14th International Conference on Microbial Interactions & Microbial Ecology August 19-20, 2019 Vienna, Austria

The Influence of the Biopreparate "Phytocatena" on the Fungus Fusarium Of the Tomato Root and Rhizosphere

Guliko Dvali, Leila Zviadazde, Naili Lomtadze, Maia Kobakhidze
Georgian Technical University, Biotechnology Centre, Tbilisi 0175, Georgia

Introduction

Tomatoes are important vegetable cultures that are infected by fungi, bacteria and viruses. The pathogenic fungus Fusarium causes Fusarius. Fusarius can develop during any phase of plant growth. Fusarium inhabits soil and develops around the root system of a plant in the rhizosphere and roots. The toxins that are released by the Fusarium build up in the soil, resulting in physiological changes in the plant. Therefore, the roots of the affected plant decay and so the plant dies. It is therefore important to study the effect of the biological preparate "Phytocatena" on microflora and plant pathogens, in order to achieve ecologically healthy products and improve the overall condition of the environment. The purpose of the research was to study the influence of the pathogen Fusarium which causes the disease of the tomato root and to study the influence of the biopreparate "Phytocatena" (Pseudomonas fluorenscens), produced by the Plant Biological protection Centre in Georgia.

Material and Methods

The tomato variety "Slivka" has been studied in the experiment. The total quantity of pathogenic fungi was estimated by thousandths of 1 gram of dry soil (1:10, 1: 100, and 1: 1000). For microbe cultivation to occur Chapeck, Suslo and Potato were used. Microbiological analysis was conducted using I. M. Wozniakovskaya's method. The total quantity of pathogenic fungi was estimated by thousandths of 1 gram in dry soil. A control of uncultivated soil was used. The tested soil and tomato plant roots were treated with a 2% solution of the biopreparate "Phytocatena". Following this, during the whole vegetative period the tomato plant root system was treated two to four times 15-20 day intervals

Result

As a result of the research, the total quantity of the pathogenic fungi in the uncultivated soil was established as 400 thousand. Through identification, it was established that the majority of the total quantity of pathogenic fungi present were the Fusarium fungi (205 thousand). The total quantity of pathogenic fungi and Fusarium identified within the uncultivated soil are indicated in Table 1.

Table 1. The total number of pathogenic fungi and Fusarium present in the uncultivated soil (1000/1gr. Absol. Dry soil)

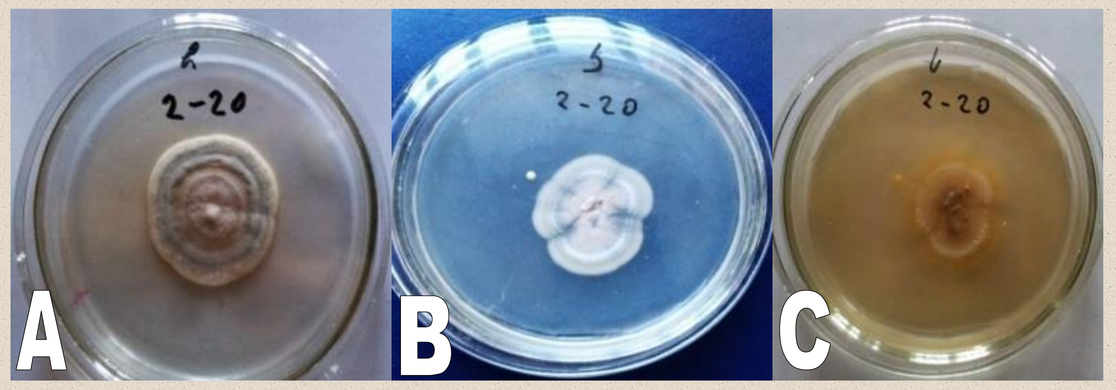
Collected Sample	Total quantity of Fusarium	Total quantity of Pathogenic fungi
Uncultivated soil	205	400

The soil that was cultivated with the biopreparate "Phytocatena" resulted in a decrease in not only the total number of Pathogenic fungi, but also the Fusarium. (**Table 2.**)

Table 2. The total quantities of Pathogenic fungi and Fusarium sampled during the flowering phase of the tomato plant (1000/1gr. Absol. Dry soil)

Collected sample	Flowering phase					
	Fusarium			Pathogens		
	Total quantity	Fungi	Rhizosphere	Total quantity	Root	Rhizosphere
Control (without biopreparate)	1 20	65	55	261	140	121
Treated with "Phytocatena"	20	11	9	49	25	24

(Figure 1.) The development of Fusarium on different nutrient areas: Chapeck (A), Potato (B) and Suslo (C).

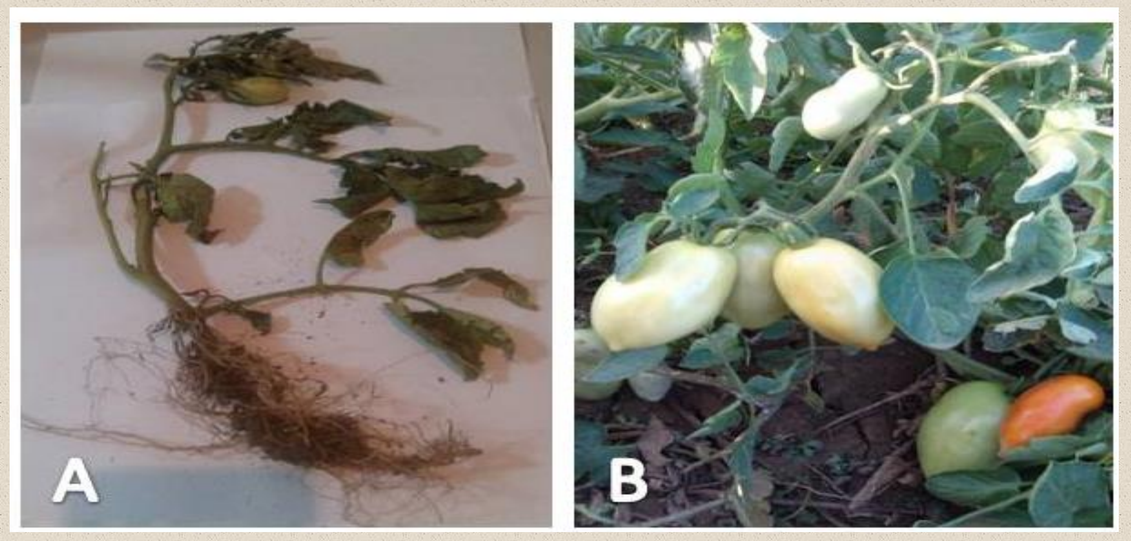


The Fusarium that spread through the roots and the rhizosphere of the tomato plant caused the disease of the plant. The root darkened, softened and the leaves wilted. (Figure 2. A, B). In contrast, the treatment with the biopreparate "Phytocatena" prevented the development of the Fusarium in the rhizosphere and as a result produced a healthy product. (Figure 3. A, B).

Figure 2. Root (A) and Fruit (B) of tomato with Fusarium diseases



Figure 3. Effect of "phytocatena" on the development of the Root (A) and Fruit (B) of tomato with Fusarium diseases



Conclusions

Therefore, with the soil-climatic conditions in Georgia, the "Phytocatena" was capable of significantly decreasing the development of Fusarium on the tomato plant root and rhizosphere, leading to a fruitful plant product and healthier environement.

Literature

1.Biologicheskaya zashchita rastenii. M.V. Shternshis, F.U. Jalilov. M. Koloss, 2000.
2.Vozniasenskaia I.M. Mikroflora rastenii I urojai. Izdatelstvo "Kolos" 1969.
3.Sistemnoe ispolzovanya preparatov na osnove bakterii I gribov v zashchite rastenii I uluchshenii mikrobiologicheskogo sostava pochv – Nauchni jurnal KuvGAU, #105(01), 2015
4. Soils of Georgia. Atlas. Tbilisi. 2015
5. "Bolezni tomata I metodi zashchiti", Agrogliad: ovoshchi frukti. 2008.