

Sustainable Collection of Laurel (*Laurus nobilis* L.) Leaves in Antalya Province

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Abstract

Laurel (*Laurus nobilis* L.) is an evergreen shrub which belongs to the Lauraceae family. It grows naturally along the entire coastal line of Turkey up to altitude of 1200 m. Laurel has been regarded as an important medicinal and aromatic plant for years in the Mediterranean Basin. Meantime, it is also often used as an ornamental plant in parks and gardens because it is very much suitable to pruning and to give the desired forms. Turkey provides about 97% of the world's laurel leaf need. It is one of the top five plants collected from nature and exported from Turkey. However, there are some serious problems about the production system of laurel. Laurel production is done in conventional methods by local people. These areas are under threat due to overgrazing and uncontrolled collection. Ultimately, laurel growing areas have been exploited. In recent years, the researches related to sustainable use of laurel have increased. In this study it was investigated the researches conducted to sustainable use of laurel in Sirtkoy, Manavgat district and some other districts of Antalya. The aim of these studies was to develop an inventory method and to prepare management plans to be used by forest service and regional people. The cut shoots and leaves of laurel should be controlled and they should not be cut from the same locations every year. The rotation must be strictly applied in every 3 or 4 years intervals. Leaf collections should be done by experienced people in right period of the years and the leaves should be dried in a proper way.

Keywords: Laurel, leaf, sustainability

1. INTRODUCTION

Medicinal and aromatic plants are used for many purposes. There is a growing demand for them at the global level. They are mostly collected from nature. Therefore, conservation and sustainable use of these species are necessary to meet the needs of present and future generations. Laurel is an important medicinal and aromatic plant in Turkey. Laurel areas are under threat due to some serious problems such as uncontrolled collection and overgrazing. In this study, it was investigated the researches have been conducted so far (e.c. Sirtkoy-Manavgat district) to conservation and sustainability of laurel areas.

Laurel (*Laurus nobilis* L.) is a member of the Lauracea family which contains 45 genera and about 1000 species. It is also known, as sweet bay, bay laurel, Grecian laurel, true bay and bay. In Turkish, it is named as Akdeniz defnesi or only defne. The homeland of the Laurel is Anatolia and Balkans. But it was taken to the shores of the Mediterranean in ancient times. Today it is one of the characteristic plants of the Mediterranean. Laurel grows wild and is cultivated in many warm regions of the world particularly in the Mediterranean countries (Turkey, Greece, France, Spain, Portugal, Algeria and Morocco). It grows naturally along the entire coastal line of Turkey up to altitude of 1200 m (Davis, 1982; Başer and Ekim, 2003). It has a wide distribution in Turkish flora: Balıkesir, Bursa, İstanbul, Zonguldak, Kastamonu, Sinop, Trabzon, Rize, İzmir, Muğla, Antalya, Mersin and Maraş (Davis, 1982) (Figure 1). It isn't selective in terms of soil request and prefers stream beds (Göker and Acar, 1983; Özel, 2008). Its distribution area is related to water (in soil or in weather) every time (Özel, 2008)

Laurel is an evergreen large shrub or small tree growing up to 15 m in height (Davis, 1982). The leaves are elliptic and shiny dark green about 5-10 cm long, rather thick, aromatic and leathery. It has shiny gray bark. The laurel is dioecious plant with male and female flowers on separate plants. Clusters of small yellow or greenish white flowers are produced in spring on the female plants. The fruits are small (about 1-2 cm long), egg-shaped, green single-seeded berries that ripen to shiny, purplish black in the fall (Gökmen 1973; Seçmen et al., 1992).

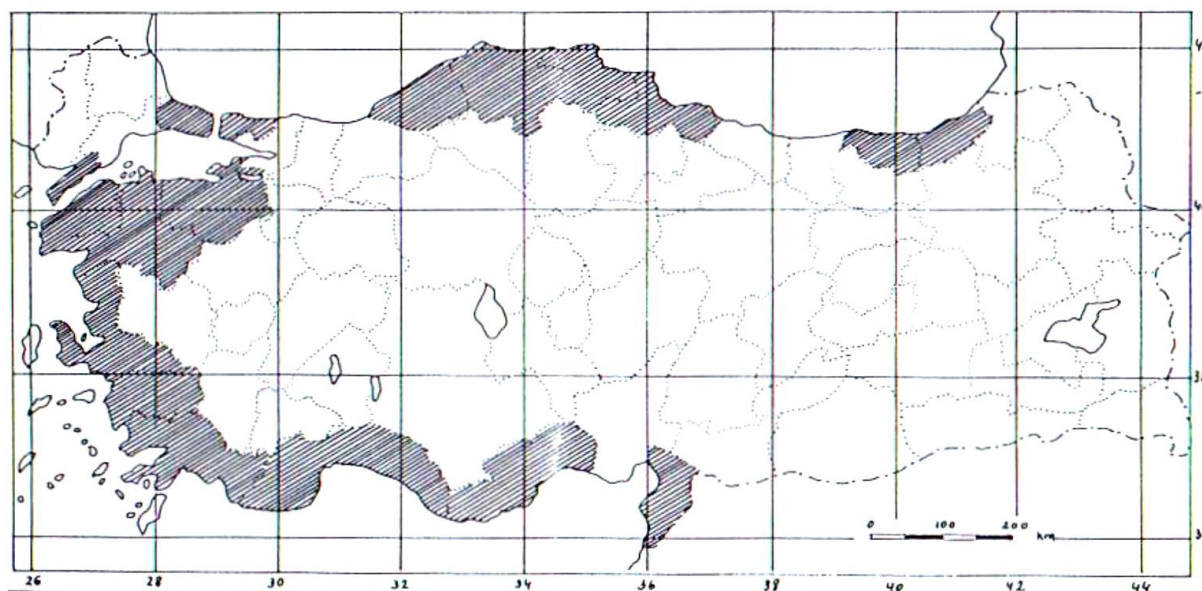


Figure 1. Distribution of Laurel in Turkey (Davis, 1982)

Laurel has been symbolised of victory, strength and protection since ancient times. After the victory or success, a crown of laurel leaves was worn by the emperors, generals, heroes and

athletes in ancient Rome and Greek. Also it has been used for many purposes for ancient times (Jirovetz et al., 1997).

The tree is grown primarily for its leaves. Fresh or dried, they are used as a culinary herb and also for leaf essential oil. Dried leaves are used as flavour and spice, especially in canned meat and fish, storage of olive, packaging raisins and dried figs. Laurel leaf essential oil has got widely usage in the flavouring, cosmetic and perfume industries. The oil extracted from berries is utilized in the food, drink, pharmaceutical, chemical and cosmetic industries. The leaves are also used in traditional medicine and to rheumatism, joint pains, epilepsy, parkinsonism, schizophrenia, stress, stomach ulcers, to stimulate the appetite and as a sedative and antiseptic. The oil extracted from the berries is used as a cure for irritated skin, earache, asthma and urinary ailments.

Furthermore, it was widely cultivated and used mainly in Europe and the USA as an ornamental plant in parks and gardens because of suitable to pruning and to give the desired forms. (Barla et al., 2007).

Turkey has an important potential for production and exports of the laurel. About 90% of world's laurel production is done in Turkey. It is one of the top five plants collected from nature and exported from Turkey.

Laurel leaf production is arranged according to laws and principles and the annual production programs of the General Directorate of Forestry. Laurel leaf production is done between July - October due to vegetative growth has stopped.

Since the best quality leaves are on 2-3 year-old shoots, leaf production is the collection of these leaves. This process is not in the form collection of single leaves, is obtained by cutting the 2-3 year old leafy shoots (Bozkurt et al., 1982; OGM, 1987). Leafy shoots are made bunch and are dried in the shade. So, the green color of leaves is protected. After the leaves dried, they are collected from shoots. Yellowed leaves and contaminated foreign substances are eliminated. Then the dried leaves are separated into quality classes and packed. The drying process is made very primitive conditions. Ultimately, percent of the unqualified leaf is increased.

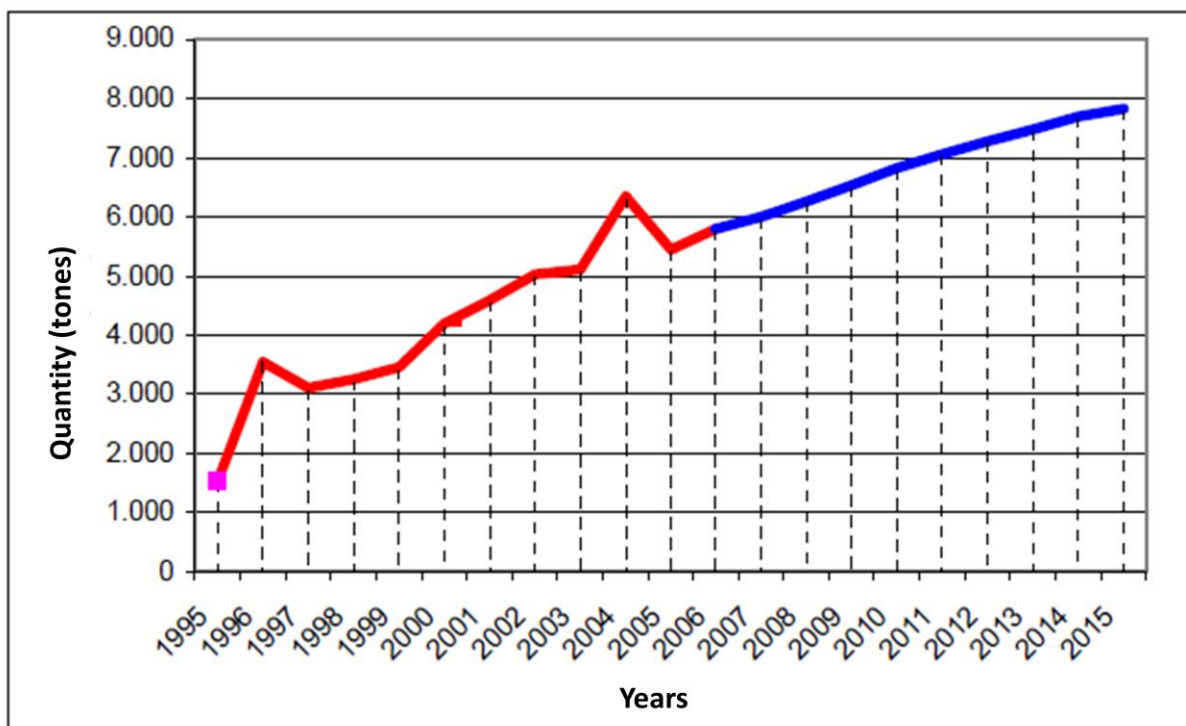


Figure 2. A graph showing the production quantities until 2006 and the estimated demand quantities after 2006 in the laurel areas

As seen from the Figure 2, the demand quantities are increasing every year. However, there is no increase in the laurel areas. On the contrary, it decreases with each passing day. Accordingly, the amount of production also decreases. The reasons for this are as follows:

1. The dense, irregular and uncontrolled leaf collecting is made.
2. These areas are under threat due to overgrazing.
3. There is not an applicable inventory method and management plan accepted and implemented by forest service and small farmers.
4. Laurel production is done in conventional methods by local people.
5. Laurel production is mostly done from its native areas. The newly established plantations are very limited.
6. The clonally propagation techniques aren't used for sampling production. Therefore, the standard product can not be obtained from the new plantations.
7. Diseases and pests of laurel are damaged its leaves. This situation causes a loss in product.
8. The lack of information

Some researches have been conducted to ensure the sustainability of production and exports of laurel leaves in the laurel production areas of Antalya and other provinces.

2. Researches on Laurel in Antalya:

1. Sirtkoy-Manavgat: This is the main study in laurel. Sirtkoy-Manavgat district were chosen to study the criteria of sustainable use of laurel. The aim of this study was to develop an inventory method and prepare a management plan to be used by forest service and farmers. In

the first step, the inventories of the areas were carried out and the areas were assigned into homogenous classes. In the second step, fresh laurel leaf yield was measured on 30 sampling plots. In the third step, an index named “crown index” was developed to estimate actual leaf stocking in sample plots taken for inventory. The index is determined by multiplying of crown diameter and crown height and gives the values represent the amount of leaf production for a tree. Correlation of this index values with measured values was significant ($r=0.79$; $P<0.0001$). This index was used successfully for inventory of study area. The index was also suggested to planers to use for inventory studies. The digital maps produced by the use of GIS (Geographic Information System). The leaf harvesting rotation plans were developed on digital maps. GPS (Global Positioning Systems) was also used to locate all the fieldwork plots. As a result, a management plan was prepared for practitioners and forest service (Baş et al., 2005).

2. Yardop project: After the huge forest fire (16 000 ha) in Tasagil-Serik in 2008, Yardop project was developed in order to establish fire-resistant forests by forest service. This project aims to establish with leafy forest trees 50-150 m wide area between forest and farmland. For this purpose selected plants are laurel, carob, acacia, olives, almonds and cypress. Especially laurel is preferred because it is fire resistant and provides income.

3.The Other Researches on Laurel in Turkey:

1. The aim of this study was to determine the most suitable leaf harvesting method and cutting period which were yield good quality and quantity leaves of laurel and its economy. Experimental design was completely randomized parcel design with three different leaf harvesting methods (clear cutting, pollarding, combination) and three different shoot cutting periods (every year, once in two years, once in three years) on total 108 plots. First treatment was clear cutting method (coppice system). Second treatment was pollarding method. Within this method, one shoot which good growing and 1.0-1.5 m height at each plot was selected and were cut over its shoots on 1/3 ratio. The third treatment is combination method. It was combination of first and second methods. Shoot cutting periods were every year cutting, at two years interval cutting and at three years interval cutting. Commercially important dry leaf yield/plot (g/plot), the best quality dry leaf yield/ dry leaf yield ratio (%), the best quality dry leaf yield/plot (g/plot) and dry base essential oil contents (%) were given.

According to results of this research; combined leaf harvesting method and two years interval cutting period were suggested for laurel areas (Polat et al., 2009).

2. The aim of this study was to determine the most suitable vegetative propagation method of laurel. For this, the cuttings were taken in 11 different time periods and treated with 5 different dose of IBA, were planted in 4 different medium. The best results were obtained from cuttings taking on 30 July and applied with 5000 ppm IBA. The mix of peat and perlite was determined as the best media (Parlak, 2008).

4.CONCLUSION

In this study, to ensure the sustainability of laurel areas have been revealed primarily the problems. Some researches done in these areas are examined and some proposals are presented. One of the oldest and the most comprehensive studies were done in Sirtkoy-Manavgat district and it was followed by several other studies. Considering the results of

these studies, the following recommendations can be presented to the sustainability of the laurel areas: The cut shoots and leaves of laurel should be controlled and they should not be cut from the same locations every year. The rotation must be strictly applied in every 3 or 4 years intervals. Leaf collections should be done by experienced people in right period of the years and the leaves should be dried in a proper way. To prevent destruction in natural laurel areas and to promote management of culture fields should be primarily carried out education, information and organization activities. For this purpose, the state, producers and private sector must be provided coordination and unity of purpose.

REFERENCES

- Barla, A., Topcu, G., Oksuz, S., Tumen, G. and Kingston, D. (2007). Identification of cytotoxic sesquiterpenes from *Laurus nobilis* L. *Food Chem*, 104: 1478-1484.
- Baş, M.N., Güler, S. ve Erkan, N. (2005). Defne (*Laurus nobilis* L.) Alanlarında Yaprak Üretim Miktarlarının Belirlenmesi (Manavgat-Sırtköy Örneği). Çevre ve Orman Bakanlığı Batı Akdeniz Ormancılık Araştırma Müdürlüğü. Teknik Bülten Serisi. No:24, Antalya
- Baser, K.H.C. and Ekim, T. (2003). Medicinal Plants in the Western Black Sea Countries: Turkey, Eurasia Environment Conference, Istanbul, 21-23 October 2003, Türkiye Çevre Vakfı Yayını, Istanbul.
- Bozkurt, Y., Yaltırık, F. ve Özdönmez, M. (1982). Türkiye’de Orman Yan Ürünleri, İstanbul Üniversitesi Orman Fakültesi Yayınları, İÜ Yayın no:2845, O.F. Yayın no:302, İstanbul, s:13-15
- Davis P.H. (1982). *Flora of Turkey*, Vol. 7, Edinburgh University Press, Edinburgh.
- Göker, Y. ve Acar, İ. (1983). Orman Yan Ürünlerinden Akdeniz Defnesi (*Laurus nobilis* L.). İ. Ü. Orman Fakültesi Dergisi. Cilt: 33. Seri: B. Sayı: 1. İstanbul.
- Gökmen, H. (1973). *Kapalı Tohumlular 1*. Cilt. Şark Matbaası. 576 s. Ankara.
- Jirovetz, L., Buchbauer, G. and Ngassoum, M. (1997). GC/MS-analysis of essential oils from Cameroon plants used as spices in local foodstuff. *Recent Research and Development In Agricultural and Food Chemistry*, 1: 241-255.
- OGM (1987). Ülkemizdeki Bazı Önemli Orman Tali Ürünlerinin Teşhis ve Tanıtım Kılavuzu, Orman Genel Müdürlüğü, Yayın No:659, Seri No:18, Ankara, sayfa:25.
- Özel N., Akkaş, M.N., Öner, H.H., Akbin, G., Altun N. ve Albayrak Akbin, N. (2008). Batı Anadolu’da Defne (*Laurus nobilis* L.) Yayılış Alanlarının Yetiştirme Ortamı Özelliklerinin Belirlenmesi. Ege Ormancılık Araştırma Müdürlüğü. Teknik Bülten Serisi. No:39, İzmir.
- Parlak, S. (2008). Defne (*Laurus nobilis* L.)’nin Çelikle Üretilmesi. Ege Ormancılık Araştırma Müdürlüğü. Teknik Bülten Serisi. No:42, İzmir.
- Polat, S., Gülbaba, A.G., Tüfekçi, S. ve Özkurt, A. (2009). Defne (*Laurus nobilis* L.) Alanlarında En Uygun Yaprak İşletme Şekli ve Maliyetlerinin Belirlenmesi (Tarsus Örneği). Doğu Akdeniz Ormancılık Araştırma Enstitüsü. Teknik Bülten Serisi. No: 34, Tarsus.
- Seçmen, Ö., Gemici, Y., Görk, G., Bekat, L. and Leblebici E. (1992.) *Tohumlu Bitkiler Sistematigi* (Ders Kitabı). Ege Üniversitesi Fen Fakültesi Kitaplar Serisi No:116. Ege Üniv. Basımevi. Bornova-İzmir.