**ISSN:1306-3111**
e-Journal of New World Sciences Academy
2011, Volume: 6, Number: 2, Article Number: 4A0040

**NATURE SCIENCES**
Received: November 2010
Accepted: February 2011
Series : 4A
ISSN : 1308-7282


**Ayşe Nur Timor**
Istanbul University
atimor@istanbul.edu.tr
Istanbul-Turkey

# WORD PRODUCTION OIL ROSE AND ROSE OIL

**ABSTRACT**

Requirement for essential oils in the world gradually increases. Rose oil has an important place within these kinds of oils as one of the basic raw materials of perfume and cosmetics industry. The most important type of rose which has been cultivated in order to extract oil and which has an economical value is The Rosa damascena Mill. which is also known as "oil rose". Turkey is the top producer of the odorous rose type and the obtained rose oil worldwide. Turkey meets approximately 70% of the rose oil production of the world. Almost all production areas are available in Isparta, Afyon, Burdur and Denizli. Especially Isparta and its surrounding has achieved the condition of the most important oil rose production center of not only Turkey but also the world. Turkey is also an exporter of traditional rose oil; almost all produced rose oil has been exported. Thus it has been observed that almost all of the export income related to rose production has been obtained from rose oil.

**Keywords:** Rosa Damascena Mill., Essential Oils, Rose Oil, Turkey, Isparta

# DÜNYA YAĞ GÜLÜ VE GÜL YAĞI ÜRETİMİ

**ÖZET**

Dünyada uçucu yağlara duyulan ihtiyaç giderek artmaktadır. Gül yağı, parfüm ve kozmetik endüstrisinin temel hammaddelerinden biri olarak, bu tür yağlar içinde önemli bir yere sahiptir. Yağ elde etmek amacıyla yetiştirilen ve ekonomik değere sahip olan en önemli gül türü "yağ gülü" olarak da bilinen *Rosa damascena* Mill.'dir. Bu kokulu gül türünün ve elde edilen gül yağının dünyadaki en büyük üreticisi Türkiye'dir. Türkiye dünya gül yağı üretiminin yaklaşık % 70'ini karşılamaktadır. Üretim alanlarının tamamına yakını Isparta, Afyon, Burdur ve Denizli'de bulunmaktadır. Özellikle Isparta ve çevresi yalnızca Türkiye'nin değil dünyanın da en önemli yağ gülü üretim merkezi konumuna yükselmiştir. Türkiye aynı zamanda geleneksel gül yağı ihracatçısıdır; üretilen gül yağının tamamına yakın bölümü ihraç edilmektedir. Böylece gülcülükle ilgili ihracat gelirinin tamamına yakınının da gülyağından elde edildiği görülmektedir.

**Anahtar Kelimeler:** Rosa Damascena Mill., Uçucu Yağlar, Gül Yağı, Türkiye, Isparta

## 1. INTRODUCTION (GİRİŞ)

In parallel with population increase, requirement for herbal products increases gradually. An important group out of these has been constituted of medical and aromatic herbals together with the essential oils obtained out of these. Rose oil has an important place within essential oils; owing to the fact that it is the only oil which contains every odor added, it remains one of the indispensable raw materials of perfume and cosmetics industry. Emerging life standards nowadays, increase in the number of working woman and the young population lead the development of cosmetics industry in the world and Turkey. Due to this, increasing domestic and overseas demand is the basic factor in the fast development of this sector and accordingly production of rose oil.

In the world many types of rose (Rosa) are available, but very few of them can be evaluated in perfume and cosmetics industry. Main odorous rose types that have been cultivated commercially for oil are "*Rosa damascena Mill.*", "*Rosa gallica L.*", "*Rosa alba L.*", "*Rosa centifolia L.*", "*Rosa moschata Herrm.*" and "*Rosa rugosa L.*" (Tucker ve Maciarello 1988). Out of these, the type which contains the most amount of rose oil and the most odorous one due to high quality odor components in it is *Rosa damascena* Mill which is also known with names such as "Isparta rose", "Kazanlık rose", "Damascus Rose", "Pink oil rose" or only with "Oil Rose".[1] (Guenther, 1952; Widrlechner, 1981; Antonelli vd., 1997). The oil rose (*Rosa damascena Mill.*) is also the type which bears the highest value economically. This type of rose is produced most densely in Turkey and Bulgaria in the world. Major part of essential oil production in Turkey has been constituted of the rose oil[2] which has been obtained from this type and also makes our country

[1] It has been estimated that type Rosa damascena Mill. which has been used in rose oil production and cultivated is the crossbreed of "*Rosa moschata J. Herm*" and "*Rosa gallica L.*". But also records which say that this type is a crossbreed that is composed of types "*Rosa gallica L*". and "*Rosa phoenica Boiss*" far back have been also met. As well as this breed of which hometown and origin is not known clearly has various types, especially "*Trigintipetale*" is the most important one in terms of rose oil (Zakaryan, 1895; Kayacık, 1965; Widrlechner, 1981; Garnero, 1982; Baytop, 1990).

The oil rose (Rosa damascena Mill.) which is the most well-known and recognized type of rose is a plant which is perennial, is grown between 1-3 m length, is thorny and which has high endurance against winter weather conditions. While its flowers that are blossomed once a year (only in the beginning of summer) are in pink color, they are extremely dense, fresh and they have a strong odor. Oil rose is a typical mild climate plant; it has well attuned to the regions in which any drought and frost conditions are seen, but dew falls in the early hours of the morning and in which spring late frost is not observed in the blooming season which corresponds to May-June months with plenty of light and sufficient rain. The blooming is observed in May-June and is continuous for about 1,5-2 months. The harvest starts as soon as the flowers are blossomed and continues until the roses are collected completely. The oil product can be affected by dominant weather conditions dramatically; for instance drought and high temperatures observed during blooming period can cause the harvest to be limited with only two weeks and can cause the produced essential oil to be evaporated and lost. On the other hand, mild and humid air conditions extend the harvest period and increase the amount of oil product (Altıntaş, 2009; GÜLAR, 2010a).

[2] Two kinds of oil have been produced from the blossom of oil rose. *First* of these is the thin rose oil which is also known as "rose oil". The rose oil is the most expensive essential oil of cosmetics and perfume industry as it provides the odor to remain on the skin as well as its role of odor. Today 1 kg of it is around 6.000$. In average, 1 kg rose oil has been extracted out of 3.500 kg rose blossom. Annual requirement of the world cosmetics and perfume industry for rose oil is 3 ton; accordingly approximately 12.000 ton of rose blossom is required. Second one is the solid rose oil which is also known as "concret". It is also used in perfume and cosmetics industry as well as in the case of rose oil. But as it is cheaper (1 kg is 800$ in average), the requirement increases every year gradually. 1 kg concret has been produced out of 350 kg rose blossom in average; rose concret requirement of the world perfume and cosmetics industry is 7-8 ton (Bektaşoğlu, 2009).

the biggest rose oil producer in the world. The rose oil produced in Turkey meets approximately 70% of the whole demand of the world and is well-known as "Turkish rose oil" in the markets (Konur, 1990; Baydar, 2006; Baydar vd., 2007; Bektaşoğlu, 2009; Hongratanaworakit, 2009).

The oil rose has been discussed in many scientific studies due to both economical and cultural values it has. These studies can be listed under three main groups: (1)studies conducted on oil efficiency and quality (for instance Kahol et.al., 1983; Başer et.al., 1990; Başer, 1992; Bayrak and Akgül, 1994; Kiran et.al., 2002; Başer et.al., 2003; Basım ve Basım, 2005; Baydar and Göktürk Baydar, 2005; Baydar et.al., 2007; Yousefi et.al.; Sereshti et.al., 2009); (2)studies conducted on its economical importance and commerce (for instance Konur, 1990; Göktürk Baydar ve Baydar, 2005; Demircan, 2005; Bektaşoğlu, 2009); (3)studies about genetics characteristics and compounds (for instance Anaç, 1984; Jabbarzadeh et.al., 2005; Özel et.al., 2006; Loghmanni-Khouzani et.al., 2007; Rusanov et.al., 2007; Kiani et.al., 2008). Besides; "Rose and Rose Products Research and Implementation Center – GÜLAR" which has been established within Süleyman Demirel University also has conducted many studies on the biological characteristics and economical value of the breed (for instance "Turkey Rose Production", "Bulgaria Rose Production", "Rose oil, Concret and Absolute Production", "Oil Rose Cultivation") (Bilir, 2010; GÜLAR).

Rose blossom also enters into research areas of Plant Geography, enters into research areas of Agricultural Geography with its production, its role in usage of agricultural areas and the changes it has created and enters into research areas of Commerce Geography with its characteristics of being an important export item and being a global commercial product which has a gradually increasing international market share. Especially fast developments occurred in the recent years have attracted the attention of geographers also and various studies have been conducted in this subject. But this interest is mainly intended for cut flower sector or the characteristics of being an ornamental plant (for instance Meier, 1999; Hughes, 2001; Özdemir and Bahadır, 2007; Zaman et.al., 2007; Doldur, 2008). Interest of the geographers in oil rose as a specific breed has been discussed in post graduate thesis and fewer numbers of studies which cover limited regions (for instance Bilir, 2010).

## 2. RESEARCH SIGNIFICANCE (ÇALIŞMANIN ÖNEMİ)

The purpose of this study is to exhibit the importance and place in Turkey of "oil rose", rose species with highest economical value. Turkey has the highest share in oil rose production and rose oil export. Oil rose growing and rose oil exports are both important agricultural activities with historical significance, and enable a considerable commercial activity. This condition attracts attention of many scientists, and also of geographers in recent years. Although various studies have been conducted in this respect, there is very limited number of researches on its cultural and economical importance. In this study, it was presented production and distribution areas of oil rose and rose oil, export data, and importance of Turkey in the world. In this way, it was though that this study will be a reference for future studies.

## 3. OIL ROSE AND ROSE OIL PRODUCTION IN THE WORLD (DÜNYADA YAĞ GÜLÜ VE GÜL YAĞI ÜRETİMİ)

It has been known that rose plant (while it is not certain which type or types have been used) has been utilized medically for about 5.000 years in Ancient Egypt, Greek and Rome civilizations. Also it has been anticipated that oil rose had been produced firstly in Iran or India then it spread over Anatolia, Mesopotamia, Europe and North Africa and via Moroccan, it could have reached to Spain. Another rumor tells that it had been carried from Damascus to South France with the return of The Crusaders (Widrlechner, 1981; Lawrence, 2005). Countries in which today the oil rose has been cultivated mostly are Turkey and Bulgaria. Majority of world oil rose production and world rose oil requirement (more than 85% of thin "rose oil" which is known as rose oil, 705 of "concret") has been met by these two countries.

Development of oil rose production in Bulgaria shows parallelism with the expansion of lands of Ottoman Empire in a way that involves whole of The Balkans and bringing rose culture together with it. In the 16th century, Ottoman merchants have carried Rosa damascena Mill. to Kazanlık and its surrounding which is a settlement in Bulgaria in order to have it cultivated. Kazanlık Valley which is located in Middle Bulgaria between Stara Planina and Sredna Gora Mountains was providing almost excellent environment conditions for oil rose. The Balkan Mountains were serving as a shield against cold and high winds coming from the north, especially the slopes facing towards South and productive flat plains following these were offering considerably convenient opportunities for rose cultivation: Rain was received in the blooming season of the rose; high temperatures were not observed during summer months; the lands irrigated by Tunca river had been cultivated easily and also planted rose blossoms were growing very well. Thus rose production has developed rapidly in a short while and Kazanlık Valley has become the most important oil rose production center of the world during Ottoman Empire period. This region is today also known as "The Valley of Roses" and its main source of income is oil rose.

In Bulgaria, outside of Kazanlık Valley; also in settlements such as Stara Zagora, Nova Zagora, Karlova, Plovdiv and Chirpan oil rose cultivation has become widespread rapidly, when it comes to year 1859, annually 1.5-2 ton of rose oil had been produced out of 2.500 rose distillers in around 140 villages in the rose valley. But against all these developments in rose production, processing method of the rose was still very simple and poor. The rose oil had been produced with distillers which is the oldest distillation method. Rose oil production in distiller has started in 1690's and has continued almost until the beginning of 20th century. The period of 240 years passed from 1664 in which first rose cultivation has started in Bulgaria tp 1902 has passed into history as "Gyulpans Period". The path for transition from traditional distillation to modern distillation with steam boiler has been opened by steam distillation technology which was developed in France for perfume industry. Thanks to steam boilers which provide the rose blossoms to be distilled at high capacity and rapidly, rose oil production in Bulgaria has leapt forward. Rose oil export which was 2.7 ton in 1889 has increased up to 5.3 ton in 1900. Modern distillation facilities proliferated starting from the beginning of 20th century. Especially foreign companies were making big investments in Valley of Roses of Bulgaria. Oil rose has become one of the most important sources of income for Bulgarian peasants, and one of the most important Dynamics of agriculture based industry. In this period, rose oil production of Bulgaria has reached to top level and has started to meet almost all rose oil demand of the world.

This supremacy has entered into a strain process with the global crisis exploded in 1929. Due to radical changes in political and economical conditions after The Second World War, rose cultivation areas ruggedly diminished and many rose oil factories was closed. Thus, a great decline had been experienced in both rose production and rose oil extraction: Rose oil export which was around 3.500.000 kg in 1933 has declined to 350 kg in 1945. Again speed has been gained with the leading of the government of the production in various regions mainly Kazanlık, Karlova and Plovdiv by establishment of a company in 1948 and starting to buy the rose oils from the producers regularly: rose oil production increased to 1.6 ton in 1975.

Oil rose cultivation and rose oil extraction has gained a new dimension in Bulgaria starting from 1989. At the beginning rose oil factories could not renew their Technologies due to economical problems. Whereupon a restructuring has been started starting from 1995 and privatization has been concentrated on; many private companies has been established in Plovdiv and Kazanlık. Today oil rose cultivation has been carried out in an area of 35.000 decares, annually rose oil around 1-1.5 ton and concret around 2,5-3 ton has been produced (Kovats, 1987; Baydar, 2006; Bilir, 2010; GÜLAR, 2010).

In the world, other than Turkey and Bulgaria; in countries such as Iran, India, Afghanistan, China, Morocco, Egypt and France; oil rose cultivation and rose oil extraction has been carried out. But production in these countries are significantly low in terms of amount, productivity and quality or is intended for obtainment of other sub-products rather than rose oil (for instance in Morocco for rose water). As mentioned before, India and Iran are among the oldest rose cultivator countries. Especially it has been known that in India commercial cultivation of oil rose (Rosa damascena Mill.) goes back to Mughal (Mughal Empire) times. Mainly in the plains that are in the North of the country, in Kashmir, Himachal Pradesh, Utar Pradesh, Rojasthan and Bihar regions in an approximately 30.000-40.000 decares of land, oil rose has been cultivated. Especially Kashmir and slopes of the plain that face to the North are among the places in which rose farming has been carried out intensively. In the recent years, in Palampur which is a hilly town in Himachal Pradesh, organic oil rose cultivation has been started. In India, annually rose oil in an amount of around 150-200 kg has been produced; but it is not intended for export and all of it has been consumed in the domestic market (Baydar, 2006; IHBT, 2008).

Another country in which rose cultivation has been carried out since the ancient times of history is Iran. Even some sources mention that rose was first cultivated in Iran in the world. Rose production developed in especially Shiraz and its surrounding neighborhood from 10th century till 17th century. Today; in and around Ghamsar (known as the "Rose Capital" of Iran) and Niasar that are in Esfahan Region, every year 500 ton oil rose has been produced, distilled and rose oil has been obtained. At the same time in Kashan is known as an important place in oil rose and rose oil production. But this historical production branch of Iran has lost its traditional importance for years now; rose oil does not bear any commercial importance and production is mainly intended for rose water. Iran has started to concentrate on organic rose production in the recent years (especially in Shiraz) (Almasirad et.al., 2007; Babaei et.al., 2007; Tabaei-Aghdaei et.al., 2007; Shamspur, 2010).

As for in Afghanistan and China, oil rose production is a newer branch and almost completely organic production has been carried out. While data related to production amount of China is not available, it has been known that oil rose in a considerable amount has been

produced and rose oil has been obtained in Kushai Region in the north. This production branch has been developing in Afghanistan recently. Since 2004, oil rose production has been started in Cenanabat Region in order to decrease production of poppy and to offer a new alternative product instead (via a German Charitable Foundation). While the production has been carried out in area of approximately 400 decares, oil rose produced in 2006 has reached to 40 kg. Rose production in all regions of Afghanistan has been certificated with organic certification since 2007 (IHBT, 2008; GÜLAR, 2010).

## 4. OIL ROSE AND ROSE OIL PRODUCTION IN TURKEY (TÜRKİYE'DE YAĞ GÜLÜ VE GÜL YAĞI ÜRETİMİ)

It has been accepted that Anatolian and Thracian lands are among the places in which both oil rose and rose oil has been known and used since ancient times in the world. For instance, Hippocrate tells about that "In Anatolia, oil rose has been prepared by steeping the fresh rose leaves in olive oil and macerating them". Many historical documents confirm this statement: There are some documents available which show that first oil rose production started in Thracian region of Turkey, these roses were brought by the soldiers who returned back from Macedonia Garrison of Alexander; The history of Belgium tells that in 1210, The Crusaders have seen wide areas around Edirne on which rose was cultivated; Evliya Çelebi tells in his "Seyahatname" (Travel Book) that "Rose and Rose Gardens of Edirne decorate the whole world", Katip Çelebi also tells in his de "Cihannüma" that "there are wide rose gardens around Edirne"; some authors who make researches about rose and its history (for instance Zakaryan,1895) regard Edirne among the provinces in which rose oil is obtained; in 1849, an Embassador of France has written that "Rose oil has been produced around Edirne, so this region remained in his mind as a Rose Valley".

Under the light of these information, it has been accepted that in Ottoman Period, first rose oil production has started in Edirne in the middle of 18th century and rose cultivation and oil extraction methods has passed to Bulgaria with the immigrants from Edirne. Indeed Ottoman Turks provided oil rose to spread in both Europe and Anatolia. Oil rose cultivation in Anatolia had been started by the immigrants who arrived in Anatolia after The 1877-78 Turkish-Russian War. Thus rose production which comes from Edirne and goes to Bulgaria has returned back to Anatolia. In this period in Edirne especially around Hıdırlık hermitage large rose gardens had been established (Orozoff, 1906; Açatay, 1969; Baytop, 1999; Altıntaş, 2003 and 2009).

Later on, mainly in Istanbul, in cities such as Bursa, Burdur and Isparta, the period of "second rose garden establishment and rose oil extraction" has started. In this period, free of charge rose saplings had been distributed to the cultivators, rose oil production had been promoted by providing distiller and loans (still production in Isparta and Burdur is a follow-up of this period). Ottoman strived considerably in order to develop rose cultivation in Istanbul, their new capital after Edirne and made real progress in rose oil production. In 1880's, in some farms extending along Göksu Creek (especially in Hekimbaşı Farm), oil rose gardens had been established with the rose saplings brought by the immigrants arrived from Kazanlık Region. Some records have been coincided in the direction of rose oil production had been carried out with copper distillers brought from Kazanlık with the contributions of Agop Pasha in 1886, in Çavuşbaşı Farm which was hold by Sultan II. Abdulhamit in Istanbul. Also in Bursa; especially with the great efforts of Melhame Selim Pasha, free of charge rose sapling and distiller had been distributed to the

villagers (a part of these distillers can still be seen in villages of Bursa).

Main reason of promoting rose cultivation in Ottoman Empire period was the intend for increasing the rose oil production. Rose oil Trade also gained importance in this period of time; in the middle of 1880's rose oil production in the amount which can be a subject for Trade was carried out in Istanbul and Bursa. As a result of this successful oil rose cultivation and rose oil production trials, free of charge rose sapling distribution in various states of Anatolia (such as Diyarbakır, Trabzon, Adana, Kastamonu, Konya and Aydın) has been continued in the beginning of 1900's. Besides with the purpose of having positive influences on oil rose production, in 1912 a book was published about rose production by Ministry of Commerce and Agriculture and deposit distillers was distributed. Oil rose cultivation has spread in this way and produced rose oil has become demanded in European and American markets. But after a while problems occurred due to insufficient amount and quality of distillers and problems experienced in receiving required Money or loan for the procurement of distiller by the farmers. On the other hand, problems occurred during the years of First World War and the following Turkish War of Independence caused the cultivation areas to diminish and rose gardens in many states disappeared due to neglect (Bonkowski, 1888; İgolen, 1966; Baytop, 1963 and 1999; Anaç, 1982).

Table 1. Oil rose production areas in Turkey, amount of production and yield
8Tablo 1. Türkiye'de yağ gülü üretim alanları, üretim miktarı ve verim)

| *Years* | *Area (da)* | *Production (ton)* | *Yield (da/kg)* |
|---|---|---|---|
| 1991 | 62.860 | 24.945 | 397 |
| 1992 | 53.561 | 24.790 | 463 |
| 1993 | 48.298 | 18.868 | 391 |
| 1994 | 41.425 | 17.981 | 434 |
| 1998 | 24.470 | 8.388 | 343 |
| 1999 | 27.580 | 9.940 | 360 |
| 2000 | 22.980 | 8.151 | 355 |
| 2001 | 22.840 | 8.538 | 374 |
| 2002 | 19.840 | 7.776 | 392 |
| 2003 | 20.230 | 8.213 | 406 |
| 2004 | 22.950 | 9.773 | 426 |
| 2005 | 25.377 | 12.281 | 484 |
| 2006 | 25.567 | 12.737 | 498 |
| 2009 | 25.796 | 12.986 | 502 |

Source / Kaynak: DİE 2010,Bilir 2010.

As for in Isparta and surrounding towns, oil rose production made progress continuously. However, transition from rural type (distiller) production to factory type (boiler) production could have been achieved barely after the announcement of Republic. In the direction of requisition of Mustafa Kemal Atatürk during his Isparta visit on 6th of March, 1930 for "transition from rural type rose oil production to industrial type rose oil", distillation boilers heated with steam had been imported from France and the first modern countable rose oil facility had been established in 1935 by "Economy Department". In real terms, factory type rose oil production has been transited with Gülbirlik (Rose, Rose oil and Oil Seed Agricultural Sales Cooperatives Association) which was established in 1954 (GÜLAR, 2010).

In Turkey, rose cultivation areas mainly differ depending on rose blossom purchasing price and alternative agricultural products while product and efficiency amount differ depending on climate and similar reasons, while oil rose has been cultivated in an approximately 26.000 decares of areas and around 13.000 ton of product have been harvested. In the beginning of 1990's, the production areas of oil rose which was over 60.000 decares has decreased in about twenty years gradually. Similarly significant declines were recorded also in the amount of production. Here, price uncertainty at the sales instant of the rose blossom is an important factor for the farmers in leading towards different areas. Thus, number of farmers who deal with rose production has decreased gradually. Main factors in differences observed by years in terms of production area, amount of production and productivity of the oil rose are supply-demand balance, rose blossom purchasing price, alternative agricultural products that could be cultivated in rose gardens, and climate conditions especially in the harvest season. For instance, production in 2009 has decreased at a rate of 35% due to rains received in the blooming season (Bilir, 2010).

Table 2. Rose oil production in Turkey
Tablo 2.Türkiye'de gül yağı üretimi

| *Years* | *Production (kg)* |
|---|---|
| 2002 | 6.032 |
| 2003 | 4.330 |
| 2004 | 2.643 |
| 2005 | 2.159 |
| 2006 | 2.310 |
| 2007 | 3.860 |
| 2008 | 4.831 |

Source / Kaynak: Bilir 2010, IGEME, 2010.

Since 1992, oil rose has been cultivated organically. Organic oil rose has been farming by four companies a done cooperative in Isparta by Gülbirlik and in Afyon by Basmakçı and two companies have been carrying out studies in this subject. In Turkey, in 1999 47.7 ton of organic rose oil had been produced in organic agriculture while 1.9 ton of this amount had been exported (Dolun 2003). The organic rose area today has reached to 2.000 decares. This area meets approximately 8% of total oil rose production areas; by this way around 850 ton of organic oil rose and 110 kg of rose oil has been obtained.

Whilst rose oil production had been carried out in family-type enterprises and with primitive methods previously, today facilities in factory scales have been established. Number of these facilities have reached to 14 and 4 of them belongs to Gülbirlik. *Gülbirlik* carries out the major part of Turkey rose oil production with approximately its 8.000 producer. Besides cooperatives (for ins. "Basmakçı in Afyon and Surrounding Rural Development Cooperative") and distillers with small capacities in the rural also produce considerably high amount of rose oil.

### 4.1. Distribution of Oil Rose and Rose Oil Production Areas (Yağ Gülü ve Gül Yağı Üretim Alanlarının Dağılışı)

The majority of the oil rose production of Turkey is done in Isparta, Burdur and Afyon. This region[3] reached to a position of being the most

[3] The region named "Isparta, Burdur, Afyon and Denizli" is registered as "the name of the origin of Isparta Rose" by Turkish Patent Institute (TPE), in 2006, upon Suleyman Demirel University's application.

important oil rose production center in the world, not only in Turkey. Oil rose is produced in limited quantities, also in Denizli and in Karacasu which is a town in Aydin. It is also known that this type of rose is grown in villages of Inegol in Bursa under the name of "nut rose" for acquiring rose oil (Baytop, 1997; Bilir, 2010). Currently, with 80% of the participation of Isparta, oil rose is produced in about 26.000 decares area totally; including Burdur, Afyon and Denizli. These production areas are divided into two different types as conventional and ecological. In conventional production areas, all kinds of synthetic based agrochemicals are used without any restrictions in all kinds of maintenance and agricultural contention methods, while only natural materials are used in ecological production areas.

Figure 1. A traditional garden of Rosa damascene Mill.
(Şekil 1. Geleneksel üretim yapılan bir gül bahçesi)

Burdur and Afyon provide approximately 20% of the total oil rose and 15% of the total rose oil production in Turkey. Rose oil was produced in Burdur, first of all by Sheikh Bekir, who is originally from Isparta. Sheikh Bekir has gone to Kazanlık for learning how to distill the oil rose and he built up a "rosehouse" in Sülemiş(Güvenli),village of Burdur ,after he returned back with many old retorts with him. Woods to be used for distilling and rose flowers to be processed, have been carried by mules, from the villages around to Gülhane. After Sheikh Bekir's successful attempt, rose cultivation in the region began to develop rapidly, and then his son, Mehmet Efendi from Eğirdir, has continued to produce rose oil with the retorts, inherited from his father. After that, rose cultivation and industry have developed with the help of entrepreneurs up to 10. Recently, rose production is done in 4.096 decares in Burdur, particularly in central and Ağlasun districts.(Burdur Provincial Directorate of Agriculture 2009). Oil rose production in Afyon is substantially carried out in the villages of Başmakçı town. Rose gardens in Başmakçı take place of more than 2.000 decares and 300-420 tons of rose flowers are obtained per year. A significant amount of land is also devoted in Dazkırı(240 decares) and Dinar(350 decares), so total area has devoted to rose cultivation in the province has reached to 2.600 decares.(Afyon Provincial Directorate of Agriculture, 2009).Oil rose production area in Denizli is only about 320 decares.(Denizli Provincial Directorate of Agriculture,

2009).Determining the situation in Isparta under a separate heading, would be more appropriate , since it is the most important center of oil rose production and rose oil extraction in Turkey.

### 4.1.1. Oil Rose and Rose Oil Production in Isparta (Isparta'da Gül Yağı ve Yağ Gülü Üretimi)

73% of Turkey's total oil rose production areas are located in Isparta, and approximately 80% of the total production in Turkey is carried out within the borders of this province. At the same time, Isparta has become the most important oil rose cultivation and rose oil industry center in the world; although it has a deep rooted history going back thousands of years. Currently, land about 20.000 decares in total is used for growing oil rose and 7000 to 10,000 tons of rose flower is cultivated.

Table 3. Oil rose cultivation area in Isparta, production amount and yield
(Tablo 3.Isparta'da yağ gülü üretim alanı, üretim miktarı ve verim)

| Years | Area (da) | Production(ton) | Yield (da/kg) |
|---|---|---|---|
| 1991 | 41.350 | 18.729 | 453 |
| 1994 | 33.930 | 15.550 | 458 |
| 1998 | 17.720 | 6.034 | 341 |
| 2000 | 15.870 | 5.530 | 348 |
| 2001 | 15.910 | 5.811 | 365 |
| 2002 | 15.630 | 5.827 | 373 |
| 2003 | 15.630 | 6.073 | 389 |
| 2004 | 15.910 | 7.540 | 474 |
| 2005 | 18.935 | 9.971 | 527 |
| 2006 | 19.025 | 10.564 | 555 |
| 2009 | 19.057 | 7.084 | 372 |

Source / Kaynak: DPT, 2007; Isparta Tarım İl Müdürlüğü, 2009.

The largest part of the rose oil production areas in Isparta is located in Keçiborlu (46.7%), Gönen (21.1%.), Center (19.3%) and Eğirdir (5.5%) towns. These districts, although with significant changes in rates, hold the largest share in terms of production quantity: Keçiborlu (22.3%), Gönen (31.1%), Center 28.6%), and Eğirdir (10.1%).

Table 4. Distribution of the oil rose production area, production amount and the yield to the towns
(Tablo 4. Isparta'da yağ gülü üretim alanı, üretim miktarı ve verimlerinin ilçelere dağılışı)

| *Towns* | *Area (da)* | *Production(ton)* | *Yield (da/kg)* |
|---|---|---|---|
| Merkez | 3.690 | 2.030 | 550 |
| Aksu | 135 | 101 | 750 |
| Atabey | 441 | 132 | 300 |
| Eğirdir | 1.058 | 721 | 682 |
| Gönen | 4.020 | 2.220 | 552 |
| Keçiborlu | 8.900 | 1.580 | 178 |
| Sütçüler | 300 | 80 | 267 |
| Uluborlu | 513 | 220 | 429 |
| TOPLAM | 19.057 | 7.084 | |

Source / Kaynak:Isparta Tarım İl Müdürlüğü, 2009.

Majority of the oil rose production areas, take place at the less inclined territories, having sandy, deep, organic-rich soil and which are located close to the residential districts. Oil rose flowers, which are harvested early in the morning, should be taken to the factories to be processed as soon as possible for protecting the oil amount in the oil rose flower, in other words, to get the peak output. This reason brings out how important is the distance between the oil rose harvest area and the processing plant. Therefore, rose gardens generally take place nearby the roads where all the factories are centered around the cultivation territories. Usually rose gardens are not irrigated but the efficiency is higher at the places where watering is possible. Due to melting snow water reducing the maintenance costs and increases the efficiency especially in summer; some parts of the rose gardens are placed in the higher villages such as Gülkoy, Kavak, Kozluca, Yeşilyurt (Bilir, 2010).

Oil rose and rose oil production in Isparta and its surroundings have been carried out over a hundred years. However, the development has occurred in a different way than the other regions in Anatolia. While oil rose and rose oil production have been supported and promoted by Ottoman Empire in many parts of Anatolia; it has came out fully by an individual effort and developed in an independent way.(Işık, 1953; Altıntaş, 2007). It is stated that; the person, who brought the oil rose to Isparta and who produced rose oil for the first time, was Müftüzade İsmail Efendi[4]. Müftüzade İsmail Efendi has gone to the region called Kazanlık (Kızanlık) region in Bulgaria as a soldier or an officer in 1888, where he learned how to grow rose and extract rose oil. Then he brought one single rose cutting to Isparta, planted it in his house which was in Hacı Ayvaz Mahallesi (named Gülcü after 1935) and started rose cultivation in his 30 decares land.

Although he has attempted immediately extracting rose oil several times, he couldn't succeed and has only been able to get rose water. In 1892 (during the fourth crop) he has succeeded in extracting rose oil. After that success, oil rose cultivation and rose oil production have been started developing rapidly and Isparta has gradually become the center of the rose and rose oil production. Rose oil production amount has reached 119.7 kg in 1912 and remained around 100 kg until 1915. On the other hand, immediately after the First World War, and during the War of Independence, the production amount has gradually decreased and dropped to 22 kg in 1923. With the Foundation of Turkish Republic, it has started raising again, reached 149,8 kg. In 1927.The rose oil production amount has reached 229,5 kg in 1931 with starting to apply the modern methods as the first modern rose oil factory is founded in 1930 (as mentioned above).

[4] Muammer Gocmen defends that the first person who first started the oil rose and rose oil production was not Ismail Efendi.He indicates that Izzet Aga from Islamkoy was already growing rose and extracting rose oil by using copper boilers.`According to Gocmen , Izzet Aga was a wealthy and wise man having camel caravans who was doing trade business in Balkans and Middle East.And he was awarded by being charged in the provincial administration board because he planted the seeds of oil rose and rose oil business`(Gocmen, 2006)

Figure 2. Retorts in a rose oil extraction plant in Isparta
(Şekil 2. Isparta'daki bir gül yağı tesisinde imbikler)

However, it is considered that transition into truly factory-type production has been accomplished with the establishment of Gulbirlik in 1954. Oil rose cultivation has spread over a large part of the province and has become an important source of income until 1980. Then, decrease in the government grants in accordance with the privatization of government owned factories, has led to a decrease in the production amount in the late 1990s. The production started to increase slightly, since the government started again to subsidize the manufacturers (in accordance with the production area amount) in 2003-2004.

Rose is one of the agricultural products having important place in Isparta's economy. Nowadays, approximately 10,000 families (8,000 families are partners of Gülbirlik) make their living from rose and rose oil production. As in some agricultural regions of Turkey, especially female workers take important parts in sourcing income, by being charged in different production stages (Özgüç 1998). Moreover, Isparta has a great importance ,not only because of oil rose cultivation and rose oil production , also in the meaning of rose being used just as a product itself directly in trade and featuring the relevant industry branches. With these aspects, Isparta is recognized as the world's most important production center of, rose oil called as "liquid gold" as well as other products produced from rose. (Sallan Gül et.al., 2005; Baydar, 2009).

Rose, which is integrated with Isparta, has a very important place also in the socio-cultural structure. Many place names (Gülköy, Gülevler District, Gülkent Government Hospital, etc.) are related to roses. Newborn children are called with the names starting or ending with rose (Gülay, Gülcemal, Nurgül, etc.) is suggested; rose symbol appears as the emblems (Suleyman Demirel University and the City Council's emblems) and the logos. Weddings are organized according to the rose harvest in the areas where rose cultivation is common. It has an important role in the local cuisine and the city's landscape. Also rose motifs are frequently used in carpets which are another component, integrated with the city's identity (Göde, 2005).

## 5. ROSE OIL EXPORT IN TURKEY (TÜRKİYE GÜL YAĞI İHRACATI)

Turkey is the world's biggest manufacturer of oil rose and exporter of traditional rose oil; almost all of the rose oil produced in Turkey is exported. This is also reflected in the export values and it is seen that nearly all the export income is obtained from rose oil. On the other hand, rose oil has a large share of Turkey's essential oils export values. Although decrease in the percentage is observed in the last ten years, rose oil continues to take a share of

45% in the essential oils which is the subject for export (Demir, 2005; Bektaşoğlu, 2009).

Table 5. Turkey's rose oil export values ($ X 1000)
(Tablo 5. Türkiye'nin gül yağı ihracatı) ($ X 1000)

| Years | Essential Oils | Rose Oil | % |
|---|---|---|---|
| 2002 | 11.610 | 8.068 | 69.5 |
| 2003 | 16.110 | 9.784 | 60.7 |
| 2004 | 13.589 | 7.393 | 54.4 |
| 2005 | 14.361 | 7.174 | 49.9 |
| 2006 | 14.843 | 7.594 | 51.2 |
| 2007 | 19.348 | 9.383 | 48.5 |
| 2008 | 24.638 | 11.210 | 45.4 |
| 2009 | 21.000 | 8.492 | 40.4 |

Source / Kaynak: Dış Ticaret Müsteşarlığı, 2009

Gülbirlik, which has a significant share in the rose oil production, keeps the same importance in export. Nearly 40% of the world's rose oil demand is met by Gülbirlik and 5 million $ of income is provided annually from this export. (Gülbirlik, 2009).The first rose oil process facility which was founded in 1958, has been followed by the foundations of others in 1967. Currently, Gülbirlik, processes 3 tons of rose flowers a day in four rose oil facilities situated in 3 different places. During the recent years, Gulbirlik also started to produce and export different kinds of rose oil products (creams and etc.).Another manufacturer is Başmakçı Rose Cooperative in Afyon. Başmakçı cooperative which has associates more than 3000, produces certified organic rose oil. Also there are eight other small and medium scaled private production companies in the sector where two of these are French companies which do the production for family cooperation. In addition, rose oil is also produced in the small scaled family manufacturing plants in Isparta villages, as well as in the neighbor cities.

Rose oil export in Turkey has traditional roots. It is known that rose oil export which is lasting for many years was done mostly to France and United States in the early years. Recently, rose oil is exported to nearly 20 countries. Among these, come the countries, which are developed in perfume industry: The major share is owned by France with the 53%. Respectively, Germany with 13% share, U.S.A. with 10% share and Switzerland with 9% share can be listed as the other countries which rose oil export is important. Of rose oil exports to other countries that constitute important. Rose oil is exported also to some Europe countries such as Spain, United Kingdom, Ireland, Greece, Austria and some Middle East countries such as Bahrain, Kuwait, United Arab Emirates, Iraq in smaller shares (IGEME, 2009; Yilmaz, 2010).

## 6. CONCLUSION AND RECOMMENDATIONS (SONUÇ VE ÖNERİLER)

Rose oil cultivation leads to an important commercial dynamism by covering all the agricultural activities such as the planting the gardens, harvesting and processes done for oil extraction, as well as it has a historical and cultural significance. However, this traditional activity is facing major problems. The oil rose cultivation areas are declining, particularly in Isparta which has a position to be the most important production center. While the area devoted for oil rose gardens was approximately 63.000 decares in early 1990s , today it is not even up to 26.000 decares. And the available spaces are small and fragmented. One of the main reasons for this is

the division of the gardens into smaller pieces by inheritance. Increase in the needs for workers as a result of the shrinkage in the family structure and increase in wages had a negative impact on oil rose cultivation (and production of rose oil accordingly).

Another reason for the reduction in the oil rose production areas is especially zoning the places around the cities for construction. It is necessary to have the rose gardens close to processing plants and cities so, opening these areas for construction effects rose cultivation in a negative way, as well as all the other agricultural activities. Individual rose growers express their frustration about the high fertilizer, agricultural pesticide prices whereas purchase prices of rose flowers are low and unstable. On the other hand, competition power has been decreased, due to the transition of the significant portion of government grants to all sizes off private companies which merged to establish their own gardens in early 2000s.

Accordingly, some of the rose gardens were replaced by other agricultural products or other economic activities. Farmers started to prefer alternative agricultural products which have less risk in marketing and bring in more money in terms of increase in the areas which can be irrigated. For example, nowadays , apple and sugar beet cultivation in Gelendost, fishery and growing apples in Eğirdir, growing medicinal plants and animal husbandry in Sütcüler, wheat production and tourism in Yalvaç, animal husbandry (due to terrain conditions) in Yukarıbademli and Aksu took place instead of oil rose cultivation (Temurçin, 2004; Knowles, 2010).

Rose oil (and therefore the oil rose flower) market value has dropped, due to world production of rose oil supply-demand balance change, as the increase in the supply direction. Turkey is incapable of determining the price although it is the largest manufacturer. Currently low prices prevents oil rose from being an attractive product. Overproduction of the rose flower (accordingly rose oil), caused by lack in planning, brings problems. In this case, rose production areas have been reduced; as well as rose flowers have not been harvested because of the flowers could not find the desired value.

Rose oil cultivation started to be considered as just an economical support rather than being a source of income. All of these problems require a variety of precautions. First of all, existing oil rose cultivation areas should be protected, establishment of new gardens should be allowed according to certain criteria (especially considering the need for annual oil rose products in the world market). Arrangements needed for combining the small production areas and preventing the areas, having size under certain amount, from being split-off; should be made. This will bring the conditions for being more durable and effective in international competition.

By taking the estimates ,which states that the numbers of the small manufacturers will decrease in the upcoming years, into consideration ; it is obvious that government grants should be given to these companies rather than the big manufacturers and weight should be given to local cooperativization. Rose oil facilities remain inactive except in the harvest season between months of May to June. However, other essential oil plants (lavender, thyme, bay, etc.) which are important in the world market can be also used, as well as oil rose. On the other hand, organic oil rose and rose oil production should be encouraged, in order to withstand international competition, in terms of price and quality.

There is a great need for the technological developments for increasing the efficiency and quality of rose oil, and the research

and development (AR-GE) departments, which can develop fragrance and cosmetics industry. To remedy this important deficiency in Turkey; "Rose and Rose Products Research Center" (GÜLAR) was founded by Süleyman Demirel University and "Rose Museum" was established by Gülbirlik. Similar developments and suggestions which can be considered as a part of the belated solutions, have a great importance for the survival of oil rose cultivation which has historical and cultural importance of Turkey.

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