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AURICULARIA SPECIES IN MANIPUR AND ITS ARTIFICIAL CULTIVATION

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Four species of *Auricularia* viz. *A. polytricha, A. delicata, A. mensenterica* and *A.auricula* are reported and described from Manipur. The yield potential of *A. polytricha* by growing both on synthetic log and paddy straw is also investigated.

Keywords : *Auricularia*, cultivation, synthetic log, paddy straw, yield, potential.

Introduction

Occurrence and distribution of Jew's ear or *Auricularia* species in India is reported by many workers[1-5]. In Manipur, species of *Auricularia* are found in abundance because of conducive agroclimatic condition prevalent in the state. The rich forests in the hills provide a favourable habitat for this fungus.[6] This fungus has a special place among the local people and there is always a gap between supply and demand due to dwindling forest cover[7,8]. The market value of this mushroom in assorted form ranges from Rs.150-180 per kg on dry weight basis. However, no attempt have so far been made to grow it artificially in the state although there are reports of its artificial cultivation elsewhere in India[9-12]. The present study gives an account of *Auricularia* species available in the state and attempts to grow it artificially.

Material and Methods

Regular field visits and collection of *Auricularia* species in the local markets and jungles of the state were made during 2002-2006. All the collected specimen were sorted out and dried properly in the sunlight and preserved in air tight plastic containers. The samples were soaked in clean cold water overnight before studying their morphological and anatomical characters. Free hand sections of the specimen were studied critically for identification and characterization of different *Auricularia* species following Lowy[13-14]. Representative samples of each identified species were deposited in the Department of Botany, D.M. College of Science, Imphal.

Result and Discussion

Based on the internal structures of the fruit bodies, four species of *Auricularia* were identified from the state as.

Auricularia polytricha (Mont.) Sacc. - Basidiocarp leathery, gelatinous, cup or ear shaped with a convex surface, one to several lobes, upto 10 cm wide, 1.0–1.5*mm* thick, reddish brown when fresh, light gray or tan when dry and mostly sessile. Eight distinct hyphal zones present. Zona pilosa consists of hyaline hairs, 400–500 µm long, 5.0–7.0 µm thick, in tufts with prominent central strands. Zona compacta 20–25 µm wide, hyphal elements not distinguishable, zona compacta superioris 75–90µm wide, hyphae arranged perpendicularly to the surface. Zona laxa superioris 250-260 µm wide, Medulla 25-30 µm wide, zona laxa inferioris 250–260 µm wide. Zona sub compacta inferioris 90-100 µm wide. Hymenium 80–90 µm wide, dark, smooth, occasionally papillate. Basidia 50 – 60 × 4–6 µm, cylindrical, spores 12–17 x 5–6 µm, allantoid.

This species was foud growing on different decaying woods and collected from different local bazars in fresh, dried and rehydrated forms during April to August. It was earlier reported from Punjab, West Bengal, Maharastra and Tamil Nadu[15].

Auricularia delicata (Fr.) Henn. - Basidiocarb gelatinous and more fleshy than *A. polytricha*, solitary, ear shaped with margin slightly reflexed downwards, sessile to substipitate, upto 8 *cm* wide, reddish to creamish in colour. Six distinct hyphal zones observed in cross section. Zona pilosa of variable hyphal length (60 - 185 µm), hyaline with no central strands, tip blunt or irregularly rounded. Zona compacta 20-30 µm wide, zona subcompacta superioris ranges from 40-50 µm in wide, hyphae 2-3 µm in diameter. Zona intermedia 400-500 µm wide, hyphae 2-3 µm in diameter. Zona subcompacta inferioris 135-140 µm wide with hyphae 2-3 µm in diameter. Hymenium 80-90 µm thick, meruloid to strongly porose reticulate. Basidia 40-50×4 -5 µm, cylindrical, spores 9 -13×4 – 6 µm, allantoid.

Collected from the local markets of Imphal, Bishnupur, Churachandpur, Thoubal and Senapati districts. Reported earlier from Darjeeling[1] and North Eastern Hills[7].

Auricularia mesenterica Pers.- Basidiocarb tough,

gelatinous, sessile, bracket shaped, lobed, upto 10 cm wide, 2–4 *mm* thick, upper surface hairy and concentric zonate, lower surface reddish purple. Six distinct hyphal zones in cross section of the fruit body. Zona pilosa with hairs of varying length ranging from 500–600 µm, hyaline to dark brown. No central strand. Zona compacta 80-90 µm in wide. Zona subcompacta superioris 130-150 µm wide, zona intermedia 570 - 600 µm wide. Zona subcompacta inferioris 160-180 *µm* wide. Hymenium 110-130 µm thick, surface wrinkled, red brown when fresh, blackish when dry. Basidia 45-50×3-4 µm, cylindrical, spores 12 -18×5×-6 µm, allantoid.

Collected occassionally from Thoubal, Churachandpur, Bishnupur districts. It was earlier reported from Jammu and Kashmir[4].

Auricularia auricula (L. ex. Hook) Underwood.- Sporophore solitary, gregarious or in tufts, sessile, shallow, cup shaped or flattened, ear like, 3 – 7 *cm* wide, yellowish to reddish brown when moist. Surface convoluted and flexible, becomes horny and brittle when dry. Five distinct hyphal zones in cross section. Zona pilosa hyaline with rounded apices, 80–100 µm long, 5–7 µm thick. Zona compacta 65–75 µm wide, zona subcompacta superioris 115–130 µm wide, hyphae 2–3 µm diameter. Zona intermedia 280–300 µm wide with hyphae of 1–2 µm diameter. Zona subcompacta inferioris 100–200 µm wide. Hymenium 150 µm thick, smooth, red brown or coffee colour when moist. Basida 50–60×5–6 µm, cylindrical. Spores 10–15×5–6 µm, allantoid.

Collected from Tamenglong district and Jiribam subdivision of Imphal East district. Reported earlier from Calcutta and Sikkim[2,3].

Cultivation - Out of the four identified species of *Auricularia*, only *A. polytricha* was taken up for artificial cultivation as it was the most common and prevalent type during the field surveys. Pure culture of *Auricularia polytricha* was made both from fresh fruit body and multiple spore cultures. A visibly healthy fresh fruit body was selected and washed in sterile distilled water several times. A piece of the hyphal tissue was again surface sterilized in 0.1% $HgCl_2$ soln. for 30 seconds and washed in sterile distilled water repeatedly. It was then planted onto the surface of potato dextrose agar (PDA) medium in a test tube. The inoculated tube was incubated at 25± 2°C for a week. Similarly, multispore culture was made by taking a spore loop with the help of a sterile inoculating needle and then transplanting it onto the surface of PDA medium in a test tube and incubated. The cultures so obtained were used for spawn preparation.

Grain spawn of the culture was prepared on coarse paddy seeds by following the conventional methods. Boiled grains were mixed with 2% calcium sulphate and 4% calcium carbonate and sterilized in heat resistant polyprophylene bags for one hour at 20 *lb* p.s.i. The cool sterile spawn medium was then inoculated with a piece of pure culture of the test fungus and incubated at 25±2°C.

Artificial cultivation of *Auricularia polytricha* was carried out both on synthetic logs and supplemented paddy straw substrates. The synthetic logs were prepared from partially decomposed saw dust. The partial decomposition was carried out by taking a mixture of sieved non-resinous saw dust (100 kg), $(NH_4)_2SO_4$ (1 kg), rice bran (5 kg), urea (0.7 kg) and CaO (1kg) respectively. All the ingredients were mixed thoroughly and required amount of water was added (70% approximately) and a conical heap of the mixture was made in a shade over a clean plastic sheet.

The compost heap was turned after every five days for 25 days till the colour of the compost turns dark brown and with no ammonia smell. If ammonia smell persists after 25 days another turning of the compost heap was undertaken.

The synthetic log was prepared again by taking a mixture of partially decomposed saw dust (25 kg), rice bran (4 kg), corn powder (1.3 kg) rice floor (0.25 kg), CaO (0.75) and $MgSO_4$ (three tablespoonfuls) with appropriate water (70%). Heat resistant polypropylene bags (33 × 18 *cm*) were filled up with two kilogram of the mixture. The open end of the bags were plugged with non-absorbent cotton wool and covered with a piece of brown paper. The bags were then sterilised at 20*lb* .p.s.i. for one hour on alternate days. The bags were spawned after cooling with the grain spawn at the rate of 2% of the substrate taken. Spawning was done by removing the cotton plug and by making holes with the help of a sterile glass rod aseptically. The spawned bags were incubated in a warm room for mycelial running.

In the case of paddy straw, good quality, dry and mould free straw was cut into 3-5*cm* long and soaked in clean cold water overnight. The excess water was squeezed manually after removing from the water on the next day. The soaked straws were then mixed with 5% rich bran. Two kg of the mixuture was then filled into heat resistant polypropylene bags and open ends were plugged with non-absorbent cotton wool and rubber bands. The bags were sterilized as in the case of synthetic logs and spawned with the grain spawn at the same rate as in the synthetic logs and incubeted.

The polypropylene bags were cut opened after

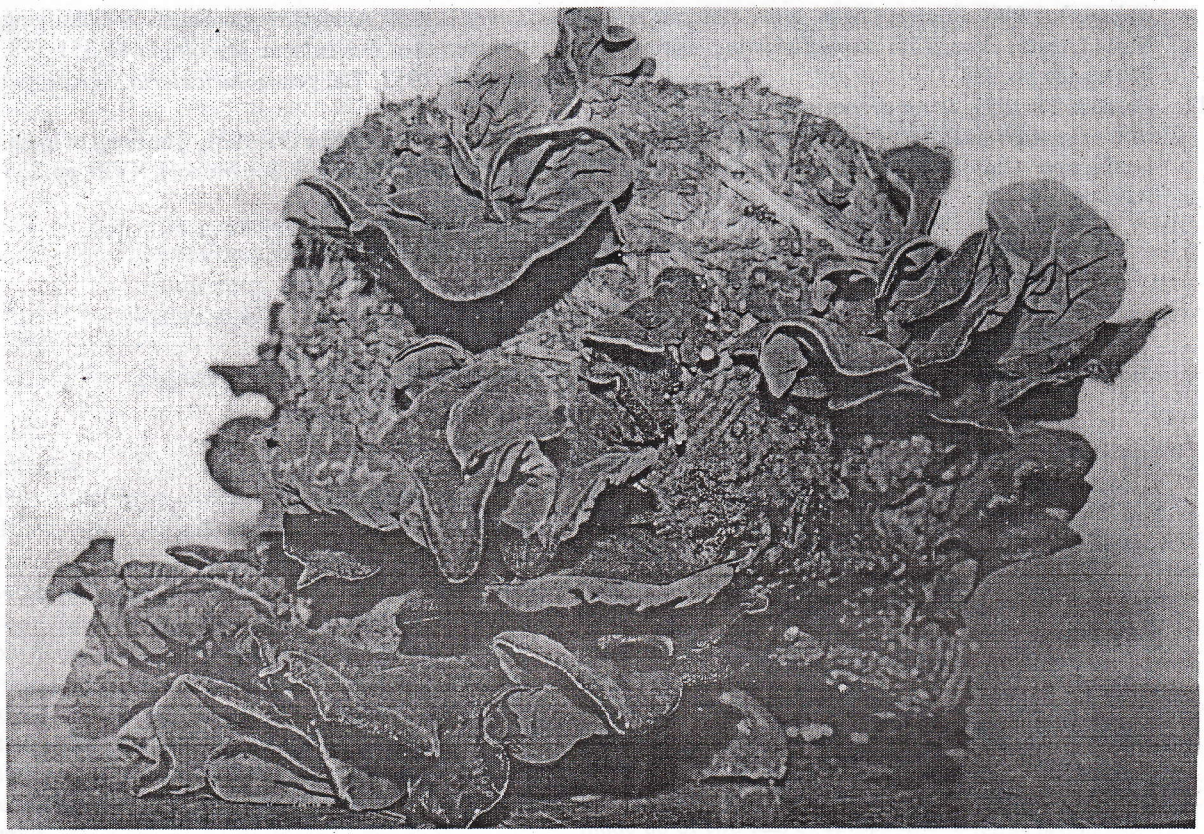

Fig-1. *A. polytricha* on paddy straw substrate.

the mycelial mats completely covers the surface of the substrate. It takes about 15-20 days at 25±2°C and arranged on a bamboo rack for fruiting. Regular spraying of water was undertaken for maintaining a relative humamidity of about 80%. Fruit body primordial develop after 25-30 days of opening the bags. Fresh weight of the fruit bodies were recorded upto third flush and biological efficiency was calculated. The highest biological efficiency of 90% was recorded on paddy straw (Fig.I) substrate followed by the synthetic log with a biological efficiency of 80% respectively.

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