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in

Ak B.E. (ed.).
XI GREMPA Seminar on Pistachios and Almonds

Zaragoza : CIHEAM
Cahiers Options Méditerranéennes; n. 56

2001
pages 393-396

An investigation on the bud take and shoot growth of different almond varieties at Harran Plain in nursery conditions

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SUMMARY – Almond growing may be improved as an alternative to pistachio in the GAP region. Therefore it will be necessary to establish almond plantations in the irrigated areas. The young plant stage is a basic period for the almond orchard. This region is a disease-free area because it has been recently put under irrigation. To prevent disease contamination in this area it will be basic to grow our own young plants in this area rather than to take them from outside and also to implement quarantine conditions. For this purpose, a nursery has been established in Akçakale. In this experiment, growth, development and bud sprout rate were investigated on 21 varieties which are grafted on almond seedlings. Cultivars were compared in terms of growth, development and bud sprout rate.

Key Words: Almond, budding, growth, development.

RESUME – *"Recherches sur la prise du greffage et la croissance des pousses chez différentes variétés d'amandier dans la plaine de Harran en conditions de pépinière". La culture des amandiers pourrait être améliorée comme alternative aux pistachiers dans la région GAP. Il sera par conséquent nécessaire d'établir des plantations d'amandiers dans les zones irriguées. Le stade de jeune plante est une période importante pour les vergers d'amandiers. Cette région est indemne de maladies car les nouvelles installations d'irrigation sont récentes dans cette zone. Afin d'empêcher la diffusion des maladies dans cette zone il sera essentiel de cultiver nos propres plants dans cette région plutôt que de les faire venir de l'extérieur, et également de mettre en place des conditions de quarantaine. A cet objet, une pépinière a été installée à Akçakale. Dans cette expérience, la croissance, le développement et le taux de bourgeonnement ont été étudiés sur 21 variétés qui ont été greffées sur des plants d'amandier. Les cultivars ont été comparés entre eux en termes de croissance, développement et taux de bourgeonnement.*

Most-clés : *Amandier, bourgeonnement, croissance, développement.*

Introduction

The cultivated almond apparently originated from one or more of the many wild species that evolved in the deserts and lower mountain slopes of central and southwest Asia (Kester and Ross, 1996). Almond seedlings have been used in almond production for centuries (Edstrom and Viveros, 1996).

Almond was scattered to different regions which have different ecological conditions in the world. With the effect of agricultural techniques of different countries, a lot of different almond populations, varieties or local types were formed. Up to now, almond production has been done by seeds. In Turkey, using of budding or grafting techniques is very low in almond production. Therefore our country has a wide variability of almond populations (Gülcan, 1976). These populations may be utilized and new domestic varieties can be found out from them.

In Turkey, Mediterranean Sea and Aegean Sea Regions have mild winters and warm summers. Almond production scattered in these regions and partly semi-dry areas of South-East of Anatolia. Almond production is not developing properly because of two reasons: (i) the most of almond orchards are created by seedling (unbudded) trees, under unirrigated conditions, fruit yield and quality are very low; and (ii) most of growing areas are not suitable for almond production because of high risks of frost damage. Frost free coasts are very limited or reserved for more economical crops, such as early vegetables (Ayfer, 1990).

In our country, almond production has been done for a long time. But, because of spring frost, its cultivation has been limited in some part of Turkey. Because of spring frost safety, some part of GAP

Project region can suitable for almond production. After irrigation facilities, almond cultivation may be improved as alternative to pistachio in the GAP region. Because of early bearing and high yield, this fruit can be more attractive than pistachio for growers. Therefore it will be necessary to establish almond plantations in the irrigated areas. The young plant stage is a basic period for the almond orchard. This region is diseases-free area due to new area recently met irrigation facilities. To prevent diseases contamination in this area it will be basic activity to grow our own young plant in this area rather than to take them from outside and also to implement quarantine conditions.

In near future, new almond orchards in the South-East Anatolia Project (GAP) region can expand Turkey's almond areas. When the project is completed, the arid soils of the region will be irrigated. Thus, new almond and pistachio orchards can be established side by side in this region. This region (GAP region) has a potential to almond production. Some domestic and foreign almond varieties have been experimented to find out their adaptation ability in GAP region. This study was carried out during the young plant stages of 21 domestic and foreign almond varieties in Harran Plain nursery conditions.

Material and method

This study was carried out at TOSCANA nursery condition in Harran Plain. In this experiment, 8 domestic selections (17-4, 48-1, 48-2, 48-5, 101-9, 101-13, 101-23 and 300-1) and 13 foreign almond varieties (Drake, Tuono, Picantili, Ferragnes, D. Larguetta, Garrigues, Nonpareil, Yaltinski, Nikitski, Ferraduel, Cristomorto, Primorski and Texas) were budded on almond seedlings.

In this nursery, drip irrigation method has been used. Budding facilities were done in early September. After that, in the spring period, bud sprout (bud take) rates were determined and when plant growing stopped in the autumn, growth and development (5 cm below and above of budding point) diameter of traits were determined.

Results and discussion

Young almond plants can be easily propagated by budding. Three budding techniques are in common use in young plant propagation of fruit species. They are June budding, spring budding, and fall budding. In almond propagation, the most suitable technique is T budding (Dokuzoğuz and Gülcan, 1979). In nurseries, T budding technique has been mainly used in fall. Thus, young plants can be obtained in 2 years. Satisfactory results were obtained from these young plants (Table 1).

Rootstock diameter was varied among the varieties, statistically. In this study it was determined from 13.87 to 18.87 mm depending on the varieties and averagely 16.74 mm.

Shoot diameter was also varied among the varieties, statistically. The shoot diameter was determined from 12.04 to 16.20 mm depending on the varieties and averagely 14.25 mm.

Shoot length was varied among the varieties, statistically. Shoot length were found out from 90.70 to 172.43 mm depending on the varieties and averagely 143.86 mm.

Bud sprout rate were also satisfactory (Table 1 and Fig. 1). The highest value have been taken from Ferragnes as 100% and the lowest value taken from 101-13 as 83.56%. Bud sprout rate were determined 91.50% averagely.

Güngör *et al.* (1995) report that, rootstock diameter was 12.74 and 12.35 mm, and shoot length was 112.6 and 109.7 cm in Texas and 48-1 varieties budded on almond seedling, respectively.

Akbudak *et al.* (1995) were use different budding and grafting techniques on 5 almond variety. According to researchers, T budding more successful than T bark budding, Omega and Tongue graftings. They report that, bud sprout rate was 100% in Nonpareil, 96.6% in Texas and 104-1, 86.6% in Drake and 83.3% in Tuono in T budding. They have found that, plant diameter was 27.6 mm in Texas, 21.8 mm in Nonpareil and 104-1, 18.0 mm in Drake and 12.6 mm in Tuono. Shoot length was 112.03 cm in Nonpareil, 100 cm in Texas, 90.40 cm in 104-1, 77.40 cm in Drake and 70.37 cm in Tuono.

Table 1. Some growth and development traits and bud sprout rates of different almond varieties

Varieties	Rootstock diameter (mm)	Shoot diameter (mm)	Shoot length (cm)	Sprout rate (%)
17-4	17.16 abcde	15.04 abc	159.03 abc	89.74
48-1	15.64 cdef	14.18 bcdef	138.80 efgh	94.81
48-2	18.77 a	15.73 ab	158.10 abcd	86.07
48-5	16.56 abcde	14.24 bcdef	153.47 bcde	85.88
101-9	15.10 def	12.45 fg	137.43 fgh	89.87
101-13	16.22 bcde	12.83 efg	128.30 ghi	83.56
101-23	16.31 bcde	14.42 abcde	138.33 efgh	94.87
300-1	17.75 abc	15.83 ab	157.93 abcd	84.93
Drake	18.68 a	15.37 ab	149.23 cdef	91.78
Tuono	15.47 cdef	13.07 defg	135.57 fgh	97.60
Picantili	15.34 def	13.20 cdefg	115.57 i	92.31
Ferragnes	18.01 a	14.91 abcd	167.77 ab	100.00
D. Larguetta	17.40 abcd	14.86 abcd	136.73 fgh	89.02
Garrigues	17.79 abc	15.36 ab	172.43 a	92.50
Nonpareil	18.06 ab	15.67 ab	142.87 defg	94.94
Yaltinski	13.87 f	12.04 g	90.70 j	90.35
Nikitski	15.20 def	12.39 fg	132.63 gh	89.87
Ferraduel	17.26 abcde	14.22 bcdef	166.73 ab	96.34
Cristomorto	17.16 abcde	14.33 bcde	154.47 bcd	89.61
Primorski	14.99 ef	12.95 efg	124.67 hi	96.25
Texas	18.87 a	16.20 a	160.30 abc	91.14
Mean	*16.74*	*14.25*	*143.86*	*91.50*
Tukey %5	*0.45*	*0.36*	*2.94*	—

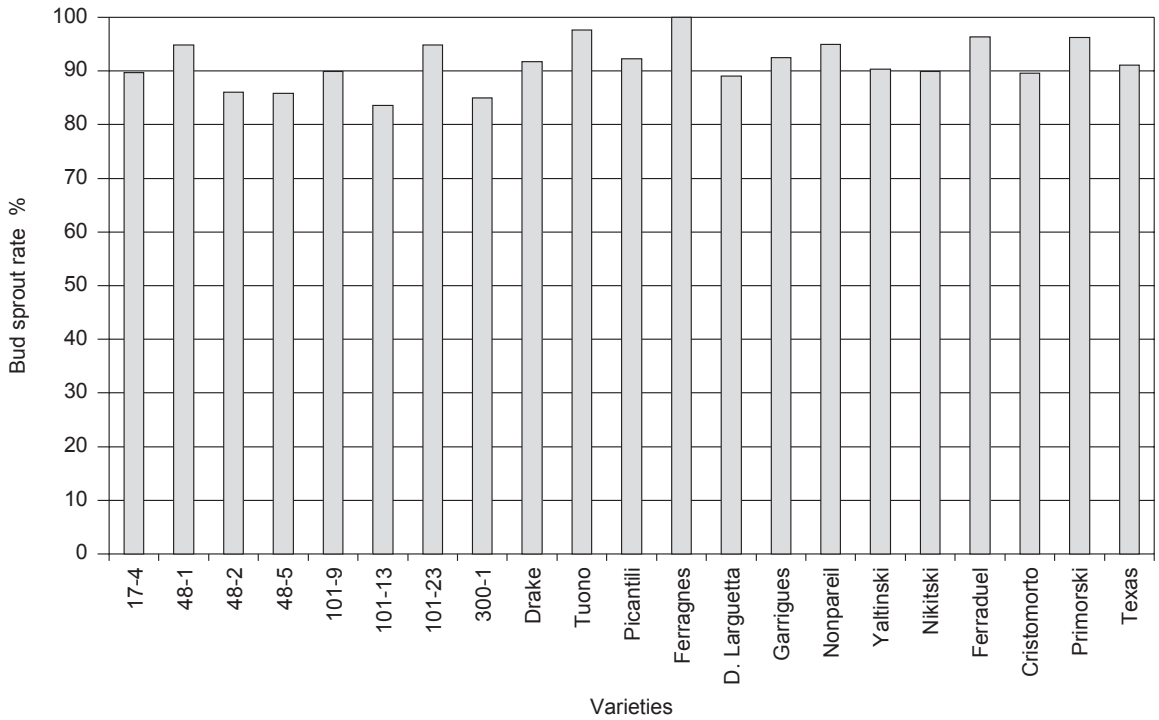

Fig. 1. Bud sprout rate of different almond varieties.

Budding success depends on a lot of factor in fruit trees. Ecology, rootstock and variety features, budding or grafting techniques, and care after budding or grafting can be counted among these factors. When the results compared to the other research, it shows that Harran Plain condition is suitable for young plant propagation. Plant growth and development is quite satisfactory. The reason of good growth and development can be depend on long vegetative period in this region. On the other hand, this region is diseases-free area due to new area recently met irrigation facilities. Besides almond young plants, the other fruit species' young plants can also growth in this region.

This region should be utilized for different fruit species to young plant propagation.

References

Akbudak, B., Eriş, A. and Barut, E. (1995). Bazı badem çeşitlerinde değişik aşı uygulamaları üzerine bir araştırma. Türkiye II. Ulusal Bahçe Bitkileri Kongresi, 3-6 Ekim 1995, Adana, pp. 389-393.

Ayfer, M. (1990). Nut production in Turkey. In: Nut Production and Industry in Europe, Near East and North Africa. *Reur Technical, Series* No. 13, pp. 317-325.

Dokuzoğuz, M. and Gülcan, R. (1979). Badem yetiştiriciliği ve sorunları. TÜBİTAK, XI. Kuruluş Yılı Bilimsel Yayınları, 80 p.

Edstrom, J.P. and Viveros, M. (1996). Almond Production Manual. In: *Division of Agricultural and Natural Resources*, Micke, W.C. (ed.). Univ. of California, Publication 3364.

Gülcan, R. (1976). Seçilmiş badem tipleri üzerinde fizyolojik ve morfolojik araştırmalar. Ege Üniv. Ziraat Fak. Yay. No. 310, 72 p.

Güngör, M.K., Çağlar, S., Kaşka, N. and Küden, A. (1995). Badem yetiştiriciliğinde saçak köklü çöğür ve fidan eldesi üzerinde araştırmalar. Türkiye II. Ulusal Bahçe Bitkileri Kongresi, 3-6 Ekim 1995, Adana, pp. 384-388.

Kester, D.E. and Ross, N.W. (1996). Almond Production Manual. In: *Division of Agricultural and Natural Resources*, Micke, W.C. (ed.). Univ. of California, Publication 3364.