

THE CULTURE OF ALMOND TREES WORLDWIDE AND IN ROMANIA

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Abstract

Although the supremacy of almond breeding has been held by Europe, it appears that during the past 2-3 decades the USA has got ahead of the old continent, especially due to the fact that the almonds are cultivated on rich, irrigated soils, the country doubling its production between 1980 and 1990. In Europe, the biggest almond breeders are Spain and Italy.

Key words: production per continent, production per main breeding countries.

INTRODUCTION

The cultivated almond is originally from Central Asia. In all the mountainous regions that stretch from Tian-Sahn and Azerbaijan, crossing Turkistan, Afghanistan, Iran and northern Iraq, numerous wild forms can be found, which develop on poor soils, at up to 2000 m altitude (C. Grasselly, 1972).

The precise time of the systematic breeding of almonds is not known, but it is believed that the Greeks and the Romans played a huge role in spreading it on the territories that we now know as Italy, France, Spain and the Balkans (V. Cociu, 1973).

MATERIAL AND METHODS

The annual F.A.O. data was calculated as averages over four years, 1979 – 1981, 1989 – 1991, 1996 – 1998 for the production of shelled almonds per continents, whereas per countries the average data was calculated for the years 1995 – 1998, 1999 – 2002, annual for 2003, 2004, 2005 and 2006, in order to grasp the trends and the percentage (%) of 2006 compared to the total.

RESULTS AND DISCUSSION

Table 1 presents the production of shelled almonds per continents in tons. The total production of almonds of 1.377.333 tons in 1996-1998 has a 34.9% growth trend compared to 1.020.580 tons in 1979-1981.

Regarding the production per continents, Australia has the most spectacular growth of 446.7%, followed by Africa with 243.5% and South America with 115.4%, all of which, except Africa, have a small share in the total per continents. The biggest cultivating continents remain North and Central America with a share of 32.7% of the total per continents, followed closely by Europe with 30.9%.

While total production in Europe has shown a light decrease during the past three decades, North and Central America illustrate a constant growth, therefore beginning with 1995-1996 they have surpassed Europe, which had been the main almond breeder for decades.

Table 1

The production of shelled almonds per continents

Nr. crt.	Continent	Averages 1979-1981	Averages 1989-1991	Averages 1996-1998	%1996-1998 compared to 1979-1981	%1996-1998 compared to total
1.	Africa	48.624	150.000	167.000	343,5	12,1
2.	North and Central America	272.910	414.000	451.000	165,3	32,7
3.	South America	1.547	3.000	3.333	215,4	0,3
4.	Asia	206.270	224.000	304.000	147,4	22,1
5.	Europe	482.334	472.000	426.000	88,3	30,9
6.	Australia	2.073	6.000	11.333	546,7	0,8
7.	Russian Federation	6.822	19.000	14.667	214,9	1,1
	Total	1.020.580	1.288.000	1.377.333	134,9	100

Table 2 presents the production of almonds in the main countries that cultivate them.

Table 2

The production of almonds in the main cultivator countries
(F.A.O. Data 2008)

Nr. Crt.	Country	Averages 1995-1998	Averages 1999-2002	2003	2004	2005	2006	% 2006 compared to total
1.	Afghanistan	9.000	12.500	15.000	14.471	14.374	14.250	0,81
2.	Algeria	23.617	27.393	33.234	37.985	45.379	53.673	3,06
3.	Australia	11.411	13.719	9.554	9.430	11.755	11.755	0,67
4.	Burkina Faso	1.391	2.141	2.849	2.918	1.365	1.250	0,07
5.	Chile	4.975	8.310	8.800	9.000	10.153	10.153	0,58
6.	China	23.228	22.786	25.762	27.359	28.360	28.000	1,6
7.	Croatia	1.974	2.828	1.567	1.567	1.368	1.086	0,06
8.	Cyprus	1.927	1.350	650	693	909	875	0,05
9.	France	4.364	6.917	6.800	6.800	2.137	1.781	0,1
10.	Greece	51.331	51.156	36.480	48.177	47.088	47.088	2,68
11.	Iran	89.262	97.420	38.231	69.989	108.677	108.677	6,19
12.	Israel	3.682	5.532	4.900	4.210	9.118	11.242	0,64
13.	Italy	91.729	104.187	91.382	105.245	118.344	112.796	6,43
14.	Lebanon	32.285	25.050	27.400	27.500	28.300	28.300	1,61
15.	Libya	27.000	26.000	26.000	25.000	24.345	24.345	1,39
16.	Morocco	46.175	77.642	70.808	60.200	70.629	83.000	4,73
17.	Pakistan	49.118	35.500	23.688	23.924	23.129	23.344	1,33
18.	Palestine	7.970	4.252	4.478	5.979	5.489	5.700	0,32
19.	Portugal	8.788	21.245	23.829	13.953	13.823	11.166	0,64
20.	Spain	252.623	259.578	214.448	86.622	217.869	220.000	12,53
21.	Syria	45.538	77.121	130.000	119.865	119.648	119.648	6,82
22.	Tajikistan	3.625	3.651	3.391	3.299	3.223	3.330	0,19
23.	Tunisia	46.675	42.125	40.000	44.000	57.000	50.000	2,85
24.	Turkey	37.250	43.250	41.000	37.000	45.000	43.285	2,47
25.	Turkmenistan	1.175	1.075	1.000	1.008	1.003	1.200	0,07
26.	U.S.A.	407.775	643.307	786.262	785.462	715.623	715.623	40,77
27.	Uzbekistan	6.875	11.000	6.100	19.000	20.000	23.545	1,34
	Total	1.290.763	1.627.0355	1.673.613	1.590.656	1.744.108	1.755.112	100

The United States of America, the most important breeder with a share of 40.77% of the total production, has doubled its production of shelled almonds during the past 10 years. Therefore, if during 1995-1998 the production was of 407.775 tons, in 2006 it is of 715.623 tons. The great expansion was due to the increase of surfaces in the middle and south of the San Joaquin valley with irrigated plantations. Another reason is the expansion of almond breeding in the poorer soils of Sacramento Valley. The cultivation of almonds is mainly

performed in Kern, Merced, Fresno, Madera, Stanislaus and San Joaquin, as well as in the Butte and Colusa areas.

The most popular cultivar is Nonpareil, with a share of 45% of the entire surface. Other important cultivars are Carmel with 18%, Mission with 7%, Price with 5%, Butte with 5%, Ne Plus Ultra, Merced and Peerless, each with 3% and others.

The average production is 1.3-1.5 tons/ha almonds in shell. The whole technological process of harvesting is automated, from the tree-shaker to the collecting of almonds on the interval between the rows and the automatic loading in trailers.

Spain is the most important cultivator country in Europe, having a relatively constant production, ranging from 217.896 tons in 2005 to 259.578 tons in 1999-2002. Spain's share in the production of the main breeder countries is 12.53%. The most important areas in which almonds are cultivated are the provinces of the Balearic Islands, Saragossa, Tarragona, Lleida, Granada, Almeria, Malaga, Alicante, Castellon de la Plana, Valencia and Albacete.

The most popular cultivars are Marcona and Desmayo Langueta, which represent 40% of the total current Spanish production. Other cultivars are Desmayo Rojo, Carrigues, Ramillette and Atocha. In the Balearic Islands the Jordi and Vivot breeds are cultivated. In more recent orchards, Ferragnes, Cristomorto and Ferraduel have been cultivated. Recently, the Guara varieties have also been planted: Moncayo, Masbovera, Glorieta and Francoli.

Although breeding almonds requires large areas for plantations, the production per hectare is modest. The orchards established during the past 10 years, which are irrigated, are starting to compete with the ones in America.

The problems which affect the culture of almonds in Spain are non-homogenous and low productions in the arid zones, as well as on scattered plantations of small dimensions. In new orchards, another problem that has arisen is that of difficulties in pollination.

Tunisia recorded a share of 2.85% of the total of main cultivators in 2006 that is 50.000 tons. Almonds are usually cultivated in the Sfax region, around Bon Cape, in the north of the country and in the pre-desert zones (Kairouan, Kasserine, Feriana).

Each culture zone has its own specific features. The Sfax zone is characterized by mild winters and reduced rainfall (200 mm), great distances of plantation like 12-13 m/12-13 m (60-70 trees/ha).

The most wide-spread cultivars are Achaak, Ksontin and Mazzetto (probably Tuono). In the new, young orchards of the Bon Cape region, with rainfall of over 500 mm annually, the crops are more intensive, with 200 m/ha (7 m/7 m). The local cultivars are Hench ben Smail, Blanco – Khoonkhi and Abiot de Ras Djebel.

In the plains and hills of northern Tunisia, where rainfall is about 400-600 mm annually, winters are cold and summers hot, the most used cultivars are: Tuono, Ferragnes, Monaco, Peerless, Fournat de Brezenaud and Desmayo Langueta. In these areas the density of the trees reaches about 250 per hectare. In the north-western regions, with rainfall between 350 and 550 mm annually, Ferragnes, Ferraduel and Tuono are cultivated.

A great part of Tunisia's production is sold locally and almond breeding is not lucrative both because of low production values per ha, as well as because of inauspicious climate. Nevertheless, Tunisian production can be appealing to European markets due to the early ripening of the fruit.

In Morocco, the production has doubled in the last ten years, thus in 2006 it reached 83.000 tons, which represents 4.73% of the total production of the main cultivator countries. The entire production is used locally. Large areas are cultivated near the Atlantic Ocean. The production is very non-homogenous, most of the times mixed with bitter almonds; therefore it is mainly used for industrial purposes. During the last few years, plantations with the Marcona, Ne Plus Ultra, Ferragnes and Ferraduel cultivars have been established.

In Portugal, the production of the last four years (2003-2006) is decreasing from 23.829 tons to 11.166 tons. The cultivation of almonds is present in two main areas: Algarve in the south, Trás-os-Montes and Alto Douro in the north-east of the country. The quality of the production is low, being a mix of breeds and local populations.

Turkey has a relatively constant production, from 37.000 tons in 2004 to 45.000 tons in 2005, representing 2.47% of the total production of breeder countries. Although it is very difficult to quantify the production, it is important for the local market. The largest areas for cultivating almonds are around Izmir and in the north-west, on the Syrian border.

In Greece, cultivating almonds has existed for a very long time, being considered a tradition. The production of the past four years oscillates between 36.480 tons in 2003 and 48.177 tons in 2004, representing 2.68% of the total production of almond breeding countries.

In the areas with young plantations, the following cultivars were introduced: Texas, Truitt (probably Tuono), Retzou and, more recently, Ferragnes. The most important area of cultivation is Crete. Irrigated plantations have also been established in Thessaly.

In Italy, the production of the last four years varies from 91.382 tons in 2003 to 118.344 tons in 2005, representing 6.43% of the total production of the main countries that grow almonds. The plantations are generally old. The last established plantations introduced the following cultivars: Tuono, Ferragnes, Filippo Ceo and Falsa Barese.

In Iran, the production of the last four years ranges between 38.231 tons in 2003, a year that was partially affected by calamity, and 108.677 tons in 2005 and 2006, representing 6.19% of the production of the main countries that breed almonds.

Organized orchards represent 40-50% of the total, the rest being scattered trees. The production area is situated in the north-west of Iran, around Tabriz, playing an important role in the area's agricultural economy. Almost all the almonds were obtained from seed and show major deficiencies regarding production uniformity and quality, especially when it comes to export.

As for the breeding of almonds in Romania, the area in which almonds are spread overlaps that of the grapevine. An important role in the introduction and expansion of the almond was played by the Greeks from the ancient cities on the banks of the Pontus Euxinus, the Romans after conquering Dacia and later the Turks, through their economical influence over Romanian countries.

We owe the first written documents about this breed to Paul de Aleppo, who, in the year 1650, in a travel log named "Across Walachia and Moldavia" mentioned that the almonds and the plum trees were very prosperous, especially in the royal garden of Vasile Lupu (V. Cociu, 1967).

Ion Ionescu de la Brad is the first Romanian agronomist that demonstrated the possibilities of growing almond trees in our country. In the work "Agriculture in the Putna County", written in 1868, he says that, in an exhibition in Focșani, a farmer was given an award for "cultivating almonds and improving fruit by grafting" (V. Cociu et al., 1973).

"Notions about Pomology", a manuscript dating back to 1880, at the "Herăstrău Agricultural School", reveals that almonds were bred in our country in the same areas as peach trees, reached 6-7 m in height, lived about 45-50 years and produced fruit (V. Cociu et al., 1973).

The spreading of the almond was not supervised properly, and people continued to plant it by using seeds or spontaneously, ensuring rather long-lived trees, with regular production, but with hard shelled fruit.

It seems that the first grafted cultivars were introduced in our country along with the establishment of state tree nurseries, in 1896. After N. Ghena et al., 1977, the almond is frequently found in Dobrogea (Tulcea, Sarica, Babadag, Niculițel, Mangalia, Ostrov),

Banat (Orșova, Moldova Veche, Moldova Nouă, Siria, Lovrin, Madarat, Păuliș) as well as in the Dealu Mare vineyard.

During the last thirty year and more recently, the almond has been systematically included in crops at the Mărculești, Constanța, Oradea and Drobeta Turnu-Severin stations.

The census of the trees performed in 1979 reveals that there are 50.000 almond trees, largely scattered and 170 ha of intensive cultivation. It is important to mention that the Bihor County holds the top position with 15.000 scattered trees and 47 ha of plantations, followed by Buzău with 11.000 trees, Mehedinți with 8.000 trees, Sălaj with 3.800 trees, Prahova with 3.000 trees (M. Popescu et al., 1982).

The Bihor County excels due to the large number of cultivated almonds and the fact that this breed was used for decades in the tree nursery for grafting peach trees and cultivating them on sunny hillsides with high contents of calcium carbonate.

In 1989, the nurseries of the Research Institutes delivered 94.000 grafted trees, whereas in 1990, the production of grafted trees dropped to 39.000, reaching less than 12.000 trees in 1996 (N. Ghena, N. Braniște, 2003).

S.C.D.P. Oradea grafted between 1981 and 2005 a number of 224.900 almond trees, having the following share for each cultivar: Texas – 18.2%, Bruantinne 15.1%, Ardechoise – 12.2%, Mărculești – 2/1 – 9.6%, Mary Dupuy – 7.4%, Pomorie – 7.3%, Primorski – 7.4%, Retsou – 6.9%, Preanăi – 4.9%, Nikitski 62 – 4.0%, Burbank – 0.9% and Sudak – 6.1% (V. Scheau et al., 2007).

CONCLUSIONS

During the past two decades, the supremacy regarding both the production of almonds as well as the areas that are cultivated is held by the United States of America, which has managed to get ahead of Europe. The greatest producers of almonds in Europe remain Spain and Italy.

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