CUCUMIS METULIFERUS, A NEW ACCLIMATIZED AND BREEDED SPECIES AT V.R.D.S. BUZĂU

CUCUMIS METULIFERUS, O SPECIE NOUĂ, ACLIMATIZATĂ ŞI AMELIORATĂ LA S.C.D.L. BUZĂU

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Abstract: *There were more activities concerning the acclimatization and breeding of this new species in different geographical areas from the origin area, whereas intensive studies were carried out after 1980, when the first concrete results were given to publicity. In our country the first research on studying this species started after 1990 at V.R.D.S. Buzău. During 20 years of studies and research of Breeding Laboratory in the station, the proposed objectives were reached. The station presently disposes of genetical adapted and diversified material for our country and also were elaborated specific crop technologies both for protected areas and open field. Also it detains a rich germplasm source composed of 8 genetical stabilized distinct lines and an enhanced amount of information concerning this species. L 1 was registered at I.S.T.I.S. Romania towards approval and patenting in 2012.*
Key words: acclimatization, breeding, segregation, phenotype, genotype.

Rezumat*: Preocupări pentru aclimatizarea şi ameliorarea acestei specii în alte areale geografice diferite de zona de origine au existat de mult, însă în mod intensiv, după anul 1980, când au fost date publicității primele rezultate concrete. La noi în țară, cercetările privind studierea acestei specii au debutat la Stațiunea de Cercetare și Dezvoltare pentru Legumicultură Buzău după anul 1990. În cei peste 20 de ani de studii şi cercetări în cadrul Laboratorului de Ameliorare al unității, obiectivele propuse au fost atinse. Unitatea dispune în prezent de material genetic adaptat şi variat pentru țara noastră, au fost elaborate tehnologiile specifice de cultură pentru spații protejate şi câmp, deține o bază solidă de germoplasmă compusă din 8 linii distincte stabilizate genetic şi un volum mare de informații privind cunoaşterea acestei specii. În anul 2012, L1 a fost înscrisă la ISTIS România în vederea omologării şi brevetării.*
Cuvinte cheie: aclimatizare, ameliorare, segregare, fenotip, genotip.

INTRODUCTION

Cucumis metuliferus is an annual herb with seed propagation, which can be cultivated in similar conditions as melons or cucumbers. The plant is native from Africa, Kalahari desert, successfully cultivated in tropical and subtropical regions, mostly in hot areas because the species does not tolerate low temperatures. This species is known under different names such as: "African horned cucumber", "kiwano" in New Zeeland, also with international spreading. It is also called "Jelly melon", "melano", "pikano", etc.

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Breeding and acclimatization research of this species in other geographical areas were carried out in the past but intensively after 1980 year. This species is successfully cultivated in Kenia, New Zeeland, Senegal, Somalia, Yemen, South Africa, Botsuwana, Zimbabwe, California, Israel, Australia, France, Spain, Japan, S.U.A. and even Croatia. In our country, research concerning acclimatization of this species have intensified after 1990 year. The first significant results were obtained at V.R.D.S. Buzău, at the Plants Amelioration Laboratory in 1996. A significant contribution has had prof. C. Petrescu from University of Agronomic Sciences and Veterinary Medicine of Bucharest.

The main objectives of this study were:

- acclimatization of this species in Romania;
- applying the specific crop technology for protected spaces and open field;
- breeding of this species in order to obtain new varieties with different phenotypical characters.

MATERIAL AND METHOD

Biological material utilized in this study was purchased from the native area of the plant in 1992 when the research started. The species showed genetical potential and high adaptability to the climatic conditions of our country, especially in protected areas. After many studies and research, in 1996 was elaborated the crop technology and were obtained the first significant results concerning acclimatization and cultivation.

The main features of the studied biological material are:

- Vigorous annual plant, with climbing and trailing stems;
- Strong root system with large roots, resistant at breaking, slightly elastic and in drought conditions explores deep the soil.
- The stems reach 2-3 m length covered with stiff, bristly hairs. The stem has single tendrils of 4-10 cm.
- The leafs are altern ovate or slightly pentagonal with a stalk of 3-12 cm.
- The flowers are monoecious, single or two grouped at the leaf axil. There are two types of flowers, staminate flowers typically appearing several days before pistillate flowers. After pollination the flowers dry and die. The pistillate flowers are larger and have an inferior ovary tiny fruit shaped at the corolla base covered with rough spines.(fig. 1 şi 3)
- Fruits are elongated, slightly cylindrical, 6-16 cm long, 3-9 cm diameter. These are tapered ends covered with strong spiny out-growth of 1-1,5 cm long, dark green spotted specific colour and turns into bright yellow at physiological maturity with highlighted circles around spines. The fruits are covered with bloom along the entire vegetation period. After harvest shelf life is very long. If the ripened fruits are not crushed, their shelf life can be 360 days, practically from one year to another. The fruit is pendulous hanged by a resistant thin stem, 2-7 cm. (fig. 2).
- The seeds are ovate, smaller than commun cucumber seeds, 3-5 cm long and 3-4 mm width, with round ends, flattened, covered with a bright fine down.



Fig. 1 – Female flower (♀) → **Fig. 2** – Fruit evolution ← **Fig. 3** – Male flower (♂)

These species crop technology is similar with commun cucumbers crop technology. In this study were used two variants to set up the culture: by seedling and direct sowing. The two variants demonstrated effectiveness both in protected ground and open field. The cucumber plants were distributed in rows spaced 1,4 m apart and 40-50 plant spacing in open field and 50-60 cm for protected ground. Both for open field and protected ground, a particular attention should be paid on climbing plants vertically on strings. If the plant grows horizontally on the ground, the results are not conclusive. Care works are similar with the ones for commun cucumbers, only that this plant is far more resistant at pattogens, pests and diseases attack and needs few treatments. Therefore, we registered the main phenological and yield data (tab. 1).

Table 1

The main phenological and yield data obtained

Culture systems	Sowing date	Spring date	Bloom date	Green fruits	Yellow fruits	Harvest	Yield t/ha
Greenhouse	5.04	12.04	15.06	25.07	10.08	1.09	42
Open field	10.05	22.05	18.07	20.08	12.09	25.09	21

Concerning breeding, altough was started from a single phenotype which showed genetical stability for six years after applying conservative selection correctly and segregation appeared because of the environment stress, especially in greenhouse. After a careful evaluation and lineage examination of the main characters, were obtained eight new distinct phenotypes and a number of eliminated intermediary forms. The eight obtained families were separated and lineage studied for many years.

RESULTS AND DISCUSSIONS

The proposed objectives of this study have been met. The species was acclimatized successfully in our country, it could be cultivated all over the country in protected ground or open field in hot areas, especially south regions. Concerning crop technology, this plant does not require special treatment, it can be cultivated in many technological variants in what concerns culture setting.

The species can be cultivated in ecological system. A special attention should be paid to nutrition and development space required and vegetation factors optimal ensuring, especially temperature and sunlight. Breeding works ended obtaining distinct phenotipical expression at eight new genotypes as regards fruits characters (tab. 2). The main fruits characters of the new obtained families are presented in tab. 3.

Table 2

Fruit detalis of new obtaining biotypes

Line	Longitudinal section	Cross section
		
		
		
		
		
		
		
		

Table 3

The main fruit characters at new obtained families

Studied character/ Line	L 1	L 2	L 3	L 4	L 5	L 6	L 7	L 8
Fruit weight (g)	338	96,6	157,5	321	358,6	278,9	301	370
Fruit lenght (cm)	12	6	11	17	16	12	12	11,4
Fruit diameter (cm)	7,2	5,5	5,7	6	10,2	6,7	6,6	7
Pericarp thickness (mm)	6	4	3	5	6	6	6	6
Spines lenght (mm)	6	2	7	4	4	5	6	5
Spines no./fruit	42	38	68	62	42	66	65	52
Fruits no./plant	22	41	34	25	20	29	24	18
Ribes no./fruit	weak	absent	absent	weak	present	weak	present	present
Bloom degree	medium	medium	strong	medium	medium	strong	medium	medium
Unriped fruit colour	Spotted green	Spotted green	Dark green	Spotted green	Slightly striped	Dark green	Light green	Spotted green
Riped fruit colour	orange	yellow	orange	Yellowish orange	Yellowish orange	orange	orange	Spotted orange
Seed no./fruit	406	82	209	214	194	339	517	400
Seed weight/fruit	5,5	1	3,3	3,2	3,3	5,2	7,9	6,3

CONCLUSIONS

1. *Cucumis metuliferus* was acclimatized for climatic conditions of our country and can be cultivated in all country areas but not allowing decreasing temperature under 12 ºC and under 8 ºC when seed germination is completely inhibited.

2. In our country climatic conditions it manifests as medium late plant with 110 days vegetation period.

3. Because of the valuable genetical heritage it can be cultivated ecologically. New obtained lines seeds were promotional distributed to all over the interested country growers.

4. The research will continue aiming breeding for obtaining new valuable genotypes.

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