

## Commercial Importance of Oil Rose (*Rosa damascena* Mill.) in Isparta Province, Turkey

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**Abstract:** Oil rose (*Rosa damascena* Mill.) is one of the most important commercial plant species, producing valuable oil which used medicine, food and cosmetic industries and also export products for national economy. For instance, Turkey exported 9.4 million USD rose oil which is totally 19 million USD export essential oil products in 2007. Besides, it has also important role for local economy of Isparta province from establishment of rose lands to harvest. Commercial importance of oil rose for the province and national was studied in this study. Results of the study were also discussed based on early researches to contribute future studies on the species.

**Key words:** Oil rose, *Rosa damascena*, economy, farming, Turkey

### INTRODUCTION

The Rosa is one of the most important genus comprising approximately 200 species and 18000 cultivars (Gudin, 2000). It is widely distributed thought the temperate and subtropical habitats of the Northern hemisphere. Oil rose (*Rosa damascena* Mill.) is a commercially plant species, producing a high-value aromatic oil which is used in the pharmaceutical, flavorings and fragrance industries and for rose water production in the roses (Douglas, 1993). The world main producers of rose oil are Bulgaria, Turkey and Iran and to less extend India, China and Northern Africa while Turkey is the biggest rose oil producer in the world. Current demand of rose oil is supplied mainly by Turkey (50%) and Bulgaria (40%) and the remaining Iran, India, Morocco and Afghanistan. For instance while world-wide rose oil production was 4.5 tons, Turkey and Bulgaria produced 2.5 and 1.5 tons, respectively in 2001 (Gunes, 2005). Majority of production in Turkey being located in Isparta; Burdur, Afyon and Denizli provinces (Fig. 1) also produce rose oil from *Rosa damascena* that is known as Turkish oil rose in world market.

Although, there were some fluctuations between 1980 and 2009, oil rose production has seen two times with the increase of production from 4870-10000 tons. Almost all of the oil production in Turkey is exported. For instance, approximately 10.4 million USD worth of rose oil has been exported mainly to EU countries mainly to France, Germany, USA and Switzerland according to 2010 inventory. Isparta province holding 84.41% of rose oil production of Turkey has potential to create a cosmetics valley to develop cosmetics and perfume industry in Turkey. Such a valley could only be created by joint



Fig. 1: Location of Isparta and land of *Rosa damascena* in Turkey

efforts between government, private industries and research centers but in turn would provide an international presence in the world cosmetics market (Kart *et al.*, 2012).

Thus, the aim of the study was to document all related information regarding the commercial data of Turkish oil rose.

### MATERIALS AND METHODS

Published and unpublished data and also literature document related to the commercial of Turkish oil rose was used as a material in this study.

**Description of Isparta province:** Isparta is located on Lakes district in Mediterranean region of Southern part of Turkey (Fig. 1). About 68% of Isparta which cover in Turkey 8933 km<sup>2</sup> is consisted of mountains reaching Upto 3000 m. Averages of annual temperature and rain fall are 12°C and 506 kg/m<sup>2</sup>, respectively. Economy of the province depends on generally agricultural activities such as husbandry, cereals and oil rose. While there are

Table 1: The economic activities of the population in Isparta province for the years

Sector	1970 (300029)*		1980 (350116)		1990 (434711)		2000 (513681)	
	No. of people	Percentage	No. of people	Percentage	No. of people	Percentage	No. of people	Percentage
Agriculture	81.305	59.2	89.180	55.3	108.441	54.5	126.518	56.9
Services	25.136	18.3	42.585	26.3	54.951	27.6	67.466	30.3
Industry	23.720	17.3	21.283	13.2	24.206	12.2	18.532	8.3
Construction	5.207	3.8	6.885	4.3	9.916	5.0	9.752	4.4
Unknown	1.869	1.4	1.458	0.9	1.361	0.7	69.000	0.1
Total	137.232	100.0	161.391	100.0	198.875	100.0	222.337	100.0

\*Total population of the province

Table 2: Number of oil rose farmers and oil rose area in Isparta for the years

Years	Area (da)		Years	Area (da)	
	Isparta	Turkey*		Isparta	Turkey*
1991	41350	59740	2002	15630	19840
1992	37690	53561	2003	15630	20230
1993	36880	48898	2004	15910	22950
1994	33930	41425	2005	18935	24358
1998	17720	24470	2006	19025	24620
1999	18310	27580	2007	19057	24338
2000	15870	22980	2008	18550	23493
2001	15910	22840	2009	17700	23343

\*Kart *et al.* (2012)

251,282 ha agricultural lands (28% of total land), 89,421 ha has become irrigated land as irrigation projects have been started to develop since 1960's. In this way, agricultural products with high commercial value have begun to be produced since these years in Isparta province (Temurcin, 2004). Details of economical activities are given in Table 1 based on population and years (Bilir, 2010).

As seen from the Table 1 agricultural activities has the highest commercial sector in the province for many years. The service is also one of the important sectors for the province (Table 1).

**Oil rose (*Rosa damascena*):** *Rosa x damascena*, more commonly known as the Damask rose cultivated flower no longer found growing wild but generally understood as coming from the Middle East. The name refers to Damascus, Syria a major city in the Middle Eastern region. It is widely distributed thought the temperate and subtropical habitats of the Northern hemisphere. While Turkey has 23 native *Rosa* species, *Rosa damascene* introduced to Isparta and Turkey in 1877 to 1878. The Damask rose is a deciduous shrub growing to 2.5 m tall, the stems densely armed with stout, curved prickles and stiff bristles (Fig. 2).

The leaves are pinnate with five (rarely seven) leaflets. The roses are a light to moderate pink to light red. The relatively small flowers grow in groups. The bush has an informal shape. It is considered an important type of old rose and also important for its prominent place in the pedigree of many other types. According to agricultural inventory there were 25567 da oil rose land in Turkey in



Fig. 2: a) Oil rose plants b) harvested flowers

2006 while it was 19025 da in Isparta. Number of oil rose farmers and oil rose land were shown based on agricultural inventory for years in Table 2.

About 8200 families grow oil roses and 0.5-1.0% of total cultivated land in Turkey is used for rose production (Gunes, 2005). The numbers of families grow oil roses was about 7200 at beginning of 2000 (Bilir, 2010).

The rose flowers are renowned for their fine fragrance and are commercially harvested for rose oil used in perfumery and to make rose water and rose concrete. The flower petals are also sometimes used directly to flavor food or to make tea and are considered safe for human consumption. The main commercial products of oil rose are rose blossom, rose oil, rose concrete and rose water. It was reported that the total cost for rose blossom flower production is 52.3% for labor, 17.7% for machinery, 12.8% for materials, 11.8% for field rent and 5.5% for draft animal power while the flower's share of total price of rose oil is 55% (Gunes, 2005).

**RESULTS AND DISCUSSION**

**Oil rose products:** The rose products changed based on balance of supply and demand and climate of especially harvesting period for the years. For instance, rose blossom yield decreased 35% because of higher rainfall in 2009. Amount of oil rose products were shown in Table 3 for the years.

It could be said that amount of rose products is generally increasing from 2001 to 2008 years. While there were large differences for the rose blossom production among the years of 1991 and 2000. For instance, amount of rose blossom were 24945 tons in 1991 and 8388 tons in 1998 (Bilir, 2010). In some years, the oil rose land was converted to the other agricultural activities because of the unsteady of supply and demand in rose oil products. For instance, the oil rose land were 59740 da in 1991 and 24470 da in 1998. They were reported 2183 da and 1709 kg in 1979 by Temurcin (2004). The amount of land devoted to rose production in Turkey continuously fluctuates based on the market's demand for rose oil, the amount of land devoted to rose production in other countries and other factors (Gunes, 2005). Gunes (2005) also reported that while the rose cultivation area was 5000-6000 ha at the beginning of 1990's this has decreased to as little as 2000 ha after 1995. Based on the 2001 inventory, 8358 tons rose blossom flowers which 65% of production from Isparta were obtained from 2300 ha. Gunes (2005) reported that approximately 2-2.5 tons of rose and 4-4.5 tons rose concrete are annually produced in Turkey. On average, 1 kg of rose oil is extracted from 3-5 tons of rose blossom. In fact, the price of rose oil has averaged between 3800-4000 USD kg<sup>-1</sup> and its highest price was 4200 USD kg<sup>-1</sup>.

**Trade of oil rose:** Annual yield of rose blossom is approximately 7000 tons in Isparta. About 10000 families are supported financially by the harvested rose in the province. The biggest customer of harvested rose blossom is Rose Cooperative called as Gulbirlik in Turkey associated by 8000 people. About 40% of rose oil and 20-25% of rose concrete demand of the world are supplied by the Rose Cooperative which was established in 1953. The cooperative is acquired about 5 million USD in export of oil and concrete.

Turkey acquired 19 and 25 million USD in export of essential oil in 2007 and 2008, respectively. The ratios of rose oil were 49% (9.4million USD) and 44% (25 million) in these exports, respectively (Bektasoglu, 2009). It was 8.6 million USD in 2000, 9 million USD in 2001 and 11.6 million USD in 2002 (Gunes, 2005). The average of export ratio of rose oil was reported 67% by Gunes (2005).

Table 3: Amount of oil rose products in Isparta and in Turkey for years

Years	Rose blossom (ton)		Rose oil (kg)		Rose concrete (kg)	
	Isparta	Turkey	Isparta	Turkey	Isparta	Turkey
2001	5811	8538	1180	-	3383	-
2002	5828	7776	1185	-	3183	-
2003	6073	8213	1185	1200	3183	5000
2004	7539	9773	1185	1100	3240	5600
2005	9576	12281	1251	1200	5150	6000
2006	10564	12737	2332	1450	9300	6500
2007	7085	9649	1157	1100	4377	7000
2008	8420	10327	1500	1300	9400	9000

Table 4: Export values of rose oil of Turkey

Years	Export values (USD×1000)	Years	Export values (USD×1000)
1990	5913	2000	5871
1991	4706	2001	6009
1992	5141	2002	8068
1993	5196	2003	9784
1994	3705	2004	7393
1995	5526	2005	7174
1996	6109	2006	7594
1997	4974	2007	9383
1998	4428	2008	11210
1999	3238	-	-

The rose oil mainly exported to France (53%), Germany, USA, Switzerland, United Kingdom, Greece, Ireland, Bahrain, Austria, Canada and Spain (Igeme, 2009). Turkey exported 62, 13, 10 and 9% of rose oil to France, Germany, USA and Switzerland, respectively according to commercial inventory of 2009. Isparta province produced 84.41% of oil rose production in Turkey (Kart *et al.*, 2012). Export values of rose oil of Turkey were shown for years in Table 4.

The balance of between supply and demand is very effective in export value of the rose products. Beside the competition between the producer countries is also play important role in the export. For instance although, there were some fluctuations between 1980 and 2009, oil rose production increased from 4870-10000 tons in Turkey (Kart *et al.*, 2012). World rose oil annual consumption is much lower than the combined annual production total in fact, yearly consumption is between 3.5-4.0 tons. This causes rose oil producer companies to carry product (stock) over from year to year. As a result, fluctuations in prices are encountered with the severity of these fluctuations dependent on how aggressively companies compete for business and find additional customers for their products (Gunes, 2005). Gunes (2005) also reported that the price of rose oil on the world market was 1.800-2.000 USD kg<sup>-1</sup> during 1991 to 1994. It increased to 3.500-4.000 USD kg<sup>-1</sup> during 1998 to 1999 and but then regressed to between 3.200-3.500 USD kg<sup>-1</sup> during 2000 to 2001.

## CONCLUSION

It could be understood that rose farming has play an important role in economy social and cultural structure of the province based on results of the study. In this context, conclusions could be summarized.

Rose land is divided into small lands especially by heritage. In this context, small rose lands should be combined by specific legislation. This international competition will also be more durable and effective.

Rose is involved with farming and trading rose fields and sectors in order to increase revenue rose lands and the new facility should be protected in accordance with certain criteria and scientific grounds should be allowed based on the annual world market supply in rose products.

One of the most important problems of farmers engaged in rose farming purchase prices rose flower instability. For this reason as well as other agricultural products on the basis of a stable rose products of the country or the world for the Rose Stock Exchange or Rose Union should be established.

Roses are gathered in May to June when a 40 days blossom season occurs. Out of rose season mint, thyme, lavender essential oil extraction as well as other agricultural products alternatives should be considered in present rose factories.

Harvesting and marketing the necessity of the rose blossom daily is one of the most important problems in rose farming. To ensure that the supply-demand balance rose oil and rose products, long-term storage facilities should be explored.

Low price should be arranged for special periods in prices of rose products such as mother's day. Government should support financially to rose farmers together with cooperatives.

Cosmetic rose products for export should be investigated by research and development activities instead of crude rose. Rose oil farming mainly is carried

out in Isparta province of Turkey. For this reason, the province of Isparta specific incentives should be planned.

Rose lands should be secured by agricultural insurance against risks such as flood, drought, fire and insects. Combination of agricultural activities should be investigated such as combination of cherry and rose farming.

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