THE DEVELOPMENT OF KUEHNEROMYCES MUTABILIS (AGARICALES)

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SUMMARY

A histological study of the development of *Kuehneromyces mutabilis* (Schaeffer ex Fries) Sing. et Smith has shown that the species is bivelangiocarpous and pileo-stipitocarpous. The author has given particular attention to the development of the hymenophore, the latter arising as a separate structure.

1. INTRODUCTION

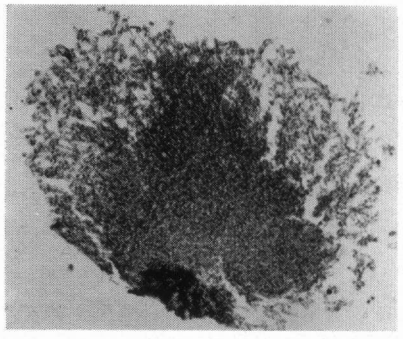
It may be surprising that the development of *Kuehneromyces mutabilis* (Schaeffer ex Fries) Sing. et Smith has not been examined hitherto as there are no difficulties to collect the primordia and as the workers in this field have examined since Atkinson's time mainly the easily obtainable species. As the results of this investigation do not give rise to specific problems a further discussion of the subject appears to be superfluous. The microtome sections have been prepared in the usual way (REIJNDERS 1963); the fixation was effected with Bouin's picro-formol-aceticacid solution and the staining with Mayer's haem-alum.

2. DEVELOPMENT

2.1. The first very young stage (*fig. 1*; width at the level of the hymenophore 442 μ) shows a column in the center surrounded by the developing universal veil. The orientation of the hyphae in the column (diam. 2 μ) is mainly longitudinal. The radiating hyphae of the veil are directed outward and loosely intricated, they consist of a chain of short cells with metachromatic walls, the cells gradually broadening towards the tip (diam. 3–5–7 μ).

Another section shows the same details: the shape is narrower. Although the direction of the hyphae is preponderantly longitudinal there is a region near the top where they are more interwoven. Somewhat later when the origin of the hymenophore is perceptible the hyphae in the upper portion of the primordium are clearly interwoven contrary to those of the lower part. In such cases we prefer to designate the species (as to the order of succession) as pileostipitocarpous and not as stipitocarpous although the parallel hyphae run longitudinally somewhat before the plectenchyma in the upper part is visible.

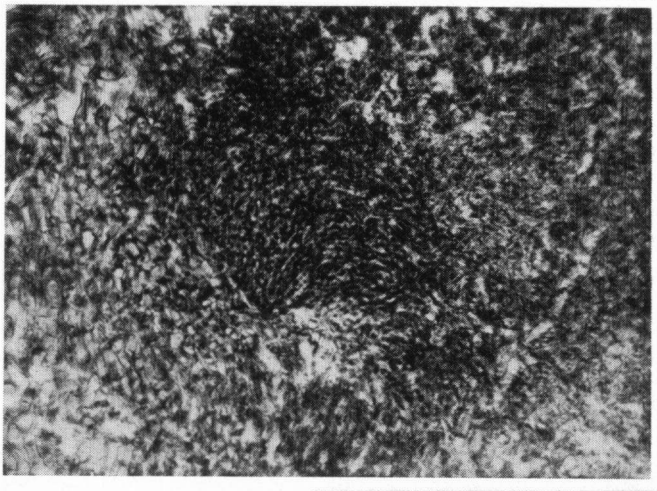
2.2. A somewhat older phase represents the rudiment of the hymenophore (*fig. 2a;* diam. 510 μ). At the base there is a tissue of interwoven hyphae, as usual forming a sort of stroma (diam. of the rather broad hyphae 3–8 μ) on which arises the stem the hyphae of which are running longitudinally (diam. in the center



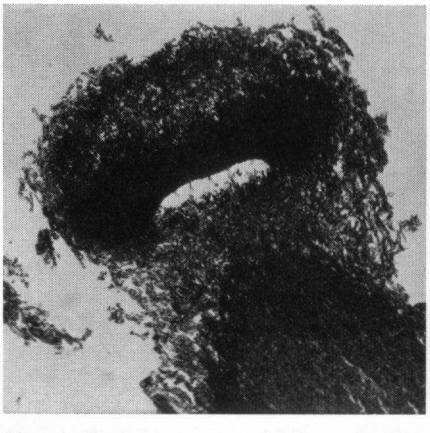
116×

1

2a 80×



2b 444×



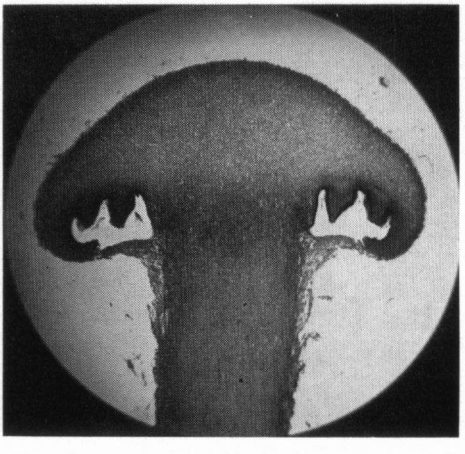


Plate 1. *Kuehneromyces mutabilis* 3. 80× 4 16×

3–7 μ, at the side 1.5–2 μ). The hyphae of the pileus trama are strongly interwoven (diam. 2–5 μ), the transition between stipe and pileus-trama is not abrupt. The universal veil is very broad at the level of the rudiment of the hymenophore (130–150 μ), at the inside of it under the future gill-room the lipsanenchyma presents itself as consisting of a sheaf of parallel protenchymatic hyphae (diam. of the sheaf ± 30μ). The universal veil on the surface of the cap is already incoherent; the character of its hyphae did not alter (diam. of the cells at the tip –7 μ, clamp-connections numerous).

We photographed the portion where the hymenophore develops at a higher magnification (*fig. 2b*), its rudiment is composed of a bundle of very dark-coloured protenchymatic hyphae which grow outward and then downward, whilst the tips of the hyphae converge. This peculiar phenomenon has already been observed by GURWITSCH (1922) (see REIJNDERS 1963: 284). By the gyrate movement of this bundle there is a region underneath the reversed cone where the hyphae are torn apart and where the beginning of the gill-cavity is perceptible. Under this cavity and at its inside there are a number of hyphae which show also a centripetal direction as if in this area might be found a centre of attraction. The dark protenchymatic and parallel running hyphae, are restricted to the bundle and the hyphae surrounding this area.

More inward we find the intricated tissue of the zone between stipe and pileus: the generative hyphae of the hymenophore must originate by ramification of hyphae belonging to this part which have preserved their protenchymatic character. At the outside of this structure we find hyphae which run obliquely from the lateral portion of the pileus into the lipsanenchyma. The pileus margin is not yet sharply outlined but quite probably this portion will be formed later by hyphae coming from the newly formed structure inside it. As has been stated several times the young hyphae at the circumference of the hymenophore divide into hyphae which join this expanding structure and sterile hyphae which reinforce the pileus margin. In any case we do not observe afterwards a clear demarcation between these parts. Still more outwards the broader hyphae of the universal veil are perceptible. We described the origin of the hymenophore at some length in order to elucidate the peculiarity of this structure which is surrounded by interwoven tissue the cells of which are decidedly less protenchymatic. This proves that this species belongs to a developmental type with an average concentration (REIJNDERS 1963: 221).

2.3. We insert this tangential section (diam. at the level of the hymenophore 620 μ) to demonstrate that the layer of palissade hyphae is continuous, over it is the dark-coloured matrix of the hymenophore consisting of radiating protenchymatic hyphae at the underside of the pileus (*fig. 3*).

2.4. Finally we print a section of a young carpophore (*fig. 4*) just before the expansion of the cap (diam. 3.1 mm). The stem is long, its hyphae are parallel-(breadth up to 6.5 μ, scattered cells up to 10 μ). On its surface there are flakes of metachromatic hyphae: the remnants of the universal veil. Those flakes are also

visible at the outside of the partial veil but this is composed for the greater part of the lipsanenchyma with protenchymatic parallel hyphae. The remnants of the universal veil on the cap are hardly visible, the pileus underneath them is bordered by a rather thin cortex (breadth 70–80 μ), consisting of slender hyphae (2–3 μ) with somewhat mucose walls. The hyphae of the pileus trama are interwoven (breadth –10 μ); the trama of the gills is in this phase indeed divergent, but almost regular.

REFERENCES

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