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New Hope Agriculture of Turkey: *Diospyros* sp. (Trabzon Date, Paradise Date)

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Abstract
In this study, in recent years, taking its place among the popular agricultural products in Turkey *Diospyros* sp. (Trabzon Palm, Paradise Date) were examined as multifaceted dimensions of agriculture. Trabzon Palm, which belongs to the genus Diospyros, is cultivated with nearly 30 varieties in 3 species in our country. Diospyros agriculture, which has been growing rapidly in Anatolia in recent years, continues to be the gateway of hope for Turkish farmers. Diospyros fruit consumed especially in the domestic market is also very important in terms of health. Exports started in small quantities are increasing day by day and are rapidly moving towards becoming an alternative source of income for Turkish farmers. Diospyros plant, which has a particularly mild climate, is on its way to take its place among the important agricultural products of our country. In this study, the current situation of Diospyros agriculture in our country has been investigated economically and the potential of being an alternative source of income has been revealed to Turkish farmers.

Keywords: *Diospyros* sp., Agriculture, Economy, Turkey.

INTRODUCTION

Persimmon (Trabzon Palm, Paradise Date), which belongs to the genus Diospyros, is cultivated with nearly 30 varieties in 3 species in our country. *Diospyros kaki, Diospyros lotus Diospyros virginiana*. Diospyros agriculture, which has been growing rapidly in Anatolia in recent years, continues to be the gateway of hope for Turkish farmers. Diospyros fruit consumed especially in the domestic market is also very important in terms of health.

Persimmon: Persimmon, (*Diospyros kaki* L.) is a plant that is cultivated in subtropical climatic regions of the world. The origin of persimmon is China. Important palm grower countries in Korea, Japan, Brazil, Italy, Israel, the US, New Zealand, Australia, Spain, Georgia, Egypt, Turkey, Iran and Chile counted [1].

The genus *Diospyros* contains about 400 natural species, most of which are found naturally in tropical and subtropical climatic zones. But produces only three types of trabzon dates. Trabzon dates, which are used for commercial purposes, are generally produced from rootstocks of *Diospyros kaki*, *Diospyros lotus* L. and *Diospyros virginiana* L. Species [1-5].

Persimmon, Turkey has to adapt to many areas. needed by climate values of the persimmon has the most in the Black Sea region of Turkey. Therefore, most agriculture is done in Black Sea in Turkey. Turkey why it's called the persimmon Persimmon; For the first time in Trabzon in Turkey it is grown in the province. This fruit is given many different names in Turkey, for example; In many places it is also called Cennet Meyvesi, Cennet Hurma and Hurma. This fruit is also locally Amma, Grafted Uvaz, Russian Dates, Japanese Persimmon, Batumi Dates, Lazar Dates are given different names in Turkey. Today, the largest persimmon cultivation in Turkey, Black Sea, Marmara, Aegean and Mediterranean regions are made [1-5].

Scientific classification of Persimmon (In Turkish: Trabzon Hurması, Cennet Hurması) [4]

Regnum: Plantae
Divisio: Magnoliophyta
Classis: Magnoliopsida
Ordo: Ericales
Family: Ebenaceae
Genus: *Diospyros*
Species: *Diospyros kaki*

Turkey's persimmon is likely to be a very important country in agriculture. Because Turkey persimmon climate provides great opportunities for production. Generally, a total of 80 types of persimmon in the Mediterranean and Black Sea Regions has been studied. In addition, about 70 cultural varieties brought from abroad to production it was initiated. Persimmon is a fruit rich in nutritional value and is a good source of ascorbic acid and vitamin A. Persimmon shows quite different features in terms of taste. This feature is related to the phenolic acid content it contains. The more the phenolic asti content, the more bittersweet taste. The antioxidant properties of persimmon also stem from phenolic acid compounds. The higher the antioxidant properties of the foods, the more they are valuable for health [5].

Due to this feature, persimmon should be eaten widely to prevent cancer, which is one of the most feared harvests of today. This feature of persimmon increases its value even more. It is known that in the past as an amateur since grown persimmon Turkey. Although persimmon is grown in many regions of our country, the regions where it is most intensively grown are the Black Sea and Mediterranean regionsPersimmon is a plant that sheds its leaves in the winter. It can be grown easily in cool regions such as Black Sea, Aegean and Marmara [6].

The word meaning of Diospyros is "food of the gods". It is known to take this name because of the beauty and taste of the Tramzon date. Persimmon in 2018 Turkey's total production stood approximately 60,000 tons. The most important part of persimmon production takes place in the Aegean, Marmara and Black Sea regions [3].

MATERIALS AND METHODS

In this study, examining the stages of production within persimom, the overall economic situation in Turkey and in the international marketing of persimom production has been demonstrated theoretically in 2018. Persimom literature relating to the production and economy as well as compiled in Turkey. Turkey's agriculture and persimom is intended to contribute to the economy.

RESULTS AND DISCUSSION

Persimmon (*Diospyros kaki*)

Persimmon fruits are quite delicious and nutritious. Persimmon is a plant that usually requires pollinators, but it can fertilize on its own. Persimmon trees usually grow upright. They usually show a fragile structure quickly but still show a medium strength wood structure depending on the branch varieties. The trunk of the persimmon tree is without thorns and is generally gray. Voracious branches grow strong and upright. The root system of persimmon tree has different structure according to the rootstocks used (Fig. 1) [3].

Figure 1. Persimmon Sapling [11]

Branching in persimmon varies according to the variety. For example, the Fuyu variety is frequently branched, while the Hachiya variety is sparsely branched. In general, branch types of persimmon in Persimmon differ vertically, semi-vertically or obliquely. The branches of persimmon are very fragile. Depending on the variety, the branches; It can be evaluated as weak, medium and strong. While gluttonous branches grow strong and upright, they generally do not branch out. From the third year on, persimmon forms many short branches of fruit while reducing the gluttonous branches (Fig. 1) [1-2].

Another characteristic of persimmon is that it has a remarkable appearance as a landscape element. This feature makes him very attractive and admired. Persimmon leaves show a straight anatomical structure on the upper face and a hairy on the lower face. Although it varies from variety to variety, generally persimmon leaves are bright light green when they first come out, then they become bright dark green color. At the beginning of autumn, they change from pale green to orange-red colors. During the harvest period, persimmon trees shed their leaves in autumn and ripe fruits offer a very beautiful visual [1-2].

Figure 2. Persimmon Field [12]

Persimmon trees have three types of flowers [4-6]:

Three types of flowers can be observed in persimmon trees. These are hermaphrodite, female and male.

Hermaphrodite flowers: both male and female organs has this type of flower.

Female flower: Male organs are not found, there are female organs.

Male flower: There are male organs, no female organs.

Generally of the 3 different types of flowers observed in persimmon hermaphrodite flower type is the least found flower. Hermaphrodite flowers have almost no effect on fruit yield. In the persimmon plant, fertilization biology takes place roughly as follows; female flowers occur on the branches a year ago. When they first open, the petals are yellowish cream, then turn brown. Petals are four-part. Flowers are large, showy petals are hard and green in color. Male flowers occur in leaf seats and are smaller than female flowers. New shoots are found in the form of single, two or three clusters in the leaf seats. Petal leaves in flower have four parts. Generalyy petals are light yellow, about 1 cm tall and tubular (Fig. 3-4).

Figure 3. Female Flower in *Diospyros kaki* [12]

Figure 4. Male Flower in *Diospyros kaki* [12]

Persimmon fruit is divided into two parts according to whether the fruit taste is acrid and not acrid. Whether or not drying determines the time of harvest. The non-acrid varieties can be eaten immediately after harvesting, but the acrid ones can be eaten only after they are softened.

When pollination generally occurs in persimmon varieties, the fruit is seeded. The more the amount of kernel formed in the fruit, the darker the color of the flesh. If there is no core, the fruit color will be lighter. Some varieties do not change the color of the flesh when it is dusted. The fruits of these varieties are mostly light (dark yellow-orange). In this case, a new classification can be made taking into account the effect of the fruit on the skin color.

In this classification, varieties were collected in 2 groups [4-6].

Fruit flesh color not variable varieties: When the flowers of the varieties in this group are fertilized, the fruits are seeded and the fruit color remains orange. The fruits of this group do not change color, but the taste remains acrid (Fig. 5).

Figure 5. Persimmon Tree, Variety: Fuyu [11]

Fruit flesh color variable varieties: In the other group, fruit meat varieties; In color, orange taste and acrid ones generally develop when there is no fertilization. In case of fertilization in persimmon, the meat becomes more or less brown depending on the degree of pollination and its rot will change depending on this color change. In the persimmon, this situation appears as a desired or undesired situation according to the region. If fertilization is low in persimmon, the color change will be very low. When the fertilization is complete, all the seeds are formed and the fruit flesh turns completely brown and the fruit does not remain sour, but can be eaten when hard. Pollination of persimmon species is required. Pollination is provided by insects. Persimmon flowers do not hold fruit when they are not dusted or fruit is shed. Regular pollinator varieties should be used as pollinators. Generalyy pollinator varieties have no commercial value.

Fertilization may not always have the same effect in persimmon. For example, Fuyu variety must be pollinator, this type of powder will remain orange even if the color of the flesh does not change. Persimmon varieties differ considerably in size, shape and color. For example Tenenashi variety can be given as an example. It can be flat, round and conical. Fruit peel is generally flat and waxy. Fruit color varies from greenish yellow, orange-yellow, orange, orange-red to varieties (Fig. 6) [7-8].

Figure 6. Some varieties of persimmon [13]

Persimmon Varieties [4-7]

Persimmon fruits are divided into two parts according to their astringency and non-astringency. The astringency and the absence of astringency indicate the status of fruit harvesting. Non-acrid varieties can be eaten when hard after harvest, while those that are acrid become eaten after softening (when their astringency disappears). In our country, acrid varieties are grown and these fruits are not known in some regions and it is not known enough to be eaten when softened. It is undesirable when it appears to be acrid. Therefore, persimon cultivation is not very common compared to other fruit species. This fruit is loved and sought after by consumers. In particular, there is a high demand for hard-eating, non-bitter varieties.

Groups of persimmon varieties according to taste and maturity:

Those with acrid taste: Izu**,** Hana Fuyu, Hana Gosho, Ichikikei Jiro, Jiro, Matsumoto**,** Wase Fuyu, Midia, Shogatsu**,** Fuyu, Suruga

Those with not acrid taste: Giombo, Nishumura Wase, Saijo, Eureka, Gailey, Great Wall, Hachiya, Hiratanenashi, Ormond, Sheng, Tamopan, Tanenashi, Yomato Hyakume (Fig. 7.).

Figure 7. Persimmon Tree, Variety: Haciya [12]

Figure 8. Persimmon Tree, Variety: Fuyu [12]

Persimmon varieties according to fruit color and taste of meat groups [4]:

Fruit meat color fixed:

Those with acrid taste: Izu, Hana Fuyu, Hana Gosho, Ichikikei Jiro, Jiro, Matsumoto, Wase Fuyu, Midia, Shogatsu, Fuyu, Suruga (Fig. 8).

Those with not acrid taste:

Giombo, Nishumura Wase, Saijo, Eureka, Gailey, Great Wall, Hachiya, Hiratanenashi, Ormond, Sheng, Tamopan, Tanenashi, Yomato Hyakume (Fig. 9-10).

Figure 9. *Diyospyros duclouxii* [12]

Figure 10. Persimmon Tree, Variety: Sheng [12]

Persimmon varieties according to fruit color and taste of meat groups [4]:

Fruit flesh color fixed:

Those with acrid taste: Saijo, Tamopan, Tanenashi, Triumph, Tsuru

Those with not acrid taste: Costata, Fuyu, Fuyu (Kaliforniya), Hana, Fuyu (Yotsudani), Gosho, Hana Gosho, O'gosho, Izu, Jiro, Suruga (Fig. 11.)

Figure 11. Persimmon fruit cross section (Fruit meat color fixed) [12]

Fruit meat color changing:

Those with acrid taste: Fuji, Hachiya, Hiratanenashi (Fig. 12.).

Those with not acrid taste: Chocolate, Gailey, Hyakume, Maru, Zengi, Maru, Okame

Figure 12. Persimmon fruit cross section (Fruit meat color changing) [12]

Persimmon varieties and characteristics [4]:

Those with acrid taste:

Hiratanenashi: Fruit medium-large, round-flat, is highly efficient. **Hachiya:** Fruit is large (230 g), rectangular-conical, the end is round. Fruit peel is orange (Fig. 13). **Saijo:** One of the oldest varieties. The fruit is small-medium sized, rectangular.

Those with not acrid taste:

Fuyu: It is the most important variety cultivated in Japan. Fruit large (200 g), flattened, rounded and angular. **Jiro:** It forms the largest fruit among non-kekre varieties. Fruit flesh color does not change with pollination. **Matsumoto Wase Fuyu:** Formed by eye mutation from Fuyu. Its fruit is smaller than Fuyu. **Suruga:** Large fruit.

Fruit round-flat, bright orange red. Fruit flesh is light yellow, sweet. **Izu:** Fruit is medium-coarse, flattened, orange-red. Flesh is light orange. Fruit flesh color does not change with pollination. **Maekawa Jiro:** Jiro's eye mutation. Among the non-kekre varieties are among the largest fruit. **Ichikikei Jiro:** It is the eye mutation of Jiro. Forms small crown suitable for frequent planting. **O'gosho:** Fruit of medium size (150 g), round-conical. Fruit peel is orange-red.

Figure 13. Persimmon prepared for sale [11]

General Requirements of Persimmon [1]

Starting from the second year of planting, it begins to bear fruit in the persimmon varieties of persimmon. Hachiya varieties can produce after the fourth year. The fruit yield of the course is based on variety, care, climate etc. varies according to factors. Persimmon conditions in Turkey and the average yield per tree is around 40-60 kg.

Persimmon is a subtropical climate fruit, adapted to warm temperate climatic conditions. Persimmon is more resistant to low winter temperatures because it shed its leaves in winter. In general it can withstand up to -12ºC.

It seems that most of the persimmon varieties have winter rest needs of less than about 7 °C and between 200 and 400 hours. In the first half of March for the Mediterranean region Turkey budding Black Sea region further delayed in getting started.

Persimmon loves moisture, so the most harmonious region in our country is the black sea region. This need can be compensated by increasing the amount of strain in other regions. However, sunburn may occur in fruits in these areas and measures should be taken for this.

Persimmon trees are generally not affected by winds. However, where there is a lot of wind, the fruits can be damaged by leaves and branches during fruit ripening in autumn, which can lead to poor quality. However, in the fruit period, strong winds can damage the tree. This causes economic losses, and seedlings need to be supported by stakes.

The most suitable soil type in persimmon cultivation is medium heavy soils. In addition, deep soils rich in organic matter and well-drained are preferred by the persimmon. In general, soils with a pH request of 6.5-7.0 are ideal. Persimmon is a plant with high tolerance and can be adapted to different soil types from very light soils to very heavy soils. On the other hand, it can withstand 20% calcareous soils.

Production of Persimmon

Persimmon tree can be produced by vegetative methods. This is generally the method of production with steel and vaccine methods. However, grafting methods are generally preferred because the rooting of steels is very difficult. For this, quality rootstocks are needed.

Broodstocks and Properties

Diospyros kaki: Generally China, used in Japan and Turkey. It shows rapid and strong development. In general, it adapts well to all varieties. The pile root is long and the side roots are small. It is based on difficult conditions. It is very resistant to throat rot. It is sensitive to nematodes. Compared to other rootstocks, it is not resistant to heavy soil [4].

Drying

Another important usage of persimmon is to consume by drying. Persimmon is collected before reaching full maturity. Then, the peeled dates are tied to the ropes and tied on the stems. It is dried for 20-30 days in places that do not see sun. The price of dried Persimmon is 30-40 TL (Fig. 14-16).

Figure 14. Persimmon lined up on drying rope [11]

Figure 15. Dried Persimmon [12]

Figure 16. Dried persimmon sold in the market [11]

Economic Dimensions of Persimmon

Persimmon is the national fruit of Japan so persimmon has the most commercial development in Japan. The developing industries of Persimmon include Japan, Korea, China, Brazil, Italy, Israel, USA, New Zealand and Australia. According to 2018 data; persimmon cultivation is carried out on approximate 11.000.000 decare area in the world. China is the world's leader in persimmon production. Persimmon production in the world is around 7,500,000 tons. The largest producer countries in the world are China (4.000.000 tons), Korea (800.000 tons), Spain (400.000 tons) and Japan (400.000 tons) respectively [9-10].

Then, respectively, Brazil (250.000 tons), Azerbaijan (200.000 tons), Uzbekistan (100.000 tonnes), Italy (80.000 tons), Israel (70.000 tons), Turkey (60,000 tons), and New Zeland (8.000 tons) are listed with production (Table 1). Turkey with annual production of 60,000 tons Persimmon ranks tenth in the world rankings [9-10].

Table 1. Persimmon (*Dyospyros* sp.) producing countries in World and production amounts (according to 2018 data).

Country	Production (tons) (approximate)
China	5.000.000
Korea	800.000
Spain	400.000
Japan	400.000
Brazil	250.000
Azerbaijan	200.000
Uzbekistan	100.000
Italy	80.000
Israel	70.000
Turkey	60.000
New Zeland	8.000
Others	112.000
Total	7.500.000

The largest part of 60,000 tons persimmon production in Turkey is grown in the province of Adana and environs. Adana produces about %15 of this production with 10,000 tons of production. Then, respectively, Adıyaman (8.000 tons), Mersin (7.000 tons), İzmir (6.000 tons), Denizli (5.000 tons), Hatay (5.000 tons), Bursa (3.000 tons), Yalova (3.000 tons), Kahramanmaraş (2.000 tons) and Çanakkale (2.000 tons) are listed with production (Table 2).

Table 2. Persimmon (*Dyospyros* sp.) producing Turkey (according to 2018 data)

City	Production (tonnes) (approximate)
Adana	10.000
Adıyaman	8.000
Mersin	7.000
İzmir	6.000
Denizli	5.000
Hatay	5.000
Bursa	3.000
Yalova	3.000
Kahramanmaraş	2.000
Çanakkale	2.000
Others	9.000
Total	60.000

Turkey is advancing rapidly in the cultivation of persimmon. Particular attention is paid to the cultivation of persimmon in the Mediterranean and Aegean regions in Turkey. Persimmon has been on the way to address Turkish farmers' search for alternative crops in recent years. Persimmon is a new hope for Turkish farmers, with annual production reaching approximately 60,000 tons. The annual revenue of the Turkish farmer from Persimmon is approximately 300.000.000 Turkish Liras (Fig. 17). Persimmon is on the way to becoming the hope of Turkish farmers.

Figure 17. Fresh Persimmon Sold in the Market [12]

Turkey 's agriculture in the persimmon has a significant potential. Today, it is seen that the cultivation potential of persimmon cannot be evaluated very well. Persimmon agriculture can provide significant economic benefits for Turkey. For this reason, more studies should be done on the cultivation, agriculture and marketing of persimmon.

Persimmon one could hope for Turkey, which is an agricultural country. For this reason tarbzon farming should be supported both mechanically and scientifically. Especially farmers in regions that need to change products should introduce this fruit and persimmon agriculture should be encouraged. With this study, we have aimed to make positive contributions to the agriculture and economy of our country.

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