

Diversity and Distribution of Macro Fungi Associated with Beech Forests of Northern Iran (Case Study Mazandaran Province)

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Abstract: This paper lists recent finds of macrofungi from the Mazandaran province Beech forest in north of Iran. The list contains data on the occurrence of 100 taxa of macrofungi, 41 of which are new to Mazandaran province, 24 new Iranian fungus-beech association and 11 have not previously been recorded from Iran. Russulaceae and Polyporaceae are the most representative family with 12 and 11 species. 57 species are wood inhabiting, 22 ectomycorrhizae on beech trees and 21 grow on terra. Edible and poisonous species are 42, 10 respectively. Additionally, the study increases the information of macrofungi pattern of spread on Iranian beech forests.

Key word: Diversity · Macro fungi · Beech · Northern Iran

INTRODUCTION

Beech dominated forest ecosystems are among the most important natural habitat in Iranian northern forest (Caspian region) and among the most utilized forest of Iran. The tree provides multiple purpose benefit such as fodder, fuel, timber, conservations of soil and water, food and shelter for wildlife, etc.

Oriental beech (*Fagus orientalis* Lipsky) is one of the 10 species of beech found world wide. It has a limited disjunctive distribution area; Southeastern of Europe, Caucasia and north of Iran, which are the main distribution areas of this species. The Caspian forest in north of Iran are not well known in scientific world [1]. In this area, beech is the most industrial tree species among more than 80 broad-lived trees and shrubs. It covers almost 18% of forest area in the Caspian region and is a dominate tree species between 700 -1500 m. a. s. l. (scattered from 400-2200). It forms the so called *Fagetum hyrcanum* community in form of pure and mix stands. The proportion of oriental beech reaches to 24% of total stem number and 30% of total volume in the Caspian forest. [2]. Fungi that appear to be specific to habitats with particular environmental conditions (e.g.

moisture, irradiation, temperature, salinity) may actually be responding to environmentally determined distributions of susceptible host species [3]. Hence forest vegetation type is one of the factors that are related with the occurrence of macro fungal communities in the forests [4-6].

Hattori [11] reported there are many species of polypore were vegetation type specific in beech of central Japan. 13 to 26 species were recorded from beech forest plots. More than 70 species of decay agent fungi have been reported on American beech (*F. grandifolia*) [7]. Northern forest of Iran supports rich diversity of macrofungi, because of a high diversity of topographical, climatic conditions as well as host; some of the macrofungi are specific to beech forests.

A few studies provided information on relative abundance or host preferences for the macro fungi on Iranian northern beech (*F. orientalis*) forest described . In the book of Fungi of Iran [8] 70 species of fungi consist of 68 macrofungi reported on *F. orientalis*. This is the last and consists of an entire list of fungi from Iran. In this book listed 115 species of macrofungi on *Fagus Sp.* Most of them were reported by Hallenberg [9-12] from north of Iran.

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The Objectives of this research are (i) to list specific species in beech forest vegetation type on Mazandaran province, (ii) study on distribution and spread pattern of macro fungi on Hyrcanian beech forest (iii) provide more data on the macrofungi flora of northern forests Iran.

MATERIALS AND METHODS

The Study Area: The study was conducted in Mazandaran province, (35° 47' - 36°35' N, 50°34' - 54°10' E) (Fig. 1) located in north of Iran. The real temperate commercial deciduous forest, with an area of almost 2 million hectares, in length of 800 km, are expanded in the north of Iran, in the Caspian region, the So-called Hyrcanian Zone. This humid region is extended in the Southern coastal plain of Caspian Sea from -20 - 2500 m. a. s. l. on the northern slopes of Alborz mountains. Caspian region consist of three provinces: Gillan (eastern) Mazandaran (central) Gollestan (western). Nature of Mazandaran is affected by Latitude , Alborz mountain , altitude and local or regional winds , causes an especial climate variations. According to De Martounne classification, climate of this province in western, central, eastern, mountain areas are high humid, humid, Mediterranean and semi-humid respectively. Annual rainfall average in costal area is 977 mm, reduces from west to east, maximum and minimum rainfall accord with

autumn and spring respectively. The province enjoys a moderate, subtropical climate with an average temperature of 25°C in summer and about 8°C in winter. Although snow may fall heavily in the mountains in winter, it rarely falls around sea lines. About one millions hectares of 1.9 million hectares of Iranian northern forests are located in this province. Forest trees species of this forest comprise: *Fagus orientalis* *Acer velutinum*, *A. cappadocicum*, *Carpinus betulus*, *Quercus castaneaefolia*, *Diospyrus lotus*, *Zelkova carpinifolia*, *Almus glabra*, *Alnus glutinosa*, *parrotia persica*, *Crataegus melanocarpa*, *Mespilus germanica* ,and the flora of the forest floor consists of different species of herbaceous plants .

Collection and Identification of Macrofungi: To begin assessing the distribution, structure and diversity of the macro fungal community associated with beech forest of north of Iran, During the last 5 years, macrofungi fungi have been collected in the 19 localities marked (Y) in fig. 1. Intensive Survey has been taken at least once a weak in Behshar area (indicated by 15, 16 and 17 on map) and erratic times on other regions. Samples were placed and kept in a separate plastic bag blowing them to avoid damaging and mixing. Took photos and a permanent marker was used to make note indicating the place where it is collected, color and characteristics of habitat such as:

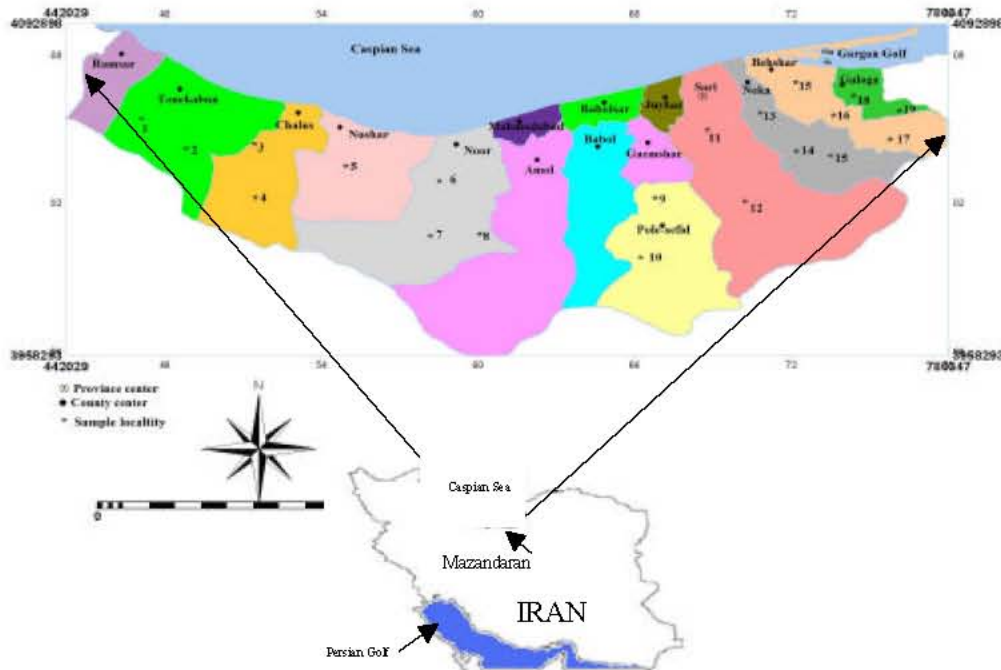


Fig. 1: The location of Mazandaran province in Iran: ○ Province center, ● County center, * investigated area

host, type of forest, altitude and slope facing of collection site during the collection. Samples were taken to the laboratory in basket for microscopical examination and identifications. Upon returning from collecting trip, the Spore print was taken right away to determine the color of the spores in the case of Agaricales. The collected fruiting bodies were identified according to [13], [14], [15], [16] [17] and [18]. Most Polyporus specimens were sent to Prof. Ryvarden in Botanical Inst. University of Oslo-Norway for identification.

To reviewing and comparing the list of macrofungi that have been reported from Iran, especially from Mazandaran province to our list used [8]. Measurements and drawings were made from slide preparations stained with cotton blue- lacctophenol contains 100 ml. lacctophenol, 2ml 1% aqueous solution of cotton blue, by Olympus light microscope (BH2). The collected specimens were kept in to refrigerator (6 -8°C) for more study in short time or They were subsequently placed in oven at

45 - 50 °C for drying, between 2-7 days [19], then into a herbarium zipped plastic bag, with a herbarium label .All Samples are deposited in the herbarium of forest and rangeland research station of Passand - Behshar.

RESULT

A total of 100 species of macrofungi were appeared and collected over the period of investigation in all study plots, Consist of 11 species new for Iran, 41 species new record for Mazandaran province and 24 species were new record on beech trees of Iran (mentioned in the checklist)

The species belong to 57 genera, 37 families ,12 orders and 2 Phyla. The largest part of fungi found on beech forest belong to the phylum *Basidiomycota* (89%), whereas the phylum *Ascomycota* (11%) comprises a smaller part. The dominant orders (considering the number of species) of macrofungi were, Agaricales, Russulales and Polyporales (Fig. 2).

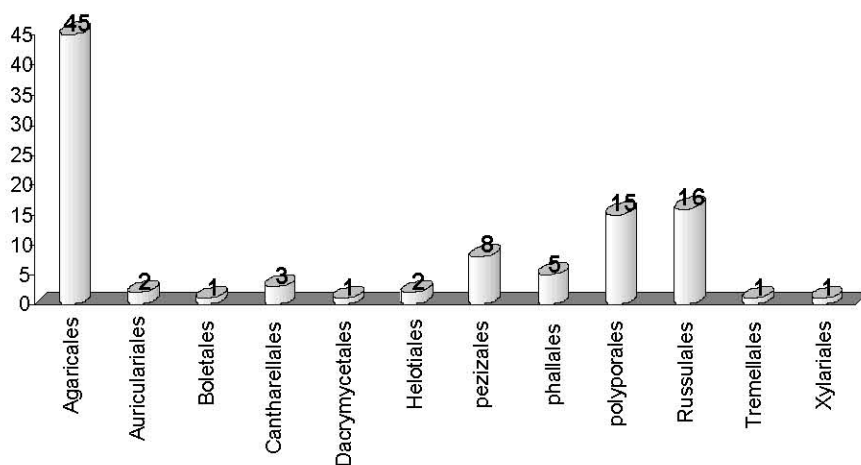


Fig. 2: orders and ampleness of macrofungi species in beech forest

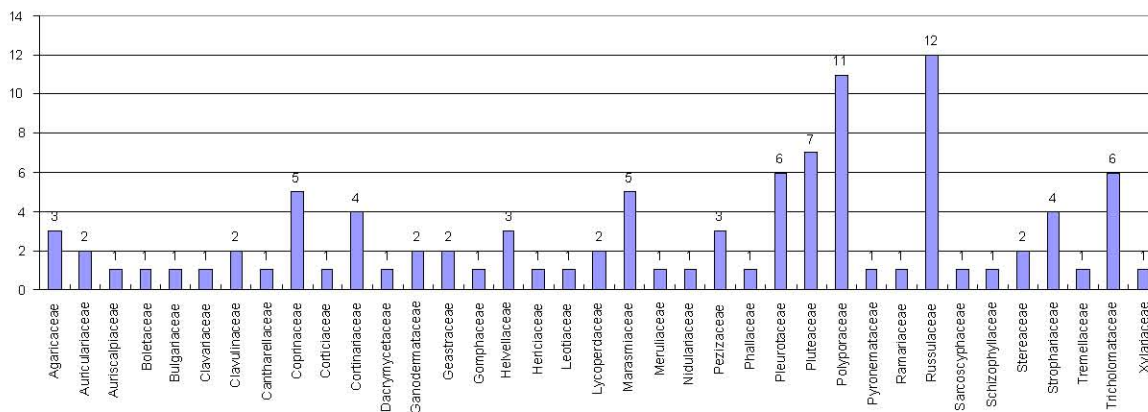


Fig. 3: Families and ampleness of macrofungi species in beech forest

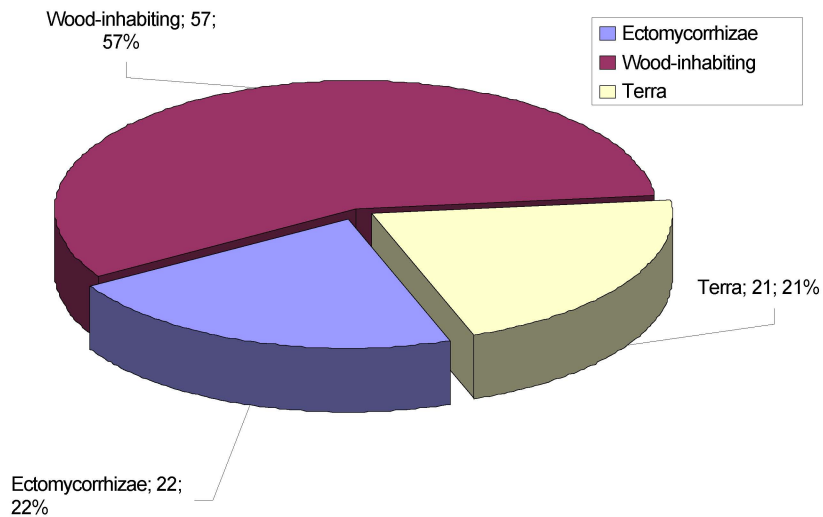


Fig. 4: Distribution of macrofungi species on different habitats in beech forest

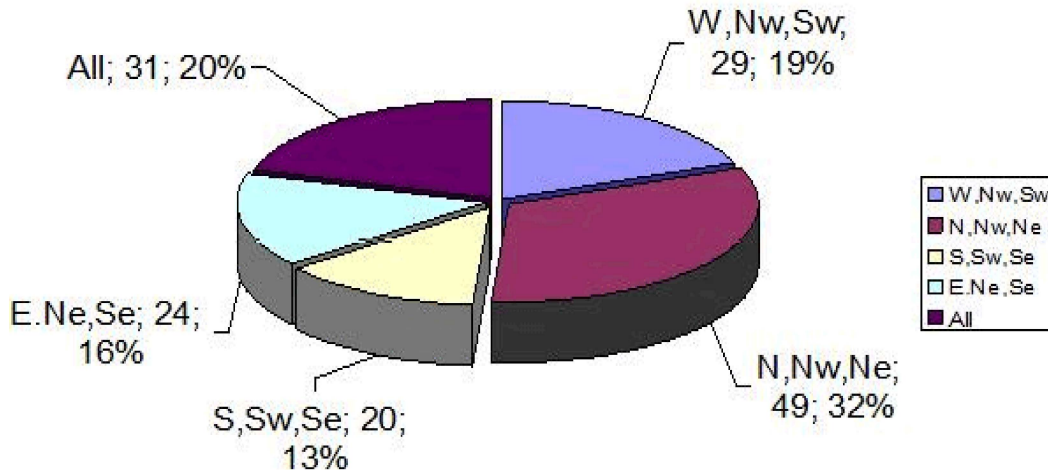


Fig. 5: Pattern of spread of macrofungi on different slope directions

Russulaceae is the most representative family with 12 species, followed by Polyporaceae with 11 species and Pluteaceae with 7 species (Fig. 3). *Russula* is the genus with the highest number of species with 8 taxa.

In aspect of habitation, most of collected species (57%) were wood inhabiting, consist of 9 species on living trees. (Fig. 4)

Number of species have found on northern slope directions (N, NW, NE) were the largest comprise 49 species and 32%, in compare eastern slope directions (E, SE, NE) were smallest comprise 24 species and 16%. 31 species (20%) have not related to slope directions and have found on all slope directions (Fig. 5)

The checklist below includes the following data separated by a slant. The following symbols and abbreviations used in the checklist.

R- Reported here first time from Iran/ S- New fungus-host associations for Iran / □ - Reported here first time from Mazandaran Province / ● - Edible or can be eaten / _ - Poisonous/x- Inedible / CS- collection site / masl - Meter altitude see level / O- Occurrence / FS- Facing slope / LT- Living trunk / DST- Dead standing trunk / FT- Fallen trunk / L- Log / S- Stump / FTg- Fallen twig / FB- Fallen branch / WD Wood debris/ T- Terra / M -Mycorrhizae/ R- Root/ = - synonym ,reported form Iran with that name/

Checklist for Collected Macrofungi from Beech Forests of Mazandaran Province

- *Agaricus arvensis* Fr. ● /- /CS14/ masl 540/ O Oct. / FS SW/T/
- R *Amanita fulva* (Sch.:Fr.)Gig.& Guil - /● / CS 8,9,10,15/ masl 800-1700/ O Jul. - Nov. / Fs SE/ M/

- *Amanita pantherina* (C.D. :Fr.) Krombh ☠ - / / CS all/ masl 800-1000/ O Jul. - Nov./ FS all/M/
- □ *Amanita rubescense* Pers.: Fr. - / / CS 9,14,16/ masl 400/O Jul./ FS SW/M/
- *Amanita vaginata* (Bull. :Fr.) Vitt. ☠ / / SD 8,10,16/ masl 800-1800/ O Jul. - Nov./ FS all/ M/
- *Armillaria mellea* (vahl.: Fr.) Kumm. - / ☉ / CS all/ masl 450-1900/ O Oct. - Nov. / FS all/ R/
- *Auricularia auricula-judea* (Bull. :Fr.) Wettst. - / ☉ / CS 7,10,16,17,19/masl 500-1600/Oall/S FS all/ FB,FT/
- *Auricularia mesenterica* (Dicks.:Fr.) Pers. - / x/ CS all/masl 400-1600/O all/FS all/FB, FTg /
- □ *Boletus edulis* Bull. :Fr. - / ☉ / CS 7,10,19/ masl 600-1800/ O Jun. - Nov./ FS N/M/
- □ *Bovista plumbea* Pers. - / ☉ / CS 7,17/ m0asl 600-1600/ O Jul. - Nov./ FS SE/T/
- *SBulgaria inquinans* (Pers. :Fr.) Fr. - / ☉ / CS all/ masl 400-1600/O Sep. - Nov./ FS N/FT/
- *Calocera cornea* (Batch.Fr.) Fr. - / ☉ / CS all/ masl 400-1400/ O all/ FS All/FT/
- *Cantharellus cibarius* Fr. - / ☉ / CS 9,10,12,18/ masl 400-1500/ O Jul. - Nov./ FS all/M/
- □ *Clavaria vermicularis* Sw.,Fr. - / ☉ / CS 10,16/ masl 800-1600/ O Nov./ FS N/T/
- *Clavariadelphus pistillaris* (L.:Fr.) Donk - / ☉ / CS 7,15/ masl 1600/O Sep.-Nov./FS SE/T/
- S,**Clavicornia pyxidata* (Fr.) Doty - / ☉ / CS 8,16/masl 800-1600/O Jul./FS SW/FB(rotten)/
- S,□ *Clavulina cinerea* (Bull. :Fr.) Sch. - / ☉ / CS 10,16/masl 400-1100/O Nov./FS SE/M/
- R *Clavulina cristata* (Hol.:Fr.) Sch. - / ☉ / CS 7/masl 300-1000/O Oct. - Nov./FS SE/M/
- □ *Climacodone septentrionole* (Fr.) Kar. = / *Donkia pulcherrima* (Berk. & Curt.) Pilat - / ☉ / CS 10,14,16/masl 500-1200/O Aug. - Jun. /FS All/FT,L/
- *Clitocybe candicans* (Pers.:Fr.) Kumm ☠ - / / CS 12/masl 950/O Jul. /FS N/T&fallen leaves /
- □ *Clitocybe gibba* (Pers.:Fr.) Kumm = *C. infundiboliformis* (Sch.:Fr.) Quel - / ☉ / CS 7/masl 1400-1800/O Jul.- Oct. /FS NE/T/
- *Clitocybe phyllophila* (Pers.:Fr.) Kumm - / ☉ / CS 7/masl 1400/O Sep.-Nov. /FS SE/T& fallen leaves/
- R *Collybia fusipes* (Bull. :Fr.) Quel - / ☉ / CS 7/masl 400-1800/O all/FS NE/S& around it on humus /
- S,□ *Collybia platyphylla* Fr.:Pers = *Megacollybia platyphylla* (Fr.:Pers) Kotl&Pouz - / ☉ / CS 16,18/masl 450/O Jul. /FS NSE/S/
- □ *Coprinopsis atramentarius* (Bull) Redhead, Vilgalys & Moncalvo / = *Coprinus atramentarius* (Bull. :Fr.) Fr. - / ☉ / CS 15,16,18/masl 800- 16/O Oct.- Nov. /FS NE/ S& around it on humus /
- S,□ *Coprinellus disseminatus* (Pers.) J.E. Jange / = *Coprinus disseminatus* / (Pers.:Fr.) S.F.Gray - / ☉ / CS 5,13,18/masl 400-1800/O al /FS N, NW/S & around it on humus /
- S,□ *Coprinellus domesticus* (Bilt.) Vail. Happ. & Jacg. John. / = *Coprinus domesticus* (Bolt.:Fr.) S.F. Gray - / ☉ / CS 6,7,10,16,18/masl 600-1200/O Apr. - Oct. /FS NE/S& around it on humus /
- S,□ *Coprinellus micaceus* (Bilt.) Vail. Happ. & Jacg. John. / = *Coprinus miaceus* (Bull. :Fr.) Fr. - / ☉ / CS 8, 16,18/masl 500-1600/O Mach- Apr. /FS N/ S& around it on humus /
- S,□ *Crepidotus athochthumus* J.E. Kumm - / ☉ / CS 16/masl 400/O Jul. /FS N/ S& around it on humus /
- *Crepidotus mollis* (Fr.) St. - / ☉ / CS 6,7,9,15,16,18 /masl all/O all /FS all / S& around it on humus /
- *Cyathus striatus* (Hude.:Pers) Willd. - / ☉ / CS 2,7,9,15,16,17 /masl 400-1400/O Apr. - Nov./FS all / FTg,FT /
- □ *Daldinia concentrica* (Bolt.:Fr.) Ces. & De Not. - / CS all / masl 400-2000/O all/FS all / WD /
- *Fomes fomentarius* (L.Fr.) Fr. - / ☉ / CS all /masl 400-2000/O all./FS all / LT,DST,FT/
- R *Galerina autumnalis* (Peck) Sing. & Smith. - / ☉ / CS 10,12,16 /masl 400-900/O May-Jun./FS all / LT,DST,FT/
- *Ganoderma applanatum* (Pers.) Pat. - / ☉ / CS all /masl 400-2500/O all/FS all / LT,DST,FT/
- *Ganoderma lucidum* (Leyss.:Fr.) P.Karst. - / ☉ / CS all /masl 400-2500/O all/FS all / LT,DST,FT/
- *Geaster fimbriatum* Fr. - / ☉ / CS 1,6, 9,15,16/masl 1000-1600/O Sep. Oct. /FS all / T& Leaves compost /
- □ *Geastrum triplex* Jungh - / CS 2,6,8, 9,14,16 /masl 1500-1600/O Sep. Nov. /FS all / T& Leaves compost /
- □ *Helvella elastica* Bull.Fr. - / ☉ / CS 1,7, 9, 16/masl 500-800/O Sep. Nov. /FS all / T /
- *Helvella acetabulum* (L.) Quel / = *paxina acetabulum* (L.) Kunt/ Kumm ☠ - / / CS 7,16/masl 400-1200/O Mar.- Apr. /FS NE/T /
- □ *Helvella lacunosa* - / ☉ / CS 7, 8/masl 1000-1800/O Apr.-Jun.Sep.-Nov. /FS SE/T /
- *Hericium cirrhatus* (Pers.) Nikol / = *Creolophus cirrhatus* (Pers.:Fr.) P.Krast - / ☉ / CS 15/masl 480/O Jul. /FS N/ FT /
- R *Hygrocybe splendidissima* (Orton.) Svr. - x/ CS 6,10/masl 1000-1800/O Jun.-Des. /FS N/ T /
- S,□ *Hypholoma capnoides* (Fr.:Fr.) Kumm. - / ☉ / CS 10,16,17/masl 400-1500/O Oct. /FS NW/ S/

- S, □ *Hypholoma fasciculare* (Huds.:Fr.) - /CS 1,4,7,9,10,16,17/masl 400-1600/O All except winter/FS all/ S, FT/
- R *Inocybe lamuginosa* (Bull.:Fr.) Kumm. /CS 16/masl 635 /O Aug. /FS NW/M /
- R *Lactarius camphorates* (Bull.)Fr. - /CS 12/masl 950 /O Jul. /FS NW/M /
- □ *Lactarius deliciosus* (L.:Fr.) S.F.Gray - /CS 7/masl 1400-1600 /O Jun. -Des. /FS N/M /
- □ *Lactarius piperatus* (Scop.:Fr.) S.F.Gray - /CS 16/masl 800 /O Jul. /FS NW/M /
- (Bull.)Fr. *Lactarius volemus* (Fr.:Fr.)Fr. - /CS 7/masl 800 /O Jul. /FS NW/M /
- (Bull.)Fr. *Lentinus strigosus* (Schw.)Fr. / = *panus rudis* Fr. - /CS 10/masl 1600/O Jun. Jul./FS N/L /
- S *Lentinus tigrinus* (Bull.:Fr.)Fr. - /CS 2/masl 500/O Des. Jul./FS N/ S (Soaked) /
- S *Leotia lubrica* (Scop.)Pers. - /CS 9,10,15/masl 1000,1500/O Sep. Nov. /FS NE/ T (between moss) /
- S □ *Lepiota cristata* (Bolt.:Fr.)Kumm. - /CS 8,10/masl 1000-1600 /O Oct.-Nov. /FS SE/WD /
- *Lycoperdon pyriforme* Sch.:Pers. - /CS 8,10,15/masl 800- 1800 /O Jul. /FS NE/Rotten S, FT/
- □ *Macrolepiota rhacodes* (Vitt.)Sing- ä/CS 9,10,16/masl 800- 1600 /O Jul.-Nov. /FS SE/T/
- S *Marasmius alliaceus* (Jacq.:Fr.)Fr. - /CS 5,12,16,17/masl 350-800/O May/FS NE,N/WD (Buried) /
- *Marasmius rotula* (Scop.:Fr.)Fr. - /CS all/masl 250-2500/O Jul.- Oct./FS all/ R,WD/
- *Meripilus giganteus* (Pers.:Fr.)P.Karst. - /CS 9,15,16/masl 350-1250/O Oct./FS SW,SW/ R,WD,T, humus /
- *Mycena crocata* (Schrad.Fr.)Kumm. - /CS 9,15,16/masl 800-1600/O Oct./FS N/ Fallen leaves, humus /
- R *Peziza badia* Pers.:Fr. - /CS 7/masl 800- 1700/O Oct.-Nov. /FS SE/T/
- S □ *Peziza petersii* Berk& Curt. - /CS 8, 10/masl 800-1200/O Jul. - Nov. /FS SE/ WD (burned)/
- □ *Peziza repanda* Pers. - /CS 12/masl 1200/ O May /FS N/ T(humus)/
- □ *Phaeolepiota aurea* (Matt.)Maire - /CS 12/masl 1350/O Oct.-Nov./FS NW/ T(humus)/
- □ *Phallus impudicus* L. - /CS 7,19/masl 1000-1500/O July/FS N,NE/ T(humus)/
- *Pholiota aurivella* (Batsch Fr.)Kumm. - /CS 12/masl 900- 1400/ O Oct.-Nov. /FS NE/ LT/
- *Pleurotus cornucopiae* (Paul.:Pers.)Gill. - /CS 7,15,18/masl 400-1600/O July- Aug. /FS all/ DST,FT/
- S □ *Pleurotus eryngii* (D.C.:Fr.)Quel. - /CS 7,8/masl 800/O Oct-Nov. /FS NW/ DST,FT/
- S *Pleurotus ostreatus* (Jacq. Fr.)Fr. - /CS All/masl 400- 800/O all(except winter /FS All/ DST,FT/
- S □ *Pleurotus pulmonarius* (Fr.:fr.)Quel - /CS 16/masl 800/O Jul. /FS NW/ FT/
- S □ *Pluteus aurantiorugosus* (Trog.)Sacc. - /CS 7/masl 400-1200/O Jul.-Nov. /FS NW/ FT/
- S □ *Pluteus cervinus* (sch.)Kumm. - /CS 10,14,15,16/masl 250-1000/O all/FS N/ FT/
- S □ *Pluteus luteovirens* Rea. - /CS 12,16/masl 350-900/O Apr.-May/FS all/ FT/
- *Polyporus badius* (Pers.)Schw. - /CS 7,18/masl 500-1600 /O Apr.-Jun. ,Oct.-Nov. /FS SE/FT(rotten)/
- R *polyporus leptosephalus* (Jacq.) Fr. - /CS 10/masl 1350/O Jun./FS NW/ FTg/
- S □ *Polyporus varius* (Pers.:Fr.)- /CS 7/masl 1500/O Oct-Nov./FS NE/ WD/
- S □ *Psathyrella candolleana* (Fr.)Maire - /CS 7,15,18/masl 250-1500/O Jul.- Nov. /FS all/ S& humus around it/
- *Ramaria botrytis* (Pers.:Fr.)Ricken. - /CS 7,16/masl 400-1700/O Sep.-Oct./FS NW/ M/
- *Russula cyanoxantha* (Sch.) Fr. - /CS 16/masl 750/O Jul. /FS NW/ M/
- *Russula delica* Fr. - /CS 17/masl 800/O Jul. /FS NW/ M/
- *Russula fellea* (Fr.:Fr.)Fr. - /CS 7/masl 800- 1600/O Sep.-Oct. /FS W/ M/
- *Russula lepida* (Fr.:Fr.)Fr - /CS 16/masl 480/O Jul. /FS NE/ M/
- *Russula maerii* Sing. - /CS 16/masl 800/O Jul. /FS NW/ M/
- *Russula rosea* Ss.Quel. - /CS 7/masl 800-1700/O Jul.- Nov. /FS SW/ M/
- *Russula variata* Ban. - /CS 12/masl 1000/O Jul. /FS NW/ M/
- *Russula virescens* (Sch.)Fr. - /CS 16/masl 760/O Jul. /FS NE/ M/
- R *Sarcoscypha austriaca* (Bacc Ex Sacc.)Boud - /CS all/masl 350-1600/O Jun.- Apr. /FS NW/ WD,FB,FTg/
- *Schizophyllum commune* L.:Fr. - /CS all/masl 350-2500/O all /FS all/ LT,S,SDT,FB,FT/
- *Steccherium ochraceum* (Pers.:Fr.)Gray - /CS 7/masl 650/O Aug. /FS N/ FT/
- *Scutellinia scutellata* (L.:Fr.) Lamb. Gray - /CS 7, 16/masl 500-1400/O Aug. - Des. /FS NW/ WD(rotten)/
- □ *Stereum hirsutum* (Wil.)Pers. - /CS 6, 7, 12, 13, 15, 16/masl 400-1600/O all. /FS all/ WD,L/

- *Stereum subtomentosum* Poz. - /CS 15/masl 400-1000/O Oct.- Mar. - /FS N,W/ FT, DST/
- *Stropharia aeruginosa* (Curt.:Fr.) Quel. - /CS 7/masl 1400/O Jul.-Sep. /FS N,W/ T/
- *Trametes gibbosa* (Pers.:Fr.) Fr. - /CS 15,16/masl 500-8000/O all /FS all/ FT /
- *Trametes hirsuta* Wulf.:Fr.) Pil. - /CS all/masl 300-1500/O Apr.-Jun. /FS all/ LT,FT,DST, FB /
- *Trametes versicolor* (L.:Fr.) Pil. - /CS all/masl 400-1700/O Apr.-Jun. /FS all/ LT,FT,DST, FB /
- *Tremella mesenterica* Retz.:Fr. - /CS 7,16/masl 400-1600/O all /FS all/ FB /
- *Trichaptum bififormis* (Fr.:Klot.) Ryv. - /CS 16/masl 400-1800/O Apr.-Jun. /FS all/ FT /
- *Rhizoglyphus chioneus* (Fr.:Fr.) Kar. - /CS 16/masl 500/O Jul. /FS NW/ FT /
- *Rhizoglyphus bombycina* Sch.:Fr.) Sing. - /CS 15, 16, 18/masl 300-800/O Nov. - Jul. /FS all/ LT,DST,FT

DISCUSSION

It was found that Russulaceae and Polyporaceae consist of 12, 11 species respectively, have the most variations in species among the 37 families. It is understood and mentioned in some Iranian and non Iranian studies [10, 20-22].

The macrofungi flora of Iranian northern forest is similar to that of Europe, Hallenberg [9] reported there are 89% of Xylophilous mushrooms similarities of beech forests of northern Iran to that of Europe.

Macrofungi species pattern of spread shows the most variation on species can be find in northern slopes facing and they are rich in late summer to mid autumn. Hallenberg [7,8] suggested the most abundance of macrofungi species on beech forest of northern Iran grows on northern slope directions in July when the rainfall is high and the temperatures is 25°C -28°C. It is in relation to humid climate as well as the richness of host in these seasons and slope directions. The moisture that come from Caspian Sea and other paddy field on flats of southern Caspian Sea contacts to these slope directions and accumulates there, more than the other sides.

Comparing the list of macrofungi recorded in northern forest of Iran before (mostly by Hallenberg [9], [10-12] to recent records, especially to here our list, is missing several species. Due to lack of an Iranian red list of fungi, it truly will be a daunting task to appreciably increase our knowledge of the diversity and distribution of fungi in endangered habitats, before those habitats have disappeared.

As a food supply, in despite of high species variations of edible mushrooms (42 species) and low poisonous species (10 species), macrofungi collection by local people are not common. However, the local residents know *C. cibarius*, called Zarde kija (means yellow girl). It collected to sell in local market in fall, have not reported that how much of this macrofungi are collected by resident and nonresidents for trade.

In this context, we hope that this study contributes to macrofungi flora of Iran as well as providing information on the species distributed in Iranian northern forests, in order to these important elements of nature and their vital role being more noted

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