

Pre-Sowing Treatment Of Tomato Seeds With Nutri Power And Root Winner Biogrowth Stimulants.

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Abstract - This work is devoted to new approaches to solving the problem of increasing yields with the most rational use of material and labor resources for programming (planning) crops. To program a crop means to develop a set of agrotechnical measures, the timely and high-quality implementation of which will ensure the maximum possible crop yield.

Keywords: *Biostimulants Nutri Power and Root Winner, seed, tomato, plant, seed, varieties Balarga, Campbell 33, Floradade and Rio Grande.*

Relevance of the topic.

Good seeds are the key to a good harvest. However, outwardly healthy and beautiful seeds after sowing may not give the expected results. There can be several reasons for poor germination of tomato seeds and seedling diseases:

- too old seeds;
- tomato seeds are infected with various bacteria, viruses or pathogenic fungi;
- improper preparation of seeds for sowing;
- lack of favorable conditions for seed germination.

The foundation for a future good harvest of tomatoes is laid at the first stage of their cultivation - at the stage of preparing seeds for planting seedlings. Experienced summer residents begin pre-sowing preparation of seeds already in February-March, carrying out special manipulations with them in order to speed up the emergence of seedlings, reduce the incidence of plants and, ultimately, increase their yield. Such preparatory activities include: culling, heating, disinfection, nutrient treatment, soaking, treatment with biostimulants, germination, hardening and bubbling of seeds. It is enough to carry out one or two procedures to get a significant increase in yield.

Treatment with biostimulants Nutri Power and Root Winner have a positive effect on germination and seed germination. This process determines the relevance of the topic.

The aim of the study is to find out the effect of growth stimulants Nutri Power and Root Winner on the germination and germination of tomato seeds.

To achieve this goal, the following tasks were formulated in the work:

- to study various methods of pre-sowing seed treatment in Nutri Power and Root Winner biogrowth stimulants;
- find out the importance of pre-sowing seed treatment for plants;
- summarize the knowledge and results obtained and draw conclusions based on them, determine which methods really work.

The object of the study was the seeds of tomato varieties Balarga, Campbell 33, Floradade and Rio Grande.

The subject of the study were growth biostimulants Nutri Power and Root Winner.

Research methods:

1. Experiment using Nutri Power and Root Winner biostimulants;
2. Comparison of the effect of selected biostimulants on the growth and development of seeds of tomato varieties Balarga, Campbell 33, Floradade and Rio Grand.

Theoretical significance of the study:

Biological products are biological preparations, the active principle of which are microorganisms or their metabolic products. They increase plant immunity, resistance to many diseases of fungal, bacterial and viral origin and other adverse environmental factors. Many sources have data on the effect of biological preparations on increasing crop yields by 15-30% using less mineral fertilizers, normalizing the mineral composition of plant biomass, and reducing crop losses from diseases. This is achieved by stimulating the protective properties of plants laid down in them in the process of evolution. Titov I.N. claims that biological preparations activate mycorrhizal and endomycorrhizal fungi of plants.

Plant growth regulators are successfully used to eliminate the periodicity of fruiting, accelerate flowering and fruit ripening. Experiments show that in order to obtain a high effect, growth regulators should be used at various stages of plant growth and development, especially since each drug has its own "specialization".

Titov I.N. in his work "Domestic Biological Products: Regulators of Plant Growth and Development and Humic Preparations for Modern Agriculture" writes: "Under modern conditions, an increase in crop yields can be achieved on the basis of a high culture of agriculture through scientifically sound environmentally safe use of fertilizers and pesticides...".

The scientific novelty of the study lies in the fact that for the first time it uses biogrowth stimulants Nutri Power and Root Winner to prepare seeds for planting seedlings. Biostimulants are characterized as follows:

Improve seed germination and root growth.

Auxin contained in fertilizers improves seed germination, root growth, thereby increasing the germination rate and survival rate during transplantation.

Increase in productivity.

This fertilizer provides a better development of the root systems of root crops and allows you to increase productivity.

Saturation of crops with nutrients.

Fertilizers of this series contain various trace elements and help to avoid nutritional deficiencies.

Increasing resistance.

Fertilizer increases the resistance of crops to negative environmental factors.

Tomato is an annual plant, but under favorable conditions in greenhouses, it can grow and bear fruit for several years. The stem of the tomato is grassy, juicy at the beginning of the growing season, and at the end it corks. The length of the stem is from 30 cm in dwarf varieties and up to 3-8 m in vigorous ones. The tomato has a high shoot-forming ability. When grown in greenhouses for 2-3 months, the tomato forms a huge number of shoots and inflorescences. For the growth of shoots, the plant consumes all the nutrients, some of the flowers and ovaries dry out and fall off, the fruits do not have time to ripen. Therefore, in tomatoes, it is necessary to remove stepchildren (stepson) and pinch the top (Osipova G.S., 1991).

Depending on the nature of growth and branching of lateral shoots, tomato plants are divided into indeterminate and determinant types of growth. Branching of shoots in both groups of tomato is sympodial (Gavrish S. F., Sysina E. A., 1986).

Tomato is a thermophilic plant. Seeds begin to germinate at a temperature of $+13-15^{\circ}\text{C}$ (Lupenko L. G., 1988; Edelyptein V. I., 1962). The optimum temperature for seed germination is $+24-26^{\circ}\text{C}$ (Andreeva E. N., 1973; Gavrish S. F., 1987; Popova L. N., Sergienko E. A., Mychenko L. A., 1988; Rey Y et Costes S., 1965). At temperatures below $+10^{\circ}\text{C}$, they do not germinate. At the same time, tomatoes are resistant to low temperatures and even withstand frosts down to -0.5°C (Shuin K. A., 1985). After the appearance of cotyledons and the first two true leaves in plants, the temperature is lowered to $+18-20^{\circ}\text{C}$ during the day and $+14-15^{\circ}\text{C}$ at night. After the appearance of the first buds on the plant, the temperature during the day is reduced to $+17-18^{\circ}\text{C}$, and at night it is raised to $+16^{\circ}\text{C}$ (Gavrish S.F., 1987). The sum of active temperatures ($>10^{\circ}\text{C}$) before ripening is $1800-2000^{\circ}\text{C}$. Temperatures above $+36^{\circ}\text{C}$ adversely affect plants (Vlasov A. S., 1991; Hanna N., Hernahdez T., 1982).

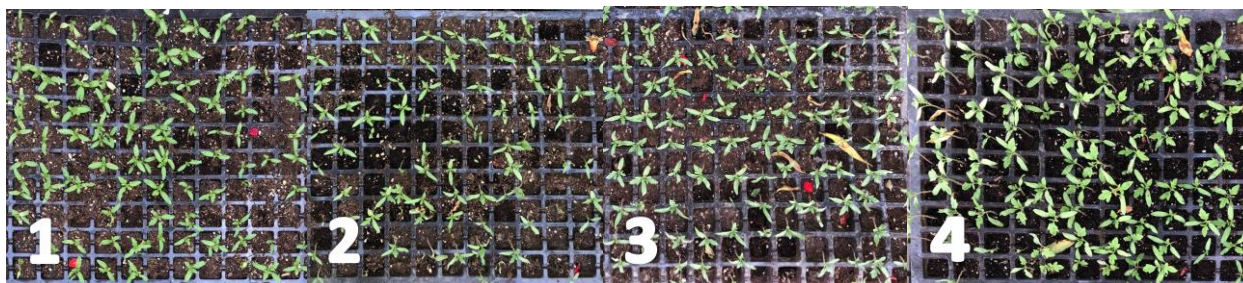




Schemes of laboratory, model, vegetation and small-plot experiments to study the effect of physiologically active substances on seed germination and initial growth of seedlings, cold resistance, development of the root system, increased resistance to viral infection, biometric and physiological-biochemical parameters of plants, fruit set, fruiting dynamics and quality of greenhouse tomato products. Methods for performing accompanying observations and physiological and biochemical analyzes are described. The name of tomato varieties and the occurrence of plants are presented in Figure 1 below.

Figure 1.

1 – Balarga 2 – Campbell 33 3 – Floradade 4 – Rio Grande



The treatment of tomato seeds with the tested growth regulators had a significant effect on the quality of seeds (germination energy and germination), as well as on the intensity of their germination. The highest germination and energy value of tomato seeds were noted when they were treated before planting with solutions of preparations: Nutri Power and Root Winner. Seedling results can be seen in Figure 2.

Figure 2.

To study the effect of using the *Nutri Power* and *Root Winner* stimulant in the cultivation of tomato varieties.



Research results:

In these options, the longest primary roots and buds are formed (root length - 3.9 cm in control, 4.1 - 5.2 cm in experimental options; bud length - 5.2 and 6.2 - 6.4 cm, respectively). Seed treatment with test preparations enhances the process of accumulation of biomass and dry matter mass by seedlings (biomass - 2.001 g / 100 pieces in control, 2.134 - 2.485 g / 100 pieces, in experimental variants dry weight - 0.106 and 0.115-0.135). g/100 pcs. seedlings). Based on the totality of the considered indicators, the optimal concentration of growth regulators tested for pre-sowing treatment of tomato seeds was established to increase the intensity of their germination, which made it possible to activate the growth processes of plants.

Conclusion.

1. The use of test preparations in the technology of growing tomatoes, in particular Nutri Power and Root Winner, significantly increases the biological resource and productivity potential of this crop.
2. Treatment of tomato seeds with tested growth regulators improved the quality of seed sowing (germination energy in control - 57.8%, in experimental variants - 60.0 - 70.0%; germination - 67.8 and 70.0 - 77.8%) and increased their intensity (root length in control - 3.9 cm, in experimental variants - 4.1 - 5.2 cm, seedling length - 5.2 and 6.2 - 6.4 cm, seedling biomass - 2.001 and 2.134 - 2.485 g / 100 pieces, dry weight - 0.16 cm. 0.115 - 0.135 g / 100 pieces, respectively).
3. Proven growth regulators activate the photosynthetic activity of tomato plants. When seeds and plants were treated with them, the net productivity of photosynthesis significantly increased (in the period from the appearance of buds to the beginning of flowering - 2.7 - 3.0 g / m, in the control - 2.5 g / m; in the period from the beginning of flowering to the beginning of fruit formation - 4.4 - 4.9 g / m, control I - 4.2 g / m day), leaf yield (at the beginning

of flowering - 0.56 - 0.62 g / dm, at the beginning of fruiting - 0.66 - 0.75 g/dm, at the beginning of cooking - 0.79 - 0.85 g/dm, in the control - 0.54, 0.64 and 0.76 g/dm, respectively).

4. Under the influence of the test growth regulators, the synthesis of pigments in tomato leaves is enhanced, which indicates that the leaves retain high photosynthetic activity.

5. Double application of the test preparations (in seeds and plants) increases the accumulation of sugars and ascorbic acid in tomato leaves (sugar content in the budding phase - 3.63-3.98%, in control - dry weight of leaves - 3.49%; vitamin C - 51, 4 - 54.5 mg, in the control - 48.3 mg / 100 g of raw materials) and their release into formed fruits (sugar content at the beginning of ripening - 1.93 - 2.08 and 1.81%, dry weight of leaves , vitamins C) - 41.8 - 43.9 and 38.4 mg / 100 g of raw materials, respectively).

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