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THE WALNUT CULTURE IN THE REPUBLIC OF MOLDOVA AND ITS PERSPECTIVES FOR DEVELOPMENT

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ABSTRACT

Since the year 2000 the walnut culture has known a substantial evolution in the Republic of Moldova, greatly sustained by the joint efforts of some active promoters and of the Government financial assistance. The methods of propagation of the walnut varieties have been consistently improved in the last ten years. In the meantime, better terms and conditions of the establishment and care of the walnut orchard have been implemented. Also, by the end of the '90, it came clear which are the best walnut varieties and to what use are they best suited.

The establishment of the walnut orchards has been greatly stimulated by informing the population about the existing demand for the walnut products, but also by helping out the business by granting it with important financial resources.

INTRODUCTION

In the light of the globalization process, the increasing cross-border movement of the goods produced by the national economies and their delivery at an international scale inherently determines these economies to focus their energies and resources on certain industries and on strengthening those industries' potential. For the decision makers in Moldova this phenomenon is to be taken very seriously and it is to play a key role in the further elaboration of the economic strategies for the country and in the identification of the resources needed in that respect.

It is known that the industrial complex of the Republic of Moldova is insufficiently developed to enable the country to get important incomes out of its exploitation. Therefore, taking that into consideration, altogether with the available soil and climate resources, one of the major value creation sectors Moldova has is agriculture. This branch supplies about 60% of the country's GDP. In response, it has been decided to spot the most profitable agricultural fields of activity and provide them the best stimulus.

Therefore, in 1999 the Parliament has enacted the Law of the walnut and the nut cultures. By doing so it created a legal framework designed to give technical and financial support to the sector. So we can come to the conclusion that at a nationwide level it has been acknowledged that walnut represents a revenue source, both for rural populations

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directly involved in the field and for a new generation of entrepreneurs that take the conception of the walnut orchard to higher levels of economic performance.

As a consequence of the above mentioned, in the last ten years the Moldovan Government has identified a number of fields of national economic interest and has, since then, multiplied the actions taken in order to assist the people involved and to launch or to sustain ongoing projects destined to promote these industries. One of those is the walnut business and it has gradually been on the rise, mainly by the establishment of more and more commercial orchards.

It's important to note that the majority of the Moldovan walnut orchards are designed in a classic planting system with high trees and big globular crowns that are hard to prune, difficult for harvest and are of low performance in the light of the standard requirements of integrated production (Ţurcan and Comanici 2004). The upgrading process that underwent and still undergoes the walnut culture is determined by the technological methods and instruments through which the process is carried on, based on the soil as a main production factor and resource.

Other features that help in the affirmation of the yield potential of a variety are related to the precocity and the type of fruit bearing, the pruning and training methods, the resistance to pests and diseases, the planting density and the used rootstock (Balan et al. 2001, Cociu 2003, Gena et al. 2004).

The purpose of this research is to promote a modern technology for the walnut culture, based on valuable local genetic resources and adapted to the soil and climate conditions existing here in Moldova. Therefore, new improvements will be brought upon this field through the promotion of modernized elements in the establishment and care of walnut orchards, no matter what the size, referring to the successful experience obtained in this matter in countries like France, the USA, Italy, etc.

MATERIALS AND METHODS

At this time, most of the walnuts that are being sold in the country or outside come from local biotypes that don't comply with the ever increasing consumer preferences. Those nuts come from trees issued from seed propagation that is known to induce a great genetic variability in the resulted hybrid populations. Therefore, by sowing a nut with very interesting features we can obtain very random results in the descendants. In order to have homogeneous walnut planting material, presenting all the advantages this type of material can provide and namely: early crop on setting, uniform fruit lots, standard trees vigor and vegetative growth it is necessary to multiply this material by vegetative propagation methods, instead of the generative ones (Balan et al. 2001, Cociu 2003, Babuc 2012).

In Moldova, in order to identify walnut genetic resources, a selection process has been carried out over the years, focused on spotting and registering of natural valuable biotypes. In this process, priority was given to those varieties that seemed most fit from an ecological and economical point of view. Thereby, several varieties have been selected and named, among them: Cazacu, Cogâlniceanu, Costiujeni, Călăraşi, Schinoasa, Pescianski, etc. If grafted onto Juglans regia seedlings, a walnut tree starts bearing important amounts of fruits from the 6^{th} – 8^{th} year, whereas if issued from seed they start producing in their 10^{th} – 15^{th} year after planting. Fruits obtained from grafted walnut trees have better quality, higher commercial and nutrition value. It is determined that from generatively propagated

walnut trees, only about 20-25% of the crop can be employed for commercial use (Cociu 2003, Ţurcan and Comanici 2004).

RESULTS AND DISCUSSION

The walnut is being cultivated from ancient times in different regions that have the temperate type of climate. On Moldovan soil, this species is being known and grown for about 2000 years. Walnuts represent a complete and concentrated nutrient; they contain fatty, mineral and protein substances, vitamins, carbohydrates. The walnut is a fruit bearing tree with great potential for extension of the orchard acreage and fruit production volumes. This potential is determined by the ever growing global demand for the walnut orchard produce.

Also, the walnut tree produces raw material for numerous industries, is also used in medicine and is one of the few trees that absorbs heavy metals from the atmosphere. Moreover, despite its slow growing rates, the walnut has a strong root system and is widely used in forestry, especially against soil erosion and landslides and as a primarily used species in wind breaking tree screens (Cociu et al. 2003). Based on a census carried out in the naturally existing trees populations, it has been determined that in 1994 there were about 2,2 mln walnut trees. Out of the 2,2 mln ha of farm land available in Moldova, about 800 thousand are predisposed to erosion. The walnut tree grows and performs well in this type of terrains. Therefore, measures should be taken to make sure this fact is known by the stakeholders so a more reasonable use could be made of the existing farm land.

The walnut orchard acreage has evolved from 3300 ha registered in 2003 to approximately 9400 ha in 2010. During the last three years, the nursery material production has amounted in average 230 000 grafted walnut trees per year. Between 2003-2010, the production of kernels has been about 13,1 thousand tons yearly, gradually increasing. Since 2005, the acreage of the planted orchards is constantly on the rise. According to the National Programe for the development of the nut cultures, in the year 2020, the total area of the walnut orchard will amount to 14-15 000 ha and the total in shell nut production will touch up to 60 000 tons (currently 25-35 000 tons).

Additionally, it is important to note that we are on the way of effectively intensifying the walnut orchard and bringing the adaptive measures required in this process (choosing the adequate training systems, establishing the mineral nutrition and irrigation programmers, deciding on how to harvest the fruits, etc.).

There are a number of nurseries (SRL „Kernel Grup", SRL „Gospodarul Rediu", SRL „Pepeniera Pomicolă Voineşti", etc.) that have specialized in the production of grafted planting material thus generally covering the internal demand. Besides the internal market, some of the most successful Moldovan nurseries are now exporting large quantities of grafted walnut trees in nearby countries, mostly Romania and Ukraine while some others have established partnerships with some European walnut nurserists and supply them with walnut rootstocks.

At the same time, we have to underline an important complementarity that is being currently created between several participants in the process (i.e. the process of the development of the nut cultures as an important economic part of the Moldovan agriculture). Since 2006, the Government provides important finances as a stimulus plan for the establishment of walnut orchards. This is being carried out in the form of subsidies.

More specifically, for one hectare of planted walnut orchard the sum amounts to 800$ (The Yearly Regulation on Farmers Subsidizing). Usually, this money is enough to cover the cost of the planting material. By doing so, the Government stimulates both the walnut orchard establishment rates and the walnut nurseries development rates.

At this level, it is interesting to note the direct relation that has developed between the growth dynamics of the yearly planted acreage and the quantity of the walnut planting material produced yearly (tab.1).

Table 1.

The production rates of the grafted walnut planting material (pieces)

year 2009	year 2010	year 2011	year 2012
171 500	198 900	283 600	250 000

With regard to the production of the walnut planting material, which will be the focus of the second part of this study, the Republic of Moldova has made important progress in the last seven years. That has mainly happened thanks to the sustained demand for the product, which in return had encouraged the producers to work on improving the propagation techniques. There has been an important step up in the general production efficiency, going from production rates of 25-50% grafted trees ready for sale (relative to 100% initially grafted) at the beginning of the years 2000 as high as 40-70% at the current time (Turcan and Comanici, 2004).

Concerning the propagation methods, several have been tested until now, including open field grafting. After a ten years period of trials (but also referring to and taking into consideration conclusions of the essays carried out previously, in the last 60 years), the nurseries have retained only the most efficient and stable ones. For instance, it has been demonstrated that the success rate of the open field grafting or budding (chip or patch) is too scarce and inconsistent to recommend it for further use. So, producers have focused their attention and energy on the most promising techniques: the table grafts, done at the end of the dormant period, from February and through April (Babuc 2012). Among these methods, the one that had generated the best results are the whip graft and the omega graft. Except the type of combining the scion and the rootstock, other elements that refer to the grafting method that have been improved are: the length and characteristics of the stratification period, the preparation and type of the sawdust used in the stratification, ways and methods used to force the rootstock into active vegetation prior to grafting, the acclimation of the grafted trees after the stratification, the further care to be given to the plants in the field (Ţurcan and Comanici 2004).

Another important evolution that happened in the Moldovan walnut orchard relates to the varieties employed in the orchard foundation. It is obvious that the yield efficiency greatly depends not only on the soil type and the amount of available rainfalls, or on the agronomic care that is taken of, but also on the genotype of the varieties chosen for a given orchard (Pîntea 2004, Botu at al. 2001). In the last ten years that have seen the rise of the establishment of commercial walnut plantations, the Moldovan producers have succeeded to identify the most valuable varieties. The criteria that have been considered at ranking the varieties have been the following: early crop on setting, yield efficiency per tree, the young tree establishment in the first years of the orchard, the capacity to yield and

to differentiate flowering buds in the conditions of increasingly hot and dry summers, different varieties resistance to extreme winter frosts and to late returning frosts in April and May months, the ability to synthesize organic substances in conditions of extremely high temperatures and acute lack of atmospheric and soil humidity (Ghena and Branişte 2003, Ţurcan and Borozan 2003).

From another point of view, the evolution and selection process through the existing walnut varieties has also taken into account the consumer preferences. As a result, mostly came out the thin shelled varieties with good tasting and easy extractable white kernel. Therefore, the most popular varieties in the Moldovan selection were: Cazacu, Cogâlniceanu, Pescianski, Costiujeni, Calarasi, Schinoasa (Ţurcan and Comanici 2004). Among others, we have to mention the introduction of foreign varieties, mostly French and American, in the Moldovan walnut culture. Franquette, Lara Pieral, Fernor, Chandler, Hartley, Payne (Germain et al. 1999), otherwise very precious varieties, haven't unfortunately proved well adapted in the more hostile continental climate found in Moldova, compared to the milder one encountered in the area of provenance of the above mentioned varieties.

CONCLUSIONS

Referring to the what has been discussed here above, we can firmly assert that currently, the walnut culture is on an ascending trend and, moreover, can already account for some important progress that has been made in the affirming of the most suited and valuable varieties, in improving the most efficient propagation techniques and in determining the most favorable regions in Moldova that can host walnut orchards. From a commercial point of view, there have been comparatively tested technical and organoleptic qualities of these varieties. This has paved the way for facilitating the sale of the walnuts, by establishing different uses (fresh consumption, industrial use, etc.) that could be given to different varieties. Characterized by distinct features, growers now know for what destination each variety is best suited for.

Nevertheless, there still is a considerable progress to be made in order to continue to develop this interesting branch and recently, in the center of the producers' attention have come certain biotypes of rootstocks, but also a new range of varieties for fruit. At the same time, new and potentially interesting propagation methods are being discussed, new trials for determining even better planting distances are being put in place, some producers are trying to find ways to optimize the soil laboring and to improve the mineral nutrition and irrigation programs in the orchard, etc. Research is also and very much required for determining how to better use the available instruments and leverages in order to insure a more efficient control over the mechanisms by which ecological, biological and technological factors have an impact upon the success rate in walnut propagation methods and in walnut orchard establishment and management.

REFERENCES

Babuc, V.2012, Pomicultură. Chişinău: Tipografia Centrală 2012, 662 p.
Balan, V., Cimpoieş, Gh., Barbăroşie, 2001, M. Pomicultură. Chişinău, 453 p.

Botu I., Achim Gh., Botu M., 2001, Cultura nucului in exploatatiile nucicole moderne, Ed. Phoenix, Brasov

Cociu V., 2003, Culturi nucifere. Editura Cereş, Bucureşti, p 11-126.

Cociu V. si colab., 2003, Culturile nucifere, Ed.Ceres, Bucuresti, p. 15-18

German E., Prunet J. P., Garcin A. Le Nouer., 1999, Monografie. INRA, ISBN 2-87911-104-8

Ghena N., N. Branişte, 2003, Cultura specială a pomilor. Matrix Rom, Bucureşti, p 281-288.

Ghena, N., Branişte, N., Stănică, F, 2004, Pomicultura generală. Bucureşti: Matrix Rom , 562 p.

Pîntea Maria, 2004, Nucul. Biologia reproductivă. Chişinău, 366 p.

Ţurcanu I., E. Borozan, 2002, Nucul, Migdalul şi Alunul, Chişinău, ACSA, 47p.

Ţurcanu I., I.Comanici, 2004, Nucul, Chişinău, F.E-P „Tipografia Centrală", 196 p.