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Barut E.

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E. Barut
Department of Horticulture, Faculty of Agriculture, Uluda• University,16059 Bursa, Turkey

SUMMARY – In Turkey, Marmara Region's total almond production is 1315 tons. The total almond production of Bursa vicinity is about 214 tons. This production is ensured from about 37,345 almond trees in Bursa. In recent years the almond orchards have increased rapidly because of suitable ecological conditions. The important almond cultivars grown in Bursa are Nonpareil, Texas, Ne Plus Ultra, Drake and Tuono. In Bursa, about 10,000 grafted almond seedlings per year are propagated and all of them are produced in private sectors.

Key words: Turkey, Bursa, almond growing.

RESUME – *"Culture de l'amandier dans la région de Bursa". En Turquie, la production totale d'amandes est de 1315 tonnes et celle de Bursa est à peu près de 214 tonnes. Cette production est obtenue à partir de 37 345 amandiers. Grâce aux conditions écologiques favorable à la culture de l'amandier, on voit une augmentation accélérée au nombre de vergers d'amandiers. A Bursa, les variétés d'amandier les plus cultivées sont Nonpareil, Texas, Ne Plus Ultra, Drake et Tuono. Chaque année, presque 10 000 plants d'amandier sont cultivés et toute la production est effectuée par les sociétés privées.*

Mots-clés : *Turquie, Bursa, culture de l'amandier.*

Introduction

The almond tree, which originated in the Middle East and Central Asia, has spread along both sides of the Mediterranean since ancient times. Until the last century, this species was cultivated by sowing, not by grafting, because it was drought-resistant, hardy and long-lived, it was planted in the poorest and driest soils as the best way of using them (Ross, 1981; Grasselly, 1990).

Almond is grown almost in every region of Turkey, except the North-East and higher elevations of Eastern Anatolia. But, there are large differences between almond growing districts, as well as great diversity within each of these populations.

Turkey's total almond production is about 45,000 tons from 4.5 million trees according to the last year's statistical data. In this production Marmara Region's ratio is 1315 tons. This production is provided about 107,187 almond trees in Marmara Region (Anonymous, 1998).

Material and methods

This study was conducted to determine the almond production capacity and cultural considerations of almond growing in Bursa vicinity in 1998-1999. So, important almond growing centers were proved in Bursa vicinity and these centers were visited. In these areas we interviewed almond growers and observed all modern and conventional techniques.

Results and discussion

Overview of almond growing in Bursa

Bursa has 214 tons almond from 37,345 trees. Orhangazi (78 tons), Keles (75 tons), Orhaneli (35 tons), Mudanya (26 tons) are the important almond producing centers in Bursa. Almond production is on the third level after chestnut and walnut productions (Anonymous, 1999). When compared to the statistics

of five year ago, it is possible to say that the amount of production has increased by four times. This production raises on regular basis.

Late spring frost injury to almond buds, flowers and small fruit is a mojor limiting factor in determining the limits of commercial production in Bursa. The best frost-protection device is growing the late-blooming cultivars and a warm orchard site. So in Bursa, generally almond orchards are in micro-climate conditions where the tempareture is not below 0ºC in blooming time (from second part of March to end of the April). And for this reason growers prefer late-blooming cultivars like Texas so much in Bursa. On the other hand, in some micro-climate areas cvs Nonpareil, Ne Plus Ultra, Drake and Tuono are also grown. Many cultivars have been recently introduced and this is likely to continue. In the emergency frost conditions, orchard heaters and over-tree sprinkling are used for protecting trees from late spring frost. There is not any harmful effect with respect to winter or fall frost in Bursa.

Almond growing soils in Bursa vicinity are generally fertile, deep, well-drained and loamly. Under this ideal soils conditions, roots can be found to depths of 3 meters or more, water-logging is seen rarely. Especially Orhangazi and Keles have the best soils for almond growing in Bursa.

Cultural considerations

Altough ancient orchards were establised using seedlings in Bursa, new almond orchards have been established using grafted seedlings. About 10,000 grafted seedlings per year are produced in private sectors, in Bursa and used for new establishments. In the nurseries generally T-budding during late summer is prefered for cvs Texas, Nonpareil, Ne Plus Ultra, Drake and Tuono on cv. Texas seedling as rootstock.

Almond trees are trained to a modified leader or vase-shaped systems. Variations by variety are done because of differences in growth and bearing habits.

Organic fertilization is conducted in the soil where organic substance content is below 1%. Inorganic fertilizers are applied by the help of soil and leaf analyses in big orchards.

In Bursa vicinity irrigation is not needed in spring or autumn thanks to an ample rainfall. In these areas, two or three applies of irrigation are done and only in summer. Surface irrigation is the most common method in almond orchards. In some orchards drip irrigation has been introduced, and the use of this method is becoming widespread.

Soil modification is often necessary in prepation for an orchard planting. Soil modification and preparation may consist of as little as a thorough ripping in deep, uniform soils which have no hardpan, to a slip plow or backhoe modification in layered or hardpan soils in Bursa.

Tree spacing of 6 5, 6 6 or 6 7 m are common and the size of orchards vary from 5 to 20 da in Bursa. These spacings may change according to irrigation and rainfall. Most orchards are planed on a square. Cultivation, mowing and harvest are simplified with the square arrangement. Strawberry or vegetable growing have been done betwwen tree rows in young orchards.

Almonds are subject to some diseases (*Agrobacterium tumefaciens, Pseudomonas syringae, Phytophthora* spp.), insects (*Quadraspidiotus perniciosus*) and nematodes which reduce yield and quality of crop and sometimes weaken and kill trees in Bursa.

Harvest varies according to district, season and variety but usually begins in July and extends into September. Dry formed orchards will mature earlier than irrigated orchards in Bursa. Harvesting is done by hand or knocking with a stick. Almond harvest costs represent about 25 percent of the total cash costs in producing a crop.

Fruits as shelled nut or kernel are marketed by grower's cooperative. Traditionally, almonds have been sold to the industrial trade, where they serve as ingredient in other food products. About 20 percent of the crop was consumed as roasted salted snack or cooking almond in the home.

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