

Full Length Research Paper

Screening the cultural characteristics of *Hebeloma eburneum* Malençon

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In this study, the cultural characteristics of *Hebeloma eburneum* Malençon (*Basidiomycota*, *Bolbitiaceae*) that included morphological and anatomical features and their natural spread in Turkey were investigated. Basidiomata of *Hebeloma eburneum* usually grows single or in groups, with fleshy caps of 4 to 8 cm in diameter. The cuticle of pileus is white and pinkish from the center toward the edges. Tissue fragments of *H. eburneum* basidiomata mycelium that formed white-pinkish pigmentation were investigated with light microscope and scanning electron microscopy (SEM). In SEM examinations, the surface of spores was not flat, but has a rough structure.

Key words: *Hebeloma eburneum*, *Bolbitiaceae*, Basidiomycota, radial growth speed.

INTRODUCTION

Members of *Hebeloma* genus have more than 100 species and they were described as biscuit-like due to their color and smell of sugar. In Turkey, *Hebeloma eburneum* Malençon (Figure 1) have been identified by many researchers in different regions and it has been stated that they grow in conifer forests.

H. eburneum grows in conifer forests, especially *Pinus nigra*, *Pinus brutia*, *Platanus orientalis* and *Abies cephalonica*, and in particular, they grow in summer and spring, owing to continuous life of mycorrhiza with high structural trees (Kaşık and Öztürk, 2000; Kasik et al., 2002, 2003; Öztürk et al., 2003; Aktaş et al., 2003; Yağız et al., 2005; Doğan and Türkoğlu, 2006; Türkoğlu and Gezer, 2006; Gezer et al., 2006; Türkoğlu and Kasik, 2007; Türkoğlu et al., 2007; Gezer et al., 2007, 2008).

In this paper, the morphological and anatomical structures, including mycelium forms of *H. eburneum* that have naturally spread in Turkey, with very few of them recognized, were examined. *H. eburneum* is distributed at Antalya (Alanya), Karabük, Kayseri, Konya and Denizli, in Turkey (Figure 2).

MATERIALS AND METHODS

H. eburneum was collected by Dr. Aziz Turkoglu from Denizli-Babadag, a neighborhood to Incirpinar at *P. brutia* forest (Figure 3), and was protected as Türkoğlu 2578 in the study's laboratory.

Morphological studies

The tissue fragments, taken from *H. eburneum* basidiocarp, were inoculated on the potato dextrose agar (PDA) medium and the primary mycelium was obtained. Mycelium agar discs (8 mm diameter), taken from the developed primary mycelium, were inoculated with potato dextrose agar and incubated at 28°C in the dark for three weeks, then the secondary mycelium was obtained. The development of the secondary mycelium was measured on a daily basis. During the completing mycelial colonization period, radial mycelial growth rates were taken as criteria.

RESULTS

Anatomical studies

Light microscopy studies

Light microscopy studies were maintained with a Nikon microscope brand kept in Kirikkale Vocational School,

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Figure 1. *Hebeloma eburneum*.



Figure 2. Distribution map of *H. eburneum* in Turkey.

Kirikkale University.

Procedures for SEM examinations

Electron microscopy studies were maintained with a Scanning electron microscope and a JOEL microscope

brand that were found in the Scanning Electron Microscope Laboratory, Kirikkale University. Four millimetres squares of *H. eburneum* mycelium on agar media were fixed in 3.0% glutaraldehyde solution for 1.5 h at room temperature. All materials were post-fixed in 1.0% osmium tetroxide and were dehydrated and embedded for 1.5 h.

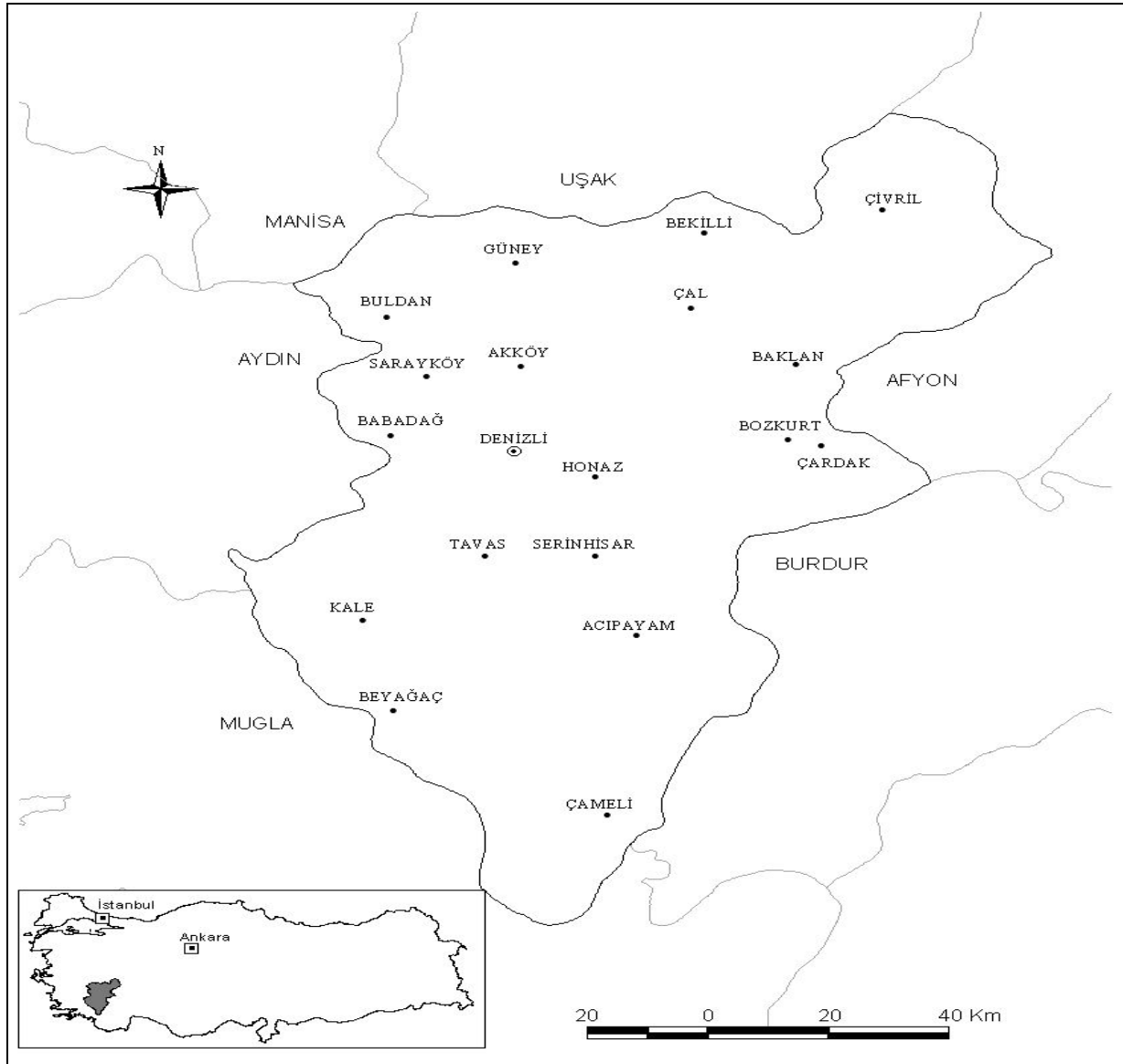


Figure 3. Study area.

Morphological studies

Cap

It has a diameter of 4 to 7 cm, and is fleshy with umbo. Its edges are slightly introverted, while the surface is glabrous and glossy. Its color ranges from cream to brown, whereas the tissue is white. However, it has a pale center on the adhesive.

Stalk

It is 5 to 7 x 0.5 to 1.5 cm in diameter. It is cylindrical and often curved, while white and yellowish spots are found

on the fibrillin.

Lamel

It has a connected stalk, with large, crowded buildings, and cutting notches or breakage. Primarily, it consists of a brown color, while the edges are whitish. Its spore trace is brownish.

Mycelium structure

Mycelium is poorly developed on the potato dextrose agar media, while the structures are gaining more con-

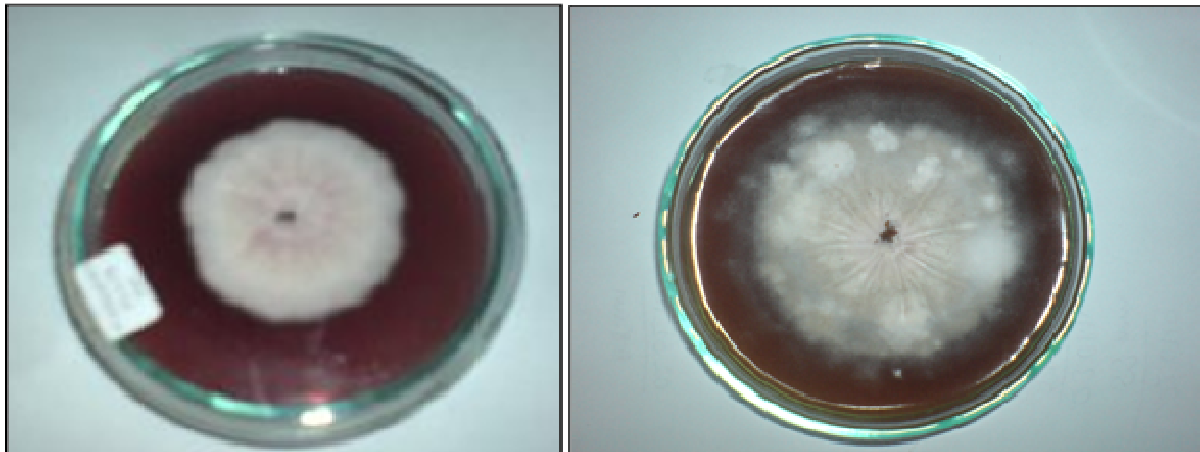


Figure 4. Mycelium development of *Hebeloma eburneum*.

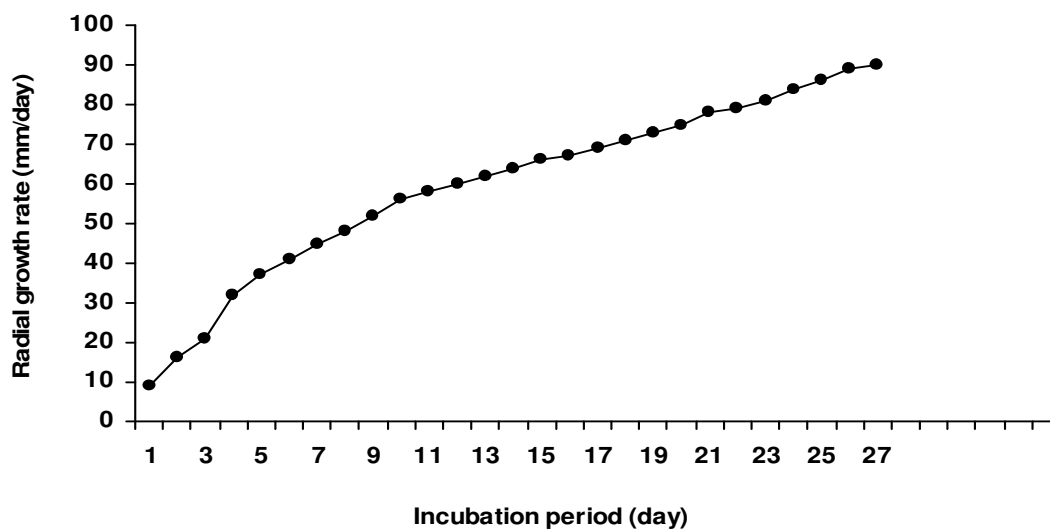


Figure 5. The development of *Hebeloma eburneum* mycelium.

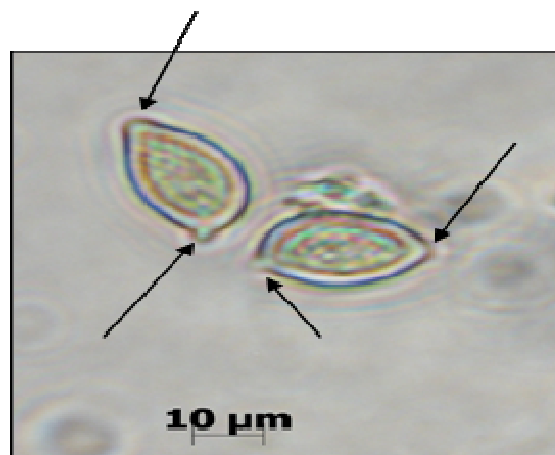


Figure 6. Spore structure (Arrows: germ pore).

entration on cotton. Four days after inoculation, the pinkish pigmentation, created by the Petri dishes, was later transformed into a purplish-brown color (Figure 4).

Mycelium development

Initially, mycelium development of *H. eburneum* was rapid, but later continually slowed down (Figure 5).

Anatomical studies

Light microscopy studies

The spore was $15 \times 25 \mu$ in size, elliptical or lemon shaped and has a significant germ pore (Figure 6). The



Figure 7. Mycelium structure (black arrows: growth starting point; white arrow: septa).

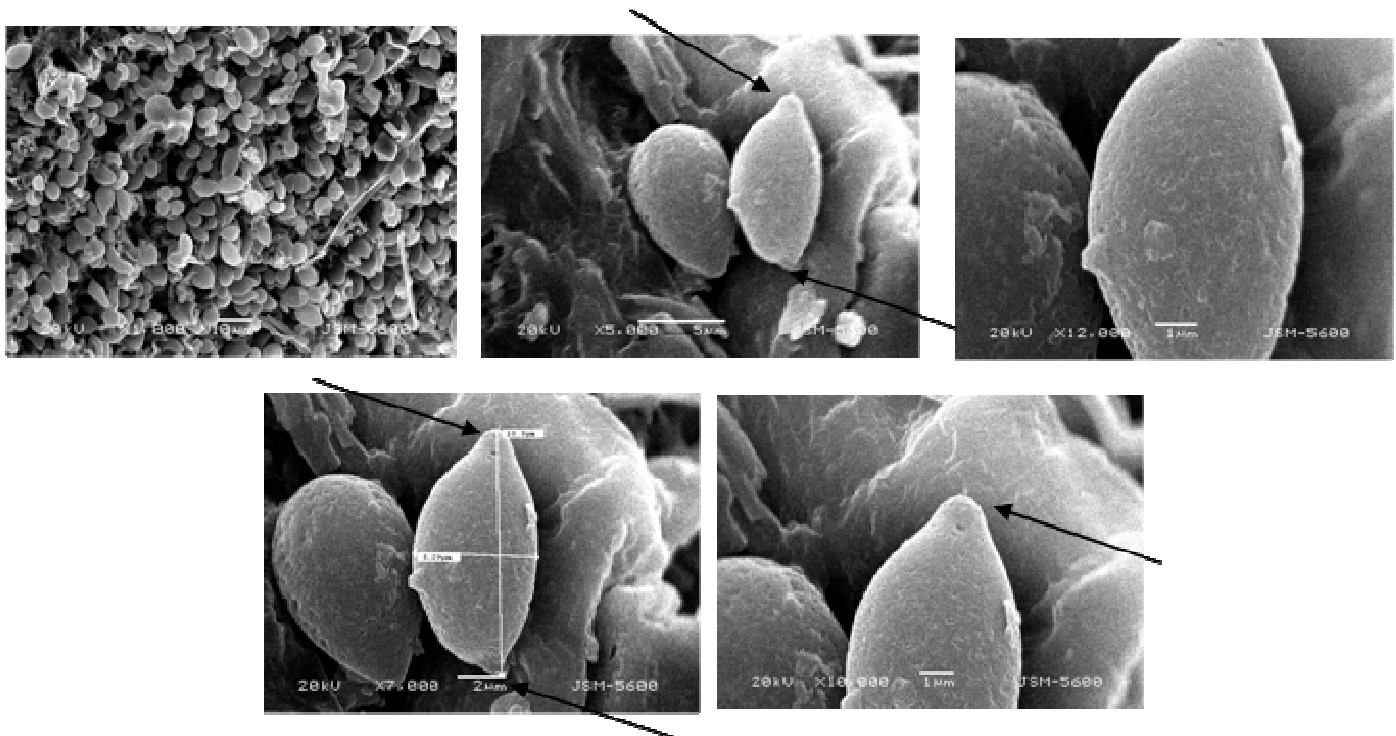


Figure 8. SEM examinations of *Hebeloma eburneum* spores (black arrows: germ pore).

mycelium is a slim line, but the growth starting point and septa are significant (Figure 7).

Electron microscopic studies

In electron microscopic studies, the spores and mycelium of *H. eburneum* were examined and the size of spores identified as $5.29 \times 10.5 \mu$. The surface of spores is not

flat and it has a rough structure (Figure 8). However, the growth starting point of mycelium is quite obvious (Figure 9).

H. eburneum is a fungus that spreads naturally in Turkey, but it is less known in the world. When eaten, it forms a gastrointestinal region problem; so, it is recommended that it should not be eaten. Particularly, the gastrointestinal syndrome is caused by diarrhea and vomiting. However, the characteristics of the fungus

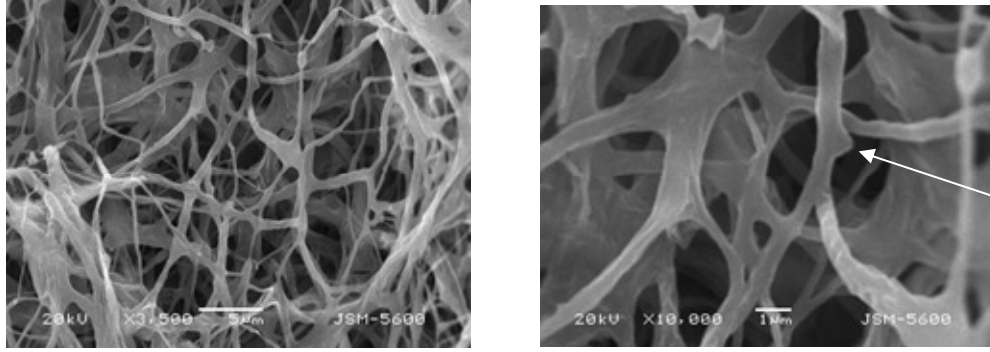


Figure 9. SEM images of *Hebeloma eburneum* mycelium (arrow= starting point of mycelium).

should not be confused with the *Hebeloma crustuliniforme* the so-called poison pie.

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