1- what is a disease?

2- compare and contrast biotic and abiotic diseases

3-How is genetic variability generated in bacteria?

4- What does the DNA/RNA of viruses encode for?

Summary

- Diseases, signs and symptoms
- Causal agents:
  - Parasitic plants
  - Bacteria
  - Phytoplasmas
  - Viruses, viroids

Some examples of bacteria, phytoplasmas and viruses present in forests

- Bacterial leaf scorch: *Xylella fastidiosa*
- Crown Gall: *Agrobacterium tumefaciens*
- Ash and elm yellows: Ca. *Phytoplasma alni* and *P. ulmi*
- Bacterial wetwood *(Enterobacter, Klebsiella, Erwinia and Pseudomonas)*
- *Poplar mosaic virus, poplar potyvirus*
- *Cherry leaf roll virus* (elms, dogwood)
- *Tobacco Mosaic Virus (tanoak, oaks elders)*

Bacterial Leaf Scorch
Xylella fastidiosa

Hosts

Scientific	Common
Acer sp.	
A. Rubrum	Red maple
A. negundo	Boxelder
A. saccharum	Sugar maple
C. florida	Flowering dogwood
C. occidentalis	Hackberry
L. stryraciflua	Sweet gum
Morus alba	Whitemulberry
Platanus sp.	
P. occidentalis	American sycamore
P. x acerifolia	London plane
Ulmus americana	American elm

Scientific	Common
Quercus sp.	
Q. velutina	Black oak
Q. incana	Bluejack oak
Q. macrocarpa	Bur oak
Q. prinus	Chestnut oak
Q. laurifolia	Laurel oak
Q. virginiana	Live oak
Q. rubra	Northern red oak
Q. palustris	Pin oak
Q. stellata	Post oak
Q. coccinea	Scarlet oak
Q. imbricaria	Shingle oak
Q. shumardii	Shumard oak
Q. falcata	Southern red oak
Q. bicolor	Swamp white oak
Q. laevis	Turkey oak
Q. nigra	Water oak
Q. alba	White oak
Q. phellos	Willow oak

Symptoms

- First appear in late summer /early fall
- Leaf scorching
- Limb death

Vector

- Not determined for each tree species yet
- Most likely Graphocephala, Oncometopia and Homalodisca species.

Graphocephala atropunctata

Oncometopia orbona

Homalodisca vitripennis

Distribution Maps of Plant Diseases

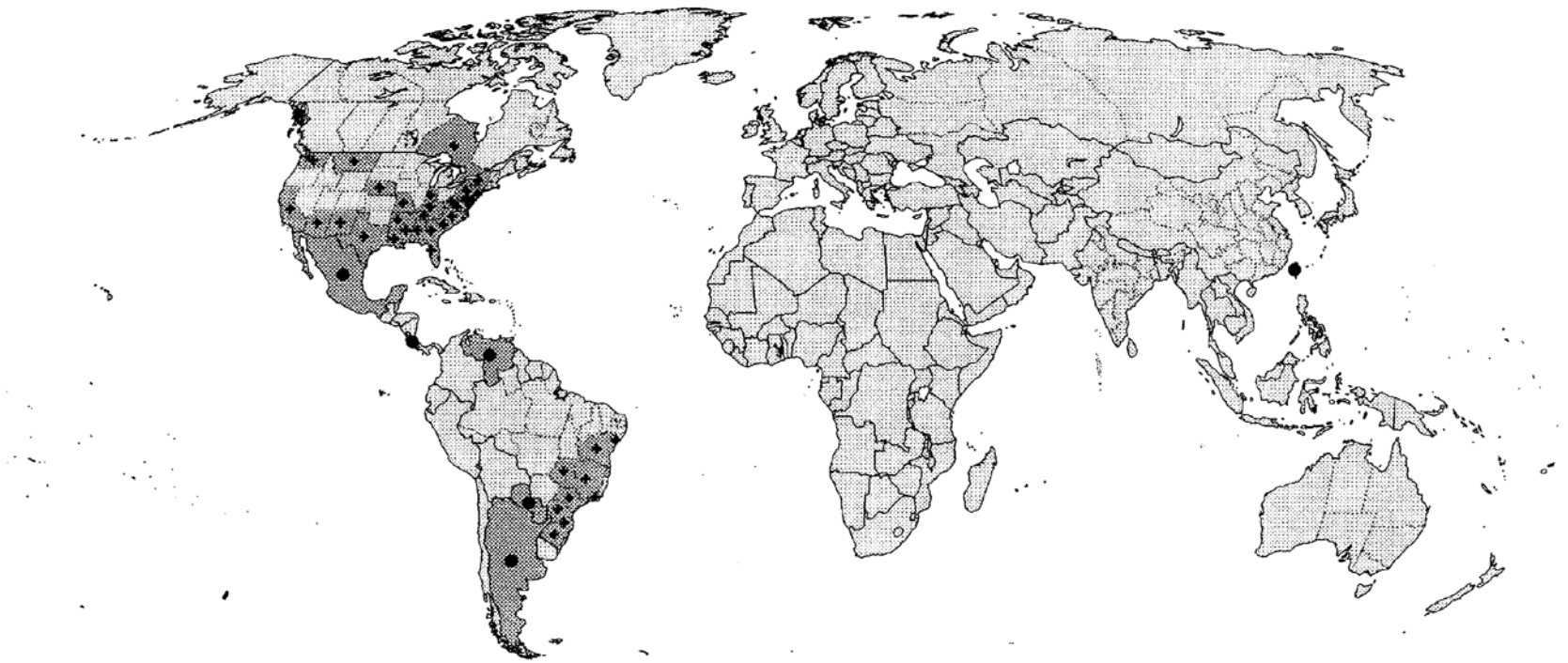
Compiled by CABI in association with EPPO

Map No. 262 **Edition 5** **Issued April 2006**

Xylella fastidiosa Wells et al.

Bacteria

Hosts: Grapevine (Vitis vinifera and others), peach (Prunus persica), Citrus, almond (Prunus dulcis), lucerne (Medicago sativa), some wild trees (incl. Acer rubrum, Platanus occidentalis, Quercus rubra, Ulmus americana), other wild plants and weeds.



● Present: national record

+ Present: subnational record

CABI/EPPO (2006) Xylella fastidiosa. Distribution Maps of Plant Diseases No. 262. CABI Head Office, Wallingford, UK.

Map No. 262

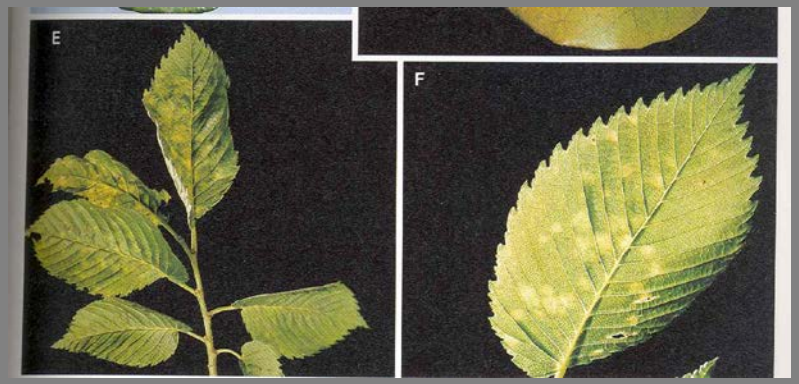
ISSN 0012-396X

A. tumefaciens

Elm yellows

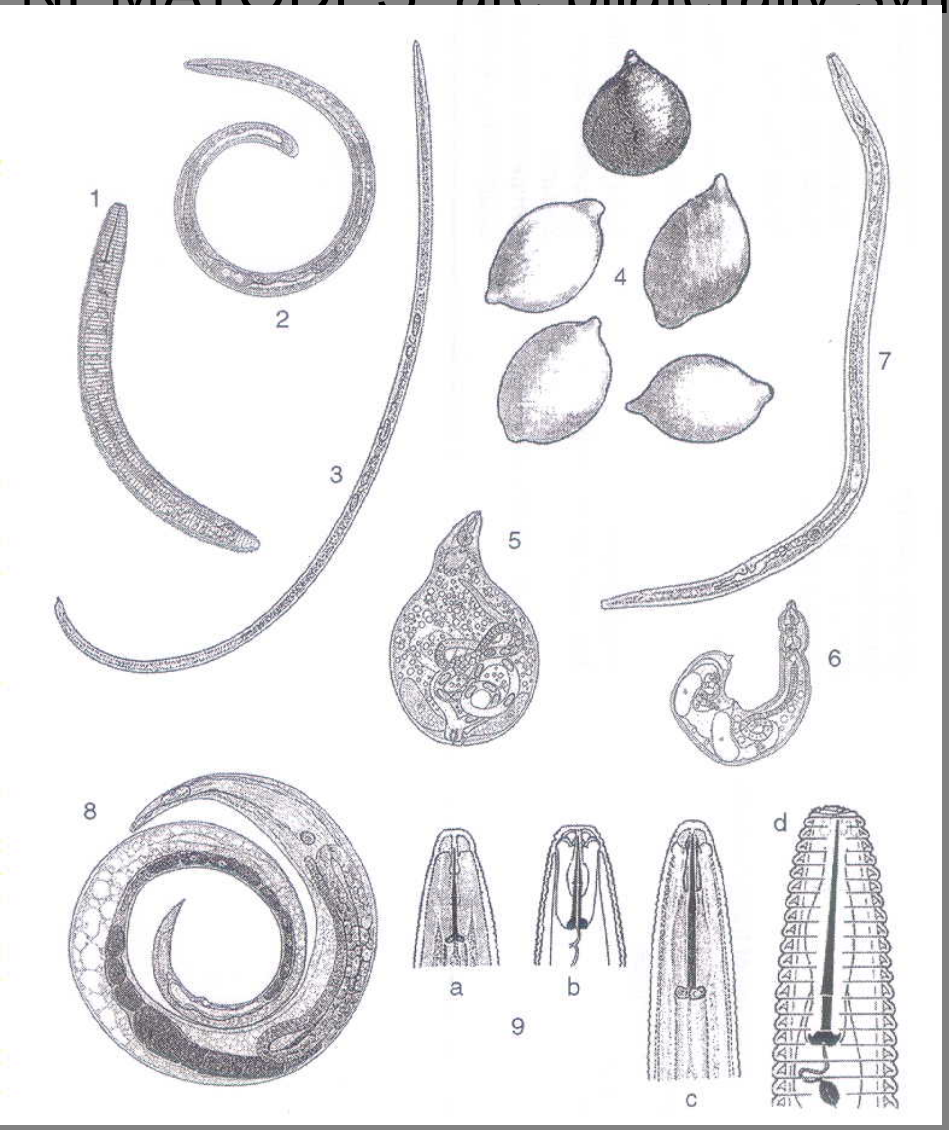
Ash yellows

Bacterial wetwood

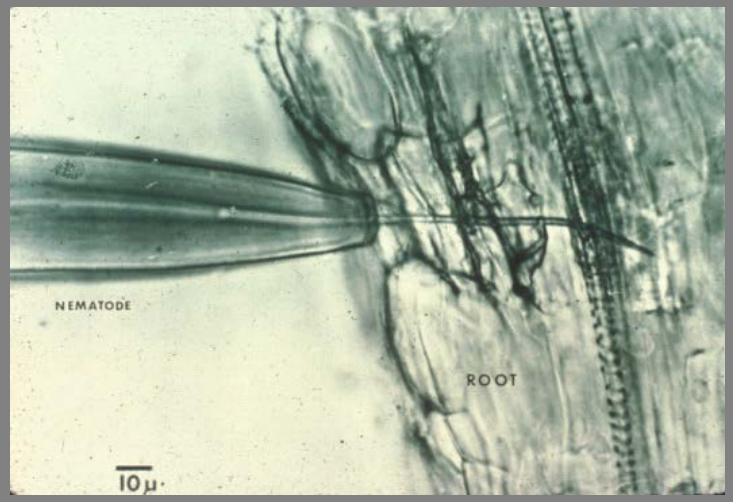


Cherry Leaf Roll virys

NEMATODES: are bilaterally symmetrical worm like organisms



*



*

*

Free living

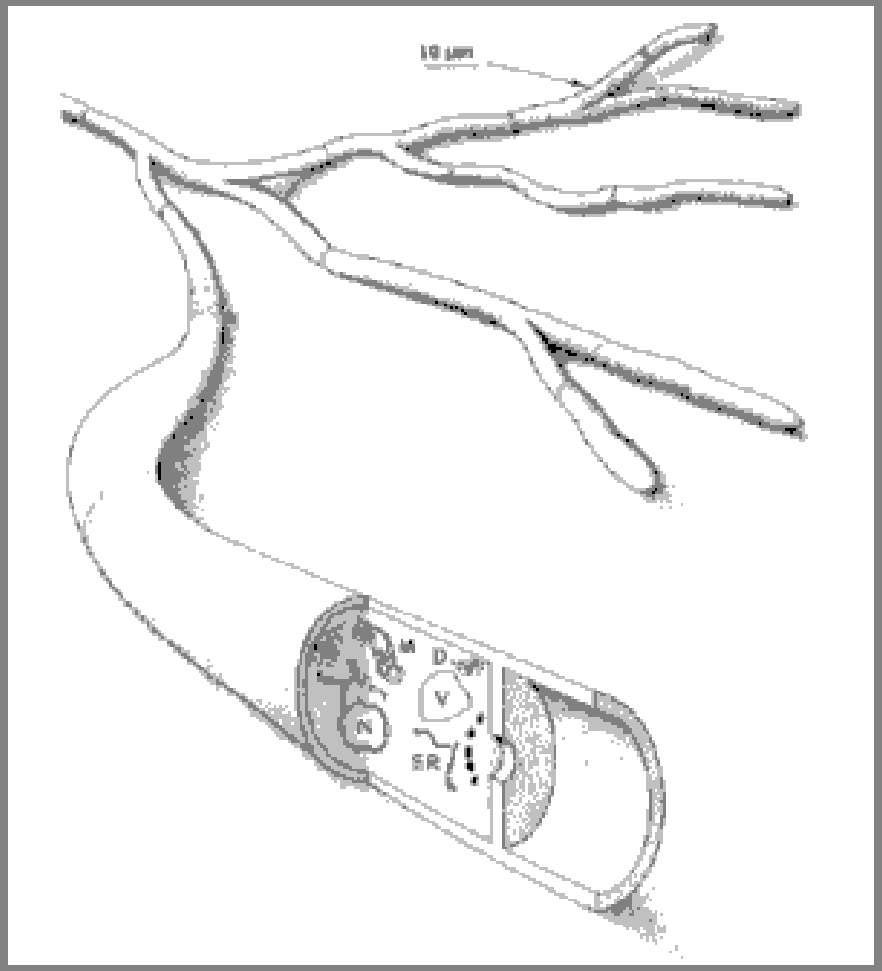
Soil and root infecting

Vascular system of plants

Fungi

- Eukaryotic organisms, heterotrophs, characterized by chitin and B-glucans in the cell wall, feeding through absorption, reproducing by spores and producing a vegetative structure made up of tubular structures,branched, irregular, and indefinite in growth (modified from B. Kendric 1992)

Fungal hyphae and mycelium



There are no differentiated structures in fungi, but hyphae can generate…

mycelia

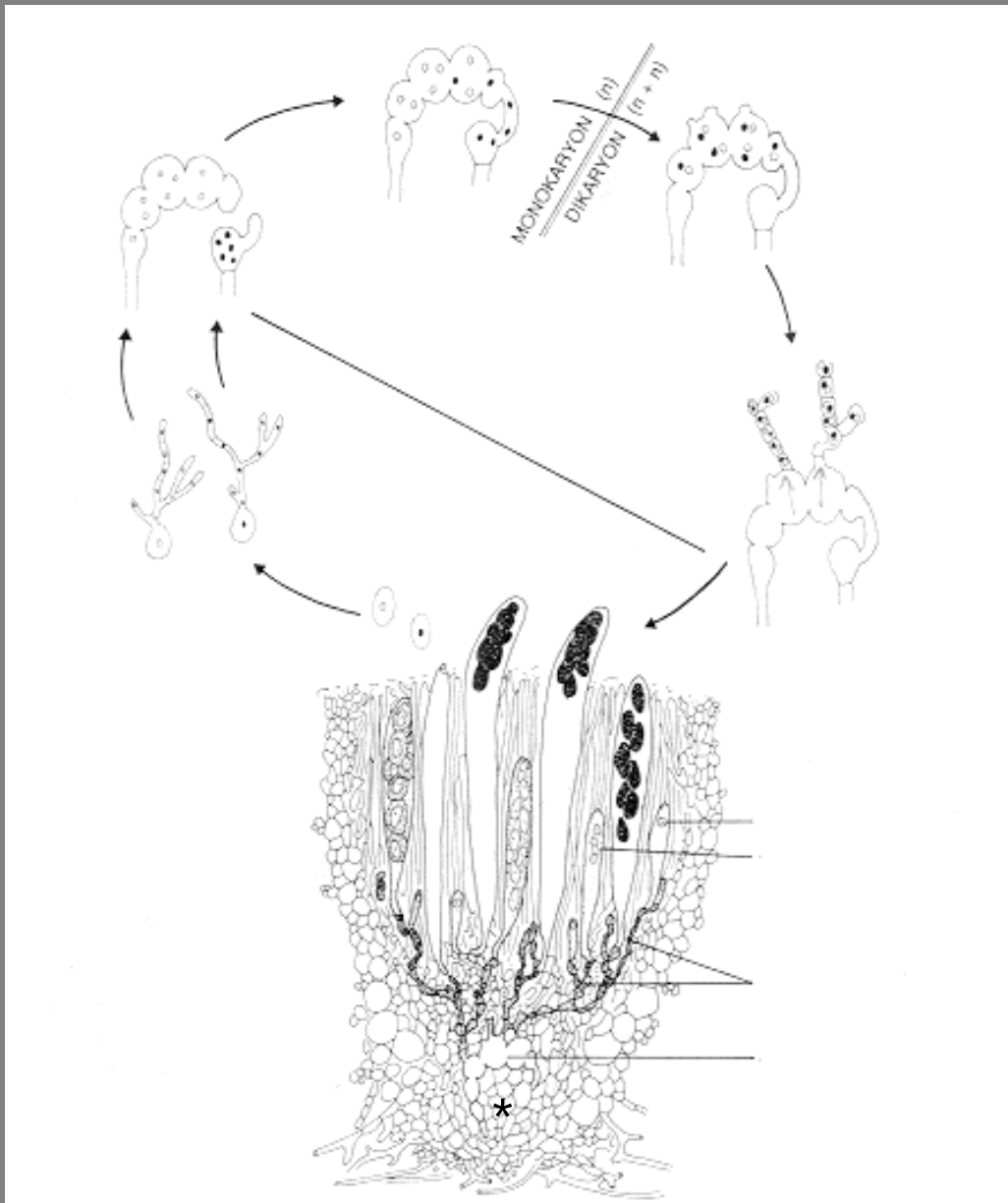
stroma

rhizomorphs

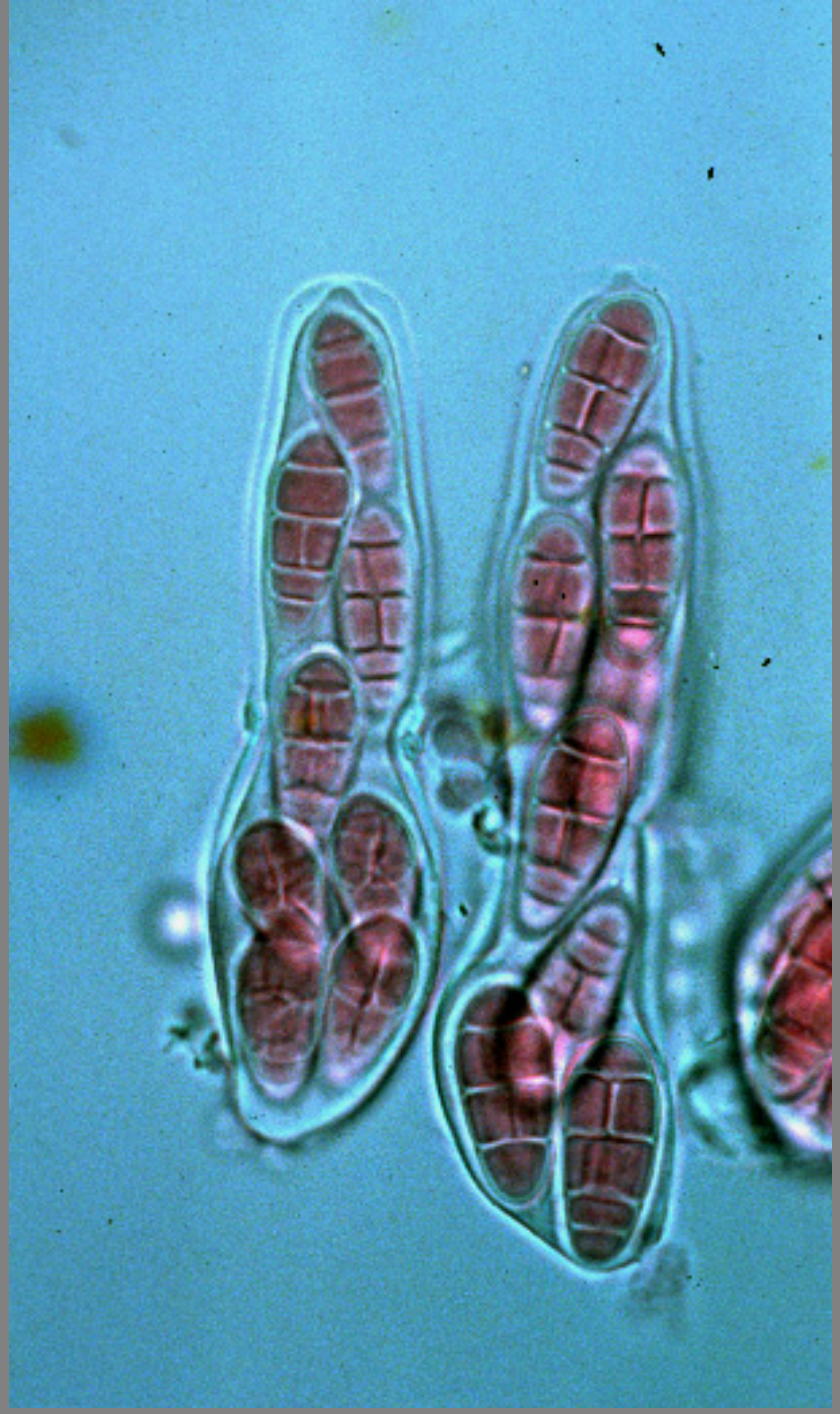
Ascomycetes (predominance of n in life cycle)

Ascus

Sexual spores (ascospores) are generated within “sacks” called asci

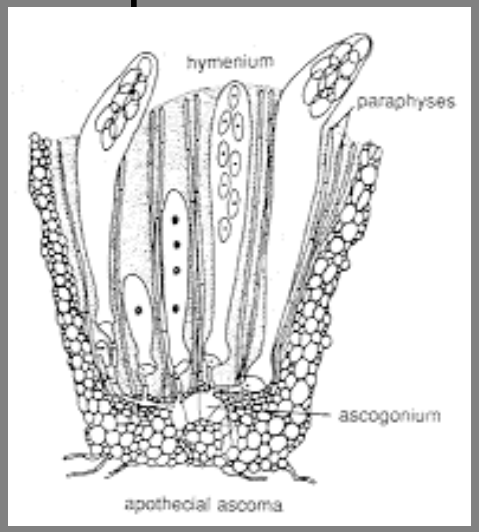


Ascomycota

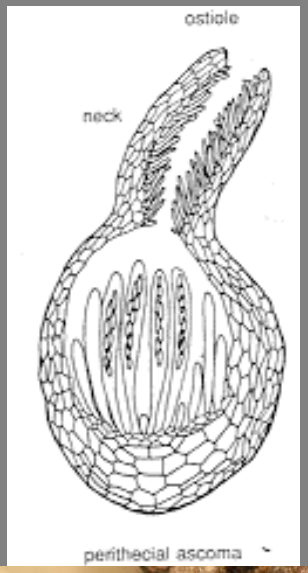


Ascomata

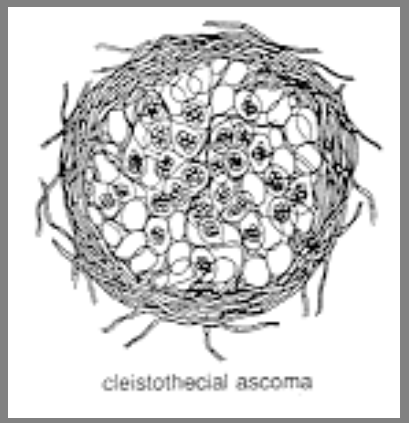
apothecium



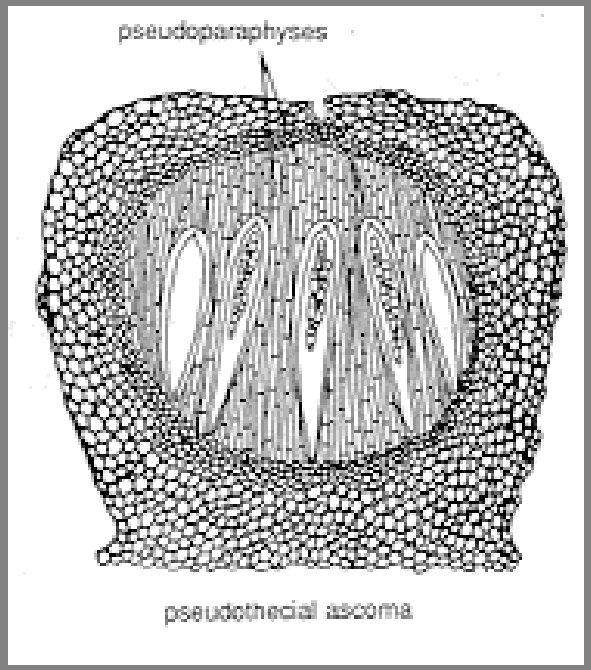
perithecium



cleistothecium



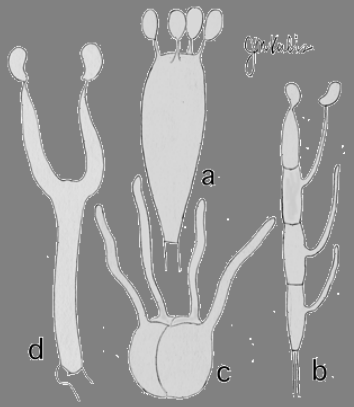
*



*

pseudothecium

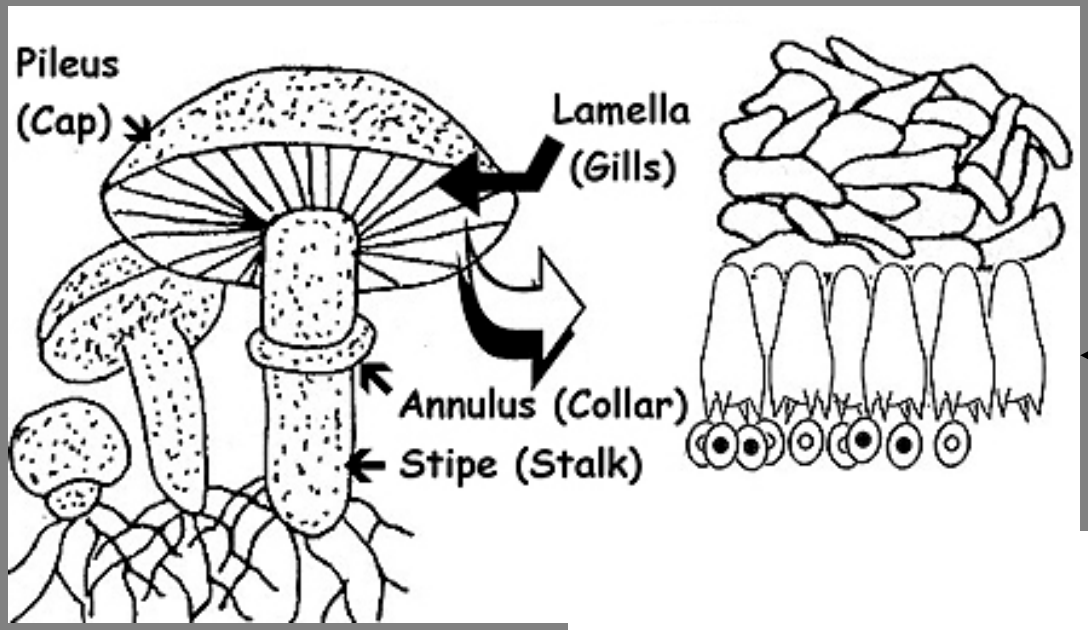
Basidiomycetes (Div. Basidiomycota) n+n or rarely 2n is predominant in life cycle

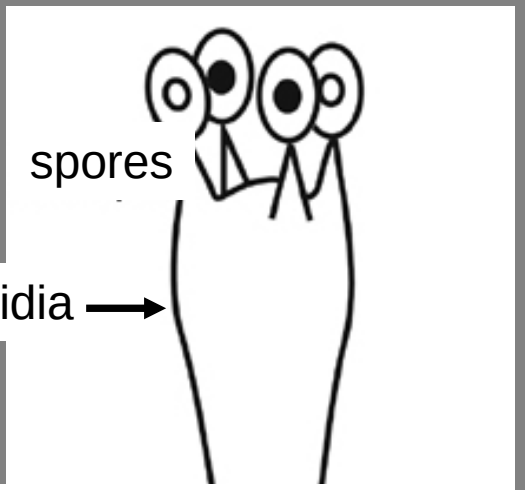


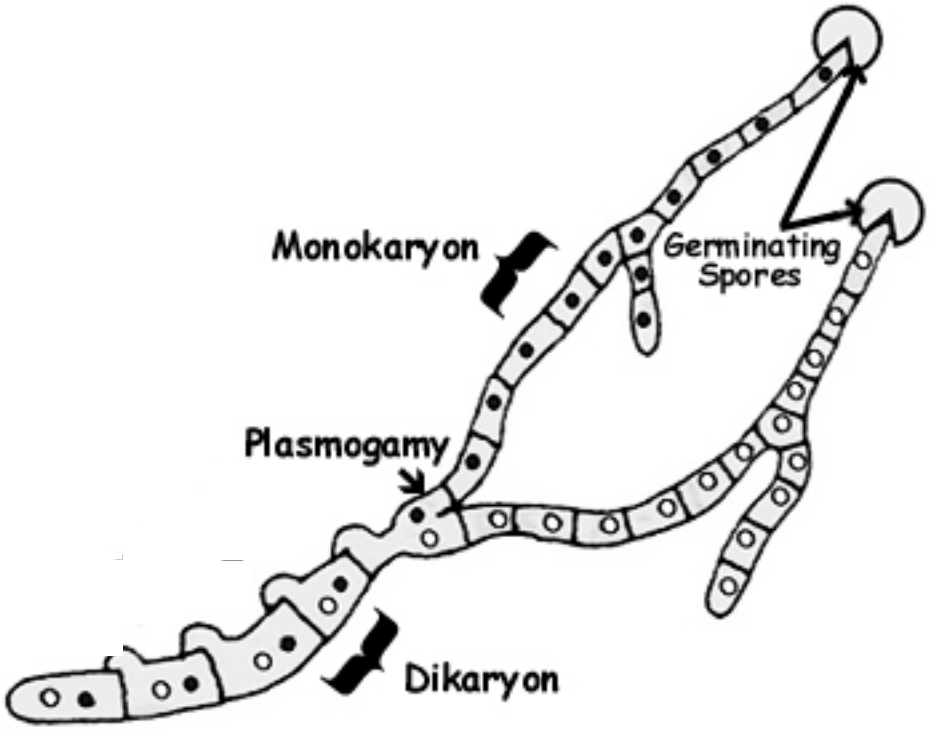
Sexual spores, basidiospores,
are carried naked on surface of “clubs”
called basidia

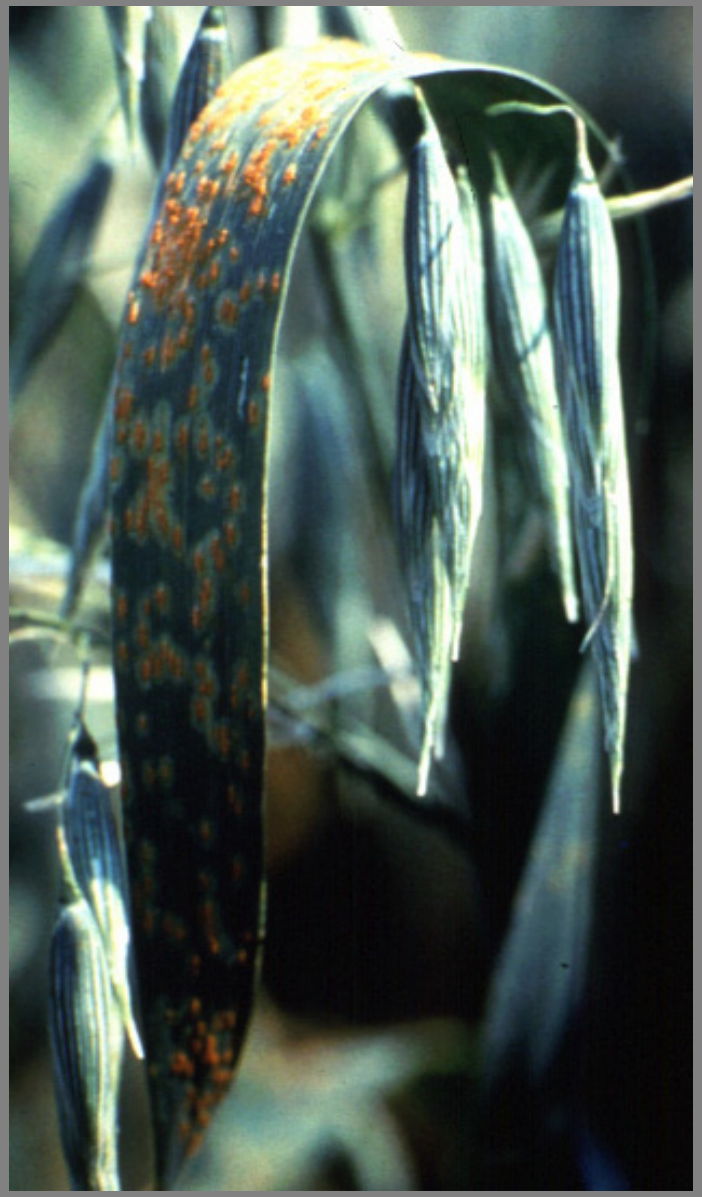
*

Basidiomycota


Pileus
(Cap)
Lamella
(Gills)
Annulus (Collar)
Stipe (Stalk)

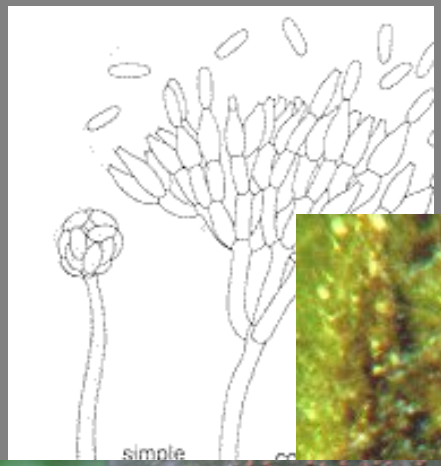

spores
basidia

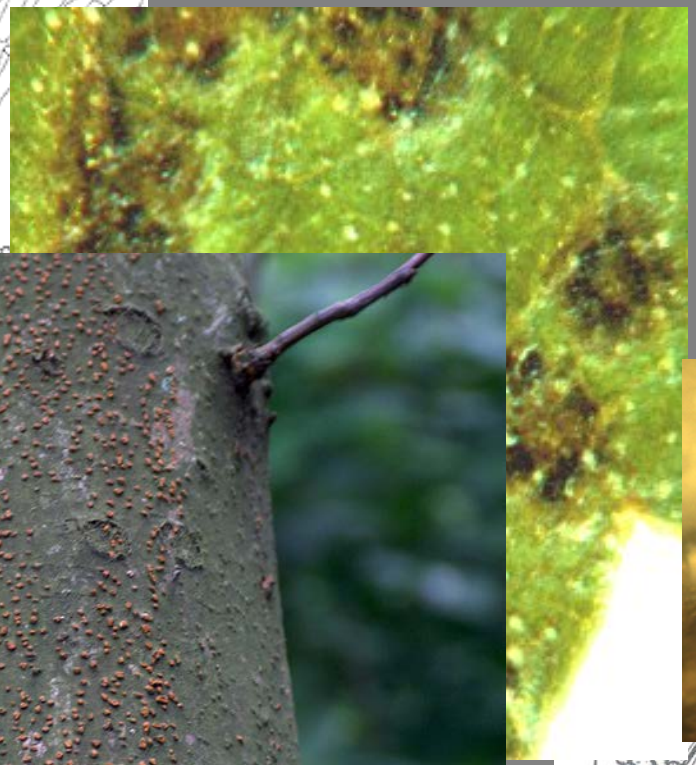

Monokaryon
Germinating
Spores
Plasmogamy
Dikaryon

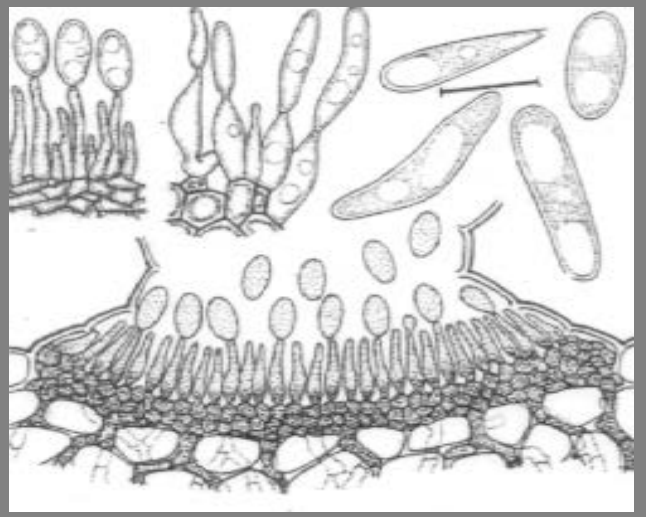


anamorphic fungi no sexual stage

conidiomi





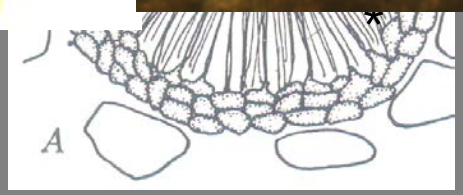


*

acervulo


Cryphonectria sp.

*



picnidio