THE PATHOGENIC PATHOGEN IN TOMATOES IS FUSARIUM OXYSPORUM F. SP. EFFECT OF VARIOUS FUNGICIDES AGAINST LYCOPERSICI FUNGI

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ABSTRACT
In this article, the pathogen Fusarium oxysporum f.sp. against lycopersici fungus Ridomil Gold Mts 68% WDG. (mancotseb + metalaxyl), Previkur SL, 722 WDK. (propamocarb hydrochloride), Quadris 25% EC (azoxistrobin), Gurzat WP. When fungicides such as (tsimoxanil + copper chloroxide) and Fundazol 50% WP. (benomyl) are tested under laboratory conditions in large and small doses, F. oxysporum f.sp. mancotseb + metalaxyl, 0.3% benomyl and 0.3% tsimoxanil + copper chloroxide fungicides in 0.4% suspension against lycopersici pathogen showed high results.

Keywords: tomato, vegetable, plant, pathogen, fungus, Fusarium oxysporum f.sp. lycopersici, fungicide

INTRODUCTION
The growth of the world's population and the growing demand for food from year to year require the further expansion of the area under agricultural crops and the uninterrupted supply of high quality products. There are 5.6 million people in the world today. Tomatoes are grown on an area of 281.5 million hectares. tons. Today, 117 varieties and hybrids of tomatoes are included in the State Register of agricultural crops recommended for planting in the territory of Uzbekistan in open areas suitable for soil and climatic conditions of the regions. Of these, 142 varieties TMK-22, Barlos, Uzbekistan, Istiqlol, Shafaq, Sharq Yulduz, Sevara, Setora, Yulduz, Matonat, Zakovat and Surkhan, as well as hybrids Nurafshan F1 and Burhon F1 were created locally [1].
The main diseases common in tomato crops are phytophthora, alternariosis and fusariosis, which cause the loss of many parts of the crop. 78 million people in the world are affected by plant diseases. tons of crop is damaged. The number of phytopathogenic objects was 630 viruses, 200 bacteria and 10,000 fungal species [4].
One of the main reasons that reduce the yield and economic efficiency of tomato plant is its susceptibility to many diseases, according to some data, there are more than 70 infectious diseases caused by viruses, bacteria and fungi, among which mycoses predominate. In the open field, 28 species of fungi have been identified in tomatoes and 15 species in greenhouses [25].
However, the symptoms of the disease in the field are very similar to each other, and it is important to identify them by pathogens. Their most important features are their proliferation, damage, and mass development in the agrocenosis. Varieties, cultivation technologies and other measures of plants growing in the open field affect the development of diseases. Identification of pathogens, study of some bioecological features and development of measures to combat them is one of the urgent tasks. Fusarium wilt is caused by Ascomycota filum, class Sordariomycetes, family Nectriaceae, Fusarium oxysporum Shlecht belonging to the family Fusarium. em. Snyder et Hansen is caused by a soil fungus.
Tomato F. oxysporum f. sp. fusarium wilt caused by the lycopersici fungus is the most common and serious disease of this crop [20], [22]. This fungus is a pathogen that causes tomato wilting, which is also economically important in Iran [6].
Fusarium fungi live mainly in soil and plant debris. They are mainly propagated by wind, water currents and mechanical weapons. F. oxysporum (Schlecht) f, which causes fusarium root rot of tomatoes. sp. Radicis lycopersici (Sacc.) Jarvis & Shoemaker fungus was first identified in 1974 in Japan. A few years later it was

observed in greenhouses in Ohio and Florida. The pathogen was identified in 1980 in the State of Israel.
F. oxsysporum f. sp. The fungus radicis lycopersici is a soil pathogen that causes disease in tomatoes grown mainly in greenhouses and is currently one of the main diseases in many countries (USA, Mexico, Canada, Japan, Israel), resulting in a 40% reduction in yield due to this disease [19].
Fungi isolated from tomato seeds can be sources of external or internal infection. Sources of internal infection are mainly representatives of the families Fusarium and sometimes Alternaria. Many of these fungi are also found during seed storage. In the field, it is mainly observed in species belonging to the families Botrytis, Fusarium and Alternaria. The main part of these fungi is the internal infection of the seeds and they occur during the entire storage period. These fungal species found in the field reduce seed germination and lead to the death of germinated seedlings. Seed germination caused by Fusarium fungi decreases to 70-80% and in some cases disappears completely [3].
Other forms of F. oxysporum in Uzbekistan, including F. oxysporum f. sp. melonis melon and F. oxysporum f. sp. lycopersici is one of the main pathogens that cause wilt disease in tomato crops, causing great economic damage to the crop of these crops [26].
There are several strategies to control the disease: agrotechnical methods, biological control, crop rotation and chemical control [13]. The use of resistant varieties in the fight against fusarium wilt is the most effective measure [6], but new strains of the pathogen appear regularly, resulting in a loss of the resistance genes of varieties grown at a given time [23].
In the management of fusarium wilt disease, it is recommended to establish crop rotation, biological control and disease-resistant varieties in the first place [24].
The chemical control of fusarium wilt has been tested many times in vitro and in the greenhouse. The efficacy of fungicides, including benomyl, captafol, imazalil, tyramine, and prochlorase, against tomato fusarium wilt and root rot is irregular; in addition, the presence of fungicide residues in the fruit tissue caused a problem [16], [12], [11]. Methyl bromide and chloropicrin fumigants have reduced tomato fusarium wilt and root rot [17].
Compounds such as copper chloride, iron chloride, and manganese sulfate have been reported to induce resistance in disease-resistant varieties, and F. oxysporum sp. effective against lycopersici [15].
Treatment of tomato seeds with Vitavax (carboxyn) -tyram and Vitavax-captan fungicides was effective against fusarium wilt, in which Vitavax-captan was more effective than Vitavax-tyramnik [9]. F. oxysporum sp of a mixture of metamidoxime and copper chloride. lycopersici has been tested in vitro; test results showed that these fungicides showed strong synergism, which concluded that they could be the basis for the production of new fungicides in the fight against tomato diseases [18]. Finally, a mixture of Tiram and Topsin-M was added to the soil at a rate of 800 mg / g, and 45 days later F. oxysporum sp. reduced lycopersici infection by 83.4% [8].
Among the fungicides tested against pathogens belonging to the Fusarium family, prochloraz and bromuconazole showed the highest efficacy in vitro and in the greenhouse [7]. Similar results were obtained in experimental trials of prochlorase against other species of the Fusarium family [21]. In another experiment, benomyl at a dose of 10 μg / ml was found to completely stop the growth of F. solan, F. oxysporum and F. proliferatum [5]. F. oxysporum sp. After 10 days at a concentration of iprodion + carbendazim, benomyl, and carbendazim10 and 100 ppm (promille). completely stopped lycopersici growth [10]. Prochlorase and carbendazim have been shown to be most effective in inhibiting the growth of mycelium of this pathogen in other experiments [21].

MATERIALS AND METHODS

F. oxysporum f.sp., which causes fusarium wilt in tomatoes. In order to study the effect of new fungicides against lycopersici fungus, studies were conducted in Petri dishes with potato-dextrose agar medium under laboratory conditions.
In the study, in 2018, Ridomil Gold MTS 68% WDG. (mancotseb + metalaxyl), Previkur SL, 722 WDK (propamocarb hydrochloride), Quadris 25% .. (azoxistrobin), Gurzat WP (tsimoxanil + copper chloroxide) and Fundazol 50% WP. (benomyl) fungicides have been tested at various concentrations. The effect of fungicides on the growth of pathogens was observed for 3, 5, 7 and 14 days.

The effect of fungicides against pathogenic fungi in tomatoes was studied by the method of D.M. Kokhabidze [2]. The consumption rate of the fungicides tested was measured, then 3 cm^3 of the drug was pipetted into a 40 °C fused potato-dextrose agar medium in the flask. The tube was then shaken, Petrie was placed on a plate and left for 24 h. After that, the pathogenic fungi were planted in 3 places with a planting needle in the treated artificial nutrient medium in a Petri dish and placed in a thermostat at 20-25 ° C for development. After 3 days, the development of pathogenic fungi was observed.

RESULTS AND DISCUSSION

According to the results of the study, F. oxysporum f.sp. the lycopersici pathogen increased to 1.3 mm on day 3 of the control variant and to 4.3 mm on day 14.

Of the fungicides tested, 0.4% suspension contained mancotseb + metalaxyl, 0.3% benomyl and 0.3% tsimoxanil + copper chloroxide F. oxysporum f.sp. lycopersici also showed the highest efficacy against the pathogen. Even in these variants, the pathogen was found not to grow at all.

F. oxysporum f.sp. lycopersici pathogen growth in 0.25% suspension of mancotseb + metalaxyl, 0.2% benomyl and 0.2% tsimoxanil + copper chloroxide in small doses with fungal growth from 0.17 mm to 0.24 mm on day 3, Day 14 ranged from 0.6 mm to 1.51 mm.

Also, in the tested variants of azoxystrobin (0.06–0.1% suspension) and propamocarb hydrochloride (0.15–0.2%), F. oxysporum f.sp. the lycopersici pathogen increased from 0.85 mm to 1.2 mm on day 3 and from 1.39 mm to 3.86 mm on day 14 (Table 1).

CONCLUSION

In summary, mancotseb + metalaxyl, 0.3% benomyl and 0.3% tsimoxanil + copper chloroxide fungicides showed high results in 0.4% suspension against F. oxysporum f.sp.lycopersici pathogen. Pathogens did not develop at all in these variants.Table 1

F. oxysporum f.sp. the effect of various fungicides on the growth of the lycopersici pathogen.

Laboratory experiment (potato-dextrose agar in Petri dishes with nutrient medium)

2018 year

Seq u-ence num -ber	Variant	The density of the working solution, %	Growth of the pathogen over days, mm (X±Sx)			
			3-day	5- day	7- day	14- day
1.	Control (pathogen)	-	1,21±0,05	2,80±0,26	3,57±0,05	4,3±0,05
2.	Ridomil Gold MTs68% WDG (mancotseb + metalaxyl)	0,25	0,17±0,01	0,33±0,04	0,56±0,02	0,60±0,02
		0,4	0	0	0	0
3.	Previkur SL, 722 WDK (propamocarb hydrochloride)	0,15	1,10±0,02	1,22±0,02	1,32±0,02	2,26±0,04
		0,2	0,85±0,03	1,08±0,09	1,18±0,06	1,39±0,03
4.	Kvadris 25% EC. (azoxistrobin)	0,06	1,19±0,07	2,17±0,08	3,24±0,13	3,86±0,04
		0,1	1,20±0,04	2,13±0,07	3,07±0,04	3,78±0,03
5.	Gurzat WP (tsimoxanil + copper chloroxide)	0,2	0,24±0,03	1,11±0,05	1,15±0,06	1,03±0,03
		0,3	0	0	0	0
6.	Fundazol 50% WP (benomil)	0,2	0,19±0,02	0,21±0,03	0,24±0,02	1,51±0,06
		0,3	0	0	0	0

Notes: No fungicide was used in the control option.
The table shows the average values of the three returns.

REFERENCES

1) The State Register of agricultural crops recommended for sowing in the territory of the Republic of Uzbekistan. Tashkent, 2019. - P.47-50.
2) Koxabidze D.M. Itogi ispytaniya fungitsidov // J. Zashchita rasteniy.
3) Moscow, 1973. - №9. - S.31.
4) Zuparova D.M., Ablazova M.M. Transmission of diseases of vegetable crops through seeds. / Collection of articles of the Republican scientific-practical conference on the problems and prospects of food and environmental safety in plant protection. - Tashkent. - 2019. - B.22-23.
5) Kunichenko N.A. Possible directions and prospects for the development of research in the field of plant immunity in Transnistria./ Achievements and prospects for the development of vegetable growing, melon growing and potato growing at the turn of the century. - Tiraspol, 2005. - pp. 39-46.
6) Allen T.W., Enebak S.A., Carey W.A. Evaluation of fungicides for control of species of Fusarium on longleaf pine seed. // Journal of Crop Protection.- 2004.- №23. -pp.979-982.
7) Amini J. Physiological race of Fusarium oxysporum f. sp. lycopersici in Kurdistan province of Iran and reaction of some tomato cultivars to race 1 of pathogen. // JournalofPlant Pathology. - 2009. - №8. - pp.68-73.
8) Amini J., Dzhalilov F.S. The effects of fungicides on Fusarium oxysporum f.sp. lycopersici associated with Fusarium wilt of tomato. // Journal of Plant Protection Research.- 2010. vol. 50.- №2.-pp.172-178**.**
9) Dwivedai S.K., Dwivedi R.S., Ambasht R.S. Effect of fungicides on population dynamics of Fusarium wilt pathogens of two economic. // Crop Journal of Mycopathological Research. - 1995. - №33. - pp.49-52.
10) El-Shami M.A., Awad N.G.H., AbdelNour N.A.R. Effect of fungicides and herbicides interactions on tomato dampingoff and plant growth. // Egyptian Journal of Agricultural Research.- 1993. - №71. - pp.641-658.
11) Etebarian H.R. Studies of Fusarium wilt of tomato and its chemical control in Varamin area. // Iranian Journal of Agricultural sciences .– 1992. – №23.– pp.1–14.
12) Hartman J.R. and J.T. Fletcher Fusarium crown and root rot of tomatoes in the UK. // Journal ofPlant Pathology.- 1991. - №40. -pp.85-92
13) Jarvis W.R., Fusarium crown and root rot of tomatoes. // Journal of Phytoprotection. -1988. - №69. pp.49-64.
14) 13[77;203-б] Kamal A.M. Abo-Elyousr., Hashem M. Mohamed. Biological control of Fusarium wilt in tomato by plant growthpromoting yeasts and rhizobacteria. // JournalofPlantPathology. - №25. - 2009. - pp.199-204.
15) Krikun J.NachmiasA.Rut KonL.The occurrence of Fusarium crown and root rot of tomato in Israel./PhytoparasiticaSpringer International Publishing AG. - 1982. - №10. - p.113.
16) Mandal N.C., Sinha A.K. An alternative approach for the chemical control of Fusarium wilt of tomato. //Journal of Phytopathology. -Indian, 1992. - №45.- pp.194-198.
17) Marois J.J. and Mitchell D.J. Effects of fumigations and fungal antagonists on the relationships of inoculumden sity to infection incidence and disease severityin Fusarium crown rot of tomato. // Journal of Phytopathology.- 1981.- pp.167-170.
18) McGovern R.J., Vavrina C.S. Evaluation of application methods of metam sodium for management of Fusarium crown and root ort in tomato in southwest Florida. // Journal of Plant Disease.- 1998. - №82. - pp.919-923.
19) Nedelcu L., Alexandri A.A. Synergistic effect between metamidoxime and copper oxychloride. / Probleme de Protectia Plantelor. - 1995.- №23. -pp.13-21.
20) Nusret O., Steven E. Fusarium Crown and Root Rot of Tomato and Control Methods. //Journal of Plant Pathology. – 2004. - №3 (1). - pp.9-18.
21) Reis A., Costa H., Boiteux L.S., Lopes C.A. First report of Fusarium oxysporum f. sp. lycopersici race 3 on tomato in Brazil. // Journal of Fitopatologia.- Brasileira,2005. - №30. - pp.426-428.
22) Song W., Zhou L., Yang C., Cao X., Zhang L., Liu X. Tomato Fusarium wilt and its chemical control strategies in a hydroponic system. // Journalof Crop Protection. - 2004. - №23. -pp.243-247.

23) Sudhamoy M., Nitupama M., Adinpunya M. Salicylic acidinduced resistance to Fusarium oxysporum f. sp. lycopersici in tomato. // Journalof Plant Physiology Biochemistry. - 2009. - №47. - pp.642–649.
24) Tello-Marquina J.C., Lacasa A. Evolution of races among Fusarium oxysporum f.sp. lycopersici. De Sanidad Vegetal Plagas. - 1988. - №14. - pp.335-341.
25) Zhonghua M.A., Themis J.M. Advances in understanding molecular mechanisms of fungicide resistance and molecular detection of resistant genotypes in Phytopathogenic fungi. // Journal of Crop Protection.- 2005. - №24. - pp.853-863.
26) Akhatov A.K. Plant protection against diseases in greenhouses (reference book).- Moscow, 2002 .-- p. 164.
27) Ҳасанов Б.А. Микология. -Тошкент, 2019. - Б.102-107.
28) Омонова, Н. М. (2020). ВЛИЯНИЕ РАЗНОЙ ТЕМПЕРАТУРЫ ВОЗДУХА НА РОСТ ПАТОГЕННЫХ ГРИБОВ В ТОМАТАХ. Life Sciences and Agriculture, (2-3).
29) Раззаков, М. М., & Омонова, Н. М. (2019). ВИДОВОЙ СОСТАВ И АРЕАЛ РАСПРОСТРАНЕНИЯ ГРЫЗУНОВ СКЛАДСКИХ ПОМЕЩЕНИЙ В УЗБЕКИСТАНЕ. Актуальные проблемы современной науки, (6), 79-82.
30) Омонова, Н. М., Абдуллаева, Х. З., & Гофурова, Ю. К. (2019). ЭФФЕКТИВНОСТЬ ПРИМЕНЕНИЯ ФУНГИЦИДОВ ПРОТИВ ГРИБКОВЫХ БОЛЕЗНЕЙ ТОМАТА. In ПРОРЫВНЫЕ НАУЧНЫЕ ИССЛЕДОВАНИЯ КАК ДВИГАТЕЛЬ НАУКИ (pp. 91-94).
31) Жураев, А. А., Камбарова, М. А., & Омонова, Н. М. (2016). ПРИМЕНЕНИЕ РЕГУЛЯТОРА РОСТА И РАЗВИТИЯ ЗЕРЕБРО АГРО В ВЫРАЩИВАНИИ ОЗИМОЙ ПШЕНИЦЫ. Современные тенденции развития науки и технологий, (5-1), 53-56.
32) Омонова, Н. М. (2013). ПРИМЕНЕНИЕ ФУНГИЦИДОВ ПРОТИВ ГРИБКОВЫХ БОЛЕЗНЕЙ ТОМАТА. SCIENCE AND WORLD, 54.
33) Omonova, N. M. (2020). THE EFFECT OF DIFFERENT AIR TEMPERATURES ON THE GROWTH OF PATHOGENIC FUNGI IN TOMATOES. In Фундаментальные и прикладные научные исследования: актуальные вопросы, достижения и инновации (pp. 90-93).
34) Omonova, N. M., & Mukhtazar, K. (2019). Methods of fight against temperature diseases in natural damages. Indonesian Journal of Innovation Studies, 8.
35) MAHMUDJONOVNA, O. N., & MUHAMMADIYEVICH, B. F. Protection of Tomatoes From Phytophthora. JournalNX, 6(12), 384-389.
36) Saliyeva, R., Musaev, A., & Jumaeva, A. (2019). CLEARANCE OF THE EAST FRUIT BIOLOGY. Academia Open, 1(1).
37) Saliyeva, R. Z., Parpiyeva, M. Q., & Abdullayeva, G. D. (2019). BIOLOGY OF GRAPHOLITA MOLESTE AND METHODS FOR ITS DETERMINATION. In АКТУАЛЬНЫЕ ВОПРОСЫ СОВРЕМЕННОЙ НАУКИ (pp. 9-13).