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A contemporary approach to breeding elongated pepper (*Capsicum annuum L.*) varieties

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Abstract: Growing area, various ways of production (traditional or contemporary) and consumption (fresh or proceeded), make pepper one of the most important vegetable crops. There are many pepper varieties in Serbia, but just a few genotypes have been selected.

The aim of our work was to select a new pepper variety for pickling. The new variety Dora was created at the Institute for Vegetable Crops, Smederevska Palanka, having in mind the characteristics of both the crop and its species.

This variety was certified by the Ministry of Agriculture, Department of Acknowledgement of Agricultural Crops, in 2009 under the name of "Dora".

Key words: pepper, Dora, selection, yield

Introduction

The sweet elongated pepper crop is very important for the Serbian market both for producers and consumers. Considering the early ripening and high yield, an increasing number of producers decide to produce these varieties in greenhouses, as well as under open field conditions (Cvikić *et al* 2007). This is

why researchers came up with the idea to create an elongated early-ripening high-yielding pepper variety that produces large elongated light crop. Pepper yield is defined by three components: number of plants per unit area, number of fruits per plant and fruit weight (Betlach, 1969), while major high yield components contribute to pepper yield per plant and fruit weight (Ahmed, 1983; Milkova, 1986; Silvetti, 1989).

The new pepper variety Dora is the result of crossing the mother line LP-1 and line KP-042 as the father line by using the *pedigree* method of selection. Dora produces high yields, ripens early and has quality elongated, light yellow peppers.

The objective of this study was to set up a comparative trail in greenhouses in order to establish the advantages of new variety Dora relative to the existing varieties in terms of the most important biological traits. Also, the aim was to gather information regarding the main characteristics and advantages of the new variety of this type.

Material and method

The process of selection of new pepper varieties and hybrids is a continuous task of researchers at the Institute for Vegetable Crops in Smederevska Palanka, that has resulted in over 40 pepper varieties and hybrids, which have found wide application in the production practice. Four elongated pepper varieties were used in this study: Dora, Župska rana, Zlatna medalja and Duga bela, owned by the Institute for Vegetable Crops, Smederevska Palanka. Dora is a medium early, elongated pepper variety, primarily intended for greenhouse production, but it can be successfully grown in the open field as well. It forms a large number of peppers per plant, which successively come to harvest, producing high yields and giving large, very long, light-yellow peppers having a thick pericarp. Other varieties (Duga bela, Zlatna medalja and Župska rana) were used as standards in our experiment.

The experiment was conducted in the greenhouse of the Centre for Vegetable Crops in Smederevska Palanka in a randomized block design in five replications with 30 plants per replication for each variety in the experiment. Regular care and crop protection was carried out during the vegetation.

The new pepper variety Dora is a medium early variety, producing very long and large fruits. The fruits are bright yellow at technological maturity and bright red at botanical maturity. The fruit is fleshy, flat on both sides, so it is easily processed thermally, and even easier to peel. It can be used for fresh consumption and for all types of processing. Under favourable growing conditions it yields around 50t/ha.

Earliness is determined by the number of days from germination to appearance of the first technologically mature fruit, as well as by fruit

characteristics and total yield per plant. Harvesting was carried out at technological maturity and major traits (average fruit weight and pericarp thickness) were determined by the average value of 30 fruit samples. Data were statistically analyzed by variance and LSD (Hadživuković 1991).

Results and discussion

Earlier ripening, higher yield and the quality of pepper fruits justify both the work and the funds invested since greenhouse cultivation produces higher economic benefits as compared to open field production.

The results on the phenological observations for four pepper varieties (Dora, Župska rana, Zlatna medalja and Duga bela) are presented in Table 1.

Table 1: Phenological observations

Line – variety	Sowing – germination	Germination - flowering	Germination – technological maturity	Germination- biological maturity
Dora	12	70	108	129
Duga bela	13	72	115	138
Zlatna medalja	14	69	105	130
Župska rana	12	68	106	126

The results obtained show that Dora belongs to early pepper varieties due to both parameters: period from germination to technological maturity (108 days) and period from germination to biological maturity of fruits (129 days). Also, no significant differences were observed among the test varieties.

The average fruit weight ranged from 99g in Zlatna medalja to 128.7g** in the new variety Dora, with the value being significantly higher as compared to the other test varieties. An identical situation was observed for fruit length, which was between 13.6cm in Zlatna medalja to 18.2cm** in Dora. Significant values were found for pericarp thickness (4.8mm*), as well as for yield per plant (2.72kg*) in Dora as compared to the other traits, Table 2. As for fruit width, no significant values were recorded, and they were within the 3.7 cm – 4.3 cm range for Zlatna medalja and Dora, respectively.

It is noteworthy that the variety Župska rana achieved better results for all traits as compared to Zlatna medalja and Duga bela.

Table 2: Main pepper fruit characteristics

Line - variety	Length (cm)	Width (cm)	Pericarp thickness (mm)	Weight (g)	Yield per plant (kg)
Dora	18.2**	4.3	4.8*	128.7**	2.72*
Duga bela	14.8	4.0	4.0	108.7	2.19
Zlatna medalja	13.6	3.7	3.9	99.0	2.05
Župska rana	15.7	4.5	4.3	114.0	2.35
LSD _(0.05)	0.677	0.328	0.369	8.850	0.346
(0.01)	0.956	0.463	0.520	12.107	0.477

Dora traits, including higher yields, a thicker pericarp and larger longer peppers as compared to the test standards, are of high significance to all producers who aim for large, attractive peppers intended for fresh consumption.

Conclusion

The new elongated pepper variety Dora is a medium early variety, forming a large number of fruits per plant, with fruits being very large, bright yellow, having a thick pericarp and a very pleasant taste. If grown in greenhouses, using agricultural technology, it achieves very high yields. Given the tolerance to the most common causes of plant diseases on peppers, and based on the results achieved in comparison with the test standards, we recommend the new pepper variety Dora primarily for cultivation in greenhouses and in open fields.

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**SAVREMENI PRISTUP OPLEMENJIVANJU SORTI PAPRIKE
(*Capsicum annuum* L.)**

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Rezime

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Ključne reči: paprika, Dora, selekcija, prinos