Clonal Propagation of Mastic Tree (*Pistacia lentiscus* L. var. *Chia* Duham.)

Neşat Erkan, Salih Parlak

BTU, Turkey

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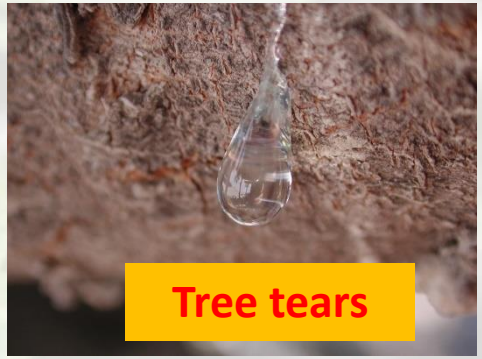
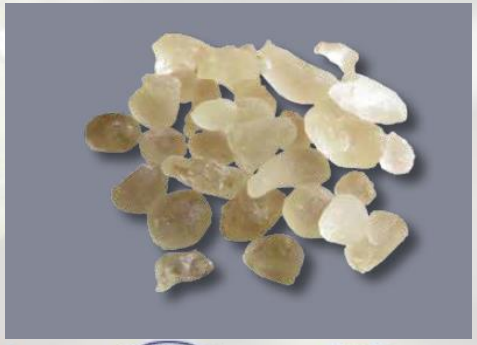
Mastic tree in Turkey

- Mastic tree has ecologically specific requirements and is naturally distributed in Çeşme Peninsula in Turkey (today only 250–300 trees)
- But it is known that mastic tree was so commonly grown in Çeşme Peninsula as it is in Chios island.
- Mastic production has been decreased due to the decrease in the rural population and weakening of the culture in this issue in the region.





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Mastic tree in Turkey

- Especially after the population exchange with Greece.
- Cut of trees by local people for wood and timber production was another factor.
- Today only some plantations in İzmir
- But Çeşme Peninsula and ecologically similar other places are potential areas for plantations.

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Mastic tree in Turkey

- General Directorate of Forestry (GDF) conducted an action plan between 2014-2019.
- Action plan aimed to revive the mastic tree growing culture in the area.
- For that;
  - inventory of potential areas,
  - Establishment of mastic tree plantations,
  - Contribution to investor for seedling production.

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Mastic tree in Turkey

Species	Common name in Turkey
Pistacia atlantica Desf.	Sakızlık, Çitlenbik
Pistacia eurycarpa Yalt.	Bendek
Pistacia khinjuk Stocks	Bıttım
Pistacia lentiscus L.	Sakız ağacı (wild)
Pistacia lentiscus L. var. *chia*	Sakız ağacı (cultuvar)
Pistacia terebinthus L.	Menengiç
Pistacia terebinthus L. subsp. *terebinthus*	Menengiç
Pistacia palaestina Boiss.	Çöğre
Pistacia x saportae	Çetem
Pistacia vera	Antep fıstığı

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Mastic tree in Turkey

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Mastic tree in Turkey

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Mastic tree in Turkey

Managed for gum mustic in the past– Çeşme Peninsula (İzmir)

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Mastic tree in Turkey

Mastic trees on the Çeşme Peninsula have been destroyed for various reasons (mainly for touristic activities, unconscious cuts, etc.).

There are currently restricted nomber of old trees in various ages and sizes on the Peninsula.

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Mastic tree in Turkey

Plantation Samples

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Mastic tree in Turkey

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1
2

Provence

Mastic tree in Turkey

Clonal Propagation Studies

Propagation by Cuttings

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Rooting rate is very low in traditional production with thick cuttings.

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Pistachio cuttings are known to be difficult to root. With the cuttings taken from one-year shoots on February 15, a rooting success of 76.6% was achieved by using 20,000 ppm IBA (İsfendiyaroğlu, 2000).

However, it has been pointed out that rooting rates may change at a high rate over the years and that the plants from which the cuttings are taken should be rejuvenated plants. (Karakır and İsfendiyaroğlu, 1999).

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Production with Tissue Culture

The desired success could not be achieved due to phenolic compounds that prevent regeneration in tissue culture (Taşkın and İnal, 2005; Mısırlı et al, 2002).

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Propagation by Trench Layering

In the trench layering method, seedling production is very slow and sufficient seedlings cannot be obtained because only the shoots close to the soil are used.

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Propagation by Air-Layering

With this method, mastic tree is easily rooted and seedlings can be produced.

This method can be applied from the beginning of vegetation period in the spring until the mid-summer.

In order to get the bracelet in a healthy way, the cambium should be in active season (Tutar et al, 2014.

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The success decreases in air layering applications with small branches.

For this reason, branches with a thickness of more than 1 cm should be selected.

First, a 0.5-1cm thick bark bracelet is removed from the appropriate places of the selected branches (Tutar et al, 2014).

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Approximately one liter of moist peat is wrapped around the removed bark ring with a polyethylene bag and the end is tightly taped (Tutar et al, 2014).

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Water need to be injected periodically into the bag (Tutar et al, 2014).

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Roots are developed usually within 1.5 to 2 months. In late summer applications, sometimes rooting may be formed in the next vegetation period (Tutar et al, 2014).

150-200 air-layerings can be applied to the trees big enough (Tutar et al, 2014).

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Successful application has also been done by wrapping humid peat with aluminum foil instead of polyethylene bags (Tutar et al, 2014).

When the roots formed, the peat get hardened due to absorption of the moisture by root, it is easily understood by hand check (Tutar et al, 2014).

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If it is applied under appropriate conditions, at the appropriate time and in the appropriate way, success can be obtained at the rate of 85-90%. The fastest and highest rate of rooting was obtained from applications in mid-summer (early July) (Tutar et al, 2014).

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Rooting branches wait one vegetation period in the container and become ready for planting the following year (Tutar et al, 2014).

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Propagation by Grafting or Budding

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IN THE STUDY; two different environments (inside and outside of the greenhouse) two rootstocks (*Pistacia atlantica* and P. *lentiscus*) three different grafting and budding methods (cleft grafting, chip budding, T budding) 11 grafting times were tested at 15 days interval

***P. atlantica* rootstock**

***P. lentiscus* rootstock**

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3 different grafting/budding types have been tried:

Chip budding

T budding

Cleft grafting

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View from inside the greenhouse

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A view from outside the greenhouse

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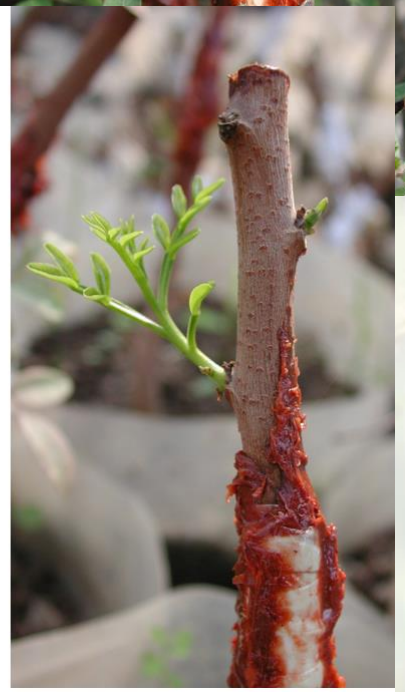


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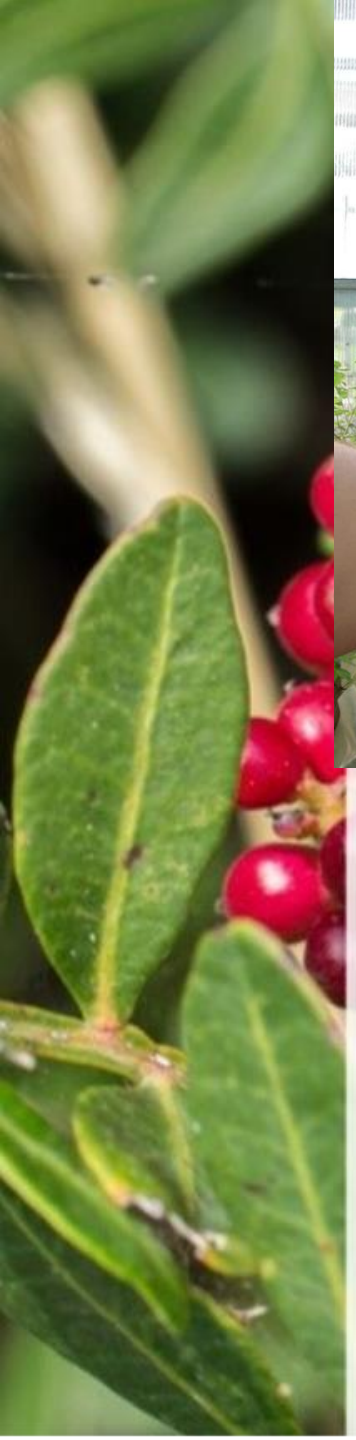



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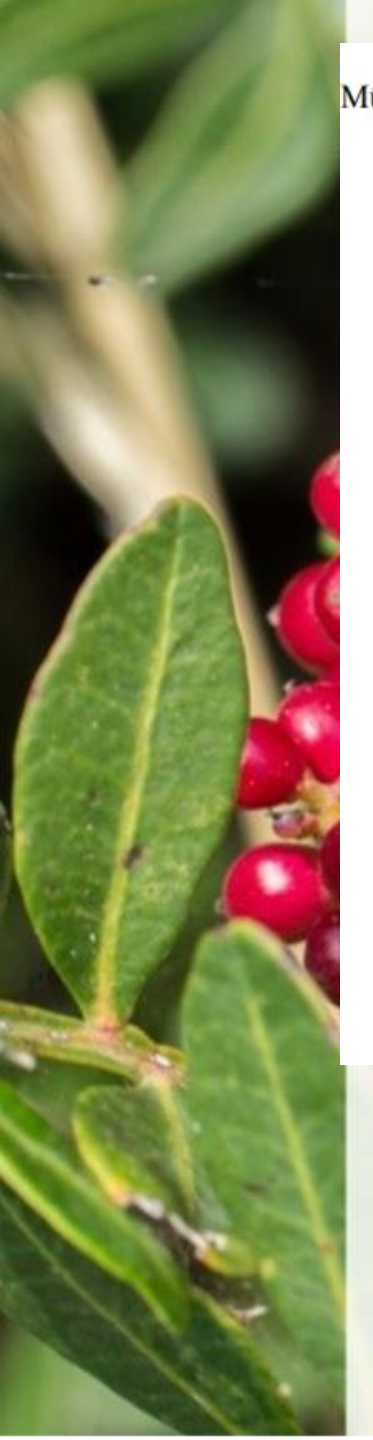

Müdürlük Yayın No : 65

ISSN 1300-9508

SAKIZ (*Pistacia lentiscus* var. *chia*)'IN AŞILAMA YOLUYLA ÇOĞALTILMASI

Mastic Gum Tree Vegetational Propogation by Grafting

(ODC:232. 328.5)

Dr. Salih PARLAK
Nadire ALBAYRAK

TEKNİK BÜLTEN NO: 49

*Clonal propagation of mastic tree (*Pistacia lentiscus *var.* chia *Duham.) in outdoor beds using different rootstock and grafting techniques*

Salih Parlak

Journal of Forestry Research

ISSN 1007-662X

J. For. Res.
DOI 10.1007/s11676-017-0514-4

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Seedling Production With Grafting On Field

Rootstocks:

P. lentiscus

P. atlantica

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There is compatibility between *P. atlantica* and *P. lentiscus* species and var. *chia*. However, indication of incompatibility were observed sometimes in *P. lentiscus* due to the difference in growth.

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Grafting success on *P. lentiscus* was lower than other species. Especially in the summer months, it is thought that the intense resin released during grafting/budding prevents the compatibility.

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Grafting/budding for *P. atlantica* are well developed and shows no incompatibility.

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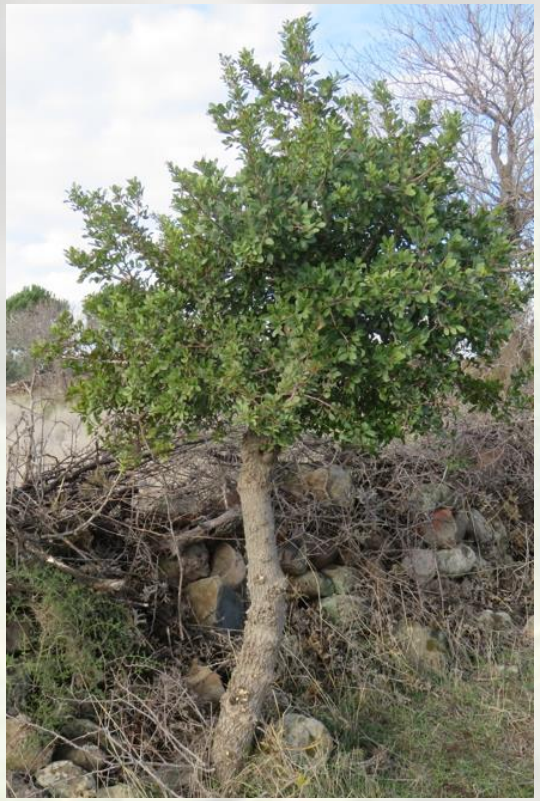

Another grafting was the cleft graft application on old trees in the field. With this grafting method, 65% of success was achieved on *P. atlantica* trees (Tutar et al, 2016).

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It is possible to propagate mastic tree by grafting.

For this purpose, natural *Pistacia* species can be used. Although all species generally show incompatible with the mastic tree, *P. atlantica* is more compatible than the others due to its resistance to decaying disease.

Mastic tree grafted on *P. atlantica* grows much faster than those of grafted on *P. lentiscus*. It is observed that ungrafted Mastic trees full yield in 15 years, while grafted ones can reach the same yield in 7-8 years on strong rootstocks.

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REFERENCES

Mısırlı, A., İsfendiyaroğlu, M., Gülcan, R., özeker, E., Köktürk, U., Yılmaz, H., Yıldırım, F.,2002. Manisa Yunt Dağı Bölgesindeki Pistacia Genetik Materyalinin Tanımlanması, Vegetatif Çoğaltım Olanakları ve Tozlayıcı Özelliklerinin Belirlenmesi, Türkiye Bilimsel ve Teknik Araştırma Kurumu, Türkiye Tarımsal Araştırma Projesi.

İsfendiyaroğlu, M., 2000. Cutting Propagation of Mastic Tree, Fao-Ciheam Nucis Newsletter.

Acar, İ., 1989. (Pistacia lentiscus var. chia) Sakız Üretiminin Geliştirilmesine Esas Olmak Üzere Sakızın Fiziko-Kimyasal Yönden İncelenmesi, Ormancılık Araştırma Enstitüsü, Teknik Raporlar Serisi No:35.

Acar, F.C., 1999. Sığla (Liquidambar orientalis Mill) ve Sakız (Pistacia lentiscus L.) (Mastic) in Vejetatif Yolla Üretilmesi, Ege Ormancılık Araştırma Enstitüsü Dergisi, Sayı:1 Yıl: 1999, s.15-21, İzmir.

Taşkın, T., İnal, A., 2005. Sakız Ağacı (Pistacia lentiscus var chia Duhamel)'nın İn Vitro Mikroçoğaltımı Üzerine Araştırmalar, Ege Tarımsal Araştırma Enstitüsü Dergisi, Cilt 15, Sayı 1. s 1-14.

Tutar, M., Aksoy, D., Şafak, Çiçek, F.,2016. Damla Sakızına (Pistacia lentiscus L. var. Chia Duham.) Anaç Olarak Kullanılabilecek Pistacia Türleri . Atatürk Bahçe Kültürleri Merkez Araştırma Enstitüsü dergisi, BAHÇE Özel Sayı: VII. Ulusal Bahçe Bitkileri Kongresi Bildirileri - Cilt I: Meyvecilik cilt 45 özel sayı . cilt 1 meyvecilik s. 230-235 ISSN 1300-8943

Tutar, M., Şafak, C., Aksoy, D., Çiçek, F., 2016. Damla Sakızının (*Pistacia lentiscus* L. var. Chia Duham.) Havai Daldırma Yöntemiyle Üretilmesi. Atatürk Bahçe Kültürleri Merkez Araştırma Enstitüsü dergisi, BAHÇE Özel Sayı: VII. Ulusal Bahçe Bitkileri Kongresi Bildirileri - Cilt I: Meyvecilik. cilt 45 özel sayı . cilt 1 meyvecilik p 864-866 ISSN 1300-8943

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Thank you

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