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Bacteriemic diseases of vegetable pepper (*Capsicum annuum*)

The purpose. To study causal organisms of bacteriemic lesion of vegetable pepper in conditions of Kiev and Zhitomir regions.

Methods. Microbiologic - for isolation of causal organisms of bacteriemic diseases from samples of attacked plants (leaves, seeds, fruits), and also morphological, physiological, culture and biochemical- for identification of causal organisms of diseases.

Results. It is fixed that in conditions of open cultivation in Kiev and Zhitomir regions the most nocuous are causal organisms of black bacterial spot (*Xanthomonas vesicatoria*) and soft rot (*Pectobacterium carotovorum* subsp. *carotovorum*).

Conclusions. From the attacked leaves and fruits of vegetable pepper bacteria were sampled which caused pathological process in leaves and fruits - black bacterial spot of fruits and leaves and soft rot of fruits.

Key words: bacteriemic diseases, causal organisms of bacteriemic diseases, vegetable pepper.

Peppers are grown on all continents, and in Ukraine - mainly in the South. According to the taste and nutritional properties of peppers belongs to the group of the most important vegetable crops. In addition to sucrose, its fruits contain such valuable vitamins as C, PP, B1, B2, carotene, nicotinic and folic acid, as well as essential oils, the aroma of which stimulates appetite, promotes a better assimilation of food and metabolism. Diseases and pests cause great damage to vegetable plants, which often leads to a shortage of 20-40% of the crop. For cultivation in open and closed soil in pepper, about 30 infectious diseases, caused by fungi, viruses, bacteria, have been detected. The literature describes 12 types of bacteria that can affect various parts of sweet pepper [2, 4-7]. In recent years, due to the warming of the climate and the change in agroecocenosis, there is also a change in the species composition of the pathogens of sweet pepper diseases [6]. And if in previous years the diseases of pepper were mostly caused by fungi, now bacterial diseases prevail. The prevalence of bacterial diseases is uneven and depends on ecological characteristics (temperature, precipitation, soil, air humidity, etc.), and on the biological characteristics of pepper varieties and pathogens. As a result of the use of different agricultural systems, the influence of biotic and abiotic factors, the use of new varieties varies pathogens of diseases and their redistribution in the ecosystem. To prevent the spread of bacterial diseases, it is very important to timely determine their pathogen, since the accuracy of the diagnosis depends on the choice of remedies and the effectiveness of their use.

The purpose of the research is to study pathogens of bacterial damage of vegetable pepper in the conditions of Kyiv and Zhytomyr regions.

Research methodology. The object of research was bacterial isolates isolated from seeds, leaves and fruits of vegetable pepper, infected with bacteriosis, obtained for the survey of sweet pepper crops in Zhytomyr and Kyiv regions of Ukraine. The isolation of the pathogens from the specimens of the affected

plants (leaves, seeds, fruits) was carried out by generally accepted methods. The isolated isolates studied morphological, cultural, biochemical and physiological properties. The morphology of cells and colonies was studied during growth on potato agar (CA) at 27 [deg.] C over the course of a day [1]. The pathogenic properties of isolated isolates were studied by the method of artificial infection of leaves and fruits of pepper. In leaves and fruits a syringe was injected with 0.1 ml of a bacterial suspension with a cell concentration of 1 billion in 1 ml of sterile water. On the development of visual signs, made conclusions about the pathogenicity of experimental bacterial cultures [1, 3].

Study of biochemical properties of phytopathogenic bacteria is obligatory for the determination of their generic, species and typical affiliation. To detect and study these properties, the culture of bacteria was sown on media containing various carbohydrates, proteins and organic acids, alcohols. Some of them were given an indicator that indicates the presence or absence of splitting, oxidation or recovery of substances introduced into the environment. Determination of generic and species belonging to isolated microorganisms was carried out by comparing the obtained results with the properties of bacterial pathogens presented in literature sources [8, 9].

Research results. We analyzed 54 samples of fruits and peppers, selected in the Zhytomyr and Kyiv oblasts, with obvious signs of defeat. It was found that 2 types of disease symptoms dominated the affected pepper. The first type has the following characteristics: on the leaf, on its lower side, there were small, irregular shapes, slightly raised dark green or pale brown with yellowish border patches, later tissue on the central part of the yellow or black. Strongly affected leaves fell. On the fruit formed convex black spots in the form of bubbles with a water-saturated border, which increased in sizes up to 6-8 mm. The second type of symptoms has the following symptoms: on the leaf signs of the disease were not observed, and on the fruit appeared first light or dark spots, later the fabric around the spot was pressed, became soft, easily separated from the epidermis and turned into watery-mucous fluid with unpleasant Smell For bacteriological analysis of infected vegetable pepper tissue with the symptoms of the first and second type isolated 23 isolates of bacteria. To study the pathogenic properties of isolated isolates of bacteria, an obligatory condition is the carrying out of an artificial infection of the host plant. For artificial infection of pepper leaves and stems (Californian miracle variety)

The first type of isolates appeared small dark and light brown spots with a black border without chlorotic halo. On the petioles and stems, the spots are elongated, black. The affected leaves subsequently became yellow, became dry and dropped off. By artificial inoculation of pepper fruits (California miracle variety), second type isolates originally formed watery, light green spots with a dark green margin. After 24-48, the stains became dark brown, the fabric of the spots softened, increased in size, merged and covered most of the fetus. On the 10-11th day, the fruit was completely rotten. For the internal analysis of the fruit from the meaning of an unpleasant smell and the complete disintegration of the tissue with the formation of yellow mass. According to morphological, cultural and biochemical properties all isolated isolates are divided into 2 types (Table 1). Bacteria of the first type are short gram-negative sticks, arranged singly, in pairs or chains. Oxidazonegative. On potato agar colony forming slimy light yellow, convex shape to form a thin BCH and they will ring sparkling form acid on glucose, lactose, galactose, fructose, sucrose, maltose, rhamnose, mannose, raffinose; Do not form acid on inositol, sorbitol, mannitol, dulcits. These biological properties identical to the literature [5-9] and give reason to believe that the emphasis of the affected leaves and fruit pepper vegetable strains share many properties with previously described and identified as the causative agent of bacterial black spot *Xanthomonas vesicatoria*. Bacteria are the second type of mobile perytryhalni, short, small sticks with rounded edges gram, do not form spores, facultative anaerobes, oksydzonehatyvni (tab. 2). On potato agar (SC) form a grayish-white, round, shiny, as if wet, smooth, uniformly convex, with a

dense center and transparent, watery or equal to the edge of the colony. On a meat-pumped broth (MPB) in 24 hours form an intense mud, a ring and a precipitate. Use glucose anaerobically. Identify pectinase activity without gas forming acid on glucose, lactose, galactose, fructose, sucrose, maltose, rhamnose, mannose, raffinose; Do not form acid on inositol, sorbitol, mannitol, dulcits. Analyzing the cultural-morphological and biochemical properties of selected strains of affected fruit vegetable pepper and comparing them with the literature [5-9], we can assume that the emphasis strains have many common characteristics and identified as the causative agent of soft rot *Pectobacterium carotovorum* subsp. *carotovorum*.

In the world most often occur and are the most harmful diseases - soft rot of fruits, seeds and stalks, caused by *Pectobacterium carotovorum* subsp. *Carotovorum*, various spots caused by the bacteria of the genera *Xanthomonas*, *Pseudomonas* and *Clavibacter*. The latter is most often observed for growing peppers in closed soil. Major economic losses in the countries of the Middle East are caused by the causative agent *Ralstonia solanacearum* (Table 2). It affects more than 200 plant species, including seeds, sprouts, and peppermint stalks, causing bacterial wilting of plants. In the Middle East, Cuba, in Japan, this is a serious problem. The question of the presence and harmfulness of the pathogen of bacterial vibration in Ukraine is controversial. This agent is a quarantine for Ukraine and its exposure is very dangerous. During 2012-2013, we did not detect Pepper *Ralstonia solanacearum* from infected plants. It was established that in conditions of open soil in the Kiev and Zhytomyr regions the most dangerous are pathogenic agents of black bacterial spotting of *Xanthomonas vesicatoria* and soft rot *Pectobacterium carotovorum* subsp. *carotovorum*.

Conclusions

From affected leaves and fruits of pepper vegetable isolated bacteria that cause pathological process on leaves and fruits. Their morphological and physiological and biochemical properties have been studied. It is established that isolated from the leaves and fruits of pepper strains that cause black bacterial spotting of the fruits and leaves, identified as *Xanthomonas vesicatoria*, and isolated from the fruits of pepper strains cause soft rot of the fruits and belong to *Pectobacterium carotovorum* subsp. *Sarotovorum*

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