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Micromycetes Of Class Leotiomycetes Distributed On Ornamental Trees Introduced In The Conditions Of The Southern Part Of Uzbekistan

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Abstract. 14 species of myrcomycetes of the class Leotiomycetes have been identified on decorative trees in the southern part of Uzbekistan. Species of the genera Uncinula, Phyllactinia, Leveillula, Microsphaera, Erysiphe are obligate parasites, and Marssonina, Melasmia, Rhytisma are considered facultative parasites and causative agents of dangerous diseases in trees. The species Rhytisma ulmi Fr., Melasmia populinae Rehm were first identified in the mycobiota of Uzbekistan. During a scientific study, 10 species of ornamental trees were found to be infecting representatives of the Leotiomycetes class. Including Salix dahynoides Vill. - 3, Ulmus pumila L. – 2, Populus alba are found in pairs, and in the species Acer negundo L., Sophora japonica L., Fraxinus sogdiana Bunge., Catalpa bignonioides Walt., Salix alba L., Quercus robur L., Robinia pseudoacacia L. one at a time.

Keywords: micromycetes, leotiomycetes, ornamental, dahynoides, uncinula, fungus, Microsphaera alphitoides

1. INTRODUCTION

The southern part of Uzbekitan includes the Kashkadarya and Surkhandayin regions located in the southern part of Central Asia. The Amu Darya flows between the borders of Uzbekistan and Afghanistan. The southern side of Uzbekistan covers 48,500 km² (18,800 kv mil) [16].

Micromycetes of the class Leotiomycetes are ecologically diverse, they are mycorrhiza, endophytes of roots and leaves, plant parasites, mammalian pathogens and saprotrophs. The class Leotiomycetes belongs to the Ascomycota division, and they are infectious agents of various fungal diseases in most plants. 4407 species of this class included in 592 genera, 43 families, 11 orders, and their differences depending on the taxonomic order (Johnston et al. 2019) [1], (Wijayawardene et al. 2017, 2018) [2], [3].

The initial research on micromycetes of the Leotiomycetes class in Uzbekistan was carried out by NG Zaprometov (1926) [6], TS Panfilova and NI Gaponenko [8], Gaponenko et al. (1983) [7], Y. S. Solieva (1989) [9], Kh. Kh. Nuraliev (1998) [10], Sh. G. Kamilov [11], Y. Gafforov (2004) [12], etc. However, micromycetes of introduced decorative trees widespread in the territory of southern Uzbekistan have not been studied.

2. MATERIALS AND METHODS

Scientific research was carried out during 2016-2018. Mycological analyzes were carried out using a binocular MBS-9 and, with universal microscopes MBI-3, Motic B1, NU2E [4]. When determining the species structures, the following scientific literature and determinants were used [5], [13], [14], [15]. The modern nomenclature of micromycetes is given on the basis of mycobank (http: // www. Mycobank. Org) [17], and the name of the host plant is based on “The plant list” (http://www.theplantlist.org.) [18].

3. RESULTS

As a result of taxonomic analyzes, 14 representatives of 8 genera, 3 families, 3 orders of the class Leotiomycetes were found in arboreal plants.

Table 1

Class	**Order**	**Family**	**Genus**	**Number of species**
Leotiomycetes	Erysiphales	Erysiphaceae	Microsphaera	1
			Phyllactinia	2
			Erysiphe	1
			Leveillula	2
			Uncinula	3
	Helotiales	Dermateaceae	Marssonina	2

	Rhytismatales	Rhytismataceae	Rhytisma	1
			Melasmia	2
1	3	3	8	14

According to previous information, 9 representatives of five genera, one family from the Erysiphales order, 3 representatives of two genera, one family from the Rhytismatales order, 2 representatives of the same genus and a family from the Helotiales order belonging to the Leotiomycetes class were noted.

Most of the identified micromycetes are representatives of the genera Uncinula (3), Phyllactinia, Leveillula, Marssonina, Melasmia (2), Microsphaera, Erysiphe, Rhytisma (1).

The following is a list of micromycetes and host plants:

- Uncinula adunca (Wallr.) Lév., Annales des Sciences Naturelles Botanique 15: 151 (1851) (primary scientific name Uncinula salicia Wint.). At Salix dahynoides Vill. Karshi city, 25.07.2016.

- Sawadaea bicornis (Wallr.) Miyabe., Journal of the Faculty of Agriculture of the Hokkaido Imperial University 38: 371 (1937) (primary scientific name Uncinula aceris (DC.) Sacc.). At Acer negundo L., Karshi city, 07/27/2016.

- Uncinula ulmi M.N. Kusnezowa, Izv. AN Kaz. SSR: 129 (1950). The fungus infects the leaves of Ulmus pumila L., Termiz, 27.09.2016, Karshi, 24.10.2017.

At the beginning, the mycelium of the fungus is in the form of white dusty specks and grows over time. In some cases, these spots cover the leaf surface. The spots gradually become grayish, then ascocarps are formed in the form of black dots. In the ascocarps, bags and spores mature. In favorable conditions, fungal spores spread to other plants.

The fungus is found on the surface of the leaf. Ascocarps are spherical, processes are simple, but their tip is hooked, up to 9-20, colorless. Ascocarps 70-105 μm. The number of bags is 4-6, on a short stem, rounded, 36.5-40.5x30-35 μm. The number of spores in bursae is 2, in some up to 3, ellipsoidal, 18-34.5x12-19 μm.

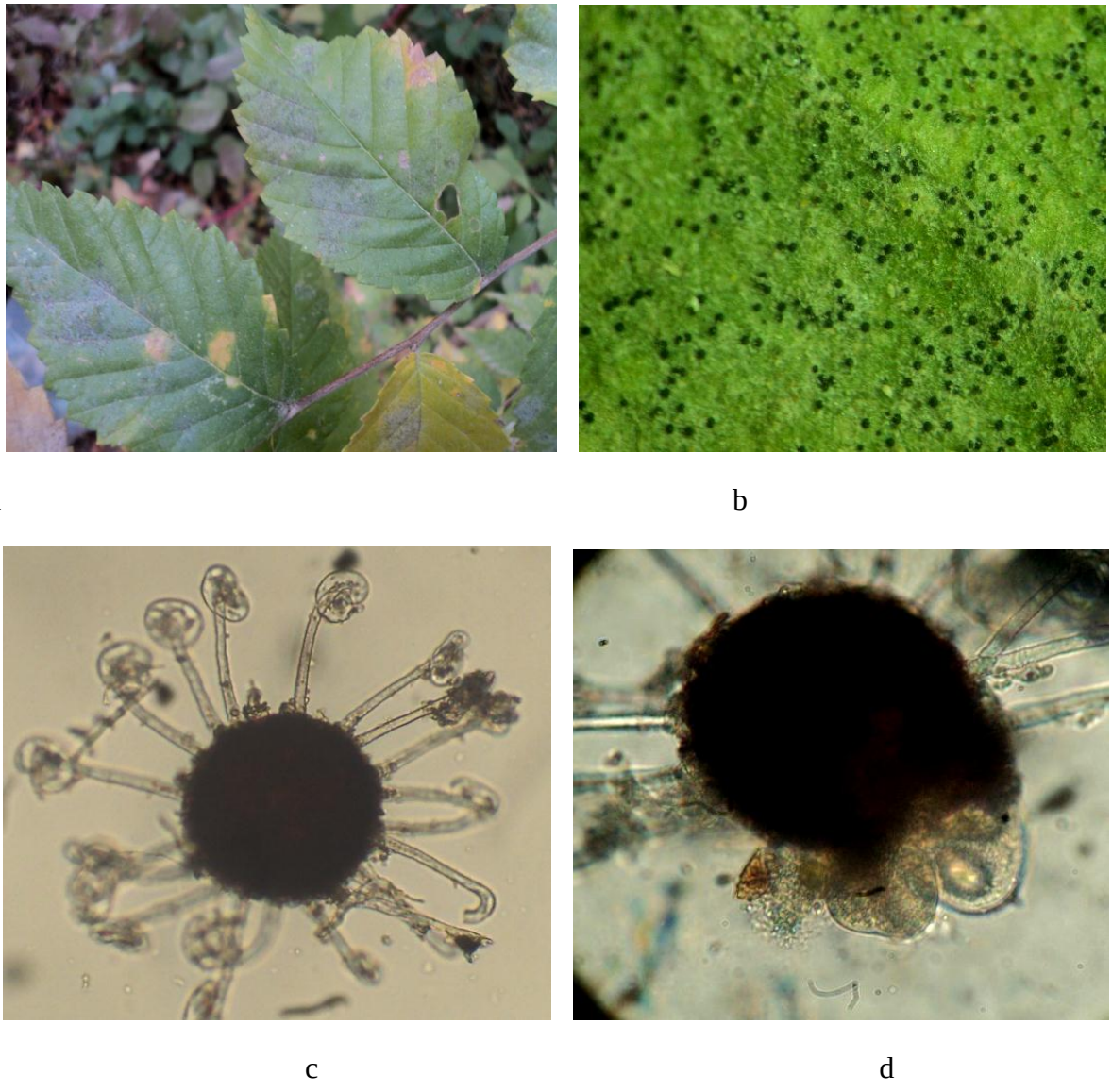


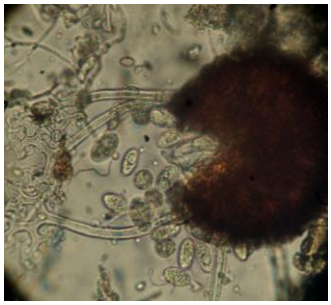
Figure 1. Uncinula ulmi M.N. Kusnezowa. – Ulmus pumila L .: a, b - ascocarps on the leaf surface; c - ascocarp and processes; d - the exit of the bags from the askocarp.

Phyllactinia fraxini (DC.) Fuss, Archiv des Vereins für Siebenbürgische Landeskunde, Neue Folge: 463 (1878) [MB#437871]. At Fraxinus sogdiana Bunge. Karshi, 09/22/2016.
Phyllactinia suffelta Sacc.f. populi Jacz. Populus sp. Termez town "Dustlik" alley. 26.08.2016.
Leveillula bignoniacearum f. catalpae (Teich) Golovin, Trudy Botanicheskogo Instituta im. V.L. Komarova 10: 245 (1956) [MB#352184]. At Catalpa bignonioides Walt.,
Leveillula leguminosarum f. sophorae (Jacz.) Golovin., Trudy Botanicheskogo Instituta im. V.L. Komarova 10: 263 (1956) [MB#352220]. On Sophora japonica L.
Marssonina populi (Lib.) Sacc., Sylloge Fungorum 3: 767 (1884) [MB#163704]. Populus alba L.

Marssonina salicicola (Bres) Magn., Krieg. Fung. Saxon. 19, 1894: 949. On Salix alba L., Salix dahynoides Vill.
Microsphaera alphitoides Griffon & Maubl., Bull. trimest. Soc. mycol. Fr .: 103 (1912).
The fungus infects the leaves of Quercus robur L. This disease is considered one of the most widespread diseases. The primary signs of the disease begin in spring with the appearance of thin mycelium on young foliage. The manifestation of the disease occurs in late June to early July. During this period, new leaves are infected due to the bags emerging from the ascocarp and conidia ripened in the infected foliage.
As a result of the disease, assimilation decreases, the leaves curl and fall off. This leads to a slowdown in growth and a change in the crown of young plants. Infected plants become powerless and cannot prepare for wintering. Large trees become unbearable for cold weather, pests and disease-causing agents. As a result, there is a massive drying out of trees.

At first, the ascocarps of fungi are brown, then they become black, scattered on the surface of the leaf, very small black dots are visible with the naked eye. Ascocarps are brown, spherical, 80-155 μm, their filamentous processes are up to 7-11, colorless, non-septic, 80-180 μm long. The number of bursae is 6-20, oblong-ovate, with very short legs. Bags 37-67x24-45 μm. The number of spores in asbestos is 4-8, ellipsoidal, 15-27x9-17 μm.

a



b

c

Figure 2. Microsphaera alphitoides Griffon. - Quercus robur L .: a - Infected oak leaf; b - bursa exit from the askocarp; c - bags and scions.

Erysiphe communis Grev. f. robiniae (Tschern.) Golov. Robinia pseudoacacia L.
Rhytisma ulmi Fr., Elenchus Fungorum 2: 128 (1828) [MB # 243948]. The fungus infects the leaves of Ulmus pumila L. In early summer, yellow spots appear on the leaf blade. Later, in the fall, gradually merging angular, gray spots appear on the surface of the leaf. These gray spots grow larger and look like scabs. The middle of the spot is black, shiny, slightly swollen, conidia are formed in them. The fruiting body of the fungus produces apothecia from the middle of the spot in autumn, and they ripen the next year, in spring. Over time, in the apothecia, club-shaped bursae mature and in the spring, emerging from the pores of the apothecia, it spreads. Due to the disease, growth slows down and decorativeness worsens. This plant disease was detected for the first time in the mycobiota of Uzbekistan.

Figure 3. Rhytisma ulmi Fr. - Ulmus pumila L.

Melasmia salicina Lév., Selecta Fungorum Carpologia: Nectriei- Phacidiei- Pezizei 3: 119, tab. xv, figs15-17 (1865)) [MB # 163765]. At Salix dahynoides Vill.

Melasmia populinae Rehm [MB # 166342]. This mushroom has not been found on the territory of Uzbekistan before. Mushroom Melasmia populinae Rehm. causes disease in plants. First, brown spots appear on the leaf blade, over time they increase and darken. Castings fall off if severely damaged. In the study area, the infection rate is widespread.

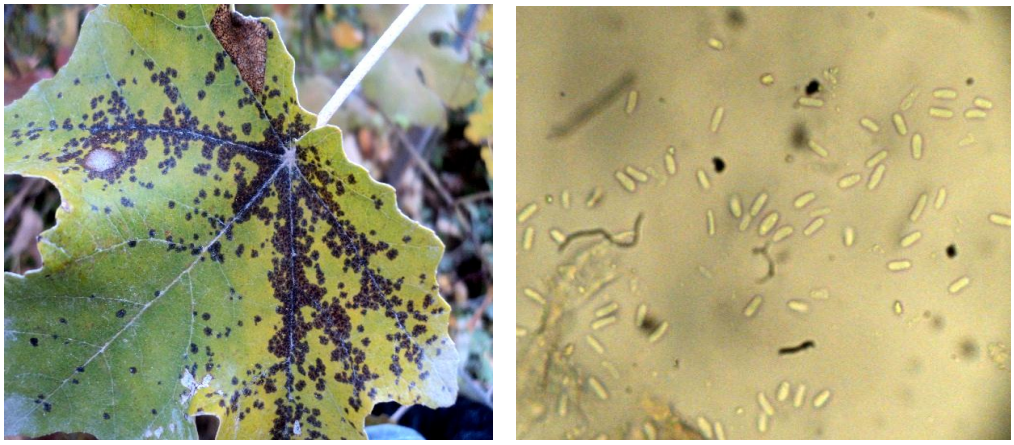


Figure 4. Melasmia populinae Rehm. - Populus alba L. a - infected leaf; b - disputes.

4. THE DISCUSSION OF THE RESULTS

During scientific research it was known that representatives of the class Leotiomycetes are found in 10 types of ornamental trees. Including Salix dahynoides Vill. - 3, Ulmus pumila L. – 2, Populus alba L. - two each, and in Acer negundo L., Sophora japonica L., Fraxinus sogdiana Bunge., Catalpa bignonioides Walt., Salix alba L., Quercus robur L., Robinia pseudoacacia L. one at a time.

5. CONCLUSIONS

Thus, 14 species of mircomycetes of the class Leotiomycetes were revealed on decorative trees in the conditions of southern Uzbekistan. Species of the genera Uncinula, Phyllactinia, Leveillula, Microsphaera, Erysiphe are obligate parasites, and Marssonina, Melasmia, Rhytisma are considered facultative parasites and causative agents of dangerous diseases in trees. For the first time, species Rhytisma ulmi Fr., Melasmia populinae Rehm. Have been identified in the microbiota of Uzbekistan.

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