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Studies on growth pattern and fruit body characteristic of *Pleurotus* spp. in East and South-Eastern Coastal Plain Zone of Odisha

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Among the cultivated mushrooms, Oyster has maximum number of commercially cultivated species suitable for diverse agro-climatic situations of the country with varying yield potential, shape, size, colour and aroma. The present investigation was undertaken to evaluate the performance of ten promising species viz. *P. eous*, *P. citrinopileatus*, *P. fossulatus*, *P. flabellatus*, *P. platypus*, *P. ostreatus*, *H. ulmarius*, *P. sajor-caju* (DMR strain) along with *Pleurotus sajor-caju* (CTMRT strain) and *Pleurotus florida* as checks, in terms of their yield potential and quality attributes in the East and South-Eastern coastal plain zone of Odisha during the winter season. Studies on growth pattern and fruit body characteristics indicated that the species exhibited compact to cottony growth on Potato Dextrose Agar medium. Most of the species were non-pigmented while few were pigmented ones. *Pleurotus citrinopileatus* produced larger sporophores among the species.

Key words: Growth pattern, fruit body, PDA, *Pleurotus*

INTRODUCTION

Pleurotus is one of the edible mushroom, generally referred to as "Oyster mushroom or Dhingri" in India, is relatively new to the mushroom industry. It has gained popularity at a tremendous pace and to-day it is cultivated in about 25 countries of Far-East Asia, Europe and America. *Pleurotus* spp. cultivation has increased tremendously throughout the world during the last few decades (Chang, 1999; Royse, 2002). It is the third largest cultivated mushroom in the world and its annual production in around 8,75,000 tonnes (Chang and Miles, 2004). China alone contributes 88% of the total world production. The other major producing countries are South Korea, Japan, Italy, Taiwan, Thailand and the Philippines. At present India produces only small quantities (2500 tonnes) of Oyster mushroom in Odisha, Karnataka, Maharashtra, Andhra Pradesh, Tamil Nadu, Bihar, Madhya Pradesh, Chhattisgarh, Jharkhand, West Bengal, Mizoram, Tripura and Assam. Among all the cultivated mushrooms, *Pleurotus* has maximum number of commercially

cultivated species suitable for round the year cultivation. Unlike other cultivated mushroom, species of *Pleurotus* exhibit much diversity in their adaptability to varying agro-climatic conditions and this characteristic provides ample scope in selecting the species for cultivation than any other cultivated mushroom. The productive strains of several species of *Pleurotus* are in the way of popularization in different parts of the country with varying shape, size, colour, texture, taste, flavour and suitability to different agro-ecological situations. Therefore, the present study has been undertaken during November, 2013 and January, 2014 spawning to explore the possibility of introduction of eight different species of *Pleurotus* mushroom in the East and South-Eastern coastal plain region of Odisha with an objective to evaluate the promising and high yielding strains on the basis of growth pattern and fruit body character, for regional adaptability.

MATERIALS AND METHODS

Morphological characterisation of ten different species of *Pleurotus* have been done in order to

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establish variation if any in between the species. For this purpose, ten test species, procured from Centre of Tropical Mushroom Research and Training, Orissa University of Agriculture and Technology, Bhubaneswar and Directorate of Mushroom Research, Solan (HP), were grown in bag method as per standard protocol. The performance of *P. eous*, *P. citrinopileatus*, *P. fossulatus*, *P. flabellatus*, *P. platypus*, *P. ostreatus*, *H. ulmarius*, *P. sajor-caju* (DMR strain) were studied along with *Pleurotus sajor-caju* (CTMRT strain) and *Pleurotus florida* as checks. After mycelia run was over, the bags were uncovered and put on the shelves in the mushroom growing chamber. Watering of bags was done as and when required. Fruit bodies were harvested from the first flush of all the test species at appropriate time. A random of ten fruit bodies were collected from each species and brought to the laboratory for characterisation. Ten test species were grown aseptically in the Petri plates containing potato dextrose agar medium for observation of the growth pattern of the individual species. The growth pattern and fruit body study was undertaken by observing visually the basidiocarp or fruit bodies of an oyster mushroom which have three distinct parts – a fleshy shell or spatula shaped cap (pileus), a short or long lateral or central stalk called stipe and long ridges and furrows underneath the pileus called gills or lamellae. Observations on colour and diameter of the pileus, stipe length, stipe thickness, margin and texture of fruit body were recorded.

RESULTS AND DISCUSSION

The analyzed data on the pileus size, stipe length, stipe thickness along with few morphological characters are presented in Table 1 and 2; Fig. 1 and 2. The observation on morphological characteristics of the ten test species raised in the month of September indicated that the mycelium of *P. sajor-caju* (both the local and the DMR strain) was compact on PDA medium, whereas *P. eous* exhibited fluffy growth. The pattern of mycelial growth in *Hypsizygous ulmarius* was cottony and sparse in others. Likewise, differently coloured fruit bodies were observed among the species. However, majority of the species were having light coloured and/or white sporocarps. The pileus diameter and the stipe length varied between 4.52-10.02 and 0.59 – 5.42 cm, respectively among the species (Fig. 1). Majority of the species showed entire margin as against dentate and wavy margins in *P. sajor-caju*

(both strains) and *P. eous*, respectively. Similar results were experienced among the test species raised in the month of January in terms of growth pattern on PDA.

The study on growth pattern and fruit body characteristics of *Pleurotus* spp. raised during the month of November indicated that on Potato Dextrose Agar medium, the growth pattern of different species were compact to cottony in behaviour. However, majority of the species showed sparse growth on the PDA medium. Further, the colour of the fruit bodies were white at large with exception of pink, grey and blue pigmentation in *P. eous*, *P. sajor-caju* and *H. ulmarius*, respectively. Margins of the fruit bodies also varied from entire to wavy and dentate in the investigation. Pileus size was largest (10.02 cm) in *P. citrinopileatus* and smallest (4.52 cm) in *P. florida* (Fig. 2). Likewise, stipe length varied considerably from a smaller type in *P. eous* (0.59 cm) to a larger type in *P. citrinopileatus* (5.42 cm). This finding strengthened the fact that among all the edible mushrooms, wide variation in shape, colour, margin of the fruiting body and growth pattern on nutrient media

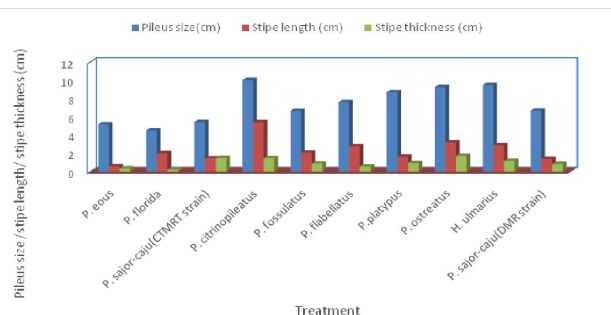


Fig. 1 : Fruit body character of different *Pleurotus* spp. under November spawning

existed in *Pleurotus*. Singh *et al.* (2010) established different colour of fruit bodies in different species of *Pleurotus*. Further, the variation in diameter

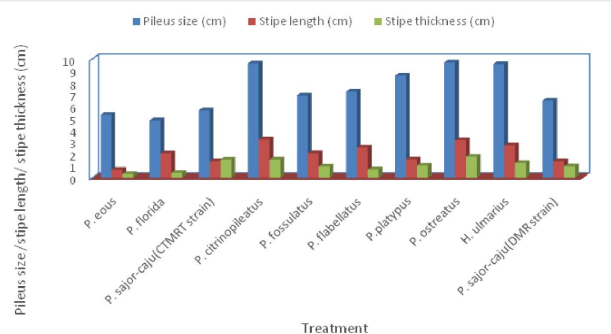


Fig. 2: Fruit body character of different *Pleurotus* spp. under January spawning

Table 1 : Growth pattern and fruit body characters of *Pleurotus* spp. (November spawning)

Treatment	Growth pattern on PDAS	Colour	Characteristics of fruit bodies on paddy straw substrate			
			Pileus size (cm)	Stipe length (cm)	Stipe thickness (cm)	Margin of fruit body
<i>P. eous</i>	Fluffy	Pink	5.19	0.59	0.36	Wavy
<i>P. florida</i>	Sparse	White	4.52	2.02	0.22	Entire
<i>P. sajor-caju</i> (CTMRT strain)	Compact	Grey	5.44	1.45	1.50	Dentate
<i>P. citrinopileatus</i>	Sparse	White	10.02	5.42	1.47	Entire
<i>P. fossulatus</i>	Sparse	White	6.67	2.10	0.89	Entire
<i>P. flabellatus</i>	Sparse	White	7.61	2.79	0.57	Entire
<i>P. platypus</i>	Sparse	White	8.69	1.63	0.95	Entire
<i>P. ostreatus</i>	Sparse	Deep grey	9.26	3.20	1.73	Entire
<i>H. ulmarius</i>	Cottony	Bluish grey	9.50	2.90	1.18	Entire
<i>P. sajor-caju</i> (DMR strain)	Compact	Grey	6.71	1.40	0.84	Dentate
CV (%)	-	-	1.54	2.22	4.24	-
CD (0.05)	-	-	0.13	0.06	0.05	-

Table 2: Growth pattern and fruit body characters of *Pleurotus* spp. (January spawning)

Treatment	Growth pattern on PDA	Colour	Characteristics of fruit bodies on paddy straw substrate			
			Pileus size (cm)	Stipe length (cm)	Stipe thickness (cm)	Margin of fruit body
<i>P. eous</i>	Fluffy	Pink	5.31	0.67	0.32	Wavy
<i>P. florida</i>	Sparse	White	4.83	2.05	0.41	Entire
<i>P. sajor-caju</i> (CTMRT strain)	Compact	Grey	5.67	1.38	1.53	Dentate
<i>P. citrinopileatus</i>	Sparse	White	9.62	3.23	1.54	Entire
<i>P. fossulatus</i>	Sparse	White	6.92	2.06	0.95	Entire
<i>P. flabellatus</i>	Sparse	White	7.25	2.55	0.70	Entire
<i>P. platypus</i>	Sparse	White	8.60	1.55	1.03	Entire
<i>P. ostreatus</i>	Sparse	Deep grey	9.69	3.17	1.77	Entire
<i>H. ulmarius</i>	Cottony	Bluish grey	9.56	2.72	1.25	Entire
<i>P. sajor-caju</i> (DMR strain)	Compact	Grey	6.49	1.38	0.96	Dentate
CV (%)	-	-	3.87	2.27	7.76	-
CD (0.05)	-	-	0.33	0.06	0.09	-

and length of fruit body among the species was in agreement to the findings of this investigation. Shukla and Jaitly (2011) characterized different species of *Pleurotus* morphologically. The stipe length (0.91-4.80 cm), pileus size (4.72-6.42 mm), margin of fruit bodies (entire to dentate) and colour (white to pigmented ones) were in conformity to the findings of this investigation.

Studies on growth pattern and fruit body characteristics revealed wide variation in terms of growth pattern on Potato Dextrose Agar medium, colour, fruit size and sporophore margin. The growth pattern ranged from compact to cottony among the species. Majority of the species were non-pigmented (white) with exceptions of grey, pink and blue colour in *P. sajor-caju*, *P. eous* and *H. ulmarius* respectively. Size of fruit body being an inherent character, varied considerably. However, *P.*

citrinopileatus produced larger sporophores. Further, fruit body margins varied from entire to wavy or dentate in the investigation.

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