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Macrofungi Determined in Ayrancı and Yeşildere (Karaman) Districts

Ahmet ÇETİNKAYA¹, Yasin UZUN²,
Abdullah KAYA^{3*}

*Sorumlu yazar: kayaabd@hotmail.com

¹Ayrancı Social Assistance and Solidarity Foundation, 70100 Karaman, Turkey
Orcid ID: 0000-0001-9794-4363/ ahmet_cetinkayaaa@hotmail.com

²Karamanoğlu Mehmetbey University, Ermenek Uysal & Hasan Kalan Health Services Vocational School, 70400, Karaman, Turkey
Orcid ID:0000-0002-6423-6085 / yuclathrus@gmail.com

³Gazi University, Science Faculty, Department of Biology, 06500 Ankara, Turkey
Orcid ID: 0000-0002-4654-1406 / kayaabd@hotmail.com

Abstract: This study was carried out on macrofungi samples collected from Ayrancı and Yeşildere districts of Karaman between 2014 and 2018. Seventy four species, belonging to 58 genera, 42 families, 13 orders and 7 classes within Ascomycota and Basidiomycota were determined. The list of the taxa is presented together with their habitats and localities.

Key words: Biodiversity, macrofungi, taxonomy, Turkey

Ayrancı ve Yeşildere (Karaman) Yörelerinde Belirlenen Makromantarlar

Öz: Bu çalışma Ayrancı ve Yeşildere (Karaman) yörelerinden 2014 ve 2018 yılları arasında toplanan örnekler üzerinde gerçekleştirilmiştir. Ascomycota ve Basidiomycota bölümleri içinde yer alan 7 sınıf, 13 takım, 42 familya ve 58 cinse ait 74 tür belirlenmiştir. Türlerin listesi habitat ve lokaliteleri ile birlikte verilmiştir.

Anahtar kelimeler: Bıyoçeşitlilik, makromantarlar, taksonomi, Türkiye

Introduction

Karaman is one of the subsequently established provinces and officially located in Central Anatolian Region of Turkey. Though some regions of the province take place at the transition zone of Mediterranean and Central Anatolian Regions, majority of the landscape is located within the latter region. Ayrancı and Yeşildere are also the districts, where the research was conducted, that take place at the north of Taurus Mountains and within the Central Anatolian Region (Figure 1). The research area is situated between 37°05'-37°25' north latitudes and 33°22'-33°51' east longitudes and takes place in C4 according to Davis' grid square system. According to Emberger's formula (Akman, 1999), the area has a Mediterranean climate. The annual precipitation is 331.7 mm, and the average temperature is 12 °C.

Though steppe vegetation is the dominant vegetation in the region, some naturally growing and planted *Pinus nigra* J.F.Arnold, *Juniperus excelsa*

M.Bieb. and some *Quercus* L. populations are localized at higher portions of the region and around Ayrancı and Yeşildere dam lakes. *Salix* L and *Populus* L. trees are dominant along the stream sides together with some *Platanus* L. trees.

Kaşık et al. (2000), Öztürk et al. (2001), Doğan and Öztürk (2006) and İleri et al. (2020) presented some lists and some new records (Doğan et al., 2003; İleri et al., 2019; Çetinkaya et al., 2020; Çetinkaya and Uzun, 2021) were reported about the macrofungi of Karaman. But a research related to macrofungal biodiversity of Ayrancı and Yeşildere districts haven't been conducted.

The work aims to determine the macrofungal composition of the region and make a contribution to the mycobiota of Karaman and Turkey.

Material and method

The macrofungi samples were collected between 2014 and 2018 from the region within the boundaries of

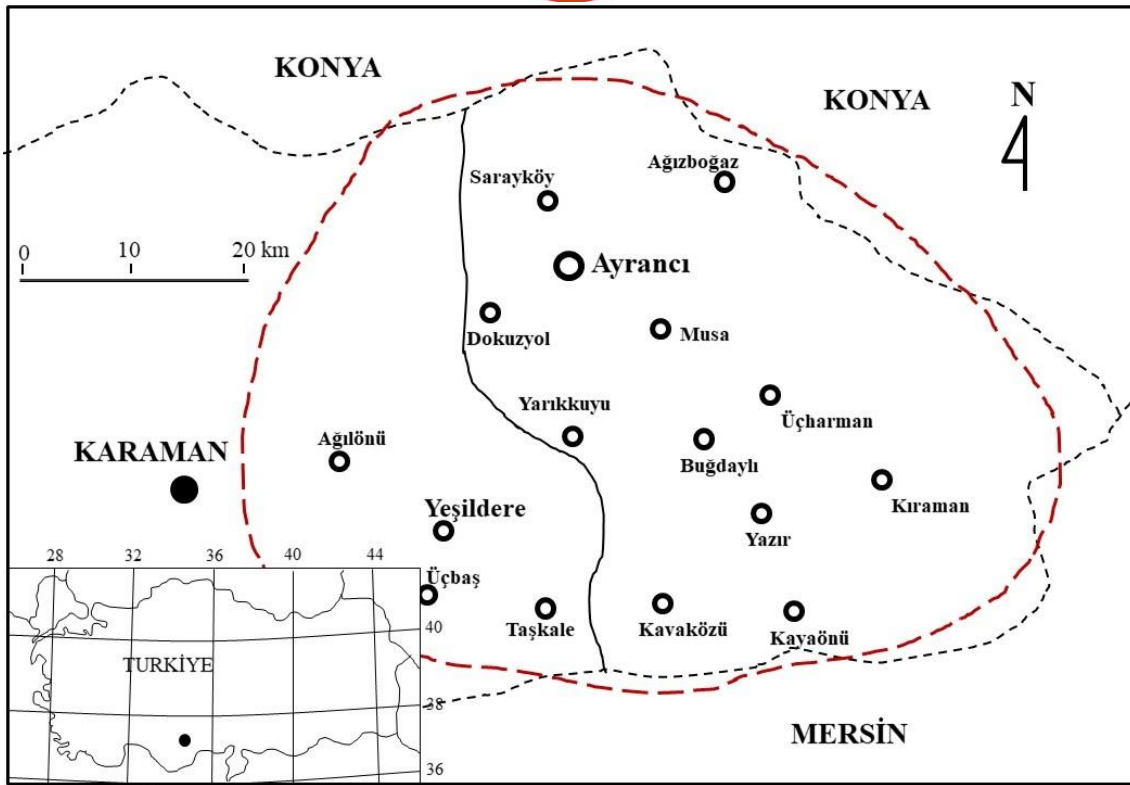


Figure 1. Map of the research area

Ayrancı and Yeşildere districts of Karaman (Figure 1, Table1). The fruit bodies were photographed at their natural habitats and ecologic characters were recorded. Detailed investigations related to their macroscopy and microscopy were carried out in the fungarium. Microscopic investigations were carried out under a Nikon Eclipse Ci-S trinocular microscope. The samples were identified by comparing the obtained data with Watling (1973), Phillips (1981), Moser (1983), Cappelli (1984), Breitenbach and Kränzlin (1984, 1986, 1991, 1995, 2000), Miller and Miller (1988), Ellis and Ellis (1990), Buczacki (1992), Hansen and Knudsen (1992, 1997), Jordan (1995), Pegler et al. (1995), Bessette et al. (1997, 2007), Medardi (2006), Hausknecht (2009), Antonin and Noordeloos (2010), Thompson (2013) and Beug et al. (2014).

The specimens are kept at Karamanoğlu Mehmetbey University, Kamil Özdağ Science Faculty, Department of Biology.

Results

Seventy four macromycete taxa were determined from the research area. The taxa are listed in alphabetical order, considering the taxonomic categories from division to species. Kirk et al., (2008) and Index Fungorum

(accessed on 15 September 2020) was followed for the systematics of the taxa.

Ascomycota Caval-Sm

Dothideomycetes O.E. Erikss. & Winka

Patellariales D. Hawksw. & O.E. Erikss.

Patellariaceae Corda

1. **Patellaria atrata** (Hedw.) Fr: On dead *Salix* sp. stump, locality 12, 1.06.2014, AÇK. 19; locality 4, 25.10.2014, AÇK. 90; locality 5, 25.10.2014, AÇK. 92; locality 22, 27.09.2014, AÇK. 80.

Leotiomycetes O.E. Erikss. & Winka

Helotiales Nannf. ex Korf & Lizoň

Helotiaceae Rehm

2. **Hymenoscyphus caudatus** (P. Karst.) Dennis: (Çetinkaya and Uzun, 2021).

Lachnaceae Raitv.

3. **Belonidium sulphureum** (Fuckel) Raitv.: On dead *Phragmites* sp. stems, locality 23, 14.06.2014, AÇK. 58.

Mollisiaceae Rehm

4. **Mollisia hydrophila** (P. Karst.) Sacc.: On dead *Phragmites* sp. stems, locality 23, 14.06.2014, AÇK. 62.

Orbiliomycetes O.E. Erikss. & Baral

Orbiliaceae Nannf.

5. **Orbilium auricolor** (A. Bloxam) Sacc.: On dead *Salix* sp. stump, locality 21, 17.05.2014, AÇK. 14.



Table 1. Collection localities of the macromycete samples

Loc. No	Locality name	Coordinates	Altitude (m)
1	Ağılönü village	37°13'N-33°22'E	1050
2	Ağızboğaz village	37°25'N-33°51'E	1100
3	Around Ayrancı Dam Lake	37°18'N-33°44'E	1190
4	Around Ayrancı Dam Lake	37°18'N-33°45'E	1200
5	Around Ayrancı Dam Lake	37°20'N-33°43'E	1150
6	Buğdaylı village	37°15'N-33°45'E	1260
7	Dokuzyol village	37°18'N-33°36'E	1130
8	From Musa village to Ağızboğaz village	37°19'N-33°45'E	1220
9	Kavaközü village	37°10'N-33°44'E	1560
10	Kayaönü village	37°07'N-33°49'E	1590
11	Kıraman village	37°16'N-33°50'E	1310
12	Musa village	37°19'N-33°44'E	1185
13	Sarayköy village	37°23'N-33°40'E	1150
14	Taşkale village	37°08'N-33°33'E	1225
15	Taşkale village	37°08'N-33°34'E	1330
16	Üçbaş village	37°07'N-33°28'E	1300
17	Üçharman village	37°17'N-33°48'E	1260
18	Yarıkkuyu village	37°15'N-33°42'E	1310
19	Yazır village	37°12'N-33°43'E	1460
20	Yeşildere village	37°09'N-33°25'E	1150
21	Yeşildere village	37°09'N-33°27'E	1130
22	Yeşildere village	37°09'N-33°28'E	1140
23	Yeşildere village	37°09'N-33°29'E	1160
24	Yeşildere village	37°09'N-33°30'E	1170
25	Yeşildere village	37°09'N-33°31'E	1220
26	Yeşildere village	37°09'N-33°32'E	1200

Pezizomycetes O.E. Erikss. & Winka

Pezizales J. Schröt.

Ascobolaceae Boud. ex Sacc.

6. **Thecotheus lundqvistii** Aas.: (Çetinkaya et al., 2020).

Helvellaceae Fr.

7. **Dissingia leucomelaena** (Pers.) K. Hansen & X.H. Wang: Among needle litter under *Pinus* sp., locality 23, 25.04.2015, AÇK. 179; Among grass in mixed forest, locality 5, 26.04.2015, AÇK. 207.

8. **Helvella acetabulum** (L.) Quél.: On soil among grass in mixed forest, locality 16, 15.05.2015, AÇK. 243.

9. **Helvella fusca** Gillet: On soil in mixed forest, locality 4, 26.04.2015, AÇK. 200.

10. **Helvella lacunosa** Afzel.: On soil in mixed forest, locality 5, 26.04.2015, AÇK. 191.

11. **Helvella solitaria** P. Karst.: On soil in mixed forest, locality 21, 17.05.2014, AÇK. 02.

Morchellaceae Rchb.

12. **Morchella deliciosa** Fr.: On soil among needle litter under *Pinus* sp., locality 16, 15.05.2015, AÇK. 244.

Pezizaceae Dumort.

13. **Peziza succosa** Berk.: On sandy soil at streamside, locality 24, 14.06.2014, AÇK. 043.

14. **Terfezia albida** Ant. Rodr., Mohedano & Bordallo: In soil among *Helianthemum* sp., locality 8, 26.04.2015, AÇK.203; locality 1, 07.05.2015, AÇK. 210.

15. **Terfezia boudieri** Chatin: In soil among *Helianthemum* sp., locality 5, 16.05.2015, AÇK. 267; locality 13, 09.04.2018, K. 14398; locality 2, 12.05.2018, K. 14495.



16. *Terfezia claveryi* Chatin: In soil among *Helianthemum* sp., locality 5, 26.04.2015, AÇK. 197; locality 1, 15.05.2015, AÇK. 238.
- Pyronemataceae** Corda
17. *Geopora arenicola* (Lév.) Kers: In sandy soil among grass, locality 5, 26.04.2015, AÇK. 190; locality 24, 10.11.2015, AÇK. 335.
18. *Geopora sumneriana* (Cooke) M. Torre: In soil among needle litter in mixed forest, locality 5, 09.05.2015, AÇK. 227.
19. *Parascutellinia violacea* (Velen.) Svrček: On sandy soil at streamside, locality 23, 29.10.2015, AÇK. 289.
20. *Picoa juniperi* Vittad.: In soil among *Helianthemum* sp., locality 1, 07.05.2015, AÇK. 209; locality 5, 16.05.2015, AÇK. 258.
21. *Picoa lefebvrei* (Pat.) Maire: In soil among *Helianthemum* sp., locality 8, 26.04.2015, AÇK. 204; locality 1, 07.05.2015, AÇK. 211.
22. *Pyronema domesticum* (Sowerby) Sacc.: On ash, locality 22, 27.09.2014, AÇK. 070.
23. *Pyronema omphalodes* (Bull.) Fuckel: On ash, locality 12, 25.10.2014, AÇK. 099.
24. *Trichophaeopsis bicuspis* (Boud.) Korf & Erb: On decaying *Populus* sp. twigs, locality 22, 29.10.2014, AÇK. 149.
- Sordariomycetes** O.E. Erikss. & Winka
- Diaporthales** Nannf.
- Valsaceae** Tul. & C. Tul.
25. *Valsa sordida* Nitschke: On *Populus* sp. stump, locality 24, 25.04.2015, AÇK. 166; locality 23, 15.05.2015, AÇK. 257.
- Hypocreales** Lindau
- Nectriaceae** Tul. & C. Tul.
26. *Nectria peziza* (Tode) Fr.: On *Populus* sp. stump, locality 24, 14.06.2014, AÇK. 55; 29.10.2014, AÇK. 135; locality 23, 10.11.2015, AÇK. 331; locality 5, 26.04.2015, AÇK. 187; 09.05.2015, AÇK. 231.
- Diatrypaeceae** Nitschke
27. *Diatrype stigma* (Hoffm.) Fr.: On dead *Salix* sp. branches, locality 25, 20.04.2014, AÇK. 101.
- Xylariaceae** Tul. & C. Tul.
28. *Kretzschmaria deusta* (Hoffm.) P.M.D. Martin: On *Populus* sp. stump, locality 23, 27.09.2014, AÇK. 84.
29. *Nemania serpens* (Pers.) Gray: On *Populus* sp. stump, locality 25, 14.06.2014, AÇK. 40.
- Basidiomycota** R.T. Moore
- Agaricomycetes** Doweld
- Agaricales** Underw.
- Agaricaceae** Chevall.
30. *Agaricus campestris* L.: On soil among grass, locality 7, 25.10.2014, AÇK. 97; locality 5, 26.04.2015, AÇK. 206; locality 11, 09.04.2018, K. 14395.
31. *Coprinus comatus* (O.F. Müll.) Pers.: On soil among grass, locality 5, 30.10.2015, AÇK. 308.
32. *Cyathus olla* (Batsch) Pers.: On decaying *Populus* sp. stump, locality 25, 25.04.2015, AÇK. 171; locality 5, 31.10.2015, AÇK. 311.
33. *Leucoagaricus leucothites* (Vittad.) Wasser: On soil among grass in mixed forest, locality 23, 27.09.2014, AÇK. 85.
34. *Macrolepiota excoriata* (Schaeff.) Wasser: Among grass in poplar grove, locality 26, 29.10.2014, AÇK. 115.
- Bolbitiaceae** Singer
35. *Conocybe apala* (Fr.) Arnolds: On manured soil among grass, locality 17, 09.04.2018, K. 14396.
36. *Conocybe deliquescens* Hauskn. & Krisai: On soil among grass, locality 26, 29.10.2015, AÇK. 277.
- Crepidotaceae** Singer
37. *Crepidotus mollis* (Schaeff.) Staude: On decaying *Populus* sp. twigs, locality 21, 17.05.2014, AÇK. 06; locality 23, 27.09.2014, AÇK. 83.
38. *Crepidotus variabilis* (Pers.) P. Kumm.: On decaying *Populus* sp. twigs, locality 12, 25.10.2014, AÇK. 94.
- Cyphellaceae** Lotsy
39. *Chondrostereum purpureum* (Pers.) Pouzar: On decaying *Populus* sp. stump, locality 23, 29.10.2014, AÇK. 138; locality 24, 29.10.2015, AÇK. 287.
- Hymenogasteraceae** Vittad.
40. *Hymenogaster bulliardii* Vittad.: In soil under mixed wood, locality 12, 01.06.2014, AÇK. 23.
41. *Hymenogaster olivaceus* Vittad.: In soil under mixed wood, locality 12, 01.06.2014, AÇK. 24.
- Inocybaceae** Jülich
42. *Inocybe rimosa* (Bull.) P. Kumm.: On soil among grass, locality 12, 01.06.2014, AÇK. 18; locality 15, 14.06.2014, AÇK.030.
- Marasmiaceae** Roze ex Kühner
43. *Calyptella capula* (Holmsk.) Quél.: On dead *Helianthus* sp. stem, locality 23, 29.10.2014, AÇK. 128.
- Mycenaceae** Overeem
44. *Mycena acicula* (Schaeff.) P. Kumm.: On soil under *Populus* sp., locality 21, 17.05.2014, AÇK. 13.
- Niaceae** Jülich
45. *Merismodes anomala* (Pers.) Singer.: On decaying *Populus* sp. twigs, locality 23, 14.06.2014, AÇK. 54.
- Physalacriaceae** Corner
46. *Armillaria mellea* (Vahl) P. Kumm.: On soil under *Populus* sp., locality 22, 29.10.2014, AÇK. 143.

**Pleurotaceae** Kühner

47. **Pleurotus ostreatus** (Jacq.) P. Kumm.: On *Populus* sp. stump, locality 22, 29.10.2014, AÇK. 144; locality 5, 26.04.2015, AÇK. 194; 07.11.2015, AÇK. 328; locality 10, 27.10.2018, K. 14723.

Pluteaceae Kotl. & Pouzar

48. **Pluteus romellii** (Britzelm.) Sacc.: On *Populus* sp. stump, locality 23, 29.10.2014, AÇK. 133; locality 22, 15.05.2015, AÇK. 245.

Psathyrellaceae Vilgalys, Moncalvo & Redhead

49. **Coprinellus disseminatus** (Pers.) J.E.Lange: On damp soil, locality 21, 17.05.2014, AÇK. 03; locality 26, 14.06.2014, AÇK. 38; locality 22, 27.09.2014, AÇK. 71; locality 23, 27.09.2014, AÇK. 81; locality CC, 07.05.2015, AÇK. 214; locality 5, 16.05.2015, AÇK. 259.

50. **Coprinellus micaceus** (Bull.) Vilgalys, Hopple & Jacq. Johnson: Around decaying *Populus* sp. stump, locality 12, 01.06.2014 AÇK. 16; locality 14, 14.06.2014, AÇK. 39; locality 22, 27.09.2014, AÇK. 73; locality 23, 25.04.2015, AÇK. 173; locality CC, 07.05.2015, AÇK. 218; locality 1, 15.05.2015, AÇK. 239.

51. **Coprinopsis atramentaria** (Bull.) Redhead, Vilgalys & Moncalvo: On soil among grasses around *Populus* sp. stump, locality 23, 29.10.2015, AÇK. 290.

52. **Coprinopsis nivea** (Pers.) Redhead, Vilgalys & Moncalvo: On decaying cow dung, locality 1, 07.05.2015, AÇK. 212; locality 23, 15.05.2015, AÇK. 253; locality 17, 09.04.2018, K. 14397.

53. **Psathyrella candolleana** (Fr.) Maire: On damp soil among grasses in poplar grove, locality 1, 17.05.2014, AÇK. 05; locality 23, 14.06.2014, AÇK. 48; locality 26, 29.10.2014, AÇK. 116; locality 9, 27.10.2018, K. 14724.

Schizophyllaceae Quéél.

54. **Schizophyllum amplum** (Lév.) Nakasone: On decaying *Populus* sp. twigs, locality 22, 27.09.2014, AÇK. 66; locality 26, 29.10.2014, AÇK. 114; locality 24, 25.04.2015, AÇK. 165; locality V, 07.05.2015, AÇK. 220; locality R, 29.10.2015, AÇK. 280; locality 12, 09.11.2014, AÇK. 161; locality 5, 09.05.2015, AÇK. 232; 31.10.2015, AÇK. 313.

55. **Schizophyllum commune** Fr.: On decaying *Populus* sp. stump, locality 26, 29.10.2014, AÇK. 104; locality 19, 27.10.2018, K. 14725.

Strophariaceae Singer & A.H. Sm.

56. **Cyclocybe cylindracea** (DC.) Vizzini & Angelini: On soil around *Populus* sp. stump, locality 21, 17.05.2014, AÇK. 08; locality 6, 27.10.2018, K. 14726.

57. **Deconica coprophila** (Bull.) P. Karst.: On decaying cow dung, locality 20, 25.04.2015, AÇK. 183.

58. **Pholiota limonella** (Peck) Sacc.: On *Salix* sp. trunk, locality 5, 30.10.2015, AÇK. 309; locality 18, 27.10.2018, K. 14727.

Boletales E.-J. Gilbert**Diplocystidiaceae** Kreisel

59. **Astraeus hygrometricus** (Pers.) Morgan: On soil in *Quercus* sp. forest, locality 20, 25.04.2015, AÇK. 182.

Gomphidiaceae Maire ex Jülich

60. **Chroogomphus rutilus** (Schaeff.) O.K. Mill.: Among needle litter in mixed forest, locality 5, 16.05.2015, AÇK. 266.

Rhizopogonaceae Gäum. & C.W. Dodge

61. **Rhizopogon luteolus** Fr.: In soil among needle litter, locality 5, 24.05.2014, AÇK. 15.

62. **Rhizopogon roseolus** (Corda) Th. Fr.: In soil among needle litter, locality 5, 16.05.2015, AÇK. 265; 30.10.2015, AÇK. 304.

Sclerodermataceae Corda

63. **Scleroderma areolatum** Ehrenb.: On soil under mixed forest, locality 23, 27.09.2014, AÇK. 86.

Suillaceae Besl & Bresinsky

64. **Suillus collinitus** (Fr.) Kuntze: On soil among grass under *Pinus* sp., locality 5, 30.10.2015, AÇK. 305.

Hymenochaetales Oberw.**Hymenochaetaceae** Donk

65. **Phellinus igniarius** (L.) Quéél.: On *Salix* sp. trunk, locality 23, 25.04.2015, AÇK. 178.

Polyporales Gäum.**Fomitopsidaceae** Jülich

66. **Fomes fomentarius** (L.) Fr.: On *Salix* sp. stump, locality 24, 25.04.2015, AÇK. 170; locality 16, 15.05.2015, AÇK. 248.

67. **Laetiporus sulphureus** (Bull.) Murrill: On *Salix* sp. trunk, locality 15, 14.06.2014, AÇK. 33; locality 22, 27.09.2014, AÇK. 69; locality 26, 29.10.2014, AÇK. 110.

Meruliaceae Rea

68. **Bjerkandera adusta** (Willd.) P. Karst.: On *Salix* sp. stump, locality 12, 25.10.2014, AÇK. 100.

Polyporaceae Fr. ex Corda

69. **Lentinus tigrinus** (Bull.) Fr.: On *Populus* sp. stump, locality 22, 27.09.2014, AÇK. 76; locality 23, 25.04.2015, AÇK. 174; locality 1, 15.05.2015, AÇK. 242; locality 24, 29.10.2015, AÇK. 286; locality 3, 30.10.2015, AÇK. 298; locality 5, 31.10.2015, AÇK.0314; locality 12, 07.11.2015, AÇK. 319.

70. **Trametes hirsuta** (Wulfen) Lloyd: On *Populus* sp. stump, locality 5, 16.05.2015, AÇK. 264.



71. *Trametes trogii* Berk.: On *Populus* sp. stump, locality 12, 01.06.2014, AÇK. 27; locality 22, 29.10.2014, AÇK. 147.

72. *Trametes versicolor* (L.) Lloyd: On *Populus* sp. stump, locality 22, 27.09.2014, AÇK. 79.

Russulales Kreisel ex P.M. Kirk, P.F. Cannon & J.C. David

Stereaceae Pilát

73. *Stereum hirsute* (Willd.) Pers.: On dead *Quercus* sp. stump, locality 23, 27.09.2014, AÇK. 87; locality 24, 10.11.2015, AÇK. 332; On *Populus* sp. stump, locality 16, 26.04.2015, AÇK. 202.

Tremellales Fr.

Tremellaceae Fr.

74. *Tremella mesenterica* Retz.: On decaying *Populus* sp. stump, locality 23, 29.10.2015, AÇK. 288.

Discussions

A list of 74 macromycete taxa were presented from Ayrancı and Yeşildere districts of Karaman. Twenty nine of them (19 *Pezizales*, 3 *Helotiales*, 3 *Xylariales*, 1 *Diaporthales*, 1 *Hypocreales*, 1 *Orbiliales*, 1 *Patellariales*) belong to *Ascomycota* and 45 (29 *Agaricales*, 7 *Polyporales*, 6 *Boletales*, 1 *Hymenochaetales*, 1 *Russulales*, 1 *Tremellales*) to *Basidiomycota*.

Pyronemataceae was found to be the most crowded family in the region. Two of the families (*Agaricaceae*, *Psathyrellaceae*) are resembled with 5 taxa, 3 of them (*Helvellaceae*, *Pezizaceae*, *Polyporaceae*) are resembled with 4 taxa, one (*Strophariaceae*) is resembled with 3 taxa, 7 (*Bolbitiaceae*, *Crepidotaceae*, *Fomitopsidaceae*, *Hymenogastraceae*, *Rhizopogonaceae*, *Schizophyllaceae*, *Xylariaceae*) are resembled with 2

taxa, while the rest of the families are resembled with only one taxon in the region.

Helvella L. was found to be the most crowded genus in the research area with 4 taxa. Two genera (*Terfezia* (Tul. & C. Tul.) Tul. & C. Tul., *Trametes* Fr.) are resembled with 3 taxa and 9 (*Conocybe* Fayod, *Coprinellus* P. Karst., *Coprinopsis* P. Karst., *Crepidotus* (Fr.) Staude, *Geopora* Harkn., *Picoa* Vittad., *Pyronema* Carus, *Rhizopogon* Fr., *Schizophyllum* Fr.) with two taxa while the rest of the 38 genera are resembled with only one taxon in the research area.

Thirty four of the determined taxa are lignicolous, 20 are terricolous, 3 are coprophilous, 3 are herbicolous and 2 are pyrophilous. Twelve of them were also determined to be hypogeous or semihypogeous.

Literatural data indicates that 24 of the determined taxa are edible, 47 are inedible and 3 are more or less poisonous. *Agaricus campestris*, *Morchella deliciosa*, *Picoa juniperi*, *Picoa lefebvrei*, *Pleurotus ostreatus*, *Terfezia albida*, *T. boudieri* and *T. claveryi* are collected and consumed by local public. Two of them have regional commercial value. *Terfezia boudieri* and *T. claveryi* are heavily collected and sold during especially May and June.

The determined taxa were also compared with the studies carried out in close environs and some similarities were observed. These studies and the similarity percentages are given in Table 2. The reason for this similarity may be the common climate and vegetation.

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Table 2. Similarity percentages of neighbouring studies with Ayrancı & Yeşildere and their close environs

	# of Identical taxa	Total taxa	Similarity (%)
Aktaş et al. (2003)	15	74	20.27
Alkan et al. (2010)	19	134	14.17
Çelik et al. (2020)	29	89	32.58
Doğan and Öztürk (2006)	27	202	13.37
Doğan et al. (2007)	21	95	22.11
İleri et al. (2020)	30	84	35.71
Kaşık and Öztürk (2000)	10	47	21.28



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