FLOWERING PERIOD AND MANIFESTATION OF MONILIOSIS OF SOME APRICOT AMERICAN GENOTYPES IN THE CONDITION OF REP. MOLDOVA

PERIOADA DE ÎNFLORIRE ŞI MANIFESTAREA MONILIOZEI LA UNELE GENOTIPURI AMERICANE DE CAIS ÎN CONDIŢIILE REPUBLICII MOLDOVA

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Abstract. *Flowering period and susceptibility to Monillinia laxa of 40 american apricot varieties and selections in the conditions of central part of Moldova were studied between the years 1996 to 2012. No significant differences have been observed between American and Moldavian genotypes according to the time of initiation and characteristics of the differentiation of flower buds. American varieties Rival, Robada, Lorna, Katy, does not have an acceptable resistance of flower buds to the winter low (-15 - -20 °C during 7-10 days) temperatures. Only some studied American genotypes have the earliest beginning of blooming (1-2 days) in comparison to the Moldavian ones. There have not been found varieties with late blooming period. Period of flowering of CR-263, NJA-42, Paterson, Tilton coincide with the principal Moldavian varieties (Bucuria, Krasnoshciokii, Nadejda, Detskii), being good pollinators for its. The most of American varieties are more susceptible to the attack of Monillinia laxa than Moldavian ones. On the basis of the complex of good manifestation of biological and agronomical properties variety CR-2-63 has been registered for the Rep. of Moldova after State Testing. NJA-42 is considered interesting variety regarding very early fruit maturation and high resistance to winter colds.*
Key words: *apricot, varieties, breeding, flowering, Monilinia laxa*

Rezumat. *În perioada a.a 1996-2012 în condiţiile părţii centrale a Rep. Moldova au fost studiate perioada de înflorire şi susceptibilitatea la Monillinia laxa a 40 soiuri şi selecţii americane de cais. Nu s-au depistat diferenţe semnificative privind iniţierea şi caracterul diferenţierii mugurilor florali între soiurile americane şi moldoveneşti. Soiurile americane Rival, Robada, Lorna, Katy, nu posedă rezistenţă acceptabilă a mugurilor floriferi la temperature relative joase din timpul iernii (-15 - -20 °C timp de 7-10 zile). Numai unele genotipuri americane studiate posedă perioadă mai timpurie de înflorire (cu 1-2 zile) comparative cu soiurile moldoveneşti. Nu s-au depistat genotipuri cu înflorire tardivă. Perioada de înflorire a soiurilor CR-2-63, NJA-42, Paterson, Tilton coincide cu perioada respectivă a soiurilor moldoveneşti (Bucuria, Krasnoshciokii, Nadejda, Detskii), ei fiind buni polenizatori pentru soiurile moldoveneşti. Majoritatea soiurilor americane sunt mai sensibile la atacurile de Monillinia laxa decât cele moldoveneşti. În baza manifestării bune a complexului de caractere biologice şi agronomice la Testarea de Stat, soiul CR-2-63 a fost înregistrat pentru înmulţire în Rep Moldova. Soiul*

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NJA-42 este considerat interesant conform caracterelor: maturare extratimpurie a fructelor şi rezistenţă mare la gerurile de iarnă.
Cuvinte cheie: *caisul, soiuri, ameliorare, înflorire, Monilinia laxa*

INTRODUCTION

Apricot fruits are distinguished by valuable qualities, being considered as an important and primordial source of nutritional and therapeutic primordial substances for maintenance and fortification the human health. In the Republic of Moldova cultivation of apricot have secular traditions. Actually there are sophisticate apricot varieties which are characterized compact crown, small and medium but strong fruiting shoots, form of crown appropriate for high density of orchard, root system of rootstock which is adaptable to different kind of soils, especially for "heavy" soil, which is specific for majority of terrains, attributed to apricot in the case of Republic of Moldova; genetic resistance to frost, fluctuations of winter ant spring unfavorable temperatures; physiologic potential of equilibration of growth and fructification, especially high excitability of vegetative buds with the possibility of rehabilitation of crown after drastic manifestation of moniliosis (Cociu, 1993, Pîntea, 2003).

For fresh consumption apricot fruits should be big, very attractive colored, with firm but juicy but succulent flesh, fine texture, equilibrate taste and pretty apricot aroma, with relatively small stone, detachable from flesh. In the same time fruits destinated for industrial processing should have constant form and largeness, uniformly colored flesh after boiling or dehydration, with high content of dry substances, sugar, pectins, macro and microelements, etc. Therefore in the programs of varieties amelioration regarding enlargement of fruit varietal conveyer there are indispensable multilateral experimental researches for evaluation of important genitors, including comparative studies of introduced perspectives varieties from international assortment (Hough According received data of researcher from domain (Nicotra et al., 2006) control of manifestation of propriety „resistance" to *Monilinia laxa* there are polygenic, and varieties which have this property of resistance could transmit this propriety to theirs progenitors. Thus, finding the respective donators for apricot amelioration for the conditions or Moldova represent a major assignment.

MATERIAL AND METHOD

Experimental researches where effectuated in the national collections of apricot (Experimental Station „Codrul", Research and Practical Institute for Horticulture and Alimentary Technologies). In the quality of biologic material in our researches where utilized more than 40 American introduced varieties and selections being compared with main created in Rep. Moldova (Bucuria, Kişinevskii rannii, Moldavskii olimpieț, Detskii, Kostiujenskii). As a rootstock served apricot biotype MVA, schema of plantation: 5 x 4 m, in the absence of irrigation. During the investigations there are employed methodical and methodological principles which are approved for breeding and genetics of fruit trees species (Cociu, 1993, Cociu and Oprea, 1989). Frequency and level of attack to *Monilinia laxa* where appreciated in percents.

RESULTS AND DISCUSSIONS

Table 1

Comportment of some American and Moldavian apricot varieties against the attack of *Monilinia laxa* in the conditions of the Rep. Moldova

Genotype	Attack frequency (%)		Class of resistance
	Flowers	Juvenile shoots	
Varieties of American origin			
Cream ridge	50	24	MA-LA
CR 24-17	65	21	HA-LA
Early orange	45	18	MA-LA
Early blush	70	20	HA-MA
Goldrich	72	70	HA
Katy	85	45	VHA -MA
Kettleman	90	72	VHA -HA
K-106-2	92	70	VHA -HA
K-604-19	96	58	VHA -HA
K-611-150	95	65	VHA -HA
Lorna	65	70	HA-AFÎ
NJA-19	67	58	HA
NJA-21	35	65	MA-HA
NJA-38	40	24	MA
NJA-42	70	70	HA
NJA-44	68	42	HA-MA
Patterson	30	20	MA-LA
P72-155	49	65	MA-HA
P74-74	41	48	MA
P301-105	30	80	LA- VHA
Robada	77	25	VHA -LA
Stark Early Orange	50	24	MA-LA
Tomcot	41	70	MA-HA
Y103-253	70	76	HA- VHA
Y604-75	81	45	VHA -MA
Wesley	77	47	VHA -MA
Created in Rep. Moldova			
Bucuria	25	20	LA
Kishinevskii rannii	38	24	MA-LA
3-2-17	60	52	HA
Raduga	27	26	MA

Legend: Attack degree: 0%-resistanse (R); 0-25%-low attack (LA); 26-50%-atac medium attack VHA (MA); 51-75 %-high attack HA)-100% - very high attack (VHA).

As a result of microscopic investigations of floral buds initiation and embryonic development of floral parts of experimented genotypes in the in summer-autumn period there are no distinguished principled differences between

American varieties and Moldavian ones. Practically within all varieties there are noticed the same morphogenetical dynamic of initiation and development of whole perianth, commencement of the development of stamens, ovarian loge (tab. 1).

Detailed observations concerning outgoing of floral buds from deep biological rest demonstrate the following results. American varieties and selections Lorna, Katy, Kettleman, Modesto, Helena, Nicole, Robada, P301-105, Y 103-253, Y604-75, K-106-2, K-604-19, Wesley, K-611-150, Y103-253, Y604-75, Rival (mains – from California) finished the profound biological rest already at December 20-25. In the same time another part of American varieties (for example: Stark Early Orange, Creame ridge, CR 24-17, Early orange, Henderson, Goldrich, Early blush, Tomcot, NJA-19, NJA-21, NJA-38, NJA-42, NJA-44 and others) continued to be in profound rest yet 4-5 weeks, that is coming to second decade of January.

During the same period get out of rest period the flower buds of local varieties (Bucuria, Kishinevskii rannii, Detskii, Moldavskii olimpieț, Nadejda, Raduga, Kosrtiujenskii). Effectuated researches demonstrate that at group of American varieties, which get out from the rest period more earlier, there is continued development of reproductive organs and structures during the "windows" of 1-2 weeks which have relatively high temperatures (higher of 10^0C). Thereby during these periods at genotypes with relatively short rest period is running rapid processes of microspogenesis.

After there main part of flower (being in buds yet) there are affected by frost of about 17^0C just in 4-6 days. We notice that dynamic of floral development in buds of the majority of registered apricot varieties in the Republic of Moldova. there is comparatively slowly.

Beginning of flowering of American genotypes, with earliest outgoing from biological rest of flower buds (during December) was earliest comparatively with others Moldavian and American varieties (average terms –the third decade of Mars –second decade of April) maximum with 1- 2 days. Thereupon terms of flowering-pollination of the majority of Moldavian varieties overlaps the same of main studied American varieties at least for 2 days.

In the conditions of Rep.Moldova American variety Cream ridge there is distinguished from the majority of studied varieties by more long periods of flowering (with 1-2 days) and by delayed maturation of fruits (more than one weak). This variety were registered in Rep. Moldova for cultivation in the frame of domestic production.

Manifestation of attack of *Monilinia laxa* (flowers and juvenile shoots) of both American and moldavian varieties there are done in tab. 1. Received data shows that the both open flower and juvenile shoots of the American genotypes there are more susceptible to this pathogen. The most susceptible varieties are Helena, Katy, Nicole, Wenatchee, Kettleman, Lorna, K-106-2, K 604-19, K 611-150, P 72-155, Y 103-255, Y 604-75 Wesley, Robada.

Table 2

General characteristics of some American apricot varieties.

Genotype	Vigor	Productivity	Fruit quality	Primary fruits purpose	Recovery capacity of trees	Important features
Varieties of American origin						
Cream ridge	+++	+++	+++	FC, PR	++	Productivity, fruit quality. Good resistance to unfavorable abiotic local factors
Early orange	+++	+++	+++	FC, PR	+++	Productivity, good fruit quality, especially for processing
Goldrich	+++	+++	++	FC, PR	++	Productivity, fruit quality.
Tom cot	++	++	+++	PR	++	Early fruit maturation, fruit quality.
NJA 42	++	++	+++	FC, PR	++	Extra early fruit maturation
Orange red	+++	+++	+++	PR, FC	++	Early fruit maturation, fruit quality.
Paterson	+++	+++	++	PR	++	Stable productivity, fruit quality. Good resistance to unfavorable abiotic local factors
Varieties created in Rep. Moldova						
Kostiujenskii	++	+++	+++	PR, FC	++	Productivity, fruit quality. Good resistance to unfavorable abiotic local factors
Nadejda	++	++	++	FC	+	Productivity, fruit quality. Good resistance to unfavorable abiotic local factors

Legend: +++ -high, ++ - medium, + - low, FC -=fresh consumption, PR - processing

The varieties Early orange, Cream ridge, Stark Early Orange, CR 24-17, Henderson, Goldrich, Early blush, Tomcot, NJA-21, NJA-38 also there are relatively highly attacked, but usually in epiphytotic years conserve a weak yield. Moldavian varieties (Bucuria, Kişinevskii rannii, Costiujenskii, Raduga, 3-2-17) there are smaller attacked. In our opinion this phenomenon could be explained by presence of various fruiting shoots, which have a different dynamic of flower structures differentiation in buds. In such cases one part of flowers and vegetal buds there are developed later, when the opportune microclimatic conditions for intensive development of patogen already pasted.

General analysis of manifestation of the most important agronomical and biological features during period of studies in relation with the frequency and intensity of the development of moniliozis lat the american varieties, introduced

in the the specific conditions of the rep. Moldova permit to ascertain the following.. The varieties Patterson, Cream ridge, Goldrich, Tomcot and Early orange there are characterized in rep Moldova by high productivity of qualitative fruits for processing, having good resistance to unfavorable local factors. Extra early ripening of fruits of NJA-42, medium vigor and high capacity of regeneration or trees represent the features for its promotion as of perspective varieties. Within the conveyer of early varieties with high quality of fruits there are tested variety Orangered. A stable fruit production of evaluated American varieties depends of appropriate management of moniliosis during flowering ad initial development of juvenile shoots.

CONCLUSIONS

1. No significant differences have been observed between American and Moldavian genotypes according to the time of initiation and characteristics of the differentiation of flower buds. American varieties Rival, Robada, Lorna, Katy, does not have an acceptable resistance of flower buds to the winter low (-15 - -20 ^{o}C during 7-10 days) temperatures. Only some American genotypes have the earliest beginning of blooming (1-2 days) in comparison to the Moldavian ones.

2. The most of American varieties are more susceptible to the attack of *Monillinia laxa* than Moldavian ones.non depending of duration of rest period of flower buds and flowering period. The varieties Cream ridge, Stark Early Orange, Goldrich, NJA-42, Patterson there are interesting for utilization in intraspecific hybridizations because the presence of the complex of valuable features which are favorable manifested in the conditions of the republic of Moldova

4. On the basis of the complex of good manifestation of complex of biological and agronomical properties variety CR-263 has been registered for the Rep. of Moldova after State Testing. NJA-42 is considered interesting variety regarding extra early fruit maturation and high resistance to winter colds.

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