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Research article (Araştırma makalesi)

Edible mushroom diversity in Isparta, Türkiye

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Abstract: Today, the widespread knowledge of the ethnobotanical characteristics of plants has enabled people to make maximum use of plants. Similarly, with the determination of the ethnomycological characteristics of mushrooms, it is necessary to make accurate and clear diagnoses of mushrooms to maximize the benefits of mushrooms to humans. In addition, ethnomycological and taxonomic studies, which include traditional knowledge about mushrooms, are highly important for transferring traditional knowledge to future generations. In this context, places where edible mushrooms can be found in the Isparta region were determined. By interviewing the people in these places, it was determined whether they collected the right species for human health by determining the mushrooms they frequently consumed. The mushroom samples were collected and morphologically identified from the study areas between 2023 and 2024. Within the scope of this study, 20 macro mushroom belonging to 11 families (*Agaricus augustus, Agaricus campestris, Agaricus bitorquis, Amanita vaginata, Bovista plumbea, Coprinellus micaceus, Coprinus comatus, Flammulina velutipes, Infundibulicybe geotropa, Lactarius deliciosus, Lepista nuda, Macrolepiota procera, Marasmius oreades, Morchella elata, Morchella esculenta, Pleurotus ostreatus, Rhodocollybia butyracea, Russula* sp., *Tricholoma terreum, Verpa bohemica*) were detected. This study provides a basis for further scientific studies to be carried out with macromycetes. In addition, by determining the accuracy of the mushrooms consumed by the local people by making mushroom diagnoses, the consumption of the wrong mushrooms can be prevented, and the number of poisoning cases can be reduced.
Keywords: Edible mushroom, Ethnomycology, Isparta, Macrofungus, Traditional knowledge

Isparta'daki yenilebilir mantar çeşitliliği

Öz: Günümüzde bitkilerin etnobotanik özelliklerinin yaygın bir şekilde bilinmesi, insanların bitkilerden maksimum düzeyde faydalanmasına olanak sağlamıştır. Aynı şekilde mantarların etnomikolojk özelliklerinin belirlenmesi ile de mantarların insanlara olan faydalarından maksimum düzeyde yararlanmak için öncelikle mantarlara ait doğru ve net teşhislerin gerçekleştirilmesi gerekmektedir. Ayrıca mantarlara dair geleneksel bilgiyi içeren etnomikolojik ve taksonomik çalışmalar, geleneksel bilgiyi gelecek nesillere bilgi aktarmak nedeniyle yüksek öneme sahiptir. Bu bağlamda Isparta yöresinde yenilebilir mantarların yoğunlukta bulunabileceği yerler belirlenmiştir. Bu yerlerdeki halk ile görüşülerek sıklıkla tükettikleri mantarları belirleyerek insan sağlığı için doğru türleri toplayıp toplamadıkları belirlenmiştir. Mantar örnekleri için çalışma alanlarına 2023-2024 yılları arasında araziye gidilerek mantarlar toplanıp morfolojik teşhisleri gerçekleştirilmiştir. Bu çalışma kapsamında 11 familyaya ait 20 makrofungus families (*Agaricus augustus, Agaricus campestris, Agaricus bitorquis, Amanita vaginata, Bovista plumbea, Coprinellus micaceus, Coprinus comatus, Flammulina velutipes, Infundibulicybe geotropa, Lactarius deliciosus, Lepista nuda, Macrolepiota procera, Marasmius oreades, Morchella elata, Morchella esculenta, Pleurotus ostreatus, Rhodocollybia butyracea, Russula* sp., *Tricholoma terreum, Verpa bohemica*) tespit edilmiştir. Bu çalışmanın makromantarlar ile yapılacak ileri aşama bilimsel çalışmalar için temel oluşturmaktadır. Ayrıca mantar teşhislerinin yapılmasıyla yöre halkının tükettiği mantarların doğruluğunun belirlenmesi ile yanlış mantar tüketiminin önüne geçileceği ve buna bağlı yaşanılan zehirlenme vakalarının azalacağı düşünülmektedir.
Anahtar kelimeler: Yenilebilir mantar, Etnomikoloji, Isparta, Makromantar, Geleneksel bilgi

1. Introduction

Türkiye has very high plant diversity due to its geological location and seasonal diversity. The presence of different habitats, different climate types and different species has provided favorable conditions for many fungal species in addition to plant diversity (Duman et al., 2003; Akyüz and Onganer, 2010). The fact that our country is home to many plant species has enabled the people of the country to use plants in various ways, such as food, goods, medicine and shelter. In recent years, plants have met almost every need of humans. However, owing to the increasing need for food by the world's growing population and technological developments, the food produced as a result of the increase in the need for food and the increase in diseases due to the increase in some hormones and drugs, people have begun to search for new organic nutrients and new treatment methods for their diseases (Duman et al., 2003; Kaytanlioglu et al.,2021; Kaytanlioglu et al., 2024; Nacakci and Dutkuner, 2018). In recent years, owing to these needs, studies have been carried out on fungi, especially edible cap mushrooms, and very important results have been reported (Güven and Gülmez, 2006; Akyüz and Onganer, 2010).

"Edibility" can be defined by criteria such as the absence of toxic effects on humans and desirable taste and aroma (Rubel and Arora, 2008). The "medicinal" properties of mushrooms are attributed to their biologically active compounds (Venturella et al., 2021). In recent years, edible and medicinal wild mushrooms have been recognized as valuable natural sources of multifunctional foods and

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medicines. Mushrooms are highly nutritious, low-calorie foods containing high-quality proteins, vitamins and minerals (Waktola and Temesgen, 2018) and have a variety of biological activities associated with their bioactive compounds that vary depending on their location and species (Turfan et al., 2019; Bulam et al., 2022). Edible mushrooms are considered "superfood" and can be recommended as valuable components of the daily diet of humans (Sganzerla et al., 2022).

Mushrooms are known as among the foods that support human health the most. Although they are low in calories, they are a source of fiber and protein (Heleno et al., 2010; Sevindik et al., 2016a). In addition to being rich in protein and iron, they also contain vitamins A, B1, B2, B12, C, D, E, P and K; lipids; crude fiber; essential amino acids; and selenium, calcium, potassium, phosphorus and copper minerals (Reis et al., 2012; Sevindik et al., 2016b). They are a good source of nutraceuticals with unsaturated fatty acids, phenolic compounds, tocopherols, ascorbic acid and carotenoids (Palacios et al., 2011). In addition, mushrooms are the best-known vegetable protein and a good option for people who do not consume meat (Pamir, 1985). Ethnomedically, they have been used for centuries in Asian countries to prevent and treat diseases, and their use in Western countries has been increasing in recent decades (Lindequist et al., 2005). Cap mushrooms are also used for medicinal purposes because of their antimicrobial, antiallergic, antidiabetic, antioxidant, anticarcinogenic, anti-inflammatory, cholesterol-lowering, and immunomodulatory properties (Kosanić et al., 2012). The bioactivities of these mushrooms, such as their antioxidant, anticancer, antitumor, anti-inflammatory and antimicrobial properties, depend on how they are prepared, eaten or used (Heleno et al., 2015; Martins, 2017).

In general, mushrooms are also economically important due to their importance in food, pharmaceutical, biocontrol, chemical, biological and other industries (Meena et al., 2020). Today, wild mushrooms are primarily used as therapeutic and functional foods due to their chemical composition and bioactive compounds, such as lentinan and lovastatin, which prevent diseases such as hypertension, hypercholesterolemia, atherosclerosis and cancer, and their global market value is expected to increase (Wasser, 2014; Woldegiorgis et al., 2015; Zhang et al., 2016; Niego et al., 2021).

In addition to the use of wild mushrooms as traditional food (spices, delicacies, beverages, etc.) for everyday use or feasting, ethnomedical and religious ceremonies, wild mushrooms are also used for many other purposes, such as as objects, raw materials, decorative motifs, symbols (immortality, fertility), poison for humans and animals, fumigation of bees, perfumes, lubricants and, in Hungarian folk tradition, fertilizers. In contrast, mycophobic people who do not appreciate wild mushrooms call them "devil's bread", "food of the dead" and "excrement" (Zsigmond, 2010).

Many people have lost their lives in the past because many mushrooms are poisonous, and the people who collect them do not know the mushrooms well enough. Unfortunately, people continue to lose their lives today because mushrooms are collected unconsciously. The reason for this may be the lack of studies on edible mushrooms to date. This study was deemed valuable considering that edible mushrooms can meet the alternative protein needs of the increasing population and people who do not consume meat, that edible mushrooms can be used for medicinal purposes owing to the components in the mushrooms, and that more human losses due to poisonous mushrooms can be prevented.

Although numerous ethnomycological studies have been conducted in Anatolia and other mycophilic countries from past to present, there are three main problems in the development of these studies (Guzmán, 2001; Pekşen et al., 2016; Martins, 2017; Gizaw et al., 2018):

- Extensive destruction of wild vegetation in nature due to climate change, urbanization, chemical pollution, overgrazing and deforestation;
- The low number of experts on wild mushrooms in the country; and
- Loss of traditions among rural people and peasants due to the advancement of modern civilization, migration to urban areas and increased level of education, as a result of which traditional knowledge about edible and medicinal wild mushrooms has almost disappeared.

The widespread knowledge of the ethnobotanical characteristics of plants has enabled people to make maximum use of plants. Similarly, to determine the ethnomycological characteristics of fungi and maximize the benefits of fungi to humans, it is necessary to make accurate and clear diagnoses of fungi. In addition, ethnomycological and taxonomic studies, which include traditional knowledge, are highly important in Anatolia and worldwide for preserving traditional culture and memory to transfer information to future generations (Yilmaz et al., 2006; Yılmaz and Zencirci, 2016; Bulam et al., 2022; Tapan et al., 2024). This study was carried out to determine the mushrooms consumed by the local people of Isparta and to transfer traditional knowledge to future generations. As a result of this study, we aimed to help scientists work on this subject as a result of morphological diagnoses of mushrooms. This study may also provide a basis for further studies on the positive effects of edible mushrooms on human health.

2. Material and methods

2.1. Study area

Isparta, the province where the study area is located 37° 45′ 53″ North, 30° 33′ 24″ East in the northern Mediterranean Region in the Lakes region. The study area is shown in Figure 1. Afyonkarahisar in northwestern Isparta, Burdur in the southwest, Antalya in the south, and Konya in the southeast. Its altitude is 1050 m on average.

The interviews were conducted with people in areas that are considered representative of the Isparta region and where the mushrooms are currently thought to be mostly distributed. In this context, local people were interviewed in the districts of Isparta Province, and mushroom species were collected from these regions or from the places described by the people. Mushroom samples were collected between January 2023 and February 2024.

2.2. Morphological identification of mushrooms

The identification of the mushrooms was based primarily on their morphological characteristics using other researchers' methods (Bengü et al., 2021; Beram and Bıkzad, 2024). The macroscopic characteristics of the fungal growth

structures brought to the laboratory were noted, and the samples were then placed on white or black paper (with the pores or coverslips on the paper) and maintained for 24 hours for spore tracing. In the diagnosis of some fungi, the reactions of certain parts of the reproductive structure (such as the bark or trama) or spores with a KOH (potassium hydroxide) solution are also used. The spore-traced reproductive structures were stored in a freezer at -20°C. The mushrooms were identified on the basis of macroscopic and microscopic characteristics determined after they were brought to the laboratory.

3. Results

Within the scope of the research, 20 macro mushrooms belonging to 11 families were identified (Table 1). Visuals of the identified macro mushrooms are given in Figure 2 and Figure 3.

As seen in the graph, the month with the highest mushroom collection is May, during which the glade and on trees habitats stand out prominently (Figure 4). In contrast, during January and December, collection activities are more concentrated in the under trees habitat. This indicates that mushroom species tend to develop in different habitats depending on seasonal and ecological conditions.

The *Agaricaceae* family has been collected over a wide time span and in many different locations throughout the year (Figure 5). This suggests that the family is rich in species diversity and shows strong adaptability to varying environmental conditions. In contrast, families such as *Russulaceae* and *Tricholomataceae* have mostly been observed during the winter months (January–December) and in limited locations like Çukurköy and Aşağıgökdere. This indicates that these species may have more specific habitat and climate requirements. The *Morchellaceae* family, on the other hand, was mainly collected between March and May, suggesting that springtime soil temperature and humidity levels are favorable for their growth.

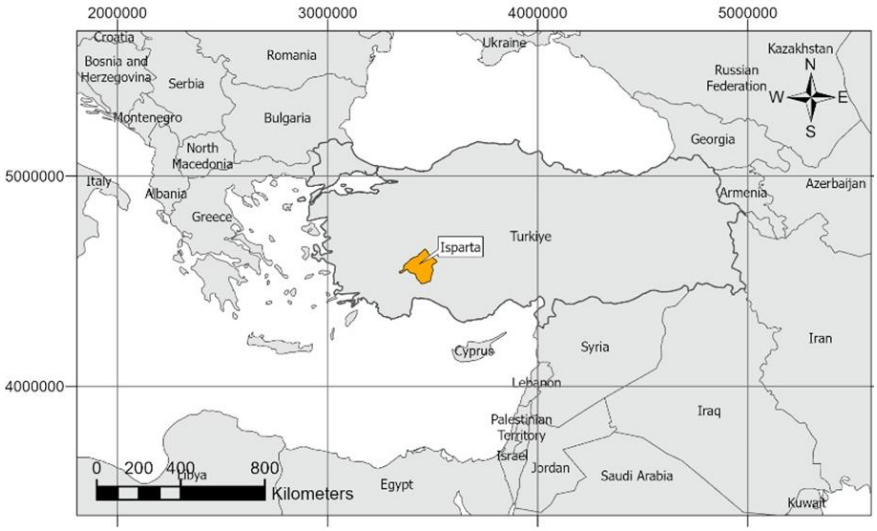

Figure 1. Location of the study area

Figure 2. Some of the mushrooms (1. *Flammulina velutipes;* 2. *Lactarius deliciosus;* 3. *Tricholoma terreum;* 4. *Macrolepiota procera;* 5. *Marasmius oreades;* 6. *Pleurotus ostreatus;* 7. *Morchella elata;* 8. *Agaricus augustus;* 9. *Coprinus comatus;* 10. *Coprinellus micaceus*)

Figure 3. Some of the mushrooms (1. *Morchella esculenta;* 2. *Agaricus campestris;* 3. *Bovista plumbea;* 4. *Amanita vaginata;* 5. *Verpa bohemica;* 6. *Infundibulicybe geotropa;* 7. *Lepista nuda;* 8. *Agaricus bitorquis;* 9. *Rhodocollybia butyracea;* 10. *Russula sp.*)

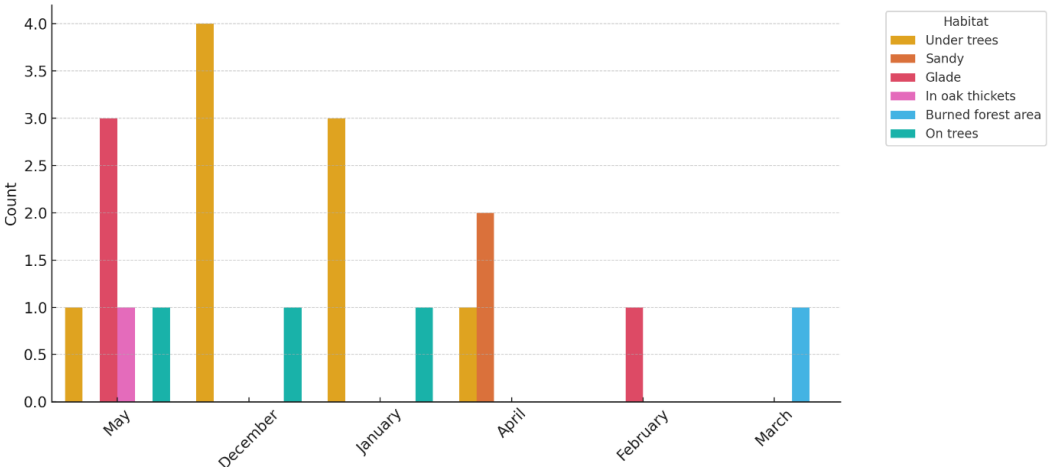

Figure 4. Collection time and habitat

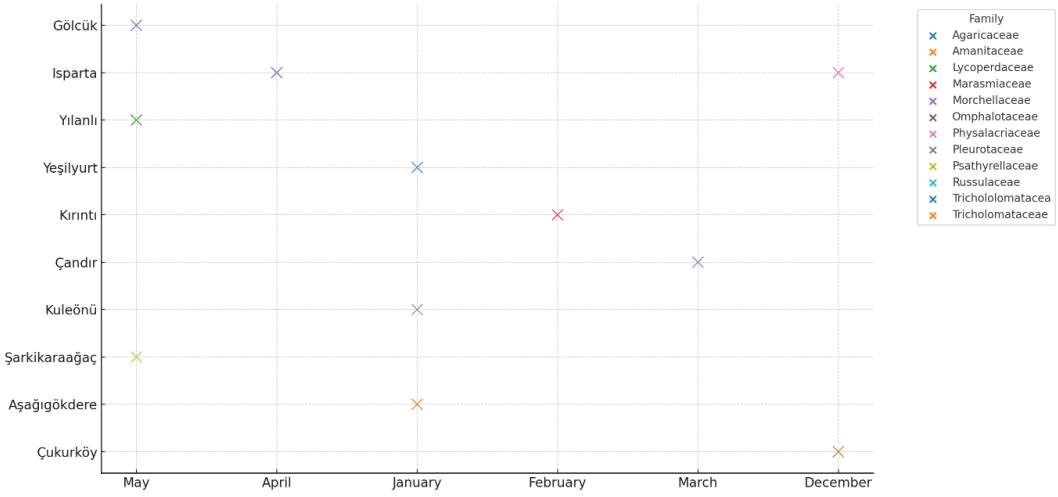

Figure 5. Collection time, collection locations and families

As shown in the graph, the most common method of mushroom consumption is sautéing (Figure 6). This method is used across nearly all mushroom families, indicating its popularity due to both flavour and practicality. In addition, methods intended for long-term preservation—such as cooking, canning, freezing, and drying—are also widely practiced. This reveals that mushrooms are not only consumed fresh but are also preserved for use throughout the year. On the other hand, methods like frying and grilling are used for a smaller number of species and typically cater to specific taste preferences. Overall, this distribution highlights that mushrooms have a wide range of culinary uses and reflect traditional consumption habits shaped by local knowledge.

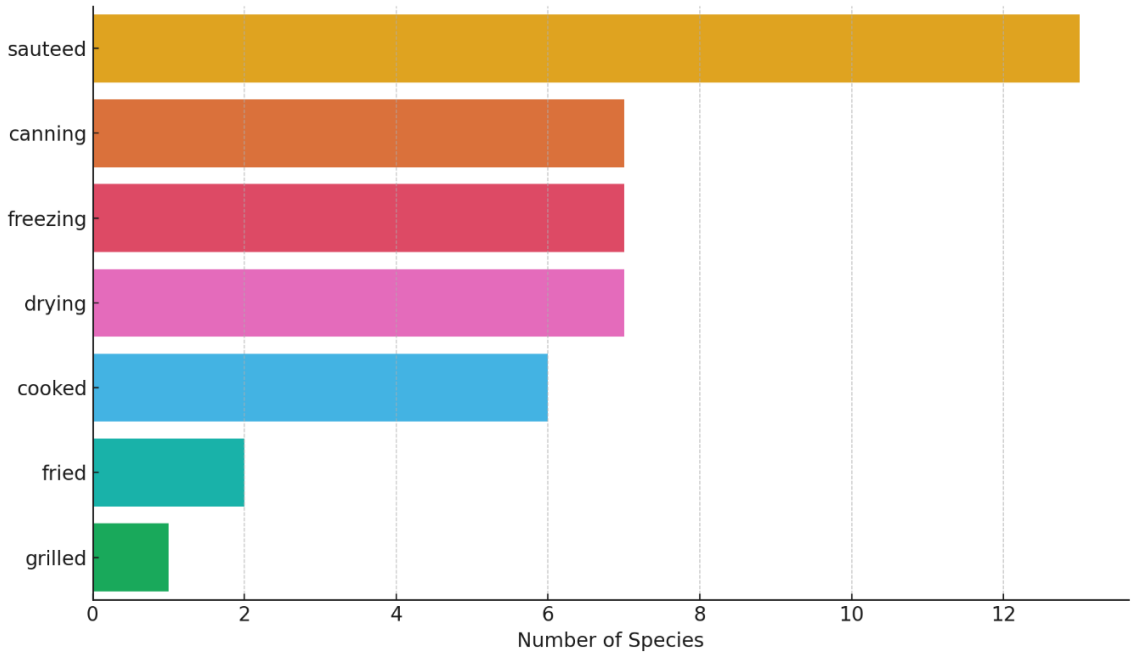

Figure 6. Consumption styles of mushrooms

Table 1. Families, collection location and time, habitat and consumption patterns of the mushrooms

No	Family	Scientific name	Local name	Collection location	Collection time	Habitat	Consumption style
1	*Agaricaceae*	*Agaricus augustus* Fr.	Şehzade mantarı, kara mantar	Gölcük	May	Under the coniferous trees	It is consumed sauteed with onion and various spices.
2	*Agaricaceae*	*Agaricus bitorquis* (Quél.) Sacc.	Doğal tarla mantarı	Isparta	April	On sandy terrain	It is consumed sauteed or made into soup. It is also preserved by canning, freezing or drying.
3	*Agaricaceae*	*Agaricus campestris* L.	İçi kızıl, çayır mantarı	Yılanlı	May	Glade, meadow	It is consumed grilled or sauteed with onion. It is also preserved by canning, freezing or drying.
4	*Agaricaceae*	*Coprinus comatus* (O.F.Müll.) Pers.	Söbelen mantarı	Isparta	April	On sandy terrain	It is consumed in meat dishes or soup.
5	*Agaricaceae*	*Macrolepiota procera* (Scop.) Singer	Şemsiye mantarı	Yeşilyurt	January	Under coniferous trees and among maquis elements	It is consumed fried or cooked with eggs.
6	*Amanitaceae*	*Amanita vaginata* (Bull.) Lam.	Meşe mantarı	Yılanlı	May	Roadside, in oak thickets	It is consumed sauteed with onion and various spices.
7	*Lycoperdaceae*	*Bovista plumbea* Pers.	Puf mantarı	Yılanlı	May	Glade	It is consumed fried in butter.
8	*Marasmiaceae*	*Marasmius oreades* (Bolton) Fr	Mıhbaşı mantarı	Kırıntı	February	Glade	It is consumed sauteed with onion and various spices.
9	*Morchellaceae*	*Morchella elata* Fr.	Kuzu göbeği, göbek	Çandır	March	Burned forest area	It is consumed sauteed with onion and various spices. It is also preserved by canning, freezing or drying.

Table 1. continued

No	Family	Scientific name	Local name	Collection location	Collection time	Habitat	Consumption style
10	*Morchellaceae*	*Morchella esculenta* Fr.	Kuzugöbeği, göbek	Gölcük	May	Glade	It is consumed sauteed with onion. It is also preserved by canning, freezing or drying.
11	*Morchellaceae*	*Verpa bohemica* (Krombh.) J.Schröt.	Yalancı kuzugöbeği, sahte göbek	Isparta	April	Under broad-leaved trees	It is consumed cooked with onions and eggs.
12	*Omphalotaceae*	*Rhodocollybia butyracea* (Bull.: Fr.) Lennox	Yağlı mantar, Gövertek mantarı	Isparta	December	Under the coniferous trees	The hat is eaten sauteed with onion.
13	*Physalacriaceae*	*Flammulina velutipes* (Curtis) Singer	Kış mantarı	Isparta	December	On *Ailanthus*	Often used in soups and cooked with onions and tomato paste.
14	*Pleurotaceae*	*Pleurotus ostreatus* (Jacq. ex Fr.) P.Kumm.	İstiridye mantarı	Kuleönü	January	On *Populus nigra*	It is sauteed with onion or roasted with butter and flour to make soup. It is also preserved by canning, freezing or drying.
15	*Psathyrellaceae*	*Coprinellus micaceus* (Bull.:Fr.) Vilgalys, Hopple & Jacq.Johnson	Mürekkep mantarı	Şarkikaraağaç	May	On rotten trees	It is consumed in omelettes or sauteed.
16	*Russulaceae*	*Lactarius deliciosus* (L. ex Fr.) S.F.Gray	Çıntar, Kanlıca	Aşağıgökdere	January	Under the coniferous trees	It is usually eaten sauteed and grilled. It can also be pickled, stored and sold. Animals also consume this mushroom. It is also preserved by canning, freezing or drying.
17	*Russulaceae*	*Russula* sp.	Keçi mantarı	Çukurköy	December	Under the coniferous trees, under oak trees	It is consumed sauteed with onion and various spices.
18	*Tricholomatacea*	*Infundibulicybe geotropa* (Bull.) Harmaja	Bal kadın, ebişke, kalburcuk	Çukurköy	December	Under the coniferous trees, under oak trees	It is used as a filling in pie making. It is also preserved by canning, freezing or drying.
19	*Tricholomataceae*	*Lepista nuda* (Bull.) Cooke	Mor cincile mantarı	Çukurköy	December	Under the coniferous trees, under oak trees	It is consumed sauteed with onion and various spices.
20	*Tricholomataceae*	*Tricholoma terreum* (Schaeff.) P.Kumm.	Karaoğlan	Aşağıgökdere	January	Under the coniferous trees	Although its consumption is not considered appropriate in some scientific studies, local people consume it by cooking it with bulgur.

4. Discussion

Local names of edible wild mushrooms may be common for the same species or may vary from province to province. The same species of edible wild mushrooms can be given different local names in different places, and sometimes the same local names can be given to different species of edible wild mushrooms in different places (Yılmaz and Zencirci, 2016; Bulam et al., 2018b). Pekşen and Kaplan (2017) reported that Ordu edible wild mushrooms are very similar to Giresun species (Pekşen et al., 2016) in terms of both species' diversity and nomenclature. However, they stated that the words "Kirmit" or "Tirmit" are also used instead of "Mushroom" (e.g., Chicken kirmit, Hazelnut kirmit, Deer tirmit, White mountain tirmit, etc.). Şimşek and Önek (2021) reported that in Kastamonu, Lamb's Belly mushroom is called "Kuzukulağı", "Black mushroom" and "Rabbit Belly", and the Porcini (Bolet) mushroom is called "Ayuca". In this study, it was determined that lamb belly mushrooms are sometimes also called "belly". Sesli et al. (2020) published a book with commonly used names of wild mushroom species in Anatolia. According to the mushroom names, 233 local mushroom names were used for 25 edible mushroom species in a study conducted in Sinop (Acar, 2016), and 266 local mushroom names were used for 26 edible mushroom species in a study conducted in Kastamonu (Acar, 2018). While naming these mushrooms, morphological characteristics, shape, hat/stem, color, taste, sound, smell and texture, place/region where they grow, growing time, organ, animal and plant names (tree, grass, flower), clothing and article names, names of tools and equipment, gender, kinship, names of religious and literary figures, nicknames, numbers and beliefs were found to be more determinative among the locals. In addition, it was determined that bitter, inedible and poisonous mushroom species were given a general and bad name, and this was very rare.

In a study conducted to determine the antioxidant activities of edible mushrooms in the Mediterranean region, *Russula delica* species belonging to the genus *Russula, Tricholoma auratum* species belonging to the genus *Tricholoma*, and *A. campestris* species were identified from the Isparta region, and their antioxidant properties were determined (Sarıkürkcü, 2009). Scientific studies on edible mushrooms have been carried out within the borders of Isparta Province to date. In one such study, the species *Meripilus giganteus* was identified in Isparta (Kalyoncu et al., 2010). However, this species was not observed in the field during the period when the present study was conducted. In another study, new macrofungal species were recorded for Isparta, among which some are edible mushrooms (Güngör

et al., 2015). A study was conducted with antimicrobial substances obtained from *Flammulina velutipes* (Özcan, 2015). In this study, it was concluded that *F. velutipes* was consumed by local people. *Amanita vaginata* was found to be edible in a study conducted in Tokat and Yozgat Provinces (Bengü et al., 2021). In this study, it was also found to be edible, and the results were similar. A study conducted to determine the biological activities of *C. micaceus* and *T. terreum* suggested that mushrooms collected from these regions may cause serious damage to the human body and should not be consumed due to the high oxidant levels of the mushrooms used in the study (Akgül et al., 2016). In our study, it was determined that both of these species were consumed by local people. Many scientific studies have shown that the suitability of consuming these mushrooms is controversial. For this reason, informing local people about not consuming these mushrooms by experts would be appropriate. *L. nuda, L. deliciosus, M. deliciosa* and *P. ostreatus* were emphasized to be the mushrooms consumed throughout Türkiye in a previous study (Eren et al., 2017). In our study, these mushrooms were also determined to be consumed in the region.

In scientific studies, it was determined that *L. nuda, M. procera* and *P. ostreatus,* species are used as food in the Eastern Black Sea Region (Uzun and Kaya, 2022); *Morchella* species are used as folk medicine for scorpion stings and eye infections (Yılmaz and Zencirci, 2016; Sırrı and Sırrı, 2020); *Lactarius* spp. species are used as food (Arslan et al., 2021); *I. geotropa*, *Lactarius* spp., *L. nuda, M. oreades, and Morchella* spp., species are used as food (Erdem et al., 2018); *Lactarius* spp. and *Morchella* spp. are used as food (Lovrić et al., 2020; 2021); *F. velutipes* and *P. ostreatus* species are used as folk medicine (Wasser, 2002; Sullivan et al., 2006; Zhao, 2013; Gopal et al., 2022); *Lactarius* spp., *Morchella* spp. and *Tricholoma* spp. as food (Okan et al., 2013; Allı and Şen, 2016; Pekşen et al., 2016; Yılmaz and Zencirci, 2016; Bulam et al., 2018a, b; Turfan et al., 2019); *A. campestris*, and *M. esculenta* species as food (Akman and Baysal, 1984; Oruç et al. 2021); *M.a procera* species as food (Keleş et al.,2014; Akata et al. 2016); *Agaricus* spp., *C. comatus*, *M. oreades*, *Morchella* spp., *Lactarius* spp., *Lepista* spp. and *Pleurotus* spp. as food (Pekşen and Karaca, 2000; Sadullahoğlu et al. 2021). It was determined that these species were consumed as food (Okan et al., 2013; Allı and Şen, 2016); In our study, these species were consumed as food, and similar results were obtained.

5. Conclusion

This study was carried out to determine the edible macro mushroom species consumed in the Isparta region and to examine the mushroom consumption behavior of local people. As a result of field studies, 20 mushroom species belonging to 11 families (*Agaricus augustus, Agaricus campestris, Agaricus bitorquis, Amanita vaginata, Bovista plumbea, Coprinellus micaceus, Coprinus comatus, Flammulina velutipes, Infundibulicybe geotropa, Lactarius deliciosus, Lepista nuda, Macrolepiota procera, Marasmius oreades, Morchella elata, Morchella esculenta, Pleurotus ostreatus, Rhodocollybia butyracea, Russula* sp.*, Tricholoma terreum, Verpa bohemica*) were detected. These species are generally consumed by frying in oil, sautéing with onions and spices, making soup, drying, freezing, canning and pickling.

This study highlights the risks of poisoning that may arise from incorrect mushroom collection and consumption among the public. Within the scope of this study, the risks related to the collection of the wrong species can be reduced by determining the accuracy of the identification of the mushrooms consumed by the local people via morphological methods. This may contribute to more conscious behavior of mushroom pickers in the region and prevent poisoning cases.

In conclusion, this study aims to provide both academic and social benefits by recording the biodiversity and traditional consumption information of edible mushrooms in the Isparta region. The findings of this study provide a basis for further studies on edible macromycetes and suggest that the sustainable use of these mushrooms should be promoted. In addition, raising the awareness of local people and expanding educational activities are important for the conservation and safe consumption of these valuable natural resources.

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