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Survey and Studies on Morphological Characters of Black Ear Mushroom (*Auricularia* spp.)

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ABSTRACT

Survey was conducted in ten different locations of Thiruvananthapuram and Kollam districts of Kerala for collecting Auricularia spp. The collected mushrooms were gregarious and lignicolous in habit. Tree stumps of Mango, Coconut, Drumstick, Teak wood, Bottle brush, Swarna gopuram, Casuarina spp, Acasia spp, Tamarind, Cashew, Vattakkanni and Rubber were found to be the usual hot spots for the occurrence of the Auricularia spp. Pileus characters of Auricularia spp. ranged from brown to dark brown colour, diameter of 2.6 – 3.8 cm, with varied texture. The stipe was absent in all collections and if present, it was very small, 0.4 to 1.0 cm in length and 0.4 to 0.9 cm diameter. Volva and annulus were also absent in all the collected mushrooms.

Key words: *Auricularia spp. Survey, Locations, Host Plants, Morphological Characters.*

INTRODUCTION

Mushrooms are considered as a delicacy with high nutritional and functional value, and they are also accepted as nutraceutical foods. They are of considerable interest because of their organoleptic merit, medicinal properties, and economic significance. The black ear mushroom comes under jelly fungi category. The term "Jelly fungi" is applied to species of fungi having gelatin-like consistency[1]. Production of wood ear accounts for about 6% of the world's total output of mushrooms. Annual production of *Auricularia* spp. in China alone reached nearly 3.6 million t in 2010 making them the second most widely cultivated mushrooms in that country[4]. The fruiting body is distinguished by its noticeably earlike shape and brown to black colouration. These mushrooms are rich in energy, protein, fat, carbohydrates, vitamins and minerals[3]. Since this is a lignocellulolytic mushroom it can be grown on largely available agro industrial wastes like paddy straw, saw dust etc. and indicates the scope for their large scale production and use as folk medicine for tribal people. The fungus can be found throughout the year in temperate as well as in tropical regions of the world, where it grows upon both dead and living wood.

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Kerala is blessed with climatic conditions very much suited for cultivation of this mushroom as well as its abundance of occurrence. Hence the study was made to know the occurrence and morphology of the mushroom from different locations of Kerala.

MATERIALS AND METHODS

Survey was conducted during pre and post monsoon showers from May to December in ten different locations of Thiruvananthapuram and Kollam districts of Kerala. Locations viz., Vellayani, Venganoor, Vanchiyoor, Neyyattinkara, Kattakada, Ponmudi, Nedumangad, Palode, Arippa and Kulathupuzha were selected to collect and to identify different strains of *Auricularia* spp. The study was undertaken in places having dense vegetation of trees, in each of the selected locations. Observations on the natural occurrence and habitat of the spotted mushrooms were also made and recorded.

Mushroom sporocarps obtained from the surveyed locations were brought to the Plant Pathology laboratory, College of Agriculture, Vellayani in order to examine the specimens and to isolate the fungal culture by the standard technique. Subsequently morphological studies of collected mushrooms were also undertaken by detailed examination of macroscopic characters of the sporocarps.

Morphological studies on the collected sporocarps of *Auricularia spp.*

Morphological studies were conducted to study and identify the macroscopic characters of *Auricularia spp.*

Studies on macroscopic characters of *Auricularia spp.*

Macroscopic studies were conducted based on details such as colour, texture, pileus, stipe, spore print, lamellae and gills were observed. Sporocarps closely resembling *Auricularia spp.*in their external features, obtained during the survey were examined and were sorted out. Macroscopic characters of the selected sporocarps were then studied in detail for their morphological characterisation.

RESULTS AND DISCUSSION

Survey and collection

Surveys were conducted in ten different locations of Thiruvananthapuram and Kollam districts of Kerala and the locations like, Vellayani, Venganoor, Vanchiyoor, Neyyattinkara, Kattakada, Ponmudi, Nedumangad, Palode, Arippa and Kulathupuzha to identify different strains of *Auricularia* spp. that were growing under natural conditions during pre and post monsoon showers of 2014-2015.

Black ear mushroom (*Auricularia spp*.) is a temperate mushroom which prefer cool and humid climate for fruiting of the mushroom.

During the course of the survey, fungal sporocarps that were externally similar to *Auricularia spp.* were obtained. These mushrooms were gregarious and lignicolous in habit and obtained from different locations as listed in Table 1and Pate 1. Tree stumps of Mango, Coconut, Drumstick, Teak wood and Rubber were found to be the usual spots for the occurrence of these *Auricularia spp.*

Mushrooms collected from all the locations were gregarious in habit and lignicolous in habitat. Wood logs of Mango, fallen Coconut wood logs, Bottle brush tree stumps, copper pod tree stumps, Swarna gopuram (*Tecoma stans*), *Casuarina equisetifolia, Acasia spp.* Cashew, *Macaranga indica* and Drumstick were found to be the host substrate for mushrooms collected from Vellayani. Coconut and Drumstick were the hosts for Venganoor collections. Rubber and Coconut saw mills were found to be hot spot for collections from Vanchiyoor, Nedumangad, Palode, Arippa and Kulathupuzha. From Neyyatinkara and Vanchiyoor mushrooms obtained from Coconut, Tamarind and *Casuarina*. Kattakada collections were obtained from Teak wood and Rubber. Coconut and Drumstick were common hosts for Ponmudi collections. These results are in agreement with observations made that *Auricularia spp.* could be collected from different locations of Thiruvananthapuram district *viz*, Vellayani, Balaramapuram, Kalliyoor, Palappur and Vanchiyoor during monsoon and post monsoon periods[8]. The mushrooms were observed on dead stumps of Mango tree and Anjili tree and Coconut tree Geetha [2] and Mohanan[5] also reported the occurrence of *Auricularia spp.* from Thiruvananthapuram district of Kerala, in Coconut and *Moringa spp.*

Studies on macroscopic characters of *Auricularia spp.*

Morphology of various collections of *Auricularia spp.* were studied in detail and their descriptions are given below (Table 2 and Plate 1).

Pileus characters: The pileus characters of *Auricularia spp.* from ten different locations, are given below Vellayani collections showed brown to dark brown in colour, incurved margin and ear shaped with a diameter of 2.6 cm and were soft and velvety in texture. Collections from Venganoor, depicted as light brown in colour, Spathulate (Like a spoon in form) in shape, 3.6cm in diameter with leathery and spreaded in texture. Vanchiyoor collections of *Auricularia spp.* exhibited brown coloured ear shaped pileus, with a diameter of 3.8 cm and had tough and leathery texture. Neyyatinkara collections showed dark brown coloured, ear shaped to flabelliform pileus, 2.5 cm in diameter with tomentose texture. Collections from Kattakada were dark brown coloured with ear shaped pileus with a diameter of 3.8 cm and the texture was leathery and caespitose. Ponmudi and Nedumangad collections were brown in colour, flabelliform and ear shaped with 3.8 and 3.2 cm diameter of pileus respectively. Palode collections showed that the mushrooms were dark brown coloured, margin incurved and 2.6 cm in diameter with a rough texture at border and smoother inside. Arippa and Kulathupuzha collections were similar in pileus characters *i,e.,* brown coloured, ear shaped and 3.2 cm in diameter. Texture varied from soft and velvety to leathery. Similar results were reported that the fruit body of *A auricula* is normally 3 to 8 centimetres (1.2 to 3.1 in) across[7]. It is distinctively shaped, typically being reminiscent of a floppy ear with brown colour. The collected fruiting bodies had 4 different shapes ranging from cup- shaped to ear shaped[6].

Stipe characters: The collected *Auricularia* mushrooms from ten different locations were devoid off stipe and even if present, it was very small, 0.4 to 1.0 cm in length and 0.4 to 0.9 cm diameter. Volva and annulus were also absent in all the collected mushrooms. The stipe of *Auricularia spp* had 0.5 – 1 cm length and 1 – 1.5 cm diameter[8].

Table 1: Occurrence of *Auricualria spp.* from ten different locations of Kerala

Sl No.	Locations	Habit	Habitat	Host plant	Month of collection
1	Vellayani	Gregarious	Lignicolous	Mango (*Mangifera indica*), Coconut (*Coccus nucifera*), Bottle brush (*Callistemon spp*), Copper pod tree (*Peltophorum pterocarpum*), Swarna gopuram (*Tecoma stans*) *Casuarina equisetifolia, Acasia spp.* Cashew (*Anacardium occidentale*) *Macaranga indica* and Drumstick (*Moringa spp.*)	November, 2014
2	Venganoor	Gregarious	Lignicolous	Coconut (Coccus nucifera) and Drumstick (*Moringa spp.*)	September, 2015
3	Vanchiyoor	Gregarious	Lignicolous	Rubber (*Hevia brassilensis*) and Coconut (*Coccus nucifera*)	September, 2015
4	Neyyattinkara	Gregarious	Lignicolous	Coconut (*Coccus nucifera*), Rubber (*Hevia brassilensis*) and Tamarind (*Tamarindus indica*)	September, 2015
5	Kattakada	Gregarious	Lignicolous	Teak wood (*Tectona grandis*) and Rubber (*Hevia brassilensis*)	September, 2015
6	Ponmudi	Gregarious	Lignicolous	Coconut (*Coccus nucifera*) and Drumstick (*Moringa spp.*)	September, 2015
7	Nedumangad	Gregarious	Lignicolous	Rubber (*Hevia brassilensis*) and Coconut (*Coccus nucifera*)	December, 2015
8	Palode	Gregarious	Lignicolous	Rubber (*Hevia brassilensis*) and Coconut (*Coccus nucifera*)	December, 2015
9	Arippa	Gregarious	Lignicolous	Rubber(*Hevia brassilensis*) and Coconut (*Coccus nucifera*)	December, 2015
10	Kulathupuzha	Gregarious	Lignicolous	Rubber(*Hevia brassilensis*), Drumstick (*Moringa spp.*) and Coconut (*Coccus nucifera*)	December, 2015

Table 2: Morphological characters of *Auricularia spp.*

Pileus characters					Stipe characters	
Collections	**Colour**	**Shape**	**Diameter (cm)**	**Texture**	**Size (cm)**	**Volva and Annulus**
Vellayani	Brown to dark brown	Margin incurved and ear shaped	2.6	Soft and velvety	0.6*0.4	Absent
Venganoor	Light brown	Spathulate	3.6	Leathery and spreaded	1*0.9	Absent
Vanchiyoor	Brown	Ear shaped	3.8	Tough and leathery	0.7*0.7	Absent
Neyyattinkara	Dark brown	Ear shaped to flabelliform	2.5	Tomentose	0.6*0.4	Absent
Kattakada	Dark brown	Ear shaped	3.8	Leathery and Caespitose	0.8*0.4	Absent
Ponmudi	Brown	Flabelliform	3.8	Soft textured	0.8*0.6	Absent
Nedumangad	Brown	Ear shaped	3.2	Velvety like	0.4*0.4	Absent
Palode	Dark brown	Margin incurved	2.6	Rough at border and smoother inside	0.5*0.5	Absent
Arippa	Brown	Ear shaped	3.2	Soft and velvety	0.9*0.8	Absent
Kulathupuzha	Brown	Ear shaped	3.2	Leathery	0.9*0.7	Absent

Plate 1: *Auricularia spp.* from different hosts

Rubber **Drum stick**

Mango **Coconut**

CONCLUSION

The rich diversity of mushrooms in Kerala offers huge socio-economic potentials. However, it needs to be properly documented for optimum application. Hence, this study is an important step towards noting ecology and growth characteristics of *Auricularia spp*. The economic considerations apart, this study has also provided a baseline reference for further ecological, ethno mycological and diversity study of this mushroom. Furthermore, it has contributed to the knowledge on distribution of this particular mushroom in Thiruvananthapuram and Kollam districts of Kerala, which had earlier been poorly reported.

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