

COMPARATIVE STUDIES CONCERNING THE INFLUENCE OF LATE FROSTS UPON SOME APRICOT VARIETIES IN CONDITIONS OF BANAT'S PLAIN AREA

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Abstract: *The apricot varieties in our country are diversified, including at the same time local and foreign varieties, varieties having quality fruits, very productive, some of them having a good resistance to low temperatures during the pause period, but also a good resistance to late spring frosts. Due to its early beginning of phenophases and early flowering, it frequently gets affected by the late frosts that come in spring. This species is recommended to be cultivated in the plain area of Banat because of the favourable climate, but we have to mention that the appearance of late frosts in spring, more and more frequent in the past years, has a high negative impact upon the production. That is why it is necessary to know the varieties behaviour in order to establish which of them can be cultivated in the climatic conditions of Banat's plain area. Like wise, there will be considered some other variants which might influence the varieties' behaviour versus their resistance to spring late frosts. Among these, we chose, in the past years, to apply green pruning, which beneath its advantages proved to be favourable by delaying the flowering with couple of days, which were sufficient so that the flowers or bind fruits not to be affected. For example in 2009,*

when the late frosts appeared they affected less the varieties, while in 2007 and 2008 when, because of the high temperatures in February, the apricot trees started their phenophases and they were strongly affected by the late frosts that appeared in March. Though the researches concerning the flowering biology are not new, it is important to know the mentioned aspects because the pedoclimatic conditions influence differently the cultivated varieties. During 2006-2009, twelve varieties of apricot, cultivated in conditions of the Didactic Station of our University, were observed and studied: Earlyryl, Dana, Neptun, Saturn, Cea mai buna de Ungaria, Venus, Callatis, Sulina, Favorit, Selena, Silvana and Olimp. There were noted the development of fruiting phenophases of these varieties, the number of flowers per tree, the number of binded fruits and the influence of the climatic conditions in that period upon the fruit binding degree, the number of fruits left on the tree after the physiological fall of fruits and at harvesting. Knowing how the apricot varieties behave in conditions of Banat plain area and also some technological culture practices, those who are interested can choose a certain variety group, which can offer high and constant productions

Key words: *apricot, varieties, late frosts, phenophases, bind fruits*

INTRODUCTION

The apricot is one of the most sensitive species to late spring frosts in our country that is why it is recommended to be cultivated in the plain areas, where the temperatures are higher and the risk of getting affected by late frosts is not that big. Banat's plain area is considered to be a favourable one for apricot's culture because of the favourable climate, but we have to mention that the appearance of late frosts in spring, which is more and more frequent in the past years, has a high negative impact upon the production. It is necessary to know the varieties' behaviour in order to establish which of them can be cultivated in the climatic conditions of Banat's plain area. We have to consider all the possibilities that might influence the varieties behaviour versus their resistance to spring late frosts. Among these, we chose, in

the past years, to apply green pruning, which beneath its advantages proved to be favourable by delaying the flowering with couple of days, which were sufficient so that the flowers or bind fruits not to be affected by the late frosts that survey in spring.

MATERIALS AND METHODS

By this paper we chose to present the behaviour versus late frosts, during the period 2006-2009, of twelve apricot varieties, which are being cultivated in conditions of the Didactic Station Timisoara: Earlyryl, Dana, Neptun, Saturn, Cea mai buna de Ungaria (CMBU), Venus, Callatis, Sulina, Favorit, Selena, Silvana and Olimp. These varieties were planted in 1997, at a distance of 4m between the trees and 5m between the tree rows, determining a density of 500 trees/ha.

The adopted working method was stationary and it consisted into two steps. First, it was the field observation, consisting in noting down the fruiting phenophases, such as: buds' opening and flowering with its three stages (beginning of flowering, in full flowering and the end of flowering) and the climatic conditions of that period that might have influenced the binding degree. At the same time, there were counted the number of bind fruits and the number of harvested fruits. The second step consisted in calculating and interpreting the collected data in the laboratory.

RESULTS AND DISCUSSIONS

The development of climatic conditions is presented in figures 1-4, being correlated to the fruiting phenophases of each variety, which were different during the four years of study, mostly the same in 2006 and 2007, while in 2008 the trees started vegetation very early and in 2009 very late.

During the years 2006 and 2007, the climatic conditions were almost similar, the phenophases developing in almost the same dates. Buds' opening started in late February and ended at the beginning of March, when flowering begun, while the end of flowering was noticed between 22 March (2007) and 25 March (2006) (fig.1,2).

At the same time, in 2007 there was registered a late frost during the night of 22-23rd March of $-1.6^{\circ}\dots-2^{\circ}\text{C}$, when the trees were in the phenophases of bind fruits, followed by another one in 23rd April, which compromised a good part of the production, with 62-92% damages.

As it can be seen, in 2008 (fig.3) the climatic conditions, respectively higher temperatures, determined an earlier beginning of phenophases, so buds' opening ended for all varieties in middle February, most of them having the flowering phenophases in the second half of this month and the beginning of March, being ended in 6th March. We have to mention that during three successive nights (18th, 19th and 20th March) the temperature decreased until -3°C , which contributed to fruits' water crystallization and freezing, followed by the massive fruits' fall down of most varieties, no matter their development stage. In that year, the production was diminished with 73-95%.

In 2009, the phenophases were late with almost one month than in the past years, so that buds' opening started in 23rd March and ended at the beginning of April. Flowering phenophases developed in the first half of April and ended around 17th April (fig.4). The late development of phenophases in 2009 protected, somehow, the trees from the negative effect of late frosts.

Considering the percentage of harvested fruits, in 2006 we registered the best results, followed by 2009 and 2007, while the percentage of harvested fruits in 2008 was the lowest for each variety (table 1).

Table 1

Fruit binding degree

Soitl	2006			2007			2008			2009		
	No. of bind fruits	No. of harvested fruits	Percentage of harvested fruits	No. of bind fruits	No. of harvested fruits	Percentage of harvested fruits	No. of bind fruits	No. of harvested fruits	Percentage of harvested fruits	No. of bind fruits	No. of harvested fruits	Percentage of harvested fruits
Earlylyl	680	312	45,88	665	100	15,03	720	69	9,51	567	118	20,81
Dana	885	415	46,89	288	103	35,76	350	14	4,00	445	102	22,92
Neptun	735	388	52,78	375	187	49,86	520	72	14,00	415	210	50,60
Saturn	845	420	49,70	344	125	36,33	380	55	14,50	520	285	54,80
CMBU	966	475	49,17	987	158	26,06	885	199	22,50	727	355	48,83
Venus	1415	625	44,16	2560	220	8,50	930	260	27,90	815	272	31,08
Callatis	815	585	71,77	2172	205	9,43	783	49	6,33	860	448	52,09
Sulina	1380	618	44,78	1980	196	9,89	1030	52	5,00	556	123	22,12
Favorit	1265	595	47,03	1512	178	11,77	985	99	10,00	912	334	36,62
Selena	600	490	81,66	398	80	20,10	715	139	19,40	856	478	55,84
Silvana	1100	560	50,90	1144	186	16,25	890	142	16,00	695	198	28,48
Olimp	988	495	50,10	315	65	20,63	620	108	17,50	910	424	46,59

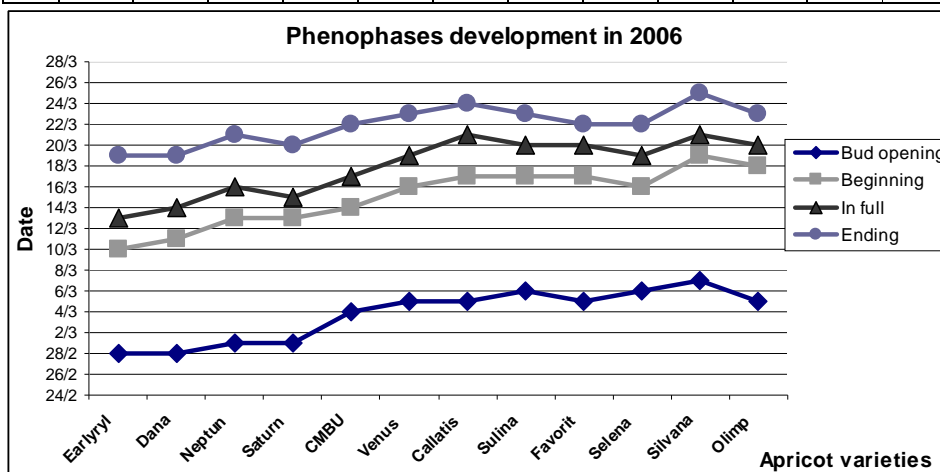


Fig.1. Phenophases development in 2006

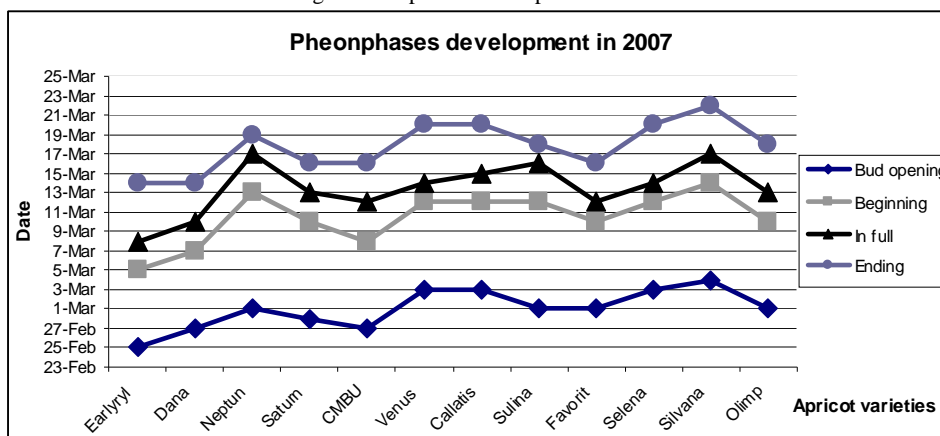


Fig.2. Phenophases development in 2007

As for the early varieties, we observed that, along all four studied years, Neptun variety had the best behaviour, the percentage of harvested fruits being of 52,78% in 2006, when there were no late frosts and of 14% in 2008, when the low temperatures ($-2^{\circ} \dots -3^{\circ} \text{ C}$) that appeared by night in 18.03-20.03.2008 affected the production of all varieties.

Considering the middle varieties, the best behaviour along the years has been observed for Cea mai buna de Ungaria and Saturn varieties, which had a high percentage of harvested fruits in 2006, of 49,17%, respectively 49,70% and were not strongly affected by late frosts in 2007 and 2008. On the other hand, Callatis variety had a very good percentage of harvested fruits in 2006 (71,77%), while in 2007 (9,43%) and 2008 (6,33%) it was strongly affected by the appearance of late frosts in spring which diminished severely the production.

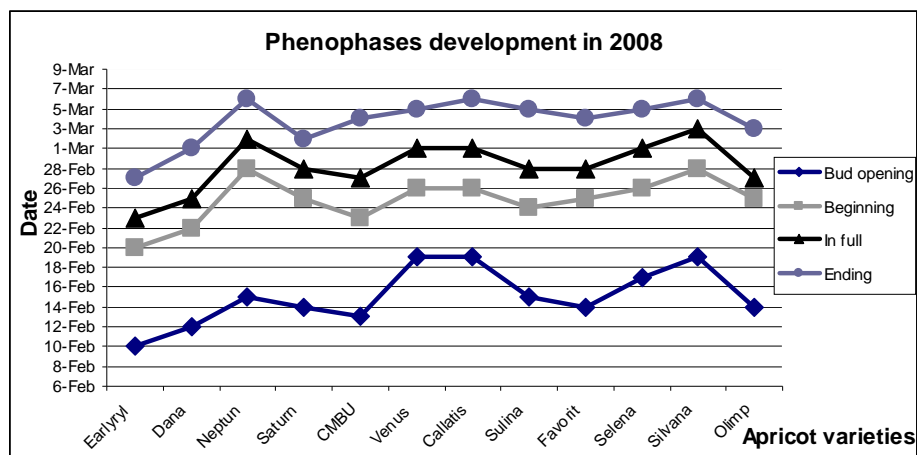


Fig.3. Phenophases development in 2008

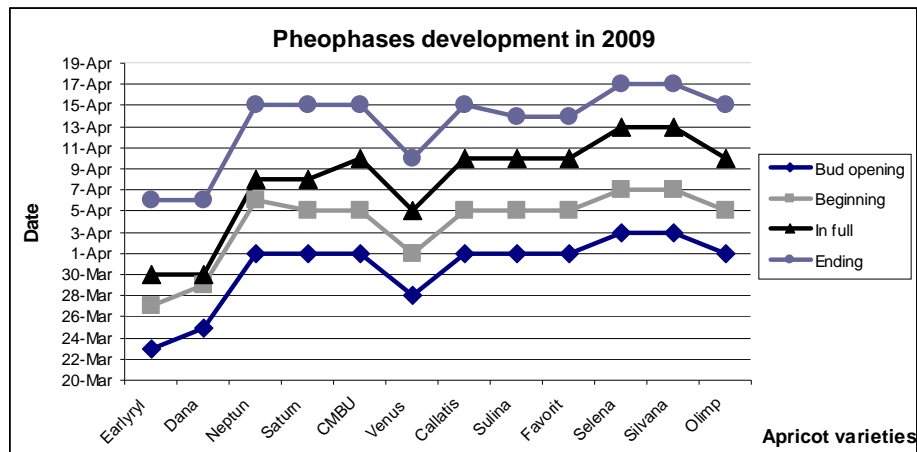


Fig.4. Phenophases development in 2009

Among the late varieties that had a good behaviour along the four studied years, there are Selena and Olimp, which were not strongly affected by late frosts, having a percentage of

over 20% harvested fruits in 2007 and of over 17% in 2008, while in 2009, when the phenophases were delayed due to the green pruning that has been applied in the past years, almost 50% of the bind fruits were harvested.

Favorit variety, had lower percentages of harvested fruits, around 40% in 2006 and 2009, and between 10 and 12% in 2007 and 2008.

CONCLUSIONS

During the years with normal climatic conditions, the apricot varieties behaved normally and they are recommended to be cultivated in Banat's area.

With all these, in the past years in late spring frosts appear and the damages they cause are huge for some varieties.

The best behaviour, no matter the climatic conditions, was observed, Saturn and Selena varieties, being recommended for culture in this area, while Dana, Callatis and Sulina varieties were strongly affected by late frosts.

The other varieties can also be cultivated in Banat's plain area, but there have to be considered aspects like: protected areas or measures used in order to control frosts.

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