

METHODS OF IMPROVING CUCUMBER GROWING TECHNOLOGIES

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Abstract

The article describes the effect of bio stimulants "Uchkun", "Super Uchkun", "Gossipren" and "Verva" on cucumber varieties ("Orzu") in the Andijan region. It was revealed that the pre-sowing treatment of cucumber seeds with bio stimulants promoted a significant increase in seed germination and growth processes.

Key words: bio stimulants, Uchkun, Super Uchkun, Gossipren, Verva, "Orzu", parthenocarp plant.

Introduction. Uzbekistan government tries to develop new policy for improving food security of the population. By means improving quality of food staff's production it is expecting to enforce the social-economic progress in Uzbekistan and ameliorate the wellbeing of the population. Fast increasing the number of population conditions a necessity of improving a technology of horticulture plants like cucumber and learning problems technology improving in versatile scope and to developing new suggestions.

An aim of the paper is study problems of improving cucumber growing technology in the conditions of Uzbekistan and explaining new conclusions developed as results of field experiment. Coming of the aim of study the next tasks were defined for discussing:

- describing a technology of cucumber growing and to comment an increase of productivity by means of using bio stimulants;

- regulation biosintesis process in field experiments of cucumber and how to intensify bio stimulants' an effect on cucumber growth.

The object of the study is the biometric parameters of the cucumber plant, its' yield, and the biochemical composition of the cucumber. The subject of the study is a parthenocarp hybrid of cucumber variety of "Orzu". In conducting research, we used standard methods of setting up experiments with vegetable crops [1, 2]; the tests were performed with bio stimulants Gossiprin, Verva, and local bio stimulants "Uchkun", "Super Uchkun".

Accompanying observations of cucumber plants in the process of research included an account for the germinating energy and seed germination, biometric parameters of seedlings, and the rate of passage of phenological phases. The weight of the crop and its marketability were taken into account by the gravimetric method according to the plot variants of the experiment on a pilot basis. As cucumber is a crop of multiple harvesting, early productivity is determined by the yield for the first period of fruit formation (10, 15, 20, 30 days) [3]. In our studies, this period consisted of 20 days.

Product quality was assessed by the standard requirements [2,3,4]. The biochemical composition of the product was determined according to standard methods: the dry matter content - by the thermostat-weight method, the sugar content - by the Bertrand method, the vitamin C content - by the I.K. Murri method. The results obtained were processed by the method of analysis of variance using the statistical program STRAZ (version 2.1) and by the method of B.A. Dospikhov [3]. The economic efficiency was calculated by generally accepted methods [2, 3].

Material and methods. The family squash (Cucurbitaceae) is very various. It includes more than

hundred sorts (labors) and over thousand kinds. The greatest diffusion was obtained) by such squash cultures, as a cucumber, a vegetable marrow, a bush pumpkin, a watermelon, a melon and a pumpkin. The ancestor of this family – is a pumpkin. Sowing campaign cucumber (*Curcuma sativa* L.) belongs to family Squash (Cucurbitaceae) (Tkachenko, 1963; Heywood et al., 2007; Judd et al., 2008). In family - 2 subfamilies also include 118 sorts and 825 kinds (Judd et al., 2008). The majority of kinds are - perennial grasses. The big economic value reckons with edible fruits and seeds, and as the basic food culture cultivate in tropical, subtropical and moderate regions (Heywood et al., 2007; Judd et al., 2008). Seeds of the cucumber has prolonged - elliptic form, white or light-yellow color, mass 1000 pieces of 16-35 normal germinating capacity is may be stored till 5-6 years (Balashev, Zeman, 1972). Qualitative characteristics of the cucumber has such signs - color light and dark green, flowers short-wave blue – light pink. Beams in sunlight accelerate development of plants of short day; promote the best blooming, formation of a considerable quantity of pistil- late flowers and reception of a high early yield of fruits (Sheveluha, 1992; Persen, 1996).

The experiment studied hybrids of cucumber variety of "Orzu". The area of the registration plot was 8.6 m², the experiment was repeated 3 times, and the placement of the variants was randomized. Cucumber variety "Orzu" is a parthenocarp, mid-early variety, it begins to bear fruit on the 46th – 47th day after planting, the plant is growing, of medium branching, female flowering type, it has dark green leaves. The fruit is 12-15 cm long, of cylindrical form, dark green. The base of the fruit is obtuse, the neck is weak, and the peduncle is long. Bitterness is genetically absent. Plants are resistant to gummosis, brown leaf spot, and are tolerant to powdery mildew. It tolerates ambient temperature fluctuations well. The effectiveness of bio stimulants was studied by soaking cucumber variety of Orzu seeds for an hour before sowing in drug solutions and subsequent plant treatments [10-20]. Seed sowing was done on April 20 in the open field. The holes were dug in a 70 x 40 two-row scheme with a distance of 35-40 cm between holes.

The planting density was 4.2 plants per 1m². Plants were formed into 1 stem, tied by a string to 2 m high espaliers. Vegetative plants were treated three times: the first - in the phase of 2-4 true leaves, the second - at the beginning of the flowering phase, and the third - in the phase of mass flowering. The drugs used have a wide spectrum of action and were intended for use in agriculture. They belong to safe chemicals, do not hurt humans and animals, and do not accumulate in soil and fruits. They are designed for seed treatment before sowing to increase the germinating energy and seed germination and to increase the adaptive

capabilities of plants under unfavorable growing conditions. Below is a brief description of these preparations.

The data given in Table 1 show that all phases of development: budding, mass flowering, and fruit formation, when treated with plant growth stimulants, occurred 2-4 days earlier, than in the control variant. The budding phase with the bio stimulant "Uchkun" treatment came 1 day earlier,



Figure 1. Photo of flower and fruit of cucumber variety "Orzu"

Table 1
The influence of plant growth stimulants on the germination and growth dynamics and development of cucumber variety of "Orzu" (2019)

Development phases	Control	Gossipren	Uchkun	Super Uchkun	Verva
Sowing seeds	20.04	20.04	20.04	20.04	20.04
Germination rate	30.04.	28.04.	27.04.	26.04	28.04.
Budding	20.05	18.05	17.05.	16.05	18.05
Mass flowering	01.06.	29.05.	27.05.	26.05	29.05.

with the "Super Uchkun" - 2 days earlier, and in the case of "Gossipren", it was at the level of the reference drug.

Accordingly, the onset of mass flowering with the "Uchkun" and "Super Uchkun" bio stimulants variants was 2-4 days earlier than with "Gossipren" bio stimulant and 2 days earlier than treated with "Verva" bio stimulant. Consequently, in these variants, fruit formation began earlier. On average, the yield of cucumbers when treated with bio stimulants increased by 10.28%; 23.8%; 24.27%; 14.29%; the yield increase was 1.3; 2.3; 2.7; 0.9 t/ha, respectively.

According to table 1 data, the time of sowing of cucumber in all types of stimulants is fixed that is 20 March of the year. But, if look at the time of the germination period, cucumber began growth early after processing with stimulant "Super Uchkun" that is on 26 March, "Uchkun"- on 27 March, "Gossiprin" and "Verva" ones - on 28 March. In control variance, cucumber growth began - on 30 March. The budding period has the same specific features. That is first budding was observed in the variance of cucumber processed with

"Super Uchkun" stimulant - on 16 May, "Uchkun" stimulant - on 17 May, and "Gossiprin" and "Verva" stimulant on 18 May, control variance - on 20 May. The mass flowering process began in the variance of "Super Uchkun" stimulant on the 26 May, "Uchkun" - on the 27 May, "Gossiprin" and "Verva" - on the 29 May, and control variance on the 1 June. The fruit formation process had the same ordinary - first - "Super Uchkun" stimulant on the 4 June, "Uchkun" stimulant on the 5 June, "Gossiprin" and "Verva" - 9 June, and control variance - 11 June. If to compare time of germination rate, budding and mass flowering time difference between 1 - 4 days. Fruit formation times have the difference between 1-7 days. What does mean these differences? Among stimulants, "Super Uchkun"s' an effect on the growth of cucumber was very strong and after 6-8 days, a cucumber began to show results of the influence of a stimulant. A stimulant "Uchkun" took second place on the rate of affecting the cucumber growth stages. The time difference of on influence on cucumber growth was longer for 1day with comparing stimulant "Super Uchkun". Other stimulants' time of influence on cucumber growth was longer for 2-3 days with comparing stimulant "Super Uchkun".

Findings. To assess the effect of stimulants on the cucumber yield volume we should consider the volume of the fruit obtained in each variance of the field experiment. In the table 2, had been illustrated the influence of bio stimulants on yield. If to compare yield volume (t/ha) per hectare, "Super Uchkun" bio stimulant increased harvest significantly that is 15.6-ton fruit per hectare. But other bio stimulant's yield volume is less than the "Super Uchkun" bio stimulant one. This fact confirms by the number of fruits

per plant - 6 pieces. The second place occupies bio stimulant "Uchkun", third place Gossiprin and fourth place Verva. Besides, Super Uchkun bio stimulant fruit exceed other fruits by weigh - 120 grams. It means that the economic efficiency of using bio stimulant "Super Uchkun" very significant and bio stimulant may ameliorate the financial position of the farm facilities. The biochemical composition of the "Orzu" cucumber had been changed by the influence of bio stimulant "Super Uchkun" positively. According to the data table 2, sugar level consisted 2.52 %, vitamin C level 5.2 mg %, and NO3 mg/kg rate was equal to 189. Other bio stimulants, like "Verva" and "Uchkun", have relatively close meanings.

"Verva" bio stimulant has 2.16% sugar, 6.7 % vitamin C and 195 NO3 mg / kg. It means that "Verva" bio stimulant has the advantages of comparing it "Uchkun" and "Super Uchkun" bio stimulants using variances. Among considered bio stimulants, "Gossiprin" has the lowest variables and planting cucumber variety "Orzu" after processing with bio stimulant maybe not effective from point of view productivity

Table 2

Influence of bio stimulants on yield volume

Variants	Number of fruits/plants	Average weight of fruit, g	Yield (t/ha)
Control	3	100	12,9
Gossiprene 0.1% (200 ml/ha)	4	110	13,9
Uchkun 0.1% (200 ml/ha)	5	120	15,2
Super Uchkun 0.1% (200 ml/ha)	6	120	15,6
Verva 0.1% (200 ml/ha)	4	110	13,7
*HCPO,5=4,4		**Sx=0,6	

Table 3

Influence of bio stimulants on the biochemical composition of "Orzu" cucumber

Variants	substance, %	Sugar, %	Vitamin C, mg /%	NO3 mg / kg
Control	5.0	2.16	4.0	165
Gossiprene 0.1% (200 ml/ha)	4.4	2.28	5.1	170
Uchkun 0.1% (200 ml/ha)	6.5	2.34	4.9	182
Super Uchkun 0.1% (200 ml/ha)	4.9	2.52	5.2	189
Verva 0.1% (200 ml/ha)	5.1	2.16	6.7	195

and quality of fruit.

Root feeding of cucumber plants with bio stimulants "Uchkun" and "Super Uchkun" significantly increased the content of vitamin C in fruits (5.3-5.5 mg%). At the same time, there was a slight decrease in sugars in fruits in comparison with the control (Table 3). The content of nitrate-nitrogen in the products in all variants of the experiment was significantly less than the MPC value, which is 400 mg/kg of fresh weight for a greenhouse cucumber. The effect of the aforementioned bio stimulants was also observed on other crops of the "Cucurbitaceous" family, on cucumber varieties "Orzu" and "Spanish", in which the acceleration of phenophases and an increase in yield were also observed [10,11,12,13].

Thus, coming of the above-described data of field observations, it was obtained the next results:

- a technology of using bio stimulants for intensifying growth of cucumber plant may be useful if a time of sown is appropriate that is April month;
- on the day of sowing a grade of air better to observe +20 +22 0C and soil grade by +18 +20 0C;
- before sowing pumpkin seeds should be processed with bio stimulants during 3 days;
- cucumber seedlings on the experimental field necessary watering 6-7 times till the last days of growing;
- experimental field soil should be processed with ammonia with a proportion of 300 kg/he and potassium mineral fertilize 100 kg/he;
- for sowing of cucumber seeds preferable using of chart 330x70)x100;
- better to allocate 6600 cucumber seedlings in each hectare and a depth of sowing of seeds 5-6sm;
- during the period of vegetation, plants should be feed up with a proportion of 300 kg/he with saltpetr ammonia;
- against of an insect, Aphid use a preparation "Mospilan" in the proportion 300 gr/he with 300-liter water after mixed up 2 times;

- against Necroz and Xlores diseases use Entolikur fungicide in proportion 0,5 l/ga 1 time and Ridomil Gold fungicide in proportion 2,5 kg/he after mixing up with 300-liter water;

-processing seedlings within pitchblende fodder prepared by using 2-liter plant oil, 2 kg Clorophos chemical preparation, and 40 kg oilcake per hectare against such insects as rootworm, short wire maggot, and calf head allows to save all seedlings;

- in the accordance with seed-growing methods, an isolated zone has to create in the size of 1000 meters around the experimental field.

Literature analysis. The word "method" is Greek for "methods" - a way of research, theory, or teaching. In other words, a method is a set of methods and operations that attempt to achieve a specific goal, find a solution to a specific theoretical task, or solve a specific theoretical problem related to the study of an event. In other words, a method is a sequence and appearance of these actions, which implies a generalization of ways to solve a specific practical task to achieve any goal. Based on these considerations, we can make the following logical conclusion: a research method is a set of ready-made "guidelines" that are considered to be algorithms, procedures for research that must be conducted using available data to achieve a goal. Methodology, on the other hand, is a generalized approach to solving a problem of one kind or another. Today, the development and improvement of existing technologies of cucumber nutrition in our country is a requirement of the times. We will explain the term yield below as we have identified wrapping as the main task of wrapping the effect of organic fertilizers on the yield of cucumber cultivation in this paragraph. The essence of the question is how to enhance the effect of bio stimulants on the growth of cucumbers?

According to L.Jiani, V. Ovshinsky, and T. Zaychenko, productivity is the amount of raw material phytomass,

which indicates the gross yield per 1 hectare of land, or its amount per 1 square meter. Productivity depends on the type of practice of the plants and it depends on many factors. Productivity is determined based on three approaches:

- based on the method of land use;
- based on the method of samples and specimens;
- based on the project coverage method.

L.Jiani, V. Ovshinsky, and T. Zaychenko's approach to technology efficiency is very simple and takes into account the effects of biosynthesis processes and the use of organic fertilizers and bio-stimulants. M.Baratova, N.Khidirova and Sh.Kasimova notes that the choice of method depends on the following reasons:

- the characteristics of plants and the choice of their method of feeding;
- the amount of plant selected for use as a raw material.

However, G. Belodubrivskaya, K. Blinova, and V. Vandshev proposed the following approach: for plants and trees with small bodies, it is preferable to use the criterion "yield per hectare" used to determine the yield, the amount of fruit harvested from their body parts as raw material they show. This method is one of the most accurate methods in science because it does not require additional calculations and does not complicate the data. However, if the product is used as raw material, for example, underground fruits or shrubs with large bodies, the above method is inconvenient due to the need for large labour costs, and in such a situation a "model copy" approach is more convenient. For short-stemmed plants and shrubs, the criterion of "projected yield" should be used as the measurement criteria, as this method assumes that the plants cover the surface of the plant thickly and its density directly affects the yield volume. Most of the field experiments are conducted in the fields of farms located in a particular administrative area, and it is assumed that the field surface of that area has a precise dimension. If the amount of raw material grown is measured in large tons, then the crop is planted in large fields and comparative checks are carried out. The approaches described above reflect the general directions of the study of technical efficiency in terms of quantitative analysis. However, to study the effectiveness of cucumber plant cultivation technology, it is necessary to collect and group information on additional methodological tools, i.e., factors, and make systematic and qualitative calculations. To do this, the use of the method of phenomenological observation of quality gives good results. We show this in this section based on the results of field experiments on cucumber cultivation in 2017-2018.

The main role in conducting field research on the technology of growing cucumber plant belongs to the methods of quantitative observation. In our opinion, the choice of methods in the development of research methodology can be based on the philosophical theory of "positivism" for quantitative observation of field experiments. According to the theory of positivism, a clear positive result is based on any natural phenomenon and its properties and relations. The received information is interpreted as the basic principles of knowledge and results. And the results obtained are considered to be the results obtained due to observations.

Several hypotheses need to be developed in quantitative observations to validate research results. The researcher explores the interrelationships between independent and related variables as a database for conducting quantitative observations. Also, the researcher finds out by examining how important the interrelationships between variables are. Upon verification, this degree of interdependence is confirmed or

denied. However, rapid scientific and technological progress and the growth of factors influencing climate change indicate the need to use the method of "qualitative phenomenological observations" in scientific research on the technology of growing cucumbers. There is no pre-determined hypothesis in this approach. As a postulate, the researcher forms an idea that can emerge in the process of observation. A postulate is a form of a research problem. This means that there is a direct correlation between the variables studied in the study. These relationships consider the factors that affect the success of the technology. Based on these considerations, all the factors influencing the plant development of technology are observed in the following order: environment of application of new technologies in agriculture, paradigm, analytical approach, object selection approach, systematic approach, and comparative analysis approach. Below we explain why we need to focus on qualitative phenomenological observations.

First, it is taken as a necessary consideration of the number of resources. To do this, it is necessary to calculate its volume in terms of yield per square meter of land or in areas where plants grow. Its' role in calculating the harvest area is similar to that of any geometric figure. (Four squares, three squares or rhombuses), then its covering surface is. Sometimes, if the growing plant does not grow evenly in the field, the total area and the area covered by the growing plant are first calculated and the difference is determined. The next step is to harvest and calculate the volume. At the same time, the indicators differ in terms of "harvest result" and "yield density". However, many scientists studying plant growing technologies consider these indicators as synonymous.

Based on the above data, the field of "Biotechnology" is a very important approach to the study of methods of fertilization in the cultivation of cucumber to increase its productivity. In the study of biotechnology, in addition to theoretical data on the cultivation of cucumber plants, it is important to consider practical recommendations, to compare them with each other. At the same time, it is necessary to identify the object and methods of research to develop a research approach and enrich it with the necessary methodological methods. In this context, the methodological approach of this study includes the following three areas:

- study of recommendations for the use of fertilizers in the cultivation of cucumber plants based on cabinet research to study the theoretical data on the study of international experience in the process of using of fertilizers;
- to study the climatic conditions and soil requirements of international experience in the cultivation of cucumbers, to compare them with each other, and to explain the influence of time and temperature factors in preparation of seed for planting;
- describe the conditions and results of 3 field experiments conducted in the Andijan region and develop proposals for the practical application of bio stimulants.

Conclusions. The study of the effect of the complex preparation "Uchkun plus" showed that it has a significant effect on the growth, development, and productivity of cucumber plants of the "Orzu" variety during the pre-sowing seed treatment. Under its' influence, the acceleration of the main phases of development was observed. There was also a significant increase in the yield of crops, the average increase in the yield of cucumber variety "Orzu" with pre-sowing seed treatment with Super Uchkun was 2.5 t / ha compared to control, and under the influence of Uchkun - 2.3 t / ha. Thus, as a result of the experiments carried out, the positive effect of bio stimulants Uchkun and Super Uchkun on the growth

and development of cucumber plants, yield, and product quality was established. Considering the high efficiency of the use of bio stimulants Uchkun and Super Uchkun to increase the early and general yield of cucumber in the open field, agrochemicals can be recommended for root fertilization of plants. The regulations for application are as follows: 1st top dressing (application with irrigation) - in the phase of 2-3 leaves, 2nd, 3rd, and 4th with an interval of 20 days, the consumption of the agrochemical 200 ml/ha, the consumption of the working solution - depending on from the watering rate.

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