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THE GENOTYPES' FEED-BACK TO THE ENVIRONMENTAL FACTORS

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Abstract

Expected results in improving grapevine can be obtained only when using the technique of directed interspecific hybridization based on crossing genotypes from different eco-geographical areas, thus creating native varieties of grapevine. In this case, the genotype combines the desired properties and characteristics of the parent forms. As a result, the formation of genotypic characteristics necessary for adaptation occurs. The adaptation of the created varieties to extreme environmental conditions is possible only if they have been received as a result of crossbreeding of various species (taxa) of grapevine. Besides possessing high resistance to diseases and pests, these genotypes are characterized by high adaptability to the soil and climatic conditions. The use of the biological potential of interspecific genotypes will help obtain high quality products, in terms of organic agriculture, which requires reducing the use of synthetic and natural chemicals in pest and disease control.

Keywords: *genotypes, environmental factors, interspecific hybrides, reaction.*

INTRODUCTION

Development of human society imposes pay specific attention issues related to environmental protection. It is indisputable that the capabilities necessary get to know the genetic potential of the genotypes in relation to climatic conditions, which have a significant impact on the quantity and quality of programming of the products.

It is well recognized that the is not inherited directly to the character, but just the genetic code responsible for a certain reaction of the organism, which allows determination of the limits of changes. Thus, the phenotype of which is formed based on a certain genotype under the influence of climatic conditions.

Creating new capacities as a reaction genotype of response of the against different of the environment factors is conditioned by genotypic modifications [13, 14].

MATERIALS AND METHODS

As an object of study have served of vineyard the genotypes in compared with areas spreading, taking into consideration the biotic and abiotic factors of the environment. [4, 5, 7, 8, 11, 13].

RESULTS AND DISCUSSIONS

For each specific genotype is its response a given reaction, which is determined by preventive genetic point of view. The plant varieties possess a certain amount of response to environmental factors.

The capacity of coexistence of living organisms in relation to some factors of the habitat is assured of the heritability and genotypic modifications. Due to the changes genotypic those organisms adapts to environmental factors that are most representative of a particular habitat. But the formation of new capacity ensures normal of genotype coexistence in the conditions of new format, where the initial variety could not be coexist [16, 17].

At the end of the Paleozoic era there was only one gigantic continent - *Pangaea*, which consists of two parts: northern - *Laurasia* and south - *Gondvana*.

In the cainozoi, with about 70 million years agoshall be initiated rapid development of magnoliofitelor. The current were growing throughout Europe: chestnut, oak, palm trees, vines etc.

Fig. 1. Gigantic continent - *Pangaea*.

It takes place finalizing the different continents on this planet started at about 200 mln. years ago [13].

The genotypes of vines until the continental drift, develop into uniform pedoclimatic conditions and geographical and after the separation of the continents evolution of species has passed through in conditions of geographical isolation. Although the spontaneous species from different geographic regions (European, Asian and American) differ in morphological, however, share many common characteristics, which indicate that they are the related and have a common origin [15].

Pending the completion of the process of formation continents, the climatic conditions were similar throughout the area of spreading vine genotypes, which contributed to their widespread.

As a result of the intensification of cloak convection action torrent of the earth had occurred hobs tectonic movements, fact that led to the change of the Earth's topography and soil and climate conditions. Finally, many genotypes changed their area of spreading, and some genotypes generally disappeared.

Natural areas of spread for: *Phyloxera vastatrix* Planch., *Plasmopara viticola* Berl. & De Toni, *Uncinula necator* (Schwein) Burrill. etc. is the South-eastern North America (Fig. 2.) [12, 13, 20, 21].

The genotypes of vines as: *M.rotundifolia* Michx., *V.labrusca* L., *V.lincecumi, V.riparia, V.aesrivalis* etc. has the same area of distribution - South-eastern North America and during the evolution of the genetic code of the genotypes of these species of vines has been modified in the sense of creating immunity against this pest (Fig.2.) [12, 13, 20, 21].

The varieties of *V.vinifera* L. that are spread in the Euro-Asian and not have the same natural habitat of spread the phylloxera of the vine as a result of the lack of influence during developments was not necessary the formation of genotypes grapevine living resistance to this pest.

Although *V.vinifera* L. has great potential genetic the genotypes of origin intraspecific does not ensure overcoming the genetic barrier on a nonresistant against the unfavorable conditions of the environment in the area of cultivation.

The mechanism for resistance genotypes to pathogens consists of groups of genes that are responsible for adapting against the exogenous factors and resistance to pathogens. A major role in this relationship is represented by integration and impact of genes on the relationship as "genotype - environment" and "host - parasite".

In such cases the only solution to the problem would be to create new genotypes, which are based on genes responsible for adapting total or specific of the plant against environmental factors, thus representing character responsiveness in the "genotype - environment" and "host - parasite - environment". New variations of genetic recombination are formed in the case.

To creating the genotypes resistant to some or other factors in of the environment, it is necessary to look for varieties homeland initial selection (center of origin) "parasite and host." In the event co-evolutions "parasite" and "host", within the natural range of spread, form relationships adaptation of organisms that includes strength and accommodating. The basic feature of the relationship "host - parasite" is a monotype reaction on the environment, so what is beneficial to the parasite is beneficial for the host.

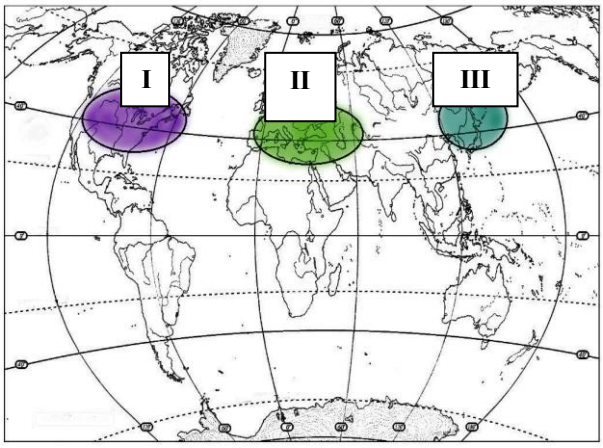

Fig. 2. Natural areas of spreading of vines the genotypes in relation to environmental factors.
I. The genotypes of vines in South eastern North America: *M.rotundifolia* Michx.; *V. labrusca* L.; *V.riparia*, *V.rupestris* etc. resistant to pests and diseases as: *Phylloxera vastatrix* Planch., *Plasmopara viticola* Berl. & De Toni, *Uncinula necator* (Schwein) Burrill etc.
II. The genotypes of Euro-Asian of vines: *V.vinifera* L. ssp. *sativa* D.C.; *V.vinifera* L. ssp. *sylvestris* Gmel.
III. The genotypes of vines in East Asia *V.amurensis* etc., with high resistance to low temperatures during the winter.

Of course, in an environment with pedo-climatic conditions which differ from those of the center of origin, these reactions may change, which could lead to a negative impact on the environment and living organisms.
The genotypes of vineyard interspecific used as donors characters agro-technological outstanding in the improvement of the vine helps create new varieties of vines with durability, productivity stable, high quality fruit from will be achieved derivatives organic wine.
Using the biological potential of interspecific the genotypes derived products will lead to higher quality wine, in terms of organic farming, which requires reducing the use of synthetic chemicals and natural pest and disease control.
Taking into account the areas of spread of the genotypes of vines, such as pests and diseases conclude that the genotypes of grape vines by the area of spreading by South-eastern North America is the center yes in creating the genotypes interspecific resistance increased against biotic and abiotic factors of the environment (Fig.3.).
As a result of the interspecific hybridization of species of vines *V.vinifera* L. and *M.rotundifolia* Michx. It was succeeded by inheritance transmission capacity coexistence newly created genotypes in relation to this pest in the areal of habitation.

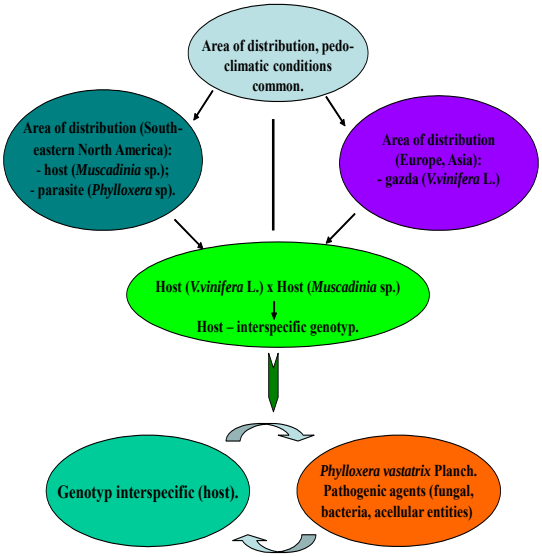

Fig. 3. Host (genotyp interspecific) – parasite.

Thus, the genetic code of the newly created genotypes are present gene responsible for the body's resistance to environmental factors.
Interspecific genotype result of interbreeding *V.vinifera* L. with *M.rotundifolia* Michx. possesses set of chromosomes from the diploid level 2n = 39 and consists of 48.72% of genetic material from genotype *V.vinifera* L. ssp. *Sativa* DC and 51.28% of genetic material from genotype *M.rotundifolia* Michx. (Fig.4.) [1-3, 6].

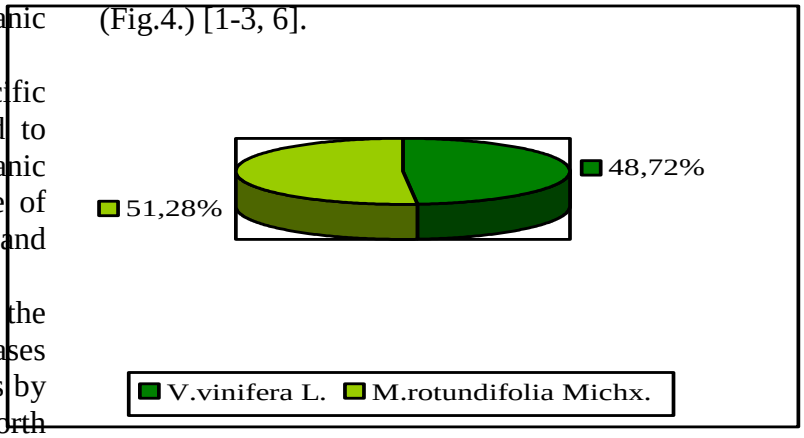

Fig. 4. Interspecific genotype F1. (2n = 39)

First generation interspecific genotype with diploid set of chromosomes 2n = 39, retro-

crossing him with maternal parental form *V.vinifera* L. ssp. *Sativa* DC, with the set of chromosomes 2n = 38, we get with the set of genotypes the interspecific BC1 diploid chromosomes level of 2n = 39.

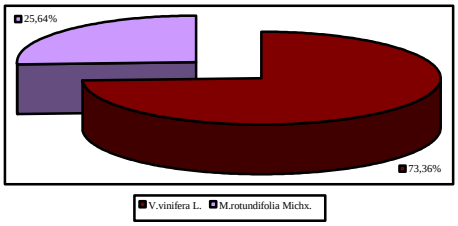

Fig. 5. Interspecific genotyp BC1. (2n=39)

Interspecific BC1 genotype consisting of 73.36% of genetic material from genotype *V.vinifera* L. ssp. Sativa D.C. and 25.64% of genetic material from genotype *M.rotundifolia* Michx. (Fig. 5.).

Interspecific genotype BC1 with diploid set of chromosomes 2n = 39, used in backcrossing with parental form *V.vinifera* L. ssp. *Sativa* DC, 2n = 38, we get BC2 genotypes, with the set of chromosomes diploid level 2n = 39 and 2n = 38.

Analysing the formula BC2 interspecific hybrid genotype, we can conclude that consists of 87.18% of genetic material from genotype *V.vinifera* L. ssp. *Sativa* D.C. and 12.82% of genetic material from genotype *M.rotundifolia* Michx. (Fig. 6.).

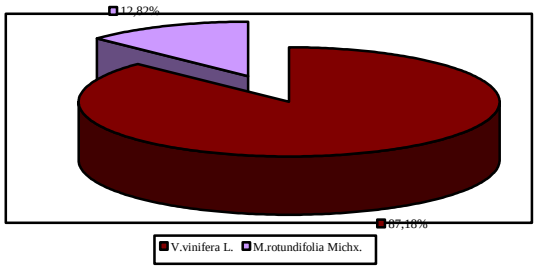

Fig. 6. Interspecific genotyp BC2. (2n=38)

It was BC2 interspecific hybrid backcrossing with parental form *V.vinifera* L. ssp. *Sativa* D.C. and other varieties the interspecific.

By examining the level of ploidy in the BC3 population interspecific hybrids it was found that they were diploid level set at 2n = 38.

The mechanism of resistance genotypes to pathogens, consists of groups of genes that are responsible for adapting to exogenous factors and resistance to pathogens (Fig. 7.; Fig.8.) [1-3, 6, 9, 10, 18, 19].

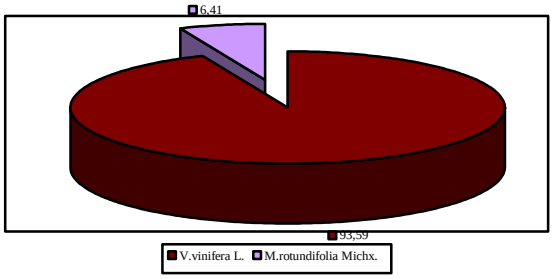

Fig. 7. Interspecific genotyp BC3. (2n=38)

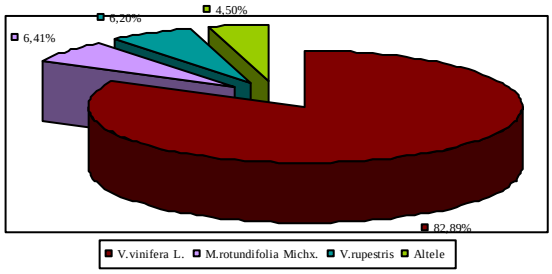

Fig. 8. Interspecific genotyp BC3. (2n=38)

CONCLUSIONS

The involvement of vines genotypes with enhanced resistance rhyzogene front of biotic and abiotic factors in the cultivation of vines will significantly diminish the impact on the environment thus contributing to improving agro-ecological communities.

The genotypes of spontaneous vines in the area of spreading from South-eastern North America is the main center to create interspecific genotypes with increased resistance to biotic and abiotic factors of the environment.

Although *V.vinifera* L. has great potential the genotypes of origin intraspecific genetic overcoming the barrier does not ensure the non-resistant against unfavorable environmental conditions in the area of cultivation.

The provenance of genetic complex genotypes interspecific vines, any order, as a result of heritability of characters expected, enables the creation and selection of genotypes that will underpin the production of raw material for the wine sector and in future will contribute to

the development direction of wine organic.

Creating of the genotypes resistant to some or other environmental factors, it can be successfully achieved only if the original homeland determine genotypes (center of origin) "parasite and host." As a result of development "parasite" and "host" under the natural range of distribution, form relationships adaptation of the body, including resistance "host" to "parasite" and accommodating "parasite" in habitat. The basic feature of the relationship "host - parasite" is a monotype reaction, so what is good for "parasite" is good and "host".

The implementation of the interspecific genotypes will reduce the number of chemical treatments applied in the technological process, this will reduce the environmental impact, increase the quality of products derivative would decrease production costs of planting material.

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