Lecture 10:
Series 2: Discomycetes

General characteristics:

1- Produce their asci in apothecia; we define apothecium as an open ascocarp.

2- Discomycetes contain fungi included, Morels, Traffle and Spongiofungi.

3- The asexual stage is unknown in most of these fungi.

4- Discomycetes classify into two groups according to its habitat.

Group 1: Hypogean: which presence under the surface of soil.

Group 2: Epigean: which presence on the surface of soil, and they involved operculate and inoperculate.

Epigean inoperculate discomycetes:

Most of them are parasites and causes plant diseases.

Order: Helotiales

Family: Sclerotinaceae

Genus*: Sclerotinia*

Species: *S. fructicola*, or *Monilinia fracticola* or *M. laxa*, which causes the brown rot of peach and other stone fruits.

Life cycle of *Monilinia fracticola*:

The mycelium of *M. fracticola* which begins as a germ tube emerging from the ascospore or conidium (A). In the spring, invades a susceptible host, causing twig blight or leaf blight. Soon after the mycelium reaches a certain stage in its growth, it produces long, branched conidiophore (B). That rapidly breaks up into chains of oval or lemon-shaped conidia (C). The

conidia break off easily from the chain and are scattered by the wind. If they reach a susceptible host, they germinate in the presence of water, each conidia produces a germ tube, invades the host, and thus spreads the disease (D).(Asexual cycle).

Note:- young peach fruits are resistant to the invasion of fungus, but as they approach maturity their resistance decrease and the fungus invades through hair sockets, insect punctures and other wounds and cause the familiar brown rot.

The mycelium of the fungus spreads rapidly, secreting a head of powerful enzyme that dissolves the middle lamella of the host cells and renders tissues soft. Invasion of the soften tissues by the hyphae penetrate the entire fruit, which shrivels and mummifies (E). *Monilinia fructicola* commonly produces spermatia (F&H). The function of which no one has yet discovered? Apothecial fundaments are formed in large numbers on peach mummies on the ground (G&I). **Note: The production of apothecia on the grounded mummies and their absence from the aerial mummies that cling to the tree branches have not been explained.**

The long-stalked apothecia are produced in great numbers in the spring on peach mummies that have passed the winter on the ground and develop asci and ascospores (J&M). Air currents carry the spores to the blossoms, twigs, and young leaves of the trees and, if the weather conditions are favorable, the ascospores initiate infection and start a new life cycle Figure (34).

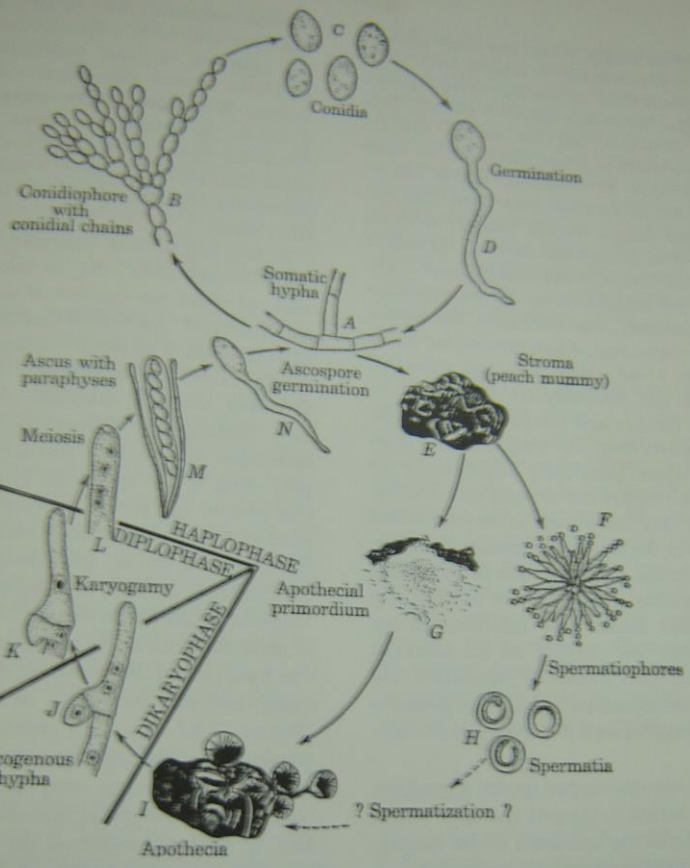


Figure 17-6. **Life cycle of *Monilinia fructicola*. *G*, *H*, *J–L*, redrawn from J. W. Heuberger (1934). *Maryland Agr. Exp. Sta. Bull.* 371:167–190.**

chains of oval or lemon-shaped conidia (Fig-
7-6*C*). This is the *Monilia* stage of the fun-
so called because it belongs to the form-genus
lia of the Deuteromycetes (see page 561).
conidia break off easily from the chain and are
ried by the wind. If they reach a susceptible
host, they germinate in the presence of water;
conidium produces a germ tube, invades the h
and thus spreads the disease. In wet years br
rot epiphytotics occur, and this disease is wit
doubt the worst enemy of the peach grower.
conidia mature every few days, repeating the

Figure 34 : Life cycle of *Monilinia fracticola*

<u>Epigean operculate discomycetes</u>:

General characteristics:

1- Involve the fungi that apothecia on the surface of the soil, and their asci with operculum.
2- Most of them are saprobes.
3- Asexual reproduction is unknown.

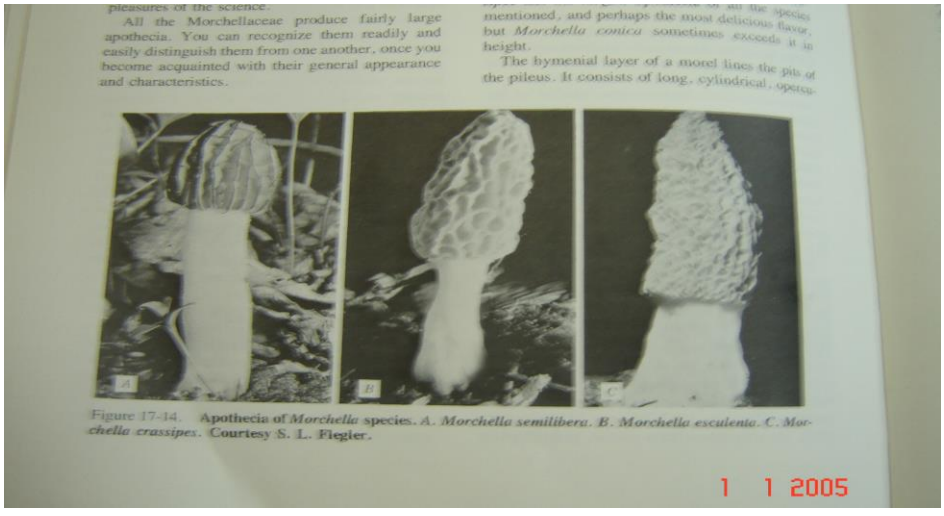
These fungi involve two families:

Family 1: Pezizaceae:

1- Pezizaceae are mostly cup- disc, or sessile to stalked; minute to very Large; bright-colored to dark-brown; smooth, velvety, hairy.
2- Apothecia reach to 5cm or more.
3- Ex; *Peziza aurantia*; Orange in color, edible (spongefungus), sessile apothecium.

Family 2; Morchellaceae: Figure 35

1- Morchellaceae is characterized by large, stalked apothecia.
2- Apothecia reach to 14cm.
3- Grayish white to a dark-brown in color.


pleasures of the science.

All the Morchellaceae produce fairly large apothecia. You can recognize them readily and easily distinguish them from one another, once you become acquainted with their general appearance and characteristics.

mentioned, and perhaps the most delicious flavor, but *Morchella conica* sometimes exceeds it in height.

The hymenial layer of a morel lines the pits of the pileus. It consists of long, cylindrical, opercu-

Figure 17-14. Apothecia of *Morchella* species. *A. Morchella semilibera. B. Morchella esculenta. C. Morchella crassipes.* Courtesy S. L. Flegler.

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Figure 35 : *Morchella spp.*

Hypogean discomycetes :

The ascocarps are hypogean and remain closed in most species, liberating the ascospores only when the ascocarp decays or broken by animals.

Order: Tuberales

Fungi in this order are mycorrhizal fungi living in association with the roots of Oak and beech-trees. There are two families, Tuberaceae and Terfeziaceae, and two genera; *Trimania* and *Terfezia*.

The ascocarp surrounding by a thick-wall cells called peridium. There is a veins which contain the hymenial layer (ascospores) Figure (36), in Genus*; Terfezia* the acospores are globose and eight in number, and the wall is smooth, while in *Trimania* , the wall is spiny and there are only four ascospores Figure(37).

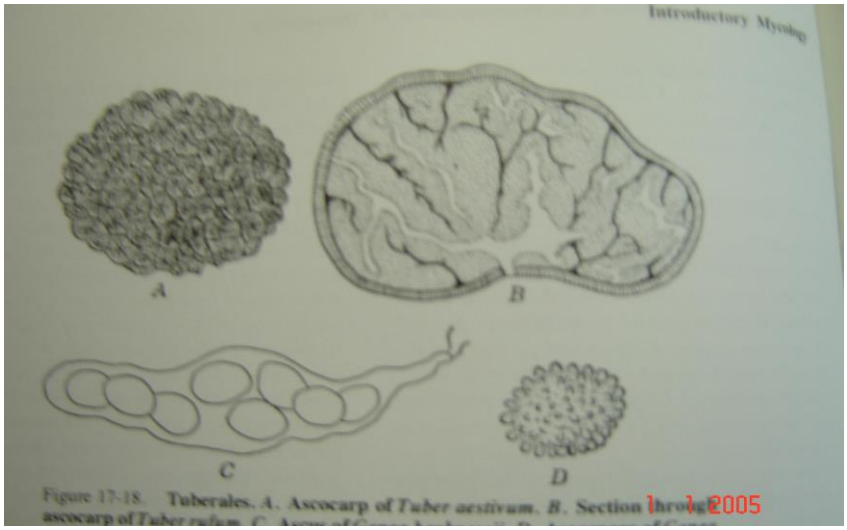

Figure 36:- Ascocarp of Tuberales

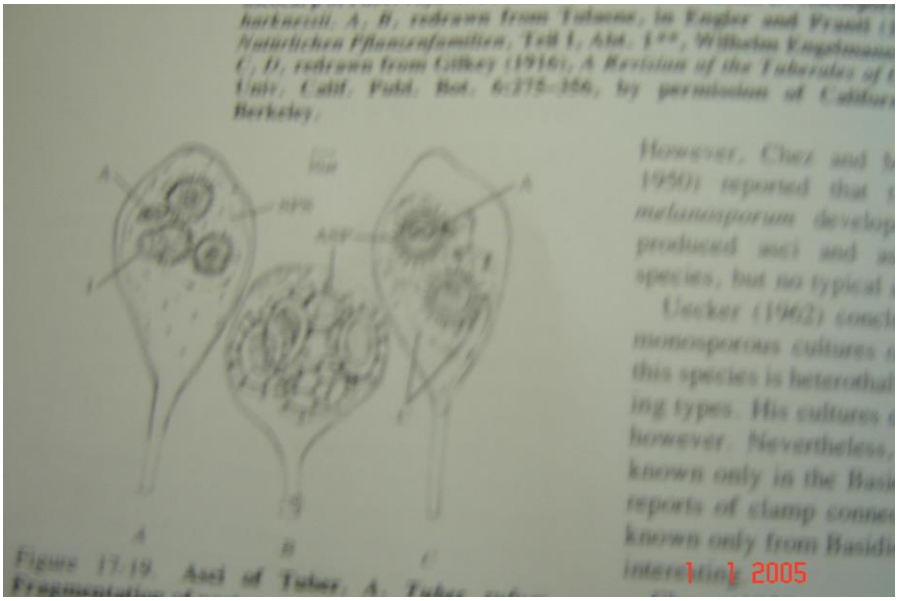

Figure 37

Subclass 2: Loculoascomycetidae

General characteristics:

1- The asci are bitunicate.

2- The ascocarps are ascostroma in which the asci are borne in locules.

Order: Pleosporales

Family: Venturiaceae

Genus: *Venturia*

Species: *V. inaequalis*

Venturia inaequalis attacks apple fruits and causes apple scab.

In the spring, at the time the apple buds are bursting, the fungus begins its life cycle by forcibly ejecting its ascospores, through the openings of ascocarps buried in the tissues of dead apple leaves lying on the ground.

The ascospores are two-celled, yellowish with the upper cell shorter and somewhat wider than the lower (H). The unequal size of the two cells of

the ascospores gives the species its name. Air currents lift the ascospores to the apple leaves on the trees, and germination occurs in the presence of moisture (I). The germ tubes issuing from the ascospores penetrate the cuticle, and the mycelium begins to grow forming a thin, subcuticular stroma. A few days after infection, numerous short conidiphores (B) break through the cuticle and each produces a flame-shaped conidium at the tip, so that conidiophore and conidium resemble a short burning candle. Conidia are spread by rain to other leaves or to young fruits in various stages of development; the fungus propagates it self asexually throughout the spring and summer, producing several conidial generations. Late in the season when the leaf cells begin to die, the mycelium penetrates deep into the leaf tissues and proceeds to form ascocarps as follows:-

When coil in a hypha consisting of uninucleate cells initiates the formation of the stroma. As this develops, a coil of multinucleate cells representing the ascogonium differentiates inside the young stroma, and a trichogyne pushes through and protrudes from the stromatal wall (E). In the same time, an antheridium is formed from a hypha of the opposite strain and contact is soon established between the antheridium and the trichogyne. The antheridium nuclei pass into the ascogonium through the trichogyne (F). The nuclear pairs pass into the ascogenous hypha, which now develop from the lower portion of the ascogonium (G). Ascus formation takes place, and the stroma continues to develop and form the ascocarp (H). The ascospores mature in April or May depending on the locality Figure(38).

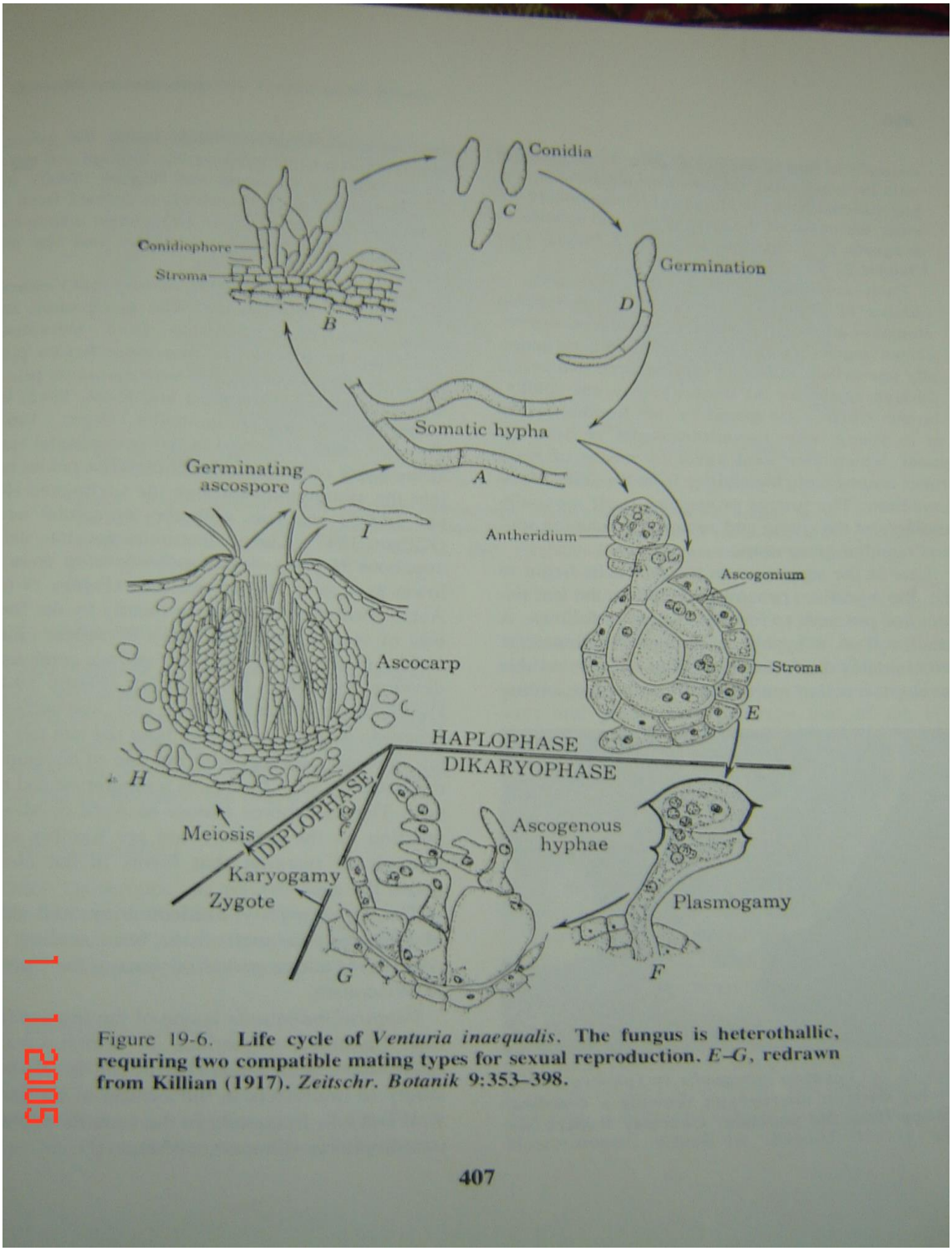

Figure 19-6. **Life cycle of *Venturia inaequalis*. The fungus is heterothallic, requiring two compatible mating types for sexual reproduction. *E–G*, redrawn from Killian (1917). *Zeitschr. Botanik* 9:353–398.**

Figure :- Life cycle of *Venturia inaequalis*