



FUNGAL DISEASES OF MEDICINAL PLANTS IN UZBEKISTAN

Камилов Шухрат Ганиевич,
Ташкентский государственный аграрный университет,
г.Ташкент, Республика Узбекистан
e-mail: shukhrat.kamilov.1963@mail.ru

Холмурадов Уктам Эркинович,
Национальный университет Республики Узбекистан,
г.Ташкент, Республика Узбекистан
e-mail: uktam.xolmurodov@mail.ru

Хужаев Пирназар Юнусович,
Ташкентский государственный аграрный университет,
г.Ташкент, Республика Узбекистан
e-mail: pirnazarhojayev2@mail.ru

Abstract

Since ancient times, people have been using plants for food and as medicines. The centuries-old experience of folk medicine has proved indisputable that many plants contain substances with healing properties.

Introduction

In modern health care, about half of all medicinal products are produced from wild and cultivated medicinal plant raw materials. Currently, there are up to 12 thousand plants used in folk and professional medicine. It is known that out of 100,000 modern medicines and preparations, about 30,000 are substances of plant origin (Kurmukov, Belolipov, 2012). According to A. Ergashev et al. (2010), about 50% of medicines are produced from raw materials of medicinal plants. The therapeutic value of medicinal plants is recognized by scientific medicine, they are carefully studied in medical and pharmaceutical institutions and, according to Uzpharmsanoat, still make up 30-40% of all medicines dispensed by pharmacies. In this regard, the relevance of the use and study of medicinal plants has immeasurably increased in recent decades. However, on the issue of study, disease susceptibility and measures of protection of medicinal plants, scientific literature data in Uzbekistan are extremely limited.

The protection of medicinal plants from diseases occupies an important place among the measures to increase the production of medicinal plant raw materials. The most important task of medicinal crop production is to obtain high-quality medicinal raw





materials, the successful solution of which largely depends on the maximum reduction of crop losses from harmful organisms. According to the literature, the loss of the yield of medicinal plants from diseases is 10-30%.

Medicinal plants are subject to numerous diseases. According to the literature, it has been established that medicinal plants are affected by diseases such as powdery mildew, rust, various spots and root rot, which cause great damage not only to the crop, but also to the quality of the resulting products. The studied crops are medicinal and environmentally friendly means should be used in the fight against diseases and pests of these crops.

Material and methods of research.

The material of the study was samples of affected medicinal plants collected on the territory of the Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan, in the laboratory of medicinal plants. Collection of material is carried out by route detours of the territory during the entire period of the growing season.

Identification of fungi was carried out in laboratory conditions by microscopy of directly diseased parts of plants. For qualitative determination, the method of "wet chambers" is used, based on the ability of the mycelium of the fungus in the plant tissue to germinate outwards and form sporulation at high humidity of the surrounding space (Dudka et al., 1982).

Identification of fungal species was carried out according to classical and well-known keys and monographs, depending on the systematic position of pathogenic fungi: N.I. Vasilevsky, B.P. Karakulin (1937, 1950), V.I. Ulyanishchev (1978), T.A. Dobrozrakova et al. (1956), M.A. Litvinov (1969), N.M. Pidoplichko (1977-1978), "Fungal flora of Uzbekistan" (1983-1990), as well as scientific articles in periodicals and collections.

The degree of damage serves as a qualitative indicator of the pathological process. It is determined by examining plants by the root, by the area of organs covered with spots, plaques, pustules. for which the assessment of the lesion in points is used, on a 5-point scale (0-4 points).

The intensity of the development of diseases is determined by the following formula:

$$R = \sum (a * B) / NK * 100,$$

where $\sum (a * B)$ - is the sum of the products of the number of plants and their corresponding damage score;

N is the total number of plants counted in the samples (healthy and diseased), pcs;

K is the highest score of the accounting scale for converting a point assessment into a percentage category.





Results

Diseases affecting medicinal plants are diverse and similar to diseases of other crops. Among them, root rot, wilting diseases, powdery mildew, rust, leaf spots and others are widespread. For a clear understanding of the nature of diseases and ways to combat them, it is necessary to clarify the species composition of diseases and their causative agents.

As a result of studies carried out in 2021-2023 on 7 species of herbaceous medicinal plants, the development of 29 species of phytopathogenic fungi was noted. The work involved cultures of mint, chamomile, motherwort, tansy, calendula, sage, marshmallow cultivated in the laboratory of medicinal plants of the Tashkent Botanical Garden of the Academy of Sciences of the Republic of Uzbekistan.

As a result of identifying the species composition of phytopathogenic fungi affecting medicinal plants in the conditions of Tashkent, 29 species from 16 genera, 9 families, 8 orders, 6 classes, 4 divisions of fungi and fungi-like organisms were noted (Table 1). Of the total composition of the identified species, 3 belong to the kingdom Chromista (division Oomycota) and 26 species belong to the kingdom Eumycota (true fungi). Among the list of species, the largest number - 14 belong to the formal division Anamorphic fungi.

The surveys have shown that the main diseases of medicinal plants in Tashkent are powdery mildew, rust, fusarium and spots are found on some crops.

From the table above, it can be seen that the main diseases of herbaceous wild medicinal plants are powdery mildew and rust.

So, powdery mildew was found on almost all crops, where the maximum incidence was noted on chamomile - 16.2%, followed by mint (15.4%), tansy (12.2%). The remaining species affected less than 10% of cases.

Plant rust affected 5 out of 7 plant species. The maximum damage was noted in marshmallow - 21.9%, followed by mint (18.6%), chamomile (16.5%). The rest of the species were also affected by less than 10% of cases.

From all of the above, it can be noted that on 7 species of herbaceous medicinal plants (mint, chamomile, motherwort, tansy, calendula, sage, marshmallow) the development of 29 species of phytopathogenic fungi from 16 genera, 9 families, 8 orders, 6 classes of 4 divisions of fungi and fungus-like organisms was noted, as well as the main diseases of cultivated medicinal plants in the central part of Uzbekistan are powdery mildew, rust, Fusarium and spots are found on some crops





Table 1.

**Revealed species composition of pathogens of medicinal plants in the
Tashkent Botanical Garden
(2021-2023)**

№	Division (phylum)	Class	That is ok	Family	Genus	View	Host plant			
1	Oomycota	Oomycetes	Pythiales	Pythiaceae	Pythium Pringsh.	P. debaryanum Hesse	Sage Calendula			
2			Peronosporales	Peronosporaceae	Downy mildew Rope	P. swinglei Ell. That Must.	Sage			
3						P. leptosperma DB.	Camomile			
4	Ascomycota	Leotiomycetes	Erysiphales	Erysiphaceae	Erysiphe R.Hedw. ex DC.	E. cichoracearum DC. f. menthae Jacz.	Mint			
5						E. cichoracearum DC. f. valeriana Jacz.	Valerian			
6						E. cichoracearum DC. f. matricaria Jacz.	Camomile			
7						E.labiatarum Chev. f. salvia Jacz.	Sage			
8					Sphaerotheca Lev.	S. fuliginea Poll. f. calendulae Jacz.	Calendula			
9	Basiomycota	Pucciniomycetes	Pucciniales	Pucciniaceae	Puccinia Pers.	P. menthae Pers.	Mint			
10						P. malvacearum Mont.	Althaea			
11						P. commutata Sydow	Valerian			
12						P. flaveria Jack.	Calendula			
13						P. pyrethri Rbnh.	Camomile			
14						P. salvia Unger.	Sage			
15	Anamorphic fungi (Deuteromycota)	Deuteromycetes	Hyphomycetes	Moniliaceae	Verticillium Nees	V. albo-atrum Reinke et Berth.	Camomile			
16					Ramularia Unger	R. menthicola Sacc.	Mint			
17						R. malvae Fuck.	Althaea			
18						R. valeriana (Speg.) Sacc.	Valerian			
19					Botrytis P.Micheli ex Pers.	B. cinerea Fr.	Camomile			
					Dematiaceae	Cercospora Fresen.	C. calendulae Jacz.	Calendula		
				C. polymorpha Bull.		Althaea				
21				Thielaviopsis Went		Th. basicola (Berk. et Br.) Ferr.	Sage			
22					Tuberculariales	Tuberculariaceae	Fusarium Link	Fusarium sp.	Camomile Mint Sage	
23										
24					Agonomycetes (Mycelia sterilia)			Rhizoctonia DC.	Rhizoctonia DC.	Valerian Calendula
25								Sclerotium Fuck.	S. sclerotiorum (Lib.) DB.	Valerian
26		Coelomycetes	Melanchonial	Melanconiaceae	Colletotrichum Corda	C. malvarum (Br.et Cap.) Southw.	Althaea			
27			Sphaeropsidales	Sphaeropsidaceae	Septoria Fr.	S. menthae Oudem.	Mint			
28						S. lachastriana Sacc. and Lab.	Althaea			
29					Ascochyta Lib.	Ascochyta malvicola Sacc.	Althaea			
	Total: 4	6	8	9	16	29				



Table 2.

**Average disease infestation of herbaceous medicinal plants
(2021-2023.), %**

Plants	Average Affliction				
	Fusarium, Verticillium, Wilt	powdery mildew	rust	Root rot	Various spots
Mint	4,2	15,4	18,6	-	6,2
Valerian	10,0	6,2	7,1	3,7	2,8
Tansy	-	12,2	7,8	-	-
Calendula	-	7,5	7,9	5,9	8,1
Camomile	7,1	16,2	16,5	-	5,8
Sage	6,1	9,3	8,2	3,7	8,9
Marshmallow	-	-	21,9	-	14,2

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