

## DEVELOPMENT OF POTATO BREEDING RESEARCH FOR CREATION NEW POTATO VARIETIES FOR PROCESING AT STATION FOR RESEARCH AND DEVELOPMENT OF POTATO TARGU SECUIESC

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**Abstract.** Potato, from the breeding point of view, presents the following biological physiological specific features: vegetative multiplication, heterogeneity of progenitors', large plasticity, sterility, incompatible to hybridization, excessive sensibility to diseases. The first three specific features advantage the breeding process on a large scale, but the last two thus complicates the breeding activity and constitutes important problems to success.

The breeding of potato has as permanent objective the obtaining new varieties with high yield capacity, with high resistance to diseases and pest, with high quality, which have to give the satisfaction to consumers.

The creation of new potato varieties is a continue process, which has to take into account the change of ecological conditions, with increase of aggressivity and pathogenity of diseases and pest, apparition of rases, stems, brotypes, pathotipes, as well as the continue increasing of consumers demands.

**Keywords:** potato, new varieties, yield capacity, resistance to viruses, chips and pommes frites

### INTRODUCTION

The cultivated potato in Europe, having the origin in the South and Central America, cannot have the possibility to improve the genetically material from other species of tubers *Solanum* genre, and evaluated as a low number of genotypes [8].

The variety is a main resource for increasing the yield, without supplementary costs and energy [1].

But, each variety, as any other biological material or production equipment, has a confined time and biological degeneration with a normal wear, according to pathogens evolution, change of climatically, technical and economical condition, as well as the demand of market [6, 9]. To give satisfaction with priority to continuously demand of consumers and producers, potato breeding is a permanent activity, of long standing, with objectives in a permanent progress, well established, which have to be satisfy by genetics' and breeders in the new creation [7].

The yield capacity, as hereditary feature, is very complex, having a great influence by climate and photoperiod [5].

The precociousness is considered recessive by genetics', having a strong correlation with yield capacity and it is conditioned by a large number of polymers genes [4].

The dry matter content, respectively starch, is a hereditary feature, which has a strong influence by geographical and agrotechnics conditions. This feature is polyfactorial, dominant. The hybride clones are heterozygote and those with high content of starch can be selected [2].

The potato breeding activity at the Research and Development Station for Potato – Targu Secuiesc, Covasna County, have been started since 1987, with very definite objectives, which give the possibility of homologation of 11 potato varieties, from which 4 varieties have breeding licenses.

In this paper is presented the methodology of obtaining and description of varieties with destination for processing: *Luiza*, *Mikel* and *Ioana* new varieties

created by the Research and Development Station for Potato Targu Secuiesc.

### MATERIALS AND METHODS

All varieties are obtained by sexual hybridization followed by individual clonal selection, according to the classical scheme of potato breeding – 12 years [3].

The main steps of working method were:

- Established of genitors according to physiological and technological qualities of tubers with destination for processing;
- Sexual hybridization, followed by all steps: seedlings, vegetative populations, descendants, comparative crops for completion (3 years in the network of research units and 3 years in the network of National Institute for testing and Registration of Varieties / ISTIS) and selection for maintaining in the field of clonal selection on over 1000 m a.s.l. (Apa Rosie);
- Homologation, obtaining license and registration in the National List of Cultivated Varieties.

All three mentioned varieties have a high yield capacity, have a starch content over 18%, are resisting to potato cyst nematodes (*Globodera rostochiensis*), and black wart (*Synchytrium endobioticum*) and viruses. The starch content and processing quality were determined in the laboratories of SCDC Targu Secuiesc, resistance to potato cyst nematodes at Fagaras Centre, resistance to black wart at Pojorata Centre Suceava and resistance to viruses at virology Laboratory (I.N.C.D.C.S.Z. Brasov).

### RESULTS AND DISCUSSIONS

**Variety LUIZA (Fig. 1)** – have been patented in 2005/00029.

*Genealogy of variety Luiza:* FANAL X OMEGA

*Description of plant:* the plant is well developed, with a medium number of stems; the flowers are big and have white colours. The tubers are oval, with no deep eyes, the skin is yellow and the flesh is yellow. The sprouts have a middle size, they have a conic

shape at the beginning of development and cylinder shape later, the terminal bud have a red – violet colours, with short lateral ramifications.

*Period of vegetation:* *Luiza* variety belongs to the group of middle late varieties, with a vegetation period of 85 – 100 days.

*Yielding capacity* was tested at the Station for Agriculture Research Braila and it is over 52.5 tonnes/ha.

*Culinary quality* is very good and belongs to B class, recommended to production of chips, having a yellow colour, after frying and 7 rate on a scale from 1 to 9. The content of starch is over 20%. This variety can be used for pommes frites production.

*Resistance to diseases and pest:* *Luiza* variety is middle sensitive to late blight on leaves and tubers, very resisting to Y (PVY) and leaf roll (PLRV) viruses, resisting to potato cyst nematodes (*Globodera rostochiensis*).



Figure 1. Variety LUIZA



Figure 2. OSIM brevet

**Variety IOANA (Fig. 3)** – have been homologated in 2003 following obtain the licence.

*Genealogy of variety Ioana:* M.P.I. 69 X CARPATIN

*Description of plant:* the plant is well developed, with a medium number of stems, the flowers have a middle size and white colours with dark yellow anther. The tubers have a round shape, with yellow skin and

white flesh, which is very rare and confers a high quality of chips production.

*Period of vegetation:* *Ioana* variety belongs to the group of middle late varieties, with a vegetation period of 90 – 100 days.

*Yielding capacity* was tested at the Station for Agriculture Research Braila and it is over 56.2 tonnes/ha.

*Culinary quality* is good and belongs to B class, suitable for chips production, the colours of chips after frying is white, obtaining 9 rates on scale from 1 to 9. The content of starch is over 19%.

*Resistance to diseases and pest:* *Ioana* variety is resisting to potato cyst nematodes (*Globodera rostochiensis*), middle resistance to late blight on leaves and tubers, resisting to viruses Y.



3A



3B

Figure 3. Variety IOANA

**Variety MIKEL (Fig. 4)** – have been homologated in 2003 following obtain the licence.

*Genealogy of variety Mikel:* DESIREE X ROESLAU

*Description of plant:* the plant is vigorous with a large number of stems and belongs to foliage type. The leaves have a medium size with light – green colour. The flowers have a medium size, having a violet colour with white points. The tubers have a short oval shape with shallow eyes. The colour of skin is red and the colour of flesh is cream. The sprouts have a conic shape with middle size and red – violet colours on the base of sprouts. The bud of sprout on light is half open and porosity is dense to very dense.

*Period of vegetation:* *Mikel* variety belongs to the group of late varieties, with a vegetation period of over 110 days.

*Yielding capacity* was tested at the Station for Agriculture Research Braila and it is over 67.0 tonnes/ha.

*Culinary quality* is good and belongs to B class. *Mikel* variety is very suitable for pommes frites production. The content of starch is over 19%.

*Resistance to diseases and pest:* *Mikel* variety is resisting to late blight on leaves and tubers, is resisting to leaf roll virus (PLRV) and tolerant to virus (PVY). It is resisting to potato cyst nematodes (*Globodera rostochiensis*), and black wart (*Synchytrium endobioticum*).



4A



4B

Figure 4. Variety MIKEL

## CONCLUSIONS

- The potato varieties LUIZA, IOANA and MIKEL have a good capacity of yield, are very well adapted to soil and climate condition of Romania on the base of testing activity on the network of the National Institute for Testing and Registration of Varieties (ISTIS) before homologation.
- Thanks to the high content of starch and good culinary and technological qualities, all varieties are suitable to production of chips and pommes frites.

- The high resistance to viruses Y (PVY) and leaf roll (PLRV) permits the multiplication of seed potato a longer time and obtaining a more profitable yield.
- The utilization of complex fertilizer (15:15:15) is efficient till N<sub>150</sub>, P<sub>150</sub>, K<sub>150</sub> level, when is possible to obtain maximum clear profit.

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