Mycoflora of pistachio rhizosphere affected by Fusarium wilt: Uzbekistan

Nazarova Odina Jumadullaevna — Chief specialist of the Research Institute of Forestry

Khujaev Otabek Temirovich — Head of the laboratory of the Research Institute of Forestry

ABSTRACT

This article presents the results of research conducted in Samarkand and Jizzakh regions. Scientific research was conducted to study the rhizosphere of pistachio sprouts and seedlings, the results of which can be found below

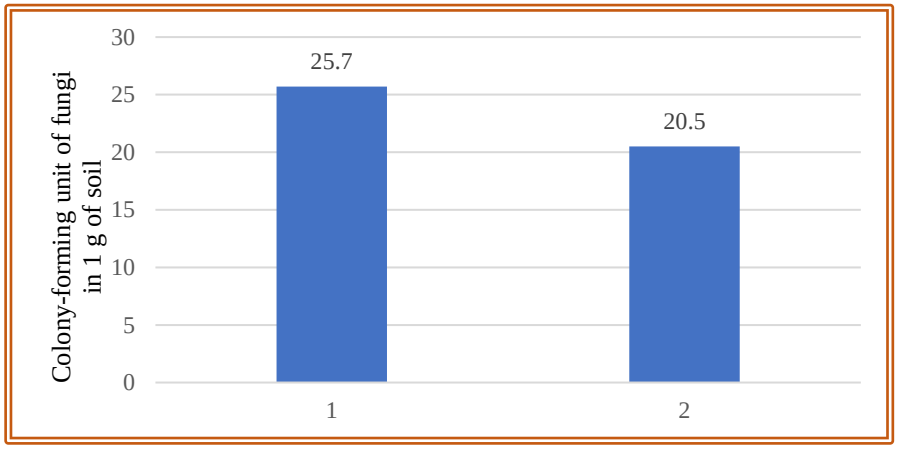
Keywords: Rhizosphere, pistachio sprouts

A number of researchers have conducted scientific research aimed at studying the rhizosphere of agricultural crops affected by Fusarium disease. Based on the results of these studies, measures to combat the fusarium disease of crops have been developed [1; 2; 4; 5; 6; 7].

Since the fungus that causes fusarium disease in plants is a soil phytopathogen, it is important to study the rhizosphere of pistachio sprouts and seedlings, and to determine the species composition of fusarium fungi and other fungi in the soil, as well as to study the relationship between them, in order to implement the correct control measures against this disease of this crop type.

Research work on the study of the rhizosphere of pistachio sprouts and seedlings was carried out in the forest farms of Samarkand and Jizzakh regions. Soil samples for research were taken from the base of fusarium-infected and healthy sprouts from pistachios in the container, and from the rhizosphere of diseased and healthy bushes of plantation trees. These soil samples were planted in humidity chambers in Petri dishes and in different nutrient media using methods accepted in phytopathology in the laboratory and placed in a thermostat at a temperature of 24-26 C for the growth of fungi [3]. These petri dishes were observed from day 3 onwards and the grown fungal colonies were inoculated onto an agar medium slant in the test tubes. Then the type of pure culture of isolated fungi was determined.

According to the data obtained as a result of the experiments, 1 g in the rhizosphere of sprouts and seedlings infected with pistachio fusarium. it was found that the number of colony-forming units in the soil (25.7 c.f.u /gr.) is higher than that of healthy plants (20 c.f.u./gr.) (Fig. 1).



These data confirmed the data reported in the literatures.

Fig.1. Colony-forming unit of fungi in 1 g of soil obtained from pistachio rhizosphere: 1 – in case of fusarium infection, 2 – in healthy case

During the study of the rhizosphere of healthy and diseased pistachio seedlings and 2-3-year-old trees, it was found that the age of the plants and their physiological state affected not only the amount of fungi in the rhizosphere, but also the composition of the species. In the rhizosphere of seedlings and 1-2-year-old trees infected with Fusarium, an increase in the number of certain genera and a decrease in some of them were observed. At the same time, certain fungal species adapted to the rhizosphere of pistachio sprouts and 2-3-year-old trees affected by fusarium disease, while some were found only in healthy ones.

25 genera of fungi were isolated from the soil samples taken from the rhizosphere of healthy seedlings and 1-2-year-old pistachio trees, while 33 genera of fungi were recorded from the soil samples taken from the rhizosphere of pistachios affected by Fusarium disease (Fig. 2).

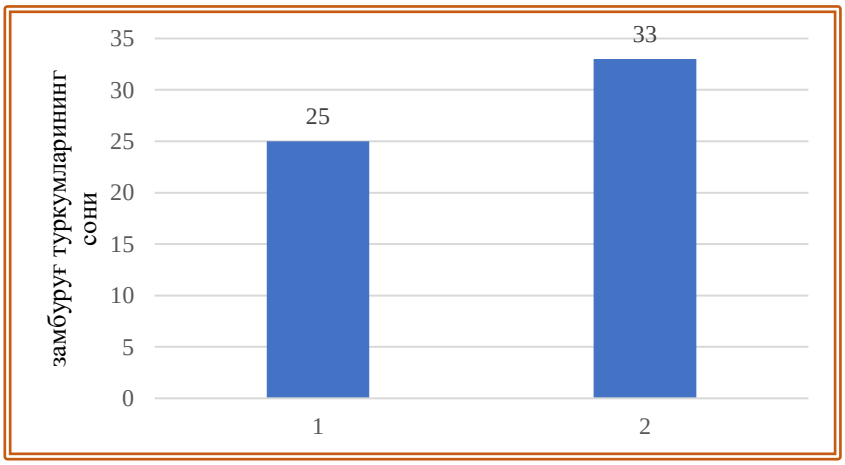


Fig.2. The number of genus isolated from the soil obtained from the pistachio rhizosphere: 1 – in patients with fusarium, 2 – in healthy patients

Representatives of *Mortierella, Papularia, Sepedonium* and *Trichothecium* genera were isolated only from healthy pistachio sprouts and rhizosphere of 1-2-year-old trees, while fungi belonging to *Hyalostachybotrys, Oospora, Ozonium, Rhinocladiopsis, Sporocybe, Tetracoccosporium* and *Thuelaviopsis* genera were isolated only from fusarium-infected sprouts and 1-2-year-

old trees. was recorded in the rhizosphere of trees (Table 1).

From the rhizosphere of healthy pistachio seedlings, 24 fungi belonging to 31 genera were isolated, from the rhizosphere of healthy seedlings, 23 fungi belonging to 24 genera were isolated.

Fungi with different levels of parasitism and saprophytic properties were noted among the isolated fungal genera. *Alternaria, Aspergillus, Cladosporium, Trichothecium,* and *Penicillium* from the saprophytic fungi families include secondary parasites and companion species.

Table – 1.
Fungal genera isolated from the rhizosphere of healthy and fusarium-infected pistachio seedlings and 1-2-year-old trees

№	Fungal genera	Pistachio rhizosphere			
		In sprouts		In seedlings	
		healthy	damaged	healthy	damaged
1.	*Actinomucor* Schost.	-	+	-	-
2.	*Alternaria* Nees ex Lk	+	+	+	+
3.	*Aspergillus* Mich ex Fr.	+	+	+	+
4.	*Cepholosporium* Cda	+	+	+	+
5.	*Chaetomium* Kunze ex Fr.	+	+	-	-
6.	*Cladosporium* Lk ex Fr.	+	+	+	+
7.	*Curvularia* Boediju	+	+	+	+
8.	*Dendrodochium* Bonord.	+	+	+	+
9.	*Fusarium* Lk ex Fx.	+	+	+	+
10.	*Gliocladium* Cda	+	+	+	+
11.	*Helmintosporium* Lk ex Fr.	-	+	+	+
12.	*Heterosporium* Klotzsch	+	+	+	+
13.	*Hormiscium* Kunze	+	+	-	-
14.	*Humicola* Cda	+	+	+	+
15.	*Hyalostachybotsys* Srinivasan	-	+	-	-
16.	*Mortierella* Coem.	+	-	+	-
17.	*Mucor* Mich. ex Fr.	+	+	+	+
18.	*Oospora* Wallr.	-	+	-	-
19.	*Ozonium* Lk	-	-	-	+
20.	*Paecilomyces* Bain	+	+	+	+
21.	*Papularia* Fr.	+	-	-	-
22.	*Penicillium* Lk ex Fr.	+	+	+	+
23.	*Rhinocladiopsis* Kamyschko	-	+	-	-
24.	*Rhinocladium* Sacc. Et March.	-	+	+	+
25.	*Rhizopus* Her. ex Cda	+	+	+	+
26.	*Scopulariopsis* Bain	-	+	-	+
27.	*Sepedonium* Lk ex Fr.	+	-	-	-
28.	*Sporocybe* Fr.	-	-	-	+
29.	*Stachybotrys* Cda	+	+	+	+
30.	*Stemphylium* Wallr.	+	+	-	-
31.	*Stysanus* Cda	-	+	+	+
32.	*Tetracoccosporium* Szabo	-	+	-	-
33.	*Thielaviopsis* Went.	-	+	-	-
34.	*Torula* Pers.	+	+	+	+

35.	*Trichoderma* Pers. ex Fr.	+	+	+	+
36.	*Trichothecium* Lk	-	-	+	-
37.	*Verticillium* Nees ex Lk	+	+	+	+
Total:		24	31	23	24

As a result of the research, it was found that the number of saprophytic fungi and the composition of species in the rhizosphere of pistachio seedlings and 1-2-year-old trees due to the disease decreased compared to healthy plants, and the number of parasitic and facultative parasite species increased.

List of literatures:

1. Babushkina I.N. Soil microscopic fungi of cotton-growing regions of the Uzbek SSR and their antagonistic activity against verticillium wilt pathogens// Abstract of the thesis. cand. diss. - Leningrad, 1977. - P.23.
2. Zuparov M.A., Azimkhodzhaeva M.N., Taubaev T.T. Influence of protococcal algae on some soil fungi of the mulberry rhizosphere // VII conference on spore plants of Central Asia and Kazakhstan. - Alma-Ata, 1984. - S.214-215.
3. Kirilenko T.S. Isolation of fungi from soil // Methods of experimental mycology. - Kyiv, 1973. Science thought. - 240 s.
4. Lyubetskaya O.S. Root mycoflora of healthy and diseased Fusarium wilt plants of fine-staple cotton // Turk. SSR. Biological Sciences Series. 1970. - No. 1. - P. 9-16.
5. Orazov Kh.N. Mycoflora of some soils of the Turkmen SSR and antagonistic relationships of its representatives. - Ashgabat: Ylym, 1976. - p. 179.
6. Popova T.E. Changes in the rhizospheric microflora of cotton under the influence of wilt disease // Soil. and s.kh. microbiol. - Tashkent: Publishing House of the Academy of Sciences of Uzbekistan, 1963. - C 215-222.
7. Sagdullaeva M.Sh., Kirgizboeva Kh.M., Bashirova G.S. quantitative and qualitative composition of mulberry rhizosphere fungi depending on the state and type of soil // Algae and fungi of water bodies and soils of Central Asia. - Tashkent, 1977. "Fan". - S. 207-212.