

# *Auricularia olivaceus*: a new species from North India

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*Auricularia olivaceus* sp. nov. (family *Auriculariaceae*) is described and illustrated as a new species, based on collections from Himachal Pradesh, North India.

**Key words** – Basidiomycetes – India – macrofungi – taxonomy.

## Article Information

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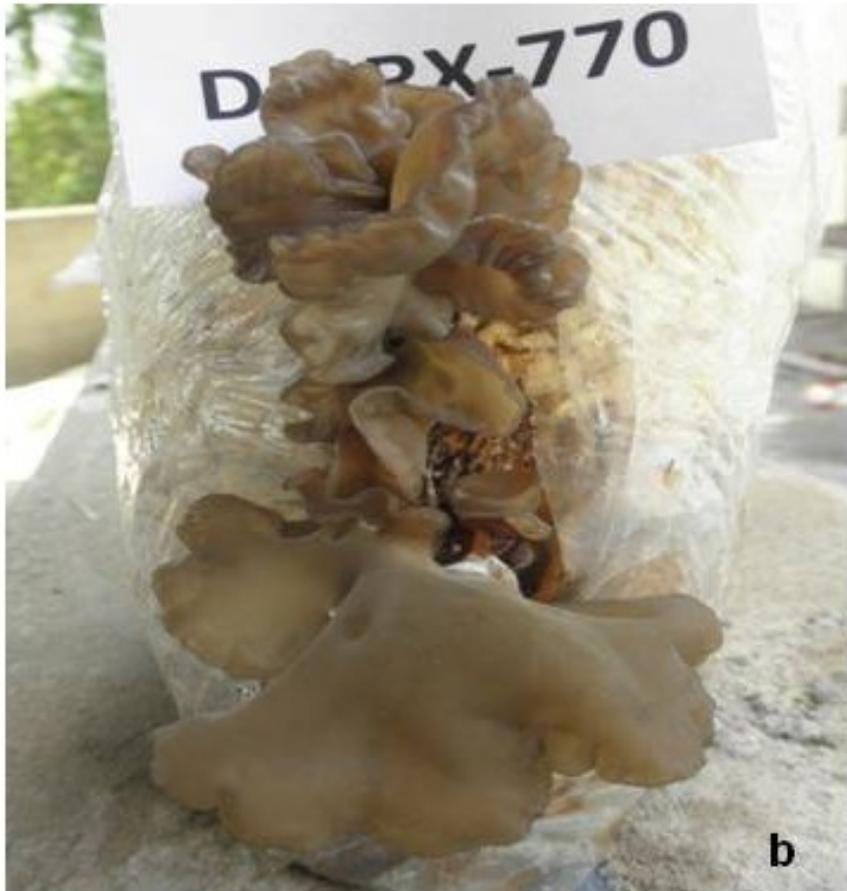
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## Introduction

The genus *Auricularia* is recognized as an edible mushroom, including 9 species throughout the world: *A. americana*, *A. auricula-judae*, *A. cornea*, *A. fuscossuccinea*, *A. delicata*, *A. pectata*, *A. mesenterica*, *A. polytricha* and *A. sordescens* (Kirk et al. 2008). This genus is diverse and complicated within basidiomycetes having gelatinous, resupinate to substipitate, solitary to gregarious dark yellow to brown or reddish to dark brown basidiocarps with the lower surface smooth, rugulose to meruloid, glabrous to pruinose and pilosy upper surface. Microscopically it has interesting internal details including presence or absence, width and morphology of medulla, length of abhymenial hairs and interesting characteristic nine zones (zonapilosa, zona compacta, zona superior subcompact, zona superior laxa, zona intermedia laxa, medullary layer, zona inferior laxa, and zona inferior subcompacta, hymenial layer) of the fruit body tissue. Basidia are cylindrical to clavate, transversely 3-septate, with projecting slender epibasidia terminating in sterigmata which are

branched, slender, usually strongly metamorphosed. Basidiospores are inamyloid, hyaline, cyanophilous and allantoid. It is commonly known as wood ear fungus or grouped under "jelly-fungi" based on the ear-like or gelatinous consistency of the fruiting bodies.

The species of this genus have been described on the basis of both classical or phylogenetic tools (Lowy 1952, Kobayasi 1981, Bandoni 1984, Weiß & Oberwinkler 2001, Montoya-Alvarez et al. 2011). The genus is categorized into two types on basis of presence or absence of a medullary layer in middle portion. Those with a medullary layer are: *A. cornea*, *A. fuscossuccinea*, *A. tenuis*, *A. emini* and *A. polytricha* and those without a medullary layer are: *A. auricula-judae*, *A. delicata*, *A. mesenterica*, *A. ornata* and *A. peltata*. Six species of *Auricularia* have been reported from India: *A. polytricha*, *A. auricular-judae*, *A. cornea*, *A. mesenterica*, *A. delicata*, and *A. curricula* from India (Sohi & Upadhyay 1990, Singh 2008, Mukerji & Manoharachary 2010).



**Fig. 1** – *Auricularia olivaceus* sp. nov.

## Material & Methods

Standard methods for collection, preservation and description of agarics were followed, using the terminology given by Atriet al. (2005) for collection and identification of mushrooms. Colour notations in the macroscopical descriptions are from Kornerup & Wanscher (1978). The specimens were hot air dried and packed in cellophane paper bags containing 1–4 dichlorobenzene as preservative to ward off insects. Macroscopic examination was carried out on fresh specimens in the field. Microscopic characters were studied from free-hand sections mounted in 5% KOH, stained with 1% Congo red. Microscopic line drawings were made with the aid of a camera lucida at 1000 $\times$ . Basidium length excludes the length of sterigmata. The spore shape quotient ( $Q = L/W$ ) was calculated considering the mean value of length and width of 20 basidiospores. Microphotography of the internal details was done under Leica DM LS2 (Glattbrugg, Switzerland) microscope with light and phase contrast optics. The specimens have been deposited in the Herbarium of Botany Department, Punjabi University, Patiala (Punjab), India under PUN and Herbarium of Directorate of Mushroom Research, Chambaghat, Solan H.P India under DMR. For taxonomic treatment, Singer (1986) and Kirk et al. (2008) have been followed.

## Results

### Taxonomic observations

*Auricularia olivaceus* B. Kumari sp. nov.

Figs 1–3

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Diagnosis – The examined collection is closed to *Auricularia tenuis* in having pileal hairs up to 100  $\mu\text{m}$  long and presence of medulla, differs in having large basidiospores and unique olivaceous coloration in fruiting body.

### Morphological details

Carpophores 2.0–5.5 cm in height. Pileus 3.0–6.5 cm in diameter, surface moist, silky, slippery, rubbery, gelatinized fan-shaped with irregularly lobed margins, olive-brown

(4E5) with brownish grey (6D2) tinge in few specimens, surface 0.2 cm thick, near margin 0.1 cm thick. Vein-like elevations present, more near margin, margin irregular, splitting at maturity; cuticle fully peeling; flesh white, unchanging, up to 0.4 cm thick; taste and odour mild (Fig. 1a, b).

### Microscopical details

Zona pilosa – Hairs 25–100  $\mu\text{m}$  long, 5–7  $\mu\text{m}$ , broad with prominent central strand, rounded at tips, hairs cylindrical to slightly broadened in lower portion or basal portion, appearing truncate at apical end, golden brown walled, forming tufts while some of them are scattered (Fig. 2d, e).

Zona compacta – 30–80(–120)  $\mu\text{m}$  wide, densely compacted, individual hyphae not distinguishable, rarely or in distinguish up to 0.5–1  $\mu\text{m}$  in width (Fig. 2f-h).

Zona subcompacta superioris – 30–100  $\mu\text{m}$  wide, hyphae 1–2  $\mu\text{m}$  in diameter, oriented mostly perpendicular with the surface (Fig. 2f-h).

Zona laxasuperioris – 130–400  $\mu\text{m}$  wide, hyphae 1.5–3  $\mu\text{m}$  in diameter (Fig. 2f-h).

Medullary layer – 100–400 $\mu\text{m}$  wide, hyphae 2–3.5  $\mu\text{m}$  in diameter, almost parallel with the surface (Fig. 2f-h).

Zona laxainferioris – 120–420  $\mu\text{m}$  wide, hyphae 1.5–2  $\mu\text{m}$  in diameter (Fig. 2f-h).

Zona subcompacta inferioris – 40–110  $\mu\text{m}$  wide, hyphae 0.5–1  $\mu\text{m}$  in diameter (Fig. 2f-h).

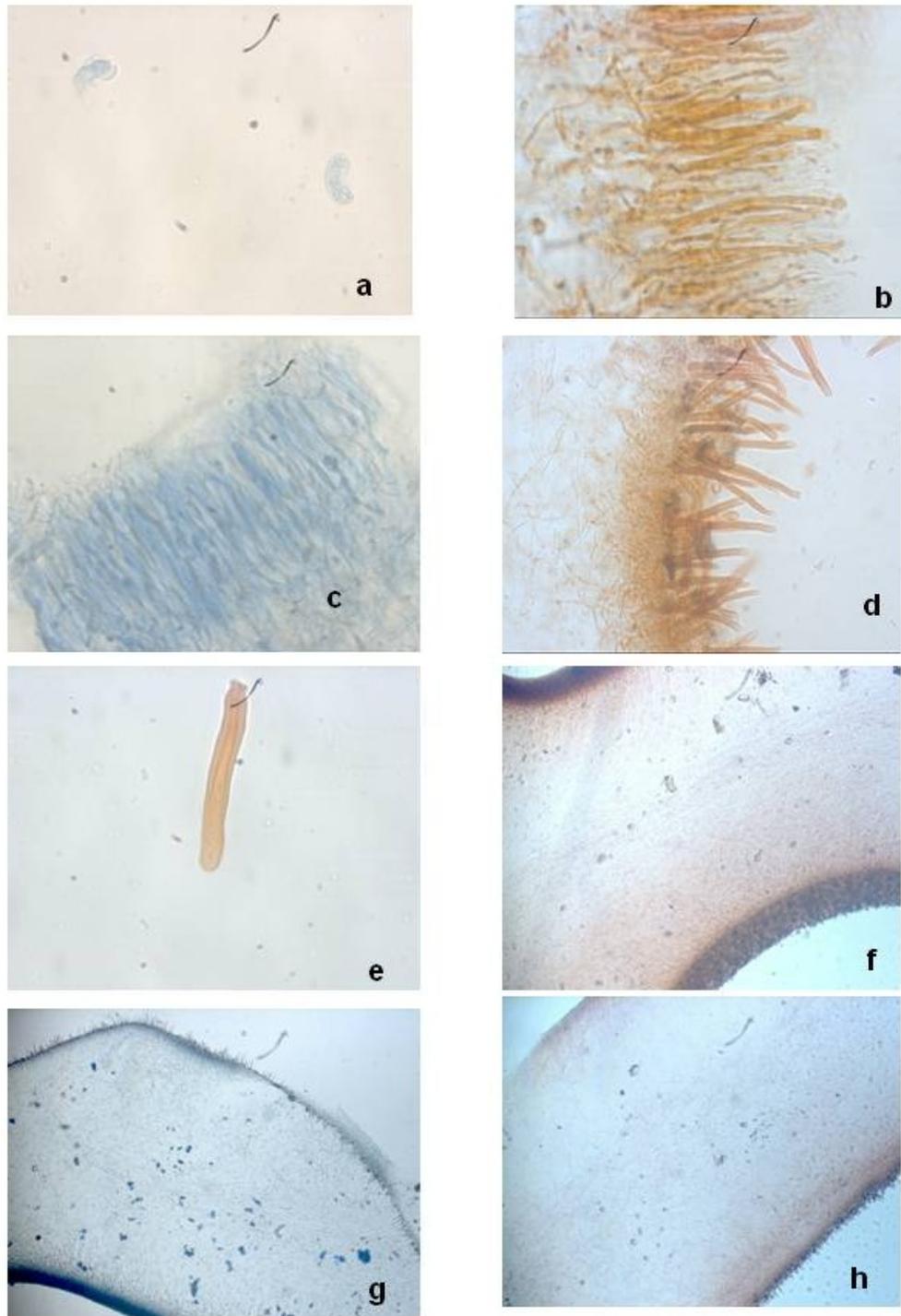
Hymenium – 30–120  $\mu\text{m}$  wide (Fig. 2 f-h).

Basidiospores – 7.5–12.5(–14.5)  $\times$  3–5  $\mu\text{m}$  ( $Q = 1.6 \mu\text{m}$ ), allantoid, few with oil guttule, inamyloid, cyanophilous (Fig. 2a).

Basidia – Cylindrical to clavate 30–65  $\times$  2–4  $\mu\text{m}$ , 3-septate. Clamp connections present (Fig. 2b, c).

Type – India, Himachal Pradesh: Shimla Tara Devi, growing gregarious on old *Quercus incana* among Sal forest (PUN 5075, holotype), 22 Aug 2010, Himachal Pradesh, Barot (2500 m) under *Cedrus deodara*, Babita Kumari (DMRX770) 11 Aug. 2010.

Etymology – The name of the species is based on unique olive colouration of carpophores.

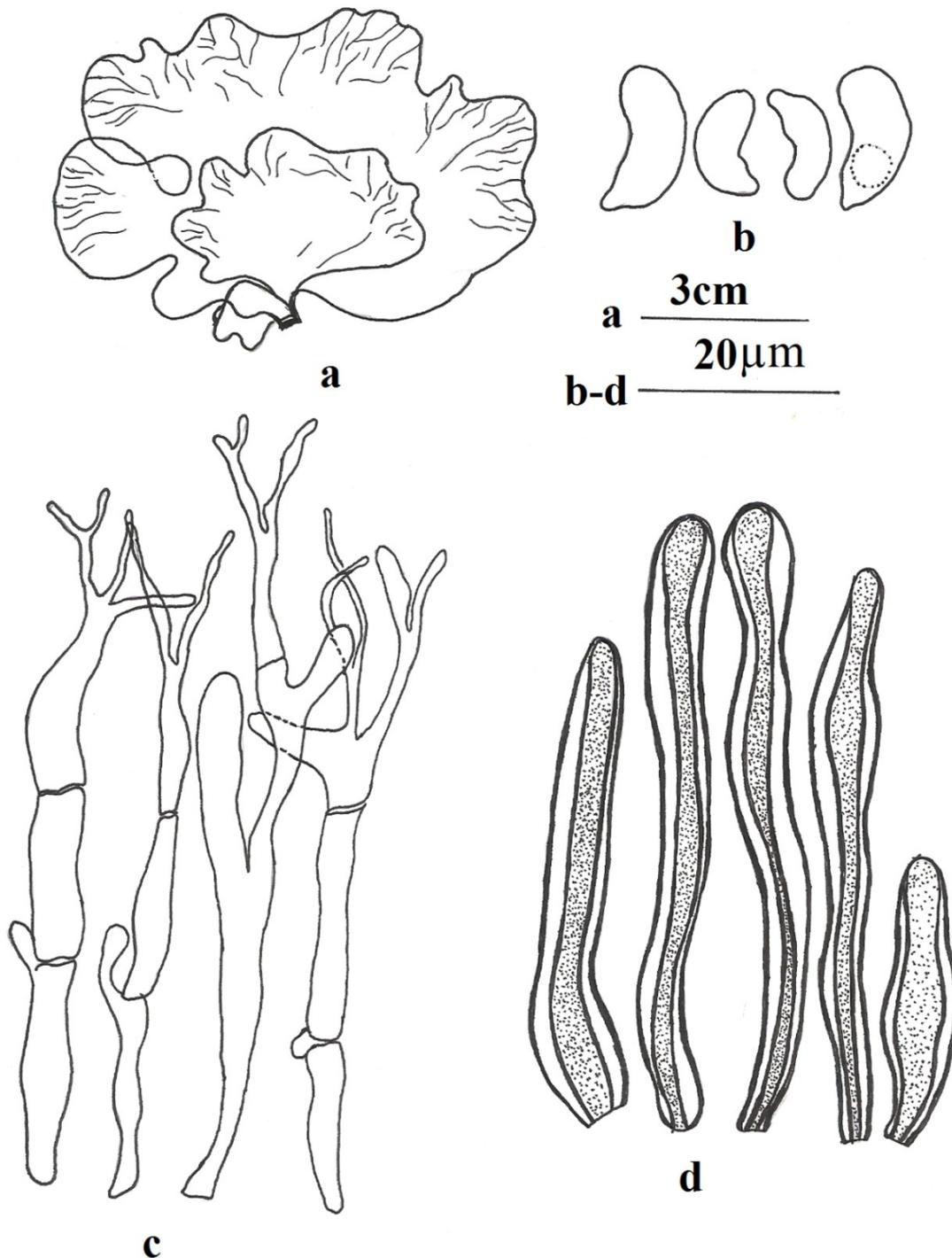


**Fig. 2** – a–h *Auricularia olivaceus* microscopic structures **a** basidiospores **b–c** basidia. **D** – epileal hairs. **f–h** cross sections.

### Discussion

*Auricularia olivaceus* sp. nov is characterized by having a unique olivaceous colouration to the fruiting body, presence of medulla, multi-lobed margin, presence of venation on the surface, and presence of prominent central strand in hymenial hairs. In

our observations more variance occurred in the width of the hyphal zonations than that reported in previously published accounts (Lowy 1952, Kobayasi 1981, Bandoni 1984). *Auricularia olivaceus* shows large morphological variations of the fruit-bodies from others members of the genus *Auricularia*.



**Fig. 3 – a–d** *Auricularia olivaceus* **A** Carpophore. **B** Basidiospores. **C** Basidia. **D** Pileal hairs.

In external morphology it is quite different from *A. polytricha* which has dark brown to dark lilac surface, upper surface densely pilose and cylindrical and solid substipitate. In gross morphology, it is also distinct in section from *A. mesenterica* and *A. auricula-judae*.

It shows close resemblance to *A. tenuis* in having pileal hairs up to 100  $\mu\text{m}$  long and

presence of medullary layer, but *A. tenuis* has large basidiospores (12–15  $\times$  5–6  $\mu\text{m}$ ). It differs from *A. fuscosuccinea* in having pileus zone approximately 100  $\mu\text{m}$  instead of less than 100  $\mu\text{m}$  and medullary layer more than 150  $\mu\text{m}$ . It shows resemblance to *A. polytricha* in having a medullary layer more than 150  $\mu\text{m}$  but it has a pilose zone more than 100  $\mu\text{m}$ .

Due to its unique olive colouration and no resemblance with other species of *Auricularia* in its internal morphology, the present collection is described as a new species, *Auricularia olivaceus* sp. nov.

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