

## PROTECTION OF THE OLD AUTOCHTONUS VARIETY OF PEPPER FROM PERMANENT LOSS IN OUR AREA

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### Abstract

*In 2007, the Agricultural Extension Service "Sombor", in cooperation with the Provincial Secretariat for Agriculture and the Ministry of Agriculture, launched the Pilot Project Let's Preserve and Protect Old Varieties of Vegetables. The goal of the project was to preserve old domestic varieties of vegetables that are traditionally grown in our area, and their survival is endangered with greater commercialization of vegetable production. They participated 22 primary schools with 3163 students. In this project were collected 5296 samples over three weeks. After collecting, the samples were each individually determined and sorted by plant species, marked, prepared for sowing and recorded in the sample database. Today, in 2022, over 1000 samples of old varieties and populations of vegetables and other plant species are being maintained within this program. A couple of years ago, we began to deal more seriously with old varieties and deepened research on plant species of peppers. This paper will present the phenotypic and morphological characteristics of interesting varieties of indigenous varieties of peppers. These varieties are excellent for further production and testing in laboratory conditions and also for organic production. With this project, forgotten plant species, varieties and food populations have been returned to production.*

**Keywords:** *old variety, peppers, vegetable production, yield*

### 1. INTRODUCTION

Old varieties of vegetables are disappearing at a high rate, every year 1-2% of the percentage is lost. In the last century alone, as many as 75% of old varieties have disappeared in the world. Unfortunately, we do not have data in Serbia. Older varieties of vegetables have a much higher nutritional value. Nowadays, when natural varieties are neglected and suppressed a lot, their renewal and reproduction are very important. What is important is the big difference in taste between hybrids and domestic varieties (Sabadoš et al 2019). With the onset of hybrids from the fifties, the old varieties were suppressed, and the biggest reason is better yield and shape. However, with good cultivation, irrigation and fertilization, old varieties can give excellent yields. Old varieties are suitable for organic producers, because they generally have stronger resistance than hybrids. The old varieties have grown on that land for centuries and thus have best adapted to the conditions, soil and climate. It is most important for pepper to be grown on loose, nutritious, light soil, in areas where there are no late frosts, where there is water for irrigation, and on new land, because it suffers from many diseases and pests. If it is grown in a monoculture, meaning for many years in the same place, then it suffers from viral and fungal diseases and gives poor results and unusable fruits. Irrigation is a very important agrotechnical measure in the production of pepper, especially if it is grown from seedlings because, when transplanting, its root is pulled out, torn and grows in the shallow surface zone of the land, so it is sensitive to drought.



**Picture 1.** Old variety of pepper (V. Sabadoš)

Peppers require heat for proper development. At a temperature below 15 °C, it stops developing, as well as above 36 °C (Ilić, 2009). Seeds begin to germinate at temperatures above 13 °C, and the optimal temperature for growth and development is 22-25 °C. Temperatures from -0.3 to -2.5 °C lead to the death of the plant. Monoculture significantly reduces yields. Soil preparation for peppers begins in the fall, with deep plowing at 30-35 cm. A month before planting, the soil for cultivation is cultivated (shredded and leveled, and immediately before planting, the surface is arranged already according to the choice of technology (use of foil, agrila, irrigation system, etc.). It is necessary to feed peppers regularly, before planting (fertilizer or NPK) and during growth (usually with crystalline and water-soluble fertilizers). Foliar feeding (through the leaves) is also possible.

## **2. MATERIALS AND METHODS**

### *2.1 Methods*

We will single out the most interesting species such as paprika. The Agriculture Extension Service "Sombor" produces seedlings in a greenhouse and sows them in an experimental field. Experiments were placed on mulch film in a drop by drop system. During the growing season, all parameters of growth and development, as well as plant protection, were monitored. At the end of the growing season, all yield parameters were measured. Agriculture Extension Service "Sombor" produces seedlings of old autochthonous varieties every year. The production of seedlings is done in plastic pots of different diameters. During sowing, the substrate is mixed with fertilizer that stimulates plant growth and development. Measurement of parameters on the fruit with the help of a ruler, a refractometer for measuring the sugar content, a dryer for measuring dry matter.



**Picture 2.** Old authrone variety pepper (V. Sabadoš)

### 3. RESULTS AND DISCUSSION

#### 3.1. Results in 2022

The containers are placed in the greenhouse under controlled conditions for growth and development. Seedlings are watered with sprinklers. After that, the seedlings are planted by hand on a mulch film in a drip irrigation system. The plant grows in partially controlled conditions with irrigation, fertilization and protection. Seedlings are planted in pairs on mulch foil at a distance in a row depending on the species. We have selected a few interesting ones from many interesting varieties.

**Table 1.** Results with evaluations of yield and fruit parameters in 2022 years

| nb | variety  | weight/g. | width/cm | length/cm | thickness/cm | type          | color  | nb/chambers | mass sach % | dry matery | capsaicin |
|----|----------|-----------|----------|-----------|--------------|---------------|--------|-------------|-------------|------------|-----------|
| 1  | A 1024   | 45,4      | 5,2      | 3,0       | 0,8          | tomato pepper | red    | 1           | 4           | 9,06       | -         |
| 2  | B 894    | 76,4      | 5,7      | 12,0      | 0,5          | ears          | red    | 2           | 9           | 12,3       | -         |
| 3  | A 243    | 60,6      | 5,2      | 6,8       | 0,5          | bell          | yellow | 2           | 4           | 6,93       | -         |
| 4  | A 2440   | 175,9     | 8,0      | 11,5      | 0,7          | ears          | red    | 2           | 6           | 8,08       | -         |
| 5  | B 1588   | 174,2     | 7,5      | 12,0      | 0,5          | ears          | red    | 2           | 7           | 9,95       | -         |
| 6  | B1       | 77,8      | 6,0      | 6,5       | 0,7          | tomato pepper | red    | 1           | 6           | 7,58       | -         |
| 7  | B 1694   | 106,1     | 6,5      | 11,5      | 0,5          | ears          | red    | 2           | 6           | 10,06      | -         |
| 8  | A 1731   | 108,8     | 6,0      | 11,0      | 0,4          | ears          | red    | 2           | 8,5         | 10,56      | -         |
| 9  | A 97     | 64        | 5,6      | 5,3       | 0,9          | bell          | red    | 2           | 6           | 7,55       | -         |
| 10 | B 412    | 104,8     | 6,0      | 10,8      | 0,4          | ears          | red    | 2           | 9           | 12,43      | -         |
| 11 | B 64     | 212,8     | 10,0     | 14,5      | 0,9          | ears          | red    | 2           | 6,5         | 9,49       | -         |
| 12 | B 1109   | 112,6     | 7,2      | 11,5      | 0,5          | ears          | red    | 3           | 8           | 10,9       | -         |
| 13 | B 4      | 100       | 6,5      | 9,8       | 0,6          | ears          | red    | 2           | 11          | 11,59      | -         |
| 14 | B 1560   | 89,7      | 5,7      | 10,0      | 0,4          | ears          | red    | 2           | 9           | 10,7       | -         |
| 15 | B 1678   | 85,3      | 6,0      | 8,5       | 0,5          | ears          | red    | 2           | 10,5        | 13,56      | -         |
| 16 | A 2599   | 47        | 3,2      | 10,3      | 0,5          | peaked        | red    | 2           | 10          | 14,41      | +         |
| 17 | A 309    | 47,3      | 3,5      | 14,0      | 0,3          | peaked        | red    | 2           | 11,5        | 13,72      | +         |
| 18 | A 2310   | 58,7      | 5,5      | 5,0       | 0,7          | tomato pepper | red    | 1           | 7           | 8,59       | -         |
| 19 | B 105    | 60,7      | 5,3      | 5,0       | 0,8          | tomato pepper | red    | 1           | 7           | 10,77      | +         |
| 20 | A 2184/4 | 24,9      | 3,3      | 8,6       | 0,3          | peaked        | orange | 2           | 9           | 13,25      | +         |
| 21 | A 2148/3 | 44,7      | 3,5      | 14,0      | 0,3          | peaked        | red    | 2           | 11          | 14,69      | +         |
| 22 | B 1424   | 94,5      | 4,5      | 18,0      | 0,5          | peaked        | red    | 2           | 9           | 10,86      | -         |
| 23 | A 2020   | 135,3     | 6,5      | 11,8      | 0,6          | ears          | red    | 2           | 7           | 10,38      | -         |
| 24 | A 2297   | 117,7     | 5,5      | 20,0      | 0,4          | peaked        | red    | 2           | 8,5         | 11,29      | +         |
| 25 | B 849    | 149,4     | 5,0      | 14,5      | 0,6          | ears          | red    | 2           | 7,5         | 10,53      | -         |

Pepper B 64, A 2440 and B 1588 stood out with about 175 grams per fruit, intestinal color in the ear type, which can be produced in our fields with a high yield. Also, it can be used and processed for further needs.

### **Old variety of pepper – B 64**

Pepper B 64 is an old variety that has proven itself in the last few years as an excellent variety with good results in the test field. As we can see in the picture, the pepper is in the ear type, red in color, and larger in size. Fruit weight on average 212 grams, length 14,5 cm and width 10 cm. The sugar content ranges from 6 to 6,5 % on average, while the dry matter content is 9,49. Paprika belongs to sweet peppers and is great for household and processing.



**Picture 3.** Old variety of pepper – B 64 (D. Žunić)

| variety | weight/g. | width/cm | length/cm | thickness/cm | type | color | nb/chambers | mass sach % | dry matery | capsaicin |
|---------|-----------|----------|-----------|--------------|------|-------|-------------|-------------|------------|-----------|
| B 64    | 212,8     | 10,0     | 14,5      | 0,9          | ears | red   | 2           | 6,5         | 9,49       | -         |

### **Old variety of pepper – A 2444**

Pepper A 2240 is an old variety that has proven itself in the last few years as an excellent variety with good results in the test field. As we can see in the picture, the pepper is in the ear type, red in color, and larger in size. Fruit weight on average 175 grams, length 12 cm and width 8 cm. The sugar content ranges from 6 to 6.5% on average, while the dry matter content is 8.08. Paprika belongs to sweet peppers and is great for household and processing.



**Picture 4.** Old variety of pepper – A 2440 (D. Žunić)

| variety | weight/g. | width/cm | length/cm | thickness/cm | type | color | nb/chambers | mass sach % | dry matery | capsaicin |
|---------|-----------|----------|-----------|--------------|------|-------|-------------|-------------|------------|-----------|
| A 2440  | 175,9     | 8,0      | 11,5      | 0,7          | ears | red   | 2           | 6           | 8,08       | -         |

#### **Old variety of pepper – B 1588**



**Picture 5.** Old variety of pepper –B 1588

Pepper B 1588 is an old variety that has proven itself in the last few years as an excellent variety with good results in the test field. As we can see in the picture, the pepper is in the ear type, red in color, and larger in size. Fruit weight on average 175 grams, length 12 cm and width 7,5 cm. The sugar content ranges 7% on average, while the dry matter content is 9,95. Paprika belongs to sweet peppers and is great for household and processing.

| variety | weight/g. | width/cm | length/cm | thickness/cm | type | color | nb/chambers | mass sach % | dry matery | capsaicin |
|---------|-----------|----------|-----------|--------------|------|-------|-------------|-------------|------------|-----------|
| B 1588  | 174,2     | 7,5      | 12,0      | 0,5          | ears | red   | 2           | 7           | 9,95       | -         |

In previous years, we witnessed major climate changes, high temperatures, lack of precipitation, occurrence of diseases, increased use of pesticides and a large impact on agricultural production, and after extensive research in the experimental field and laboratory, we can say with certainty that old varieties can respond to this great challenge.

Also, by exchanging seeds, we try to maintain ties and join forces with promoters of old varieties in order to bring the importance of preservation and production of old autochthonous varieties closer to agricultural producers. Further plans related to preservation are certainly developing more and more every year, and we have excellent plans for further analysis of old varieties, promotion, creation of catalogs and advertising material.

Our goal is to preserve the old varieties from oblivion because they have adapted to people and the environment for centuries, and have great cultural significance because songs and customs are associated with them, and to include as many agricultural producers as possible in order to expand production with autochthonous varieties. Today, with the growing trend of organic producers, the chance for old varieties also grows, because they are the basis of this production.



**Picture 6.** Brand with the Somborka variety (V.Sabadoš)

In addition to processing, it is also possible for the product to be branded as with the famous Somborka pepper, which is placed in jars and pickled.

Based on these results, we can claim that the old varieties showed very good yields, which we can see in the table, where some varieties show that they are better than hybrids. In addition to the parameters and grades on the fruit, we can also see that some varieties also contain capsaicin, which makes them interesting for larger production. Also, the dry matter content of some varieties has excellent results. The old varieties are very relevant today, there is more and more talk about healthy food, and unfortunately, with the appearance of hybrids, they have fallen into oblivion.

#### 4. CONCLUSIONS

The earth is the workshop of our crops, and the basis of all agricultural work, our net income depends on her strength and kindness (Radić, 2009). We must first know the soil, then choose healthy seeds so that we can expect good and healthy yields. Statistically, since 1900, 75% of agricultural crops have been lost (Sabadoš et al 2019.). With this project, forgotten plant species, varieties and food populations have been returned to production. The knowledge about plant species that are used not

only in food production, but also in medicine, pharmacy, technology and other industries that can also carry the brand of organic production, has been renewed. With this project, the education of the youngest was carried out in primary schools, as well as the importance of organic production. Agricultural producers and advisors of agricultural professional services of Serbia and Vojvodina were informed about the results of the project, with the aim of finding a place in organic production. The first local bank of genes and seeds of old varieties of fruits and vegetables in the Balkans was formed in Serbia. The news met with positive reactions from our readers, and individuals expressed a desire to be part of the mission of preserving indigenous plants. In the future, we plan to send the samples to the laboratory for additional analyzes on the content of vitamin C, colors, and antioxidants in order to have an overall picture of the most interesting peppers.

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