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ON THE IDENTITY OF PADDY STRAW MUSHROOM GROWN IN SOUTH INDIA

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On the basis of morphologcial and cytological studies, it was concluded that the commercially grown paddy straw mushroom in South India is not *Volvariella diplasia*.

INTRODUCTION

The commercially grown paddy straw mushroom in South India has long been know under the name *Volvariella diplasia* (Berk. and Br,) Sing. This was first introduced in Coimbatore by Thomas *et al* (1943). They obtained the culture from U Thet Su, Mycologist to the Government of Burma and in their description of the fungus they mention "The cap is dark grey at the top and slightly raised 'umbonate' in the centre". This fungus has been described by U That Su and Seth (1940) as *Volvariella volvacea* (Fr.) Sing. But somehow Thomas *et al* named this isolate as *V. diplasia* (Berk. and Br) Sing. Infact Singer (1961) named this particular isolate, based on U Thet Su and Seth's description as *V. volvacaa* (Fr.) Sing. var *masseei* Sing. This isolate was used in the Coimbatore until 1968 when it was lost and a fresh isolate was obtained from Philippine department of agriculture. (Dr.K. Ramakrishnan, Personal communication). Even this isolate was mentioned as *V. diplasia* (Berk. and Br.) Sing. in later publications from Coimbatore (Ramakrishnan *et al.*, 1968). This is the isolate which is now distributed as *V. diplasia* (Berk. and Br.) Sing. from Coimbatore.

With a view to study the morphology and cytology and also to establish the

correct identity of the fungus grown commercially in South India, a culture of the fungus was obtained from Tamil Nadu Agricultural University, Coimbatore, from where the commercial cultivaters obtain their spawn.

MATERIALS AND METHODS

Mature fruit bodies of the fungus were obtained by growing it on paddy straw beds as well as under laboratory conditions in paddy straw bundles (Plate I Fig. b). For cytological studies the method used by Lowry (1963) was followed.

RESULTS AND DISCUSSION

The description of the fungus given below is based on the fruit bodies obtained from the beds (Plate I, Fig. a).

Pileus 5 to 8 cm in diameter, dry, at first white becoming yellowish grey (4B2, Methuen Handbook of Color 1967) at the centre, dull white at the margin, plano convex with an umbo in the centre. Pileus cuticle nongelatinous, fibrillose glabrous ; cuticle hyphae up to 8.4 μ diameter. Clamp connections absent. Greyish silvery scales run along the surface. Lamellae white at first, becoming pink. Gills free. Stipe dull white, terete, up to 8 cm in length, 0.5 cm broad, slightly enlarged at the base, stuffed, attached centrally to the pileus. Volva fleshy tearing irregularly, white. Cheilocystidia clavate to fusiform with an elongate neck, 31.0—63.0 x 11.5—12.5μ ; the neck measuring up to 28μ long. Basidia clavate, 4—spored, 19.0—24.0 x 5.5—8.5μ. Spores elliptical to ovate, hyaline, thin-walled 5.5—8.5 x 4.2—5.6 μ.

Cytology

The number of nuclei in the vegetative mycelium varied from 10 — 30. (Plate II, Fig. a). Clamp connections were absent. The two haploid nuclei in the

young basidium usually lie paralell to the long axis of the basidium (Plate II, Fig. b). Though actual karyogamy was not observed, indications of the fusion of the two haploid nuclei in the basidium were there (Plate II, Fig.c). The supporting cell of the young basidium contains two nuclei (Plate II, Fig. c). After fusion of the two haploid nuclei there was an enlargement of the basidium corresponding to the enlargement of the diploid nuclei. It was found the diploid nucleus was larger than the haploid nucleii (Plate II Fig.d). At the early prophase stage the nucleus appeared as a chromatin reticulum containing one or two nucleoli (Plate II, Figs. e & f). At early metaphase 9 discrete bivalent chromosomes were observed (Plate II, Fig. g). After the first meiotic division the chromatin masses often reorganised into compact nuclei (Plate II, Fig. h). After this the second meiotic division takes place (Plate II, Fig. i). The resulting 4 nuclei were usually arranged towords the centre of the basidia (Plate II, Fig. j). The mature basidiospores were uninucleate (Plate II, Fig. k).

CONCLUSIONS

The forms which are often quite even in the centre of the pileus has been described as *V. diplasia* (Berk. and Br.) Sing., and this species can be easily distinguished from the closely related species by the lack of pigment in the pileus. According to Singer (1961) "It may very well be a mere albino form (mutations lacking pigment are quite common in this family) of another paddy straw mushroom, but it may also be easily distinguishable different species". Modern redescription of this white species are not available, except the original description of Berkeley and Broome (1871) and the description given by Saccardo (1887).

From the description of the fruit body of the Coimbatore isolate given above it is evident that this is not *V.diplasia* (Berk. and Br.) Sing. It agrees very well with the description of V. *volvacea* (Fr.) Sing, var. *masseei* Sing. The results of the cytological studies in the present work are also in conformity with those of Chang and Chu's (1969) work on V. *volvacea* (Fr.) Sing. Based on their nuclear studies Nita Bahl *et al.* (1974) also came to the conclusion that

the paddy straw mushroom grown in Northern India is V. *volvacea* (Fr.) Sing. var. *massei*. It is concluded that the paddy straw mushroom grown in South India is not V. *diplasia* (Berk. and Br.) Sing.

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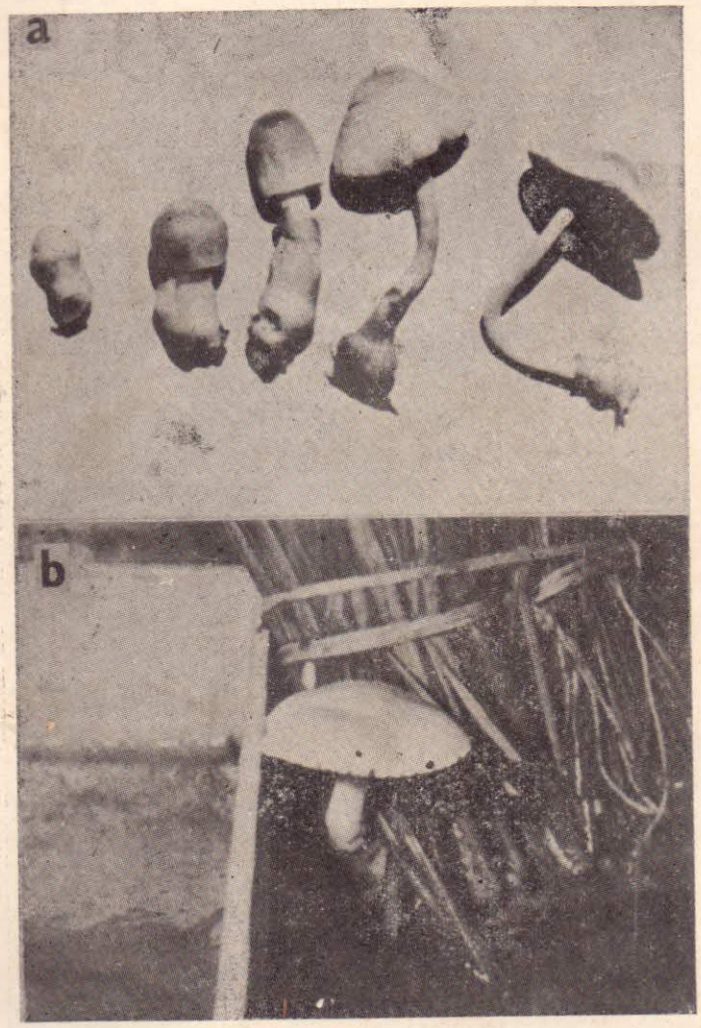
EXPLANATION OF PLATES :

Plate I, Fig. a. Different stages of fruit bodies of *V. Volvacea* (Fr.) Sing. var. *masseei* Sing.
Fig. b. Production of fruit bodies of *V. volvacea* (Fr.) Sing. var. *masseei* Sing. in paddy straw bundles under laboratory condition.

Plate II, Fig. a. Hypha showing multinucleate cell (×970).
,, b. Binucleate young basidium (×2000)
,, c. Fusion of two haploid nuclei. The binucleate condition of the supporting cell of the basidium is also seen (×1500)
,, d. Diploid fusion nucleus (×2000)
,, e. and f. Early prophase stage showing chromatin threads and nucleoli (×1800)
,, g. Early metaphase showing 9 discrete bivalent chromosomes (×1800).
,, h. Two nuclei after first meiotic division (×1800)
,, i. Early anaphase II (×1800).
,, j. Basidium with 4 nuclei after meiosis (×1800)
,, k. Uninucleate basidiospores (×1800)



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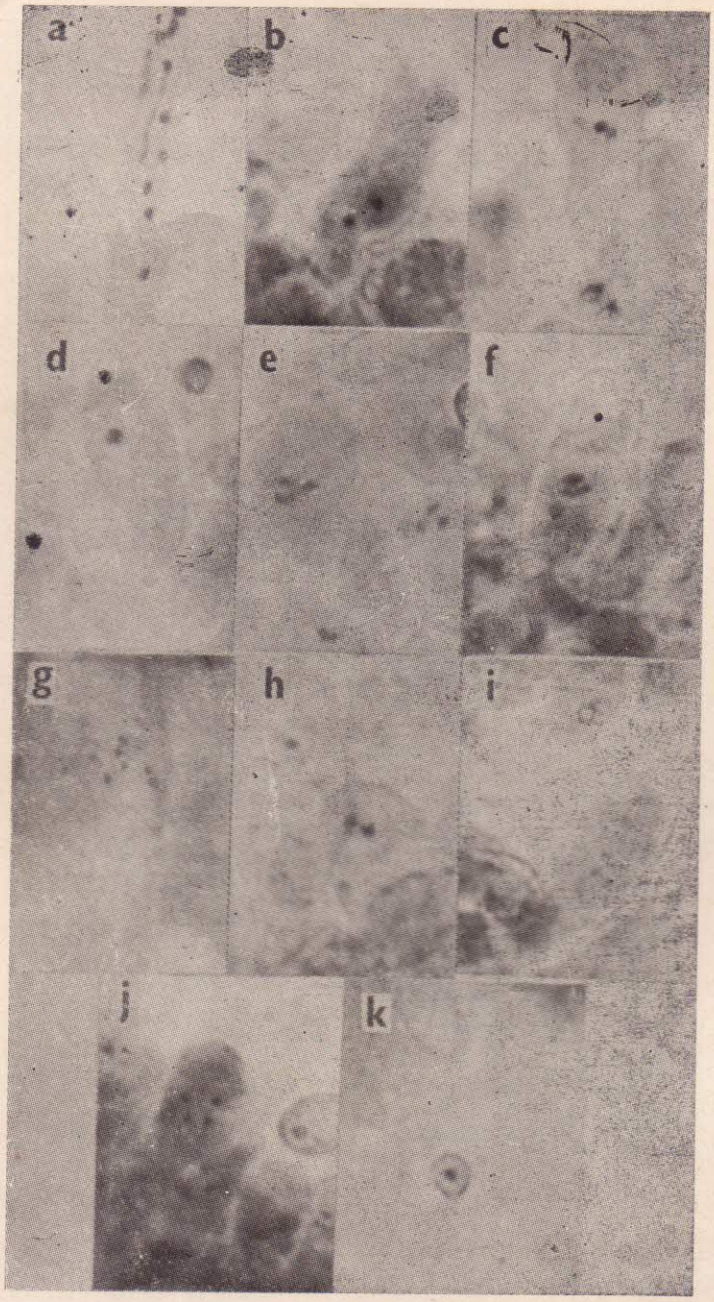

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