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BIOLOGICAL CHARACTERISTICS OF FUNGAL PATHOGENS OF BULB FLOWERS AND CONTROL MEASURES

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Abstract

The experiments were carried out in floriculture farms located in Namangan region during 2017-2019 years, and laboratory work was carried out at floriculture centers in Namangan region of the Republic of Uzbekistan. 19 species and 5 forms of fungal pathogens were detected in 7 species of bulb flowers grown in the Namangan regions of the Republic of Uzbekistan. Infection of selected bulbous flowers with 27 species of pathogenic fungi was revealed. It was revealed that the selected 7 species of bulb flower plants were infected with the most dangerous diseases, such as 5 of them by botrytis and rust diseases; 4 by Fusarium wilt; 4 by Fusarium rot; 1 by powdery mildew; 2 by scleratiniosis; 3 by penicilliosis, and by 1 powdery mildew, black aphids and false verticillioses were infected. In the conditions of the Namangan region of the Republic of Uzbekistan, the fungus Trichoderma viride was used as a biological method on 7 types of bulbous flowering plants, and fungicides such as Maxim, Bayleton, Fundazol were used as a chemical method in the fight against identified diseases.
Keywords: floriculture, bulb flowers, botrytis, Fusarium, Trichoderma viride

Introduction

Currently, around the world, affords are made to combat more than 1,500 species of pests and microorganisms that cause diseases in decorative flowers. 92% of the microorganisms that cause disease is various fungi. Therefore, the definition of diseases of decorative flowers

that cause various fungi, their bio ecological properties, distribution rules and improvement of measures to combat them makes it possible to improve the efficiency of floriculture [1-3].
Scientists conducted studies on cultivating flower varieties that are new to the climatic conditions of Uzbekistan, developed measures to combat the types of fungal pathogens and achieve resistance to other factors, and developed agricultural techniques for growing healthy decorative flowers. In this regard, great attention was paid to increasing research on the improvement and introduction into production of methods for creating flower varieties resistant to diseases and pests suitable for soil climatic conditions and methods for the prevention of diseases caused by pathogenic fungi [4-6].
At present, in a number of developed countries of the world, including Holland, England, France, and the USA, effective methods of growing flowering plants, determining their diseases, and controlling them have been put into production. It was determined that species of fungal pathogens such as Fusarium, Botrytis, Sphaerotheca, Puccinia are geographically widespread, change their shape depending on climatic conditions. For this reason, in order to improve effective methods of combating fungal pathogens of many flowers planted and cultivated in the Republic of Uzbekistan. Many researches dedicated to their bioecological properties, the laws of distribution [7, 8].
The following plants can be attributed to the bulbous cultures of spring flowering: tulips, hyacinths, daffodils, decorative bows, fritillaria, muscarias, cannons, crocuses, blueberries, snowdrops and others. They have approximately the same pests, diseases and symptoms of their manifestations. The exception is fritillaria and bows, which do not eat mice and bypass the raspberries. Onion cultures are known about 30 species of fungal, viral and bacterial diseases and harmful insects. Some are rare, others more often. But there is one general rule: the healthier the bulbs, the better the preparatory work carried out with the ground before planting, and the more favorable the climatic conditions, the less various diseases attack

Research Objectives:

1) Collection of herbarium samples of the infected bulb flower and its affected parts and identification of the types of fungal pathogens.
2) Definition of the analysis of the types of fungal pathogens.
3) Determining the degree of infection of selected plants with the most dangerous types of fungal pathogens;
4) Improvement of control measures against the most common types of fungal pathogens found in bulbous flowers.

Research methods.

The studies conducted according to current methods in accordance with standards in this field of science. The method of M.K. Khokhryakov used for collecting herbarium samples of bulbous flowers infected with various fungi pathogens in the field. When isolating and determining the types of fungi from seeds of bulbous flowering plants in laboratory conditions, the methods of N.A. Naumov, A.Ya. Semenov, A.P. Abramov, M.K. Khokhryakov. The determination of fungal species in the cells of infected plants was carried out by definition (identifiers) developed by V.I. Bilay, P.N. Golovin, T.A. Dobrozrakova, M.K. Khokhryakov, N.I. Gaponenko [1-5].

The object of the research is bulb flowers, widely distributed in certain regions and highly appreciated by consumers, such as cloves, hyacinth, gladiolus, iris, lily, tulip, daffodil and phlox.

According to the laws of nature, plants, microorganisms, as well as fungi, change their bioecological characteristics. Therefore, the study of fungal species is an ongoing process.

On a global scale, in Italy, the pathogen Phytophtora cotianae var. parasitica. Scientists A.Francaschini, Serrs S., A.Foddai found that soil fungi of the Gerber jamesonii hbrida species, including species belonging to the Fusarium family, cause the greatest harm.

In the conditions of our republic, scientists have been studying diseases of agricultural cults for many years. Including P.K. Ozolin P.N. Golovin, N.G. Zaprametov, M.A. Karimov, S.S. Ramazanova, B.O. Khasanov and their many students, having studied the biological, environmental, physico-biochemical characteristics of the types of fungi that cause the greatest harm to crops, the laws of their distribution and systematics, based on this, developed measures to combat them and put them into practice. The studies were carried out in the following sequence: Herbarium samples of infected bulbous flower plants and their parts were collected by the method of M.K. Khokhryakov; the selection of fungi from the seeds of bulbous flower plants and the determination of their species by the methods of N.N. Naumova, A.Ya. Semenova, A.P. Abramova, M.K. Khokhryakova; species of fungi in the cells of infected plants were determined using determinants V.I. Bilaya, P. N. Golovina and T. A. Dobrozrakova.

$$P = \prod_k \cdot 100 / N$$

Where, P - the spread of the disease, %; N is the number of plants in the experiment, pcs .; P-total number of infected bulbous plants in the experiment, pcs. In the fight against infected bulbous flower plants, the methods of S. N. Maskovets, I. S. Fedorinchik and H. T. Tillaev were used [8-10]. The experiments were carried out in floriculture farms located in Namangan region during 2017-2019, and laboratory work was carried out at floriculture centers in Namangan region (Fig. 1).

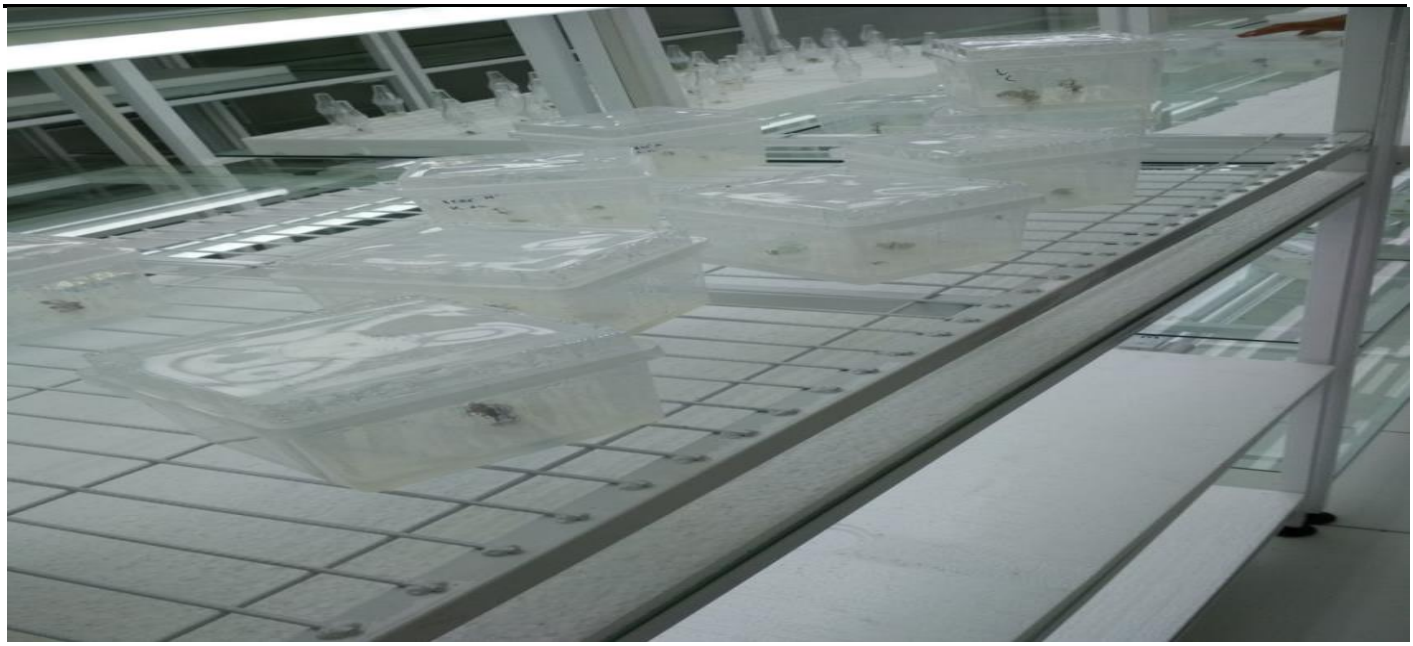

Fig. 1. Place of study (Namangan region, Republic of Uzbekistan)

RESULTS AND DISCUSSION

Fungal diseases of bulbous flower plants and their systematic location. Table 1 shows the systematic arrangement of species of fungi isolated from bulb flower plants. This table shows 19 species and 5 forms of fungal pathogens isolated from bulbous flower plants grown under conditions in Namangan regions for 3 years and revealed that they belong to 4 classes, 7 subspecies, 7 families and 12 orders.

The largest group consists of fungal species that are part of the class Deuteromycjtina consisting of 19 species and 5 forms. Then follows the class Basidiomycotina - 4 species; Ascomycotina - 3 species. The smallest group is Mastigomycotina, consisting of 1 species.

The most common types of fungi of the Fuzarium family were found in the study, having 4 species and 4 forms. Of these, F.oxysporum f. sp. gladioli (Mass.) Snyd.et Hans, F.oxysporum f. sp. lilii Jmle, F.oxysporum f. sp. narcissi, Snyd. Et Hans, F.oxysporum f. sp. tulipae Apr. cause fusarium wilt.

Table 1.The systematic arrangement of species of fungi isolated from bulb flowers (2017-2019)

Class	Order	Family	Category	Types of fungi, their forms and variations
1	**2**	**3**	**4**	**5**
Mastigomycotina	Peronosporales	Peronosporaceae	Peronospora	P. lilii. Stenina
Ascomycotina	Erysiphales	Erysiphaceae	Erysiphe	E.cichoriacearum f. phlogis Jacz.
			Sclerotinia	S. gladioli (Mass.) Dray.
				S. tuliporum Kleb
Basidiomycotina	Ustilaginales	Ustilaginaceae	Urocystis	U. gladioli W.G. Smith.
	Uredinales	Pucciniaceae	Uromyces	U. lilii (Link.) Fuck.
			Puccinia	P. gladioli Cast.
				P. iridis (DC.) Wallroth
Deuteromycotina	Moniliales	Moniliaceae	Oidiopsis	O. phlogis Golov.
			Penicillium	P. gladioli Mc. Cull. et. Thom.
			Botrytis	B. gladiolorum Timmer.
				B. narcissicola Kleb.
				B. tulipae (Lib.) Horkins.
	Acervulales	Tubercullariaceae	Fusarium	F.oxysporum f. sp. gladioli (Mass.) Snyd.et Hans.
				F.oxysporum f. sp. lilii Jmle.
				F.oxysporum f. sp. narcissi Snyd. Et Hans.
				F.oxysporum f. sp. tulipae Apr.
	Pycnidiales	Sphaerioideae	Pyllosticta	P. paeoniae Sacc. Et Speg.
			Septoria	S. paeoniae West.
Total: 4	**7**	**7(11)**	**12(28)**	**19 types, 5 forms**

And also, in the experiments, the types of fungus pathogens of bulbous flower plants, the degree of infection of bulbous flowers, which plant organs are infected, the interaction of pathogens and plant hosts, the spread of diseases and the harm they cause to the flower industry were determined in experiments (table-2). In particular, 5 species of bulbous flower plants were infected with botrythiosis and rust diseases; Fusarium wilt-4; Fusarium rot-4; powdery mildew-1; scleratiniosis-2; penicilliosis-3, powdery mildew, black aphids and false verticillioses were infected with only one bulb flower plant. In general, it was revealed that selected for research purposes, 7 species of bulb flowers were infected with 27 species of fungal pathogens. In the process of conducting research, for the first time in the conditions of the Republic of Uzbekistan in the Namangan region, 27 identified diseases were analyzed and the characteristics of the morphological properties of fungal species were determined.

Table 2.Names of diseases identified in bulbous flower plants (2017-2019)

Bulb Flower Names	Disease names										
	Botirithiosis	Verticilliosis	mildew	Black aphid	Penicilliosis	Sclerotiniosis	Downy mildew	powdery mildew	fusarium wilting	fusarium rot	Total
Gladiolus	+		+	+	+				+		5
Lily	+		+			+	+		+	+	6
Tulip	+				+				+	+	4
Hyacinth			+		+	+				+	4
Narcissus	+		+						+		3
Iris	+		+							+	3
Phlox		+						+			2
Total	**5**	**1**	**5**	**1**	**3**	**2**	**1**	**1**	**4**	**4**	**27**

Improving control measures against the most common types of fungal pathogens in bulbous decorative flowers. Numerous data are known that the fungi of the Trihoderma family have high antagonistic properties against fungi that cause pathogens and diseases caused by phytopathogenic microorganisms found in crops. To determine the effectiveness of T.viride against the disease, fusarium rot isolated from bulb flower plants, trichoderma grown on oats was used with a calculation of 60 and 120 kg/l and pure fungal spores in quantities of 4 and 8 g/l. The highest biological efficiency was 68.6%, with an increase in the consumption rate to 120 kg/ha, more healthy plants were obtained (Fig. 2).

In the Namangan region of the Republic of Uzbekistan, fungicides were used as measures for the chemical control of the diseases of ornamental bulbous flower plants, which are included in the list of “Chemicals approved for use by the State Chemical Commission” special attention was paid to determining their economic efficiency. The following fungicides Baraka (1.0-2.0 kg/t), Maxim-2.5% (0.2 and 0.4 l/t), Vitavax 200-75 are mainly used against the disease Fusarium rot of ornamental bulbous flower plants. (3.0-4.0 kg) and Topsin-M 70% s.p. (1.0-1.5 kg / t). Fundazol 50% s.p. is used as a reference against root rot disease of many plants. (2.0 kg / t) which gives good results (Fig. 3).

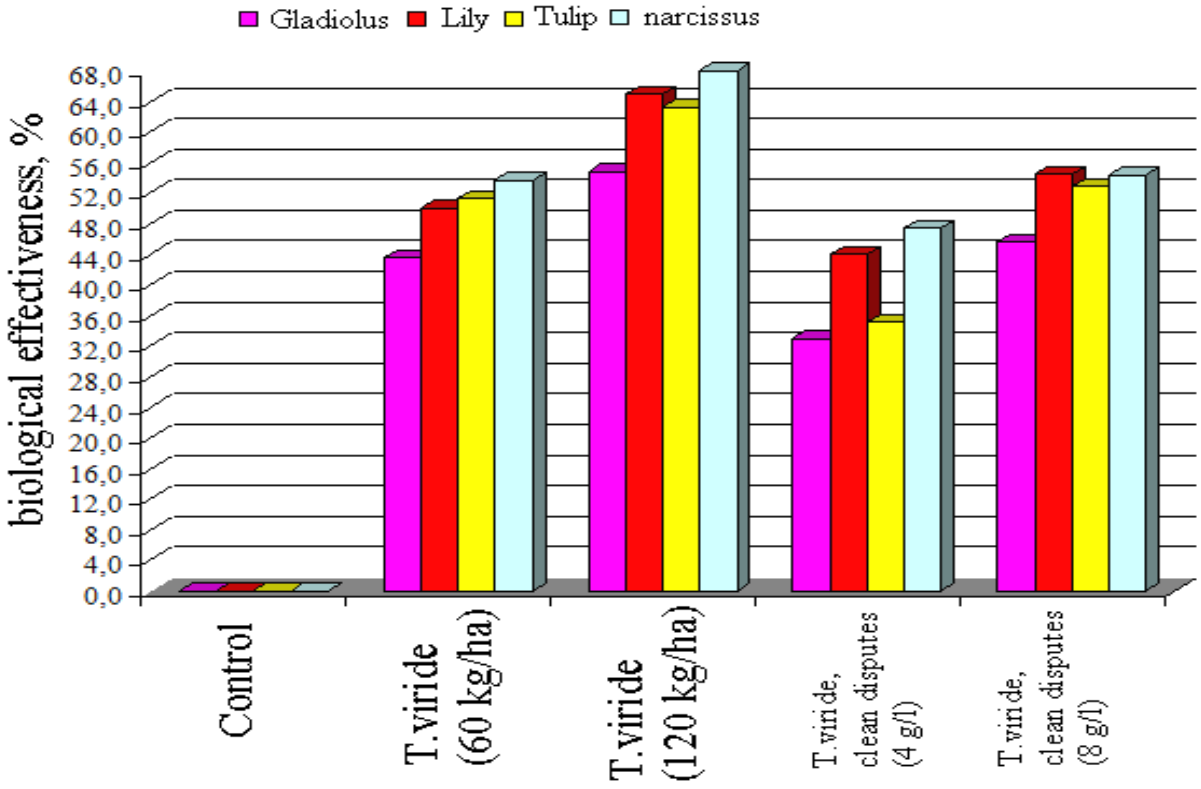

Fig. 2. Biological effectiveness of T. viride against Fusarium rot of bulb flower plants
(Namangan region of the Republic of Uzbekistan, 2017-2019)

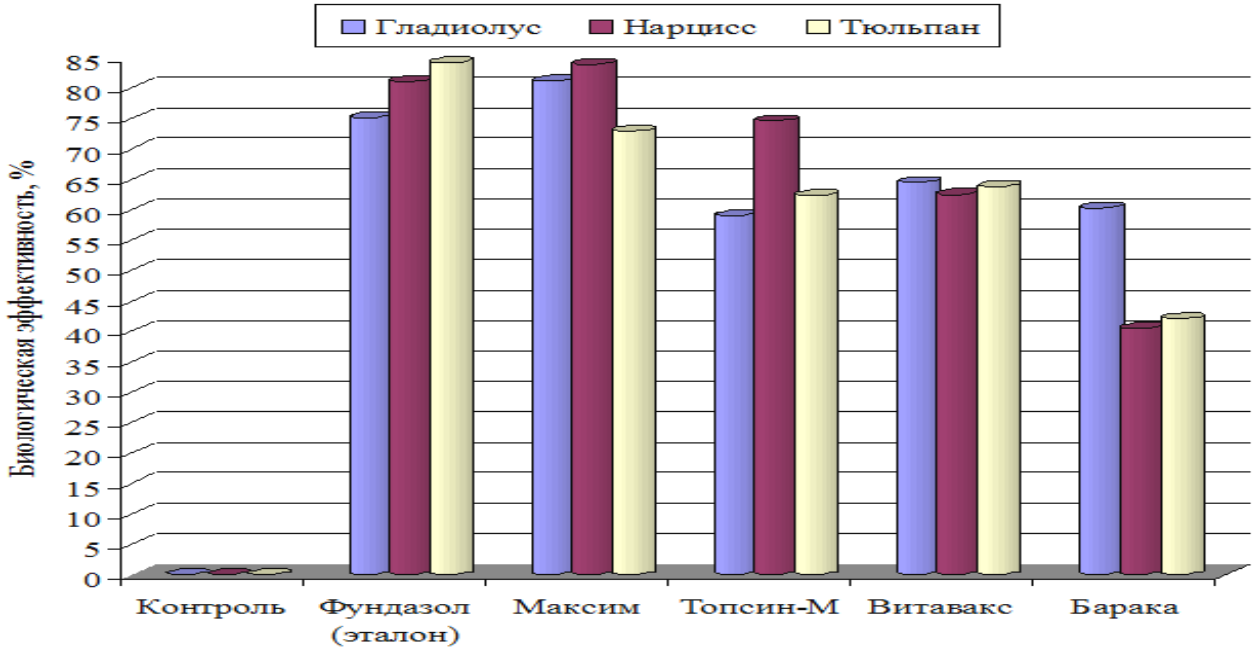

Fig. 3. The biological effectiveness of the drug used against fusarium root rot (Namangan region of the Republic of Uzbekistan, 2017-2019)

Conclusion

Based on the studies, the following conclusions can be drawn: 19 species and 5 forms of fungal pathogens were detected in 7 species of bulb flowers grown in the Namangan regions

of the Republic of Uzbekistan. Infection of selected bulbous flowers with 27 species of pathogenic fungi was revealed. It was revealed that the selected 7 species of bulb flower plants were infected with the most dangerous diseases, such as botrythiosis and rust diseases; 5 species of bulb flower plants were infected; Fusarium wilt-4; Fusarium rot-4; powdery mildew-1; scleratiniosis-2; penicilliosis-3, powdery mildew, black aphids and false verticillioses were infected with only one bulb flower plant. In the conditions of the Namangan region of the Republic of Uzbekistan, the fungus Trichoderma viride was used as a biological method on 7 types of bulbous flowering plants, and fungicides such as Maxim, Bayleton, Fundazol were used as a chemical method in the fight against identified diseases.

References:

1) S.A.Misirova. Determining of the measure disease control ornamental crops during the growing season in the conditions Tashkent region. Global Journal of Bio-Sciences and Biotechnology. 2016, Vol.5, Issue 1. pp.119-124
2) S.A.Misirova. Systematic types of fungi of allocated and determined types from decorative flowers in conditions region Tashkent. Agricultural sciences. 2015, Vol.6, №.11, pp.1387-1392.
3) S.A. Misirova. N.S.Sarimsaqova. Bioecology of fungi-Pathogens of flower crops and the system to combat them. Agricultural sciences. 2016, Vol.7, №.8, pp.539-547.
4) Barbara Marcinek, Jerzy Hetman, Danuta Kozak. Influence of cultivation method and bulbs planting depth on the growth and yielding of tulips. Acta sci. Pol., hortorum cultus 12(5) 2013, 97-110.
5) A.Amiri, M.Kafi, S.Kalate-Jari and M. Matinizadeh. Tulip response to different light sources. The journal of animal & plant sciences, 28(2): 2018, page: 539-545.
6) Mohsin Bashir, Muhammad Aslam Khan, Muhammad Qasim and S.M.A. Basra. Evaluation of commercial tulip accessions for flowering potential in climatic conditions of Faisalabad. International journal of agriculture & biology. Vol. 20, No. 1, 2018, p.25-32
7) Khelida Fayaz, F.U.Khan, I.T.Nazki, Madinat-Ul-Nisa, Pushpendra Verty and Vivek Kumar Singh. Effect of integrated nutrient application on yield and bulb production characters in tulip (tulipa gesneriana L.) Cv. "Red Beauty". International journal of current microbiology and applied sciences, special issue 7, pp.190-195. 2018.
8) Tahir Mehmood, Waqas Ahmad, Khawaja Shafique Ahmad, Jamil Shafi, Muhammad Asif Shehzad, Muhammad Aqeel Sarwar. Comparative Effect of Different Potting Media on Vegetative and Reproductive Growth of Floral Shower (Antirrhinum majus L.) Universal Journal of Plant Science. 1(3): pp.104-111, 2013.
9) A Yu Zhidkova, V V Podberesnij and V A Panova. Features of the growth and development of tulips in the Rostov region of the Russian Federation. IOP Conference Series: Earth and Environmental Science. 421 (2020) 032008. doi:10.1088/1755-1315/421/3/032008