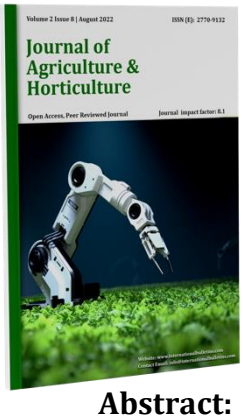

TESTING SWEET PEPPER VARIETY SAMPLES IN SPRING GREENHOUSES

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Abstract: In-depth scientific analysis of the results of the research carried out for the purpose of testing sweet pepper variety samples in spring greenhouses is presented.

Key words: open field, greenhouse, productivity, phenological and biometric monitors, fruit weight.

Introduction

In recent years, in the greenhouses of our republic, not only tomatoes and cucumbers are grown, but also sweet peppers, cauliflowers and greens are grown.

It should be said that sweet cornflowers grown in the open field are not suitable for growing in greenhouses. Because they are not adapted to grow in the shade. These sweet peppers are varieties that do not require a lot of solar insolation and its energy. In addition, sweet peppers grown in greenhouses are varieties that require the formation of bushes until their morphological structure and generative organs are formed. If the generative organs are not formed at the required level, the generative organs will not be formed on time, and those that are formed will not produce fruits at the level of the standard requirement.

Varieties designed for outdoor cultivation grow in greenhouses, but cannot harvest at the level of their biological potential. The reason for this, as reported in the literature, is a significant reduction in the length of the bright day, a lack of ultraviolet, infrared and short-wave rays in the sunlight. In addition, their root system growing in open ground in the soil layer is one of the main reasons for this. Therefore, special varieties of sweet peppers for growing in greenhouses have been created by experts in this field.

Sweet pepper varieties created and recommended for growing in greenhouses differ not only in their morphological structure, but also in terms of fruit size, flesh color, thickness, and their location on the bush. The fruits of these varieties are suitable for export to near and far foreign countries and are resistant.

As it is known from the above, it is advisable to plant shade-loving varieties that have been adapted to artificial climatic conditions and have been tested for several years, and are resistant to diseases and pests, in order to cover the huge capital costs in greenhouses.

Materials and methods

Field experiments 2018-2020 were conducted at the field of the experimental farm of the Termiz Institute of Agro-Technology and Innovative Development. This experimental station, where the research was conducted, is located in Surkhandarya region. Therefore, its climate is sharply continental like this region.

Study of sweet pepper variety samples “Methodology of state variety testing of agricultural crops”, “Methodology of experimental work in vegetable growing and melon growing”, “Methodological recommendations for conducting experiments with vegetable crops in protected ground facilities” guides were used.

The statistical analysis of the results was calculated by the dispersion analysis method in the “Methodology of field experience” (Dospekhov B.A., 1985) “Statistica 7.0 for Windows”.

Results and discussions

In greenhouses in Uzbekistan, sweet pepper is grown in small areas among the rare vegetables. In the greenhouses of European countries, large areas are allocated for this crop. The morphological structure and agrobiological characteristics of the varieties and hybrids planted in 2018 and 2019 in order to identify early-ripening, high-yielding varieties and hybrids of sweet pepper for growing in greenhouses during the transitional season were as follows.

"Dar Tashkenta". It was created by crossbreeding Kolokolchik and Moldovan 118 varieties at the Scientific Research Institute of Vegetables, Rice Crops and Potatoes of Uzbekistan. In 1980, it was entered into the State Register for planting in all regions of the republic. Medium variety. The shape of the fruit is conical, medium in size, yellow when technically ripe, and red when biologically ripe. The surface of the fruit is smooth, smooth, the thickness of the flesh is 5 mm. seeds are 3-4. The bush is compact, medium-sized, with a stem. The leaf is blue-green. The flower is white, the corolla is 5-sided, and the fruit is semi-bent compared to the tone. Productivity is 200-250 ha/h in open areas, 6-8 kg/m in sheltered areas.

"Lastochka". This variety was created by a single selection method from 118 Moldovan varieties at the Moldovan Agricultural and Vegetable Research Institute. The bush is semi-closed, with a stem, and the fruit is borne in pieces. The shape of the fruit is conical, medium in size, red when technically ripe. The flesh is tender, the taste is sweet, the yield is 27-28 tons per hectare. Fruit weight 41-55 g, taste 5.0 points. Dry matter content is 5.9 percent. The ripening period is 152 days until the fruit is biologically ripe.

"Reyna F1". This hybrid is a very productive early ripening hybrid from the Dutch company Nunems, which is very strong and grows well. The leaves are green. The average weight of the fruit is 90-95 g, it is thick fleshy, the top of the fruit is flat, and the shape is cube-shaped. It is green in color, but changes its color to red during storage. Hybrid Xa 1235 is highly disease-resistant, recommended for growing in open fields and greenhouses.

"K F1". This hybrid was also obtained from the Dutch company Nunems, it grows in a compact open type and has good foliage. The fruit is a cubed pepper with a large and thick flesh and a great taste. The fruit is picked green, but changes its color to red during storage. It grows well in a variety of harsh conditions, mostly in relatively cold temperatures. The hybrid is recommended for growing in the open field and in greenhouses.

"Sprinter F1". A vigorous hybrid with open trunks, long and short branches. The size of the fruit is 75-80 mm, 6-7 mm in diameter, and the cube-shaped flesh is thick. When the fruit is ripe, its color changes from bright green to dark red. It is easy to grow for a long season and has high productivity. The flower is very resistant to rotting.

We experimented with sweet pepper varieties "Dar Tashkenta (control)", "Lastochka", "Reyna F1", "Claudio F1", "Sprinter F1" on October 4, 2018 in the 70+45/2x35 scheme, placing 4 plants per square meter. Seedlings were fed 4-5 times during the cultivation of sweet pepper varieties and hybrids in a heated greenhouse. The first feeding was carried out 35 days after the planting of seedlings with organomineral and mineral fertilizers, 316 g of nitrogen, 165 g of phosphorus and 216 g of potassium per m. This feeding is repeated in 7-8 days. As fertilizers, all given mineral fertilizers amount to 22-25 t/ha.

They were processed 3-4 times between the rows and between the bushes in the row during the growing season. Watering is repeated every 2-5 days according to plant demand and external conditions.

Not only light, soil and air nutrients are necessary for sweet pepper grown in the greenhouse, but air humidity is one of the decisive factors during its growth and development.

After planting sweet pepper seedlings, we kept the temperature at 18-20°C during the day, 16-17°C at night, and 22-24°C on sunny days. When the crop started to enter the ripening period, the temperature was raised to 24-26 °C on sunny days, 20-22 °C on cloudy days, and 17-18 °C at night. During this period, the temperature of the soil was not lowered below 18 °C, and the relative humidity of the air was maintained at 60-70%.

Sweet pepper is one of the vegetables that require soil moisture, so it should not be lowered from 75-80%. In order to maintain this amount of moisture, sweet pepper was saturated and watered taking into account the external environment. In winter, it was watered every 6-7 days at the rate of 5-7 l per 1 m.

Phenological and biometric observations were conducted according to the approved method in the field of experiments conducted in the microclimatic conditions described above.

It is known from our research that the tested varieties and hybrids of sweet pepper differ from each other in terms of the height of the main stem, the number of leaves on the stem, and the different surface.

The height of the stem of the "Lastochka" variety was 7 cm more than the standard variety, and the number of leaves was also increased by 14, which, in turn, caused an increase in the leaf surface per hectare. If, in the standard variety, 18.3 dm of leaf layer was formed per plant, and the total leaf surface per hectare reached 7,320 m, then in the "Lastochka" variety, this indicator was more than 2,400 m.

Table 1

Formation of the above-ground part of sweet pepper varieties and hybrids (2018-2019 year)

Varieties	**The length of the main stem**	**Indicators during the period of fruit formation**		
		number of leaves on per plant, piece	**leaf surface on per plant, dm**	**leaf surface in 1 ha area, m**
Dar Tashkenta Ташкента St	98	107,3	18,3	7320
Lastochka	105	121,4	24,4	9720
Reyna F1	125	127,2	28,2	11280
Claudio F1	117	130,4	26,3	10520
Sprinter F1	112	132,5	24,5	9800

The hybrid produced fewer leaves than the Reyna F1, Claudio F1, and Sprinter F1 hybrids, but because each leaf area of these hybrids was larger than the latter two, the leaf area per hectare was 11,280 m, or 680 - increased by 1400 m2.

So, in conclusion, it can be said that "Reyna F1" among the varieties and hybrids of sweet peppers tested in heated greenhouses produces more leaf layers than others. It should also be noted that the "Lastochka" variety produces more leaves than the standard variety, close to hybrids. All hybrids of the Dutch company "Nunems" are tall hybrids, the number of leaves on the plant, as well as the leaf surface, are large.

Climatic conditions and variety characteristics had an effect on the growth stages of plants. During the observations, it was found that the tested varieties and hybrids of sweet pepper started flowering in 70-86 days after the seeds germinated.

Table 2

Duration of development of generative elements in varieties and hybrids of sweet pepper (2018-2019 year)

Varieties	The shape of the fruit	From the day the seed germinates			Fruiting period, day
		until the flowers, day	until the 1st picking of the fruit, day	until the final of the fruit, day	
Dar Tashkenta Ташкента St	conical	70	98	165	67
Lastochka	conical	63	90	162	70
Reyna F1	cubical	61	88	165	75
Claudio F1	cubical	65	91	161	70
Sprinter F1	cubical	86	102	163	61

"Reina F1" and "Claudio F1" varieties bloomed the earliest in 61-63 days. "Sprinter F1" hybrid from the Dutch company Nunems bloomed the latest (86 days) among the varieties tested. From the results presented above, it can be seen that the early flowering varieties and hybrids also formed the first crop early. Our observations revealed that "Orion" and "Lastochka" varieties yield 10-12 days earlier than the standard "Dar Tashkenta" variety.

It was found that the periods of fruit bearing mainly depended on the characteristics of the variety and lasted from 61 to 75 days in the tested varieties and hybrids. Early flowering varieties and hybrids have a productive period of 70-75 days. The late flowering "Dar Tashkenta", "Claudio F1" and "Sprinter F1" varieties lasted 10-17 days longer. It was found that the tested varieties and hybrids of sweet pepper grow in different phenological phase periods.

Variety is one of the most important elements in growing any agricultural crop. A variety known to be productive in one climate may not produce the desired yield in another climate. Therefore, varieties can be selected through experiments for any climatic conditions.

The main sign of the variety is productivity. Measurements carried out to determine the productivity of tested varieties and hybrids of sweet pepper showed that hybrids with advanced growth periods and large leaf surfaces were distinguished by their productivity. The productivity of seedlings produced with different number and surface of leaves also differed.

Among the tested varieties and hybrids of sweet pepper, "Reyna F1" produced the most fruits per bush (26 pieces) and gave the highest yield per bush (2025 g). Compared to

the standard variety "Dar Tashkenta", the yield of this hybrid was 6 fruits and the yield per bush was 750 grams. The quality of the harvest was also 7 percent higher than the standard. This variety gave an average yield of 8.1 kg per m, of which 51.8 percent was the earliest yield. "Reyna F1" yielded 3 kg per m2 or 58.8% more than the standard.

The weight of the fruit of "Reyna F1" hybrid is 92 g, the thickness of the fruit pulp is 1.5 mm thicker than that of the standard variety. All this contributed to the high productivity of this variety.

Among the studied hybrids, "Claudio F1" also has its positive agrobiological indicators. In particular, this variety yielded 2.3 kg (45%) more per m2 than the standard one, and the yield was 3.2 kg/m2 (43.2%). The weight of the fruit was 27 g more than the weight of the fruit of the standard variety.

The "Lastochka" variety of sweet pepper, which is widespread in our country, is superior to the standard variety in terms of the number of fruits that are hoeil per bush, in terms of average weight, but it is significantly less than hybrid peppers. At the same time, the amount of fruit that meets the standard requirements is 2% more compared to the standard variety, and 3.1-5.0% less than hybrids. In general, we recommend "Reyna F1" and "Claudio F1" from the studied sweet pepper varieties and hybrids for heated greenhouses, "Lastochka" variety and "Sprinter F1" hybrid can be considered promising.

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