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General Appearances of Turkish Roses

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Abstract: This study is carried out in between 2006-2012 years. Materials of it collected from all over the country and identified by the classic systematic literatures. Voucher specimens are deposited in **GUL** Herbarium of Süleyman Demirel University in Isparta. In this paper, important new systematic, geographical and ecological characters, and also economical usage values of all Türkiye's roses were determined by literature and field observations. In addition to this, some known characters in the genus were broadened.

In the result, totally 45 taxa as natural and garden roses are being grown in Türkiye. Hybridisation among taxa is very high and an important part of old garden roses of Türkiye are natural hybrids of least two taxa, they may be too hybrided from 3, 4 and more natural taxa or another hybrid. Some cultured varieties have been formed by gene transference in last time. Most of the taxa are distributed in 1000-2000 m from sea level in Türkiye. They prefer limestone, vulcanic and conglomerate rocks. This land structure with three-rocks is being distributed in Mediterranean region of the country in genera L. Orogenic belt of the Mediterranean is being accepted as gene center and differentiation region of the genus by us.

There are almost 30 factories working on extraction and distillation of rose flowers and fruits in the country. Rose oil factories are established in Lakes Region (Isparta, Burdur and Afyonkarahisar provinces) and also fruit factories in Tokat, Gümüşhane and Erzincan provinces. Rose flower production for gaining rose oil is being done only in Lakes Region in nowadays. ***R. damascena*** is cultured in nearly 35000 da and its flowers are manipulated in 25 rose oil factories of the region. The fruit collection and manipulation for domestic deprivations are being done by local people in all over Türkiye, especially Gümüşhane, Tokat, Erzincan, Erzurum, Trabzon etc. but there are their industries only in Gümüşhane, Tokat, Erzincan provinces.

Distributions of Turkish roses according to phytogeographical regions, continents, polytical regions, countries, flowering and fruiting times, main rock preferings and elevations are being given and interpreted in the paper.

Türkiye Güllerine Genel Bakış

Anahtar Kelimeler
Bitki Coğrafyası,
Rosa L., Gül,
Kuşburnu,
Ekonomik Botanik,
Türkiye.

Özet: Bu çalışma 2006-2012 yılları arasında yapıldı. Çalışmanın materyalleri tüm ülkeden toplandı ve klasik sistematik literatüre göre tarafımızdan teşhis edildi Değerli örnekler GUL Herbaryumu'nda (Süleyman Demirel Üniversitesi, Isparta) tutulmaktadır. Bu makalede, Türkiye güllerinin önemli yeni sistematik, coğrafi ve ekolojik karakterleri; aynı zamanda ekonomik önem değerleri literatür ve arazi gözlemlerimize bağlı olarak anlatıldı. İlaveten cinsin bilinen bazı özellikleri genişletildi.

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Sonuç olarak; toplam 45 taksonun doğal ve bahçe gülü olarak Türkiye'de yetiştiği belirlendi. Taksonlar arasında hibritleşme çok yüksektir ve Türkiye bahçe güllerinin önemli bir kısmı en az iki takson arasında doğal hibrittir; hibritler 3, 4 ve daha fazla doğal taksondan ya da bir başka bir hibritle in hibritleşmesinden meydana gelmiş olabilir. Bazı kültür varyeteleri son zamanlarda gen transferi ile oluşturulmuştur. Taksonların çoğu Türkiye'de deniz seviyesinden 1000-2000 m 'ler arasındaki yükseltilerde yayılış gösterirler. Kireçtaşı, volkanik ve konglomera kayalarını tercih ederler. Bu üç kayalı arazi yapısı genelde ülkenin Akdeniz bölgesinde dağılmıştır. Akdeniz bölgesinin yüksek dağ kuşağı tarafımızdan cinsin gen ve farklılaşma merkezi olarak kabul edilmiştir.

Ülkede gül çiçeklerinin ve meyvelerinin distilasyonu ve ekstraksiyonu üzerine çalışan yaklaşık 30 fabrika vardır. Gül yağı fabrikaları Göller Yöresi(Isparta, Burdur, Afyonkarahisar illeri); kuşburnu fabrikaları ise Tokat, Gümüşhane ve Erzincan illerinde kurulmuştur. Günümüzde gül yağı elde etmek amaçlı gül çiçeği üretimi sadece Göller Yöresi'nde yapılmaktadır. ***Rosa damascena*** yörede yaklaşık 35000 da lık bir alanda üretilmekte ve çiçekleri 25 gülyağı fabrikasında işlenmektedir. Tüm ülkede ama özellikle Gümüşhane, Tokat, Erzincan, Erzurum, Trabzon vs.de evsel ihtiyaçlar için meyveleri toplanmakta ve işlenmektedir. Ancak Gümüşhane, Tokat, Erzincan illerinde endüstrisi bulunmaktadır.

Bu makalede, Türkiye güllerinin fitocoğrafi bölgelerine, kıtalara, siyasi bölgelere dağılımları; çiçeklenme ve meyvelenme dönemleri; anakaya tercihleri ve yayılış gösterdiği yükseltiler verilmekte ve yorumlanmaktadır.

1. Introduction

Rosa L. taxa are distributed throughout the temperate and subtropical regions of the Northern hemisphere. The genus has about 200 species and 18000 varieties belonging to the species. It was divided into four subgenera as ***Hulthemia*** (Dumort.) Focke, ***Platyrhodon*** (Hurst) Rehder, ***Hesperhodos*** Cockerell and ***Eurosa*** Focke (Wissemann and Ritz, 2005). Most of Turkish taxa included to the end subgenus ***R. acicularis*** Lind L., ***R. borboniana*** Desp., ***R. cinnamomea*** L., ***R. laevigata*** Michx., ***R. moschata*** Herrm., ***R. nitidula*** Besser, ***R. noisettiana*** Thory, ***R. rugosa*** Thunb., ***R. spinosissima*** L. and ***R. stellata*** Woot. have been recorded as new taxa for Türkiye (Özçelik, 2010). On the other hand, the country have a lot of hybrids, varieties and cultured forms of these species but most of them not published yet(Özçelik et a L., 2009).

It was known almost 25 species of the genus grown in Türkiye (Nilsson, 1972). The number of described Rose species in Türkiye increased into 42 after our studies. Our studies on natural and cultural populations indicated that there has been a problem in roses for a long time. Insufficient knowledgement on their genetic conservations is only one of serious problems (Özçelik et a L., 2009).

Rose water and oil productions in Anatolia had being made by local people since 19. Century. In nowadays, the productions are being done from only ***R. damascena*** by modern fabrication techniques in genera L. Isparta, Trabzon, Rize, Kastamonu, Gümüşhane, Erzurum, Erzincan, Sivas, Ankara, Çankırı, Niğde and Amasya are important provinces of diversity centers for wild roses (Özçelik et a L., 2009).

In the paper, it is purposed to determine ecological characters, phytogeographical distributions, species number and subtaxa in Turkish roses and also their economically using methods.

2. Materials And Methods

The study was carried out between 2006-2012 years. Voucher specimens belonging to ***Rosa*** L. genus collected from different localities and habitats of Türkiye and field observations formed basis of the study. All specimens are deposited at the GUL Herbarium in Süleyman Demirel University. In this paper, valid latinish names, synonims and outhors of all taxa in Türkiye revised in light of present literatures **(**Özçelik et a L., 2009; Özçelik, 2010; Nillson, 1972**;** Mandenova, 1970; Tutin et a L., 2001; Cuizhi, 2003; Gleason, 1963; Boulenger, 1932; Komarov, 1971; Feinbrun-Dothan, 1977; Meikle, 1977-1985; Donner and Çolak, 2007; Baytop, 2001).

Results of the systematical, geographical, phenological and ecological observations have been given in table 1

at section leve L. Flowering/Fruiting, Habitats and Main Rocks, Elevations (m), Phytogeographical Regions, General Distribution, Distribution in Grid Squares, Origin and Using systematical characters of species are explanated in the table. Terms which very frequently transcend especially in directions and regions of Türkiye (E: East, N: North, S: South, W: West, C: Central, Middle, m: meter/meters etc.) are abbreviated in its first letter or form of easily understood. The growing areas in the beginningof the taxa numbered in the table 1 as below:

[1]: Only grown as natural in Türkiye(not endemic),
[2]: Only grown by the cultivation in Türkiye,
[3]: Grown by both natural and cultivation in Türkiye,
[4]: Exotic, not indigenous-plant in Türkiye.

All observations and results have discussed and compared with consideration of all current literature especially(Nillson, 1972**;** Mandenova, 1970; Tutin et a L., 2001; Cuizhi, 2003; Gleason, 1963; Baytop, 2001; Wissemann and Ritz, 2005; Ercişli, 1996; Roberts et a L., 2003, Ercişli, 2005; Kutbay and Coşgun, 1996; Wissemann, 2003)**.**

3. Discussion and Results

Roses have been a great influence on cultural development of human. In the country, many plants are used for medicinal and economical purposes. Genus *Rosa* L. from Rosaceae family is an important plant group for medicinal and other economical purposes. Cultured taxa of the genus among the public are known as "Gül" in genera L. And also wild rose taxa are named as "Kuşburnu". The fruits(hypantium) are very rich in vitamin C(ascorbic acid); and also the seeds in omega fatty-acids. There are almost 25 factories obtaining liquid and solid oils from flowers of ***Rosa damascena*** in Isparta, Burdur and Afyonkarahisar provinces. Liquid oil (named as thin rose oil), congregate (named as solid rose oil) and absolute are being obtained from *R. damascena*'s flowers in fabrication. The liquid oil is being obtained by distillation of the flowers. The congregate is being obtained by exraction with hexane of the flowers and also the absolute by titration with ethanol of the congregate. These crude materials are being exported from Lakes Region(Türkiye) to France, United States of America etc. Rose oil is used in cosmetic, perfume, food sectors and medical industry. Almost 150 products are prepared from rose oil, congregate, absolute, rose water from ***R. damascena*** and rosehip(fruits of ***R. canina, R. dumalis*** etc.) extracts in Türkiye. There are 5 factories obtaining extracts and products of natural rosehips in Tokat, Gümüşhane and Erzincan provinces. The fruit juices, cordials, nectars; cool and hot drinks, teas, marmalades, delight etc. are obtained from these rosehip species. Fruit collectings of rosehips are being done from ***R. canina, R. dumalis, R. heckeliana, R. villosa, R. pimpinellifolia, R. gallica, R. beggeriana, R. pisiformis, R. foetida, R. hemisphaerica*** and ***R. alba*** etc. Other species except for ***R. alba*** are being grown naturally in Türkiye. ***R. alba*** are only planted in rose gardens. ***R. gallica, R. beggeriana, R. canina, R. dumalis, R. heckeliana, R. pisiformis, R. foetida*** and ***R. hemisphaerica*** are grown both in nature and cultural areas. Flower production for purposing rose oil obtained only from a hybrid form of ***R. damascena*** in nowadays. The species is being cultured almost in 35 ha (35.000 da) of Lakes region in nowadays. Farmers of Balıkesir(especially Dursunbeyli), Bursa(especially İnegöl), Antalya(especially Korkuteli) deserted flower production from ***R. damascena,*** because this production is not economic for them. Rose oil industry in these provinces could not be established and produced oil could not sold. ***R. damascena;*** fields in these provinces turned to cherry, apple, strawberry, raspberry and so on fruit gardens.

3.1. General systematical characters of Turkish roses: Shrubs, erect, diffuse or climbing; mostly prickly, bristly or rarely unarmed; stems and leaves pubescent, glandular pubescent or glabrous. Leaves alternate; imparipinnate; stipules adnate to petiole and dentate at sides. Flowers solitary or in a corymb, rarely in a compound corymb, panicle or rarely dicasium; bracts solitary, several or absent. Hypanthium globose, urceolate or cupular, constricted or not.

About 200 species and 18.000 varieties belong to these species are widely distributed from subtropical to cold-temperate regions(Wissemann and Ritz, 2005). Most of the varieties have been obtained by gene tranfer methods in vitro conditions and named as modern rose. To know origin of the roses is very hard. Flowers of modern roses can not product smell and aromatic oi L. But Turkish old garden roses have been made by natural selection or hybridisation. Almost 45 taxa (2 taxa; ***R. pisiformis, R. dumalis*** subsp. ***boissieri*** var. ***antalyensis*** are endemics of Türkiye) in Türkiye are being grown as natural and culture. *R. dumetorum* Thuil L. had recorded as grown in forest, schrub areas and on wall of Gaziantep and Kahramanmaraş. *R. glutinosa* Sibth. et Sm. had recorded from Ziyaret Mountain of Amanos row mountains as grown in subalpinic vegetation (**Post and M.A.M.D., 1936**; **Boissier, 1872).** The existence in Türkiye of the species can not be confirmed. For some species of Turkish roses require further systematical and ecological studies. It is unable to treat them in this account because some of them have not identified by the literature. When all systematic studies of Turkish roses were done, it is estimated that there will be totally 70-80 species, 500 varieties (included all natural and cultural forms, except for modern ones) belonging to the species. It

may increase numbers of sections and subsections of roses.

Türkiye is one of the most diversity centers of roses. Almost 35 % of rose species in the world is being grown in Türkiye and % 25 taxa of them originated from the country and its environs. İzmir, Manisa, İstanbul, Bursa, Antalya, Gaziantep, Kahramanmaraş, Gümüşhane, Sivas, Tokat, Erzurum, Erzincan, Malatya, Çorum, Konya, Isparta and Burdur are important provinces in production of old garden roses (Özçelik et a L., 2012). Flowers of ***R. gallica, R. damascena, R. alba, R. centifolia, R. borboniana, R. odorata*** etc. had used for rose oil and rose water producing in last time.

Our studies indicated that there have been some problems in Turkish roses for a long time. These are: insufficient knowledgement on their genetic conservations is only one of serious problems (Özçelik et a L., 2009). The most problems and their resolution propositions are as follow:
Planting of modern, scentless, harsh leaved roses to parks and gardens exported from Europea rehabilitated with gene transferring is reducing interests to roses of people in Türkiye. It is also a genetic pollution because of they replaced to the original local ones. Local varieties can be improved with saving the original properties are needed. Some of the local roses of Türkiye has been commercialized in other names by another countries. The most typical example is the Halfeti rose ("Siyah gül" in meaning black rose, Arapkızı); this rose commercialized and saled in the name of "Louis XIV" (Baytop, 2001). The rose is a local variety of ***R. odorata*** named "Yediveren" in Turkish. It is needed to register as commercial mark the local roses of Türkiye immediately. Illegally taking them out of the country must be prevented. The countries these roses taken to should contribute the subject and it is a necessity of International Biological Diversity Contract for those countries. Because of the natural rose products are very expensive and insufficient, using synthetics of them in cosmetic, food and perfume industries is a serious health problem in Türkiye and the World. Türkiye is the gene and differentation centers of genus *Rosa* L. Hence, the biological diversity in *Rose*s is great. While being the most important actor in the sector of rose production and industry is the right of Türkiye, it is inevitable to use imported ones in modern landscape roses because of inadequate tissue culture and rehabilititation laboratories. There is a similar situation too in the oil roses. It is needed to modern oil roses with high efficiency and quality. Gaining 1 kg rose oil from 4 tonnes of rose flowers is wasting rose source, losing labour and economy. These losses can be decreased with modernizing the rose oil factories. The exported rose water of Türkiye is less than expected although the country is providing % 65 of worlds rose oil requirement. Can not exporting rose products is an another problem also. Putting into practise new concepts as producing fruit and color roses (theorised by us) will expand the sector of rose in the country producing and will provide economic input. There has not been founded a touristical site introducing the rose producing sector in terms of diversity of products, education, researches, social and cultural aspects. It is thought that realizing THE ROSE VALLEY PROJECT planned to established in almost 140 da on the Campus of Süleyman Demirel University with the collaboration of SDU-BAKA, the rose producing sector will leap forward. It is being thought about the creator actor in tourism of the districts(Göller Yöresi).

3.2. Distributions of Turkish roses are as follow:

- **According to Phytogeographical regions: Irano-Turanian element: 11 (% 24,4),** Mediterranean element: 8 (% 17,7), Euro-Siberian element: 5 (% 11,1), Pluriregional: 17 (% 37,7) and Unknown: 4 (% 8,8).

- **According to Continents: Asia 26(% 57,7),** Europe 25 (% 55,5), America 16 (% 35,5), Africa 8 (% 17,7).

- **According to Polytical Regions: Caucasia 14 (% 31,1),** Transcaspia 2 (% 4,4), Transhazar 2 (% 4,4), Balkans 2 (% 4,4) and Carpathians 1 (% 2,2).

- **According to Countries: Iran 27 (% 60,0),** China10 (% 22,2), Georgia 9 (% 2,0), Japan 4 (% 8,8), Korea 4 (% 8,8), Greece 4 (% 8,8), India 3 (% 6,6), Sibiria 3 (% 6,6), Crimea 2 (% 4,4) and Cyprus 2 (% 4,4); 1 (% 2,2) each counrty of Himalaya, Afghanistan, Italia, Belgium, Russia, Jugoslovia, Syria, England, Portugal, Sweden, Ukraine, Germania, Dalmatia, Scandinavia, Sicilia, Kazakhistan, Lebanon, Türkestan, Azerbaijan, Armenia, France and Pakistan.

  According to given above knowledges, Türkiye must be gene center of roses. If the theory is not true, the diversity center of Turkish roses must be Asia in Irano-Turanian phytogeographical region especialy together with Türkiye, Caucasias and Iran. Türkiye has almost 1/3 total rose species in the world. Habitat and elevation preferings of roses in the country prope the communion. Number of wild rose species in the country is decreased to west from east regions. The situation is true too roses distribution to Europe from Asia. But number of culture varieties in roses is very high in Europe, but not for wild rose species.

The Mediterranean region is second row in richness of rose species. At the beginning causes of these is coming rock, soil, habitat, altitude preferrings of roses. Most of the roses grow on limestone and vulcanic and distribution of the rocks in Türkiye is in Mediterranean firstly, and secondly Irano-Turanian phytogeographical regions. Gene center of family Rosaceae is accepted as Mediterranean region. But roses don't like low altitudes and moist damp humid habitats. Major rocks of Irano-Turanian region in Türkiye are firstly vulcanic, secondly limestone and rarely conglomerate. And also in Mediterranean region, there are firstly limestone and secondly vulcanic, rarely conglomerate. Average altitude(from sea level) of Europe Mountains is 200 and also 1100 for Türkiye, 1900 m for East Anatolia region. Turkish roses prefer elevations 1000-2000 m. Causes of the most rich province of Isparta in rose taxa are to be these main rocks(limestone and volcanic) and 900 to 3300 m from sea leve L.

- **Main rock preferings of Turkish Rose taxa are as follow: Limestone: 19** (% 43,1),

  Vulcanic: 18 (% 40,0), Conglomerate: 4 (% 8,8) and others: 4 (% 8,8).

- **According to Flowering and Fruiting times: Flowering times(months):** 4-6: 4 (% 8,8), **5-6: 20 (% 44,4),** 6-7: 16 (% 35,5) and 7-9: 5 (% 11,1). **Fruiting times(months):** 6-7: 3 (% 6,6), **7-10: 39** (% 86,6) and others: 3 (% 6,6).

Old garden roses prefer field, graveyard and garden sides. They prefer sandy soils. It doesn't prefer naked rocky places and deep soils. Wild roses having short stems prefer rocky places meadows and slopes in alpinic steppes. Other roses doesn't choose main rock and soi L.

- **According to Elevations:** 0-500 m: 16 (% 13,0), 500-1000 m: 25 (% 20,32), **1000-1500 m: 39 (% 31,7), 1500-2000 m: 29** (% 23,57), 2000-3000 m: 14 (% 11,38).

  The situations of distribution are determined as only grown as natural in Türkiye: 11, totally grown as natural in the country: 27, only grown by cultivation in the country: 16, totally grown as cultivation in the country: 32, totally grown by both natural and cultivation in the country: 16, exotic(not indigenous-plant in the country): 2, endemics for Türkiye: 2, totally taxa for Türkiye: 45; estimated total taxa for Türkiye: almost 70 and estimated total genotypes: almost 500(local 400, exotic 100).

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Table 1. Distribution characters of Turkish roses.

Subgenus I. *Eurosa* Focke Sect. 1. Synstylae DC.									
No.	**Taxa of *Rosa***	**Flowering / Fruiting**	**Habitats**	**Main Rocks**	**Elevations**	**Phyto-Geographical Region**	**General Distribution**	**Distribution in Türkiye**	**Other Knowledges**
1	***R. multiflora*** Thunb.	4 – 6 / 7-10(-12)	Graveyard and field sides, city parks, mosque and shrine gardens	It doesn't choose main rock and soi L.	50–1200 (-1800) m	Pluriregional	Asia (Türkiye, China, Japan, Korea), Europe, America	All over Türkiye	It was originated from Japan and Korea(East Asia). It is being grown in Türkiye for a long time as a garden rose. The modern roses are infused to it in general
2	***R.sempervirens*** L.	6 – 7 / 8-10(-11)	Shrubbery, slopes, along the sea side, field sides and sandy hills	It can grow on all rocks and soils; specially on limestones	Up to c. 500 m	Mediterranean element or Pluriregional	Türkiye, N.W. Africa,S. W.Europe	Thracian	It may do hybrid with ***R. gallica, R. canina, R. phoenicia*** and ***R. arvensis.*** It is being grown in Türkiye for a long time as a garden rose.
3	***R. arvensis*** Huds.	5 - 6 (-7)/ 7-8 (-11)	Shrubbery on slopes, banks	On limestones	50–900 (-1200) m	Mediterranean element ?	Türkiye, S., W. and C. Europe, Balkans	C. and S. Anatolia regions	It may be a hybrid between ***R. phoenicia*** and ***R. sempervirens***. It is being grown in Türkiye for a long time as a garden rose.
4	***R.phoenicia*** Boiss.	5-6 (-7) / 7-8 (-11)	Shrubbery on slopes, hills, hedges, sides of ditches, ledges of fields, mosque gardens	On limestones	Up to 1100 m	E. Mediterranean element	Türkiye, S. Europe, Cyprus, N.E. Greece, S.W. Asia, Lebanon, N.W. Africa	W., E. and SE Anatolia regions	It may be a hybrid among***R. arvensis, R. phoenicia, R.sempervirens***and ***R. canina.*** It is being grown for their fruits in Türkiye for very old time as garden rose
5	***R.moschata*** J. Herrmann	6 / 8-9(-10)	Graveyard, field sides; it doesn't prefer rocky places and deep soils	It can grow on all rocks and soils; specially On volcanics	Up to 200 m	Irano-Turanian element or Pluriregional	Türkiye, S.W. Europe, N. Africa, W. Asia, Himalaya India, Afghanistan	N. Anatolia region	It can do hybrid between ***R. gallica*** and ***R. odorata.*** It is being grown for flowers in Türkiye for a long time as a garden rose
Sect. 2. Pimpinellifoliae DC.									

6	***R. pimpinellifolia*** DC.	6 – 7 / 7-9(-11)	Slopes, stream banks, hedges	On limestone and volcanic rocks	1200 – 2000 (-2750) m	Euro-Siberian element	Türkiye, W. and S. Europe, SW. and M. Asia, Sibiria, N. China, N. India	N.E.,E., C. Anatolia regions	It can do hybrid with ***R. spinosissima***
7	***[4]R.spinosissima*** L.	5 – 6 / 8 – 10	Exotic, planted in botanical garden of Gaziantep University	It doesn't prefer rocky places and deep soils	1000– 1300 m	Irano-Turanian element	Türkiye, N. America, Europe, C. and S. W. Asia, Caucasia	S.E. Anatolia	It has naturalability to hybridisation especially with ***R.pimpinellifolia*** It is a polymorphic taxon
8	***R.Foetida*** J. Herrmann	4 – 6 / 8 - 10	Graveyard, mosque gardens, slopes, sides of field, garden and road, at hills	On limestone, volcanic and conglomer ate rocks	700 – 1300 (-1900) m	Irano-Turanian element	Türkiye, E. Caucasia, Iran, Iraq, Türkestan, Afghanistan	All over Türkiye	It can do hybrid with ***R. hemisphaerica*** and ***R. pimpinellifolia.*** It is being planted for its flowers in Türkiye for a long time as a garden rose
9	***R. hemisphaerica*** J. Herrmann	5 – 6 / 8 - 10	Graveyard, mosque gardens, slopes, ravines, banks, dry habitats, sides of fields	On limestone, volcanic and conglomer ate rocks	800-1400 (-2000) m	Irano-Turanian element	Türkiye, Caucasia, Azerbaijan Armenia, N., N.W. and W. Iran	All over Türkiye	It is being grown for its flowers in Türkiye for a long time as a garden rose
Sect. 3. Elymaiticae Boiss. **& Haussk.**									
10	***R.elymaitica*** Boiss. & Haussk.	6 - 7 / 8 - 10	Dry slopes, scrubs	On limestone and volcanic rocks	800 - 2000 (-3000) m	Irano-Turanian element	Türkiye, N. and W. Iran, Iraq, Georgia, Armenia, **Azerbaijan**	N., C. and S.W. Anatolia regions	
Sect. 4. Cassiorhodon Dumort.									
11	***R.acicularis*** Lindley	5 – 6 / 7 - 9	Stream sides	It doesn't prefer rocky and deep soiled places	1100– 1300 m	Unknown	Türkiye, America, N.E. Asia, Siberia	Only East Anatolia (in Muş province)	
Sect. 5. Rosa									

12	***R.gallica*** L.	5 – 6 / 8-9(-10)	Slopes, maquis, sandy hills and dry meadows	On limestones in general	(30 –) 400– 1200 (-1700) m	Irano-Turanian or Euro-Siberian element	Türkiye, America, S. and C. Europe (Italia, Belgium, C. France, Germania, Dalmatia), Caucasia, Iraq	N. and C. Anatolia regions	It may do hybrid with ***R. canina, R.moschata,R.sempervirens*** and ***R. phoenicia.*** It had been take from Holly Soils (Palestine and Damascus regions) to Europe. It is being grown for its flowers in Türkiye for a long time as a garden rose and natural in Türkiye.
13	***R.centifolia*** L.	4 – 6 / 7-9 (-12)	Graveyard, mosque gardens, field and garden sides, city parks	It doesn't prefer rocky and deep soiled places	100– 1200 (-1700) m	Pluriregional	Asia, America, Europe	N., E. and S.W. Anatolia regions	It is being grown for its flowers in Türkiye for a long time as a garden rose It had been take from Holly Soils (Mecca, Taif and Damascus regions) to Europe (Bulgaria etc.).
14	***R.damascena*** Mill.	(4-)5–6 (-8) / 7-9 (-11)	Graveyard, mosque gardens, field and garden sides, parks; cultivated in Lakes Region	It prefer sandy soils. It doesn't prefer rocky and deep soiled places.	(200-) 900– 1200 (-1700) m	Pluriregional	Asia, Europe, America	All over Türkiye	There are different opinions on its genetic origine. This plant is originated from Damascus (Şam, Dimeşk(Demşak). It was taken from Damascus to Europe in 1250 years. Nowadays, it is being cultivated for its flowers in industry. Firstly Türkiye (Lakes region) and secondly Bulgaria (Kazanlık district etc.). It is base of rose oil industry.
15	***R.alba*** L.	(4-)5–6(-8) / 7-9 (-11)	Graveyard, mosque gardens, field and garden sides, city parks, had cultivated in agricultural lands sandy soils of Lakes Region	It prefer sandy and moisty soils. It doesn't prefer rocky and deep soiled places	800– 1200 (-1400) m	Euro-Siberian element	Türkiye, Georgia, America	W., S. ,C. and N. Anatolia regions	It may be a hybrid of ***R. gallica*** and ***R. canina.*** It has been cultured in Georgia for flowers in industry. In other countries it is being grown as decoration and ornamentation.

Sect. 6. Villosae Baker									
16	***R.tomentosa*** Sm.	5-6 (-7) / 8-10 (-11)	Stony places, slopes, shrubbery;	On Limestone in general	800–1100 m	Euro-Siberian element	Türkiye, Europe, Scandinavia Russia, Sibiria, N. Africa, Caucasia, Lebanon	S. and N., partly East Anatolia regions	
17	***R.heckeliana*** Tratt. subsp. ***vanheurckiana*** (Crepin) Ö. Nilsson	6 - 7 / 9 - 10	Stony places in alpinic steppe, partly shrubbery, slopes, forest edges	On limestone and volcanic rocks	(1300 -) 1700–2300 (-3000) m	Irano-Turanian element	Türkiye, Armenia, W. Iran, Sicilia	E. and S. Anatolia regions	***R. heckeliana*** is a polymorphic species.
18	***R.heckeliana*** Tratt. subsp. ***orientale*** (Dupont) Meikle	6 - 7 / 9 - 10	Stony places in alpinic steppe, partly shrubbery, slopes, forest edges	On limestone and volcanic rocks	(1300-) 1600–2000 (-3000) m	Irano-Turanian element	Türkiye, N. Iraq, N. Iran, S. Jugoslovia, N.Albania, Greece	All over Türkiye	
19	***R. villosa*** L. subsp. ***villosa***	6 - 7 / 8 - 10	Rocky places in alpinic meadows and slopes;	On the volcanic and limestone rocks	(1300 -) 1600–2000 (-2700) m	Pluriregional	Türkiye, Europe, Caucasia, Iran, Transcaspia Transhazar	N. and E. Anatolia regions	
20	***R. villosa*** L. subsp. ***Mollis*** (Sm.) Keller Gams	6 - 7 / 8 - 10	Rocky places in alpinic meadows and slopes	On the limestone and volcanic rocks	(1300 -) 1600–2000 (-2500) m	Pluriregional	Türkiye, Europe, Caucasia, Iran, Transcaspia Transhazar	N. and E. Anatolia regions	
21	***R. hirtissima*** Lonacz	6-7 (-8) / 8-9 (-10)	Alpinic meadows, opens of ***Picea***and ***Abies***(fire) forests	On limestones and volcanic rocks in general	Up to 2000 m	Euxine or Irano-Turanian element	Türkiye, Caucasia,	Specially N.and E. Anatolia regions	
Sect. 7. Caninae (DC.) Ser.									
22	***R. jundzillii*** Besser	7 - 8 / 8-9 (-11)	Rocky places in opens of forest, Shrubbery;	On stony places	1400–1700 m	Euro-Siberian element	Türkiye, C. and E. S. Europe, Crimea, S. Russia, Caucasia, Georgia	E. Anatolia region	

23	***R. agrestis*** Savi	5 - 6 / 8-9(-10)	Rocky places in opens of forest, Shrubbery;	On limestone rocks	400–1400 m	Euro-Siberian element	Türkiye, W., C. and S. Europe, C. and S. Russia, Crimea, NW. Africa	N. Anatolia region	
24	***R. pulverulenta*** Bieb.	6 - 7 / 8-9 (-11	Dry grasslands, ***Artemisia*** steppe, opens and neighborhoods of Juniper, oak, fire forests.	At rocky places and stony slopes	700–1800 (-2550) m	Pluriregional	Türkiye, South East Europe, W. Syria, Cyprus, Caucasia, Azerbaijan, Armenia	All over Türkiye	Allied to ***R. canina*** ve ***R. dumalis*** subsp. ***boissieri***
25	***R. sicula*** Tratt.	5 – 6 / 8 (-9)	Dry grasslands, ***Artemisia*** steppe; opens and neighborhoods of Juniper, oak, fire forests	At rocky places and stony slopes	900–1700 m	Mediterranean element	Türkiye, S. Europe, W. Syria, NW. Africa	West Anatolia region	
26	***R. horrida*** Fischer	5 – 7 / 8-9 (-10)	Dry opened places, precipice places, grazing mountain meadows, brush with sparsely trees and forests	On volcanic and limestones in general	(200-) 1000–1700 m	Pluriregional	Türkiye, Balkans, S. Russia, Crimea, Caucasia, Armenia	N.W, N. and C. Anatolia regions	
27	***R. iberica*** Stev.	7 – 8 / 9-10(-11)	Stream sides, brushes, protected places in subalpinic zone	On volcanic rocks and conglomerate in general	1200–2400 m	Irano-Turanian element?	Türkiye, Caucasia, N. Iraq, Iran	N. and E. Anatolia regions	
28	***R. montana*** Chaix subsp. ***woronowii*** (Lonacz.) Ö. Nilsson	6 – 7 / 8-9 (-11)	Black pine forests, protected places, brushes, slopes, alpinic meadows	On volcanic rocks in general	1700–2750 m	Euro-Siberian element	Türkiye, Georgia, Armenia, Iran	N.E. Anatolia region	It can do hybrid with ***R. canina***
29	***R. canina*** L.	(4-)5-6(-7) / 8-11(-12)	Garden, field and road hedges, brushes, stony slopes, alpinic peaks, opens of forest	On limestone, conglomerate and volcanic rocks	30–1700 (-2500) m	Pluriregional	Türkiye, Warm EurAsia, N.W. Africa, Europe, Asia, America	All over Türkiye	It can do hybrid with ***R.pimpinellifolia, R. dumalis, R. sempervirens, R. pulverulenta***

30	***R.dumalis*** Bechst. subsp. ***boissieri*** (Crépin) Ö. Nilsson var. ***boissieri***	5 - 6 / 9 (-11)	Stream sides, brushes, stony slopes, alpinic peaks, precipice, garden hedges, opens of forest	On especially limestone rocks; seldom volcanics	1500–1800 (-2300) m	Pluriregional	Türkiye, Caucasia, Georgia, Ermenia, N.W. Iran	E., NE. and SW. Anatolia regions	It may do hybrid with ***R. iberica, R. pulverulenta*** and ***R. canina***
31	***R.dumalis* Bechst.** subsp. ***boissieri*** (Crépin) Ö. Nilsson var. ***Antalyensis*** (Manden) Ö. Nilsson	5 - 6 / 8-9 (-11)	Creek sides, stony slopes, precipice, opens in forest, crevices	On limestone rocks	1800 (-2000) m	Mediterranean element	Endemic for Türkiye		
32	***R. nitidula*** Besser	6 – 7 / 8-9 (-11)	Field and garden sides, parks. It prefer sandy soils.	On especially volcanic rocks	1300–1500 m	Euro-Siberian element	Europe (England, N. Portugal, Sweden Greece), Asia, **Carpathians**	E. Anatolia region	
Sect. 8. Rubiginosae L.									
33	***R. micrantha*** Sm.	5 – 6 / 8-9 (-10)	Hedges, protected places, stony slopes, brushes	On especially limestone rocks; seldom volcanics	400–1400 m	Pluriregional	Türkiye, W., S. and C. Europe, N. Ukraine, America, Crimea Caucasia, Armenia, Lebanon, NW. Africa	N. and N.W. Anatolia regions, East Eagean Islands	
Sect. 9. Cinnamomeae DC.									
34	***R.rugosa*** Thunb.	5 – 6(-7) / 7-9 (-10)	Exotic, gardens with sandy soils at sea shores	It prefers volcanic rocks	Up to 200 m	Pluriregional	Türkiye, East Asia (N. China, Korea, Japan), N. America, N., Georgia, W., C. Europe	E. Anatolia region	Its fruits are very important for industry and landscape architecture It was planted in Tekke town of Gümüşhane. Because it can not grow well in other districts of Türkiye
35	***R. cinnamomea*** L.	5–6 (-7) / 8–9 (-10)	House gardens with sandy soils near sea		1100–1300 (-1600) m	Pluriregional	Türkiye, N. Europe (Germany, France), Sibiria, Songaria, Asia, N. America	S.W. Anatolia region	It can do easily hybrid with ***R. gallica*.** It is recorded as a smelling garden rose in Ottoman literatures

36	***R. laxa*** Retz.	5 – 6 / 8-9 (-10)	House gardens and hedges.	It prefers volcanic rocks	1100-1800 m	Irano-Turanian element	Türkiye, Iran, India	E. Anatolia region	It was taken from East Anatolia to West Anatolia
37	***R. pisiformis*** (Christ) D.Sosn.	7 (-8) / 8-9 (-10)	Stream sides, pastures, house gardens	It prefers volcanic rocks	1600 - 2000 m	Irano-Turanian element	Endemic for Türkiye	East Anatolia region	
38	***R. beggeriana*** Schrenk	5 – 6 / 7-9 (-10)	Stream sides, slopes	It doesn't prefer rocky places and deep soils	500 - 1000 (-2000) m	Irano-Turanian element	Türkiye, Iran, Afghanistan Mongolia, Kazakhistan Pakistan and China,	C. and N. Anatolia regions	Probably it was been come to Türkiye from İran. I grows naturally in Rize and Erzincan mountains.
Sect. 10. Indicae Thory									
39	***R. odorata*** (Andrews) Sweet	(4-)6-8(-10) / 8-10(-12)	Graveyard, mosque gardens, fields and garden sides, city parks	It prefer sandy soils It doesn't prefer rocky and deep soiled places	100–1300 (-1800) m	Pluriregional	Europe, Türkiye, China	All Türkiye, specially N.,S. and W. Anatolia regions	It may do hybrid with ***R. moschata***
40	***R. chinensis*** Jacquin	4-9 (-11) / 6-11	Graveyard, mosque gardens, fields and garden sides, city parks	It doesn't prefer rocky places and deep soils.	100–1300 (-1500) m	Pluriregional	Türkiye, China	N., S. and W. Anatolia regions	
41	***R. noisettiana*** Thory	6 – 7 / 8 - 9	Graveyard, fields and garden sides, city parks.	It doesn't choose main rock and soil; thus it can grow on all rocks and soils.	100-1200 m	Pluriregional	Türkiye, China, America	N. and S.W. Anatolia	
42	***R. borboniana*** Desp.	(4-)5-7(-11) / 7-9 (-11)	Graveyard, mosque gardens, fields and garden sides, city parks	It doesn't choose main rock and soil; thus it can grow on all rocks and soils.	100–1200 (-2000) m	Pluriregional	Europe (observed in Bosnia-Hersegovina, North Cyprus), America, Georgia, Türkiye.	All over Türkiye, except for E.and S.E. Anatolia regions	

Sect. 11. Banksianae Lind L.									
43	***R. banksiae*** Ait.	4-5 (-6) / 7-9 (-11)	Graveyard, mosque gardens, fields and garden sides, city parks.	It doesn't choose main rock and soil; thus it can grow on all rocks and soils.	100–1200 m	Pluriregional	Europe, Türkiye, China	W. Anatolia region	It is originated from China and Türkiye. It may do hybrid with ***R. laevigata***
Sect. 12. Laevigatae Thory									
44	***R. laevigata*** Michx	5 – 6 / 7-9(-11)	House gardens	It doesn't choose main rock and soil; thus it can grow on all rocks and soils	100–700 m	Pluriregional	America, China, Georgia, Türkiye	N. Anatolia region	It may do hybrid with***R. banksiae***
Subgenus II.*Hesperhodos*Cockerell Sect. 13. Hesperhodos									
45	***R. stellata*** Woot	(5-) 6 - 7 (-8) / 7-9 (-11)	Graveyard, fields and garden sides, city parks	It doesn't choose main rock and soil; thus it can grow on all rocks and soils	1000–1200 m	Pluriregional	America Türkiye	Lakes region	