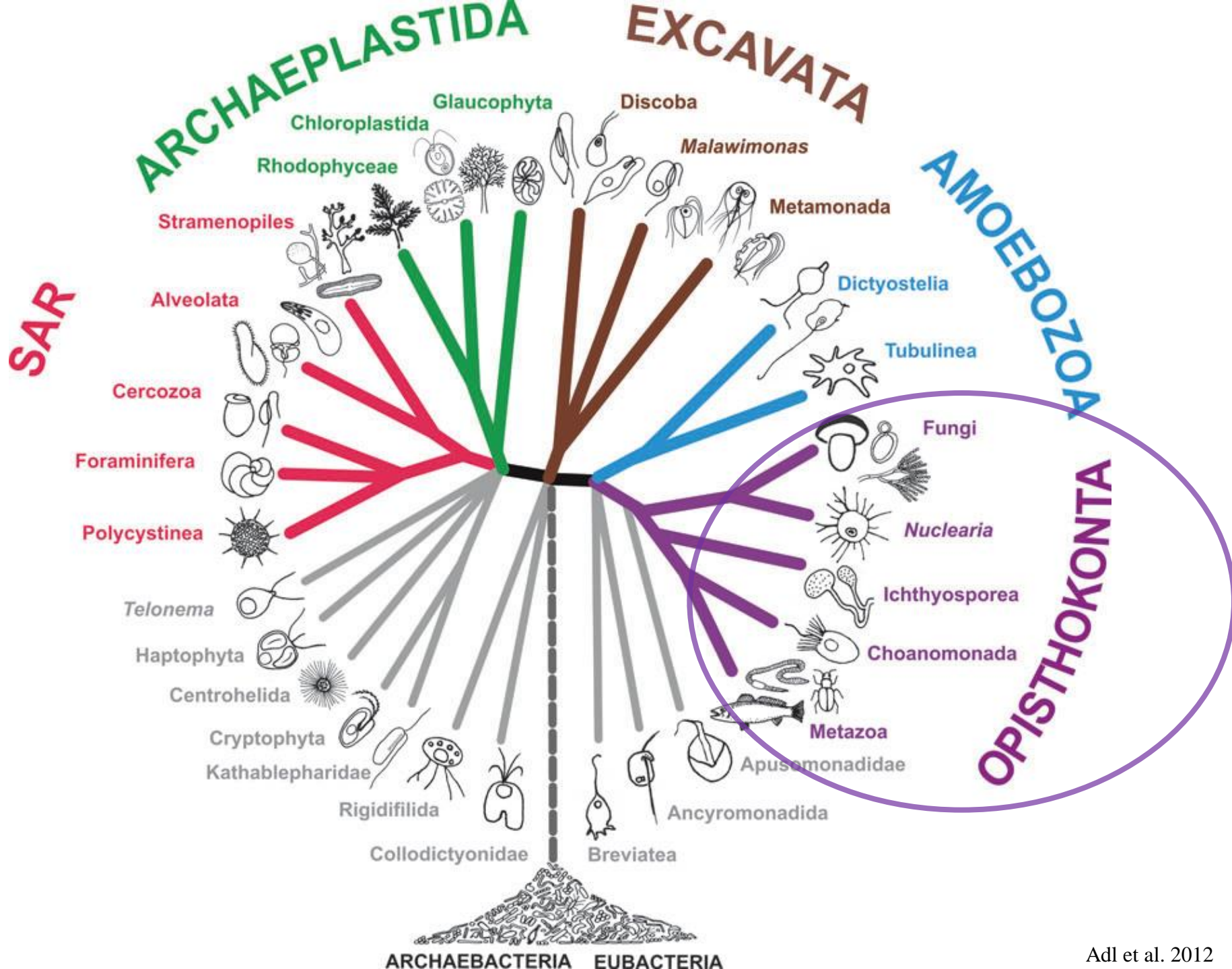
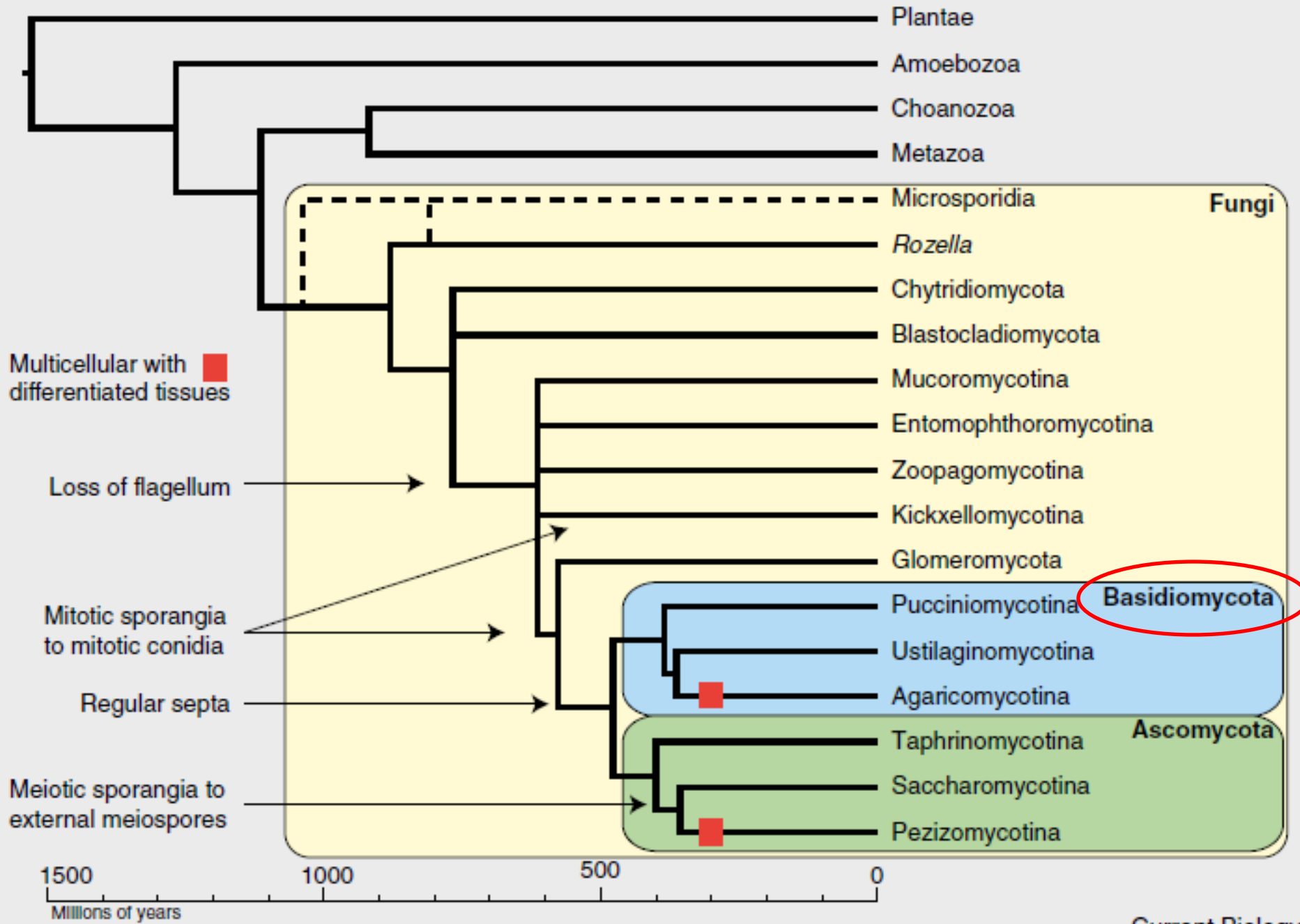


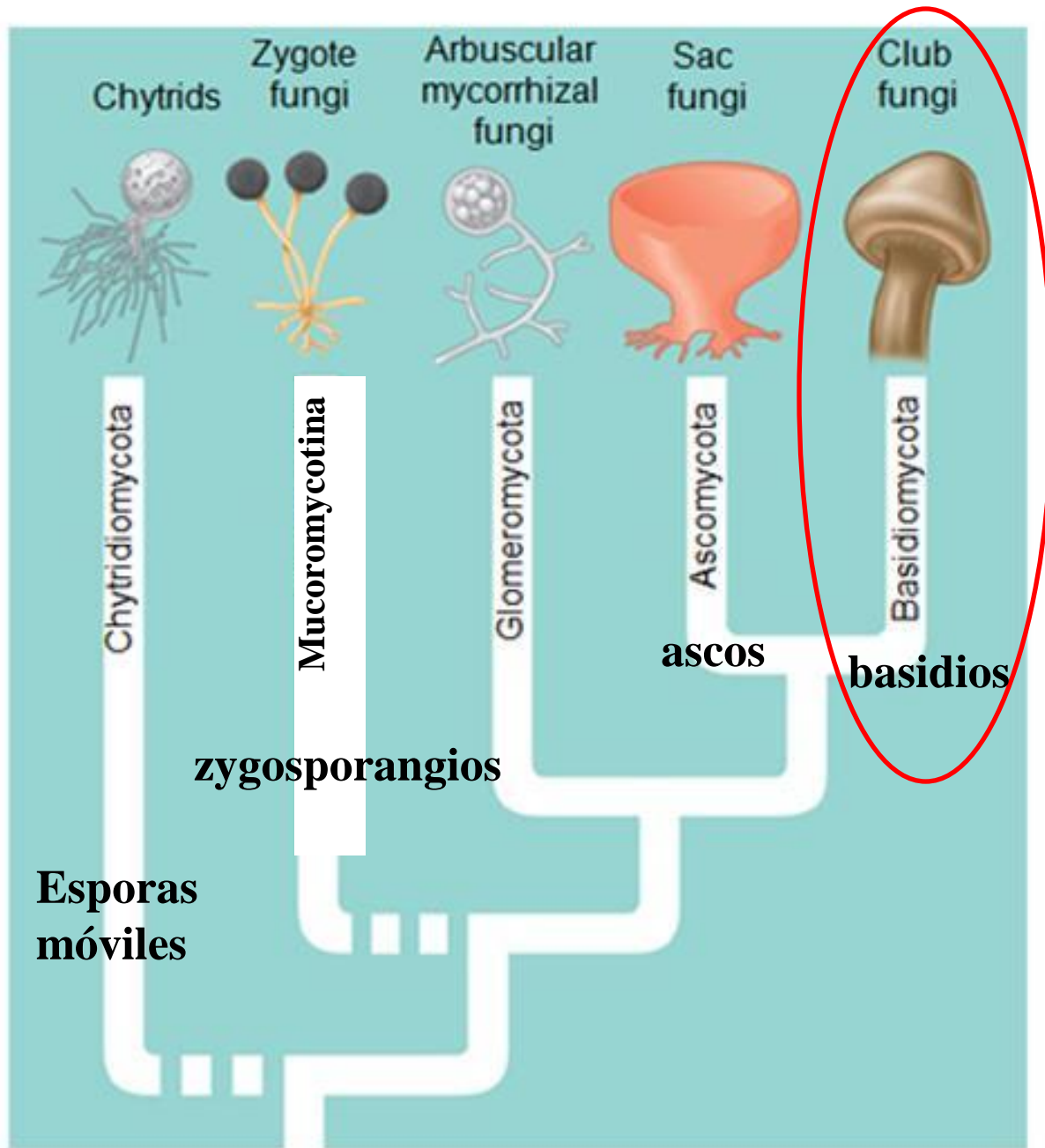


Basidiomycota

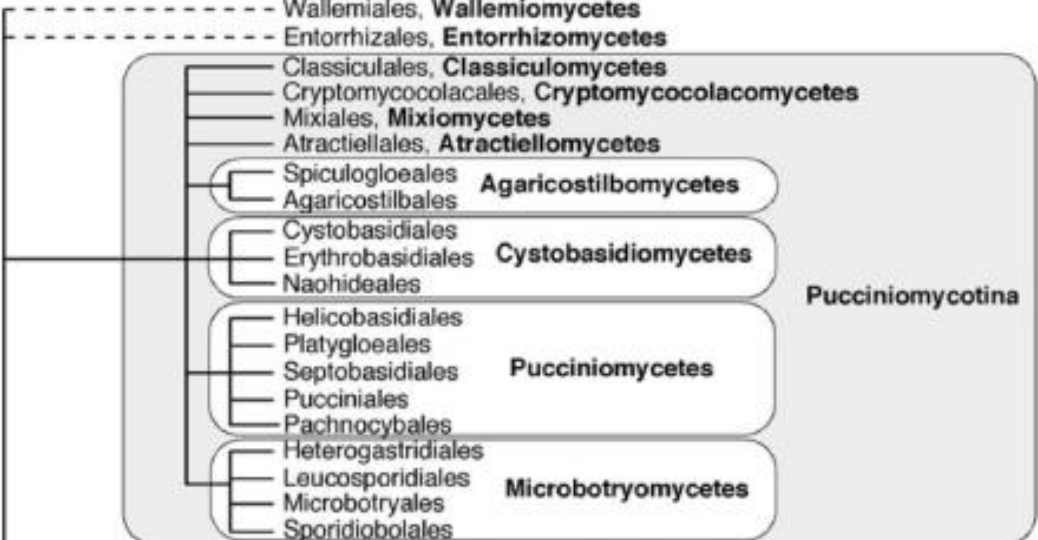








Basidiomycota



Pucciniomycotina

Ustilaginomycotina

Agaricomycotina

No forman cuerpos de fructificación

Pucciniomycotina

(royas)



Ustilaginomycotina

(carbones)



Formas cuerpos de fructificación

Agaricomycotina



Basidiomycota

Wallemiales, **Wallemiomycetes**

Entorrhizales, **Entorrhizomycetes**

Classicales, **Classiculomycetes**

Cryptomycocolacales, **Cryptomycocolacomycetes**

Mixiales, **Mixiomycetes**

Atractiellales, **Atractiellomycetes**

Spiculogloales, **Agaricostilbomycetes**

Agaricostilbales

Cystobasidiales

Erythrobasidiales, **Cystobasidiomycetes**

Naohideales

Pucciniomycotina

Pucciniomycotina

7400 especies

215 géneros

Helicobasidiales

Platyglloeales

Pucciniomycetes

Septobasidiales

Pucciniales

Pachnocybales

Heterogastridiales

Leucosporidiales

Microbotryomycetes

Microbotryales

Sporidiobolales

Urocystales

Ustilaginomycetes

Ustilaginales

Malasseziales

Doassansiales

Entylomatales

Exobasidiales

Exobasidiomycetes

Georgefischeriales

Microstromatales

Tilletiales

Ustilaginomycotina

Ustilaginomycotina

Cystofilobasidiales

Tremellomycetes

Filobasidiales

Tremellales

Dacrymycetales, **Dacrymycetes**

Auriculariales

Sebacinales

Agaricomycetes

Cantharellales

Trechisporales

Geastrales

Gomphales

Phallomycetidae

Hysterangiales

Phallales

Agaricomycotina

Agaricomycotina

Hymenochaetales

Corticiales

Gloeophyllales

Polyporales

Thelephorales

Russulales

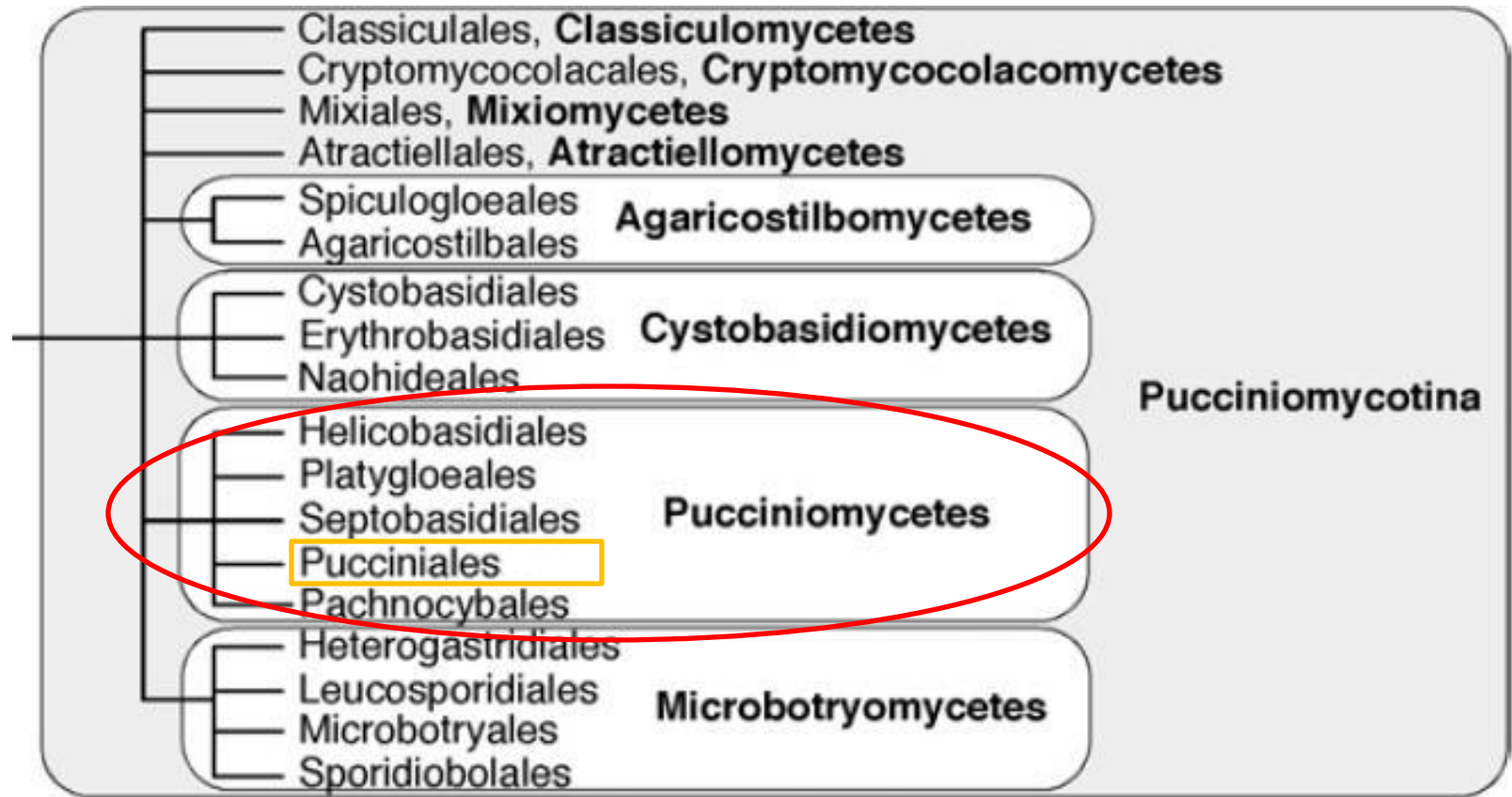
Agaricales

Agaricomycetidae

Atheliales

Boletales

Subphylum Pucciniomycotina



Pucciniomycetes

Sin Basidioma

Pucciniales “royas” (rust fungi= esporas producidas en pústulas que le dan la apariencia rust)

- 95% de las especies (5000 spp)
- Parásitos de plantas superiores (Pteridófitas, Gymnospermas y Angiospermas (mono y dicotiledóneas))

→ Basidio tabicado →



→ 4 tipos de estados de esporas (**ecidióspora**, **uredóspora**, **teleutóspora**, **basidióspora**)

→ Ciclo de vida → Heteroico (2 hospedantes no relacionadas taxonómicamente)
Autoico (1 hospedante)



Puccinia oxidalis

***Puccinia graminis* (roya negra del trigo)**

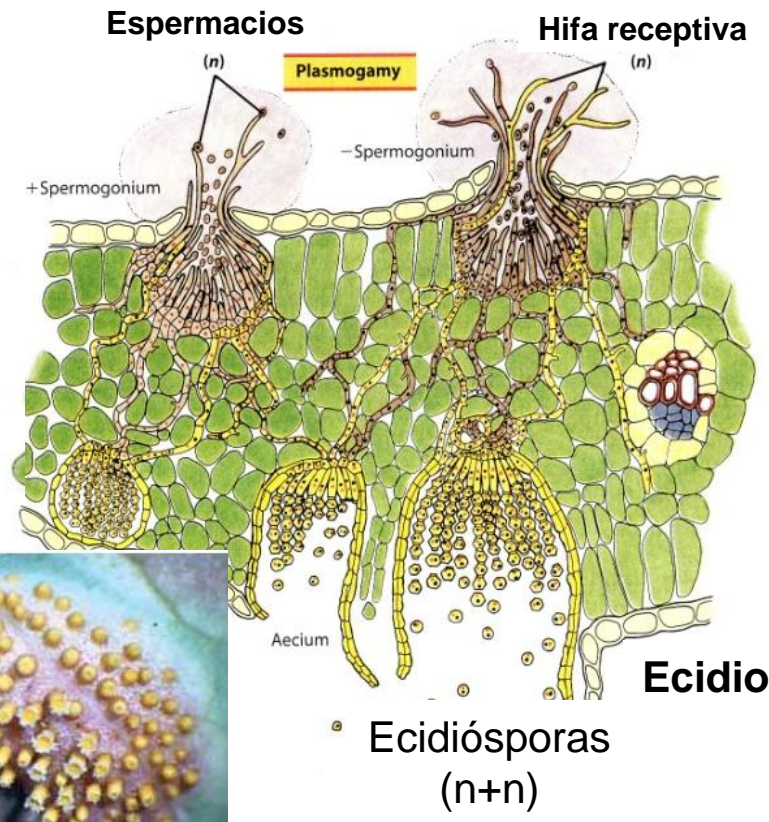
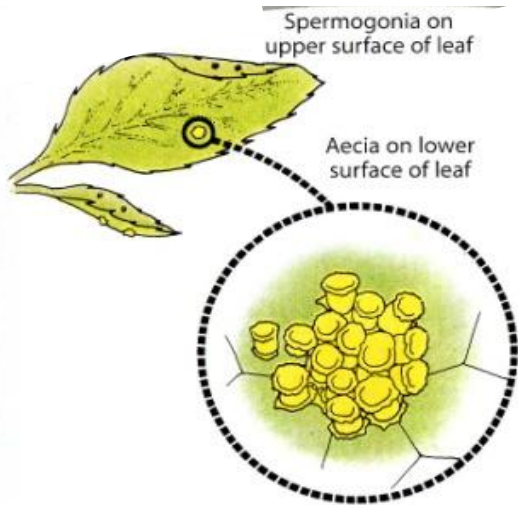
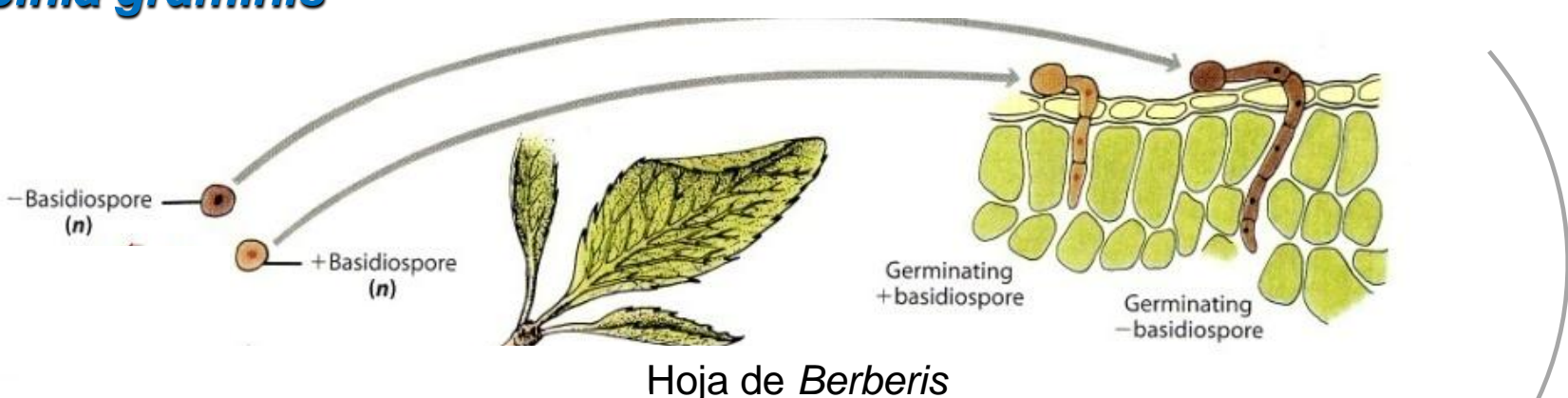


Trigo, avena, etc. (monocot.)



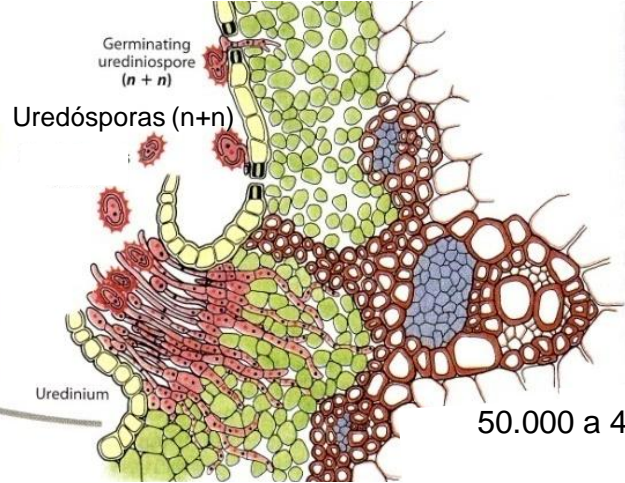
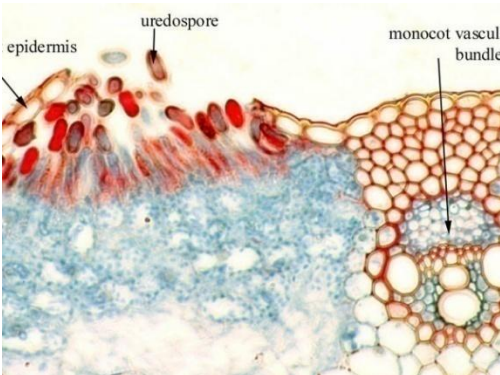
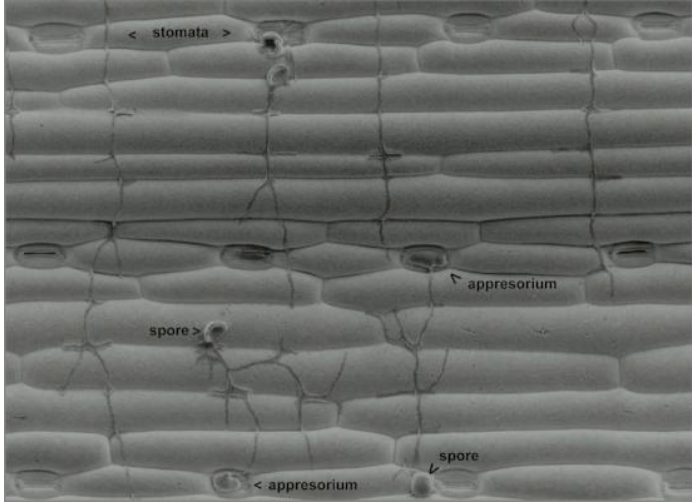
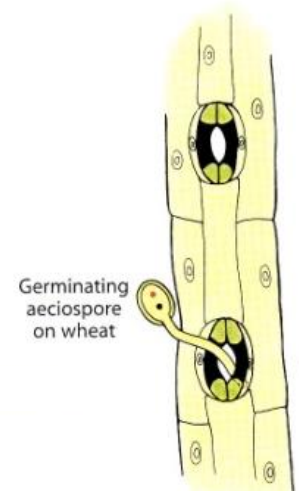
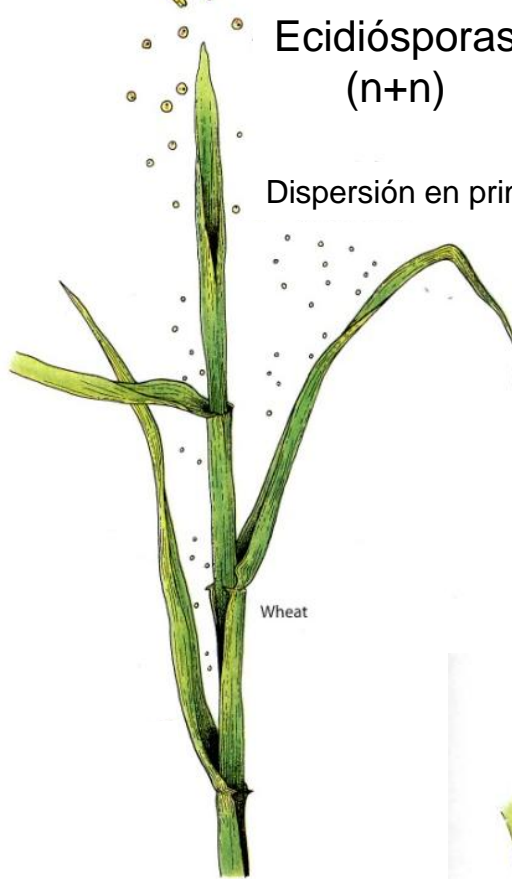
Berberis vulgaris (dicot.)

Puccinia graminis



Ecidiosporas (n+n)

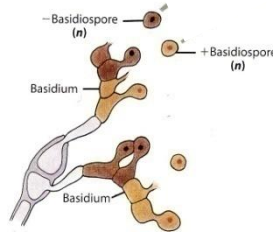
Dispersión en primavera



50.000 a 400.000 esporas



Estado rojo en primavera y verano



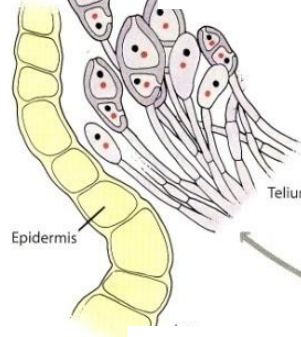
Meiosis and germination

Germinación de teliosporas
comienzo primavera



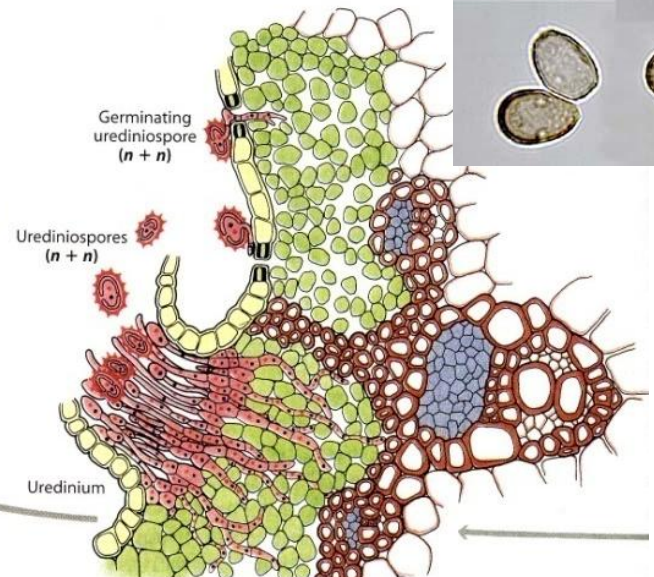
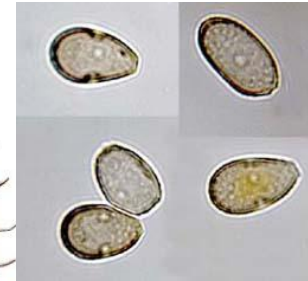
Karyogamy

Teliósporas
(2 células $n+n$)



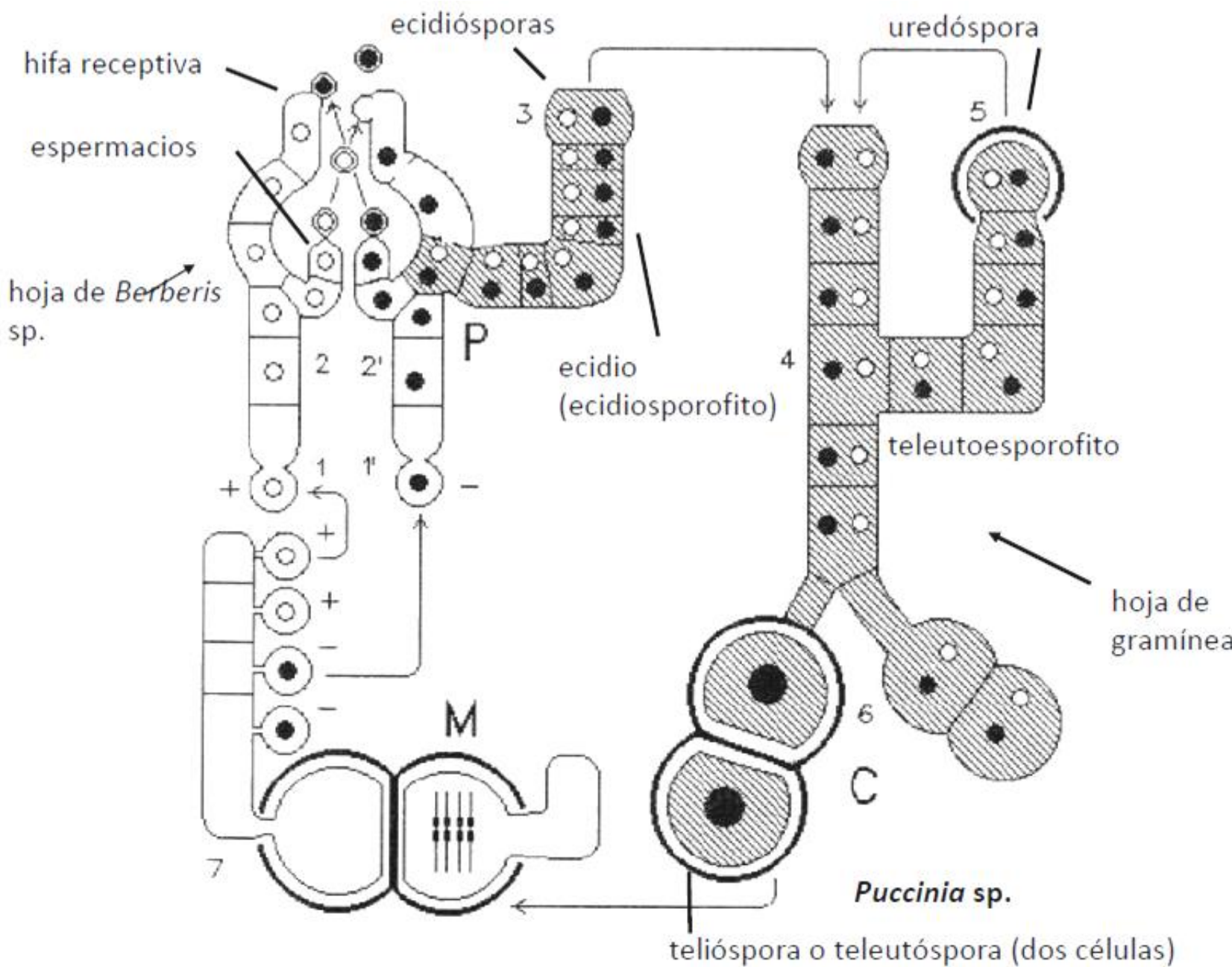
Telia

Estado negro final
verano comienzo
otoño

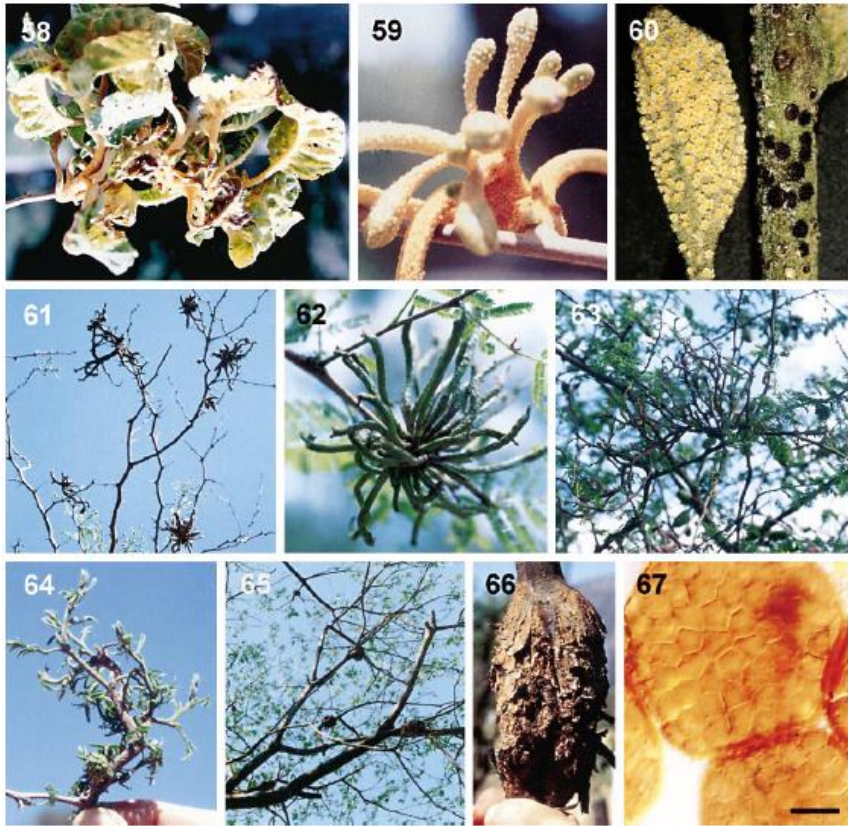


Estado rojo en primavera y verano

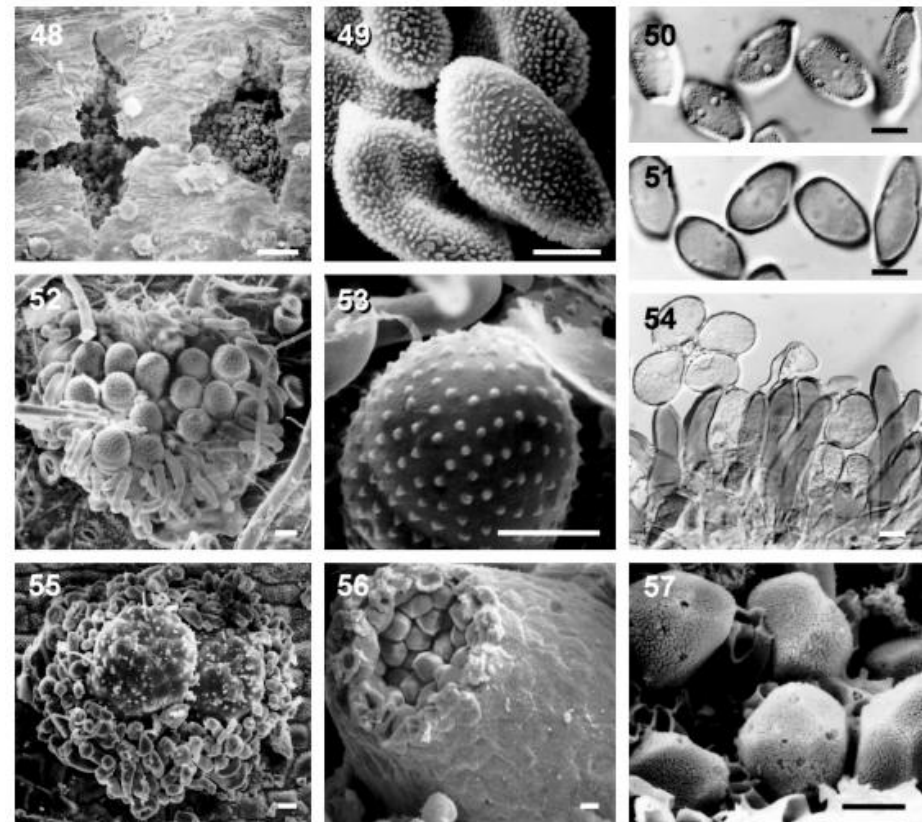
Puccinia graminis



Rust fungi causing galls, witches' brooms, and other abnormal plant growths in northwestern Argentina



FIGS. 58–67. *Puccinia pampeana*, *Ravenelia argentinica*, *Ravenelia hieronymi* and *Ravenelia papillosa*. 58. Witches' broom caused by *Puccinia pampeana* on *Cestrum* sp., 59. Sori of *Endophyllum* state of *P. pampeana* on bud malformation on *Cestrum* sp., 60. *Endophyllum* sori on leaf (left) and telia on stem (right) of *P. pampeana* on *Salpiglossa origanifolia*, 61. Witches' brooms caused by *R. argentinica* on *Acacia aroma*, 62. Spidery abnormal growth of *R. argentinica* on *A. aroma*, 63. Witches' brooms of *R. hieronymi* on *A. caven*, 64. Detail of young branch of *A. caven* infected by *R. hieronymi*, 65. Galls caused by *R. papillosa* on branches of *Parapiptadenia excelsa*, 66. Gall of *R. papillosa*, 67. Teliospores of *R. papillosa*. Bar = 20 μ m.

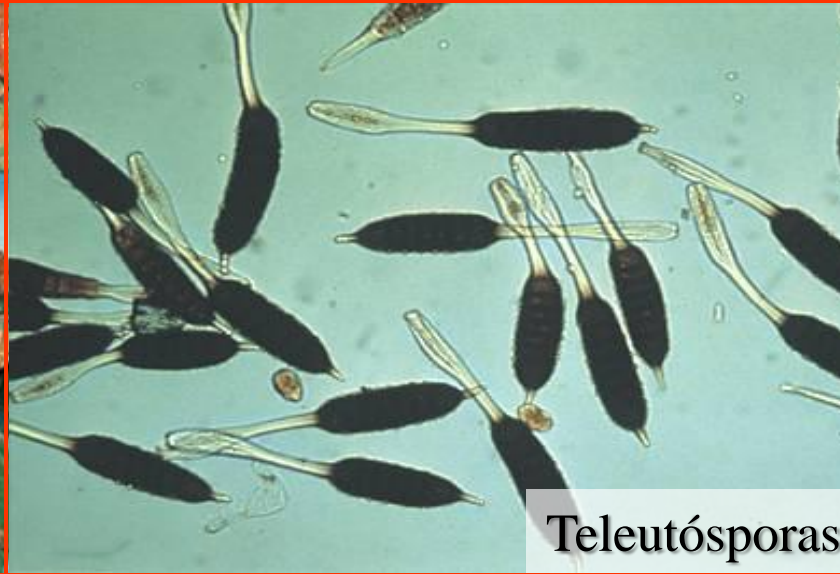


FIGS. 48–57. *Ravenelia argentinica* and *Ravenelia hieronymi*. 48. SEM of Aecia of *R. argentinica*, 49. SEM of aeciospores of *R. argentinica*, 50. Surface view of aeciospores of *R. argentinica*, 51. Median view of 50, 52. SEM of uredinium of *R. argentinica*, 53. SEM of urediniospore of *R. argentinica*, 54. Urediniospores and paraphyses of *R. argentinica*, 55. SEM of teliospores produced in uredinium of *R. argentinica*, 56. SEM of Aecium of *R. hieronymi*, 57. SEM of aeciospores of *R. hieronymi*. FIG. 48 Barr = 80 μ m. FIGS. 49–57 Bars = 10 μ m.

Royas en rosales (autoica)....



Uredósporas



Teleutósporas

Basidiomycota

Walleimiales, **Walleimiomycetes**

Entorrhizales, **Entorrhizomycetes**

Classificales, **Classiculomycetes**

Cryptomycocolacales, **Cryptomycocolacomycetes**

Mixiales, **Mixiomycetes**

Atractiellales, **Atractiellomycetes**

Spiculogloeales, **Agaricostilbomycetes**

Agaricostilbales

Cystobasidiales

Erythrobasidiales, **Cystobasidiomycetes**

Naohideales

Pucciniomycotina

Pucciniomycotina

Helicobasidiales

Platyglloeales

Septobasidiales

Pucciniales

Pachnocybales

Heterogastridiales

Leucosporidiales

Microbotryales

Sporidiobolales

Pucciniomycetes

Microbotryomycetes

Urocystales

Ustilaginales

Malasseziales

Doassansiales

Entylomatales

Exobasidiales

Georgefischeriales

Microstromatales

Tilletiales

Ustilaginomycetes

Exobasidiomycetes

Ustilaginomycotina

Ustilaginomycotina

1500 especies

50 géneros

Cystofilobasidiales

Filobasidiales

Tremellales

Dacrymycetales

Dacrymycetales

Auriculariales

Sebacinales

Cantharellales

Trechisporales

Geastrales

Gomphales

Hysterangiales

Phallales

Hymenochaetales

Corticiales

Gloeophyllales

Polyporales

Thelephorales

Russulales

Agaricales

Atheliales

Boletales

Tremellomycetes

Agaricomycetes

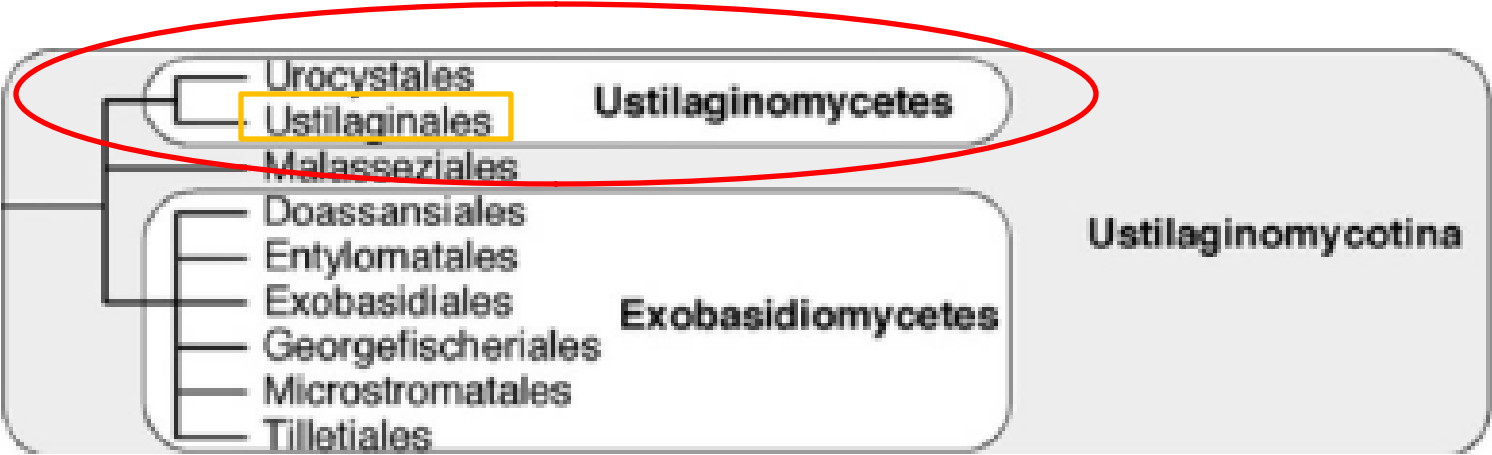
Phallomycetidae

Agaricomycetidae

Agaricomycotina

Agaricomycotina

Ustilaginomycotina

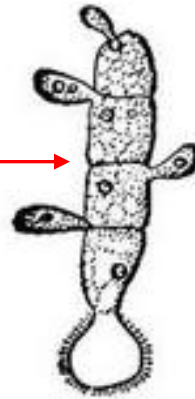


Sin Basidiocarpo

Orden Ustilaginales “carbones” (smut fungi= masa de esporas negras producidas en órganos de plantas infectadas)

→ Parásitos de plantas superiores (Hojas, tallos, flores, semillas de pastos, herbáceas)

→ Basidio tabicado



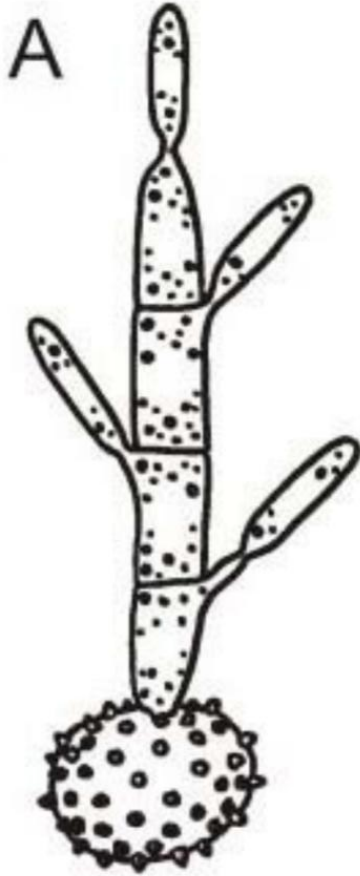
→ Frecuentemente con dos fases: 1) levaduroide monocariótica (saprofítica), 2) micelio dicariótico infeccioso.

→ Ciclo de vida → Autoico (1 hospedante)

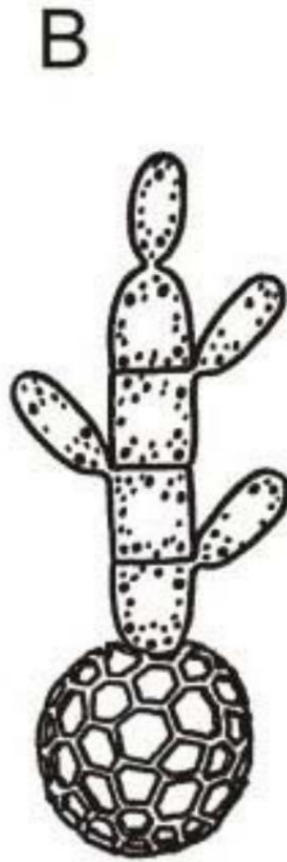


Ustilago maydis

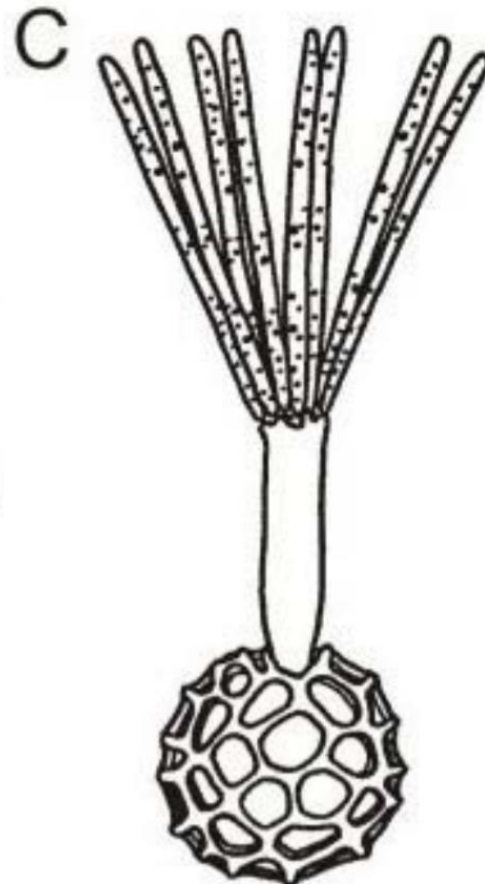
Tipos de Basidios tabicados



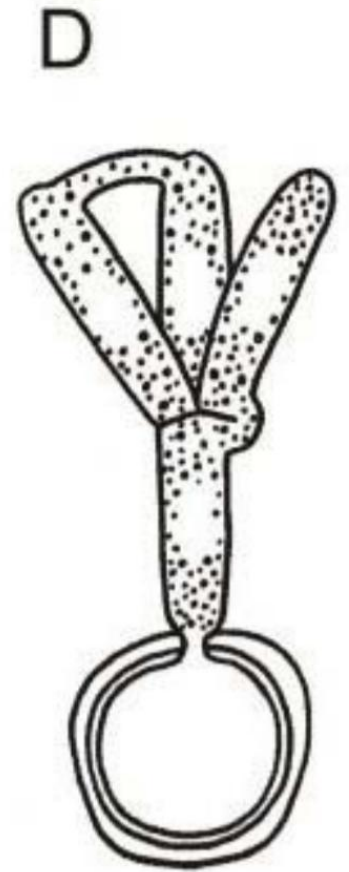
Ustilago



Myrobotrium



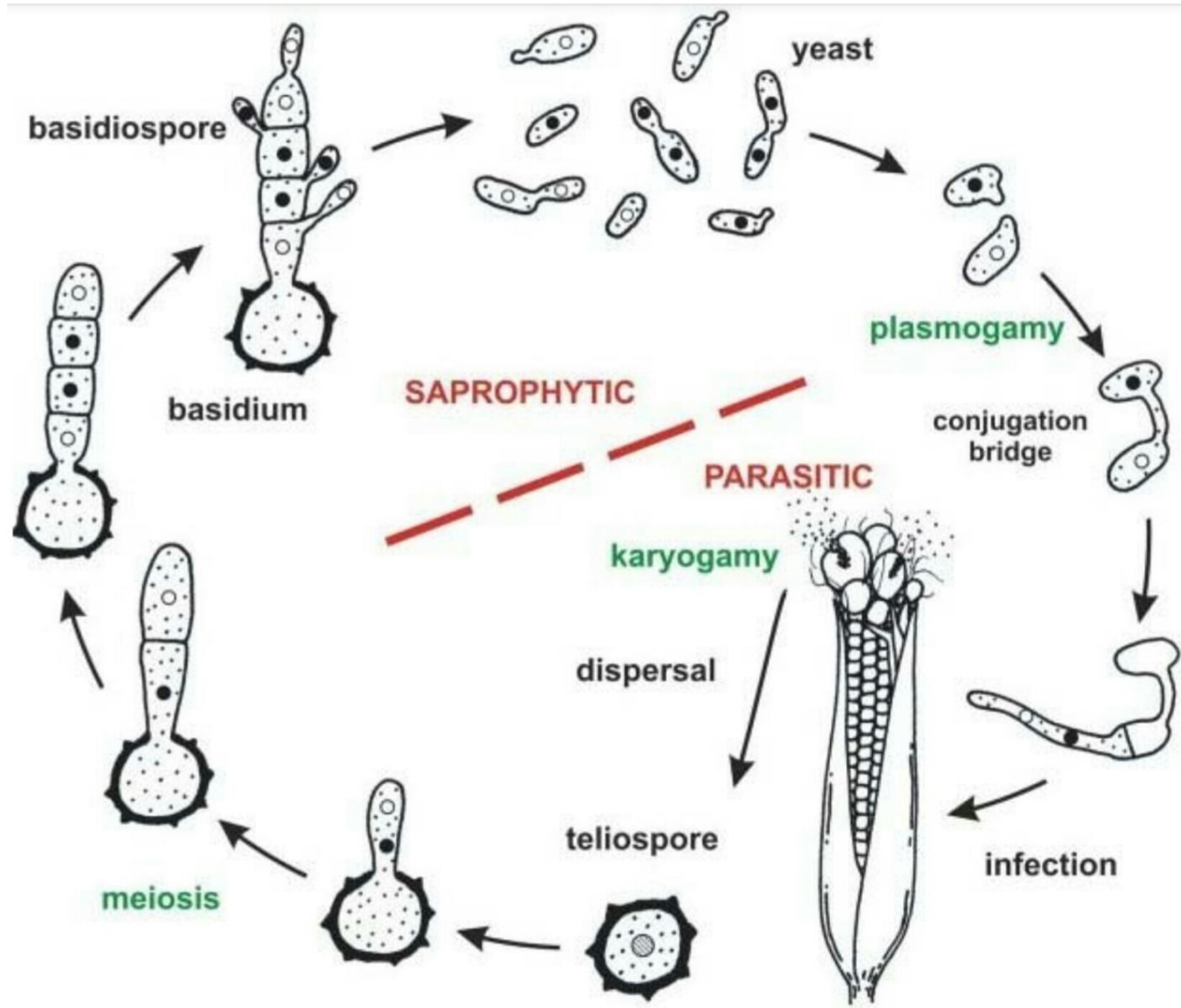
Tilletia



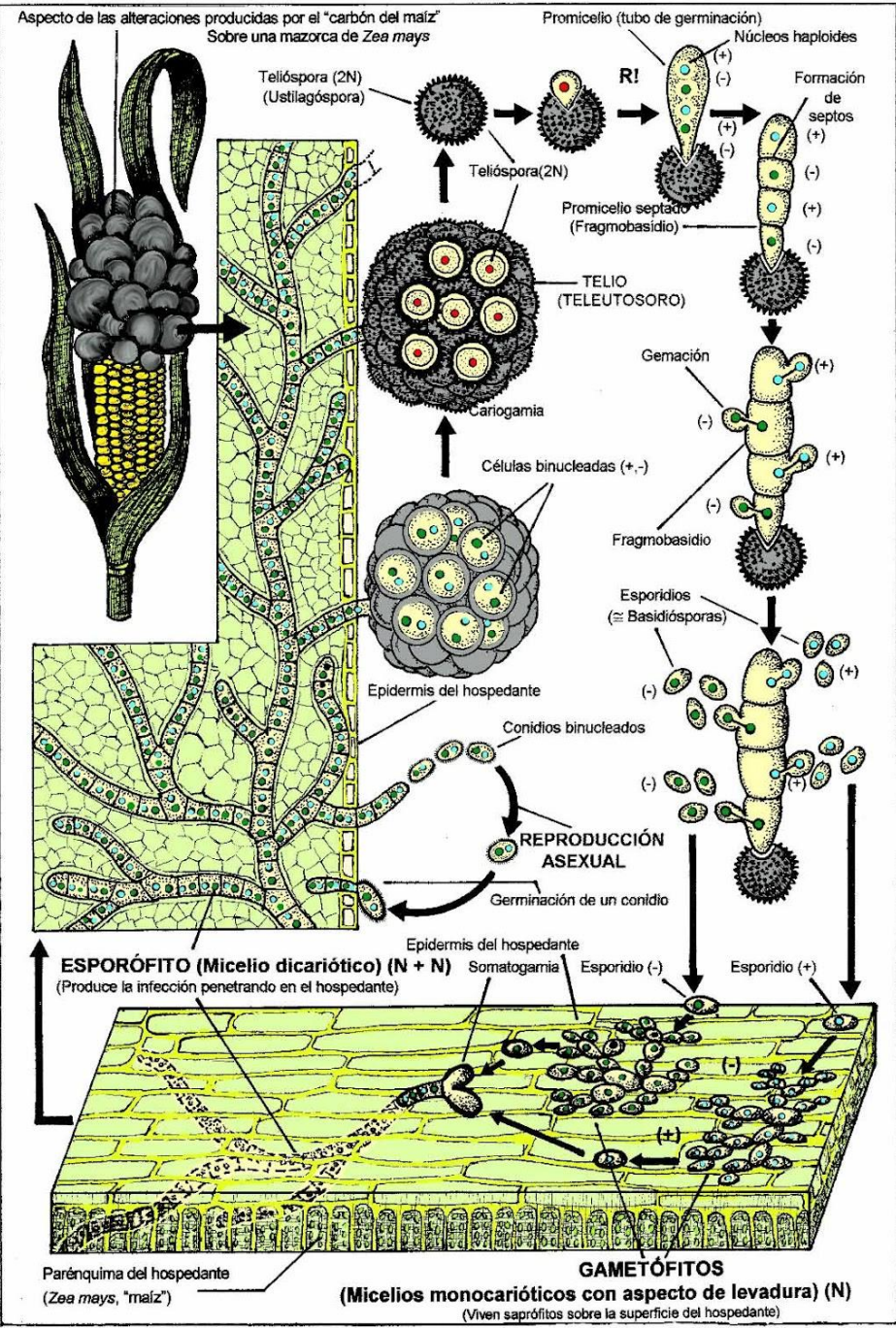
Entyloma

Basidiósporas laterales o terminales

Ciclo biológico de *Ustilago maydis*

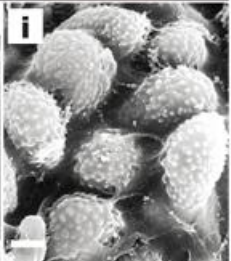
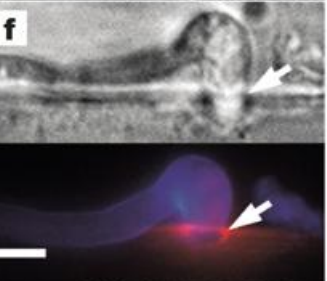
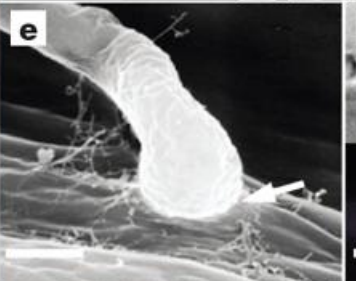
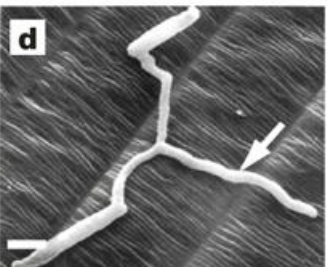
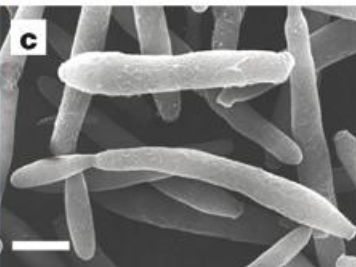
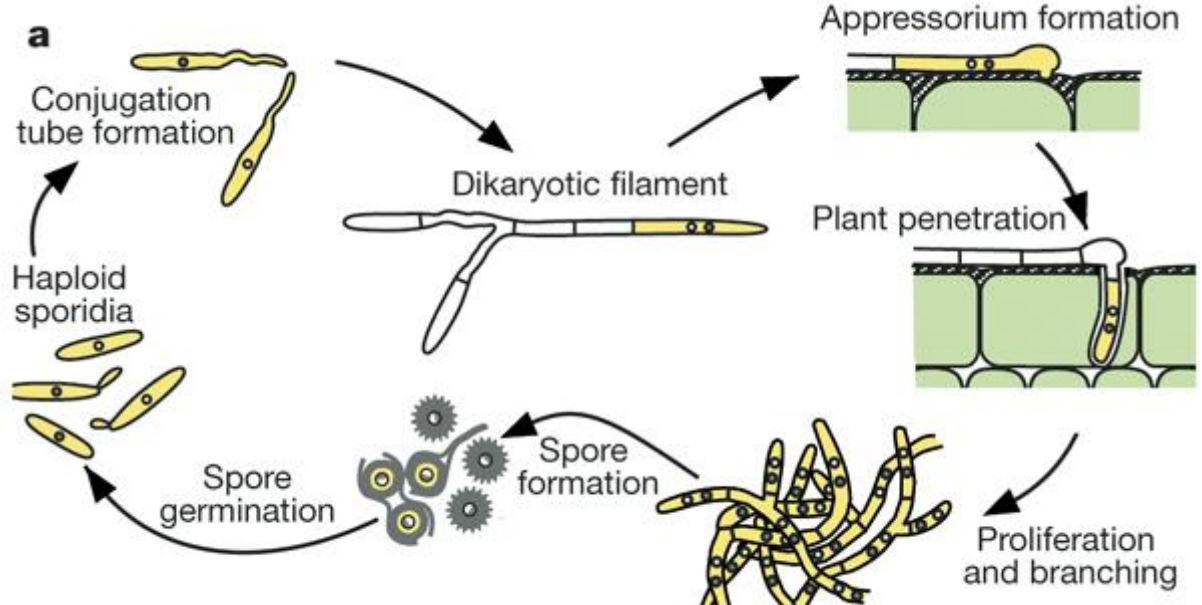


**CICLO DE USTILAGO MAYDIS ("Carbón del maíz") (Heterobasidiomycetidae)
DIGENÉTICO HETEROMORFICO CON ESPORÓFITO DOMINANTE**



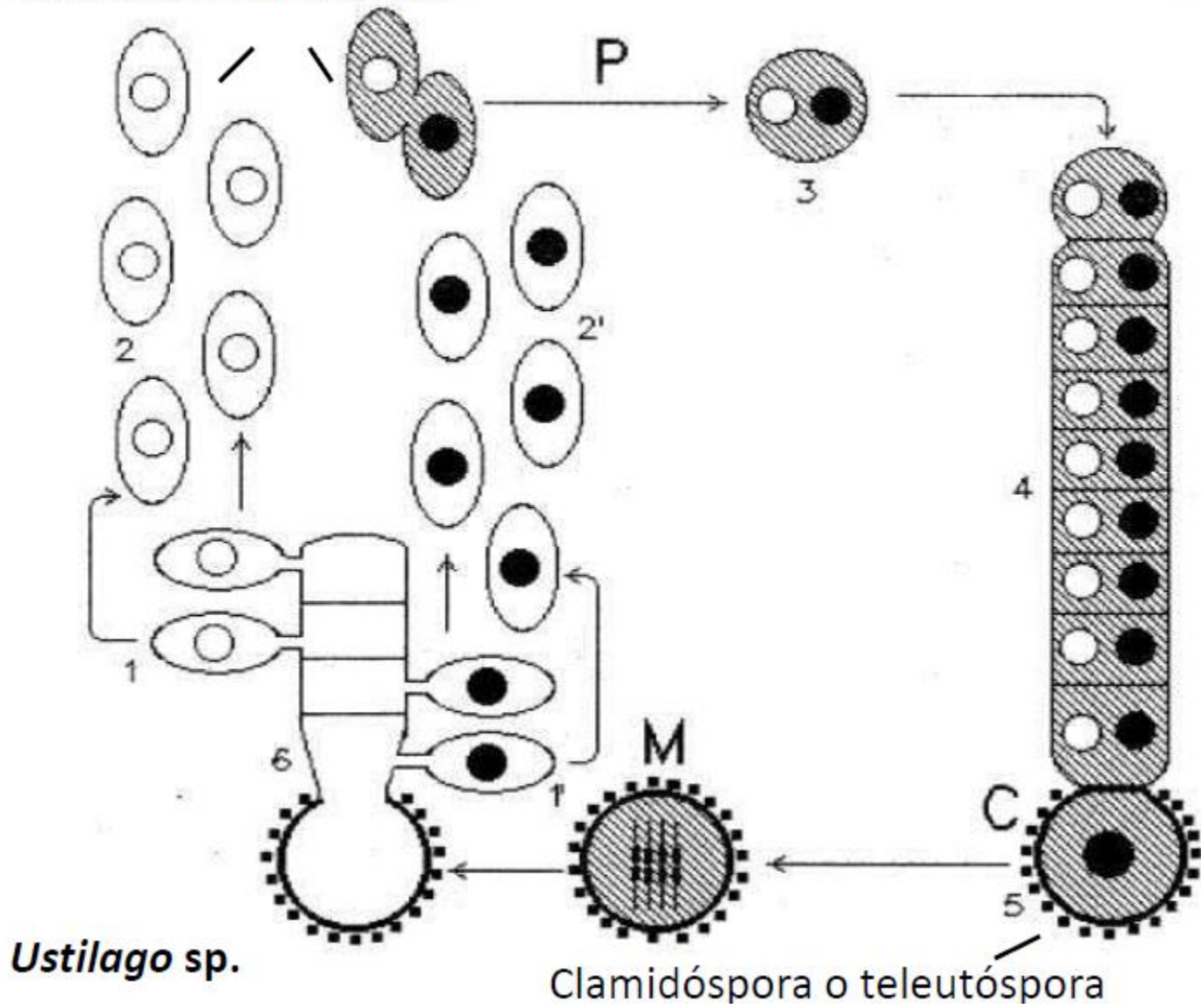
Ustilago maydis

basidiósporas



Estructura levaduroide

Cocucci & Hunziker 1994

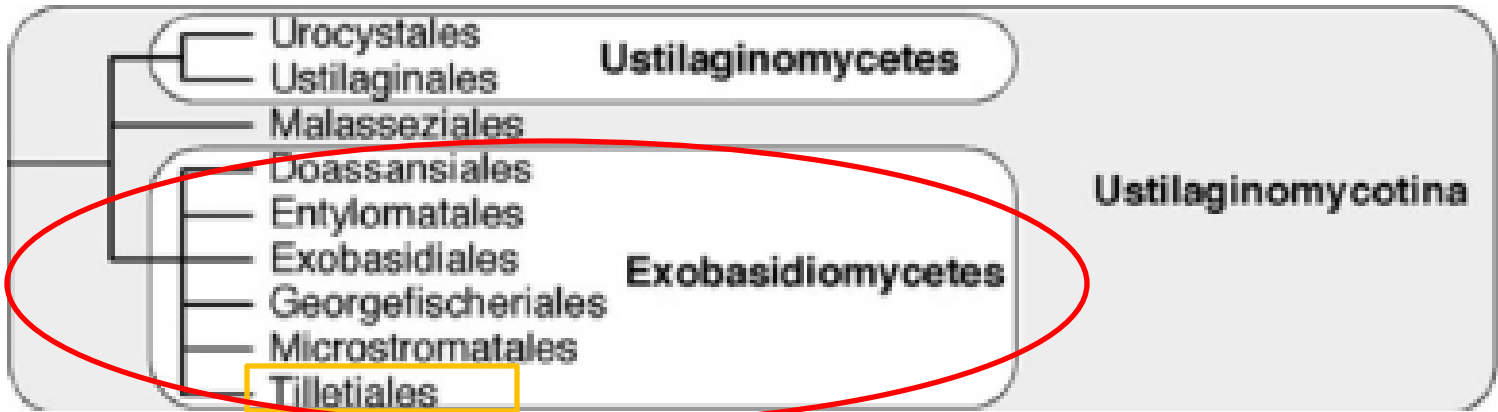




...y se comen!!!



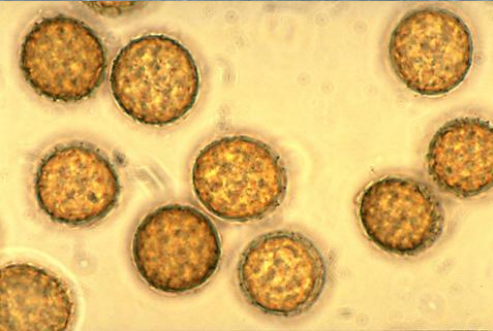
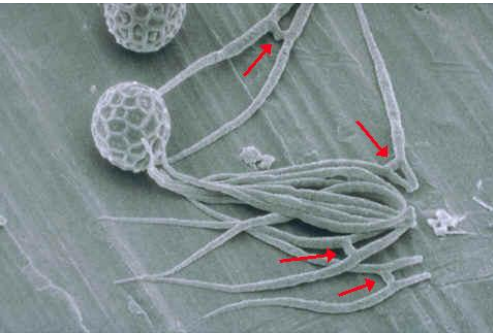
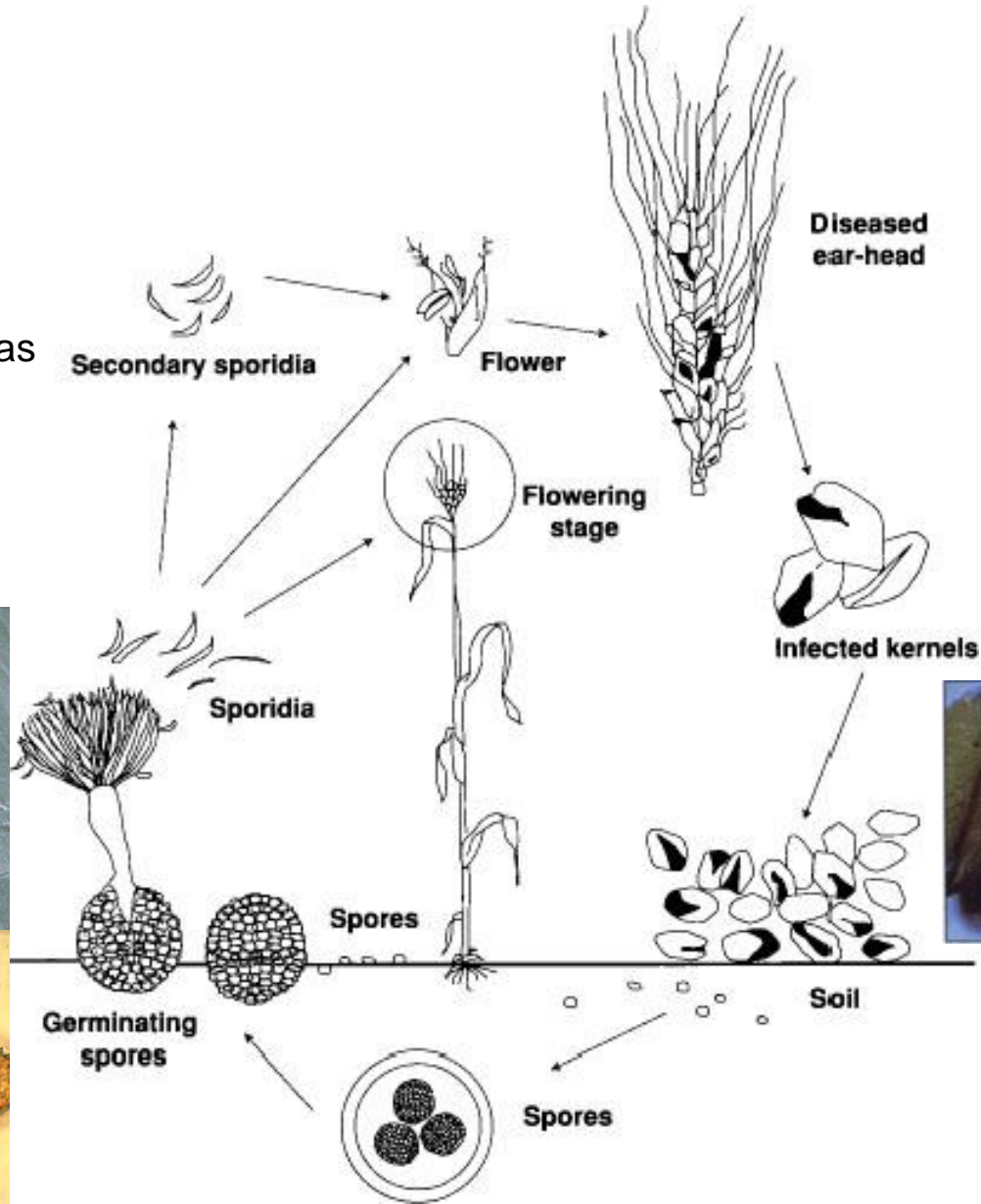
Subphylum Ustilaginomycotina



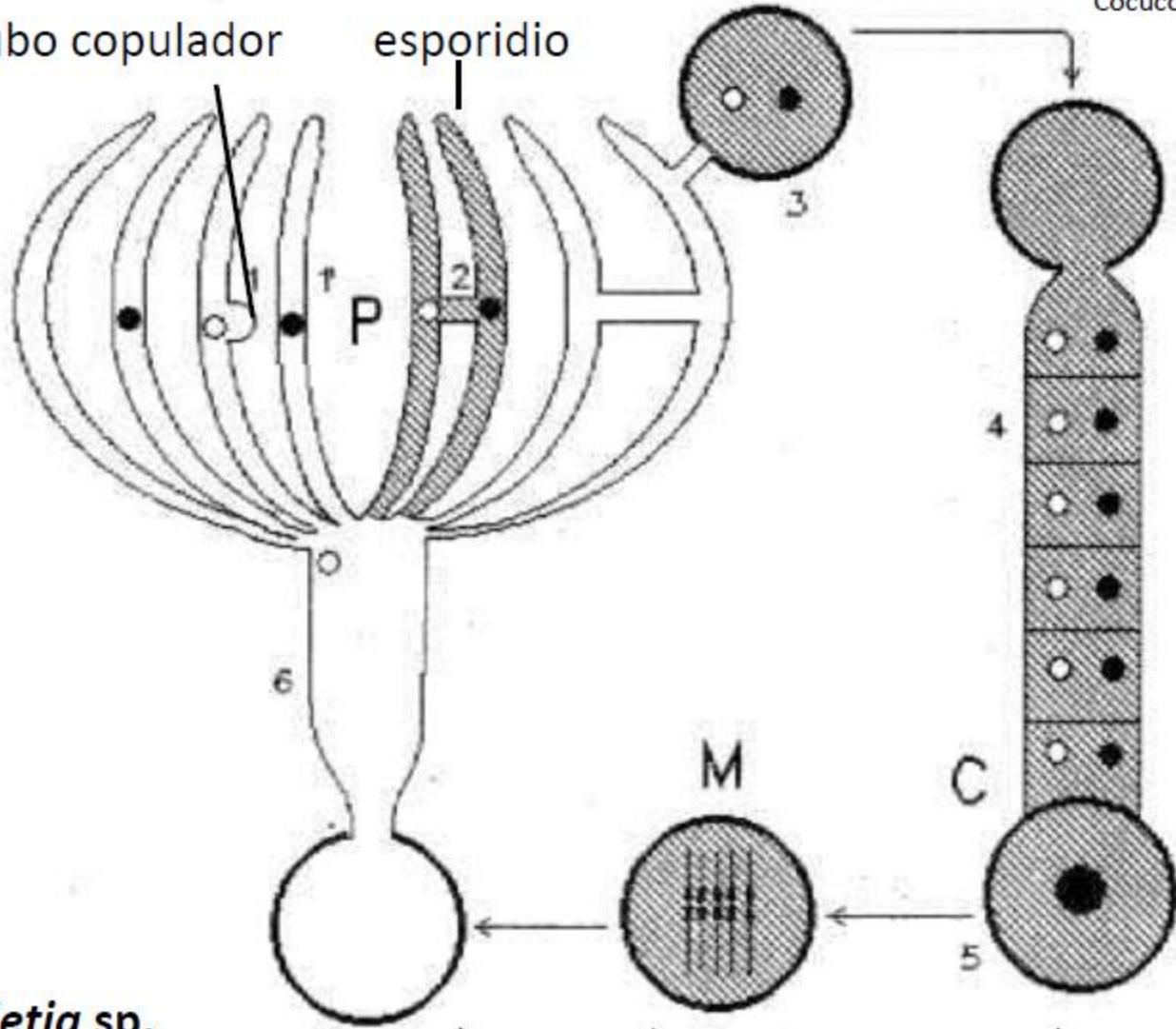
Tilletiales

Tilletia (caries del trigo)

basidiósporas



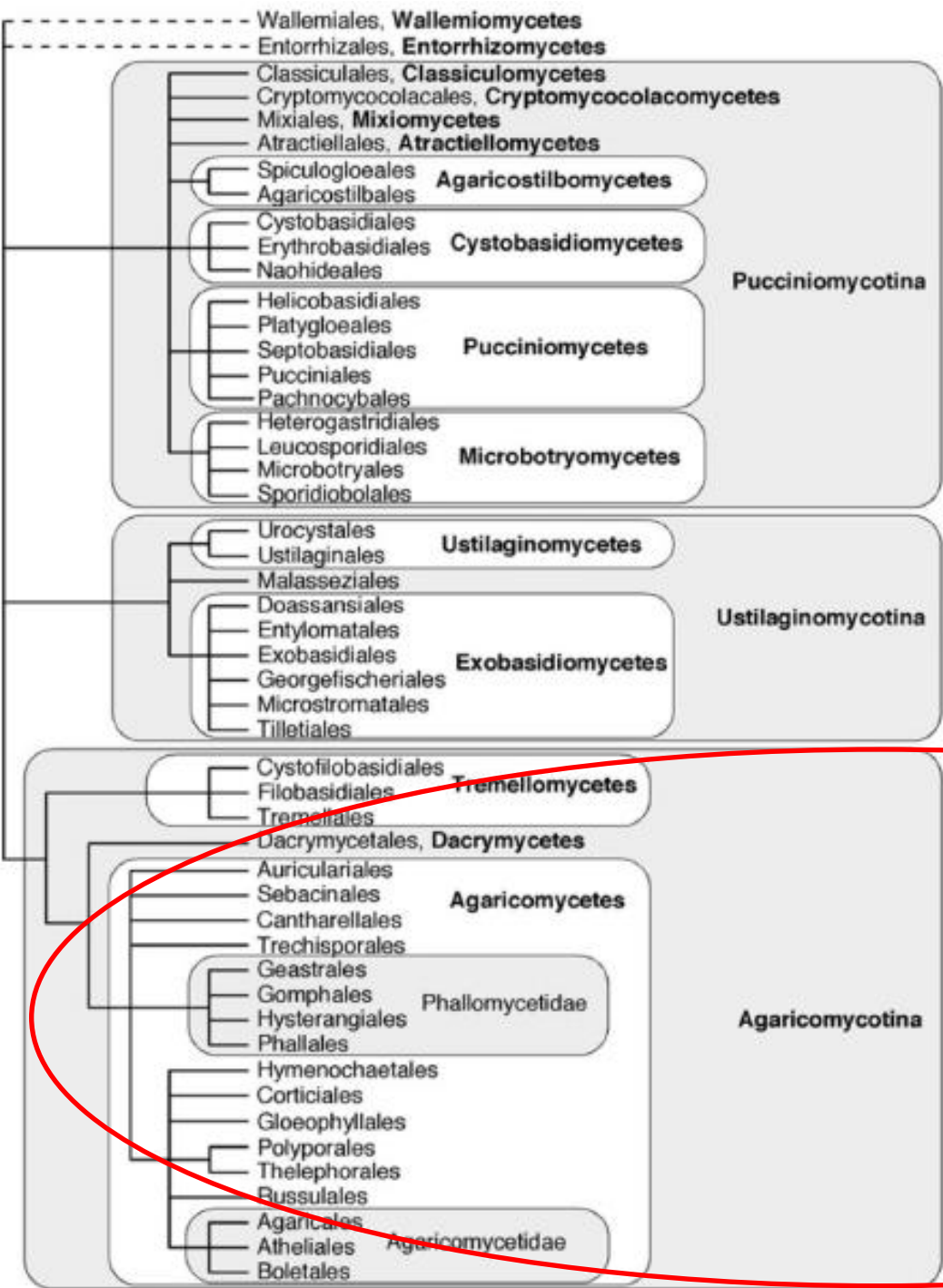
tubo copulador esporidio



Tilletia sp.

probasidio

Clamidóspora o teleutópora



Basidiomycota

Pucciniomycotina

Ustilaginomycotina

Agaricomycotina

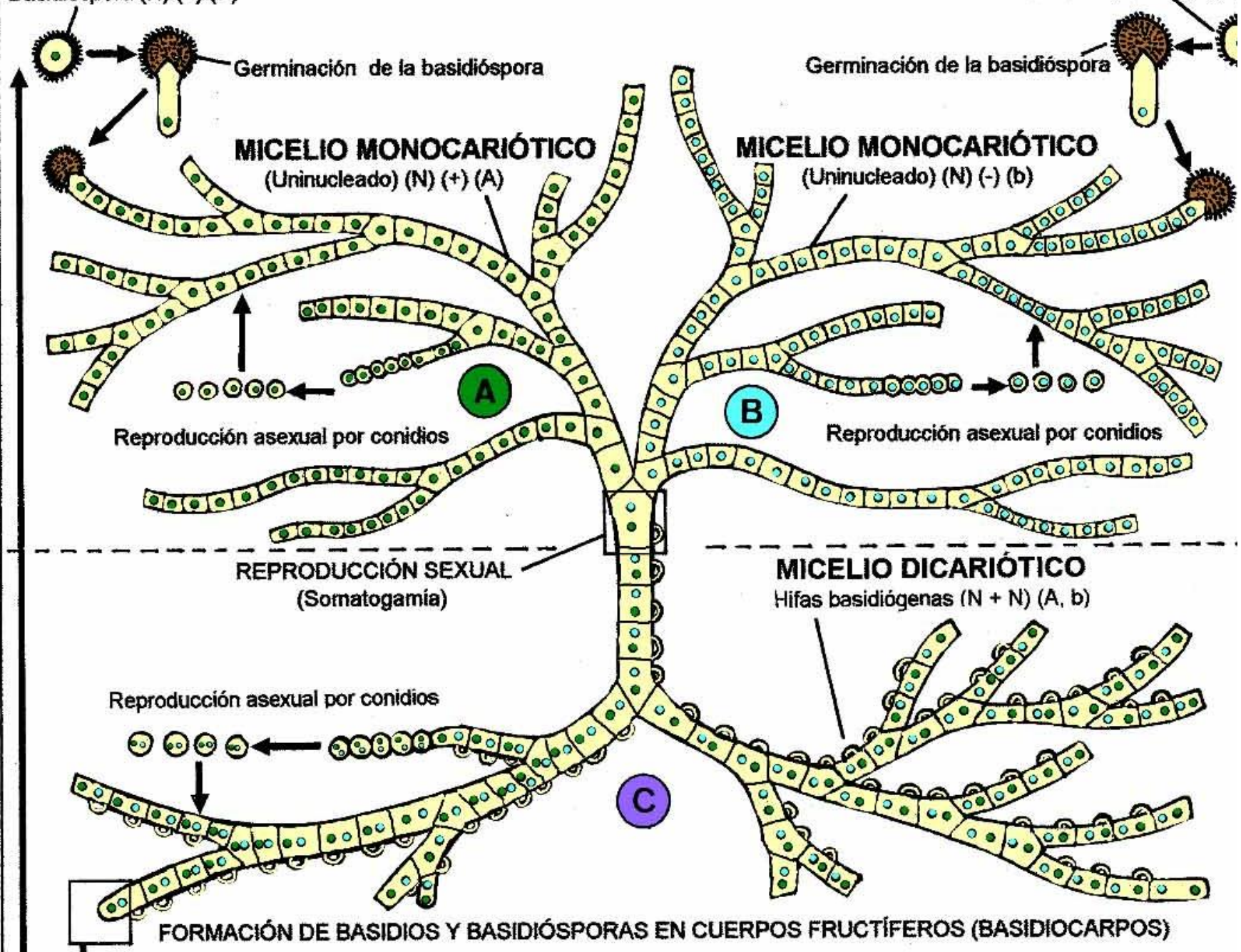
Formas cuerpos de fructificación

Agaricomycotina



Basidióspora (N) (+) (A)

Basidióspora (N) (-) (B)



MICELIO MONOCARIÓTICO
(Uninucleado) (N) (+) (A)

MICELIO MONOCARIÓTICO
(Uninucleado) (N) (-) (b)

Reproducción asexual por conidios

Reproducción asexual por conidios

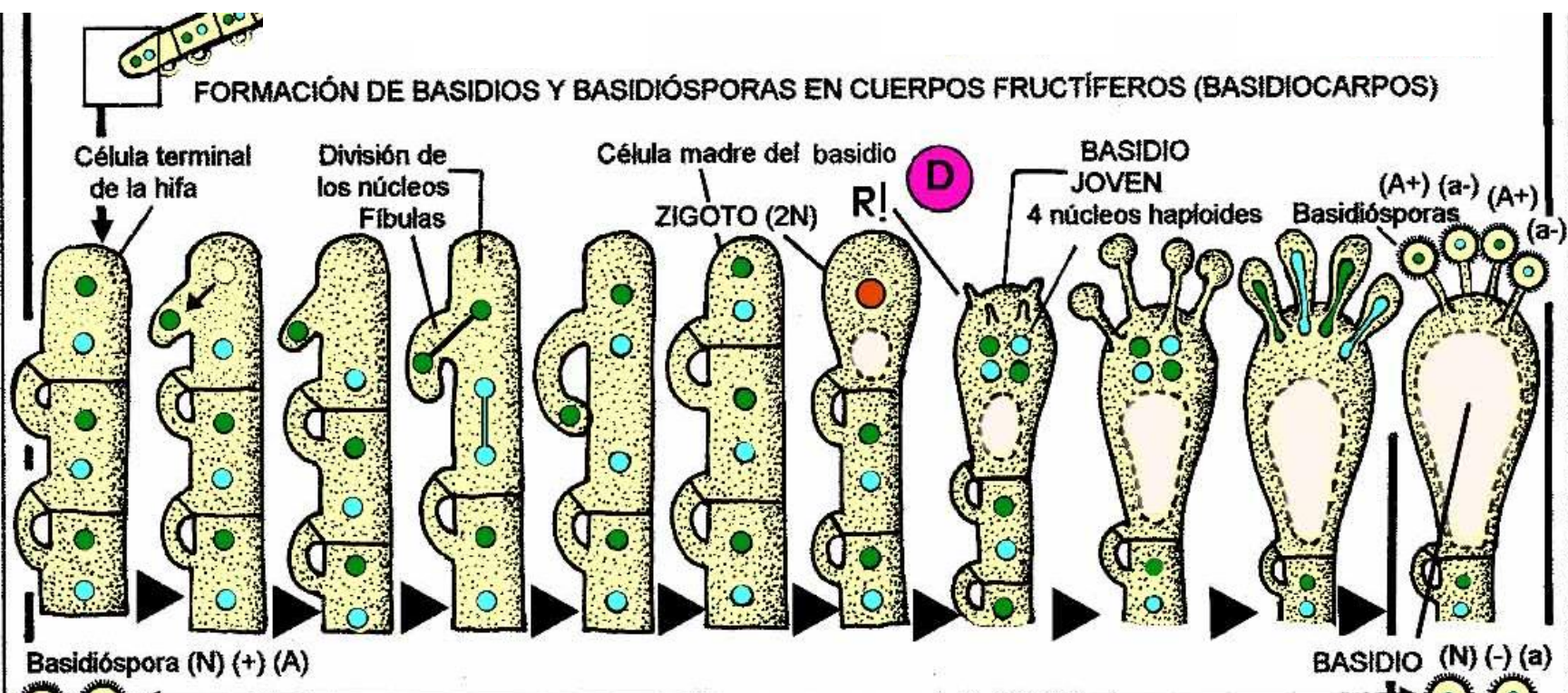
REPRODUCCIÓN SEXUAL
(Somatogamia)

MICELIO DICARIÓTICO
Hifas basidiógenas (N + N) (A, b)

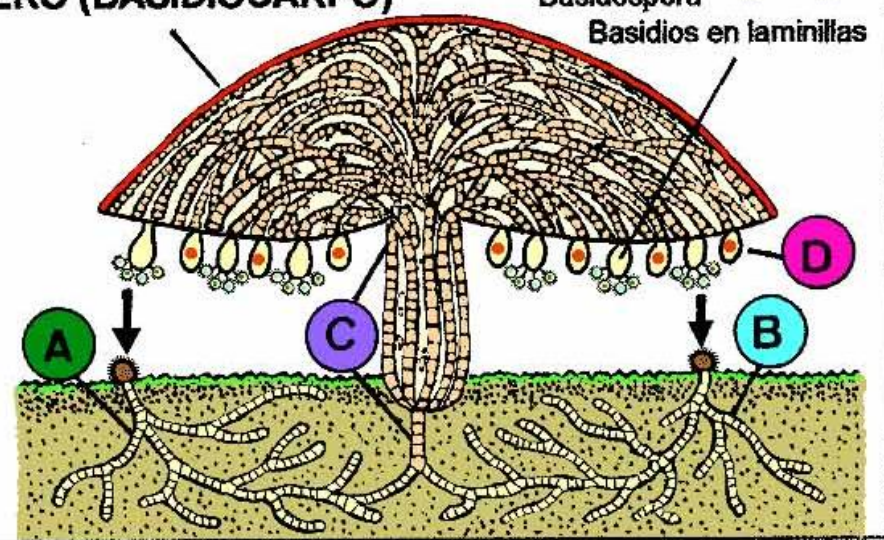
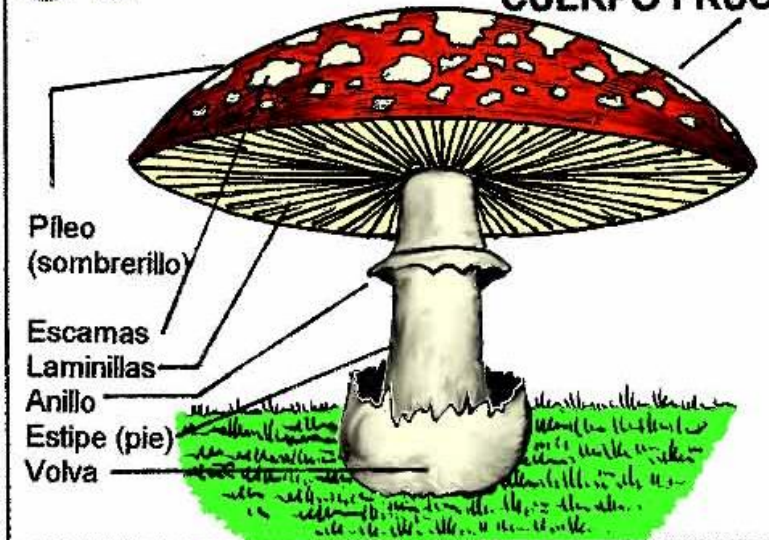
Reproducción asexual por conidios

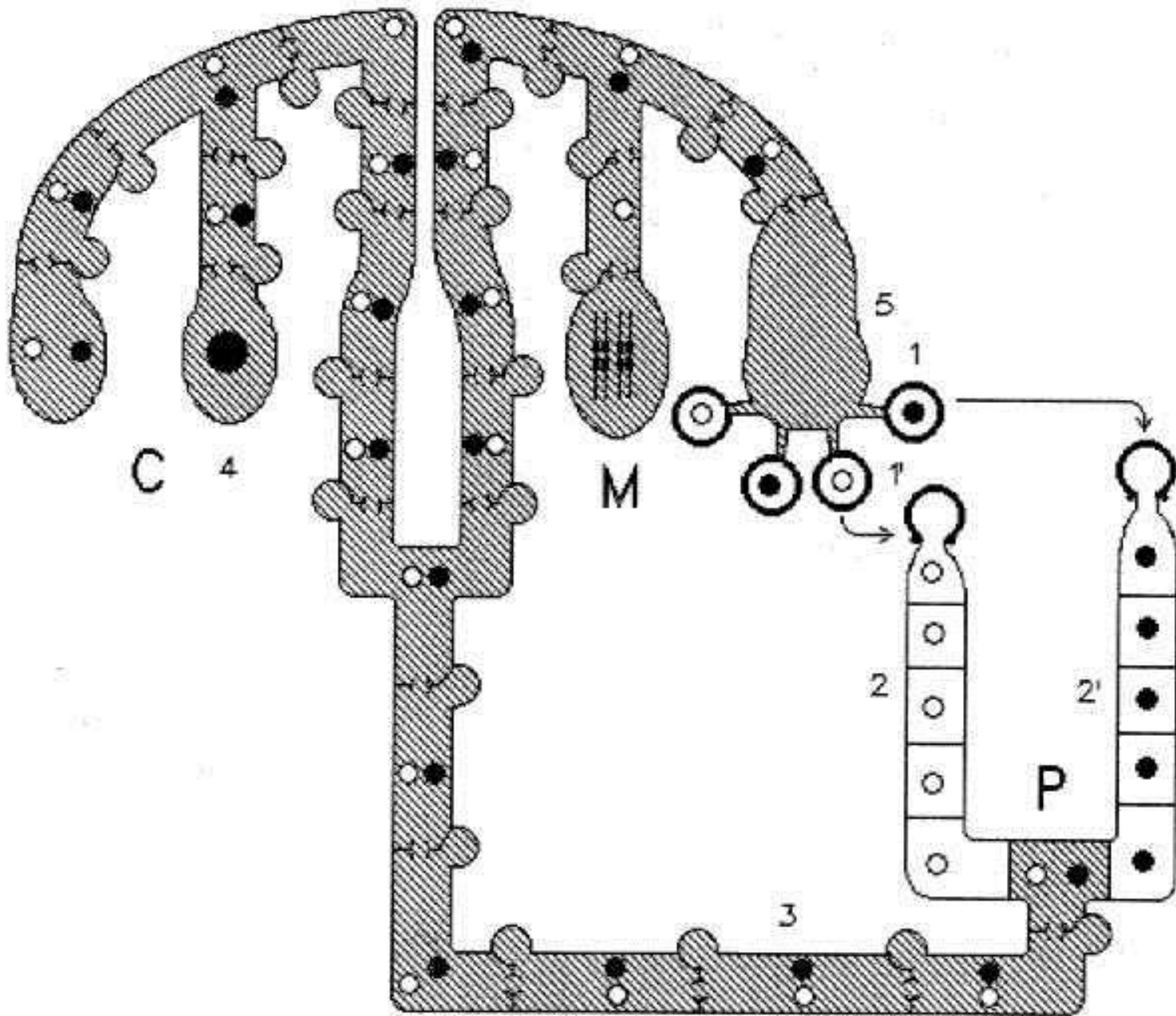
FORMACIÓN DE BASIDIOS Y BASIDIÓSPORAS EN CUERPOS FRUCTÍFEROS (BASIDIOCARPOS)

FORMACIÓN DE BASIDIOS Y BASIDIÓSPORAS EN CUERPOS FRUCTÍFEROS (BASIDIOCARPOS)



CUERPO FRUCTÍFERO (BASIDIOCARPO)

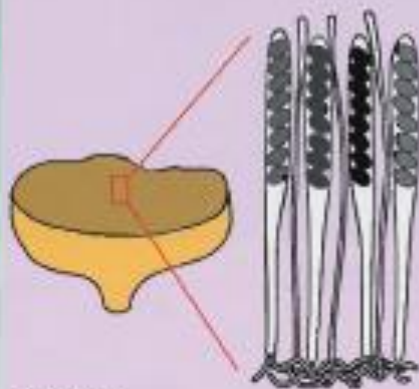




Agaricus sp.

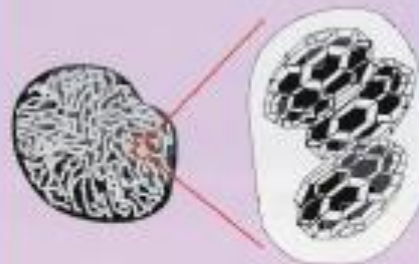
CHARACTERISTICS OF FUNGAL GROUPS

EPIGEOUS FUNGI



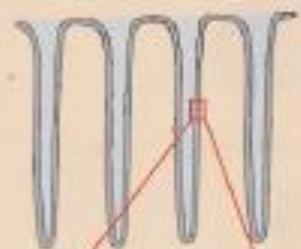
Cup fungus

SEQUESTRATE AND HYPOGEOUS FUNGI

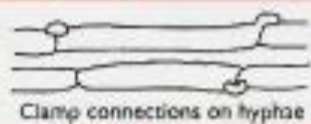


Truffle

ASCOMYCETES



Mushroom



Clamp connections on hyphae

BASIDIOMYCETES



Truffle-like fungus



Puffball



Agaricomycotina

→ Basidioma (multicelular, cuerpo de fructificación) (21400 spp.)



...diferentes arreglos del himenio....