UDC of 579.84:632.35:618. 825.1

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Causal organisms of bacterial diseases of soya and their monitoring

Aim. Monitoring of bacterial pathogens of soy, determination of risks of their distribution and biology that gives an opportunity to walk up to the questions of biocontrol. Methods. Фітопатологічні, microbiological, biochemical, statistical. Results. The results of the 4-years-old monitoring of sowing of soy are analysed on a defeat phytopathogenic bacteria. Shown new tendencies and conformities to law of distribution of bacterial phytopathogenes of soy for 2010-2014 Conclusions. At the 4-years-old екосистемного monitoring of sowing of soy in 8th areas of Ukraine the redistribution of accents is certain among specific composition of basic and second-rate causative agents of backteriosiss of soy.

Keywords: soy, phytopathogenic bacteria, virulence, symptoms of disease, monitoring.

The production of soy in Ukraine, which has favourable ground-climatic terms for her growing, has grown considerably. In the conditions of intensification of production after the priorities in growing of grain-crops, soy went out into 3rd place. Yes, in the period from 1990 to 2011, the sowing areas of this culture increased from 87.8 thousand to 1.2 million and (more than 12.6 times), and production - from 99 thousand tons to 2.3 million t (in 22.9 times). The productivity of seed of soy for this period rose from 11.3 to 20.4 c / and (1.8 times). However, the out-of-control introduction of new varieties of soy, especially the foreign selection, of the absence of the ecosystem monitoring in the sowing of soy after illnesses, wreckers and weeds was brought to the increase of harmful factors, especially the backtheriosis of soya [1, 6 10, 17]. The phytopathogenic causative agents of bacterial diseases cause soy considerable losses before sowing. Their development results in the decline of productivity or death of plants. Aggressive bacterial phytopathogenes are widespread in the wild and in terms friendly to their development, causing significant damage to harvest [1, 7, 9, 13]. A study and annual monitoring of the development of methods of fighting against them, the creation of new evidence and competitive varieties, the prophylaxis and prevention of the distribution of epiphytoties [11]. Monitoring of the distribution of the backbone of soy has begun by us in Ukraine in recent years testifies to the potential unconcern of the expansion of the circle of aggressive phytopathogenes [2, 7].

An aim of the work is to monitor the bacterial pathogens of soy, determining the risks of their distribution and biology of phytopathogenes of soy, which gives a chance to walk up to the questions of biocontrol.

Materials and methods. Monitoring was conducted on research permanent establishments and productive sowing of soy in Kyiv, Vinnytsya, Cherkasy, Chernihiv, Sumy, Poltava, Rivne and Kherson areas. Inspected plants of soy and insulated a causative agent in phases from a stair to flowering of plants, and also during pouring and ripening of grain. For determination of the defeat of sowing of soy, the method of linear estimation [4, 8]. Taken away leaves and stems of soy plants with the bacterial defect symptoms and conducted the bacteriological analysis of the staggered material. In laboratory terms, the object of research was bacterial isolates. A standard - collection of bacterial cultures is a causative agent of the backtheriosis of livestock (the Ukrainian collection of microorganisms of the Institute of Microbiology and Virology is the name of DK Zabolotny): Pseudomonas of savastanoi pv. Glucine-8541, 8571, 9072; Xanthomonas of axonopodis pv. Glucines - 8609, 9075, 9178; Pantoea of agglomers of UKM In-1089, 1090; Curtobacterium of flaccumfaciens pv. Flaccumfaciens - 6562, 6564, 6565, 6566a, 6567, 6568; Xanthomonas of fuscans pv. Fuscans - 9169, 7665, 8845; Pseudomonas of syringae pv. Syringae - 8531.8511.8414; Pseudomonas of syringae pv. Tabaci - 223. Pathogenic properties of the isolated isolates of the bacteria determined in the field terms in 4-valid for one occasion repeated. The artificial infection of plants of soy (5 plants for each isolate) was performed by a syringe by the bacterial suspension of the cages

in a stem and leaves. Closeness of suspension - 1 • 109 CFU / ml. On every plant by the 3rd pricks of inoculating 3 tiers of leaves in 4th repetitions on each sheet, and also stems and bobs. Control were 5 plants of soy, inoculated with sterile water-borne water. The account of artificial infection was conducted in 10-14 days in a 5-ball scale [5,8].

Virulence was estimated after the 5-ball system worked out by us for the basic causative agents of soy. An estimation has gone into detail for our objects, leaning on the general 5-ball system [5, 7] for phytopathogenic bacteria. For determining the belonging of the causative agent to the sort of Pseudomonas, an ultrasensitive reaction on a tobacco is known methodology [3], which determines the firmness of the plant to the pathogens. A reaction involves the rapid determination of the pathogen by a plant and the development of pathological processes, where it takes place: localization of infestants in its penetration area, rapid necroticisation of the cages of the plant and death to the pathogen.

At the distinguished isolates of bacteria studied morphological, культуральні, physiology, biochemical properties after the method resulted in works of Д. Герхардта [3] but From. Clement [15]. Oxidase activity was determined after Н. Ковач [16]. Authentication of the isolated bacteria was conducted, comparing them to property with description of collection stamms and determinant of bacteria [14].

Results of researches. A study and determination of defeat of plants take place phytopathogenic bacteria significantly more difficult than by other vermin (by mushrooms, viruses, insects). On the different phases of the height of the plant, the different cycles of development of the bacterial population, in case of change of weather conditions, the symptoms of bacterial defeat can be the same inter se, with the defeat of the mushroom diseases, and also to remind the state predefined by abiotic factors . Id est only the isolation of parasite will provide correct diagnostics. Final determination of bacterial pathogens of soy is only possible for a combination of phytopathological visual inspection and laboratory diagnostics. Therefore for the period from 2010-2014 1274 soy plants were analyzed with characteristic bacterial defeats (Table 1). From these 1018 isolates from that after a bacteriological analysis, 650 stamms are selected for further work are abstracted. It is selected medium-and high-aggressive stamms that conditionally distribute the phytopathogenic causative agents of the backtheriosis of soy into a few groups: as pseudomonads and 3 groups of yellow pigment.

The obtained data testify that newly-identified stamms are family with a test collection on basic morphological and cultural and physiological and biochemical properties. It is evident from the determination of the specific composition of causative agents of diseases, based on their study of phenotypic properties (Table 2), confirming that the soy in Ukraine is struck: Pseudomonas of savastanoi pv. Glycine, Xanthomonas of axonopodis pv. Glycine, Pantoea of agglomerans, and also Curtobacterium of flaccumfaciens pv. Flaccumfaciens, first distinguished by us in Ukraine from soya [12]. Among other causative agents of backtheriosis - Xanthomonas of fuscans pv. Fuscans (black shallow spotted), first isolated by us in Ukraine [7]. He is however insulated rarely. A brown pigment and clear symptomatology of both natural and artificial infection testify to his presence. Among the causative agents of bacterial diseases of soy, which are phenotypic properties (see a table 2), it is included in the kind of Pseudomonas, a certain percentage (30-40%) is represented by stamms, which found out a high aggressiveness Both to the plants of soy and to other agricultural cultures. It is reasonable to determine them as Pseudomonas of syringae pv. Syringae, and that of them, which did not give the reaction to supersensibilization on tobacco, struck a tobacco like Pseudomonas of syringae pv. Tabaci [15]. The presence of the last two pathogens requires confirmation of genetic researches. Such a composition of certain pathogens coincides with data from literature on bacterial diseases of soy in the world [13].

The observation of the obtained results has given the opportunity to determine the common correlation of causative agents for the defeat of plants (Figure).

Thus, the basic causative agents that cause illnesses of soy in Ukraine are Pseudomonas of savastonoi pv. Glycinea (spotted spotted), Xanthomonas of axonopodis pv. Glycines (pustular backteriosis), Pantoea of agglomerans (striped of stem).

Cited data testify that Curtobacterium of flaccumfaciens (ferruginous-brown spotted), first discovered by us in Ukraine in a certain permanent percentage, has had a tendency to increase the sow sowing.

The observation of the obtained results has given the opportunity to determine a common correlation of causative agents for defeating plants (see figure). Among the basic causative agents that cause illnesses

of soy in Ukraine, between Pseudomonas of savastonoi pv. glycinea (spotted spotted) and Xanthomonas of axonopodis pv. glycines (pustular backteriosis) exists certain intercommunication. A causative agent of the crop spotted soy is not only an inactive part of the pathogenic microbiota of soy but also presents 30-40% of the staggered plants. Usually in literature mark the distribution of basic causative agents of a backyard of soy about a seasonal change - when Pseudomonas of savastonoi pv. glycinea, that actively strikes a plant on the first phases of her height, Xanthomonas of axonopodis yields pv. glycines in the phase of ripening of bobs [5, 13]. However, the last years causative agent of pustular backteriosis after distribution and percent of diseased plants on 2nd place then Pseudomonas of savastonoi pv. Glucinase It is explained to him by a greater sensitivity to the wide range of pesticides that apply in agriculture of Ukraine [2, 7]. The optional phytopathogenesis of the Pantoea of Agglomerans finds a tendency to the recurrence of appearance of exactly high-aggressive stamms (along with a certain amount of avirulent variants), as well as a certain dependence on the distribution of basic causative agents. Thus, Curtobacterium of flaccumfaciens (ferruginous-brown spotted), first discovered by us in Ukraine, has steady development (10-15%), with a tendency to the increase. The percentage of second-rate (2013-2014) other causative agents of the backtheriosis of the leguminous belongs to that (except polyphagous pseudomonads) rises for the decline of the percentage of basic backtheriosis [13].

Conclusions

At the annual (2010-2014) ecosystem monitoring of sowing of soy in 8 areas of Ukraine the redistribution of the accents is certain among the specific composition of the soy backteriosis of the basic and second-rate causative agents. Certainly, that to the circle of phytopathogenic bacterial causative agents that strike soy, belong to: Pseudomonas of savastanoi pv. glucine, Xanthomonas of axonopodis pv. glycine, Pantoea of Agglomerans, Curtobacterium of flaccumfaciens pv. flaccumfaciens, Xanthomonas of fuscans pv. fuscans, Pseudomonas of syringae pv. Syringae and Pseudomonas of syringae pv. tabaci Found an intercommunication between the distribution of basic, second-rate and off-type bacterial phytopathogenes.

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