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Efficiency of effect of fungicides on causal organisms

Aim. To of of learn the antibacterial operating of chemical facilities of defence on the causative agents of bacterial cancer and крапчастість plants of tomatoes (Lycopersicon of of of esculentum of of of Mill.). Methods. The of of phytopathogenic bacteria of of of C of of used. michiganensis subsp. michiganensis (Smith 1910) of of of Davis of of of et al. 1984 P. syringae pv. tomato (Okabe 1933) of of of Young of of of et al. 1978, isolates distinguished in the economies of the of of Dnepropetrovsk of of area and identified as of of X. vesicatoria and of of P. syringae pv. tomato. Antibacterial of of action of chemical facilities of defence, pesticides and agrochemicalss brought in to of of List of of and settled to application in of of Ukraine of of on tomatoes for limitation of development of phytopathogenic organisms, studied the method of small holes. Results. Found of of out antibacterial activity of preparations with the fungicide operating on the causative agents of bacterial cancer and black bacterial spotted. Conclusions. Found of of out antibacterial activity of preparations with the operating substances and by phosphorous acid for limitation of development of causative agents of bacterial cancer plants of tomatoes.

Key words: fungicides, tomato, efficiency, antibacterial activity.

Lately of of the state of vegetable cultures became worse as a result of decline of level of agrotechnics, violation of technology of growing, use of off - grade seminal material, considerable distribution of root rotten, vertex rot of garden - stuffs, watery rot of stems and garden - stuffs, bacterial fading (brown rot) of stems and cancer of chums. Sometimes of of these illnesses have development, that is why at the end of vegetation period perishes 25-50% plants [8].

Almostof8 types of phytopathogenic bacteria strike tomatoes [9]. Theofcausative agents of bacterial cancer (Clavibacterof michiganensis subsp. michiganensis) inflict inofUkraineof considerable harm to the tomatoes, bacterial (Pseudomonas of syringae pv. tomato) and black bacterial spotted (Xanthomonas of vesicatoria)[1, 3, 10].

By of the characteristic sign of defeatof Clavibacter of michiganensis subsp. michi - ganensis is fading at first of puff plates, and then and all plant as a result of stoppering of the vascular system bacteria [2, 9]. The of edges of sheets, that then grow brown and dry up to the central vein, but does not fall off, fade on the initial stages of height and development, and all plant dries out after some time [2, 8, 9]. Between of the zone of and healthy fabric, as a rule, a yellow zone appears. Fading of is begun with bottom sheets, that it is related to system distribution of infection on the vessels of phloem. Through of vessels to the bacterium able to get to the formed garden - stuffs. At of the terms of superficial defeat on them dark patches appear in a center with light edges [9]. On of the green garden - stuffs of spot white, and on those that ripen, yellow. Brown of cracks that after the form remind a bird eye appear in their center [2, 5, 8].

P. syringae pv. tomato strikes surface part of plants (stems, puff plates, garden - stuffs)[2]. To of greenery garden - stuffs are more receptive to the infection, their firmness rises in the process of ripening [11, 12]. On of of puff plates, beginning from edges, the oily appear and slightly heaved up black spots a 1-3 mm meet of With of the increase of humidity, spot, and sheets convolve and die off [13]. The of staggered flowers fall off quickly. Garden - stuffs take shelter shallow black spots the wide

watery framing appears round that. Spots ofincrease and arrive at a size a 8 mm of In an autumn period a causative agent predetermines the rapid rotting of garden - stuffs [2, 9].

One of the most harmful bacterial illnesses of plants of томата there is black bacterial spotted that is caused of of Xanthomonas of vesicatoria. An of infection is possible during all period of vegetation on the above - ground organs of plants [2, 9]. On of puff plates watery round spots appear a 1-2 mm that afterwards turn black. Fabric of round a spot turns yellow [6]. At of the adult plants of sign of illness on puff plates it is discovered in places, where water that is the basic vection of causative agent gets mostly [2]. Spots of are concentrated on the edges of plates, that predetermines their wring. The of spots of the extended form appear on a stem and petioles. Flowers of are struck rarely, but can fall off.

Symptoms, harmfulness and ways of hit microorganisms, are described [2, 4, 5, 9]. Set, that the source of bacillosis is soil, vegetable bits and pieces, seed, weeds (couch - grass, amarant), constructions of hothouses. In of hothouses recommend annually to conduct to soil. Субстрат of is inundated by steep boiling water, steam thoroughly or sterilize solutions of blue and ferrous vitriol. Disinfect of seed by means of heat treatment the substances of vegetable and chemical origin. Against of bacterial causative agents apply insecticides and fungicides [2].

For of protecting of plants from organisms in agriculture use pesticides. In of reediting official of «List of of pesticides and agrochemicalss settled to the use in of Ukraine of on 2010», there is not information on preparations, plants of tomatoes recommended at bacterial defeats [8]. From of data of [10], fungicides in the complement of that enter or hydroxide of copper repress a height and development of causative agents of bacterial cancer and black bacterial spotted substantially.

Aim of of researches — to learn the antibacterial action of chemical facilities of defence on causative agents of bacterial cancer plants of tomatoes (Lycopersicon of esculentum of Mill.).

Methodology of researches. The of phytopathogenic bacteria of C of used. michiganensis subsp. michiganensis (Smith 1910) of of Davis of of et al. 1984 stamms of of P8, P12, P73, P110, P115, 4999, P. syringae pv. tomato (Okabe 1933) of of Young of of of et al. 1978 stamms 4213, 2, 120, BB9. All of of stamms are got from of of Institute of of of pesticides and defence of plants (Serbia). The of of also distinguished is used by us in the economies of the of of Dnepropetrovsk of of area isolates that were before identified as of of X. vesicatoria (isolates of group of of And : A14, A15, A15a, A22, A22a, A23, A25) and of of P. syringae pv. tomato (isolates of group of of Б : Б9, Б13)[1]. At of of the same time investigated antibacterial activity of chemical facilities of defence, pesticides and agrochemicalss brought in to of of List of of and settled to the use in of of Ukraine of of on sowing of tomatoes for limitation of development of phytopathogenic organisms. Chemical of of facilities of defence of plants are applied with operating 375 gs/l; the sulfate of copper is tribasic, 345 gs/l, copper, 350 gs/l; 250 gs/l + of, 250 gs/l; 250 gs/l; .

Influence of of of chemical facilities of defence of plants on a bacterium was studied by the method of small holes [6]. In of double - dish in the small holes done by a sterile cork drill in the center of hardening potato agar, brought in an operating substance sterile variable spouts in the concentrations recommended by producers. Then of radially sowed oneday's suspension of bacteria a title 109 КУО/ml. Cups incubated 48 h for the temperatures of 28±1oC. Antibacterial of influence of substance was determined after a diameter by the zones of absence of height of bacteria. Statistical of treatment of results was produced by means of application of STATISTICA of v package.6.0.

Results of researches. Set, that not all preparations find out antibacterial activity to the gram - positive and gram - negative causative agents of bacterial cancer and sputteringplants of tomatoes. Yes, preparations with the operating substances of azoxystrobin , 250 gs/l 375 gs/l; to the copper, 350 gs/l; mandipropamide , 250 gs/l +diphenoconazole, 250 gs/l of, 250 gs/l of appeared not active to the stamms of P8, P12, P73, P110, P115, 4999 C. michiganensis subsp. Michiganensis of and 4213, 2, 120, BB9 P. syringae pv. tomato. They of were not active and to the distinguished isolates of group of And (A14, A15, A15a, A22, A22a, A23, A25) of and of Б(table. 1-3).

In of experiments the investigated preparation is with the operating substance of phosphite aluminium, 570 gs/l + of phosphorous acid, 80 gs/l of found out high antibacterial activity to gram -

positive of of C. michiganensis subsp. michiganensis, and the zones of braking of height presented a 36-70 mm (table. 1).

Preparations of of with the operating substance of in a concentration 302, 600, 525 and 640 gs/of kg were active to gram - positive of C. michiganensis subsp. michiganensis. More of active to the stamms of P8, P12, P73, P110, P115 of and 4999 there was preparation with the operating substance of Metallaxil-m , 40 gs/of kg + of, 640 gs/of kg, zone of delay of height of bacteria were within the limits of a 36-60 mm to these stamms preparation appeared of of Less of active with the operating substance, 302 gs/l, 248 gs/l of zone of delay of height did not exceed a 14 mm.

1. Antibacterial of of activity of chemical facilities of protecting is from the causative agent of bacterial cancer of tomatoes of C. michiganensis subsp. michiganensis

Obviously, that the investigated preparations are more active to the gram - positive bacteria (table. 2). It of is well - proven that preparations with the operating substance of metalaxyl + mancozebin a concentration 302, 600, 525, 640 gs/of kg found out insignificant activity to gram - negative of P. syringae pv. tomato with the zones of braking of height a 14-30 mm of Characteristically, that preparation with the operating substance, 50 gs/of kg + of Metirams , 550 gs/of kg was active

2. Antibacterial of of activity of chemical facilities of protecting is from the causative agent of bacterial sputteringtomatoes of of P. syringae pv. Tomato to gram-positive C. michiganensis subsp. michiganensis of P8, P12, P73, P110, P115 and 4999, but did not find out antibacterial activity to gram-negative P. syringae pv. tomato 4213, 2, 120 and BB9. To our opinion, divergence in operations of this preparation is predefined by the features of structure of cellular wall of gram-positive and gram-negative bacteria.

The marked preparations also found out antibacterial activity to the distinguished isolates of group But also Б (table. 3).

3. Antibacterial activity of chemical facilities of protecting is from the causative agents abstracted from tomatoes in the Dnepropetrovsk area

Isolates of group And, identified as Xanthomonas of vesicatoria, were sensible to preparations with the operating substance of mancozeb . The zones of delay of height presented a 14-50 mm it is Found out, that preparations repressed the height of the isolates of group Б, identified as P of syringae pv, partly. tomato, with the zones of delay of height a 18-50 mm Isolates of group Б were resistantto preparation with the operating substance of Pyraclostrobin, 50 gs/of kg + of метирам, 550 gs/of kg.

Conclusions

Most fungicides recommended for treatment of plantations of tomatoes do not influence on the causative agents of bacterial illnesses. In experiments the investigated preparation is with the operating substance of aluminium, 570 gs/l + phosphorous acid, 80 gs/l found out high antibacterial activity to gram-positive C. michiganensis subsp. michiganensis, and the zones of braking of height presented a 36-70 mm Preparations with the operating substance in a concentration 302, 600, 525 and 640 gs/kg are more active to the gram-positive bacteria. They got results confirm antibacterial activity of preparations with the operating substances, to the aluminum and phosphorous acid for limitation of development of causative agents of bacterial cancer and plants of tomatoes.

Bibliography

1. *Аветисян Ю.Ф.* Возбудители бактериальных болезней томата в хозяйствах Днепропетровской области/Ю.Ф. Аветисян, Ю.В. Коломиец//Глобализация науки: проблемы и перспективы: сборник статей Междунар. науч.-практ. конф. 7 февраля 2014 г. — Уфа: РИЦ БашГУ, 2014. — Т. 3. — С. 186–189.

2. *Ахатов А.К.* Мир томата глазами фитопатолога/А.К. Ахатов. — М.: КМК, 2010. — 288 с.

3. *Етіологія* масового захворювання томатів у господарствах України/Р.І. Гвоздяк, С.М. Мороз, Л.М. Яковлєва, Є.П. Черненко//Мікробіол. журн. — 2009. — 71, № 5. — С. 33–40.

4. *Матвеева Е.В.* Черная бактериальная пятнистость томата/Е.В. Матвеева//Овощеводство и тепличное хозяйство. — 2007. — № 6. — С. 23–25.

5. *Микроорганизмы* — возбудители болезней растений/В.И. Билай, Р.И. Гвоздяк, И.Г. Скрипаль и др. — К.: Наук. думка, 1988. — 552 с.

6. *Основы* учения об антибиотиках: учебник. 6-е изд., перераб. и доп./Н.С. Егоров. — М.: Изд-во МГУ; Наука, 2004. — 528 с.

7. *Перевидання* офіційного Переліку пестицидів і агрохімікатів, дозволених до використання в Україні на 2010 рік. — К.: Юнівест Медіа, 2010. — 544 с.

8. *Ткаленко Г.М.* Захист томатів від хвороб у закритому ґрунті/Г.М. Ткаленко//Агробізнес сьогодні. — 2012. — № 23. — С. 27–31.

9. *Фітопатогенні* бактерії. Бактеріальні хвороби рослин: монографія/Р.І. Гвоздяк, Л.А. Пасічник, Л.М. Яковлєва та ін.; за ред. В.П. Патики. — К.: ТОВ «НВП «Інтерсервіс», 2011. — 444 с.

10. *Черненко Є.П.* Бактеріальні хвороби томата і біологічне обґрунтування заходів обмеження їхнього розвитку: автореф. дис. на здобуття наук. ступеня канд. біол. наук: спец. 06.01.11 «Фітопатологія»/Є.П. Черненко. — К., 2009. — 18 с.

11. *Colin J.* Presense de Pseudomonas syringae pv. tomato (Okabe) Young et al. dans les cultures de tomate au Maroc/J. Colin//Parasitica. — 1983. — V. 39, № 4. — P. 183–185.

12. *Corpeptins,* new bioactive lipodepsipeptides from cultures of Pseudomonas corrugata/M.C. Emanuele, A. Scaloni, P. Lavermicocca et al.//FEBS Lett. — 1998. — № 433. — P. 317– 320.

13. *Pseudomonas* yringae pv. tomato and Xanthomonas spp. on tomato//EPPO Bulletin. — 2011. — V. 41. — P. 269–271.