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RESERCHES REGARDING ADAPTABILITY OF NEW WALNUT VARIETIES IN THE CONDITIONS OF REPUBLIC OF MOLDOVA

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***Abstract**. On the basis of comparative researches of local Moldovan walnut varieties with some new introduced ones (Chandler, Fernor, Fernette, Franquette, Lara etc.) was established a high ecological plasticity and adaptability considering pedological and changeable climatic conditions of Central and partially North pomological zone of Republic of Moldova. Preliminary obtained data regarding compatibility of introduced and local varieties during pollination, as well as fruit setting demonstrate good perspective for industrial orchards establishment according general agrobiological recommendations for walnut culture.*

Keywords: adaptability, new varieties, walnut, Republic of Moldova.

INTRODUCTION

Through the fruit growing cultures, the walnut deserves an essential attention [1, 7-9]. Walnut (Juglans regia L.) are one of the oldest fruit trees species traditionally planted within republic of Moldova. For Moldovan people nuts always were and will remain a valuable product for food, trade, etc. 1,[4,7, 8]. Long time seed multiplication of local selected biotypes actually represents a sustainable possibility for long-term biodiversity conservation within the species Juglans regia L. [5]. Actually Moldovan registered for industrial culture walnut assortment include local varieties with high level of resistance to winter and spring temperature stresses and low sensibility to blight, others diseases. Usually trees productivity increases rapidly and reaches 2-2.5 tonnes of kernel per hectare in 8-9 years after plantation. For temporary testation in orchards there are included 15 foreign varieties [5]. Main trials of its promotion are: sustainable productivity and nuts qualities. But special attention it should be done to resistance to late spring frost, usually being in the period of flowering of walnut pistillate flowers.

MATERIALS AND METHODS

It was studied the characteristics of pistillate flower flowering processes, receptivity to pollination with determination terms of more effective pollination of

mainly protandrous introduced varieties (Chandler, Fernor, Fernette, Franquette, Lara etc.) and the condition of central and partially north pomological zone of the Republic of Moldova. Researchers are based on methodologically approved experimental agrobiological and embryological studies [3,7-9] of walnut intraspecific hybridization of some locally created varieties with introduced varieties, also the degree of compatibility and the resistance of pistillate flowers to low temperatures within walnut flowering period. Pollination compatibility of introduced protandrous varieties with Moldovan ones were studied.

RESULTS AND DISCUSSIONS

In comparative collaborative scientific researchers there where established good ecological plasticity and adaptability of the main Moldavian varieties also in the neighbor countries Ukraine, Romania, Hungary, Serbia etc. with manifestation of good kernel quality (tab. 1). As a result of different agrobiological researches of walnut production [3, 7-9] there were established basic cultural considerations. Between its important biological features o Moldavian

Table 1. General characteristics of nut and kernel of main walnut varieties registered for production in rep. of Moldova (source: multiannual biochemical data obtained by dr. Radusinskaia I.)

Variety	Medium weight of nuts, gr.	Kernel content %	Chemical composition of kernel						
			Total sugars, %	Lipids, %	Proteins, %	Carbon %	Carotene (A), mg/%	Tiamin (B_1) mg/%	Ribof lavin (B_2) mg/%
Kalarasski	14,3	51,3	5,31	66,42	18,00	5,31	0,135	0,208	0,345
Kişineovski	10,1	49,3	6,42	66,96	16,44	6,42	0,212	0,199	0,119
Kostiujenski	14,1	50,4	5,14	66,37	19,00	5,14	0,492	0,192	0,234
Korjeutki	10,2	49,7	7,76	66,52	18,81	7,76	0,308	0,114	0,153
Skinosski	13,2	50,0	8,59	67,17	17,44	8,79	0,254	0,466	0,153

varieties. High exigency given the light, which is well seen due to its rare crown. It means the light should get in its crown so high, as well as from the lateral parts. It should be noticed also that in luminosity conditions, the fit of the most dangerous disease which provokes the harvest loss is fainter. Even if the walnut trees in the rep. of Moldova during the winter supports normally the temperatures of minus 20-25 degrees, the tardy spring frosts represent a permanent danger [3,7]. That is why, while choosing the varieties for the orchards setting up, it is necessary to choose the varieties with a tardy disburgeoning and development of pistillate flowers. This will assure a more tardive flourishing, first of all for protandrous

genotypes (tab. 2,3; fig. 1-3) and the damages of pistilatte juvenile flowers avoidance from the respective late spring frosts.

Table 2. Average walnut flowering data in the Central Pomological zone of the rep. of Moldova. Local varieties.

Variety	Male flowers			Female flowers		
	Beginning	End	Period (days)	Beginning	End	Period (days)
Cazacu	11.05	15.05	5	05.05	15.05	11
Calaraşski	07.05	13.05	7	16.05	21.05	6
Costiujenski	05.05	11.05	7	15.05	23.05	9
Schinoski	12.05	18.05	7	05.05	12.05	8
Chişinevski	16.05	24.05	9	15.05	22.05	8
Cogâlniceanu	13.05	18.05	6	10.05	15.05	6
Pescianskii	14.05	20.05	7	07.05	13.05	7

Table 3. Average introduced walnut varieties flowering data in the Central Pomological zone of the rep. of Moldova.

Variety	Male flowers			Female flowers		
	Beginning	End	Period (days)	Beginning	End	Period (days)
Milotai	11.05	15.05	5	05.05	15.05	11
Aloszentivanvi	07.05	13.05	7	16.05	20.05	5
Chandler	10.05	14.05	5	17.05	22.05	6
Fernor	05.05	11.05	7	15.05	23.05	9
Fernette	12.05	18.05	7	05.05	12.05	8
Franquette	13.05	20.05	8	16.05	25.05	10
Lara	10.05	18.05	9	11.05	17.05	7

Difference between terms of flowering of female and male flowers (days) of varieties with coincidence of effective receptivity of female flowers to pollination period (tab. 2, 3) represent possibility of interpollination of local with introduced varieties. As a result of studies of morfohystochemical pecularities of pistillate flower receptivity to pollination depending on flowering stage were established terms of more effective pollination of dichogamous local and introduced varieties within condition of Republic of Moldova. Based on cytoembryological studies of walnut intraspecific hybridization studied introduced and local varieties the optimal degree and the peculirities of compatibility of all dichogamous types was also established [3].

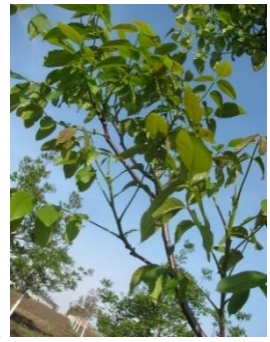

A .

B

Figure 1. Different stage of flowering of introduced varieties: A-Franquette var. B-Fernor var.


A

B

Figure 2. Homogamous Flowering-Chisinevskii.-A, Pistillate full flowering of Chandler var.-B.



Figure 3. Flowering of Pescianskii var. with partially lateral bearing.


A

B

Figure 4. Development of fruits (nuts). A -Lara. B-Fernor. Lateral bearing.



A B

Figure 5. Development of fruits (nuts). A-Chandler. B- Fernette. Lateral bearing.

Preliminary result of cultivation (within the frame oftemporal testation) within central pomological zone of Republic of Moldova of varieties Franquette, Chandler, Fernor, Fernette, etc. shows good results of adaptability regarding initiation and development of vegetative and flower buds, resistance to extremal temperatures, compatibility to some local varieties, as well as optimal development of fruits (tab. 2, 3, fig. 1-5), optimal harvests in the areas with annual medium daily temperature of 8-9 degrees. Our observations shows that even if the walnut trees in the rep. of Moldova during the winter supports normally the temperatures of minus 20-25 degrees, the tardy spring frosts represent a permanent danger. That is why, while choosing the varieties for the orchards setting up, it is necessary to choose the varieties with a tardy disburgeoning and tardy flowering of pistillate flowers. So, introduced protandrous and late homogamous varieties like Chandler, Fernette, Fernor, Franquette, as well as Moldovan ones: Costiujenskii, Cazacu, Chisiniovskii, could will assure a more tardive flourishing of pistillate flower and avoid damage from the respective late spring frosts.

CONCLUSIONS

Protandrous varieties Chandler, Fergean, Fernor, Franquette, as well as Moldovan dichogamous ones: Costiujenskii, Cazacu, Pescianskii, Chisiniovskii with a high potential of the ecological adaptability and plasticity with special refference to the resistance at the biotic factors (diseases and pests) and abiotics (the pedo climatic conditions, technological approaches). This assortment there are important for the implementation within conventional production, as well as for development of new resilient agricultural practices (organic production, etc.).

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