under a specific climate. Its border-line in south-east Asia, or perhaps more specifically the border-line of its East-Mediterranean Province, was drawn by Davis (1971). It was presented again by Avcı (1993), but the difference is in drawing the eastern line of west-Anatolian district much farther to the East. To the South, the region comprises littoral, West Syria, West Lebanon and West Israel, as well as the northern bordering of Egypt and Libya (Cyrenaica); also Cyprus comes within this region.

In Mediterranean Region, the number of species of trees and shrubs is almost identical with those in Euro-Siberian Region. Also the number of endemic genera is significant: *Cyprinia*, *Cytisopsis*, *Dorystoechas*, *Eriolobus*, *Gonocytisus*, *Podocytisus*, *Sacropoterium*.

Only few species are strictly attached to the region itself, while the others penetrate to a greater or lesser degree North Anatolia (Euro-Siberian Region), middle Anatolia and West Iran, especially Kurdo-Zagrosian Province (according to Takhtajan 1978) in Irano-Turanian Region, as well as Caucasus and Balkans. Such species as:

Myrtus communis, *Anagyris foetida*, *Nerium oleander*, *Cionura erecta*, *Crataegus aronia* also enter West Iran. The presence of *Cupressus sempervirens* is surprising in North, by-Caspian Iran. *Myrtus communis*, on the other hand, in East Afghanistan and West Pakistan was perhaps only brought during the conquests of Alexander the Great. Coniferous forests, maquis and phrygana are characteristic for that region.

3. IRANO-TURANIAN REGION (Fig. 4)

Irano-Turanian Region belongs to the biggest regions in south-west Asia and comprises at least 3/4 part of its area. That region includes neither North and South Anatolia (Euro-Siberian and Mediterranean Region) in the West, nor south-east Iran, South Afghanistan, some significant part of Pakistan (Afro-Sindian region) and the most western stretch of Himalayan Province (Sino-Japanese Region) in the East.

So widely recognised Irano-Turanian Region is basically accepted to a high degree by numerous authors dealing with south-west Asia. The internal divisions of the region, however, into provinces or districts differ from each other, often quite significantly. Usually, the region is divided into two basic parts: Western and Eastern (Zohary 1973, Ali, Qaiser 1986). Zohary distinguished four provinces in the Western sub-region: Mauritanian Steppes, Mesopotamian, Irano-Anatolian and Medio-Asiatic; and in the Eastern sub-region, he distinguished only one province – Centro-Asiatic. According to Davis (1971), only in Turkey itself, within Irano-Turanian Region, two provinces are distinct: Central Anatolian and East Anatolian, though he included Mesopotamia in the latter one.

According to Ali and Qaiser (1986), the border-line between the Western and Eastern sub-regions runs more or less along West Pakistan, while Zohary (1973) marks it in East Afghanistan, from where it runs farther to the North towards the Balkhash lake. Takhtajan (1978) on the other hand, distinguishes two sub-regions within Irano-Turanian Region: Western Asiatic (Anterior Asiatic) and Central Asiatic. In the first case, he treats this sub-region widely, dividing it into 8 provinces. Two of them: Hyrcanian and Western Himalayan have probably been wrongly included in here. Undoubtedly, Hyrcanian Province belongs to Euro-Siberian Region and comprises the narrow belt of Caspian lowland on the southern part of the Elburz massif which is mostly covered with forests, often so thick and tangled with lianas that Zohary (1973) described them as “true jungle”. Although, such species as *Parrotia persica*, *Gledistia caspica*, *Diospyrus lotus* or *Albizia julibrissin* occur here, indicating some connections with East Asia, but the whole series of species of trees and shrubs are Euro-Syberian species. Indeed, the penetration of Irano-Turanian species is significant here, especially in higher ranges of mountains, but they do not characterise the province.

Jäger and Weinert's Himalajische Region (1965) is nothing else but the most western stretch of Sino-Japanese Region. Although, it encroaches upon Irano-Turanian Region, but it constitutes a distinct separateness which, as Takhtajan (1978) himself admits, is characterised by the “monsoon climate”.

According to Hedge and Wendelbo (1970) “Two relatively small areas of Afghanistan should be excluded from Irano Turanian territory”. One of them is Nuristan and partly Paktia, and the other “... the lowlands, such as in the Jalalabad and Khost regions”. Here, at the bordering of Afghanistan and Pakistan, the penetration of Irano-Turanian species into the territory of Sino-Japanese Region is significant, and quite often, it is difficult to decide into which of the two regions a given species should be included. A similar situation also takes place in south-west Pakistan where Irano-Turanian species penetrate Afro-Sindian Region.

Zohary (1973) distinguishes within East Irano-Turanian Sub-region its eastern part (from Afghanistan, East Tadshikistan, Kirghizstan and Kazakhstan) and defines it as Centro-Asiatic Province. Grubov (1963), on the other hand, who dealt with a detailed division of the so called Central Asia, more or less between 75° and 120°E. Long, included also northern by-Caspian and by-Aral areas into it. The western border-line of the region defined in this way is in Europe in Prikaspijska Nizmennost. Similarly, on Zohary's (1973) map, the western border-line of East Irano-Turanian Subregion falls on the delta of the Volga River and eastern coasts of Caucasus. The most elaborated division is presented by Meusel, Jäger and Weinert (1965) who used other terms – Orientalisch-Turanische Region and Zentralasiatische Region. The first of them is divided into 3 sub-regions: Orientalische, Turkestanische and Turanische, and then the latter ones into a few provinces.

Also Rechinger (1986), basing on geographical distribution of species of *Cousinia*, as well as on the work of Kamelin of 1973 (Florogenetičeskij analys estestvennoj flori Srednej Azii) is of the opinion that Turanian area (Aralo-Caspian) should be excluded from Irano-Turanian Region, but that it should include Central Asian Mountain Province. In such a case, the name of the region should be changed to Irano-Turkestanian. Recently, Leonard (1988, 1989) presented in an extensive way the opinions of different authors concerning the range and division of Irano-Turanian Region, as well as his own division of the region (Centre régional d'endemism irano-turanien) into 4 basic parts: 1. Sous-centre régional occidental, 2. central, 3. septentrional, and 4. oriental as well as the border-lines of the same. For each of these parts, he quotes a set of synonyms – the names that are used by different authors in different time.

Thus, as it results from the above review, Irano-Turanian Region is in general treated similarly, but the opinions about the course of its border-line and internal division are often very different or even contradictory. It requires some further, penetrating chorological studies, which becomes more and more real in connection with the close completion of "Flora Iranica", "Flora of Iraq" and "Flora of Pakistan" edition.

Irano-Turanian Region is the richest region in species of south-west Asia, and the number of species of trees and shrubs occurring here amounts to 192 which constitutes 34% of the whole dendroflora. The region is represented by 8 endemic genera: *Ammothamnus*, *Dendrostellera*, *Halimodendron*, *Malacocarpus*, *Myrtama*, *Pteropyrum*, *Smirnovia* and *Stocksia*. Penetration of Irano-Turanian species to the neighbouring regions is significant here and it goes far beyond the border-line of this region. Probably, it is marked best in the West, in Turkey, to Euro-Siberian and Mediterranean Region. This region is characterised by steppes, semideserts and deserts.

4. SINO-JAPANESE REGION (Fig. 5)

This region in south-west Asia is represented only by Himalayan Province the western part of which reaches East Afghanistan (Kunar, Laghman, Nangarhar). The existence of this region in south-west Asia was indicated for the first time by Good (1947) according to whom ("Map of the World showing Floristic Regions, Plate 4"), it reaches only north-east Pakistan. Then, Kitamura (1960), on his "Phytogeographical Map of Central Asia and Neighbouring Regions", marked the western line of Himalayan Province in East Afghanistan. In a more or less similar form, the border-lines of the province were drawn by Ali and Qaiser (1986) and Meusel and Jäger (1992).

In Sino-Japanese region, only 47 species of trees and shrubs occur. Of course, that number may be a little higher, for the species from Pakistan which do not grow in Afghanistan have not been included in here. In Pakistan itself, the species from Himalayan Province reach the district of Quetta in the South (more or less 31° Lat.) and the district of Swat in the North (ca 36°30' Lat.) This region is characterised by coniferous forests, composed of such species as: *Cedrus deodara*, *Pinus wallichiana*, *Pinus gerardiana*, *Abies spectabilis*, *Picea smithiana* and *Taxus wallichiana*; and apart from that, by such species as: *Quercus dilatata*, *Quercus semecarpifolia*, *Aesculus indica*, *Ulmus wallichiana*, *Pistacia chinensis*, *Pyrus pashia* and evergreen shrubs: *Rhododendron afghanicum*, *Rhododendron collectianum*, *Hedera nepalensis*, *Rosa brunonii*. The only endemic genus for that region, at least in its part falling on South-West Asia, is *Parrotiopsis* with one species *P. jacquemontiana*.

5. AFRO-SINDIAN REGION (Fig. 6)

Afro-Sindian Region is a new name which I adopted for the most southern areas of Iran, West and South Pakistan and a small part of South Afghanistan. This name only indicates the African connection of the flora of south-west Asia, without any differences as to which part of Africa a given species originates from. Similarly, Good (1947) named that region North African-Indian Desert Region and drew a border-line of it on his map. I, however, resigned of that name, for India was in that time comprehended much wider than today.

In the past, this region was called in different ways, though the most popular name was the one used by Eig (1931) – Saharo-Sindian. Other names were: Region du Dattier (date-palm zone), Saharo-Arabian, Sudanian, Saharo-Indian, Nubo-Sindian, Sudano-Deccanian. Hedge and Wendelbo (1978) as well as Ali and Qaiser (1986) distinguished two different elements in this region: 1. North African/Arabian and 2. East-West-tropical African/Arabian. Probably, it is the most rational division.

Afro-Sindian Region, unlike the other four regions included in Boreal Kingdom, belongs already to Palearctic Kingdom, but everything indicates that in south-west Asia, it is only of transitional character between those Kingdoms. At the same time, it is poorest as far as the number of species of trees and shrubs is concerned – there are only 37 of them. It is almost impossible to draw a strict border-line of this region in north-west Pakistan, for three regions overlap there: Irano-Turanian, Sino-Japanese and Afro-Sindian.

There are only two endemic genera here: *Tecomella* and *Nannorrhops*.