

TAXONOMIC POSITION

Kingdom : fungi
Division : Amastigomycotina
Sub-division : Basidiomycotina
Class : Holobasidiomycetidae
Order : Agaricales
Family : Agaricaceae
Genus : Agaricus
Species : *A. campestris*

HABITAT

- Agaricus species are commonly called meadow mushrooms since these are typically found in
 1. open,
 2. Well manured
 3. Grassy areas
- The genus contains some of the fine edible mushrooms including *Agaricus campestris* , *Agaricus bisporus*



PLANT BODY

- The plant body of fungus can be divided into two main parts
 1. the vegetative mycelium
 2. basidiocarp formed of hyphae (sexual reproduction)

VEGETATIVE MYCELIUM

- The mycelium may be
- 1: primary mycelium
 - 2: secondary mycelium
 - 3: tertiary mycelium

ANATOMY OF A MUSHROOM

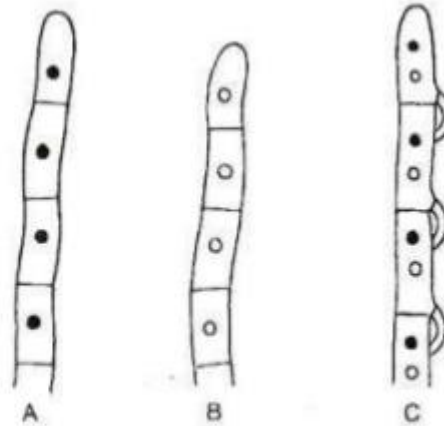
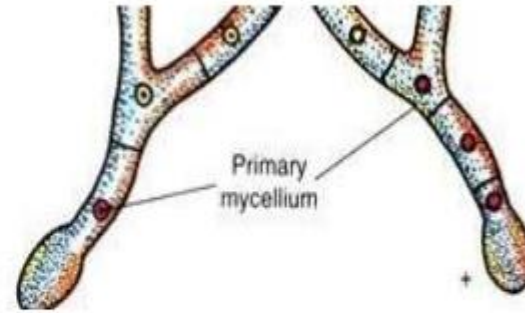


Fig. 4.70 : *Agaricus*. A-B. Monokaryotic mycelia, C. Dikaryotic mycelium.

PRIMARY MYCELIUM

1. It is monokaryotic, short lived and develops from germination of basidiospore
2. The hyphae are septate and hyaline
3. The cells are short and contain oil globules, vacuoles and thin protoplasm



1. It is dikaryotic and arose by dikaryotization through somatogamy of two compatible monokaryotic hyphae
2. The hyphae composing secondary mycelium are long, branched, septate and have short cells.
3. Typical dolipore septa are present between adjacent cells
4. The secondary mycelium is more abundant, perennating and produce mushrooms year after year.

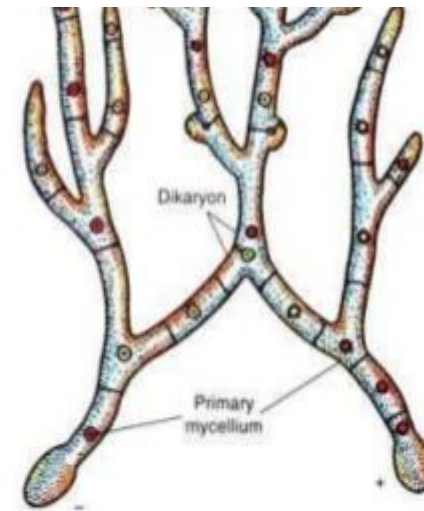
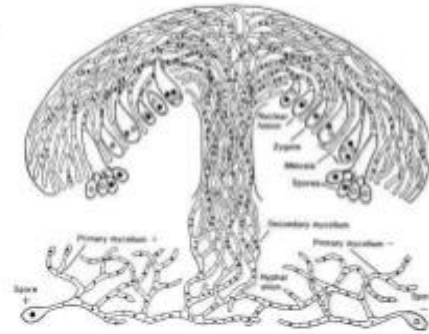


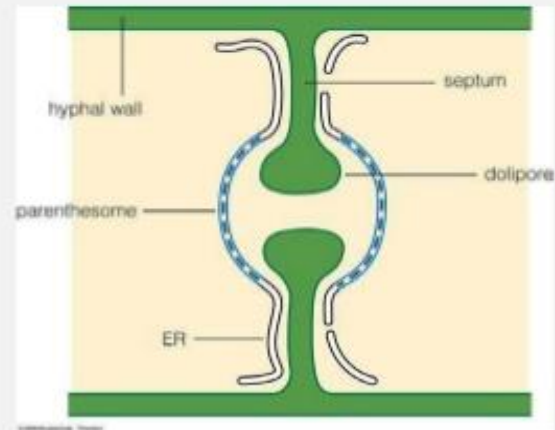
Fig. 15.2. *Agaricus*, diagram showing somatogamous copulation.

TERTIARY MYCELIUM

1. The mycelium producing basidiocarp and mushroom are sometime referred as tertiary mycelium
2. It forms complex tissue which produces basidia
3. The mycelium forms microscopic , thick , tangled , woody masses called spawns



DOLIPORE SEPTUM



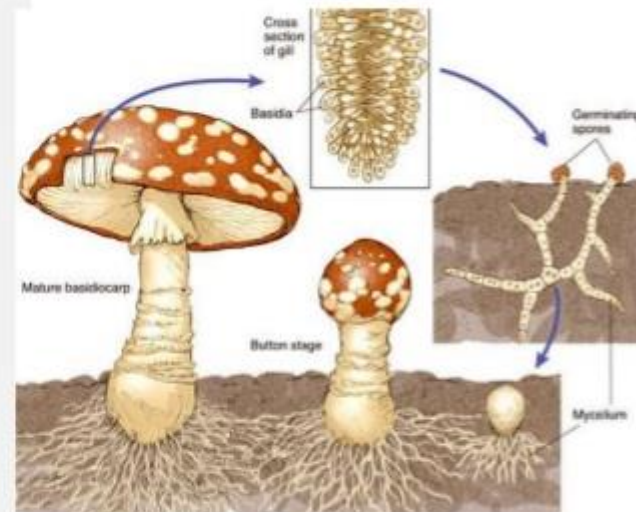
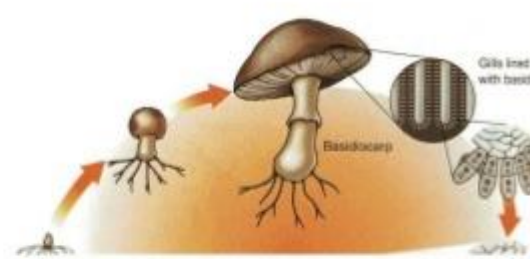
REPRODUCTION

1. The fungus reproduces sexually usually
2. The definite sex organs are absent
3. Plasmogamy is done by fusion of two compatible somatic hyphae, which results in the formation of a dikaryon
4. The nuclei of the dikaryon produce dikaryotic secondary mycelium
5. The basidiocarp develop from the hyphae of subterranean, perennial secondary mycelium

BASIDIOCARP / MUSHROOM

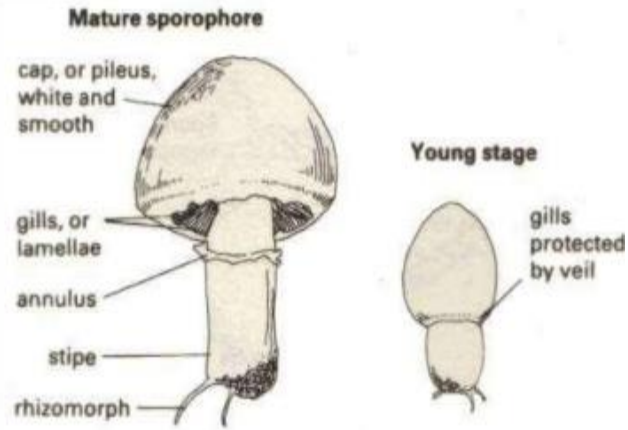
The aerial part of the fungus is called fruiting body (basidiocarp) of the fungus is popularly known as mushroom

Dikaryotic Phase



STRUCTURE → PILEUS

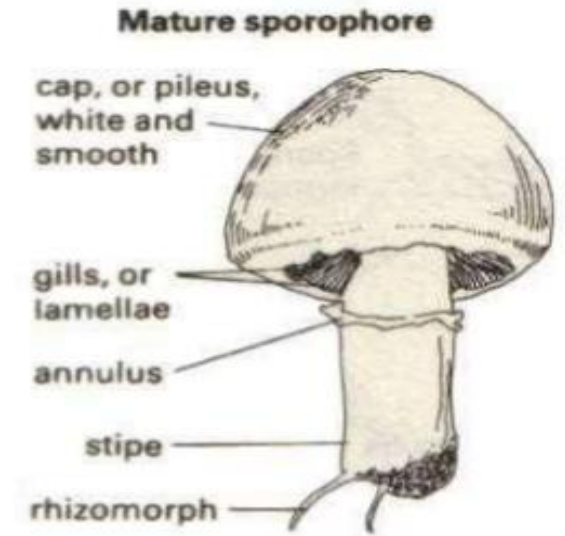
1. A mushroom is umbrella shaped generally
2. The upper portion, called pileus or cap.
3. It is circular and expanded .
4. In young condition , the pileus is more or less button shaped and is completely enclosed by a thin membrane called velum.



STIPE

The pileus is borne on a fleshy, pinkish-white, stalk called stipe

As the pileus grows in size the velum ruptures and its remnants surround the stipe, called annulus



LAMELLAE OR GILLS

A cavity is present under the pileus in which large number of thin, vertical, platelike structures called lamellae.

Gills are first pinkish but as the spores mature they become dark brown in color.



ANATOMY OF A MUSHROOM



DEVELOPMENT OF BASIDIOCARP

- It starts as a tiny swelling consisting of a knot of the subterranean hyphae of the secondary dikaryotic mycelium .
- This swelling enlarges into a broadly ovoid structure -> **basidiocarp primordium**
- Then a ring shaped cavity is formed -> **prelamellar chamber**
- The portion of the primordium above the prelamellar cavity finally develops into the **pileus** , and below portion is called **stipe**

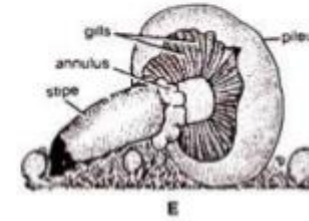
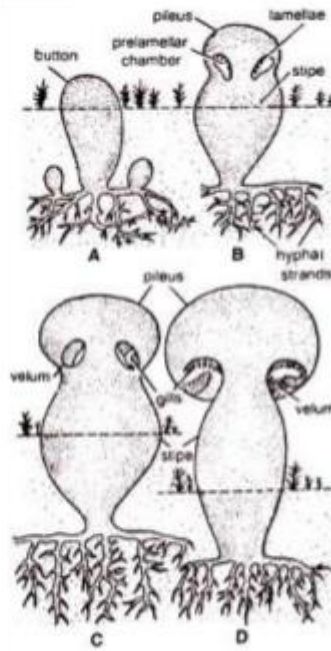


Fig. 3 (A-E). *Agaricus* : Development of basidiocarp; (A-D) Vertical sections of developing basidiocarp showing various stages of development; (E) A mature basidiocarp

DEVELOPMENT OF BASIDIOCARP

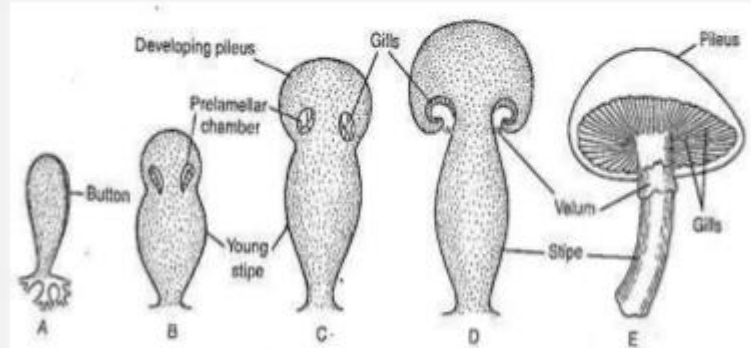


Fig. 4.72 : *Agaricus* : A-E. Development of basidiocarp

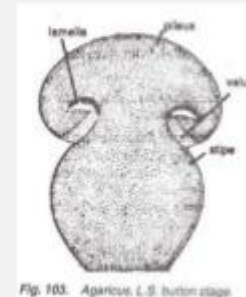


Fig. 103. *Agaricus*, L.S. button stage.

STIPE

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As the pileus grows in size the velum ruptures and its remnants surround the stipe, called annulus

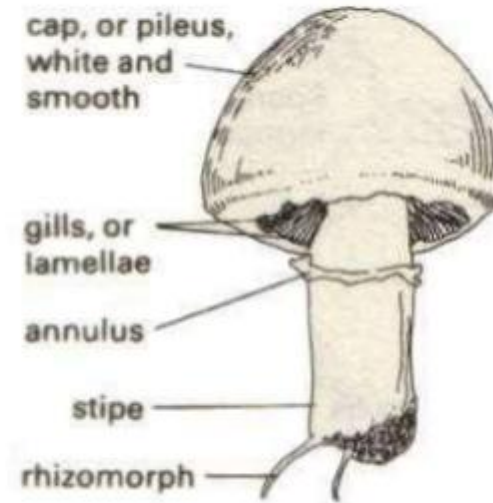
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Mature sporophore



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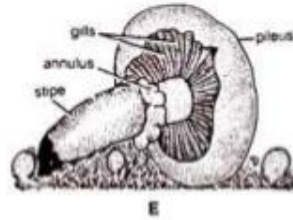
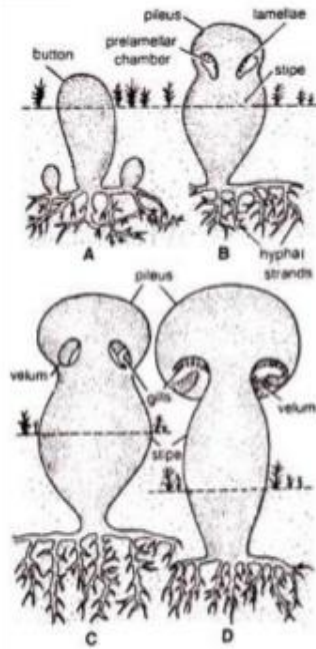


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DEVELOPMENT OF BASIDIOCARP

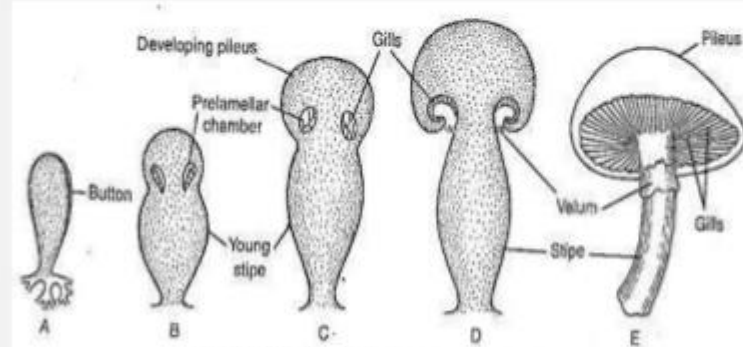


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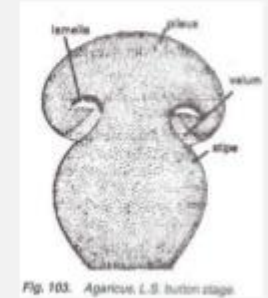
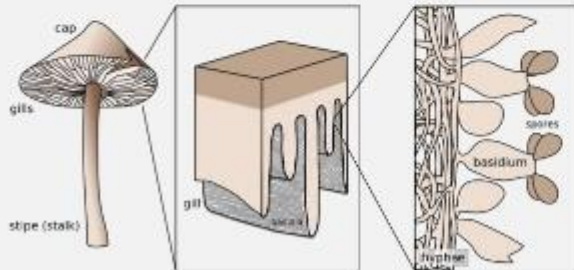


Fig. 103. *Agaricus*. L.S. button stage

STRUCTURE OF LAMELLA



Each lamella consists of three parts .

1. Hymenium
2. Trama
3. Sub-hymenium

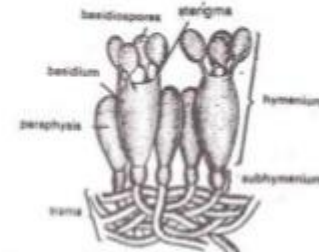


Fig. 107. *Agaricus*. A few basidia and paraphyses.

INTERNAL STRUCTURE OF BASIDIOCARP

It is composed of **interwoven hyphae** which run parallel to each other in stipe

They are compactly arranged to form **pseudoparenchymatous tissue** in the pileus region

- In stipe the **central hyphae is loosely arranged** , with prominent air spaces , forming the **medulla**
- And the outer hyphae forms **cortex**

The pileus also shows similar arrangement of hyphae into the central medulla and outer cortex

Some of the hyphae present in pileus develop into the lamellae or gills

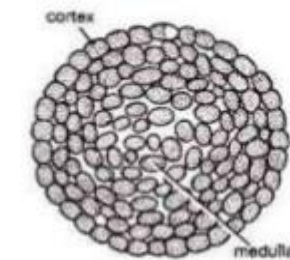


Fig. 5. *Agaricus* : Transverse section of stipe



Pseudoparenchyma A

HYMENIUM

It is the fertile region of lamella consists of club shaped , binucleate cells forming a palisade – like layer on both sides of lamella

All the cells of the hymenial layer are not fertile , others are developed to form

- Basidia

And other are sterile, they develop to form

- Paraphysis

Rest of them are elongated cells . They protrude beyond the paraphysis and are called

- Cytidia

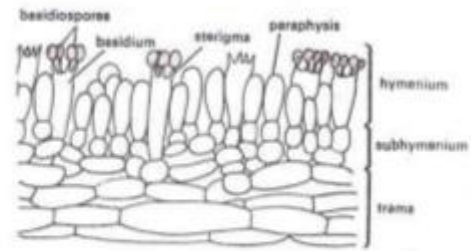
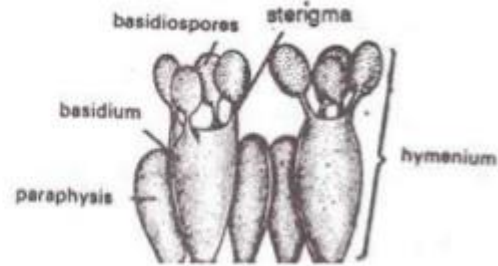


Fig. 106. Agaricus. T.S. gill (a part).



SUB-HYMENIUM

- In between the hymenium and trama , there is region composed hyphae arranged at **right angle** to those of trama
- The cells of these hyphae are **isodiametric** and **binucleate**.

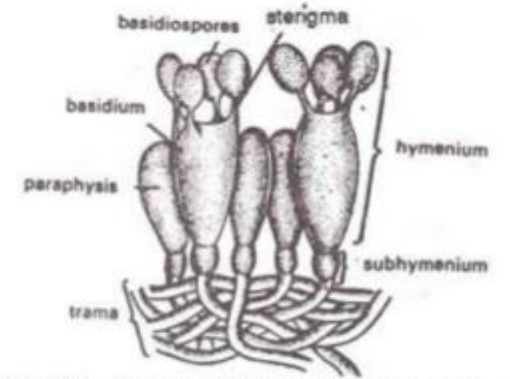


Fig. 107. Agaricus. A few basidia and paraphyses.

TRAMA

Internal to hymenium is called trama

It consists of **multinucleated** elongated cells . That extends from hyphae of the pileus

This hyphae are so oriented that their long axis lie **parallel to the hymenium**



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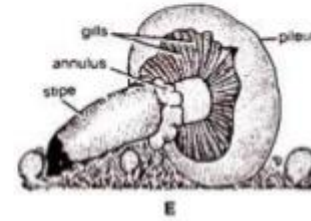
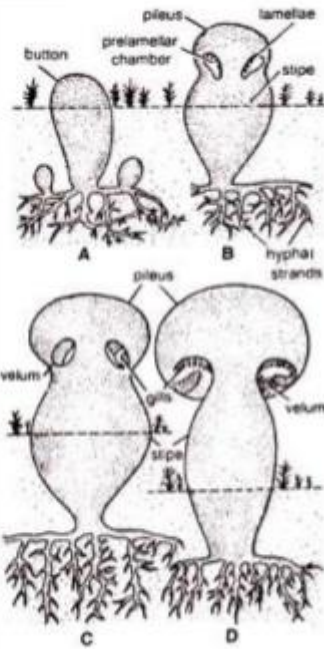


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DEVELOPMENT OF BASIDIOCARP

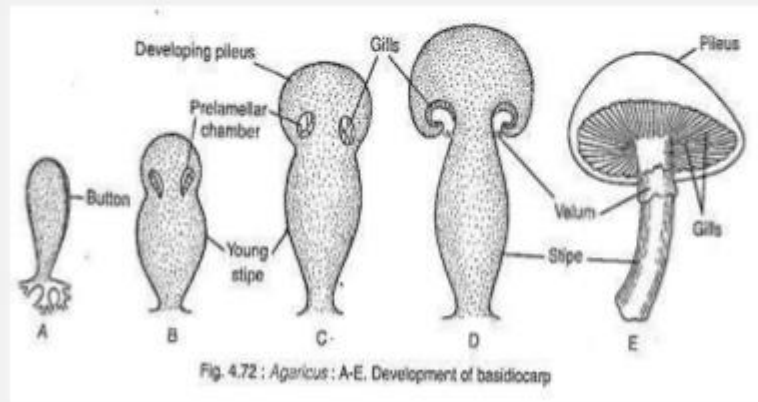


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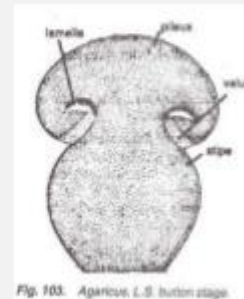


Fig. 103. *Agaricus*, L.S. button stage.

FAIRY RINGS



LIFE CYCLE OF MUSHROOM

