Research Article

First Collection and Identification of Wild Mushrooms in Western Iraq

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Abstract: Fungi are found everywhere and affect our lives every day from mushroom to industrially important product, plant helpers, plant pathogens and to human diseases. Therefore, we concentrated our attention on fungi that can be grown in our environment, while maintaining an interest in their performance in nature. About fifteen different species were collected and identified from different villages of Heet district, Anbar province, Iraq. Out of the fifteen, two species, naming Armillaria mellea and Coprinus disseminates were identified as species level and others: Pleurotus spp., Agaricus spp., Calvatia sp., Telephora sp., Fomes sp., Lepiota sp. and Morchella sp. as genus level only.

This study was aimed to collect and identify wild mushrooms that grow naturally in different orchards and gardens on 2009-2013 in Heet city. A total of 15 species in 9 genera, 9 families and 5 orders belong to woody and fleshy species were identified for the first time in Anbar province. The collected mushrooms were appearing from November to February of each year.

Keywords: Mushrooms, collection and identification, Heet city, Anbar Province, Iraq.

1. Introduction

Fungi affect human lives in many and varied ways like human diseases, plant pathogens, industrially product, plant helpers, rich with truffles (Christensen, 1981). They play very important roles in the ecosystem (Carlile et al., 2001). Mushrooms have long regarded all over the world as the most delectable and succulent of food (Christensen, 1981). When the tree leaves change color, dew rises, and autumn mists descend, mushrooms begin to appear above the soil, and logs, stumps, and fallen branches come alive with “toadstools” and other mysterious protuberances (Hall et al., 2003).

Anbar province area around 53,461 m² (Lohman, 2002) and its desert are rich with truffles (Al-Rawiand Taha, 2010). The Heet city lies at north latitudes 33.64° and east longitudes 42.83° and 66 meters elevation above the sea level. Whereas, the climate of this district either dry or semi-dry climate characterized by less than 150mm of rain per year and high evaporation rates (MOE, 2012). Aziz and Toma (2012) isolated mushroom from mountain areas in Sulaimani and Erbil province, especially in Soran, Joman, Sedakan districts Qandil and Zalm village Amad Hawa - Sulaimani areas up to more than 3000 meters above sea level in the Iraqi Kurdistan region. A total of 34 species belongs to 23 genera of woody and fleshy species of basidiomycetes were identified.

Forty four species of mushrooms belonging to twenty nine genera were collected and identified from different localities in Erbil Governorate of Kurdistan region. Agaricus spp., Clitocybe spp., Collybia spp., Coprinus spp., Cortinarius spp., Craterellus sp., Crepidotus sp., Exidia sp., Fomes spp., Galerina sp., Hebeloma sp., Helvella sp., Auricularia auricula-judae, Hygrocybe pratensis, Inocybe sp., Lactarius spp., Laccaria sp., Mycena sp., Peziza sp., Pluteus sp., Psathyrella sp., Panellus sp., Paxillus atrotomentosus, Russula fellea, Scutellinia scutellata, Tricholoma spp,
Tyromyces spp., Lepiota sp. and Cystoderma sp. the last two genera were the new record in Erbil, Kurdistan region-Iraq (Toma et al., 2013). As a result, it can be very difficult to distinguish between a country’s native fungi and those that have been introduced or have recently arrived from elsewhere (Hall et al., 2003).

This study was aimed to collect and identify wild mushroom that grows naturally in different orchards and gardens in the Heet district, Anbar province, Iraq. This is the first article research was paper made in mushroom collection and identified in Anbar province western Iraq.

1. Materials and Methods

Different genera of wild mushrooms were collected from various locations in Heet district from the orchards and gardens are following: (Abdul-Salamia, Shaqufa, Basaar, Qenan, and Shakheslya) during the period from 2009 to 2013. Standard methods of collection and identification were followed. The texts (books) used for identification of fungi; depending on their taxonomic keys are followed; Christensen (1981); Hall et al., (2003); Polese (2005); Fergus and Fergus (2003) and Telander (2012).

2. Results and Discussion

This article represents the first research paper made on mushroom collection and identified in Anbar province western Iraq. Wild mushrooms, which grew naturally in different orchards and gardens in Heet city, were collected from some villages (Fig. 1): Abdul-Salamia, Shakhesly, Qenan, Basaar and Shaqofaon 2009-2013. The soil of this district is loam sand.

Heet located in Anbar province in Iraq. Euphrates River enters the city, therefore; different gardens and orchards placed on sides of the river (Fig. 1). The collected mushrooms were appearing from Nov. to Feb. (Fig. 2) in winter season that due to the climate of this district. The climate of the Anbar zone of Iraq is a typical desert climate. This is an area of a high thermal energy. Generally, Rainfall occurs during the winter months, from December to February in most parts of the country and November to April in the mountains, with average day temperatures of 16°C dropping at night to 2°C with a possibility of frost. Summers are dry and hot to extremely hot; air temperature rises to a maximum of 45-50°C, with a shade temperature of over 43°C during July and August yet dropping at night to 26°C (Jaradat, 2002).

Fig. 1. Distribution of Villages in Heet City (Google, 2013).
Mushrooms grow in clusters, shelf-like, from the bark of trees or fallen logs (Telander, 2012).

**Armillaria sp. and Armillaria mellea**

Armillaria sp. was collected from Abdul-Salamia and Shakheslya villages with roots of trees as mycorrhizas on December 2011 (Table 1 and 2). This mushroom (Fig. 3A and 3B) is edible if cooked (Hall et al., 2003). Also known as Honey Fungus which grow on decaying stumps and logs or on living trees, often forming large clusters. It is highly variable in shape but generally convex or flat. The surface is usually honey-colored, darker in the center. Gills are attached and descending down the stalk, white to brownish. Spore print is white (Telander, 2012).

**Pleurotus spp.**

Edible brown oyster mushroom (Fig. 3C) was grown near root or on a stalk of dead tree in Basaar. Its cap is wavy, convex to flattened, shaped somewhat like an oyster shell, white to brownish or gray, and fleshy. The stalk is minimal or absent and usually off-center. Gills are white to yellowish, descending down to the base. Spore print is white or very pale purple. Oyster

**Agaricus spp.**

Agaricus spp. (Fig. 3D, 3E and 3F) were collected from the soil of Basaar gardens (Table 1 and 2) and classified to genes level. It is called white button. Its cap convex, soon flattening, smooth or fibrillose, white or pale gray, splashed with ocher, often soiled with particles of earth. It grows on packed earth, even breaking through the asphalt, in parks, gardens, footpaths, around trees in cities (Polese, 2005).
Collection and Identification of Wild Mushrooms

**Calvatia sp.**

Usually, nearly round to somewhat oval when young or egg-shaped (Fig. 3G) grown with grass in Basaar on December 2012 (Table 1), fruiting bodies tend to become more pear-shaped or top-shaped as they mature. The purple-spored puffball is most common in pastures, lawns, and other grassy and forest areas. Outer surface smooth, although sometimes slightly roughened, like chamois to the touch, white or whitish, later becoming yellow or brown. Inner substance is pure white at first, changing to yellowish, and finally becoming dingy olive (Fergus and Fergus, 2003).

**Telephora sp.**

Fig. 3H was showed this mushroom on stalk of trees in Shaqafa on December 2009 (Table 1). It belongs to Basidiomycetes; Order: Thelephorales; Family: Telephoraceae (Flores, 2012).

**Fomes sp.**

The wood-rotting fungus (Fig. 3I) was showed this mushroom on stalk of trees in Qenan on December 2011 (Table 1). It belongs to Basidiomycetes; Order: Polyporales; Family: Polyporaceae (Deacon, 2006).

**Coprinus sp. and Coprinus disseminates**

Most members of the genus *Coprinus* sp. (Fig. 3L) are characterized by fruiting bodies with gills that dissolve, producing an inky fluid, when the spores are mature. *Coprinus disseminates* (Fig. 3J, 3K) is an exception to this rule, as its gills do not become inky. The fruiting bodies occur in large groups (often several hundred in a single fruiting) on well decayed stumps and other wood debris from broadleaf trees. The rather delicate pale buff to brownish gray caps are 0.5-1.5cm in diameter, have a deeply grooved margin, and are ovoid at first but expand to become a bell-shaped to convex. The stalk is 15-40mm high and 1-3mm thick. This mushroom is edible, but not worth eating because of its small size (Hall *et al*., 2003).

**Lepiota sp.**

*Lepiota* sp. (Fig. 3M) was collected from gardens near of and around pomegranate trees in a Shakheslya village on February 2013 in large amounts, but no mycorrhizas may be due to use decomposed leaves of these trees. The genus is characterized by white spores, free gills, a definite ring around the stem, and the fact that the stem separates readily from the cap-such
definite characteristics that it is ordinarily one of the easiest genera for a beginner to recognize (Christensen, 1981).

**Morchella sp.**

It is called Common Morel (Fig. 3N, 3O), which belongs to Ascomycetes; Order: Pezizales; Family: Morchellaceae (Table 2). It was collected from the Shakheslya village in December 2012. The upper portion is a variable, elongated egg shape or bullet shape to 2” wide. The surface is like a sponge, honeycombed with irregular, pale to deep ochre ridges and dark brown pits. The stubby stalk is white, somewhat crinkly or bumpy, with a thick base. Spores in this group are produced not in the gills, but rather in structures known as asci, located in the pits (Telander, 2012). From all samples, only 11% from genera were Ascomycetes; 89% Basidiomycetes (Fig. 4).

![Morchella sp.](image)

**Fig. 4.** Percentage of Mushroom Genera were collected in Heet city.

<table>
<thead>
<tr>
<th>No.</th>
<th>Scientific name</th>
<th>Edibility</th>
<th>Date</th>
<th>Habitat</th>
<th>Village</th>
<th>Family</th>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>Armillaria mellea</td>
<td>Edible</td>
<td>Dec 2011</td>
<td>Near roots of tree</td>
<td>Abdul-Salamia</td>
<td>Basidiomycetes</td>
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<tr>
<td>B</td>
<td>Armillaria sp.</td>
<td>Edible</td>
<td>Dec 2011</td>
<td>Logs of tree</td>
<td>Shakheslya</td>
<td>Basidiomycetes</td>
</tr>
<tr>
<td>C</td>
<td>Pleurotus spp.</td>
<td>Edible</td>
<td>Nov 2012</td>
<td>Near roots of tree</td>
<td>Basaar</td>
<td>Basidiomycetes</td>
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<tr>
<td>D</td>
<td>Agaricus spp.</td>
<td>Edible</td>
<td>Dec 2011</td>
<td>Under soil</td>
<td>Basaar</td>
<td>Basidiomycetes</td>
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<tr>
<td>E</td>
<td>Agaricus spp.</td>
<td>Edible</td>
<td>Feb 2013</td>
<td>Soil</td>
<td>Basaar</td>
<td>Basidiomycetes</td>
</tr>
<tr>
<td>F</td>
<td>Agaricus spp.</td>
<td>Edible</td>
<td>Feb 2013</td>
<td>Soil</td>
<td>Basaar</td>
<td>Basidiomycetes</td>
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<td>G</td>
<td>Calvatia sp.</td>
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<td>Dec 2012</td>
<td>Soil with grass</td>
<td>Basaar</td>
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<tr>
<td>H</td>
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<td>Dec 2009</td>
<td>Soil</td>
<td>Shaqafa</td>
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<tr>
<td>I</td>
<td>Fomes sp.</td>
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<td>Dec 2011</td>
<td>Died tree</td>
<td>Qenan</td>
<td>Basidiomycetes</td>
</tr>
<tr>
<td>J</td>
<td>Coprinus disseminates</td>
<td>Edible</td>
<td>Dec 2012</td>
<td>Soil</td>
<td>Shakheslya</td>
<td>Basidiomycetes</td>
</tr>
<tr>
<td>K</td>
<td>Coprinus disseminates</td>
<td>Edible</td>
<td>Dec 2012</td>
<td>Soil</td>
<td>Shaqafa</td>
<td>Basidiomycetes</td>
</tr>
<tr>
<td>L</td>
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<td>Unknown</td>
<td>Feb 2009</td>
<td>Soil</td>
<td>Basaar</td>
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<td>M</td>
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<td>Soil</td>
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<tr>
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<td>Shakheslya</td>
<td>Ascomycetes</td>
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</table>

Table 1. Characterizations of Wild Mushrooms Collection.

<table>
<thead>
<tr>
<th>Kingdom</th>
<th>Phylum</th>
<th>Class</th>
<th>Order</th>
<th>Family</th>
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<td>Coprinus sp.</td>
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<td></td>
<td>Tricholomatae</td>
<td>Tricholomatus</td>
<td>Pleurotus spp.</td>
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<td></td>
<td></td>
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<tr>
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<td>Polyporaceae</td>
<td>Fomes sp.</td>
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<td>Lycoperdaceae</td>
<td>Calvatia sp.</td>
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<td>Theleporaceae</td>
<td>Telephora sp.</td>
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<tr>
<td>Ascomycota</td>
<td>Ascomycetes</td>
<td>Pezizales</td>
<td>Morchellaceae</td>
<td>Morchella sp.</td>
<td></td>
</tr>
</tbody>
</table>

Table 2. Classification of Wild Mushrooms Collection.
Acknowledgment

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References