

STUDY OF MICROMYCETES IN THE RHIZOSPHERE THE ORNAMENTAL TREES OF THE TREE NURSERY OF S.C.D.P. IASI

STUDIUL MICROMICETELOR DIN RIZOSFERA ARBORILOR ORNAMENTALI DIN PEPINIERA DENDROLOGICĂ A S.C.D.P. IASI

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Abstract. *The research aimed at determining the micromycetes spectrum found in the rhizosphere the ornamental trees. For Juniperus scopulorum skyrocket Sarg. 16 species of micromycetes with a total of 226 colonies were identified. For Chamaecyparis lawsoniana „Blue Piramidal” (A. Murr.) Parl 13 micromycetes with a total of 186 colonies were identified.*

Key words: micromycetes, rizosfera, ornamental trees

Rezumat. *Cercetarile de față au avut ca scop determinarea spectrului de micromicete prezente în rizosfera arborilor ornamentali. La Juniperus scopulorum skyrocket Sarg. s-au identificat 16 specii micromicete cu 226 colonii. La Chamaecyparis lawsoniana „Blue Piramidal”(A.Murr.) Parl. s-au identificat 13 micromicete cu 186 colonii.*

Cuvinte cheie: micromicetă, rizosferă, arbori ornamentali.

MATERIAL AND METHOD

The material intended for analyzing the microflora in the rhizosphere of the ornamental trees of *Juniperus scopulorum skyrocket* Sarg and *Chamaecyparis lawsoniana* “Blue Piramidal” (A. Murr.) Parl was collected from the cultures found at the tree nursery of the Research and Development Station for Fruit Tree Growing Iasi.

Experience includes four variants of fertilization with fertilizer complex: $V_1 = 0.075$ Kg/plant, $V_2 = 0.100$ Kg/plant, $V_3 = 0.125$ Kg/plant, $V_4 = 0.150$ Kg/plant,

The Petri dishes method was used for studying the *rhizosphere micro flora*. The plants were wholly collected, which allowed taking off the roots surrounded by a certain quantity of soil. In order to be transported, the samples were introduced in sterile bags. In the lab, the external and periradicular areas were removed from the plant and the internal area was separately collected on a sterile foil and served as rhizosphere material from which the analyse sample was taken. The Czapek medium allowed the development of a large number of species of fungi. The Petri dishes were sterilized in the stove at a temperature of 121°C for 3 minutes. The recipe for preparing the Czapek medium – agarized (Czapek, 1902, 1903): Na NO₃ ...3 g; K₂HPO₄...1 g; MgSO₄ .7H₂O...0,01g, KCl...0,5g; FeSO₄ . 7H₂O...0,01 g; Sucrose ...30 g; Agar...15 g; Distilled water...1000 ml. The method used to dissipate the medium in the Petri dishes was the sterilization of the necessary conditions in test tubes and then pouring the medium in Petri dishes. To avoid the condensation of water vapours on the cover of Petri dishes, the medium was poured when it had a temperature of 45°C. The medium is used in solid condition and the fungi develop at the surface. Soil dilutions were prepared according to the method of successive dilutions and inoculations were performed in Petri dishes by means of incorporation in the medium.

RESULTS AND DISCUSSIONS

Spectral micromycetes present in rhizosphere there is variable depending on the specie ornamental tree and fertilization (tab. 1, 2)

Table 1

Micromycetes identified in the rhizosphere of the ornamental trees: *Juniperus scopulorum skyrocket Sarg.* Total – 226 colonies – 12 types - 16 species.

No. crt.	Micromyceta	Number of colonies identified in the rhizosphere <i>Juniperus scopulorum skyrocket Sarg</i>					
		Witness	V1	V2	V3	V4	Overall
1.	<i>Acremoniella atra</i>	3	-	-	-	-	3
2.	<i>Aspergillus funiculosus</i>	-	1	6	-	-	7
3.	<i>Cephalosporium roseo - griseum</i>	4	2	2	1	-	9
4.	<i>Cladosporium herbarum</i>	1	6	1	-	-	8
5.	<i>Fusarium sp.</i>	2	1	-	2	6	11
6.	<i>Geotrichum sp.</i>	-	-	-	1	-	1
7.	<i>Sterile mycelia</i>	21	17	11	61	34	144
8.	<i>Mortierella sp.</i>	2	-	1	-	-	2
9.	<i>Mucor sp.</i>	-	2	1	2	7	12
10.	<i>Penicillium coryophilum</i>	6	-	-	-	-	6
11.	<i>Penicillium frequetans</i>	6	-	-	-	-	6
12.	<i>Penicillium lilacinum</i>	6	-	-	-	-	6
13.	<i>Penicillium ochraceum</i>	6	-	-	-	-	6
14.	<i>Penicillium terrestre</i>	6	-	-	-	-	6
15.	<i>Rizophus nigricans</i>	2	2	-	-	-	4
16.	<i>Sporotrichum sp</i>	1	-	-	-	-	1

Number of colonies identified rizosphera *Juniperus scopulorum skyrocket Sarg*

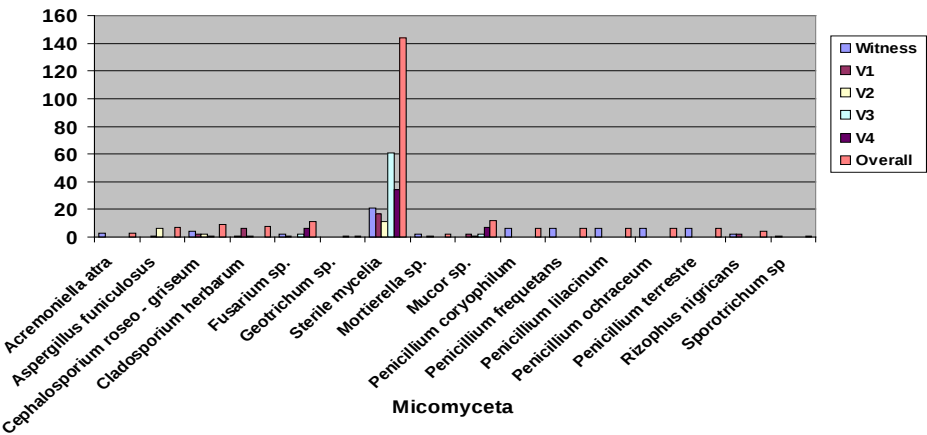


Fig.1. Micromycetes identified in the rhizosphere of the ornamental trees - *Juniperus scopulorum skyrocket Sarg.*

Table 2

Micromycetes identified in the rhizosphere of the ornamental trees: *Chamaecyparis lawsoniana* Blue Piramidal" (A.Murr.) Parl", Total – 188 colonies – 9 types -13 species

No crt.	Micromyceta	Number of colonies identified in the rhizosphere <i>Chamaecyparis lawsoniana</i> Blue Piramidal" (A.Murr.) Parl",					
		Witness	V1	V2	V3	V4	Overall
1.	<i>Aspergillus funiculosus</i>	3	2	2	-	-	7
2.	<i>Cladosporium herbarum</i>	-	4		2	-	6
3.	<i>Fusarium</i> sp.	-	-	2	1	-	3
4.	<i>Micelii sterile</i>	4	13	4	15		36
5.	<i>Mucor</i> sp.	-		6	3	10	19
6.	<i>Penicillium brevi-compactum</i>	20	1	-	-	-	21
7.	<i>Penicillium frequetans</i>	2	-	-	-	-	2
8.	<i>Penicillium lilacinum</i>	2	2	-	-	36	40
9.	<i>Penicillium ochraceum</i>	-	2	-	-	-	2
10.	<i>Penicillium pallidum</i>	7	8	3	13	15	46
11.	<i>Rizophus nigricans</i>	-	-	1	-	-	1
12.	<i>Trichoderma glaucum</i>	1	-	-	-	2	3
13.	<i>Verticillium lateritium</i>	-	2	-	-	-	2

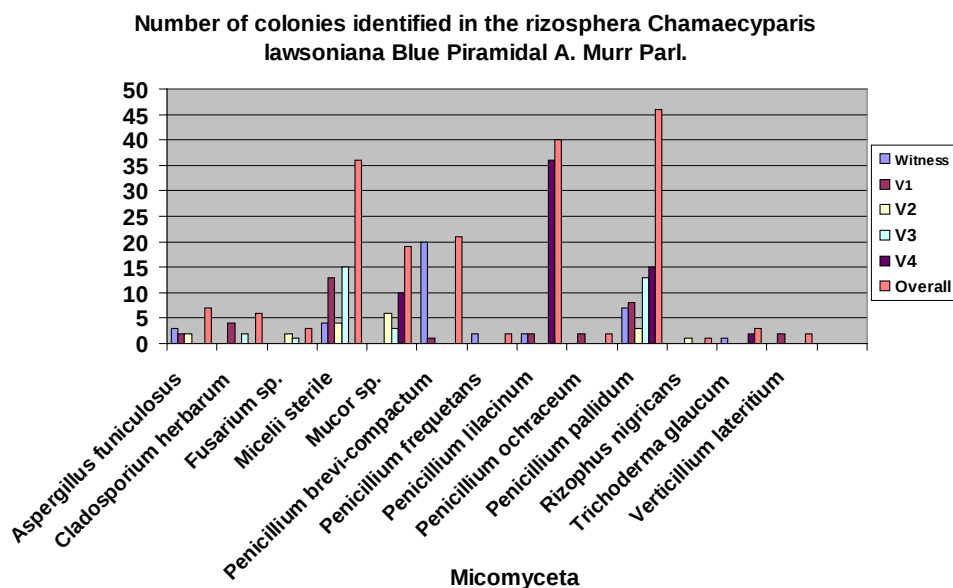


Fig.2. Micromycetes identified in the rhizosphere of the ornamental trees - *Chamaecyparis lawsoniana* Blue Piramidal" (A.Murr.) Parl"

1. *Acremoniella atra* Sacc. Syll. Sacc. Syll. Fung., IV, p.302 (1886); Ellis, Dematiaceous Hyphomycetes, page 79, fig. 44 (1971). The colony developed in Czapek medium is effuse, slightly coloured in brown when reaching maturity. The 2-7 μ m width filamentous thallus is both superficial and immersed.

2. *Aspergillus funiculosus* G. Smith, Brit. Mycol. Soc. Trans., XXXIX, page 111-114, fig. 1 (1956); J. Gilman, *A Manual of Soil Fungi*, page 220 (1957); K.B. Raper and D. Fennel, *The Genus Aspergillus*, page 440, fig. 91 F, H (1965);

The colonies of this fungus are green - yellowish, granule-like with white edge and funiculous surface. The reverse side of the colony has olive colour with some reddish spots.

3. *Cephalosporium roseo - griseum* Saksena, *A new genus of Moniliaceae*, Mycologia 46, page 660 (1954); Gilman, *A Manual of Soil Fungi*, page 211(1957).

The colony that occurs on the agarized Czapek medium has 4 cm diameter after 10 days of culture with flocculent surface, white then pink and, at the end, grey. The reverse of the colony is pink.

4. *Cladosporium lignicolum* Corda, Icon. I, fig. 2067, page 14 (1837); Massee, Brit. Fung. Fl. III, page 394 (1885); Sacc., Syll. Fung. IV, page 356(1886); De Wilde Dur.,Prod. Fl. Belgie, II,page 338(1898); Lindau, Rabenh. Kr. Fl. Deutschl. Oester und Schw., VIII page 809 (1907); Gilman, *A Manual of Soil Fungi*, p. 334 (1959).

The micromycetes develop on the agarized Czapek medium a black, circular colony with 1 – 1,5 cm diameter and a central cambered area.

5. *Fusarium* sp. The micromycetes develop on the medium a flossy mycelium of white colour first and then pink which colour the medium under the colony in reddish shades. The determination of the species was not performed since passing on standard media is necessary for *Fusarium* type.

6. *Geotrichum* sp - J. Gilman *A manual of Soil Fungi*, p. 206 (1957) – Mushroom forming on it medium colonies from hife septal how conidiophores erections to completes by conidium short cylindrical, abrupt hialin.

7. *Mortierella* sp. - J. Gilman *A manual of Soil Fungi*, p. 49(1957). Mycelium mushroom there is by half fine au present sporangiophores erections how to complete by spherical sporange, no columele

8. *Penicillium brevi - compactum* Dierckx, in Soc. Scien. Brux. XXV, page 88 (1901); Thom, *The Penicillia*, page 295-296 (1930); J.Gilman, *A Manual of Soil Fungi*, p. 255 (1957); Raper and Thom, page 407-409, fig. 106, 107 (1968); Domsch end Gams, *Pilze aus Agrarböden*, page 98 (1970). The colonies that occur on the medium are pretty limited, silky green – grey with under-colony medium coloured in yellow – grey.

9. *Penicillium coryophilum* Dierckx, in Soc. Sci. Brux. XXV, page 86 (1901); Thom, *The Penicillia*, page 254-255 (1930); J. Gilman, *A Manual of Soil Fungi*, page 250 (1957); Raper and Thom, page 341-343, fig. 91 (1968).

The colonies developed on the agarized Czapek medium are 2,5 – 3 cm in diameter after 10 days from their occurrence. The surface of the colonies is silky, folded, turquoise green coloured with small spots and the reverse of the colony is slightly coloured in brown.

10. *Penicillium frequentans* Westling, Arkiv för Botanik, XI, 58, page 133-134, fig., 39, 78 (1911); Thom, *The Penicillia*, page 216-217 (1930); J. Gilman, A

Manual of Soil Fungi, page 241 (1957); Raper and Thom, page 171-173, figure 48, 49 (1968); *Domsch and Gams, Pilze aus Agrarböden*, page 103, 105, 112, abb. 92 (1970).

The colonies that occur on the agarized Czapek medium have radii and are silky and turquoise green coloured.

11. *Penicillium lilacinum* Thom, in U.S. Dept. Agr., Bur. Anim. Ind., Bul. 118, page 73-75, figure 30 (1910); Thom, *The Penicillia*, page 331-334, figure 49, 50 (1930); J. Gilman, *A Manual of Soil Fungi*, page 263 (1957); Raper and Thom, page 285-288, figure 76, 77 - A, B (1968).

The colonies that occur on the agarized Czapek medium have a white flocculent surface first, and then when the fructification begins they get a mauve colour without colouring the medium under the colony. The micromycetes was also collected from soils cultivated with wheat, corn, freesia and salad.

12. *Penicillium ochraceum* (Bainier) Thom, *The Penicillia*, page 309-310 (1930); Gilman, *A manual of Soil Fungi*, page 272 (1959); Raper and Thom, *A Manual of the Penicillia*, page 477, figure 123 A, B (1968). The colonies developed on the agarized Czapek medium reach 3 cm in diameter after 10 days of culture. They have a more or less flocculent surface and are 2-3 mm high. At first, the colonies are silky and then they become flocculent, with white edges and folded. Drops occur on the upper surface and the reverse is coloured in yellow to olive.

13. *Penicillium pallidum* Smith, in Bot. Mycol. Soc. Trans. XVIII, 88-89, Pl. IV, figure 1, 2 (1933); J. Gilman, *A Manual of Soil Fungi*, p. 271 (1957); Raper and Thom, p. 459, 460, fig. 120 A, B (1968). The colonies developing on the agarized Czapek medium grow fast (6 – 7 cm in 10 – 14 days), have funiculous surface because of the groups of butter yellow conidiophores without exudates.

14. *Penicillium terrestre* Jensen, in Cornell University Exp. Sta. Bul. 315, p. 486-487, fig. 122 (1912); Thom, *The Penicillia*, p. 371-372 (1930); J. Gilman, *A Manual of Soil Fungi*, p. 270 (1957); Raper and Thom, p. 450-452, fig. 116 - A, B, fig. 117 (1968).

The micromycetes colonies develop on the circular shape agarized Czapek medium with dark-green colour and have characteristic conidiophores with harsh walls. The micromycetes was also collected only from mountain soils.

15. *Rizopus nigricans* Ehrenb. Nova Acta Acad. Leop. X, p. 198 (1820); Sacc., Syll. Fung. VII, p. 212 (1888); Lendner, *Les Mucorinées de la Suisse*, p. 115 (1908); Gilman J.C., *A Manual of Soil Fungi*, p. 21 (1957). The mycetes develops very quickly a colony comprising very fine hyaline hyphae from which hyaline sporangiophores appear and support the black coloured sporophore heads. The fungus is cosmopolite and it is very frequently met on various substrates or soil.

16. *Sporotrichum* sp. - J. Gilman. *A manual of Soil Fungi*, p. 206 (1957). Mushroom forming on it hife irregular branched and conidia appear side or terminal, many sessi, ovate or globular hyaline and smooth.

17. *Trichoderma glaucum* Abbott, Taxonomic studies of soil fungi (1926); J. Gilman, A Manual of Soil Fungi, p. 213 (1957). On the agarized Czapek medium, the micromycetes form a diffuse yellow colony with green shades around the sporiphoric area, which rapidly extends.

18. *Verticillium lateritium* Berkeley, Cooke, Brit. Fgi., p. 635 (1871); Sacc., Michelia II, p. 637 (1882); Sacc., Syll. Fung. IV, page 156 (1886); Gilman, A Manual of Soil Fungi, p. 304 (1959). On the agarized Czapek medium, the micromycetes produces hemispheric, circular colonies which are tile-coloured and bounded by a white area when reaching maturity. The fungus was found by Negru Al. on various vegetables (1966, 1972), by C. Sandu -Ville and his colleagues on dahlias and by the researchers from Cluj, Lörinczi (1970) and Lucia Turcu (1974,1975) who determined the soil fungi.

CONCLUSIONS

1. After performing the counting of the colonies on 30th of September 2008 for *Juniperus scopulorum* skyrocket Sarg. on average on 5 repetitions - 324 mycotic embryos/g soil, la *Chamaecyparis lawsoniana* Blue Piramidal”(A.Murr.) Parl”, on average on 5 repetitions - 204 mycotic embryos /g soil.

2. The species determined la *Juniperus scopulorum* skyrocket Sarg. were: 7 species of *Penicillium* and one species of *Acremoniella*, *Aspergillus*, *Cephalosporium*, *Cladosporium*, *Fusarium*, *Geotrichum*, *Mortierella*, *Rizopus*, *Sporotrichum*, *Trichoderma*, *Verticillium*, *Mucor* and *Sterile micelles*.

3. The species determined la *Chamaecyparis lawsoniana* Blue Piramidal” (A.Murr.) Parl”, were: 5 species of *Penicillium* and one species of *Aspergillus*, *Cladosporium*, *Fusarium*, *Rizopus*, *Trichoderma*, *Verticillium*, *Mucor* and *Sterile micelles*.

4. All variants fertilized were reported more micomycete only to witness unfertilized.

REFERENCES

1. Ahmet Asan, 1940 – Check List of *Aspergillus* and *Penicillium* Species Reported From Turkey. Trakya Universitesi, Fen Edebiyat, Fak.ltesi Biyoloji B.l.m.,22030 Edirne-Turkey.
2. Allescher A., 1903 - Rabenhorst Kryptogamen Flora von deutsch. Oesterr.Und Schweiz, Die pilze, VII.Abt. Fungi imperfecti -Leipzig;
3. Bontea Vera, 1985-Ciuperci parazite și saprofite din România. Ed Acad.R.S.R.București..
4. Ellis M.B., 1971 - Dematiaceous Hyphomycetes. Surrey, England.
5. Iacob Viorica., 2003 – Bolile plantelor cultivate – Prevenire și control. Ed. „Ion Ionescu de la Brad”, Iași,
6. Iliescu Ana-Felicia, 1998– Arboricultura ornamentală. Editura Ceres, București.