

**PROMOTING THE APPLE VARIETIES WITH GENETIC RESISTANCE TO DISEASES,
REQUIREMENT ON THE ENVIRONMENT PROTECTION AND SUSTAINABLE
DEVELOPMENT**

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Abstract

By promoting the apple varieties with genetic resistance to disease, adapted to the ecological conditions of our country, increase the amount of apples on the market with low levels of pesticides, with beneficial influences on the environment. Due to reduction of number of treatments and quantities of pesticides, the costs are reducing by over 55% to which is reflected positively in economic efficiency.

Keywords: genetic resistance, disease, apple, pesticide

1. INTRODUCTION

In the last decade, the apple varieties have seen a significant change by being promoted in the field varieties to meet growing consumer demands. A special case is promoting of apple varieties with genetic resistance to disease, which, for the new plantations are links to economic performance technology, with immediately effect by eliminated, totaly or partialy, the treatments with fungicides.

Orientation to apple varieties resistant to disease will require gradually as a result of economic efficiency, but also because they constitute the main factor in achieving the ecological productions.

R&D Station for fruit growing Voinești was and remains the promoter of resistant apple varieties that reach the competitive level on the Romanian market and fruit production preparation for integration into the European Community.

2. MATERIAL AND METHODS

Biological material is represented by apple varieties with genetic resistance to disease, obtained at SCDP Voinești between 1985 and 2009. To obtain varieties with genetic resistance to disease, it was used two methods for amelioration, respectively sexual hybridization and induced mutagenesis.

Sexual hybridization consisted of artificial pollination and mass selection of large populations of hybrids after goals, first, resistance to some diseases, productive potential, fruit quality, etc..

Sexual intraspecific hybridizations were used to obtain these apple varieties: *Generos* [*Frumos de Voinești x* {(*Parmain d'or x M.Kaido*) *x Jonathan*}); *Dacian* [*Delicios de Voinești x* {*Jonathan (Wolf rivers x Malus micromalus)*}] and *Pionier* (*Verzișoare x Jonathan*) *x Prima* (Fig 2, Fig 3.).

Sexual interspecific hybridization to obtain genetic disease resistant varieties, were used once with the introduction and widespread resistance gene Vf in

Romania by American Professor Fredrik Leon Hough, who launched in culture the Prima variety.

By sexual interspecific hybridizations were obtained these apple varieties: *Voinea* (*Frumos de Voinești x Prima*); *Ciprian și Pomona* (*Prima x Starkrimson*); *Luca* (*Champion x Prima*); *Chindia* and *Discoprim* (*Discovery x Prima*) (Fig 1. ,Fig 4.).

By induced mutagenesis, respectively irradiation with different doses of gamma radiation on seeds at dormans (dry) and postmaturated from Prima variety, were obtained these apple varieties: *Iris* and *Real*, obtained from Prima x natural pollination with irradiation of dry seed with dose of 8000 R.

Irisem, *Inedit*, *Voinicel* were obtained by Prima x natural pollination with irradiation of dry and postmaturated seed with dose of 5000 R.

Also, the *Redix* variety was obtained by sexual hybridization *Goldenspur x Prima* (pollen irradiated with 1000R X-rays), and *Remar* variety was obtained by natural pollination of Prima variety.

Observations and measurements made in experimental fields highlight the characteristics of vigor, production potential, fruit quality and resistance to attack of major diseases. The costs of treatment plant performance was determined by recording expenses with pesticides, manual and mechanical work of apple varieties with genetic resistance to disease, compared with sensitive varieties.

The data were collected from cultures and microcultures of competition, with trees grafted on MM 106 rootstock, grown in intensive susem (1000 trees/ha) and free crown flattened on the line.

3. RESULTS AND DISCUSSIONS

Promoting the apple varieties with genetic resistance to disease, has a benefically influence on protecting human health and the environment. The first apple varieties with genetic resistance to disease have been homologated at SCDP Voinești in 1985; they were appreciated for their resistance to scab and mildew, productivity and less for

and parasites populations and maintaining the fruit quality standard.

4. CONCLUSIONS

The apple varieties, grafted on rootstock MM 106, has some superior characteristics, expressed primarily through genetic resistance to major diseases and the high quality of fruit, high productive potential, with significant economic advantages.

Compared to the standard assortment of apple, sensitive to disease, which to maintain a proper healthy requires at least 14 treatments, the resistant apple varieties required seven treatments with insecticides to combat pests, which can be applied 1 - 2 treatments with fungicides during heavy rainfall, to combat *Gleosporium*.

The disposal of fungicides, the use of insecticides with high selectivity, coupled with quality and productivity of the new varieties homologated, support the economic and environmental protection, the basic arguments in promoting their in the field.

5. ACKNOWLEDGMENTS

Thanks to the S.C.D.P.P. Voinesci, Dambovita.

6. REFERENCES

- [1] Braniște Nicolae, Mazilu Crăișor, Amzăr Valentina, Petre Gheorghe, Andreieș Nistor, Șerboiu Luca, Uncheașu Gabriela, Șerboiu Albertina, Platon Ioan, Balaci Raveca, Vlădeanu Doina, 2004. Cultura soiurilor de măr cu rezistență genetică la boli în România. Proiect 818 UAPM – MAPAM – 56 pagini.
- [2] Braniște Nicolae, Mazilu Crăișor, Amzăr Valentina, Militaru Mădălina, Șerboiu Luca, Uncheașu Gabriela, Petre Gheorghe, Șerboiu Albertina, Balaci Raveca, Platon Ioan, Vlădeanu Doina, 2004. Cultura mărului. Editura Ceres, București – 88 pagini, ISBN 973-40-0666-5
- [3] Petre Gheorghe, Andreieș Nistor, Petre Valeria, Oprea Ion, 2005. Tehnologia obținerii unor producții de mere competitive. Editura Pildner, Târgoviște – 117 pagini, ISBN 973 – 7774-27-2.
- [4] Petre Valeria, 2005. Ameliorarea soiurilor prin mutagenză indusă. Editura Pildner, Târgoviște – 110 pagini. ISBN 973 – 7774-28-0.
- [5] Petre Gheorghe, Petre Valeria, Andreieș Nistor, Neagu Ionuț-Ovidiu, Erculescu Gh., 2006. Ghid pentru sporirea productivității și calității merelor. Editura SUN Grafic. Proiect 3451/2004. Program Agral, Subprogram S3 Polevit – 109 pagini. ISBN 973 – 86693 - 6 - 7.
- [6] Braniște Nicolae, Șerboiu Luca, Uncheașu Gabriela, Balaci Reveca, Petre Valeria, Militaru Mădălina, 2006. Fondul de germoplasmă la speciile pomicele de arbuști fructiferi și căpșuni. Colectarea, conservarea, evaluarea și utilizarea fondului de germoplasmă la genul *Malus sp.*



Fig 1. Voinea variety



Fig 2. Generos variety



Fig 3. Pionier variety



Fig 4. Luca variety