

THE INFLUENCE OF PLANT GROWTH STIMULATORS ON TOMATO PRODUCTIVITY IN THE CONDITIONS OF TASHKENT REGION

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ABSTRACT

A scientific research work was conducted during 2018-2019 in the educational-experimental farm of the Tashkent State Agrarian University to study the effectiveness of plant growth stimulators on the productivity of tomatoes in the conditions of Tashkent region. The aim of the research was to study the physiological characteristics of tomato hybrids during the use of various plant growth promoters using the drip irrigation method. The task of the research was to study the effect of plant growth stimulators on tomato yields. Carrying out a comparative analysis of the obtained data about the yield, it can be concluded that the growth stimulators effect positively on the development and productivity of tomatoes. Over the 2 years (2018-2019), "Uzbekistan-178" hybrid was found to be the highest yielding, on average 76,6 t/ha. The highest productivity in the experiment (159,9 t/ha) was noted in "Vostok-36" hybrid using the preparation T-86. "Vostok-36" hybrid turned out to be the most productive as well -142,8 t/ha, respectively. In general, both stimulators are highly effective and can be recommended for practical use.

KEYWORDS: hybrid, plant growth stimulators, crop yield, productivity.

1. INTRODUCTION

Continuous growth of population of the globe is accompanied by the evolution of human society. Population growth leads to increased demand for agricultural products. Currently, in most developed countries, the use of land suitable for agricultural production is approaching the limit and further growth of agricultural products is possible only through its intensification.^[4,5]

Modern technologies for obtaining high yields in agriculture provide for the creation of optimal conditions for plant nutrition, water and air regimes of the soil, and plant protection against diseases, pests and weeds. New opportunities allow the selection of new plant varieties, bioengineering and finally, another provision for increasing yields and improving the quality of crop production is the use of plant growth regulators - inducing significant changes in small concentrations in the vital activity of plants.^[2,8]

The main source of carbohydrates, minerals, vitamins is vegetables and fruits. Among vegetable crops, tomato

has one of the leading places in providing the population with vegetable products both in Uzbekistan and in neighboring countries. Growing needs of the population for tomato products set the goal of increasing the yield and quality of tomato fruits - the main biological resource of vegetable products. Therefore, the use of biological products to protect plants from pathogenic organisms and stimulate plant growth is one of the priority areas in biotechnology and environmental protection.^[7,9]

The problem of regulating the growth and development of plants by using physiologically active substances is one of the most relevant issues in modern biology. An extensive use of plant growth regulators (PGR) is an important factor in the effectiveness of crop cultivation technology. A significant achievement is the identification of the role of biologically active compounds in the regulation of the most important functions of a plant organism, in increasing resistance to adverse environmental factors, and increasing the yield and quality of agricultural products.^[1,6]

In 2018-2019, in the educational-experimental sector of the Tashkent State Agrarian University, the research was carried out to study the effectiveness of plant growth stimulators on tomato productivity in the conditions of the Tashkent region. The aim of the research was to study the biological characteristics of tomato hybrids during the use of various plant growth stimulators using a drip irrigation method.

The objective of the research included

- To identify the most promising tomato hybrids for the conditions of the Tashkent region, which have a high level of potential yield in combination with the plant growth promoters used;
- to study the effect of plant growth stimulators on the occurrence of production processes and tomato yield;
- To determine the hybrids of tomatoes that use soil and irrigation water most effectively by the coefficient of water consumption and other indicators.

2. MATERIALS AND METHODS

Field experiment was performed through the method of split plot factor A – variety. Hybrid, factor B – stimulant of plant growth.

Hybrids of medium-fruit tomatoes (A)

1. Progressivniy;
2. Podarok;
3. Vostok-36;
4. Uzbekistan-178;

Plant growth stimulator (B)

1. Control (without treatment);
2. VL-77 (spraying 3 times to the plant during the growing season in the phase of budding, flowering and fruit formation in the norm recommended by the manufacturer);
3. T-86 (spraying 3 times to the plants during the growing season in the phase of budding, flowering and fruit formation in the norm recommended by the manufacturer).

The number of replications of the experiment is fourfold. The total area for the experiment is 2520,0 m² (0,25 ha). The plot area under the plant growth stimulator is 420,0 m², the plot area under the variety is 15,4 m².

The experimental plot is located in educational-experimental farm of Tashkent State Agrarian University in Kibray district of Tashkent region. The climate of the research area is sharply continental, extremely arid and changeable. Spring does not last long, it is characterized by a rapid increase in temperature. Summer begins in the first decade of May due to a sharp increase in air temperature.

Irrigation of the experimental plot was carried out by the drip irrigation method. Irrigation water was supplied

from a natural source – the Bozsuv river. To be aware of changes in weather conditions in 2018-2019, the data of the agro-meteorological station of the Kibray district of Tashkent region were used.

During the years of research, weather conditions varied in air temperature, soil and the amount of precipitation.

The records and observations were carried out using the methodology of the field experiment by B. A. Dospekhov and the methodology of experimental work in vegetable growing and melon growing under the editorship of V.F. Belik.

- Phenological observations on tomatoes: noted the dates of sowing, emergence of seedlings, pricking off, transplanting in the ground, flowering and ripening;
- The pre-irrigation threshold of soil moisture in the layer 0-0,5 m in the main phases was determined;
- Analysis of weather factors for the occurrence of productive processes was carried out according to the data of weather station;
- Harvesting and recording of tomato crops were carried out periodically every 5-8 days from 10 plants in a row;
- Static processing was carried out according to the method of B.A. Dospekhov [3];
- Analysis of economic efficiency was performed according to actual costs.

3. RESULTS AND DISCUSSION

By making a comparative analysis of the obtained crop yield data, it can be concluded that the plant growth stimulators effect positively on the development and productivity of tomatoes.

The used plant growth stimulators not only affect the yield of tomatoes, but also increase the number of fruits on the plant, as well as the average weight of the fruit (Figures 1, 2).

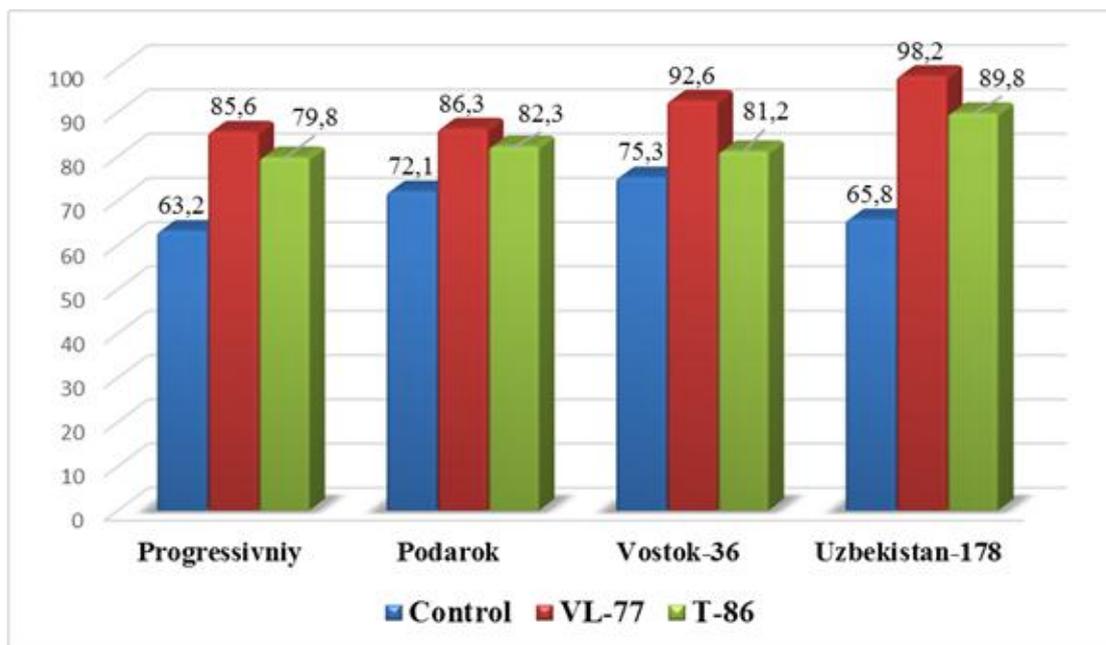


Figure 1: An average mass of 1 fruit (g), 2018-2019.

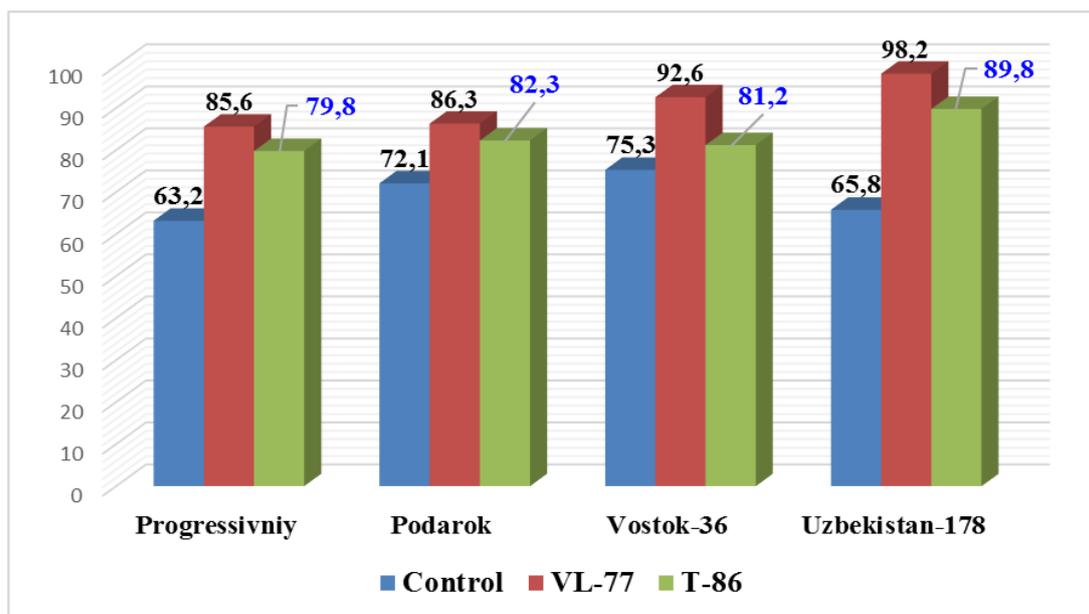


Figure 2: Number of fruits in 1 plant at the vegetation (pcs), 2018-2019.

When using the preparation VL-77, the highest average weight of 1 fruit was observed in hybrid Uzbekistan -178 – 65,8 g. The number of fruits per plant was the highest of all the studied variants during the growing season when the plant was treated with VL-77. So for the Vostok-36 and Uzbekistan-178 hybrids this indicator was maximum – 98,2 and 92,6 pieces, respectively.

In the variant where the treatment was implemented with T-86, it was revealed that the average weight of 1 fruit in all the studied hybrids was higher than in the control. At Vostok-36 hybrid, a maximum value of 65,7 was noted.

All studied hybrids were found to be responsive to the

use of plant growth stimulators. The maximum addition to the control (63,1 t/ha) was observed in the Vostok-36 hybrid in the 3rd variant (T-86 preparation), the minimal addition to the control was in the Progressivniy hybrid – 7,0 t/ha in the variant (T-86 preparation).

Table: Tomato crop yield depending on the used plant growth stimulators (2018-2019 years).

Hybrid	Variant	Biological yield, t/ha	Addition to the control, t/ha
Progressivniy	Control	100,1	-
	VL-77	119,8	18,7
	T-86	109,1	9,0
Podarok	Control	86,2	-
	VL-77	113,6	27,4
	T-86	118,2	32,0
Vostok-36	Control	96,8	-
	VL-77	158,9	62,1
	T-86	140,8	44,0
Uzbekistan-178	Control	76,6	-
	VL-77	139,7	63,1
	T-86	133,6	57,0

Over the 2 years (2018-2019), Uzbekistan -178 hybrid turned out to be the highest-yielding on average – 63,1 t/ha. The highest crop yield in the experiment (158,9 t/ha) was noted in Vostok-36 hybrid when VL-77 preparation was used. In the 3rd variant (T-86 preparation) Vostok-36 hybrid was found to be the most productive – 140,8 t/ha.

4. CONCLUSIONS

A tomato cultivation using various plant growth stimulators is economically profitable and, regardless of hybrids, gives a high return on investment.

All hybrids in the variants are highly effective while using plant growth stimulators and can be recommended for wide practical use. The most effective growth stimulator was preparation VL-77.

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