ADDITION OF DATA TO THE CHECKLISTS OF FUNGI OF THE CLASSES LEOTIOMYCETES AND PEZIZOMYCETES OF SERBIA

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Biodiversity of Ascomycota fungi in Serbia is still scarcely known although mostly phytopathogenic literature data can be found from the last decade, including previous checklists for classes Leotiomyces and Pezizomyces. This paper presents data on the new findings of fungal species of the classes Leotiomyces and Pezizomyces in Serbia, found mainly in the period from 2016 to 2020. Only those species whose presence is not mentioned in the existing checklists are included in the presented list.

Key words: Ascomycota, Serbia, Leotiomyces, Pezizomyces

INTRODUCTION

The class Leotiomyces is recognized as one of the most diverse classes in the subphylum Pezizomycotina, which in turn is one of the most

diverse groups within Ascomycota (Berbee 2001). Number of published species in the class is about 5500, but the assumption is that the total number of species is about 80,000 (Johnston *et al.* 2019). Leotiomyces is an ecologically diverse group, most are saprobes of a wide variety of substrates, such as Helotiaceae, Lachnaceae and Hyaloscyphaceae on dead plant material and Thelebolales on dung. Some, such as Sclerotiniaceae, Erysiphales, some Helotiales and some Rhytismatales are important plant pathogens. The class also includes endophytes, mycorrhizae, fungal parasites, root symbionts, and wood rot fungi (Wang *et al.* 2006, Jaklitsch *et al.* 2016).

Class Pezizomycetes with a single order Pezizales containing 16 currently accepted families with about 1100 species. These taxa are characterized by asci that usually open by rupturing to form a terminal or eccentric lid or operculum, although some hypogeous and cleistothecial forms lack an operculum. Members of certain families, such as the Pezizaceae, Morchellaceae, Helvellaceae, Rhizinaceae, and many of the Pyronemataceae, show a particularly high diversity in temperate regions (Pfister 2015). They are omnipresent in nature occurring in a broad range of habitats with epigeous, semihypogeous and hypogeous ascoma fruiting on soil, wood and leaf debris, dung, herbaceous plants, trees, bryophytes, lichens. Hence, taxa of this ascomycetous class are with diverse trophic strategies, ranging from saprotrophic, mycorrhizal, bryoparasitic, phytoparasitic (Hansen & Pfister 2006).

The results of the previous research of fungi of the classes Leotiomyces and Pezizomycetes in Serbia, conducted in the period from 2012 to 2018 were published in two separate papers, Savić & Karaman (2016) and Savić *et al.* (2018). In these papers, all available data was presented included data from the literature as well as the new findings, and initial checklists for the entire territory of Serbia was formed. Investigation of these groups of fungi was continued and the new findings are presented in this paper.

MATERIALS AND METHODS

A total of 184 samples were collected and analyzed during the period from 2016 to 2020. Most sample collected on the Fruška Gora Mountain (80%) and the rest on mountain regions: Čemernik, Goč, Jelova Gora, Kopaonik, Kukavica, Stara planina, Zvijezda and other locations in Serbia: Bačko Gradište, Crna trava, Karakuša, Pirot, Požega, Tomaševac, Užice, Vlasina Rid and Zasavica. The surveyed localities are shown in the map in Fig. 1.

Fig. 1. – Map of the studied localities. 1. **Fruška Gora** (a. Susek, b. Banoštor, Ravne, c. Čerević, Testera, d. Andrevlje, Grgurevci, Letenka, Papratski do, Šuljam, e. Beočin, Erdelj, f. Crveni čot, Mala Remeta, Kraljev izvor, g. Rakovac, h. Brankovac, Zmajevac, i. Glavica, Ledinci, Orlovo bojište, Paragovo, Popovica, Sremska Kamenica, Stari Ledinci, j. Astal, Kraljeva stolica, Novo Hopovo, Iriški venac, k. Petrovaradin, l. Bukovac, Pletena anta, Stražilovo, m. Pavlovačko jezero, n. Irig, o. Krušedol), 2. **Bačko gradište**, 3. **Tomaševac**, 4. **Zasavica**, 5. **Karakuša**, 6. **Zvijezda**, 7. **Užice** (Kotroman vill.), 8. **Jelova gora** (Gostinica), 9. **Požega** (Roge vill.), 10. **Goč** (a. Cvetne Livade,

Groblje, Ovčarnik, Partizanske kolibe, Piramida, **b.** Bela Reka, Prerovo), 11. **Kopaonik** (**a.** Samokovska Reka, **b.** Jankove Bare, **c.** Gobelja, Markov kamen, Sunčani vrhovi), 12. **Kukavica** (Slatina vill.), 13. **Čemernik**, 14. **Crna trava** (Dojčinovci vill.), 15. **Vlasina Rid** (**a.** Cvijina dolina, **b.** Polom), 16. **Pirot** (Sinja Glava vill.), 17. **Stara planina** (**a.** Vzganica, **b.** Dojkinci).

All samples were examined microscopically in the fresh, living state in tap water according to Baral (1992) using a transmission light microscope (BIM313T – LED) with bright-field technique.

Identification of the species was performed using specific published and unpublished identification keys and a collection of macro and microphotographs “*In vivo veritas*” (Baral & Weber 2020). The collected samples were dried and deposited in the officially unregistered Herbarium of Fruška Gora National Park (listed species designation F.G.). Author citations are given according to Index Fungorum (2020). Taxonomy and nomenclature (families and genera) are given according to Baral *et al.* (2015), Jaklitsch *et al.* (2016) and Johnston *et al.* (2019).

For each fungal species the following information is provided: scientific name, locality, date, host and herbarium number. For the data of other mycologists in addition to the details of the findings is the name of the person who collected and identified the sample (leg. & det.). Species found in the anamorph state (asexual reproductive stage) are indicated as “anamorph”.

Families, genera, and species are listed in alphabetical order. Each individual finding in the species list is presented primarily with the name of the wider area (e.g. Fruška Gora) followed by the name of one specific site displayed in brackets. For any cited published data, authors references are listed, including page numbers and other relevant data. Some selected species are additionally shown in the figures (Fig. 1-30).

RESULTS AND DISCUSSION

Comparison of results obtained in this study with already published checklists, showed the presence of a large number of new species for Serbia from the classes Leotiomycetes (125) and Pezizomycetes (8).

In addition, 5 pieces of information from the literature were listed, namely *Chalara cylindrosperma* (Karadžić 2003), *Ciboria viridifusca* (Karadžić & Čolić 2009), *Durella macrospora* (Milijašević & Karadžić 2007), *Monillinia polystroma* (Vasić *et al.* 2018), the citation of which was omitted during the preparation of the previous checklist, and *Hymenoscyphus fraxineus* (Keča *et al.* 2017), the findings of which have been published in the meantime.

Species List

Class **Leotiomycetes** O.E. Erikss. & Winka 1997

Ordo: **HELOTIALES** Nannf. 1932

Fam.: **Calloriaceae** Marchand 1894

1. *Diplonaevia bresadolae* (Rehm) B.Hein
Fruška Gora (Iriški venac), 10.05.2019., on *Urtica dioica*, dead stem, F.G.1064, (Fig. 2).
2. *Laetinaevia minutissima* (Rostr.) Nannf. ex B. Hein
Fruška Gora (Čerević), 23.05.2019., on *Achillea millefolium*, dead stem.
3. *Laetinaevia raripila* (Höhn.) Baral & Helleman
Fruška Gora (Kraljeva stolica), 27.05.2019., on *Ranunculus repens*, dead stem.

Fam.: **Cenangiaceae** Rehm 1888

4. *Crumenulopsis pinicola* (Rebent.) J.W. Groves
Fruška Gora (Iriški venac), 31.05.2019., on *Pinus nigra*, branch on the ground, F.G. 1119.
5. *Heyderia cucullata* (Batsch) Bacyk & Van Vooren
Fruška Gora (Paragovo), 13.10.2017., on *Picea abies*, fallen leaves, F.G.705; Kopaonik (Gobelja), 01.09.2018., on *Picea abies*, fallen leaves, F.G. 860.
6. *Trochila ilicina* (Nees ex Fr.) Courtec.
Jelova gora (Gostinica), leg. M. Adžić and D. Stojanović, 04.06.2020., on *Ilex aquifolium*, leaf, F.G. 1350.

Fam.: **Chaetomellaceae** Baral, P.R. Johnst. & Rossman 2015

7. *Pilidium acerinum* (Alb. & Schwein.) Kunze (anamorph)
Fruška Gora (Iriški venac), 14.05.2020., on *Betula pendula*, leaf, F.G. 1331, (Fig. 3).

Fig. 2. – *Diplonaevia bresadolae*.

Fig. 3. – *Pilidium acerinum*.

Fam.: **Cordieritidaceae** Sacc. 1889

8. *Unguiculariopsis hamatopilosa* (Graddon) W.Y. Zhuang
Fruška Gora (Grgurevci), 10.03.2020., on *Rosa canina*, branch on the ground, F.G. 1312.
9. *Unguiculariopsis rehmi* W.Y. Zhuang & Korf
Fruška Gora (Iriški venac), 05.06.2019., on *Ulmus* sp., branch on the ground, F.G. 1117.
10. *Unguiculella eurotioides* (P.Karst.) Nannf.
Fruška Gora (Glavica), 20.09.2017., on *Epilobium* sp., dead stem, F.G.756; **Fruška Gora** (Iriški venac), 21.01.2019., on *Cytisus scoparius*, branch, F.G.989; **Fruška Gora** (Brankovac), 03.06.2019., on *Galium* sp., dead stem, F.G. 1112. **Fruška Gora** (Letenka), 29.11.2019., on *Populus tremula*, bark of the branch above the ground, F.G. 1254.
11. *Unguiculella incarnatina* (Quél.) Baral
Fruška Gora (Paragovo), 19.05.2016., on *Petasites hybridus*, petiole of leaf; **Fruška Gora** (Glavica), 18.09.2017., on *Equisetum arvense*, dead stem, F.G. 689; **Fruška Gora** (Crveni čot), 08.05.2019., on *Urtica dioica*, dead stem, F.G. 1067; **Fruška Gora** (Astal), 04.06.2020., on *Galium schultesii*, dead stem, F.G. 1359.

Fam.: **Dermateaceae** Fr. 1849

12. *Pezicula eucrita* (P. Karst.) P. Karst.
Fruška Gora (Iriški venac), 31.05.2019., on *Pinus nigra*, branch on the ground, F.G. 1113, (Fig. 4).
13. *Pezicula rubi* (Lib.) Niessl
Vlasina Rid (Polom), 25.09.2020., on *Rubus* sp., branch, leg. N.Marić.

Discinella-Pezoloma lineage

14. *Naevalea perexigua* (Roberge ex Desm.) K. Holm & L. Holm
Fruška Gora (Zmajevac), 26.05.2020., on *Quercus petraea*, leaf, F.G. 1354, (Fig. 5).

Fig. 4. – *Pezicula eucrita*. Fig. 5. – *Naevalea perexigua*.

Fam.: **Drepanopezizaceae** Bat. & H. Maia 1960

15. *Diplocarpon fragariae* (Lib.) Rossman (anamorph)
Fruška Gora (Brankovac), 10.07.2020., on *Fragaria vesca*, leaf.
16. *Leptotrochila verrucosa* (Wallr.) Schüepp
Fruška Gora (Zmajevac), 20.05.2020., on *Galium mollugo*, dead stem, F.G. 1346.
17. *Theadgonia ligustrina* (Boerema) B. Sutton (anamorph)
Fruška Gora (Stražilovo), 08.05.2020., on *Ligustrum vulgare*, leaf, F.G. 1339.

Fam.: **Gelatinodiscaceae** S.E. Carp. 1976

18. *Ombrophila janthina* (Fr.) Sacc.
Goč (Bela Reka), 17.10.2014., on *Fagus sylvatica*, dead wood, leg. & det. N. Milosavljević; **Kopaonik** (Gobelja), 05.09.2017., on *Picea abies*, cone, F.G. 703, leg. E. Čapelja.

Fam.: **Helotiaceae** Rehm 1892

19. *Bryoscyphus phascoides* (Fr.) Baral
Kopaonik (Jankove bare), 31.08.2018., on *Hylocomium splendens*, F.G. 858, (Fig. 6).
20. *Cudoniella buissonii* Grélet
Fruška Gora (Paragovo), 12.03.2020., on *Picea abies*, rotten wood, F.G. 1314.
21. *Cyathicula amenti* (Batsch) Baral & R. Galán
Fruška Gora (Rakovac), 05.04.2018., on *Salix alba*, fallen catkins, F.G. 794.
22. *Hymenoscyphus albopunctus* (Peck) Kuntze
Fruška Gora (Paragovo), 14.06.2017., on *Fagus sylvatica*, leaf, F.G. 641;
Fruška Gora (Glavica), 02.10.2017., on *Salix alba*, leaf, F.G. 741.
23. *Hymenoscyphus fraxineus* (T. Kowalski) Baral, Queloz & Hosoya (anamorph)
Tara, on *Fraxinus excelsior*, shoots, Keča *et al.* 2017: 57; **Debelo brdo**, on *Fraxinus excelsior*, shoots, Keča *et al.* 2017: 57; **Molovin**, on *Fraxinus angustifolia*, shoots, Keča *et al.* 2017: 57.
24. *Hymenoscyphus macroguttatus* Baral, Declercq & Hengstm.
Fruška Gora (Glavica), 19.09.2017., on *Equisetum arvense*, dead stem, F.G. 739.
25. *Hymenoscyphus menthae* (W. Phillips) Baral
Tomaševac, 04.06.2016., on *Polygonum* sp., dead stem, F.G. 960; **Fruška Gora** (Papratski do), 06.06.2017., herbaceous plant, dead stem, F.G. 674;
Fruška Gora (Ledinci), 28.07.2017., on *Lythrum salicaria*, dead stem,

F.G. 614, (Fig. 7); **Fruška Gora** (Ledinci), 28.07.2017., on *Lycopus europaeus*, dead stem, F.G. 616, F.G. 683.

Fig. 6. – *Bryoscyphus phascoides*.

Fig. 7. – *Hymenoscyphus menthae*.

26. *Hymenoscyphus ombrophiliformis* Svrček
Fruška Gora (Kraljev izvor), 17.10.2019., on *Fagus sylvatica*, cupule, F.G. 1206, (Fig. 8).
27. *Hymenoscyphus repandus* (W. Phillips) Dennis
Fruška Gora (Brankovac), 18.05.2017., herbaceous plant, dead stem, F.G. 651.
28. *Hymenoscyphus salicellus* (Fr.) Dennis
Zasavica, 21.11.2019., on *Salix alba*, branch above the ground, F.G. 1248.
29. *Hymenoscyphus vacini* (Velen.) Baral & Weber
Fruška Gora (Iriški venac), 31.10.2018., on *Acer pseudoplatanus*, leaf, F.G. 949.
30. *Hymenoscyphus vitigenus* (De Not.) Dennis
Fruška Gora (Rakovac), 27.08.2019., on *Vitis vinifera*, branch.
31. *Muscicola dubia* (Velen.) Svrček
Kopaonik (Jankove bare), 31.08.2018., on *Hylocomium splendens*, F.G. 853.
32. *Phaeohelotium epiphyllum* (Pers.) Hengstm.
Goč (Groblje), 14.10.2017., leaf, leg. & det. N. Milosavljević; **Kopaonik** (Markov kamen), 31.07.2018., on *Picea abies*, fallen leaves, F.G. 980, leg. E. Čapelja.
33. *Phaeohelotium fulvidulum* (Boud.) Baral & Declercq
Kopaonik (Gobelja), 01.09.2018., on Poaceae, dead stem, F.G. 828.
34. *Symphyosirinia angelicae* E.A.Ellis (anamorph)
Fruška Gora (Glavica), 04.10.2017., on *Angelica sylvestris*, seed on the ground, F.G. 719, (Fig. 9).

Fig. 8. – *Hymenoscyphus ombrophiliformis*.

Fig. 9. – *Symphyosirinia angelicae*.

35. *Tatraea dumbirensis* (Velen.) Svrček

Goč (Cvetne Livade), 02.08.2014., dead wood, leg. & det. N. Milosavljević.

36. *Tatraea macrospora* (Peck) Baral

Goč (Piramida), 01.10.2015., dead wood, leg. & det. N. Milosavljević.

Fam.: *Hyaloscyphaceae* Nannf. 1932

37. *Cistella albidolutea* (Feltgen) Baral

Fruška Gora (Paragovo), 14.06.2017., on *Carex pendula*, leaves, F.G. 659; Fruška Gora (Glavica), 24.11.2017., on *Carex flacca*, leaves, F.G. 729.

38. *Cistella deflexa* (Graddon) Raitv.

Fruška Gora (Glavica), 04.10.2017., on *Juglans regia*, leaf, F.G. 754.

39. *Cistella dentata* (Pers.) Quél.

Kukavica (Slatina vill.), 16.12.2019., on *Quercus cerris*, decorticated wood, F.G. 1276, leg. S. Jovanović, (Fig. 10).

40. *Cistella grumosa* Senn-Irlet & Aeberh.

Fruška Gora (Paragovo), 26.10.2017., on *Quercus petraea*, leaf, F.G. 699; Fruška Gora (Popovica), 16.11.2017., on rotten oak gall *Andricus dentimitratus*, F.G. 734; Fruška Gora (Glavica), 24.11.2017., on *Ulmus* sp., leaf, F.G. 733.

41. *Dasyscyphus pteridialis* Graddon

Fruška Gora (Zmajevac), 09.12.2019., on *Pteridium aquilinum*, rachis, F.G. 1241.

42. *Hamatocanthoscypha rotundispora* Raitv. & R. Galán

Fruška Gora (Iriški venac), 25.02.2020., on *Juniperus horizontalis*, branch, (Fig. 11).

Fig. 10. – *Cistella dentata*. Fig. 11. – *Hamatocanthoscypha rotundispora*.

43. *Hamatocanthoscypha uncipecta* (Le Gal) Huhtinen
Kopaonik (Gobelja), 05.09.2017., on *Picea abies*, cone, F.G. 694, leg. E. Čapelja.
44. *Hyaloscypha alniseda* Velen.
Fruška Gora (Papratski do), 06.06.2019., on *Fagus sylvatica*, dead wood, F.G. 1120.
45. *Hyaloscypha daedaleae* Velen.
Fruška Gora (Paragovo), 25.10.2017., on *Quercus* sp., dead wood, F.G. 736.
46. *Hyaloscypha herbarum* Velen.
Fruška Gora (Iriški venac), 01.10.2019., on *Quercus petraea*, decorticated log, F.G. 1196.
47. *Hyaloscypha vitreola* (P. Karst.) Boud.
Fruška Gora (Papratski do), 25.07.2019., on *Fagus sylvatica*, dead wood.
48. *Olla scrupulosa* (P. Karst.) Svrček
Fruška Gora (Iriški venac), 27.02.2019., on *Tilia tomentosa*, bark of the branch, F.G. 999.
49. *Protounguicularia transiens* (Höhn.) Hutinen
Fruška Gora (Brankovac), 01.02.2019., on *Fagus sylvatica*, dead wood, F.G. 990, (Fig. 12).

Fam.: **Lachnaceae** Raitv. 2004

50. *Brunnipila clandestina* (Bull.) Baral
Kopaonik (Sunčani vrhovi), 02.09.2018., on *Rubus idaeus*, branch, F.G. 854.
51. *Brunnipila fuscescens* (Pers.) Baral
Fruška Gora (Rakovac), 20.04.2018., on *Fagus sylvatica*, cupule, F.G. 900, (Fig. 13); **Fruška Gora** (Ravne), 01.05.2018., on *Fagus sylvatica*,

cupule, F.G. 841; **Požega** (Roge vill.), 19.05.2018., on *Fagus sylvatica*, leaf, F.G. 820, leg. S. Leovac.

Fig. 12. – *Protoungicularia transiens*. Fig. 13. – *Brunnipila fuscescens*.

52. *Capitotricha rubi* (Bres.) Baral

Kopaonik (Sunčani vrhovi), 02.09.2018., on *Rubus idaeus*, branch, F.G. 851.

53. *Dasyscyphella montana* Raitv.

Fruška Gora (Popovica), 16.11.2017., on *Fagus sylvatica*, dead wood, F.G.690; **Fruška Gora** (Iriški venac), 14.03.2019., on *Prunus avium*, dead wood, (Fig. 14).

54. *Lachnum brevipilosum* Baral

Fruška Gora (Rakovac), 26.04.2017., on *Rubus* sp., branch; **Fruška Gora** (Sremska Kamenica), 06.09.2019., on *Salix alba*, branch.

55. *Lachnum elatius* P.Karst.

Fruška Gora (Erdelj), 25.05.2017., on Poaceae, dead stem and leaves, F.G. 656, (Fig. 15); **Fruška Gora** (Paragovo), 02.11.2017., on Poaceae, dead stem and leaves, F.G. 748.

Fig. 14. – *Dasyscyphella montana*.

Fig. 15. – *Lachnum elatius*.

56. *Lachnum pudibundum* (Quél.) J. Schröt.

Fruška Gora (Stražilovo), 04.05.2018., on *Corylus avellana*, branch, F.G. 876.

57. *Lachnum rhytismatis* (W. Phillips) Nannf.
Fruška Gora (Banoštor), 29.05.2017., on *Quercus* sp., leaf, F.G. 596.
 58. *Lachnum subvirgineum* Baral
Fruška Gora (Stari Ledinci), 03.08.2017., on *Lythrum salicaria*, dead stem, F.G. 680.
 59. *Lachnum tenue* Kirschst.
Zvijezda, 03.08.2017., on Poaceae, dead stem, F.G. 684, leg. E. Čapelja.
 60. *Lachnum tenuipilosum* Svrček
Fruška Gora (Glavica), 18.09.2017., on *Zea mays*, bare corn cob, F.G. 744.
 61. *Lasiobelonium corticale* (Pers.) Raitv.
Kukavica (Slatina vill.), 16.12.2019., on *Quercus cerris*, bark, F.G. 1273, leg. S. Jovanović.; **Fruška Gora** (Novo Hopovo), 18.12.2020., on *Populus alba*, bark, F.G. 1515.
 62. *Lasiobelonium horridulum* (Desm.) Dougoud
Fruška Gora (Erdelj), 02.04.2018., on *Tripidium strictum*, dead stem, F.G. 889.
 63. *Lasiobelonium lanceolatum* Raitv.
Fruška Gora (Krušedol), 20.03.2018., on *Conium maculatum*, dead stem, F.G. 823.
 64. *Lasiobelonium lonicerae* (Alb. & Schwein.) Raitv.
Vlasina Rid (Cvijina dolina), 27.09.2020., on *Betula pendula*, bark, F.G. 1414, leg. D. Stojanović.
 65. *Perrotia flammea* (Alb. & Schwein.) Boud.
Fruška Gora (Erdelj), 06.03.2019., on *Fraxinus ornus*, branch, F.G. 1020.
 66. *Trichopeziza elegantula* (P. Karst.) Sacc.
Fruška Gora (Iriški venac), 30.03.2018., herbaceous plant, dead stem, F.G. 959; **Fruška Gora** (Stražilovo), 04.05.2018., on *Aconitum lycoctonum*, dead stem, F.G. 845; **Fruška Gora** (Crveni čot), 05.05.2020., on *Aconitum lycoctonum*, dead stem, (Fig. 16).
- Fam.: **Mitrulaceae** Rchb. 1828
67. *Bryoglossum gracile* (P. Karst.) Redhead
Kopaonik (Samokovska Reka), 31.07.2018., F.G. 979, leg. E. Čapelja.
- Fam.: **Mollisiaceae** Rehm 1891
68. *Chlorosplenium chlora* (Schwein.) M.A. Curtis
Fruška Gora (Paragovo), 16.12.2016., on *Quercus* sp., dead wood, (Fig. 17); **Fruška Gora** (Iriški venac), 27.11.2018., on *Quercus* sp., dead wood, F.G. 956.

Fig. 16. – *Trichopeziza elegantula*.Fig. 17. – *Chlorosplenium chlora*.69. *Mollisia amenticola* (Sacc.) Rehm

Fruška Gora (Testera), 17.10.2017., on *Alnus glutinosa*, fallen female catkins, F.G. 749.

70. *Mollisia caespiticia* (P. Karst.) P. Karst.

Fruška Gora (Iriški venac), 21.02.2019., on *Prunus* sp.?, branch above the ground, F.G. 1006.

71. *Mollisia coerulans* Quél.

Fruška Gora (Iriški venac), 13.06.2019., on *Eupatorium cannabinum*, dead stem, F.G. 1111.

72. *Mollisia hydrophila* (P. Karst.) Sacc.

Fruška Gora (Glavica), 19.09.2017., on *Phragmites australis*, dead stem, F.G. 761; **Fruška Gora** (Pletena anta), 25.04.2019., on *Phragmites australis*, dead stem, F.G. 1060.

73. *Mollisia juncina* (Pers.) Rehm

Bačko gradište, 21.07.2018., on *Juncus effusus*, dead stem, F.G. 877.

74. *Mollisia lothariana* Gminder

Fruška Gora (Čerević), 20.05.2019., on *Poa* sp., dead stem, (Fig. 18).

75. *Mollisia mediella* (P. Karst.) Baral

Zasavica, 29.06.2017., on *Phragmites australis*, dead stem, F.G. 667; **Fruška Gora** (Stari Ledinci), 28.07.2017., on *Phragmites australis*, dead stem, F.G. 617.

76. *Mollisia palustris* (P. Karst.) P.Karst.

Fruška Gora (Glavica), 18.09.2017., on *Zea mays*, bare corn cob, F.G. 751; **Fruška Gora** (Glavica), 20.09.2017., on *Equisetum arvense*, dead stem, F.G. 697; **Fruška Gora** (Bukovac), 20.09.2017., on *Phragmites australis*, dead stem, F.G. 727; **Fruška Gora** (Glavica), 29.11.2017., on *Chrysopogon gryllus*, dead stem, F.G. 759; **Fruška Gora** (Erdelj), 27.03.2018., on Poaceae, dead stem, F.G. 957; **Fruška Gora** (Susek), 28.05.2018., on *Typha angustifolia*, dead stem, F.G. 829.

77. *Mollisia prunicola* (Fuckel) Gminder, Baral & E. Weber
Fruška Gora (Pavlovačko jezero), 10.04.2020., on *Prunus spinosa*, branch.

78. *Trimmatostroma salicis* Corda (anamorph)
Fruška Gora (Rakovac), 23.03.2017., on *Salix alba*, branch, F.G. 575.

Fam.: **Pezizellaceae** Velen. 1934

79. *Allophylaria subhyalina* (Rehm) Baral
Fruška Gora (Kraljeva stolica), 30.10.2020., *Acer pseudoplatanus*, petiole, F.G. 1402, (Fig. 19).

Fig. 18. – *Mollisia lothariana*.

Fig. 19. – *Allophylaria subhyalina*.

80. *Chalara cylindrosperma* (Corda) S. Hughes (anamorph)
 Serbia: more locations, Karadžić 2003: 62, on *F. sylvatica*.
81. *Calycellina microspis* (P. Karst.) Dennis
Fruška Gora (Beočin), 15.06.2017., on *Carex riparia*, leaf, F.G. 649.
82. *Calycellina pseudopuberula* (Graddon.) Baral
Fruška Gora (Paragovo), 02.11.2017., on *Quercus petraea*, leaf, F.G. 691.
83. *Calycellina punctata* (Fr.) Lowen & Dumont
Fruška Gora (Zmajevac), 20.10.2016., on *Quercus petraea*, leaf, F.G. 640.
84. *Calycina discreta* (P. Karst.) Kuntze
Fruška Gora (Glavica), 24.11.2017., herbaceous plant, dead stem.
85. *Micropeziza cornea* (Berk. & Broome) Nannf.
Fruška Gora (Brankovac), 08.10.2019., on *Poaceae*, dead stem, (Fig. 20).
86. *Psilachnum acutum* (Velen.) Raitv.
Fruška Gora (Brankovac), 18.05.2017., on *Poaceae*, dead stem, F.G. 540.

87. *Psilachnum inquilinum* (P.Karst.) Dennis
Fruška Gora (Glavica), 03.10.2017., on *Equisetum arvense*, dead stem, F.G. 740.
88. *Rodwayella sessilis* (Rodway) Spooner
Fruška Gora (Iriški venac), 26.02.2020., on *Juniperus horizontalis*, bark of the branch, F.G. 1304.
- Fam.: **Ploettnerulaceae** Kirschst. 1924
89. *Dennisiodiscus prasinus* (Quél.) Svrček
Fruška Gora (Susek), 28.05.2018., on *Typha angustifolia*, dead stem, F.G. 832.
90. *Pirottaea brevipila* (Roberge ex Desm.) J. Schröt.
Fruška Gora (Erdelj), 15.04.2019., on *Centaurea jacea*, dead stem, F.G. 1051.
91. *Pirottaea lamii* Nannf.
Fruška Gora (Zmajevac), 11.04.2019., on *Lamium maculatum*, dead stem, F.G. 1045; **Fruška Gora** (Iriški venac), 17.04.2019., on *Lamium maculatum*, dead stem, F.G. 1044.
92. *Pyrenopeziza artemisiae* (Lasch) Sacc.
Fruška Gora (Paragovo), 26.07.2017., on *Artemisia vulgaris*, dead stem, F.G. 611; **Fruška Gora** (Iriški venac), 15.05.2019., on *Artemisia vulgaris*, dead stem.
93. *Pyrenopeziza chamaenerionis* Nannf.
Fruška Gora (Petrovaradin), 11.07.2017., on *Epilobium* sp., dead stem, F.G. 612.
94. *Pyrenopeziza digitalina* (W.Phillips) Sacc.
Fruška Gora (Iriški venac), 04.06.2018., on *Digitalis ambigua*, dead stem, F.G. 941.
95. *Pyrenopeziza dilutella* (Fr.) Gminder
Kopaonik (Sunčani vrhovi), 02.09.2018., on *Rubus idaeus*, branch, F.G. 840.
96. *Pyrenopeziza escharodes* (Berk. & Broome) Rehm
Fruška Gora (Papratski do), 24.04.2019., on *Rubus* sp., branch, F.G. 1054; **Užice** (Kotroman vill.), 01.05.2019., *Rubus* ?, branch, F.G. 1069; **Fruška Gora** (Brankovac), 04.06.2019., on *Sambucus ebulus*, dead stem.
97. *Pyrenopeziza inapiculata* Declercq
Fruška Gora (Iriški venac), 13.06.2019. herbaceous plant, dead stem.

98. *Pyrenopeziza karstenii* Sacc.

Fruška Gora (Brankovac), 25.05.2018., on Poaceae, dead stem, F.G. 818;
Fruška Gora (Stražilovo), 18.05.2020., on Poaceae, dead stem, F.G. 1349, (Fig. 21).

Fig. 20. – *Micropeziza cornea*. Fig. 21. – *Pyrenopeziza karstenii*.99. *Pyrenopeziza lycopincola* (Rehm) Boud.

Fruška Gora (Stari Ledinci), 27.07.2017., on *Lycopus europaeus*, dead stem, F.G. 613.

100. *Pyrenopeziza maculata* Graddon

Fruška Gora (Astal), 03.06.2020., on *Rubus hirtus*, leaf, F.G. 1361.

101. *Pyrenopeziza polygoni* (Lasch ex Rehm) Gremmen

Fruška Gora (Susek), 28.05.2018., on *Polygonum lapathifolium*, dead stem, F.G. 873.

102. *Pyrenopeziza urticicola* (W. Phillips) Boud.

Fruška Gora (Stražilovo), 03.04.2017., on *Urtica dioica*, dead stem, F.G. 542; **Fruška Gora** (Šuljam), 09.05.2017., on *Urtica dioica*, dead stem, F.G. 534; **Fruška Gora** (Iriški venac), 09.05.2017., on *Geranium phaeum*, dead stem, F.G. 1046.

Fam.: **Rutstroemiaceae** Holst-Jensen, L.M. Kohn & T. Schumach. 1997

103. *Rutstroemia pruni-serotinae* Whetzel & W.L. White

Fruška Gora (Čerević), 23.05.2019., on *Prunus spinosa*, leaf, F.G. 1073.

104. *Rutstroemia tiliacea* (Fr.) K. Holm & L. Holm

Fruška Gora (Papratski do), 19.04.2019., on *Tilia tomentosa*, fallen branch, F.G. 1041.

Fam.: **Sclerotiniaceae** Whetzel 1945

105. *Ciboria aestivalis* (Pollock) Whetzel

Fruška Gora (Glavica), 14.09.2017., on *Prunus domestica*, mummified fruit, F.G.708, (Fig. 22).

106. *Ciboria caucus* (Rebent.) Fuckel

Fruška Gora (Rakovac), 22.03.2017., on *Populus alba*, fallen catkins, F.G.565; **Fruška Gora** (Novo Hopovo), 16.04.2018., on *Salix alba*, fallen catkins, F.G. 798.

107. *Ciboria viridifusca* (Fuckel) Höhn.

Majdanpečka domena-dolina Peka (Karadžić & Čolić 2009: 29), on *Alnus incana*, fallen female catkins; **Fruška Gora** (Testera), 17.10.2017., on *Alnus glutinosa*, fallen female catkins, F.G. 743; **Karakuša**, 27.10.2017., on *Alnus glutinosa*, fallen female catkins.

108. *Ciborinia pseudobifrons* Whetzel ex J.W. Groves & Bowerman

Fruška Gora (Andrevlje), 12.06.2018., on *Salix triandra*, branch, F.G. 896.

109. *Moellerodiscus tenuistipes* (J. Schröt.) Dumont

Fruška Gora (Glavica), 03.10.2017., on *Salix alba*, leaf, F.G. 710.

110. *Monilinia polystroma* (G. Leeuwen) L.M. Kohn

Bela Crkva, on *Malus domestica*, fruit, Vasić *et al.* 2018: 360.

111. *Sclerotinia cirsii-spinosissimi* Senn-Irlet

Kopaonik (Gobelja), 01.09.2018., on *Cirsium* sp., inflorescence on the ground, F.G. 831.

112. *Stromatinia rapulum* (Bull.) Boud.

Fruška Gora (Susek), 07.04.2018., on the ground, F.G. 948, leg. J. Gajić.

Han Clade 4113. *Hyphopeziza pygmaea* (Mouton) J.G. Han, Hosoya & H.D. Shin

Fruška Gora (Paragovo), 02.11.2017., on *Quercus petraea*, leaf, F.G. 692.

Han Clade 7114. *Dematioscypha delicata* (Berk. & Broome) Hosoya

Fruška Gora (Novo Hopovo), 05.11.2019., on *Salix alba*, decorticated log, F.G. 1228, (Fig. 23).

Fig. 22. – *Ciboria aestivalis*.

Fig. 23. – *Dematioscypha delicata*.

Stamnaria lineage / Han Clade 9

115. *Urceolella crispula* (P.Karst.) Boud.

Fruška Gora (Stražilovo), 04.05.2018., on *Aconitum lycoctonum*, dead stem, F.G. 863; **Fruška Gora** (Crveni čot), 06.05.2020., on *Aconitum lycoctonum*, dead stem, F.G. 1336; **Fruška Gora** (Stražilovo), 08.05.2020., on *Aconitum lycoctonum*, dead stem, F.G. 1337.

Strossmayeria lineage

116. *Durella macrospora* Fuckel

Serbia (more locations), Milijašević & Karadžić 2007: 97, on *Quercus* spp.

Fam.: Vibrisseaceae Korf 1990

117. *Vibrissea decolorans* (Saut.) A. Sánchez & Korf

Goč (Prerovo), 02.08.2017, dead wood, leg. & det. N. Milosavljević.

118. *Vibrissea filisporia* (Bonord.) Korf & A. Sánchez

Goč (Partizanske kolibe), 12.10.2017, dead wood, leg. & det. N. Milosavljević.

119. *Vibrissea flavovirens* (Pers.) Korf & J.R. Dixon

Goč (Ovčarnik), 12.10.2017, dead wood, leg. & det. N. Milosavljević; **Jelova Gora** (Gostinica), leg. M. Adžić and D. Stojanović, 04.06.2020., on *Fagus sylvatica*, rotten wood, F.G. 1355.

Fam.: Incertae sedis

120. *Pezizella junipericola* Svrček

Iriški venac, leg. Dragiša Savić, 26.02.2020., on *Juniperus horizontalis*, leaves, F.G. 1299 (Fig. 24).

121. *Podophacidium xanthomelum* (Pers.) Kavina

Goč (Cvetne Livade), 13.10.2014., on soil, leg. & det. N. Milosavljević.

122. *Pseudohelotium alaunae* Graddon

Fruška Gora (Brankovac), 28.02.2017., on *Poaceae*, base of leaf.

123. *Pseudohelotium sordidulum* (P. Karst.) Huhtinen

Fruška Gora (Sremska Kamenica), 16.12.2020., on *Pinus walichiana*, cone, F.G. 1511.

124. *Helotium uvidulum* P.Karst.

Fruška Gora (Iriški venac), 22.02.2019., on *Prunus* sp.?, decorticated branch, F.G. 1008.; **Fruška Gora** (Zmajevac), 16.10.2019., on *Carpinus betulus*, decorticated branch, F.G. 1258.

Ordo: LEOTIALES Korf & Lizoň 2001

Fam.: **Incertae sedis**125. *Dendrostilbella mycophila* (Pers.) Seifert (anamorph)

Fruška Gora (Mala Remeta), 11.10.2017., on unidentified basidiomycete, F.G. 735.

Ordo: MARTHAMYCETALES P.R.Johnst. & Baral 1990

Fam.: **Marthamycetaceae** Baral, Lantz, Hustad & Minter 2015126. *Phragmiticola phragmitis* (Dearn. & House) Magnes

Fruška Gora (Rakovac), 27.03.2019., on *Typha latifolia*, leaf; **Fruška Gora** (Crveni čot-Beočin), 11.04.2019., on *Phragmitis australis*, dead stem, F.G. 1050; **Fruška Gora** (Andrevlje), 17.04.2019., on *Phragmitis australis*, dead stem, F.G. 1056, (Fig. 25); **Fruška Gora** (Pletena anta), 25.04.2019., on *Phragmitis australis*, dead stem, F.G. 1057.

Fig. 24. – *Pezizella junipericola*. Fig. 25. – *Phragmiticola phragmitis*.

Ordo: RHYTISMATALES M.E. Barr ex Minter 1986

Fam.: **Cudoniaceae** P.F. Cannon 2001127. *Spathularia flavida* Pers.

Čemernik, 18.07.2018., leg. A. Marković; **Crna trava** (Dojčinovci vill.), 29.07.2016., leg. & det. S. Lazarević; **Pirot** (Sinja Glava vill.), 29.05.2013., leg. & det. D. Stojanović; **Stara Planina** (Vzganica), 20.07.2018., planted larch forest, F.G. 976, leg. G. Taskov, (Fig. 26); **Stara Planina** (Dojkinci), 31.08.2019., beech forest, F.G. 1279, leg. J. Gajić.

Ordo: THELEBOLALES P.F. Cannon 2001

Fam.: **Thelebolaceae** Eckblad 1968128. *Coprotus leucopocillum* Kimbr., Luck-Allen & Cain

Fruška Gora (Bukovac), 28.03.2018., sheep dung, F.G. 810.

129. *Coprotus sexdecimsporus* (P. Crouan & H. Crouan) Kimbr. & Korf

Fruška Gora (Čerević), 25.12.2019., *Capreolus capreolus*, dung.

130. *Ascozonus woolhopensis* (Renny) Boud.

Fruška Gora (Brankovac), 28.02.2017., mouse dung, F.G.593, (Fig. 27).

Fig. 26. – *Spathularia flavida*. Fig. 27. – *Ascozonus woolhopensis*.Class **Pezizomycetes** O.E. Erikss. & Winka 1997

Ordo: PEZIZALES J. Schröt. 1897

Fam.: **Ascobolaceae** Boud. ex Sacc. 1884

131. *Ascobolus mancus* (Rehm) Brumm.

Fruška Gora (Sremska Kamenica), 06.09.2019., manured ground near the Danube, F.G. 1163.

132. *Ascobolus stictoides* Speg.

Fruška Gora (Orlovo bojište), 05.02.2020., *Capreolus capreolus*, dung.

133. *Thecotheus holmskjoldii* (E.C. Hansen) Chenant.

Fruška Gora (Čerević), 26.12.2019., *Capreolus capreolus*, dung, F.G. 1270.

Fam.: **Ascodesmiaceae** J. Schröt 1893

134. *Lasiobolus cuniculi* Velen.

Fruška Gora (Irig), 27.05.2019., sheep dung, F.G. 1083, (Fig. 28).

135. *Lasiobolus intermedius* J.L. Bezerra & Kimbr.

Fruška Gora (Brankovac), 05.03.2020., horse dung, (Fig. 29).

Fig. 28. – *Lasiobolus cuniculi*. Fig. 29. – *Lasiobolus intermedius*.

Fam.: **Pezizaceae** Dumort. 1829

136. *Marcellaina rickii* (Rehm) Graddon

Fruška Gora (Novo Hopovo), 21.05.2018., on the ground, F.G. 928, (Fig. 30).

Fam.: **Pyronemataceae** Corda 1842

137. *Octospora rustica* (Velen.) J. Moravec

Fruška Gora (Crveni čot), 20.01.2020., on *Ceratodon purpureus* (Fig. 31).

Fig. 30. – *Marcellaina rickii*.

Fig. 31. – *Octospora rustica*.

138. *Trichophaea pseudogregaria* (Rick) Boud.

Vlasina Rid (Polom), 09.09.2019., leg. N. Marić, F.G. 1194.

CONCLUSIONS

In the period from 2016 to 2020, the diversity of fungi from the classes Leotiomycetes and Pezizomycetes was investigated mainly in the area of the Fruška Gora mountain and to a lesser extent at 16 other localities in Serbia.

A total of 133 species from both classes were found that are new to the territory of the Republic of Serbia. The list also includes 5 published pieces of information from other authors from the literature (Karadžić 2003, Karadžić & Čolić 2009, Milijašević & Karadžić 2007, Keča *et al.* 2017, Vasić *et al.* 2018).

The total number of fungal species from the class Leotiomycetes (including Order Erysiphales) recorded in Serbia so far is 472 according to all new findings and referenced data (Savić & Karaman 2016).

Order Erysiphales is not listed in this paper, however all data about 105 species in Serbia can be found in the following references: Ranković 2002, Karadžić & Milijašević 2005, Marković & Karadžić 2006, Ranković & Vukojević 2003, Stevanović *et al.* 2012.

The majority of recorded species belongs to ordo Helotiales, even 314 which makes 66,5% of the total number. It is divided into 21 families, out of which, the following ones contain the most species: Lachnaceae (41), Helotiaceae (40), Pezizellaceae (38), Hyaloscyphaceae (26), Sclerotiniaceae (25), Ploettnerulaceae (24), Mollisiaceae (23), Cenangiaceae (13), Drepanopezizaceae (13) and Rutstroemiaceae (12). The rest of the families have far less species: Dermateaceae (7), Gelatinodiscaceae (7), Calloriaceae (5), Cordieritidaceae (5), Arachnopezizaceae (4), Vibrissaceae (3), Chaetomellaceae (2), Chlorociboriaceae (2), Heterosphaeriaceae (2), Mitrulaceae (2) and Godroniaceae (1). This order also contains 19 species in 6 groups whose taxonomical position is completely (Incertae sedis) or partially unknown (Discinella-Pezoloma lineage, Han Clade 4, Han Clade 7, Sclerotinioid clade, Strossmaeyeria lineage and Stamnaria lineage / Han Clade 9).

Ordo Rhytismatales is the second in diversity and it contains 28 species, which represents 5.9% of the whole number. It has three families: Rhytismataceae (25), Cudoniaceae (2) and Ascodichaenaceae (1).

Ordo Phacidiales contains 7 species divided into two families: Phacidiaceae (4) and Tympanidaceae (3). Ordo Leotiales contains 6 species into 2 families: Geoglossaceae (2), Leotiaceae (1) and Incertae sedis (3). It is important to add that Schoch *et al.* (2009) have suggested for family Geoglossaceae to be upgraded to class level (Geoglossomycetes).

Ordo Thelebolales is present with its 6 species, all in one family (Thelebolaceae), ordo Marthamycetales contains 5 species in family Marthamycetaceae and ordo Thelocarpaceae only one species in family Thelocarpaceae.

The species *Karstenia rhopaloides*, which is listed in the previous checklist (Savić & Karaman 2016) under Incertae sedis (Rhytismatales) is excluded from the total number because its taxonomic status has been resolved in the meantime (Yang 2019) and is now housed in fam. Odontotremataceae (Lecanoromycetes). Family Ascodichaenaceae has also changed its taxonomical position, from ordo Helotiales into ordo Rhytismatales. Also, ordo Rhytismatales has contained family Marthamycetaceae which has been reallocated into ordo Marthamycetales (Johnston *et al.* 2019). It is most possible that during additional research, some other species will change their taxonomic position in the coming period, such as the following species: *Pezizella junipericola*, *Dasyscyphus pteridialis*, *Pseudohelotium alaunae*, *Pseudohelotium sordidulum* and *Helotium uvidulum* (H-O. Baral pers.comm.).

From the class Pezizomycetes, compared to the previous checklist (Savić *et al.* 2018) 8 new findings were recorded, which increased the total

number of species from this class in Serbia to 214. These species are divided in 14 families into ordo Pezizales. Pyronemataceae (80) is the most populated family, followed by Pezizaceae (32), Helvellaceae (21), Tubera-ceae (20), Ascobolaceae (16), Morchellaceae (10), Discinaceae (8), Sarco-somataceae (6), Sarcoscyphaceae (5), Ascodesmiaceae (4), Rhizinaceae (2) and Caloscyphaceae (1).

It is very important to add that the total number of so far recorded species from the classes Leotiomycetes and Pezizomycetes in Serbia is not final. Most of the found samples in the past researches had been collected on low mountain Fruška Gora, located on the North of Serbia, while on the other hand, most of the high mountains in east and south Serbia are mostly, or totally unexplored.

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ДОДАТАК ПОДАТАКА ЧЕК ЛИСТАМА ГЉИВА КЛАСА LEOTIOMYCETES И PEZIZOMYCETES СРБИЈЕ

ДРАГИША САВИЋ

Р Е З И М Е

У овом раду наведени су подаци о налазима 133 врста гљива класа Leotiomycetes и Pezizomycetes (Ascomycota) нових за подручје Србије. Већина узорака гљива сакупљена је у периоду од 2016. до 2020. године углавном на подручју Фрушке горе, а у мањем броју и на другим локалитетима у Србији. На листи су наведени само налази оних врста чије се присуство не помиње у постојећим чек листама.