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Macrofungal Diversity of Ardahan and Iğdır Province (Turkey)

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Abstract: The present study is based on the macrofungi specimens, collected from different biotope of Ardahan and Iğdır provinces of Turkey, between 2000-2001. As a result of field and laboratory studies, 78 taxa were identified and the previous reports on 61 taxa in the study area were added. Total 139 taxa belonging to 35 families in *Myxomycetes*, *Pezizomycetes* and *Agaricomycetes* were presented as a list. Seventy eight of them are new for the province. *Cortinarius uraceus* Fr. (*Cortinariaceae*) is determined as a new record for Turkish macromycota.

Key words: Macrofungi, Ardahan, Iğdır, new record, Turkey

INTRODUCTION

Ardahan is a Northeastern Anatolian vilayet of Turkey with a surface area of 5.453 km². It is surrounded by Acaristan Autonomous Republic to the North, Georgia and Armenia to the Northeast, Kars to the South, Erzurum to the Southwest and Artvin to the

West. It usually has a high and rough terrain at Northeastern portion especially along the border of Eastern Anatolian and Northeastern Anatolian regions. Within the boundaries of the province, there are many small lakes together with the Lake Çıldır which is the second largest lake of the Eastern Anatolia (Fig. 1).

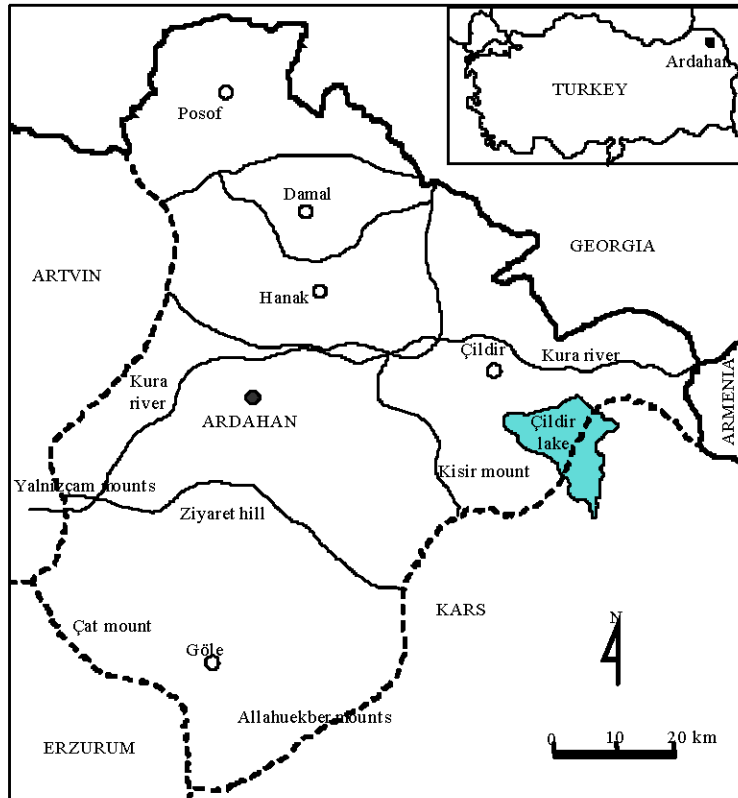


Fig. 1: Map of Ardahan province

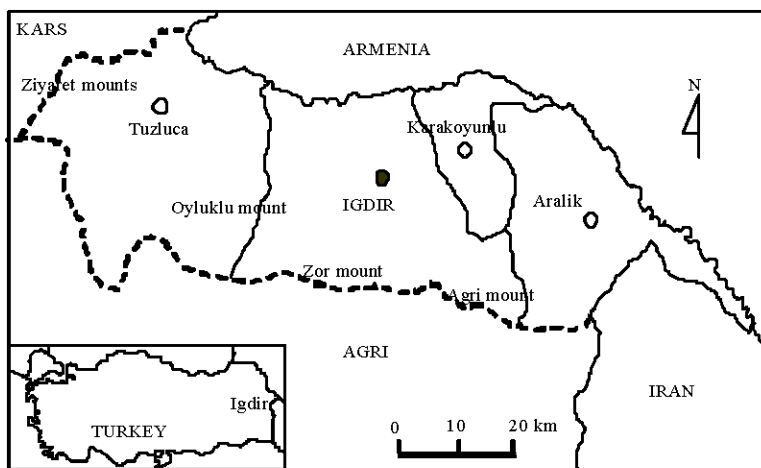


Fig. 2: Map of Iğdır province

Likewise, Iğdır is also another Turkish province at most Eastern point of Anatolia with a surface area of 3.539 km². It is surrounded by Kars and Armenia of which borderline is indicated by Aras river to the North, Armenia, Nahcivan and Iran to the East, Ağrı to the South, Kars and Ağrı to the West. Mount Ağrı, the highest mountain of Turkey also takes place within the boundaries of this province (Fig. 2).

The research area takes place in A9, B9 and B10 according to Davis' grid square system. Ardahan reflects terrestrial climate while Iğdır has the type of cold and drought Mediterranean climate (Akman, 1999). The average temperatures is 3.6°C in Ardahan and 11.9°C in Iğdır and the annual precipitations are 490.3 and 120.8 mm in Ardahan and Iğdır, respectively (Anonymus, 2001). Phytogeographically, the area falls in Irano Turanean floristic region. Though no apparent forest formation is visible in Iğdır, approximately, 5% of Ardahan is covered with forest vegetation. *Pinus sylvestris* L. is the most dominant member of these forest being one of the main three population to affect the distribution of macrofungi together with *Populus*, *Salix* and *Prunus* sp.

The checklists, presented by Solak *et al.* (2007) and Sesli and Denchev (2009) include 1814 larger ascomycetes and basidiomycetes taxa from Turkey from 1915 until the end of 2008. The following year, some new records, almost 45 taxa given by Solak *et al.* (2009), Kaya (2009a, b, c), Aktaş *et al.* (2009) and Sermenli and Işıloğlu (2009), were added to the lists. Nowadays the total number of Turkish macromycetes is increased to 1859 taxa.

Though some local records were presented by Demirel and Uzun (2004), Demirel *et al.* (2004) and Uzun (2006) from the area, but a detailed study was not carried out yet.

The aim of the present study was to determine the macrofungi taxa growing in Ardahan and Iğdır provinces and to identify edible, inedible, wood decaying and poisonous taxa and to make a contribution to the macrofungal diversity of Turkey.

MATERIALS AND METHODS

The macrofungi samples were collected during field trips in Ardahan and Iğdır province between 2000 and 2001. During fields studies, colour slides of the macrofungal specimens were taken in their natural habitats. After relevant notes were taken on their morphological and ecological features, they brought to the laboratory. Their spore prints were taken and spore dimensions were measured using an ocular micrometer. Then, dried specimens were placed in locked polyethylene bags and kept in deep freeze at -20°C to protect against parasites. All specimens are kept in Fungarium of Yüzüncü Yıl University, Faculty of Art and Science, Department of Biology.

The specimens were identified by using the literature on macrofungi by Breitenbach and Kränzlin (1984-2005), Dähncke (2004), Bessette *et al.* (1995), Jordan (1995), Kibby (1997), Bresinsky and Besl (1990), Ellis and Ellis (1990), Buczacki (1989), Moser (1983) and Phillips (1981).

RESULTS

As a result, 139 macrofungi taxa belonging to 35 families in 3 classes were identified. The systematics of the taxa was done in accordance with Cannon and Kirk (2007), Kirk *et al.* (2008) and Index fungorum (www.speciesfungorum.org; accessed 27 September 2009) and they were listed in alphabetical order. For each taxa,

habitat, locality, collection date, altitude and herbarium registration numbers (U: Uzun) are given below. New record is indicated by an asterisk (*).

Myxomycetes

Tubiferaceae T. Macbr.

1. *Lycogala terrestre* Fr.

On *Pinus* sp. stump, Ardahan, Hanak, Baştoklu village, 1945 m, 19.09.2001, U.617.

2. *Reticularia lycoperdon* Bull

On *Pinus* sp. stump, Ardahan, Göle plateau, 2165 m, 17.07.2001, U.392.

3. *Tubulifera arachnoidea* Jacq

On *Pinus* sp. stump, Ardahan, Ölçek village, 1835 m, 11.06.2001, U.368.

Pezizomycetes

Pezizales

Helvellaceae Fr.

4. *Helvella lacunosa* Afzel

Under *Populus* sp. İğdır, Konaklı district, road side, 855 m, 25.04.2001, U.08; İğdır, entrance to Tuzluca, road side, around cemetery, 1080 m, 28.04.2001, U.313; under *Prunus* sp., İğdır, Karakoyunlu, centre, 845 m, 21.05.2000, U.55.

5. *Helvella leucopus* Pers.

Under *Populus* sp., İğdır, Tuzluca, Köprübaşı village, 1020 m, 24.04.2000, U.40.

Morchellaceae Rehb.

6. *Morchella costata* (Vent.) Pers.

Under conifer trees, Ardahan, Göle plateau, 2165 m, 14.06.2000, U.63.

7. *Morchella deliciosa* Fr.

Under conifer trees, Ardahan, Göle, Eski Demirkapı village, 2090 m, 10.06.2001, U.353.

8. *Morchella esculenta* (L.) Pers.

Under conifer trees, Ardahan, çamlıçatak village, 1827 m, 11.06.2001, U.363.

9. *Morchella rigida* (Krombh.) Boud.

Under *Populus* sp., İğdır, Tuzluca, road side, around cemetery, 1080 m, 29.04.2001, U.323.

10. *Morchella vulgaris* (Pers.) Boud.

Under conifer trees, Ardahan, Göle plateau, 2165 m, 14.06.2000, U.67; Ardahan, Ölçek village, 1850 m, 15.06.2000, U.91.

Pyronemataceae Corda

11. *Humaria hemisphaerica* (F.H. Wigg.) Fuchel

Under conifer trees, Ardahan, Göle plateau, 2150 m, 17.09.2001, U.556.

12. *Geopora arenicola* (Lév.) Kers

Under *Salix* sp., İğdır, entrance to Aralık, road side, 816 m, 26.04.2000, U.18; İğdır, Konaklı district, road side, on chalky ground, 853 m, 21.05.2001, U.352.

Agaricomycetes

Agaricales

Agaricaceae Chevall

13. *Agaricus augustus* Fr.

Under conifer trees, Ardahan, Göle, Eski Demirkapı village, 2100 m, 15.08.2001, U.491.

14. *Agaricus arvensis* Schaeff.

Under conifer trees, Ardahan, Hanak forest, 2048 m, 19.09.2001, U.589.

15. *Agaricus bernardii* Quéf.

In meadowy, Ardahan, Göle, centre, 2020 m, 17.09.2001, U.559.

16. *Agaricus bitorquis* (Quéf.) Sacc.

In meadowy, İğdır, Tuzluca, Köprübaşı village, 1015 m, 25.04.2000, U.09; 25.05.2001, U.341.

17. *Agaricus campestris* L var. *campestris*

In meadowy, Ardahan, Göle, centre, 2005 m, 14.06.2000, U.61; in steppe, İğdır, In the vicinity of Ağrı mountain, 1405 m, 01.06.2000, U.58.

18. *Agaricus impudicus* (Rea) Pilát

Under conifer trees, Ardahan, Göle plateau, 2140 m, 17.09.2001, U.553.

19. *Agaricus lanipes* (F.H. Møller and Jul. Schäff.) Hlaváček

Under conifer trees, Ardahan, Hanak forest, 2048 m, 19.09.2001, U.596.

20. *Agaricus moelleri* Wasser

Under conifer trees, Ardahan, Göle, Eski Demirkapı village, 2100 m, 15.08.2001, U.497.

21. *Agaricus silvicola* var. *silvicola* (Vittad.) Peck

Under conifer trees, Ardahan Ölçek village, 1827 m, 11.09.2000, U.215; Ardahan, Çamlıçatak village, 1950 m, 11.09.2000, U.228; 1945 m, 20.09.2001, U.620; Ardahan, Göle, Köprülü village, 2170 m, 18.07.2001, U.432; Göle plateau, 2140 m, 17.09.2001, U.554; Ardahan, Hanak forest, 2048 m, 19.09.2001, U.594.

22. *Agaricus urinascens* (Jul. Schäff. and F.H. Møller) Singer var. *urinascens*

In meadowy, Ardahan, Göle, 2005 m, 14.06.2000, U.62; Ardahan, Ölçek village, 1750 m, 12.07.2000, U.126.

23. *Agaricus xanthodermus* Genev.

In meadowy, Ardahan, Göle, Çakırüzüm village, 2007 m, 14.06.2000, U.75; Göle, centre, 2010 m, 16.06.2000, U.92, under conifer trees, Göle, Samandöken village, 2150 m, 18.07.2001, U.413.

24. *Bovista plumbea* Pers.

In meadowy, Ardahan, Göle, Yavuzlar village, 2063 m, 16.06.2000, U.95; İğdır, Suveren village, 1180 m, 09.09.2000, U.202; Hanak, Baştoklu village, 1820 m, 19.09.2001, U.618; in steppe, Ardahan, the exist of Damal to Posof road, 2025 m, 21.09.2001, U.648.

25. *Coprinus comatus* (O.F. Müll.) Pers.

In garden, Posof, centre, 1525 m, 15.06.2000, U. 80; Iğdır, Tuzluca, Ağabey village, 1005 m, 01.06.2000, U.57; under *Populus* sp., Tuzluca, Köprübaşı village, road side, 1018 m, 25.04.2000, U.17; Tuzluca, road side, around cemetery, 1080 m, 07.09.2001, U.529; Iğdır, Küllük village, road side, 889 m, 20.10.2001, U.664; under *Ulmus* sp., Iğdır, Melekli village, 855 m, 09.09.2000, U.203.

26. *Lepiota erminea* (Fr.) Gillet

In meadowy, forest side, Ardahan, from Ardahan to Göle, Hasköy junction, 1945 m, 19.07.2001, U.454.

27. *Leucoagaricus subcretaceus* Bon

Among grassy, Iğdır, centre, in municipality park, 859 m, 01.06.2000, U.51; 27.05.2001, U.349.

28. *Lycoperdon excipuliforme* (Scop.) Pers.

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1945 m, 21.08.2000, U.459.

29. *Lycoperdon molle* Pers.

Under conifer trees, Ardahan, Çamlıçatak village, 1930 m, 11.09.2000, U.227; Ardahan, from Ardahan to Göle, Hasköy junction, 1950 m, 16.08.2001, U.519.

30. *Lycoperdon perlatum* Pers.

Under conifer trees, Ardahan, Göle plateau, 2188 m, 14.06.2000, U.66; Ardahan, Posof, Kır village, 1965 m, 15.06.2000, U.86; Ardahan, Çamlıçatak village, 1940 m, 11.09.2000, U.237; 1945 m, 20.09.2001, U.633; Ardahan, Ölçek village, 1930 m, 11.06.2001, U.366; Ardahan, Posof, behind of Cemal Gürsel Military quarters, 1395 m, 21.09.2001, U.651.

31. *Lycoperdon pratense* Pers.

In meadowy, forest side, Ardahan, Göle, Samandöken village, 2130 m, 18.07.2001, U.411.

32. *Lycoperdon rubroflavum* Cragin

Under conifer trees, Ardahan, Posof, behind of Cemal Gürsel Military quarters, 1395 m, 16.07.2001, U.376.

33. *Lycoperdon umbrinum* Pers.

Under conifer trees, Ardahan, Bağdaşen village, 2035 m, 21.08.2000, U.169.

34. *Lycoperdon utriforme* Bull.

In meadowy, Ardahan, The exist of Damal to Posof road, 2035 m, 15.06.2000, U.82; Ardahan, Hanak, Baştoklu village, 1830 m, 19.09.2001, U.619. in conifer forest, Ardahan, Posof, behind of Cemal Gürsel Military quarters, 1395 m, 12.07.2000, U.144; Ardahan, from Ardahan to Göle, Hasköy junction, 1950 m, 21.08.2000, U.190; Ardahan, Göle plateau, 2145 m, 17.09.2001, U.47; steppe, Iğdır, In the vicinity of Ağrı mountain, 1405 m, 27.05.2001, U.351; Ardahan, Göle, Çakırüzüm village, 2060 m, 10.06.2001, U.361.

35. *Macrolepiota procera* (Scop.) Singer var. *procera*

Under conifer trees, Ardahan, Çamlıçatak village, 1940 m, 11.09.2000, U.238; Ardahan, Hanak forest, 1945 m, 12.09.2000, U.256; Hanak, Baştoklu village, 1900 m, 19.09.2001, U.616.

Amanitaceae R. Heim ex Pouzar

36. *Amanita battarrae* (Boud.) Bon

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1957 m, 16.08.2001, U.518.

37. *Amanita echinocephala* (Vittad.) Quél.

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1945 m, 21.08.2001, U.197.

38. *Amanita eliae* Quél.

Under conifer trees, Ardahan, Çamlıçatak village, 1950 m, 08.07.2001, U.2282.

39. *Amanita gemmata* (Fr.) Bertill.

Under conifer trees, Adahan, from Ardahan to Göle, Hasköy junction, 1957 m, 16.08.2001, U.510.

40. *Amanita franchetii* (Boud.) Fayod

Under conifer trees, Ardahan, Çamlıçatak village, 1940 m, 20.09.2001, U.635.

41. *Amanita muscaria* var. *muscaria* (L.) Lam.

Under conifer trees, Ardahan, Göle plateau, 2150 m, 17.09.2001, U.540.

42. *Amanita pantherina* (DC.) Krombh.

Under conifer trees, Ardahan, Göle plateau, 2170 m, 17.07.2001, U.405; Ardahan, from Ardahan to Göle, Hasköy junction, 1957 m, 16.08.2001, U.505.

43. *Amanita pantherina* var. *mustisquamosa* (Pk.) Jenkins

Under conifer trees, Ardahan, Çamlıçatak village, 1950 m, 11.07.2000, U.112; 1945 m, 11.09.2000, U.218; Ardahan, Posof, behind of Cemal Gürsel Military quarters, 1395 m, 16.07.2001, U.374; Ardahan, Göle, Köprülü village, 2190 m, 18.07.2001, U.427.

44. *Amanita strobiliformis* (Paulet ex Vittad.) Bertil.

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1945 m, 16.08.2001, U.520.

45. *Amanita submembranaceae* (Bon) Gröger

In mixed forest, Posof, Kır village, 1748 m, 15.06.2000, U.87.

46. *Amanita vaginata* (Bull.) Lam.

Under conifer trees, Ardahan, Hanak forest, 2049 m, 12.07.2000, U.134; Ardahan, Göle, Eski Demirkapı village, 2090 m, 17.07.2001, U.390.

Bolbitiaceae singer

47. *Panaeolus papilionaceus* var. *papilionaceus* (Bull.) Quél.

In coniferous forest, on cattle dung, Ardahan, Çamlıçatak village, 1890 m, 10.07.2000, U.120; Ardahan, Göle plateau, 2170 m, 17.07.2001, U.395; Göle, Karınca plateau, 2200 m, 18.09.2001, U.573.

Cortinariaceae R. Heim ex Pouzar

48. *Cortinarius uraceus* Fr.

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 945 m, 19.07.2001, U.475.

Cyphellaceae Lotsy

49. *Chondrostereum purpureum* (Pers.) Pouzar

On *Salix* sp. stump, Iğdır, centre, road side, 862 m, 20.10.2000, U.669.

Hygrophoraceae Lotsy

50. *Hygrocybe conica* (Schaeff.) P. Kumm.

Under conifer trees, Ardahan, Göle, Karınca plateau, 2200 m, 18.09.2001, U.571.

51. *Hygrophorus hypothejus* (Fr.) Fr.

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1960 m, 19.07.2001, U.478; Ardahan, Göle, Eski Demirkapı village, 2085 m, 15.08.2001, U.488.

Inocybaceae Jülich

52. *Inocybe maculata* Boud.

Under conifer trees, Ardahan, Çamlıçatak village, 1950 m, 10.07.2000, U.117; Ardahan, from Ardahan to Göle, Hasköy junction, 1960 m, 19.07.2001, U.480.

53. *Inocybe rimosa* (Bull.) P. Kumm.

Under *Populus* sp., Iğdır, centre, 864 m, 24.04.2000, U.03; under *Prunus* sp., Iğdır, Melekli village, 854 m, 20.05.2000, U.30; Iğdır, Enver Paşa street, road side, 858 m, 20.05.2000, U.35; Iğdır, Alikamerli village, water side, 864 m, 29.04.2001, U.320; under conifer trees, Ardahan, Ölçek village, 1930 m, 15.06.2000, U.89.

Marasmiaceae Roze ex Kühner

54. *Gymnopus dryophilus* (Bull.) Murrill

Under conifer trees, Ardahan, Göle, Köprülü village, 2020 m, 13.07.2000, U.148.

55. *Marasmius oreades* (Bolton) Fr.

In meadowy, Ardahan, Göle plateau, 2020 m, 17.07.2001, U.400.

56. *Mycetinis scorodonius* (Fr.) A.W. Wilson

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1960 m, 16.08.2001, U.513.

Mycenaceae Roze

57. *Mycena epipterygia* (Scop.) Gray

On *Pinus* sp., stump, Ardahan, Göle, Karınca plateau, 2200 m, 18.09.2001, U.575.

Physalacriaceae Corner

58. *Flammulina velutipes* var. *velutipes* (Curtis) Singer

On *Salix* sp., stumps, Iğdır, Çalpala village, 898 m, 20.10.2001, U.666.

59. *Strobilurus tenacellus* (Pers.) Singer

Among moss, In coniferous forest, Ardahan, from Ardahan to Göle, Hasköy junction, 1957 m, 18.05.2001, U.702.

60. *Xerula radicata* (Rehhan) Dörfelt

On *Pinus* sp., stump, Ardahan, from Ardahan to Göle, Hasköy junction, 1960 m, 16.08.2001, U.516.

Pleurotaceae Kühner

61. *Pleurotus dryinus* (Pers.) P. Kumm.

On *Populus* tree, Iğdır, centre, road side, 858 m, 20.10.2001, U.671.

62. *Pleurotus eryngii* (DC.) Quéf.

On *Ferula* sp., remains, Ardahan, Göle, Yavuzlar village, 2100 m, 16.06.2000, U.92; Göle, Mollahasan village, 1985 m, 16.06.2000, U.96; Göle, Çakırüzüm village, 2068 m, 10.06.2001, U.360.

63. *Pleurotus fuscus* var. *ferulae* Lanzi

On decaying remains of *Ferula* sp., Iğdır, In the vicinity of Ağrı mountain, 1450 m, 21.05.2000, U.48.

64. *Pleurotus ostreatus* (Jacq.) P. Kumm.

On *Populus* sp., stump, Iğdır, Tuzluca, centre, 1105 m, 25.04.2000, U.10; Iğdır, Melekli village, 854 m, 27.05.2001, U.329; Ardahan, Posof, centre, 1536 m, 15.06.2000, U.76; under *Populus* sp., Iğdır, centre, 858 m, 05.10.2000, U.289; Iğdır, Hakveyis village, 860 m, 20.10.2001, U.677; Iğdır, Melekli village, 854 m, 02.11.2001, U.698; on *Salix* sp. stump, Iğdır, Tacirli village, 853 m, 20.10.2001, U.691.

Pluteaceae Kotl. and Pouzar

65. *Pluteus cervinus* (Schaeff.) P. Kumm.

On *Pinus* sp., stump, Ardahan, Ölçek village, 1845 m, 15.06.2000, U.90; Ardahan, Göle, Eski Demirkapı village, 2090 m, 10.06.2001, U.355.

66. *Pluteus diettrichii* Bres.

On *Pinus* sp., stump, Ardahan, Göle, Eski Demirkapı village, 2085 m, 10.06.2001, U.355.

67. *Pluteus nanus* (Pers.) P. Kumm.

On *Populus* sp., stump, Iğdır, entrance to Tuzluca, road side, around cemetery, 1080 m, 07.09.2001, U.531.

68. *Pluteus romelli* (Britzelm) Lapl.

Under *Populus* sp., Iğdır, Tuzluca, road side, around cemetery, 1077 m, 07.09.2001, U.524.

69. *Pluteus salicinus* (Pers.) P. Kumm.

Under *Populus* sp., Iğdır, Tuzluca, road side, around cemetery, 1080 m, 05.10.2000, U.292.

70. *Volvariella gloiocephala* (DC.) Boekhout and Enderle

In clover field, Iğdır, Aralık, Taşburnu village, 820 m, 27.05.2001, U.337.

Psathyrellaceae Vilgalys, Moncalvo and Redhead

71. *Coprinopsis atramentaria* (Bull.) Redhead, Vilgalys and Moncalvo

Under *Populus* sp., Iğdır, Aralık, Taşburnu village, 820 m, 26.04.2000, U.15; Iğdır, Suveren village, 1195 m, 20.05.2000, U.23; Ardahan, Göle, Çakırüzüm village, 2030 m, 14.06.2000, U.73; Ardahan, Göle, centre, 2020 m, 10.06.2001, U.357; under *Junglas* sp., Ardahan, Posof, centre, 1560 m, 15.06.2000, U.78; under *Prunus* sp., Iğdır, Küllük village, 888 m, 28.04.2001, U.304.

72. *Coprinopsis cothurnata* (Godey) Redhead, Vilgalys and Moncalvo

Under *Populus* sp., Iğdır, Tuzluca road side, around cemetery, 1080 m, 28.04.2001, U.340.

73. *Coprinopsis nivea* (Pers.) Redhead, Vilgalys and Moncalvo

On cattle dung, Iğdır, centre, 862 m, 01.06.2000, U.53; Iğdır, Tuzluca, road side, around cemetery, 1078 m, 27.05.2001, U.339; Ardahan, Göle, Çakırüzüm village, 2032 m, 10.06.2001, U.359; in coniferous forest, on cattle dung, Ardahan, Ölçek village, 1830 m, 16.06.2000, U.97; Ardahan, from Ardahan to Göle, Hasköy junction, 1960 m, 19.07.2001, U.481.

74. *Coprinopsis romagnesiana* (Singer) Redhead, Vilgalys and Moncalvo

Under *Populus* sp., Iğdır, centre, 860 m, 20.10.2001, U.670; under *Salix* sp., Karakoyunlu, Tacirli village, 854 m, 20.10.2001, U.694.

75. *Coprinellus disseminatus* (Pers.) J.E. Lange

Around of *Populus* sp. stump, Iğdır, Melekli village, 854 m, 20.05.2000, U.28; Iğdır, Aralık, Hasanhan village, 826 m, 09.09.2000, U.206; Iğdır, Tuzluca, centre, 1090 m, 20.10.2001, U.663; Iğdır, Hakveyis village, 862 m, 20.10.2001, U.675; Under *Salix* sp., Iğdır, Karakoyunlu, centre, 845 m, 27.05.2001, U.331.

76. *Coprinellus impatiens* (Fr.) J.E. Lange

Under *Prunus* sp., Iğdır, Küllük village, road side, 888 m, 28.04.2001, U.309; under *Populus* sp., Iğdır, entrance to Tuzluca, 1090 m, 28.04.2001, U.314.

77. *Coprinellus micaceus* (Bull.) Vilgalys, Hopple and Jacq. Johnson

Under *Populus* sp., Iğdır, centre, 864 m, 24.04.2000, U.06; Iğdır, Suveren village, 1160 m, 01.06.2000, U.059; Ardahan, Göle, centre, 2020m, 14.06.2000, U.72; Iğdır, entrance to Aralık, road side, 815 m, 27.05.2001, U.334; Iğdır, Hakveyis village, 860 m, 20.10.2001, U.674; around on *Populus* sp., stump, Iğdır, Çalpala village, 898 m, 24.04.2000, U.07; Iğdır, Melekli village, 854m, 20.05.2000, U.27, around on *Salix* sp. stump, Iğdır, Tuzluca, centre, 1090 m, 28.04.2001, U.311; under *Prunus* sp., Tuzluca, centre, 1075 m, 07.09.2001, U.530; 1075 m, 20.10.2001, U.662.

78. *Psathyrella candolleana* (Fr.) Maire

Around *Populus* sp. stump, Iğdır, Melekli village, 854 m, 26.04.2000, U.20; 21.05.2000, U.47; under *Prunus* sp., Iğdır, Çalpala village, 897 m, 10.09.2000, U.210; under *Populus* sp., Ardahan, Göle, centre, 2020 m, 10.06.2001, U.356; Iğdır, Hakveyis village, 865 m, 20.10.2001, U.672; Iğdır, centre, 860 m, 02.11.2000, U.695.

Schizophyllaceae Qué.

79. *Schizophyllum commune* Fr.

On branch of *Populus* sp., Iğdır, Tuzluca, road side, around cemetery, 1077 m, 21.05.2000, U.041; on branch of *Pinus* sp., Ardahan, Posof, behind of Cemal Gürsel Military quarters, 1395 m, 16.07.2001, U.370.

Strophariaceae Singer and A.H. Sm.

80. *Agrocybe dura* (Bolton) Singer

Under *Populus* sp., Ardahan, Çıldır, centre, 1903 m, 11.06.2001, U.362. Iğdır, centre, 860 m, 27.05.2001, U.348.

81. *Pholiota aurivella* (Batsch) P. Kumm.

On *Salix* sp., Iğdır, Karakoyunlu, centre, 845 m, 05.10.2000, U.290; Iğdır, Tuzluca, Ağabey village, 1007 m, 20.10.2001, U.660; Iğdır, Hakveyis village, 865 m, 21.10.2001, U.676; Karakoyunlu, Tacirli village, 854 m, 21.10.2001, U.690.

82. *Pholiota populnea* (Pers.) Kuyper and Tjall.-Beuk.

On *Populus* sp., stump, Iğdır, Melekli village, 854 m, 20.10.2001, U.683.

83. *Psilocybe merdaria* (Fr.) Ricken

In conifer forest, on cow dung, Ardahan, from Ardahan to Göle, Hasköy junction, 1948 m, 19.07.2001, U.479.

84. *Stropharia coronilla* (Bull.) Qué.

In steppe, Iğdır, foot of Ağrı mountain, 1405 m, 01.06.2000, U.52.

85. *Stropharia semiglobata* (Batsch) Qué.

On cattle dung, forest side, Ardahan, Göle plateau, 2115 m, 13.07.2000, U.161.

Tricholomataceae R. Heim ex Pouzar

86. *Clitocybe gibba* (Pers.) P. Kumm.

Under conifer trees, Ardahan, Göle plateau, 2225 m, 14.06.2000, U.68; Ardahan, Ölçek village, 1845 m, 14.06.2000, U.128; Ardahan, Hanak forest, 12.07.2000, U.137; Ardahan, from Posof to Ardahan road 5 km, road side, 1480 m, 12.07.2000, U.143; Ardahan, Çamlıçatak village, 1945 m, 11.09.2000, U.226; Ardahan, Göle, Karınca plateau, 2200 m, 17.07.2001, U.384; 2200 m, 18.09.2001, U.563. Ardahan, Göle, Eski Demirkapı village, 2100 m, 17.07.2001, U.389.

87. *Clitocybe phyllophila* (Pers.) P. Kumm.

Under conifer trees, Ardahan, Ölçek village, 1850 m, 11.09.2000, U.213.

88. *Lepista densifolia* (J. Favre) Singer and Cléménçon

Under conifer trees, Ardahan, Göle, Eski Demirkapı village, 2100 m, 15.08.2001, U.500.

89. *Lepista nuda* (Bull.) Cooke

In garden, Ardahan, Posof, 1515 m, 15.06.2000, U.81.

90. *Lepista personata* (Fr.) Cooke

Under conifer trees, Ardahan, Ölçek village, 1855 m, 11.06.2001, U.364.

91. *Tricholoma basirubens* (Bon) A. Riva and Bon

Under conifer trees, Ardahan, Hanak forest, 2035 m, 12.07.2000, U.133.

92. *Tricholoma sulphurescens* Bres.

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1960 m, 16.08.2001, U.509; Ardahan, Çamlıçatak village, 1960 m, 20.09.2001, U.627.

Boletales

Boletaceae Chevall.

93. *Boletus fechtneri* Velen.

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1957 m, 21.08.2000, U.200; 1960 m, 16.08.2000, U.515; Ardahan, Göle, Eski Demirkapı village, 2095 m, 15.08.2001, U.493.

94. *Boletus impolitus* Fr.

Under conifer trees, Ardahan, Bağdaşen village, 2040 m, 21.08.2000, U.166; Ardahan, from Ardahan to Göle, Hasköy junction, 1957 m, 21.08.2000, U.185.

95. *Boletus luridus* var. *luridus* Schaeff.

Under conifer trees, Ardahan, Göle, Eski Demirkapı village, 2100 m, 15.08.2001, U.489.

96. *Leccinum scabrum* (Bull.) Gray

Under conifer trees, Ardahan, Ardahan to Göle, Hasköy junction, 1960 m, 16.08.2001, U.507.

Gomphidiaceae Maire ex Jülich

97. *Chroogomphus helveticus* (Singer) M.M. Moser

Under conifer trees, Ardahan, Ardahan to Göle, Hasköy junction, 1854 m, 10.07.2000, U.106; Ardahan, Çamlıçatak village, 1960 m, 20.09.2001, U.637.

98. *Chroogomphus rutilus* (Schaeff.) O.K. Mill.

Under conifer trees, Ardahan, Çamlıçatak village, 1945 m, 20.09.2001, U.626; 11.09.2000, U.217; Ardahan, Hanak forest, 2035 m, 12.09.2000, U.243; Ardahan, from Ardahan to Göle, Hasköy junction, 1957 m, 19.07.2001, U.458; Ardahan, Göle, Karınca plateau, 2200 m, 17.09.2001, U.566.

99. *Gomphidius roseus* (Fr.) Fr.

Under conifer trees, Ardahan, Hanak forest, 2050 m, 12.09.2000, U.261.

Paxillaceae Lotsy

100. *Paxillus involutus* (Batsch) Fr.

Under conifer trees, Ardahan, Ardahan to Göle, Hasköy junction, 1957 m, 21.08.2000, U.186.

Suillaceae Besl and Bresinsky

101. *Suillus granulatus* (L.) Roussel

Under conifer trees, Ardahan, Çamlıçatak village, 1825 m, 10.07.2000, U.104.

102. *Suillus luteus* (L.: Fr.) Roussel

Under conifer trees, Ardahan, Göle plateau, 2225 m, 14.06.2000, U.65; Ardahan, Posof, Kır village, 1875 m, 14.06.2000, U.88; Göle, Köprübaşı village, 1950 m, 13.07.2000, U.152; Göle, Eski Demirkapı village, 2090 m, 10.06.2001, U.354.

Tapinellaceae Locq.

103. *Tapinella atrotomentosa* (Batsch) Šutara

On *Pinus* sp. stump, Ardahan, Göle, Çakırüzüm village, 2120 m, 10.06.2001, U.358; Göle, Eski Demirkapı village, 2090 m, 15.08.2001, U.503; Göle, Karınca plateau, 2200 m, 18.09.2001, U.577.

Cantharellales

Cantharellaceae J. Schröt.

104. *Cantharellus cibarius* Fr.

Under conifer trees, Ardahan, Posof, behind of Cemal Gürsel military quarters, 1395 m, 16.07.2001, U.372; Ardahan, Göle, Karınca plateau, 2200 m, 17.07.2001, U.377.

105. *Cantharellus ferruginascens* P.D. Orton

Under conifer trees, Ardahan, Posof, behind of Cemal Gürsel Military quarters, 1395 m, 12.07.2000, U.142; Ardahan, from Ardahan to Göle, Hasköy junction, 1945 m, 19.07.2001, U.473.

Phallales

Phallaceae Corda

106. *Phallus hadriani* Vent.

Under *Salix* sp. stump, Iğdır, Küllük village, road side, 888 m, 20.10.2001, U.665.

Polyporales

Fomitopsidaceae Jülich

107. *Fomitopsis pinicola* (Sw.) P. Karst.

On *Pinus* sp. stump, Ardahan. Posof, 1580 m, 14.08.2001, U.482.

108. *Postia tephroleuca* (Fr.) Jülich

Around *Salix* sp. stump, Iğdır, Melekli village, 855 m, 20.10.2001, U.682.

Ganodermataceae Donk

109. *Ganoderma adpersum* (Schulzer) Donk

On *Morus* sp. Ardahan, Posof, centre, 1555 m, 15.06.2000, U.79.

Hymenochaetaceae Imazeki and Toki

110. *Phellinus igniarius* (L.) Quél.

On *Salix* sp. Iğdır, Alikamerli village, 865 m, 28.04.2001, U.293.

111. *Phellinus pomaceus* (Pers.) Maire

On *Prunus* sp. stump, Iğdır, Karakoyunlu, 845 m, 21.05.2000, U.56.

112. *Phellinus punctatus* (Fr.) Pilát

On *Salix* sp., stump, Iğdır, Hakveyis village, 860 m, 21.10.2001, U.677.

Polyporaceae Fr. ex Corda

113. *Fomes fomentarius* (L.) J. Kickx f.

On *Salix* sp., Iğdır, Aralık, Aşağı Çamurlu village, 824 m, 20.05.2000, U.031; Iğdır, Tuzluca, centre, 1095 m, 29.04.2001, U.324. On *Populus* sp., Tuzluca, Köprübaşı village, 1020 m, 29.04.2001, U.319.

114. *Lentinus tigrinus* (Bull.) Fr.

On *Populus* sp., stump, Iğdır, entrance to Tuzluca, road side, around cemetery, 1080 m, 25.04.2000, U.12; Ardahan, Göle, centre, 2020 m, 14.06.2000, U.71; 2020 m, 16.08.2001, U.522; Iğdır, Konaklı district, 853 m, 07.09.2001, U.532; Iğdır, Hakveyis village, 865 m, 20.10.2001, U.673; Iğdır, Alikamerli village, 865 m, 02.11.2001, U.700; on *Pinus* sp. stump, Ardahan, Göle plateau, Ardahan, Hanak forest, 2035 m, 19.09.2001, U.598. 2125 m, 13.09.2000, U.285; on *Salix* sp. stump, Iğdır, Aralık, Taşburnu village, 820 m, 27.05.2001, U.336; Iğdır, Karakoyunlu, Tacirli village, 855 m, 02.11.2001, U.692.

115. *Neolentinus lepideus* (Fr.) Redhead and Ginns

On *Pinus* sp., Iğdır, Enver Paşa street, road side, 858 m, 20.05.2000, U.36.

116. *Polyporus squamosus* (Huds.) Fr.

On *Populus* sp., stump, Iğdır, Tuzluca, centre, 1095 m, 25.04.2000, U.011; Iğdır, Karakoyunlu, centre, 845 m, 26.04.2000, U.014; Ardahan, Posof, Çamyazı village, 1660 m, 15.06.2000, U.83; Iğdır, Suveren village, 1175 m, 09.09.2000, U.205; Iğdır, Küllük village, 889m, 28.04.2001, U.308; Tuzluca, centre, 1075 m, 29.04.2001, U.316; Iğdır, Alikamerli village, 865 m, 29.04.2001, U.322; Ardahan, Çıldır, centre, 1910 m, 11.06.2001, U.367; Ardahan, Göle, centre, 2020 m, 17.09.2001, U.539. Iğdır, Çalpala village, 898 m, 07.09.2001, U.537; on *Salix* sp. stump, Iğdır, centre, 29.04.2001, U.316.

117. *Polyporus tuberaster* (Jacq. ex Pers.) Fr.

On *Salix* sp., stump, Iğdır, Enver Paşa street, road side, 58 m, 24.04.2000, U.01; Iğdır, centre, 860 m, 29.04.2001, U.317; on *Populus* sp. stump, Iğdır, Çalpala village, 898 m, 28.04.2001, U.302; Iğdır, konaklı quarter, 853m, 29.04.2001, U.306.

118. *Trametes hirsuta* (Wulfen) Lloyd

On *Populus* sp., Iğdır, Enver Paşa quarter, road side, 858 m, 01.06.2000, U.060.

120. *Trametes versicolor* (L.) Lloyd

On *Populus* sp., stump, Ardahan, Posof, Asmakonak village, 1590 m, 12.07.2000, U.141; Iğdır, Çalpala village, 897 m, 28.04.2001, U.301.

120. *Trametes trogii* Berk.

On *Populus* sp., stump, Iğdır, Küllük village, 883 m, 25.04.2000, U.013; Iğdır, Aralık, entrance to Aralık, 817 m, 26.04.2000, U.016; Iğdır, Suveren village, 1195 m, 20.05.2000, U.022; Ardahan, Göle, centre, 2020 m, 14.06.2000, U.74; 2020m, 17.09.2001, U. 538; Iğdır, Tuzluca, road side, around cemetery, 1075 m, 05.10.2000, U.291; 1106 m, 28.04.2001, U.312; 1115 m, 28.04.2001, U.315; Iğdır, Çalpala village, 898 m, 29.04.2001, U.325; Iğdır, Aralık, Hasanhan village, 826 m, 29.04.2001, U.338; Ardahan, Posof, centre, 1557 m, 21.09.2001, U.649; Tuzluca, Ağabey village, 1008 m, 20.10.2001, U.659; on *Salix* sp. stump, Iğdır, centre, 860 m, 01.06.2000, U.054.

121. *Tyromyces chioneus* (Fr.) P. Karst.

On *Prunus* sp., tree, Iğdır, Tuzluca, Ağabey village, 1008 m, 20.10.2001, U.658.

Stereaceae Pilát

122. *Stereum rugosum* Pers.

On *Populus* sp., stump, Iğdır, Tuzluca, centre, 1090 m, 21.05.2000, U.41; Iğdır, Melekli village, 855 m, 21.05.2000, U.046.

Thelephorales

Thelephoraceae Chevall.

123. *Thelephora palmata* (Scop.) Fr.

Under *Populus* sp., on shrub branch, Iğdır, Tuzluca, road side, around cemetery, 1078 m, 07.09.2001, U.523.

Russulales

Auriscalpiaceae Maas Geest

124. *Auriscalpium vulgare* Gray

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1957 m, 18.05. 2001. U.702.

Russulaceae Lotsy

125. *Lactarius acerrimus* Britzelm.

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1960 m, 16.08.2001, U.506.

126. *Lactarius controversus* (Pers.) Pers.

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1960 m, 21.08.2000, U.119.

127. *Lactarius deliciosus* (L.) Gray

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1960 m, 21.08.2000, U.185.

128. *Lactarius deterrimus* Gröger

Under conifer trees, Ardahan, Hanak forest, 2050 m, 12.09.2000, U.250.

129. *Lactarius fulvissimus* Romagn.

Under conifer trees, Ardahan, Bağdaşan village, 2040 m, 21.08.2000, U.164.

130. *Lactarius piperatus* (L.) Pers.

Under conifer trees, Ardahan, Göle, Eski Demirkapı village, 2100 m, 15.08.2001, U.486.

131. *Russula albonigra* (Krombh.) Fr.

Under conifer trees, Ardahan, Çamlıçatak village, 1945 m, 11.09.2000, U.212; Ardahan, Posof, behind of Cemal Gürsel Millitary quarters, 1395 m, 16.07.2001, U.371; Ardahan, from Ardahan to Göle, Hasköy junction, 1945 m, 1395 m, 19.07.2001, U.472.

132. *Russula anthracina* Romagn.

Under conifer trees, Ardahan, Bağdaşan village, 2035 m, 21.08.2000, U.171; Ardahan, from Ardahan to Göle, Hasköy junction, 1960 m, 19.07.2001, U.455.

133. *Russula badia* Quél.

Under conifer trees, Ardahan, from Ardahan to Göle, Hasköy junction, 1957 m, 16.08.2001, U.508.

134. *Russula delica* Fr.

Under conifer trees, Ardahan, Bağdaşan village, 2040 m, 21.08.2000, U.171; Ardahan, from Ardahan to Göle, Hasköy junction, 1957 m, 21.08.2000, U.189; Ardahan, Ölçek village, 11.06.2001, U.365; Ardahan, Göle, Eski Demirkapı village, 2095 m, 15.08.2001, U.498.

135. *Russula foetens* (Pers.) Pers.

Under conifer trees, Ardahan, Bağdaşan village, 2040 m, 21.08.2000, U.175; Ardahan, Çamlıçatak village, 1945 m, 11.09.2000, U.236; Ardahan, from Ardahan to Göle, Hasköy junction, 1945 m, 19.07.2001, U.474; Ardahan, Göle, Karınca plateau, 2200 m, 18.09.2001, U.567.

136. *Russula grata* Britzelm.

Under conifer trees, Ardahan, Çamlıçatak village, 1845 m, 12.07.2001, U.121.

137. *Russua livescens* (Batsch) Bataille

Under conifer trees, Ardahan, Ölçek village, 1830 m, 10.07.2000, U.105; Ardahan, Hanak forest, 2030 m, 19.09.2001, U.603.

138. *Russula puellaris* Fr.

Under conifer trees, Ardahan, Hanak forest, 2035 m, 19.09.2001, U.610.

139. *Russula sanguinea* (Bull.) Fr.

Under conifer trees, Ardahan, Posof, behind of Cemal Gürsel Millitary quarters, 1395 m, 21.09.2001, U.371.

DISCUSSION

In this study, a summary of my PhD thesis and additionally 30 taxa, the total of 139 macrofungi taxa belonging to 3 classes and 35 families were identified. Three of them belonging to *Myxomycetes*, 9 to *Ascomycetes* and 127 to *Basidiomycetes*. 78 of them are new for the region. Among them, 38.8% (54 taxa) are edible, 50.3% (70 taxa) are inedible, 10.7% (15 taxa) are poisonous and 16.5% (23 taxa) cause wood decay according to the literature.

Ten taxa of edible macrofungi are well known and consumed by local people, which are *Morchella costata*, *M. deliciosa*, *M. esculenta*, *M. vulgaris*, *Agaricus bernardii*, *A. bitorquis*, *A. campestris* var. *campestris*, *A. urinascens* var. *urinascens*, *Pleurotus eryngii* and *P. fuscus* var. *ferulacea*. In Ardahan and Iğdır provinces, the members of the genus *Agaricus* and *Pleurotus* are named as Human mushroom or meadow mushroom and white mushroom or sheep mushroom by local people, respectively. Likewise, the members of the genus *Morchella* are named as ‘Göbelek or Kuzu Göbeği’ and collected and sold in Ardahan while none of them are known as edible in Iğdır province.

According to official records there is no poisoning case in Ardahan. However, 3 cases were reported from Iğdır in 2003. Therefore, it is necessary to inform the local public about the edible and poisonous mushrooms.

The most widespread families in the region are *Agaricaceae* (23 taxa), *Russulaceae* (15 taxa) and *Amanitaceae* (10 taxa). The members of *Agaricaceae* have no particular habitat, while *Russulaceae* and *Amanitaceae* prefer mostly forest environments and these two members symbiotically live as mycorrhiza with woody plants.

The identified taxa in the present study were compared to the studies carried out in neighbouring areas. The similarities were indicated as percentage as follow: Demirel and Uzun (1996) 58.8%, Demirel *et al.* (2002) 68.8%, Demirel *et al.* (2003) 46.4% and Demirel *et al.* (2004) 33.3%. These patterns show great similarities which might be due to same vegetation conditions.

Cortinarius have been known to be the largest genus of agarics, containing over 2000 different species and found worldwide (Kirk *et al.*, 2001). However, Bisby *et al.* (2009) reported around 410 current taxa of the *Cortinarius*. In Turkey, up to now 88 cortinarius taxa have been reported (Solak *et al.*, 2007; Sesli and Denchev, 2009; Aktaş *et al.*, 2009). The *Cortinarius* records in Turkey reached 89 with the new record of *Cortinarius uraceus* reported in the present study.

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