

# OUTLOOK ON TURKISH PISTACHIO INDUSTRY

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## INTRODUCTION TO TURKEY



The Republic of Turkey lies in the Northern Hemisphere where the “Old World Continents” (Asia, Africa, and Europe) meet. Its total land border is 2 875 km, Turkey’s surface area is 780 043 km<sup>2</sup> , 97% of which lies in Asia (Anatolia) and the remaining 3% in Europe.



Turkey's land area (excluding water bodies) is 769 604 km<sup>2</sup>. In the census conducted in 2017, the population of the Republic of Turkey was recorded 80 810 525. The current yearly population growth rate is 1.35% with the population projected to be 84 247 088 in 2023, Turkey is divided into 81 administrative geopolitical provinces and seven nonpolitical geographical regions, namely, Aegean, Marmara, Black Sea, Eastern Anatolia, Southeastern Anatolia, Mediterranean, and Central Anatolia. Each of the regions possesses unique climatic and ecological features, which can change sharply over very short distances.



Population comprises of young people, with about 56% of the population below 35 years of age

Turkey's labor force is around 30.2 million people

The climate of Turkey is very diverse with several major climate types

Of the total land area of Turkey, about 38 million ha are cultivated of which 6.23 million ha were irrigated

Forests cover 28.6% (22.3 million ha) of country surface area in 201

The agricultural sector's share of the GDP was almost 50% in 1950; by 2016 it was only about 6%. Despite the decreasing share in GDP, the value of agricultural production has been rising, reaching USD 32.6 billion in 2016,

Turkey is one of the few self-sufficient countries in the world in terms of food production. Fertile soil, adequate climate, and rainfall permit growing almost any kind of crop. Farming is conducted in all regions, Turkish agriculture sector employs about 5.1 million people that constitutes 18.9% of the total employment

Turkey is one of the countries with the largest proportion of agricultural lands (about 50% of total land area), with a total agriculture area of 38 328 000 ha (Table 3). About 36% of the country consists of arable land, about 16% of which is irrigated.

Turkey is the top producer in the world of hazelnuts, figs, apricots, and cherries by far, second in melons, leeks, raisins, and cherries (sweet and sour), and third in other products such as spices, chillies and peppers, strawberries, chestnuts, chickpeas, pistachios, walnuts, vetches, lentils, green beans, cucumbers, watermelons, fresh grapes, and honey

The government supports grain production through intervention prices and by direct subsidies for fertilizer, fuel, and certified seed



## **TURKEY'S AGRICULTURAL POLICY TO DEVELOP AND INCREASE PISTACHIO PRODUCTION**



## PISTACHIO RESEARCH INSTITUTE

Founded in 1937 by the government. It is a governmental institute serving as training grafting workman, supplying graft material and grafting wild pistachio trees.

Developing agricultural techniques to the farmers of the region.

Production of male and female pistachio cuttings, grafted and non-grafted saplings of pistachio.

The Institute has totally 1350 decaire land used in research projects and supplying the sapling requirements of the farmers.

Carrying out research projects about the problems on pistachio.

The up-going pistachio projects in the Institute are as follows,

Rootstock breeding

- Cultivar breeding
- Growing under irrigated conditions
- Sapling production
- Biotechnological applications
- Diseases and pests
- Organic farming
- Genetic resources



## AGRICULTURAL SALES COOPERATIVES (ASC) AND UNIONS (ASCU)



Their origin dates back to 1914. Initially Cooperatives were established in selected regions for strategic crops.

Agricultural Sale Cooperatives(ASC) are specialised in a particular product and ensure purchase guarantee and purchase price

Agricultural Sales Cooperatives having changeable capital, number of member and having legal entity

Minimum three independent agricultural sale cooperatives dealing with the same product must merge to establish an Union.

They received government financing not only for crop purchases and input subsidies, but also for investments in industrial installations, storage facilities, and administrative buildings

In 1960s, the cooperative became channels for increasing producer prices, organising market intervention or providing and subsidising inputs (fertiliser, credit and irrigation water).

For the agricultural sales cooperative sector, the main

issue was the role of government in cooperative management and development.

This ASC directors were appointed by the government and in that respect they were not an independent player in the policy process.

The ASCUs have operated as semi-state organizations, and despite being formed by cooperatives that were established by the farmers, their management was largely guided by governments.

The Union of Southeastern Agricultural Sale Cooperatives (Güneydogubirlik) established in 1940 is state-run cooperatives Union which purchase the pistachios directly from the farmers during harvest time throughout all pistachio growing regions

The purchase price determined by the government each year is the floor price to lessen the price risk for farmers

Until about 2000, Turkey's agricultural policy was strongly supportive to agriculture via price support and input subsidies

Market also was protected by import tariffs

Turkey's agricultural protection resulted in strong growth of agricultural outputs.

## AGRICULTURAL SUPPORT



### Direct income support (DIS)

DIS payments are given to the farmers as area based for their agricultural land. The amount of the payment per ha of the agricultural land is determined by the Council of the Ministers in accordance with the proposal of the Agricultural Support and Steering Committee.

DIS payments are made to the farmers who are registered in the National Farmers Registry System (NFRS). The payments are made for land between 0.1 ha and 50 ha.

### Deficiency Payments

The deficiency payments are provided for the products which have domestic supply shortages. The payments are made one time for every production period. The domestic and foreign market prices, costs of the producers and budgetary means have been taken into consideration in determination of the amount of the support. Payments have been made according to the Council of Ministers Decision issued annually and the Communiqués published based on the decision

### Compensatory payments

The producers who shift to alternative crops from the products that have excessive supply are encouraged by payments assisting them in their conversion to alternative agricultural crops. The purpose is to avoid structural problems in these crops due to excess supply

### Agricultural insurance support scheme

The aim of the scheme is to provide insurance for crops, animals, aquaculture and fishery products and constructions against natural disasters. The 50 % of the insurance bill of the farmer is paid by the government.

### Rural Development Investments Support Programme (RDISP)

Rural Development Investments Support Programme is a grant support programme aiming to encourage and support economic activity investments for storage, processing and packaging of agricultural products and investments for infrastructure facilities for the equity-based investment projects accompanied with design of individual or a group of agricultural producers in a rural area



## HIGHLIGHTS OF TURKISH PISTACHIOS INDUSTRY

- Pistachios are grown in arid lands in Turkey. In the pistachio production area the annual precipitation is very low, the soils are poor, stony, rocky and calcareous.
- Total pistachios plantation area is 3.545.003 decar.
- Total number of trees is 70.087.123, bearing trees 49.557.873 and non-bearing 20.529.250
- It is estimated that there are 75 millions of wild pistachio trees or bushes of different Pistacia species.
- 95 % Pistachio orchards have been established in non-irrigated lands
- 25 percent of the orchards established in mixed plantations with olive and grape
- In arid zones the trees reach the bearing stage 15 to 20 years after planting.
- 95 % Pistachio orchards have been established with non-grafted saplings.
- Grafting is performed 3 to 4 years after planting
- It is small scale family farming. Percentage of company farming is very low.
- Average size of the plantations is below 10 decars.
- Average yield is 10 to 15 Kg/tree fresh pistachios in hull.
- All pistachios lands are not registered and all farmers don't own title deeds for their lands.
- The average split percentage of inshell pistachios is from 40 to 75 on average basis.
- The harvesting technique performed basically is harvesters shake the trees and branches with poles or by hand or by other means or by bending the cluster backs and separate from branches.
- Usually drying is accomplished by spreading the nuts on canvas and drying them in the sun and open air with hull or after dehulling.
- Hulling is accomplished by rubbing the nuts with rollers followed by water treatment washing to remove the loosen hulls.
- Consume 35 percent of total production as a snack food and the rest are used in the production of confectionery, chocolate products, ice cream, especially in desserts and bakery products.
- Current per capita consumption tree nuts is around 1.5 kg/year.
- Inshell pistachios ; 90 nuts or fewer per 100 grams is considered first quality, 90-100 nuts are second quality, 100-120 nuts are third quality,
- Most of the cultivars grown in Turkey (e.g., kırmızı, uzun, halebi, cakmak, sultani) have more tendency toward biennial bearing
- There is lack of storage facilities
- High level of post harvest losses
- Small medium processing units below quality standards
- Insufficient organisation of farmers
- Traditional part of the orchards has low yields also caused by unsuitable cultivar and rootstock usage.

### ANNUAL PISTACHIO PRODUCTION (ton)

Year	Quantity (ton)
2014	80.000
2015	144.000
2016	170.000
2017	78.000
2018	240.000

### NUMBER OF TREES

Year	Bearing Trees	Non Bearing Trees	Total
2014	39.329.512	11.152.593	50.482.105
2015	40.597.427	11.163.973	51.761.400
2016	42.570.004	11.632.973	54.202.977
2017	47.765.596	19.460.186	67.225.752
2018	49.557.873	20.529.250	70.087.123

### TOTAL PLANTATION AREA

Turkey Total	Gaziantep	Şanlıurfa	Siirt
3.545.003 (Decar)	1.393.759 (Decar)	1.392.160 (Decar)	282.071 (Decar)

## Pistachios Growing Provinces in Turkey



Turkey is one of origin centers of pistachio . Pistachio nuts are conventionally produced in Turkey.

The climatic conditions favorable to pistachios culture prevail in extensive region of Turkey

Pistachio cultivation provides a vital source of economic income in the province. Wild pistachio species are widely distributed in Turkey and have been used for grafting to convert pistachio orchards .

The Southeastern part of Turkey, which is called the “Southeastern Anatolia Region” is the traditional production area for pistachios and Pistachio is grown most intensively in region. The pistachio tree is native to southeastern region of Turkey and an important income source for the farmers

Because Anatolia is in the gene center of pistachio, the richness of the country on genetic variation of this species provides facility for achievement in breeding studies in a short period of time and expanded to throughout many other regions.

The provinces in this region, Gaziantep, Sanliurfa, Adiyaman, Siirt, Kilis, Kahramanmaras, Mardin and Diyarbakir, are the most significant locations for commercial pistachio production and represent 95 percent of the total production and around 40 percent of this comes from Gaziantep. The remaining 5 percent of the pistachio production is in the Aegean, Mediterranean, and Marmara regions. 56 out of 81 provinces in Turkey produce pistachios. During the last decade, production in regions outside of Southeastern Anatolia is an increasing trend.

In recent years Aegean Region (in provinces such as Manisa, Mugla, Izmir, Aydin, Denizli) and West Marmara Region (in provinces such as Canakkale, Tekirdag) have also become popular for pistachio production.

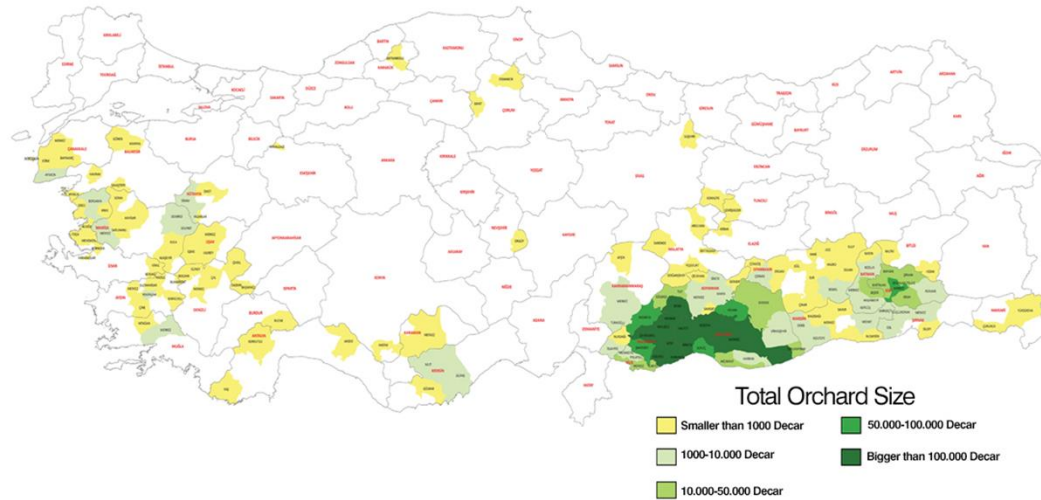
Pistachio's wild trees are spread in almost all parts of Turkey. However, the majority of this species' trees are in the Southeastern parts of the country. Because the ecological conditions (climate and soil) of this region is quite suitable for growth of this species' trees or shrubs. This region is the most significant area for pistachio production. All kinds of pistachio are conventionally produced in Anatolia. In addition, grafted pistachio cultivars on wild Pistachio species are also grown in different regions of Turkey.

Anatolia is a major centre of diversity for the genus Pistacia species are naturally distributed throughout the region used rootstock for Pistacia vera cultivars

Subsequently its cultivation spread to other parts of the country.

It is estimated that there are 75 millions of wild pistachio trees or bushes which belong to different Pistacia species.

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## Soil structure and Climate of pistachio cultivation areas



Pistachios are grown in arid lands in Turkey

Especially in some parts of Southeastern Anatolia Pistachios are mostly grown in dry conditions as irrigation for pistachios is not common in Turkey. The common perception about pistachio trees is that they can grow naturally in marginal soil and conditions. In arid zones the trees reach the bearing stage 15 to 20 years after planting.

In the pistachio production area the annual precipitation is very low, the soils are poor, stony, rocky and calcareous, summers are very hot and dry and the winters are rather cold. So in a way pistachio trees are grown in Southeastern Turkey in marginal lands where no other fruit or even field crops can be grown economically unless some cultural measures such as irrigation, fertilization are taken.

Since husbandry Pistachio orchards have been established in dry and non-irrigated lands and on the hill or mountains or inclined lands, this situation makes the total yield very low and also this causes higher growing cost.

But these areas are not suitable for other agricultural crops. Because of this reason this type of areas gain as valuable.

Also about 30 percent of the orchards established in mixed plantations with olive and grape and 70 percent as single-crop plantations.

South East Anatolia has been suffering from drought which was caused by less rainfall

Since 95 percent of pistachio is grown in this region, production has been negatively affected by the weather condition. Gaziantep and Sanliurfa provinces which represent more than half of the production are the most negatively affected area from unfavorable weather conditions.

For this reason, producers have been implementing more good agricultural practices than ever.

As it is well known, some expected changes by irrigation, leaf size, number of current year's shoot and length of shoot will be increased.

The result with irrigation increasing the yield, bigger nut size, high splitting percentage, low blank nut rate and lesser alternate bearing will be obtained.

New plantation in last approximately 15 years done in irrigated and fertile lands because of the increasing income and demand of pistachio worldwide.

Turkey's annual pistachio production is expected to increase rapidly under irrigated conditions in frame of the GAP (The South-East Anatolia Regional Project) during future years and richness in native pistachio populations is speeding up the grafting pistachio cultivars on wild pistachio species counting to about more than 70 million. Additionally new cultivars developed or adopted.

## CULTIVARS & ROOTSTOCKS

**In Turkey, there are four common Pistacia species (*P. vera*, *P. atlantica*, *P. khinjuk*, *P. terebinthus*) used as rootstocks. Except *P. vera* the others are not used commonly as seedling because of their low percentage of seed germination. According to observation, Siirt cultivar seeds have better growth and development than the other cultivars,**

**The most known pistachio cultivars of Turkey are Uzun, Kirmizi and Siirt. The cultivar Siirt has larger kernels with oval nuts and high splitting percentage and its alternate bearing is less than other cultivars.**

## BARAK YILDIZI



Name and synonyms	: Barak Yıldızı
Main cultivation area	: Gaziantep
Blooming time	: Mid-late (16-18 April)
Split shell percentage (%)	: 48
Ripening time	: Very Early (15-30 August)
Kernel color	: Gren-light pink
Kernel Ratio (%)	: 37
Alternate bearing	: Strong
Yield	: Good
Utilization	: Snacks, fresh consumption, baklava, pastry.

### Other Characteristics:

It is a new early maturing cultivar that grow at Barak province in Gaziantep. Barak Yıldızı cultivar is ripen 20 days before Kırmızı and about 30 days before other standard cultivars in Turkey. It is suitable for fresh consumption, and because of low total temperature request it can be suggested for transition regions.

## TEKİN

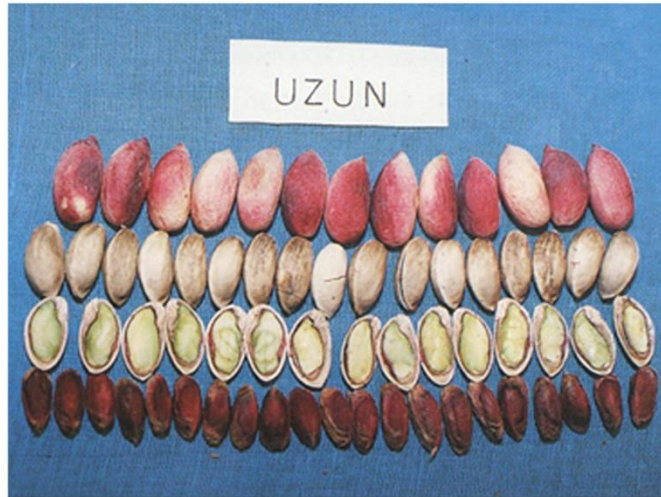


Name and synonyms	: Tekin, Sel-1
Main cultivation area	:Gaziantep
Blooming time	:Mid-early (13-18 April)
Split shell percentage (%)	:96
Ripening time	:Mid-season (8-20 September)
KernelColor	:Yellowish-green
Kernel percentage (%)	:43
Alternate bearing	:Weak
Yield	:Good
Utilization	:Snacks

### Other Characteristics:

A new selected pistachio cultivar in Turkey. Fruit quality is high, it has world standards in terms of the appetizer characteristics (bigness, splitting and kernel ratio). Tekin cultivar has high yield and low alternate bearing. It is superior than Siirt cultivar in terms of yield and quality features and can be recommended to the GAP region. The nut shape is between round and long cultivars and consumed as a appetizer.

## UZUN



Name and synonyms	: Uzun, Antep
Main cultivation	: Gaziantep, Adiyaman, Şanlıurfa, Kahramanmaraş
Blooming time	: Early-mid-season (April 10-15) (Mid-early)
Shape	: Long
Split shell percentage (%)	: 69.34
Ripening time	: Mid-season (September 10-22)
Kernel Color	: Gren-light pink
Kernel percentage (%)	: 42.48
Alternate bearing	: More
Yield	: Goog
Utilization	: Snacks, Sweet, Pastry industry

### Other Characteristics:

It is one of the standard domestic variety that grow very spreadely all the country. Chilling requirement is less than Halebi and Kırmızı varieties. At the first years of orchard, yield is late. But in following years it gives very high yield. Because of being 15-20 days earlier than Siirt and Ohadi varieties, it can be recommended for high elevation place.

## KIRMIZI

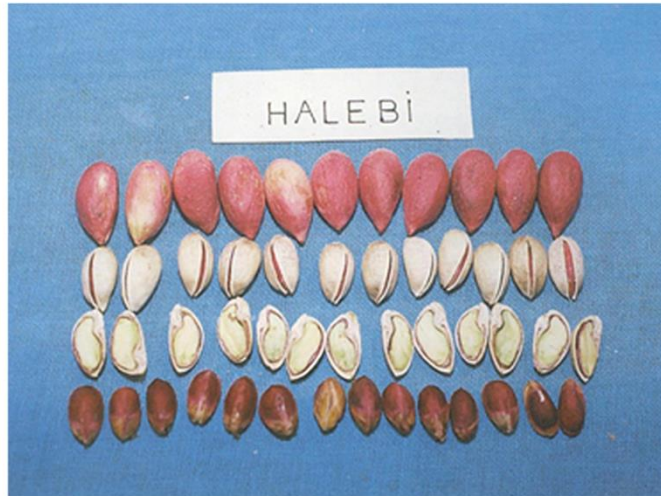


Name and synonyms	: Kırmızı, Antep
Main cultivation	: Gaziantep, Adıyaman, Şanlıurfa, Kahramanmaraş
Blooming time	: Mid-late (April 12-18)
Shape	: Long
Split shell percentage (%)	: 67
Ripening time	: Mid-early (08-20 Eylül)
Kernel color	: Green, very light pink
Kernel percentage (%)	: 40.37
Alternate bearing	: More
Yield	: Good
Utilization	: Sweet, Snacks and Pastry industry

### Other Characteristics:

It's one of our standard domestic varieties. Mostly it has been grown in Gaziantep and its related regions. In all other standard varieties, this early variety needs more chilling requirement. Because of this two characters, it is suitable for the regions have high sealevel.

## HALEBİ



Name and synonyms	: Halebi, Antep
Main cultivation	: Gaziantep and Related region
Blooming time	: Early (April 01-05)
Shape	: Long-low
Split shell percentage (%)	: 78.26
Ripening time	: Early ( September 05-15)
Kernel color	: Light pink
Kernel percentage (%)	: 42.05
Alternate bearing	: More
Yield	: Medium
Utilization	: Fresh,Snacks,Sweet, Pastry industry

### Other Characteristics:

This standard domestic variety is the earliest and needs less chilling requirement. So it can be used the regions that has been grown winter temperatures high. On the sature line and between hull and shell, there is two horny projection which is little, white and thin.

## Siirt

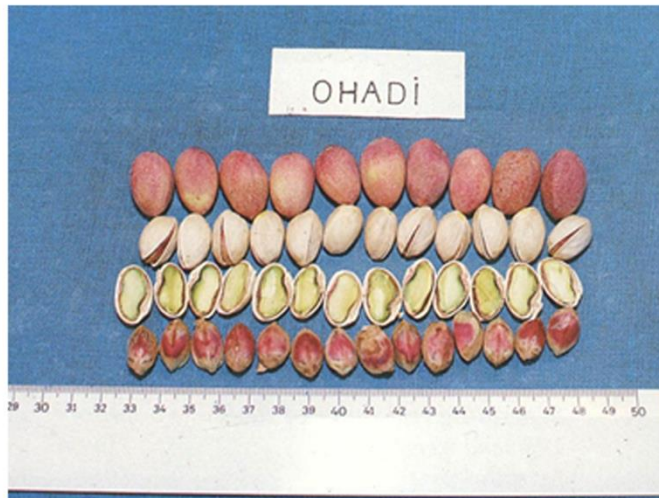


Name and synonyms	: Siirt
Main cultivation	: Siirt, Şanlıurfa
Blooming time	: Medium (April 08-12)
Shape	: Ovoid
Split shell percentage (%)	: 92
Ripening time	: Mid-late ( September 25- October 05)
Kernel color	: Yellow
Kernel percentage (%)	: 42.64
Alternate bearing	: Weak
Yield	: Good
Utilization	: Snacks

### Other Characteristics:

This standard domestic variety is suitable to world standard as fruit volume. It can take good market because of having high splitting rate and its light shell color. It is situated between long and orbicolar varieties with its nut shape. Usually it has been marketing like snacks

## OHADİ



Name and synonyms	: Ohadi
Main cultivation	: Şanlıurfa, Gaziantep
Blooming time	: Late (April 12-16)
Shape	: Orbicular
Split shell percentage (%)	: 94
Ripening time	: Late (October 01-10)
Kernel color	: Yellow
Kernel percentage (%)	: 44.53
Alternate bearing	: Weak
Yield	: Good
Utilization	: Snacks

### Other Characteristics:

This is standard and foreign variety. It has orbicular nuts. With the specialties like less periodicity, orbicular nut and high split nut rate, it rises the cultivation areas itself. For the regions have growing short season, this late variety is not adaptable.

## BEYAZ BEN



Name and synonyms	: Beyaz Ben
Main cultivation	: Gaziantep, (Nizip around) Şanlıurfa
Blooming time	: Mid-early
Fruit Shape	: Long
Kernel color	: Gren-Light pink
Kernel percentage (%)	: 42.24
Split shell percentage (%)	: 73
Alternate bearing	: More
Yield	: Medium

### Other Characteristics:

It's a natural domestic variety without standardization. It has been grown especially around Gaziantep orchards as a mix. This variety has not been sufficient economic value. It has been protected as a gene source.

## SULTANI



Name and synonyms	: Sultani
Main cultivation area	: Gaziantep and near regions
Fruit Shape	: Long
Kernel Color	: Very light pink
Kernel percentage (%)	: 43.24
Split shell percentage (%)	: 37
Alternate bearing	: More
Yield	: Medium

### Other Characteristics:

It's a natural domestic variety without standardization. It has been grown as a mix with standard varieties at southeast Anatolia. It gets very less economic value. It has been protected as a gene source.

## DEĞİRMİ



Name and synonyms	: Değirmi
Main cultivation	: Gaziantep
Blooming time	: Early
Fruit Shape	: Long
Kernel color	: Very light pink
Kernel percentage (%)	: 42.74
Split shell percentage (%)	: 61
Alternate bearing	: More
Yield	: Medium

### Other Characteristics:

It is one of the nonstandart natural domestic variety. It has been cultivated at orchards with other standard varieties around Gaziantep and Adiyaman. It is economic value is less. Also It has been protected as a gene source.

## KETEN GÖMLEĞİ



Name and synonyms	: Keten Gömleği
Main cultivation area	: Gaziantep-Şanlıurfa
Blooming time	: Early
Fruit Shape	: Long
Kernel color	: Very light pink
Kernel percentage (%)	: 42.30
Split shell percentage (%)	: 62
Alternate bearing	: More
Yield	: Medium

### Other Characteristics:

It is a nonstandart natural domestic variety. It has been growth as a mix around Gaziantep. It is economic value is less. It has been protected as a gene source.

## ROOTSTOCKS



Rootstock Name : Antepfıstığı, Pistacia (Pistacia Vera L.)

Natural wild areas : Southeast part of Anatolia

Budding age (year)

With tubes : 1,5-2

Field condition : 3-4

Conformity : Good

Effect on top growing : Weak

Effect on yield : Medium

Root system : Medium

Soil requirement : Calcareous,transient soils

## BUTTUM



Rootstock Name : Buttum (P. Khinjuk Stocks)

Natural wild areas : Siirt, Bitlis, Hakkari

Growing : Strong

Budding age (year)

With tubes : 1,5-2

Field condition : 3-4

Conformity : Good

Effect on top growing : Good

Effect on yield : Good

Root system : Strong

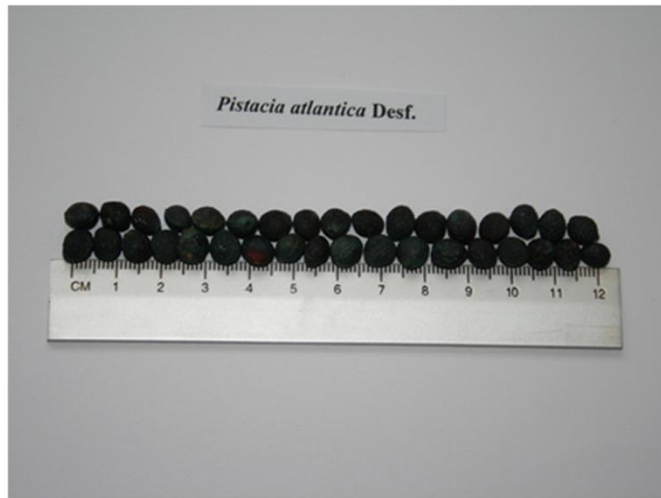
Soil requirement : Limy, clay soil

## MENENGIÇ



Rootstock Name	: Menengiç (P. terebinthus L.)
Natural wild areas	: Southeast Anatolia, Mediterranean, Middle Anatolia, Some part of Aegean Region
Budding age (year)	
With tupes	: 4-5
Field condition	: 8-10
Conformity	: Medium
Effect on top growing	: Very weak
Effect on yield	: Good
Root system	: Very strong
Soil requirement	: All kind of soil is suitable

## ATLANTIK SAKIZI



Rootstock Name : Atlantik Sakızı (P. atlantica Desf.)

Natural wild areas : Mediterranean and Aegean  
 Regions

Budding age (year)

With tupes : 2-2,5

Field condation : 4-5

Conformity : Good

Effect on top growing : Good

Effect on yield : Good

Root system : Strong

Soil requirement : Deep and permiable soil



**FLOWERS OF UYGUR MALE CULTIVAR**



**FLOWERS OF UZUN CV. AND UYGUR MALE CV.**

NAME : UYGUR

Pollen Viability Rate (%) : 91.0

Pollination Time : Early  
Pollination synchronization (day) : 8.33 (By Uzun, Halebi and Barak Yıldızı .

**Other Characteristics:**

Uygur, a type of *Pistacia vera* L. and pollinator of Uzun, Halebi and Barak Yıldızı, is cold resistant and it can be nearly almost grow all region of Turkey easily. It has long term flowering time, high pollen quality and quantity, high pollen abundance.



**FLOWERS OF ATLI MALE CULTIVAR**



**FLOWERS OF SIIRT CV. AND ATLI MALE CV.**

NAME : ATLI

MAIN CULTIVATION AREA : Gaziantep

Pollen Viability Rate (%) : 91.0

Pollination Time : Medium

Pollination synchronization (day) : 8.50 (By Siirt, Kırmızı and Tekin )

**Other Characteristics:**

Atli, a type of *Pistacia vera* L. and pollinator of Siirt, Kırmızı and Tekin, is cold resistant and it can be nearly almost grow all region of Turkey easily. It has long term flowering time, high pollen quality and quantity, high pollen abundance. Moreover, if Ozturk and Atli, which are mid-term pollinator, take place in same orchard, the pollination happens perfectly.



**FLOWERS OF OZTURK MALE CULTİVAR**



**FLOWERS OF SIIRT CV. AND OZTURK MALE CV.**

NAME : OZTURK

MAIN CULTIVATION AREA : Gaziantep

Pollen Viability Rate (%) : 91.3

Pollen Germination Rate (%) : 75.8

Pollination Time : Medium

Pollination synchronization (day) : 7.00 (By Siirt, Kirmizi and Tekin )

**Other Characteristics:**

Ozturk, a type of *Pistacia palaestina* Boiss. and pollinator of Siirt, Kirmizi and Tekin, is cold resistant and it can be nearly almost grow all region of Turkey easily. It has long term flowering time, high pollen quality and quantity, high pollen abundancy. Moreover, if Ozturk and Atli, which are mid-term pollinator, take place in same orchard, the pollination happens perfectly.



**FLOWERS OF KASKA MALE CULTIVAR**



**FLOWERS OF OHADI CV. AND KASKA MALE CV.**

NAME : KASKA  
MAIN CULTIVATION AREA : Gaziantep

Pollen Germination Rate (%) : 68.8

Pollination Time : Late  
Pollination synchronization (day) : 9.66 (By Ohadi )

**Other Characteristics:**

Kaska, a type of *Pistacia vera* L. and pollinator of Ohadi, and reasonably cold resistant (till minus 10 degrees). It has long term flowering time, high pollen quality and quantity, high pollen abundance.

## HARVESTING & HULLING



As known pistachio nuts are borne in clusters and pistachios tend to fall out of the tree naturally when they ripen.

The harvesting technique performed basically is harvesters shake the trees and branches with poles or by hand or by other means to help them fall off.

In Turkey pistachio nuts are harvested manually as clusters which can easily be separated from branches by bending them back or the nuts are harvested by knocking them off with poles by shaking onto canvas spread out under the trees. When harvested the nuts contain 40 to 45 percent of moisture and must be dried in the hull or dehulled and dried immediately otherwise heating and spoilage occur.

The in-hull nuts are separated from their clusters and left in the sun for drying. Usually drying is accomplished by spreading the nuts on canvas and drying them in the sun and open air.

The hulls of freshly harvested pistachios nut slip off fairly easily.

If the nuts dried in-hull for storage, Before dehulling process, They are soaked in water for a short time to ease the removal of the hulls.

In Turkey removal of hulls is accomplished by rubbing the nuts with rollers

The separation of nuts from the loose hulls by means of a tank of water; transferring and washing from one to another equipped with an oscillating sieve.

It is essential for the harvested pistachios to be processed and dried within a 24 hours period to prevent molds and aflatoxin contamination.

Because of low humidity and high temperature during growing and harvest season, this is a very favorable climatic condition to lessen to contamination of aflatoxin and spoilage.

In Turkey, all the cultivars except Siirt and Ohadi are stored with their hulls. The nuts are kept in the sun until they are completely dry and then put in sacks and stored.

## HARVESTING



## HULLING



## CONSUMPTION



Pistachio has been used as a savory snack or as a major ingredient in many traditional desserts, pastries, fermented meats, and puddings throughout human history.

The fruit of the pistachio differs from all the other nuts because of its green colour and the semi-opening of the shell. Matters of taste are going to differ from person to person trier

The seed color ranges from light yellow to deep green throughout.

Turkey is self-sufficient in pistachios.

Most of the traditional Turkish pistachio cultivars have a good ratio of split and have green smaller kernels with higher oil content and rich aroma. These types are utilized mainly in the food industry in chocolate and in sweets with heavy syrups like "baklava" or "kadayıf". Turkish baklava (pakhlava) made with pistachio is a globally well-known sweet pastry.

Traditionally, the Turkish people consume 35 percent of total production as a snack food and the rest are used in the production of confectionery, chocolate products, ice cream, especially in desserts and bakery products.

Inshell pistachios as a snack quality is directly related to size: 90 nuts or fewer per 100 grams is considered first quality, 90-100 nuts are second quality, 100-120 nuts are third quality, and more than 120 nuts are fourth quality.

Almost 60 to 70 percent of the crop is early harvested as the green pistachios used as the main ingredient of many traditional Turkish desserts.

The second important reason for early harvest is because of the most of the old plantation are on non irrigated arid areas and as early as the harvest is performed, pistachios bearing trees will not use all nutrition reserves to increase the yields and consecutive year become less productive.

Current per capita consumption tree nuts is around 1.6 kg/year in Turkey