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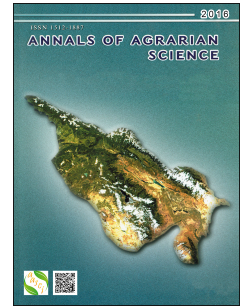
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## Bacterial diseases of tomato plants in terms of open and covered growing of Ukraine

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### Abstract

It was established that the main causes of mass diseases of tomato in covered ground in Ukraine are agents of bacterial black spotting, bacterial speck and in open ground are agent of bacterial cancer of tomato plants. Typical symptoms of diseases are wilting and die-off of young plants, blackening of fiber vascular bundles, black spotting of leaves and fruits, and fruit stem rot. It was studied morphological and cultural, as well as physiological and biochemical properties of the selected strains of the agents of tomato bacterial diseases. We recommended biological preparations Phytocide and Phytohelp based on the bacteria *Bacillus subtilis*, to restrict the development of the agents of bacterial black spotting *Xanthomonas vesicatoria* and bacterial cancer *Clavibacter michiganensis* subsp. *michiganensis*.

**Keywords:** Tomato, Bacterial speck, Crop, Agroecosystems, Pathogen

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### Introduction

In tomato plants it can be found a number of bacterial diseases affecting various organs: stem necrosis, bacterial leaf spotting, fruit mottling (spotting), fruit top rot, watery rot of stems and fruits, bacterial wilt (brown rot) of stems, root cancer.

The frequency and intensity of disease outbreaks in major tomato growing areas of Odesa, Zaporizhia, Mykolaiv, Dnipropetrovsk, and Kherson regions of Ukraine varied from year to year and depend on weather and climatic factors, as well as different degrees of compliance with environmental requirements of a certain agent [1].

In Ukraine, in terms of open and covered growing the most common disease is bacterial black spotting. The agent *Xanthomonas vesicatoria* affects aboveground plant parts, resulting in reduced harvest down to 10 – 20%; if the lesion is severe, the fruits are not formed, and the affected fruits lose their quality and their flavor is reduced. The high average temperature promotes to mass spread and development of the disease. At the end of the vegetation period the spread and the development of bacterial black spotting reaches 95 and 40% respectively, the degree of fruit destruction – 1,7%. Major crop losses are observed in the places of permanent growing of tomatoes and varieties of the nightshade family, especially of potato [2, 3].

In Zaporizhia and Dnipropetrovsk regions of Ukraine it is observed the development of bacterial speck (the agent is *Pseudomonas syringae* pv. *tomato*), which is developed due to high humidity and low night temperatures (12 ... 15° C). Lesions are observed in all above-ground plant organs, especially in fruits [3, 4]. According to phytosanitary state of agroecosystems in Ukraine and

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