Fruit Growing Research, Vol. XXXIV, 2018 DOI 10.33045/fgr.v34.2018.05
http://publications.icdp.ro/index.php

EVALUAREA UNOR SELECȚII DE MIGDAL LA SCDP CONSTANȚA
EVALUATION OF SOME ALMOND CULTIVARS AT RSFG CONSTANTA

Gavat Corina[1], Stanciu Cosmina Luminița[2]
[1] Research Station for Fruit Growing Constanta, Romania. Corresponding author Corina Gavat, email: corina_gavat@yahoo.com
[2] State Institute for Testing and Registration of Varieties, Bucharest, Romania

Abstract

Almond (*Prunus amygdalus L.*) is a fast fruit growing species that is fruiting after 3-4 years from planting. In Romania, almonds find good cultural conditions in the north-west region and in the South-Eastern area near the Black Sea (Cociu, 2003). At SCDP Constanţa there are several genotypes of almond (over 110) and few selections that have been studied. 'Autofertil 1' and 'Autofertil 2' are two selections, which have proven to be the most valuable in terms of blooming time (late), fruit productivity and quality. In 2016-2018, observations and measurements were carried out using the UPOV descriptors: the main phenophases, the average weight of a fruit in the shell, the percentage of the kernel, etc. Chemical analyses for total lipid determination (g%), dry substance (%) and ash (%) were performed. Both almond selections have an early ripening of the fruit (the second and the last decade of August) respectively, an average weight of kernel of 2.5 g and good quality ('Autofertil 2' - dry substance 95.93%).

Cuvinte cheie: fenologie, miez, substanţă uscată, lipide totale.
Key words: phenology, kernel, dry substance, total lipid.

1. Introduction

Almond (*Prunus amygdalus* Batsch) occupies a very particular place among fruit trees. It is generally placed among the nuts although it belongs to the genus *Prunus* which comprises all the stone fruit species (http://networks.iamz.ciheam.org/nuts/pdfs/NUCIS%205_1996.pdf); the shells are considered as being almost complete food, their sweet or bitter kernel containing significant amounts of fats, protein substances, carbohydrates, mineral salts. Currently, almond has become a "luxury" fruit tree, its fruits being required in large quantities to the most developed countries markets at a high price.

According to FAO data, almond world production in 2016 was over 3 million tons (Source: http://www.factfish.com/statistic-country/united%20states/almonds%2C%20area%20harvested).

The almond tree culture has begun to expand under less favourable conditions, such as in Germany (in warmer and sheltered areas) or in Hungary (on the limestone hills around Budapest or around Lake Balaton) or in Republic of Moldova. This expansion was possible due to the fact that a number of new cultivars were created and culture technologies were improved (Cociu, 2007).

In our country this species has been grown for more than 150 years; the almond cultivation area overlaps with that of the vineyards. Being included in the category of thermophilic tree species, the almond finds good area of cultivation in North-West and South-Eastern parts of Romania, but the orchards cultivated with this fruit tree has declined very much during the last three decades.

During 1970-1985, a germplasm fund of this species was set up at the RSFG Constanţa, and several studies have been conducted both regarding the behaviour of local or imported cultivars, as well as experiences regarding the optimal planting density. After 1985, the biological material was taken over by the RSFG Bihor. Since 1993, in Constanta, the almond collection has been re-established and it is currently made up of 110 native and foreign genotypes.

Late blooming has become an important trait in almond cultivars and most almond breeding programs are trying to develop later blooming cultivars in order to avoid frost damages, when also temperatures are higher and more favourable for pollination and fertilization (Kester and Asay, 1975).

Tolerance to cold depends on the phenological stage of the tree, the sensitivity to the cold is higher if the flowering is advanced. Thus, temperatures below -3 ° C can cause damage in the phenological stage of pink buds (days before flowering), while in open flowers, temperatures below -2 ° C are already dangerous and on newly formed fruits and temperatures of -1 ° C can cause significant damage. The intensity of the damage, depends on the time that the tree remains exposed to low temperatures. Other factors, especially the cultivars and nutritional status, can also influence the intensity of the damage. At RSFG Constanta, the last dangerous frost will occur before March 20, before the scheduled start of the flowering process of almond selections.

The almond selections 'Autofertil 1' and 'Autofertil 2', might enrich the assortment of this species, having late flowering, early maturation of the fruit and good yields.

2. Material and methods

'Autofertil 1' and 'Autofertil 2' almond selections were observed and described using the UPOV descriptors: the main phenophases, the average weight of a kernel in the shell, the percentage of the kernel, etc. In 2018, chemical analyses were performed to determine the dry substance (%) by gravimetric method and ash content (minerals) by calcination (Buşuricu F., 2008) and the total lipid content (g%) using the Soxhlet method.

3. Results and discussions

3.1. Origin

'Autofertil 1': it is obtained by individual selection in the field of hybrids, resulting from free pollination; it was studied from 1998 and in 2016 it was registered at ISTIS for homologation.

'Autofertil 2': selected from a local population in 2001 in Valu lui Traian; registered at ISTIS in 2016.

3.2. Cultivars descriptions

'**Autofertil 1**'. The tree has small-medium vigor, with slightly open habit, it has medium-sized annual branches, less number of anticipated shoots and poor intensity of anthocyanic pigmentation. The flowering time is late (05.04), abundant every year; natural fertility is 67%. It is behaves very well at *Taphrina deformans* and *Coryneum beijerinckii.* Fruit ripening time: 3rd decade of August - 1st decade of September.

Fruits shape: oval; the shell is thin with low breaking resistance; kernel (photo 1): medium size (2.2 g), white-pearl, crispy, sweet, fine, with light skin thin and adherent; peel yield is 50%; dry matter content: 96.36%; Total lipids (g%): 47.21. Fruit shape: ovale.

'**Autofertil 2**'. The tree has medium vigour, slightly open, with dense foliage, with shoots of medium thickness and length and low number of anticipated shoots. Distribution of flower buds is predominantly on one year branches.

Late flowering time (30.03-06.04), abundant every year; natural fertility 65%. It behaves very well at *Taphrina deformans* and *Coryneum beijerinckii* attack.

Fruits shape: elliptical, shell: obtuse, with medium hardness; kernel (photo 2) is medium size (2.5 g), well sealed in the cavity, white, taste sweet, aromatic, fine, light skin, light, longitudinal striated, double kernel 0%, peeling yield 52%; dry matter content: 95.93%; total lipids (g%): 44.52. Fruit maturation: 1st and 2nd decade of September.

4. Conclusions

The planting of almonds on irrigated land in Dobrogea is, apparently, a very reasonable cultivation alternative due to the following aspects:

Temperatures in the last fifteen days of March are normally suited to pollination, pollen tube growth, fertilization and fruit set up.

Spring and summer temperatures are suitable for growing the tree and ripening the fruit.

Supports limestone soils.

Flowering on the same tree within the same variety is very staggered, so a large number of fruit trees escape from the negative incidence of low temperatures sometimes occurring in the spring.

It is very important to note that there are late-flowering varieties and selections that reduce the risk of frost damages. For the rest of the physiological processes that comprise the annual fruit trees cycle, temperature is not considered a limiting factor.

The selections of almond 'Autofertil 1' and 'Autofertil 2', enrich the variety conveer of this species, have late flowering, early maturation of the fruit and bigger kernels (photo 3, comparation with Feragnes).

References

1. Bușuricu F., Balaban D., 2008. Metode și tehnici pentru controlul alimentului, Ed. Muntenia Constanța, pag 103-110;
2. Cociu V., 2007, Nucul, alunul, migdalul. Editura M.A.S.T., București;
3. Kester and Asay, 1996, The Evaluation and selection of current varieties, p. 52-60. In: Micke, W.C. (ed.). Almond Production Manual. Publication 3364, University of California, Division of Agriculture and Natural Resources, Oakland, CA;
4. http://networks.iamz.ciheam.org/nuts/pdfs/NUCIS%205_1996.pdf
5. http://www.factfish.com/statistic-country/united%20states/almonds%2C%20area%20harvested

Tables and figures

Table 1. Results regarding the chemical analyses of kernels samples

No.	Cultivar /selection	Total lipid g%	Dry substance %	Ash %
1	A1	47.21	96.36	3.82
2	A2	44.52	95.93	3.74
3	BURBANK	41.89	95.44	4.74
4	Cellerston	51.12	94.91	3.48
5	H III	55.74	90.27	2.82
6	ARCUITE	61.28	94.38	2.78
7	TOHANI	65.41	95.29	2.88
8	Sel. D	66.24	94.09	2.90
9	I.C.A.R 1	62.33	94.82	3.06

Fig. 1.

Fig. 2.

Fig. 3.