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New potato varieties created at the National Institute of Research and Development for Potato and Sugar Beet Brasov

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Abstract Potato breeding are oriented to obtain varieties with resistance to biotic and abiotic factors and with high yield capacity to satisfy the both quantitative and qualitative needs of consumers.

Productivity, quality and stability are achieved through crop improvement works to promote new varieties with advanced traits.

Among the achievements of National Institute of Research and Development for Potato and Sugar Beet in 2014 are registered the varieties Brasovia, Castrum, Marvis and Sarmis.

These varieties are medium early and there are obtained through sexual hybridization and individual clonal selection.

All mentioned varieties have a high yield capacity and resistance to black wart (*Synchitrium endobioticum*), middle resistance to different viruses (PVY^0 and PLRV) and to late blight (*Phytopththora infestans*).

The consumption destination is for autumn-winter, being suitable for all kinds of culinary preparations, from salads to mash potatoes.

Key words

new potato variety, Braşovia, Castrum, Marvis, Sarmis, genealogy, characterization, yield capacity

The potato variety being a living organism which is multiplied vegetatively is developing its own and after a constant period declins due to viral degeneration and climate. Increasinly complex demands of consumers and the many new varieties from the market make a number of existing varieties to be replaced by others that respond better to the requirements. (6)

By Fodor (4) quoted Bodea (1) it is estimated that approval and acceptance of a large number of varieties provide an enhanced genetic diversity. Thus, appears the possibility to choose varieties easily adapted to the production conditions and which suffer less because of unfavorable factors.

Consumer requirements evolve over time with changing production technologies and with the modification of plants growing areas due to the climatic conditions. The potato has got to be grown in areas very different from country of origin, the most obvious example is potato cultivation in countries like India or Egypt.

Galfi (5) quoted Schick treaty "Die Kartoffel" shows that success depends on 4 factors:

- various initial material suitable with the breeding objectives;
- methods to improve the selected characters;
- breeder hand as qualified and experienced;
- suitable environment to grow the plants which are under selection.

Knowledge of genetic varieties and valuing the various hybrid combinations that combines qualities of resistance to pests and diseases with agronomic qualities of tubers represents the decisive step in achieving a diverse assortment of potatoes.

The breeding process is based on a careful study of existing genetic resources, old varietes, local populations or wild species. Wild species represent invaluable sources regarding some new characters that can be introduced in the future varieties to better respond to the new requirements. A number of old varieties have some valuable characters that can be reconsidered and after carefully controlled hybridization can lead to highly successful combinations. After a rigorous selection these combinations lead to new performant varieties regarding the resistance and the cultural value.

Materials and Method

All varieties are obtained by sexual hybridation followed by individual clonal selection, according to the classical scheme of potato breeding (3, 2).

The main steps of working method were:

- establish of genitors according to the physiological and technological qualities of the tubers;
- sexual hybridization, including seedlings, vegetative populations, descendants, comparative crops (3 years

in the network of National Institute for Testing and Registration of Varieties – ISTIS);
- obtaining license and registration in the National List of Cultivated Varieties.

The resistance to black wart was determinated at Pojorata Centre Suceava. The starch content and processing quality were determinated in the NIRDPSB Brasov laboratory. Also resistance to late blight and viruses were determinated in the fields and laboratories of NIRDPSB Brasov.

Results and Discussions

Potato variety **BRASOVIA**
Genitors: Amelia x Impala
Morphological characters: The plant is well developed, with a large number of stems. The leaf with intermediary opening, strong presence of leafleats, dark green color. Medium size of corolla, low frequency of white flowers. The tubers are round-oval with yellow skin and white-yellow flesh. The sprouts are medium, conical, with strong anthociyanin colouration and medium pubescence of base.
Physiological characteristics: Brasovia variety belongs to the group of middle varieties with a vegetation period of 100 days.
Resistance to pests and diseases: Is middle sensitive to late blight on foliage and tubers, middle resistant to PVY and leaf roll viruses and resistant to potato wart (*Synchitrium endobioticum*).
Culinary quality : It has a good culinary quality (class A/B) and a starch content of 13,25%. This variety is suitable for a range of uses.
High yielding in a wide range of soil types.

Fig.1 Brasovia variety: leaf, flower and sprouts (photo original)

Potato variety **CASTRUM**
Genitors: Christian x Dura
Morphological characters. The plant is tall with semierect port. The leaf with intermediary opening, strong presence of leafleats, light green color. Medium to low frequency of white flowers with corolla medium to little.
The tubers are round-oval with yellow skin and pale yellow flesh. The sprouts are ovoid, with red purple strong anthociyanin colouration and low pubescence of base.
Physiological characteristics: Castrum variety belongs to the group of middle varieties with a vegetation period of 110-120 days.
Resistance to pests and diseases: Is middle sensitive to late blight on foliage and tubers, very resistant to PVY and leaf roll viruses, resistant to potato wart (*Synchitrium endobioticum*).
Culinary quality: It has a good culinary quality (class B) and a starch content of 10,25%.

Fig.2 Castrum variety: leaf, flower and sprouts (photo original)

Potato variety **MARVIS**
Genitors: Amelia x Impala

Morphological characters: The plant is well developed, with medium number of stems. The leaf with intermediary opening, absent or very low presence of leafleats, light green color. Very low to low frequency of white flowers, with little to medium corolla.
The tubers are oval with medium yellow skin and pale yellow flesh. The sprouts are medium, conical, with strong anthociyanin colouration and medium pubescence of base.
Physiological characteristics: Marvis variety belongs to the group of middle varieties with a vegetation period of 90-100 days.
Resistance to pests and diseases: Is middle resistant to late blight on foliage and tubers and also medium resistant to PVY and leaf roll virus and resistant to potato wart (*Synchitrium endobioticum*).
Culinary quality: It has a good culinary quality (class B) and a starch content of 14,75%.

Fig.3 Marvis variety: leaf, flower and sprouts (photo original)

Potato variety **SARMIS**
Genitors: Tresor x Impala

Morphological characters: Medium to intermediate type foliage structure, steams semi-upright. The leaf with intermediary opening, absent to very low presence of leafleats, light green color. Medium frequency of white flowers.
Tubers long oval, pale yellow skin and yellowish white flesh and shallow eyes.

Physiological characteristics: Sarmis variety belongs to the group of middle varieties with a vegetation period of 100 days.
Resistance to pests and diseases: Is moderately resistant to late blight on foliage and tubers, moderately resistant to PVY and leaf roll viruses and resistant to potato wart (*Synchitrium endobioticum*).
Culinary quality: Sarmis has a good culinary quality (class A / B) and a starch content of 14,0%.

Fig.4 Sarmis variety: leaf, flower and sprouts (photo original)

Table 1

Yielding capacity in network I.S.T.I.S. (3 years average)

Variety	Yield (kg/ha)/years							Yield average kg/ha	Difference from control	
	Târgovişte	Tg. Secuiesc	Sibiu	Satu mare	Rădăuţi	Hărman	Bacău		kg/ha	%
Braşovia	21515	46063	41014	31608	32394	38163	26441	**33885**	4385	114,86
Castrum	19082	53135	43041	31488	28383	26072	33604	**33544**	4044	113,71
Marvis	17439	45642	42584	23539	32040	25508	28912	**30809**	1309	104,43
Sarmis	17849	55261	42774	23824	26753	25424	28003	**31413**	1913	106,48
Magic (2011-2012) Sante (2013)	19522	42497	39871	21919	26900	24896	30897	**29500**	0,0	100,0

Comparing yield data obtained in network ISTIS is observed that the new varieties exceded the control varieties, Magic respectively Sante with procent between 4.43% Marvis variety and 14.86% Brasovia variety. From these procentages can be inferred production capacity in various environmental conditions and also ecological plasticity of varieties. Is recommanded cultivation in favorable areas and in thermo-hydric risk areas using irrigation system.

Culinary quality was assessed in the Technology laboratory of NIRDPSB Brasov. Based on determined attributes and the score obtained (notes for desintegration, consistency, mealiness, humidity and granulation) a variety can fit in a class of use. Class A include firm potatoes for salad but potatoes from this class can also be used for other dishes. Tubers of this type does not shatter, remain whole, are unmealy and have a fine structure. The taste is good and starch content is low. Class B tubers are reasonably firm, suitable for most culinary preparations. At boiling shatter a little, are a little mealy, slightly moist and have a fine structure. Due to the multiple uses and good taste this kind of varieties are greatly demanded by consumers.

After the determination of defining elements of culinary quality, the varieties Brasovia and Sarmis were placed in A/B class and Castrum and Marvis varieties in B class.

Table 2

Culinary quality of varieties Braşovia, Castrum, Marvis and Sarmis compared with standard varieties Magic and Santé

Character	Braşovia	Castrum	Marvis	Sarmis	Magic	Santé	Observations
Aspect	1,5	2,5	1,5	2,0	2,5	1,5	1-very showy 4-unshowy
Taste	3,0	3,0	3,5	2,5	3,7	3,0	1-excelent 4-less good
Color	4,5	4,0	4,5	4,5	4,0	4,5	1-white 6-intense yellow
Disintegration	1,0	2,0	1,5	1,0	1,7	1,5	1-remain whole 4- hard crush
Consistency	1,5	3,0	3,5	1,5	2,4	2,0	1-firm hearty 4-unhearty
Mealiness	2,0	2,0	1,5	2,5	2,1	1,5	1-unmealy 4-very mealy
Moistness	2,0	2,0	1,5	2,5	2,7	2,5	1-moist 4-dry
Granulation	2,5	2,5	2,5	2,5	2,3	1,0	1-fine 4-very coarse
Cooking type	AB	B	B	AB	B	A/B	
Rawdiscolouration	3,0	2,0	4,0	2,0	2,5	2,0	1-uncolored 9-blackened
Starch content	13,25	10,25	14,75	14,0	15,3	15,0	

Conclusions

The need to create new potato varieties in Romania is imposed by a number of factors, like quarantine pests and diseases *Globodera sp*., *Clavibacter michiganensis* and *Ralstonia solanacearum.*

The presence of viral infection in our country is above the pressure existing in European countries with tradition in potato culture. Varieties developed in these countries have a short life due to the degeneracy viruses.

It is important to have adapted varieties to the climatic conditions to avoid stress and physiological injuries.

The varieties Braşovia, Castrum, Marvis and Sarmis are recommended to be cultivated in favorable and very favorable areas for potato. In the thermo-hydric stress areas is recommended to use irrigation to obtain satisfying production.

The potato varieties created in the last years at NIRDPSB Brasov have a good capacity of yield and are well adapted to the Romanian climatic and soil conditions according to the tests in the network of State Institute for variety Testing and Registration (ISTIS).

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