New Varieties of Topinambour (*Helianthus tuberosus*) Obtained at V.R.D.S. Buzau

Costel VÎNĂTORU¹*, Bianca ZAMFIR¹, Camelia BRATU¹

¹Vegetable Research and Development Station Buzău 23, Mesteacănului Street, 120024, Buzău, Romania

*)Corresponding author, e-mail: costel_vinatoru@yahoo.com

BulletinUASVM Horticulture 73(2) / 2016

Print ISSN 1843-5254, Electronic ISSN 1843-5394

DOI:10.15835/buasvmcn-hort:12086

Abstract

It is not known precisely the introduction of this species in our country, most research indicates XVI century but there are opinions that consider that this species is present in our country since the Dacian times. The research started in 1996, aimed to obtain biological stabilized and genetically distinct varieties with reduced variability of the main characters, developing specific technology culture in accordance with DUS and rehabilitation of species through the promotion and expansion as vegetable crops in order to reevaluate its many uses.

Keywords: *breeding, clonal selection, inulin, phenotype, tubers*

Introduction

It is not known precisely the introduction of this species in our country, most research indicates XVI century but there are opinions that consider that this species is present in our country since the Dacian times. Until now has not been cultivated on a large area and it has not been obtained and patented a distinct biological Romanian variety. It can be said that this species has been neglected until now as vegetable crop. This crop gives a high yield in tubers, it grows better in poor soils than most crops, and it is resistant to pests and common plant diseases as well as to cold temperatures (Kosaric, N., 1994). Selection for high yield, inulin content and other economically important traits are useful for improving this crop (Mullin, W. J., 1994). Unlike most crops that store carbon as starch, a polymer of glucose, in the Jerusalem artichoke carbon is stored as inulin, a fructose polymer (Kays, 2007).

Aims and objectives

The research started in 1996, aimed to obtain biological stabilized and genetically distinct varieties with reduced variability of the main characters, developing specific technology

culture in accordance with DUS and rehabilitation of species through the promotion and expansion as vegetable crops in order to reevaluate its many uses.

Materials and methods

It was evaluated the local genetic heritage in this species, representing valuable germplasm base composed of 24 genotypes. After purchasing the basic biological material, the evaluated genotypes were collected and 3 of them were detained as progeny. The breeding method used was the clonal selection. Regarding crop technology were studied several technological options on the distance between plants / row and between rows, with different eras of crop set.

Results and discussion

The researches were completed by a valuable germplasm collection in this species, were obtained three varieties with distinct characteristics. In terms of plant height, A2 ranks first with a height of 2.8 m, and the smallest height is 0.8 m registered A3 feature that gives high distinction. In terms of the number of stems, first place is taken by A3 with 10 stems and the lowest value was recorded by A1

Tab.1. The main characteristics of plant (average values)

Feature		Plant height(cm)	Stems no./ plant main	Stem base diameter (cm)		Leaf lenght. (cm)	Leaf width (cm)	Peduncle length(cm)	Leaf distance (cm)
				second					
genotype	A1	2.5	6	3.2	1.8	22	14	10	6
	A2	2.8	8	2.9	1.6	18	12	8	5.6
	A3	0.8	10	2.6	1.2	10	4	1	1.2

Tab.2. Tubers number and weight per plant

Accession	A1			A2			A3		
Tubers no.	Big	Small	Total	Big	Small	Total	Big	Small	Total
Pieces	42	48	90	33	39	72	31	36	67
Tubers weight (g)	2958	904	3862	2115	360	2475	1895	541	2436
Average tubers weight (g)	70.4	18.8	42.9	64.0	9.2	34.3	61.1	15.0	36.3

Fig.1. Accession (A1, A2 and A3) and cross section

with 6 stems. Regarding the leaf size, the highest value was recorded by A1 with 22 cm length leaf and 14 cm width. In comparison, A3 recorded the smallest value of 10 cm long and 4 cm wide leaf. Regarding foliage color, A1 shows a light green, dark green at A2 and A3 green. A2 shows strong anthocyanin coloration on the upper stems, accentuated in the insertion of the leaves. A3 shows a slight coloration only anthocyanins in the leaves and A1 shows no anthocyanin coloration. Regarding leaf porosity was found that A1 shows a leaf with high porosity, A2 shows average porosity and A3 has a smooth, slightly velvety leaf (tab.1.)

The main distinguishing features of the 3 varieties are tubers that differ by color. A1 shows pink-brown tubers with an average yield of 3.862 kg / plant. A2 shows white tubers and recorded an average yield of 2.475 kg / plant. A3 shows tubers pink with a yield of 2.436 kg / plant. (tab.2.)

Crop technology research found that the best possible technological crop setting scheme for all cultivars is 70 cm between rows and 20-25 cm between plants / row on billon field. It was found

that when the crop is set in fall the yield recorded an increase of over 10% compared with spring. (fig.1)

Conclusion

The research ended with the evaluation of a valuable germplasm collection. Three stabilized genetically varieties with distinct phenotypic characteristics were obtained. Among them, A1 was patented and the other two will be submitted in 2017. It was developed a specific technology for each variety and has been promotional offered improved material to growers with the aim of extending these varieties as vegetable crops.

REFERENCES

1. Kays Stanley J, and Stephen F. Nottingham (2007). Biology and chemistry of Jerusalem artichoke: *Helianthus tuberosus* L. CRC press.
2. Kosaric N, et al. (1984). The Jerusalem artichoke as an agricultural crop. Biomass5.1: 1-36.
3. Mullin W. J., et al. (1994). The macronutrient content of fractions from Jerusalem artichoke tubers (*Helianthus tuberosus*). Food chemistry 51.3: 263-269.