



DISEASES OF GRAPEVINE

Session-11

M.S.Swaminathan School of Agriculture,CUTM



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DOWNY MILDEW OF GRAPEVINE

CAUSAL ORGANISIM: *Plasmopara viticola*

Economic importance

- Since 1875, this disease caused heavy losses in France to wine industry.
- It led to discovery of Bordeaux mixture by Prof. Millardet in 1885.
- When all the condition favourable losses vary to 50-100%.



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SYMPTOMS

- Symptoms appear on all aerial and tender parts of the vine. Symptoms are more pronounced on leaves, young shoots and immature berries.
- Irregular, yellowish, translucent spots on the upper surface of the leaves.
- Correspondingly on the lower surface, dirty white, powdery growth of fungus appears.
- Affected leaves become, yellow and brown and gets dried due to necrosis
- Premature defoliation. Dwarfing of tender shoots.
- Infected leaves, shoots and tendrils are covered by whitish growth of the fungus.
- White growth of fungus on berries which subsequently becomes leathery and shrivels. Infected berries turn hard, bluish green and then brown.
- Later infection of berries results in soft rot symptoms. Normally, the fully grown or maturing berries do not contact fresh infection as stomata turn non-functional.
- No cracking of the skin of the berries.



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PATHOGEN

P. viticola is a biotroph. The intercellular mycelium of the fungus is coenocytic, thin-walled, hyaline, and produce spherical or pear shaped haustoria.

- Sporangiohores arise from hyphae under high humid conditions. The branching of the sporangiohores is at right angles to the main axis and at regular intervals.
- From the apex of each branch 2-3 sterigmata arise and bear lemon shaped, papillate sporangia. Sporangial germination may be through zoospores or by germ tube based on humidity and temperature.

SPREAD AND SURVIVAL

- Sporangia or zoospores by wind, rain etc.
- Oospores present in the infected leaves, shoots and berries. Also as dormant mycelium in infected twigs.

FAVOURABLE CONDITIONS

- optimum temperature : 20-22° C.
- Relative humidity : 80-100 %.



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DOWNY MILDEW OF GRAPEVINE



Downy mildew symptom on upper surface and lower surface of leaf

Symptom on fruit

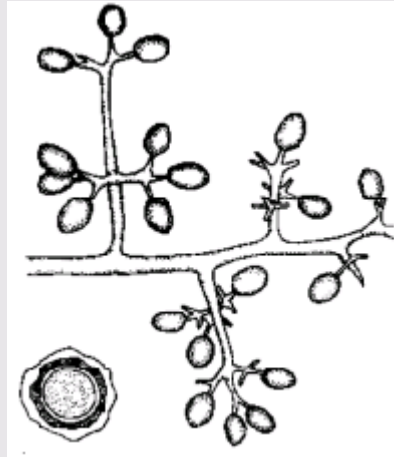




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SPORANGIOPHORE WITH SPORANGIA OF PLASMOPARA VITICOLA

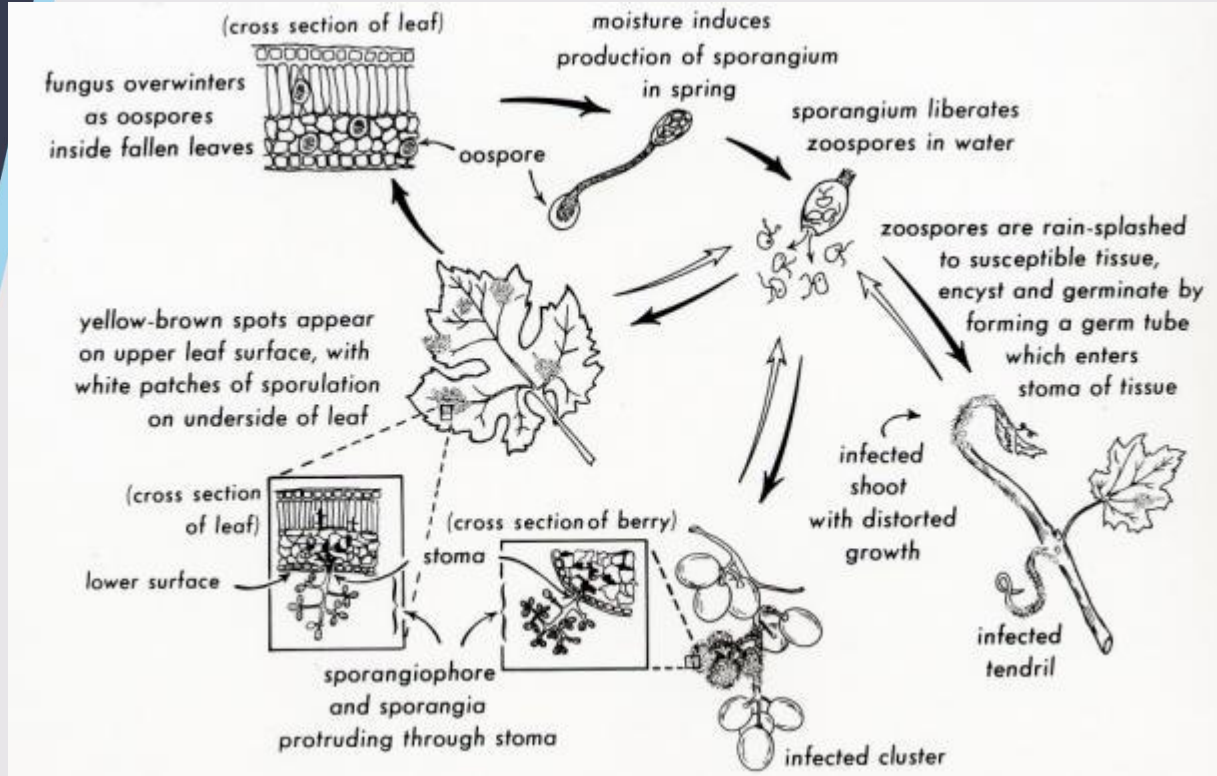




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DOWNY MILDEW LIFE CYCLE





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MANAGEMENT

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- Collect and burn fallen leaves and twigs.
- Sanitation of the orchard.
- Vine should be kept high above ground to allow circulation of air by proper spacing
- Pruning (April- may & September and October) and burning of infected twigs
- Grow resistant varieties like Amber Queen, Cardinal, Champa, Champion, Dogridge and **Red Sultana**.
- The disease can be effectively managed by giving 3-5 prophylactic sprays with 1% Bordeaux mixture or Fosetyl -Al (Aliette) 0.2% or metalaxyl + mancozeb 0.3 to 0.4% or Azoxystrobin or Dimethomorph.
- Chemical -5 sprays with 1% Bordeaux mixture
 - 1 – Immediately after pruning of vines
 - 2 - When new flush formed (3-4 weeks after pruning)
 - 3 – Before buds open
 - 4 - When bunches or berries have formed



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POWDERY MILDEW OF GRAPEVINE

CAUSAL ORGANISM:

Uncinula necator (I.S: Oidium tuckeri)

ECONOMIC IMPORTANCE

- Losses in yield of fruits may be upto 40-60%.
- In addition to loss of yield, infected berries tend to be higher in acid content than healthy fruits and are unsuitable for wine making.



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SYMPTOMS

The disease attacks the vines at any stage of their growth. All the aerial parts of the plant are attacked. Cluster and berry infections usually appear first.

- Small whitish patches appear on both the surface of the young leaves. These patches enlarge covering the leaf surface with a characteristic, whitish powdery coating.
- In advanced stage affected leaf turn greyish white and become dwarf ,twisted and malformed.
- Discolouration of stem to dark brown.
- Floral infection results in shedding of flowers,discolouration of flower and poor fruit set.
- Early berry infection results in shedding of affected berries .
- Powdery growth is visible on older berries and the infection results in the cracking of skin of the berries. Often infected berries develop a net-like pattern of scar tissues.



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POWDERY MILDEW OF GRAPEVINE





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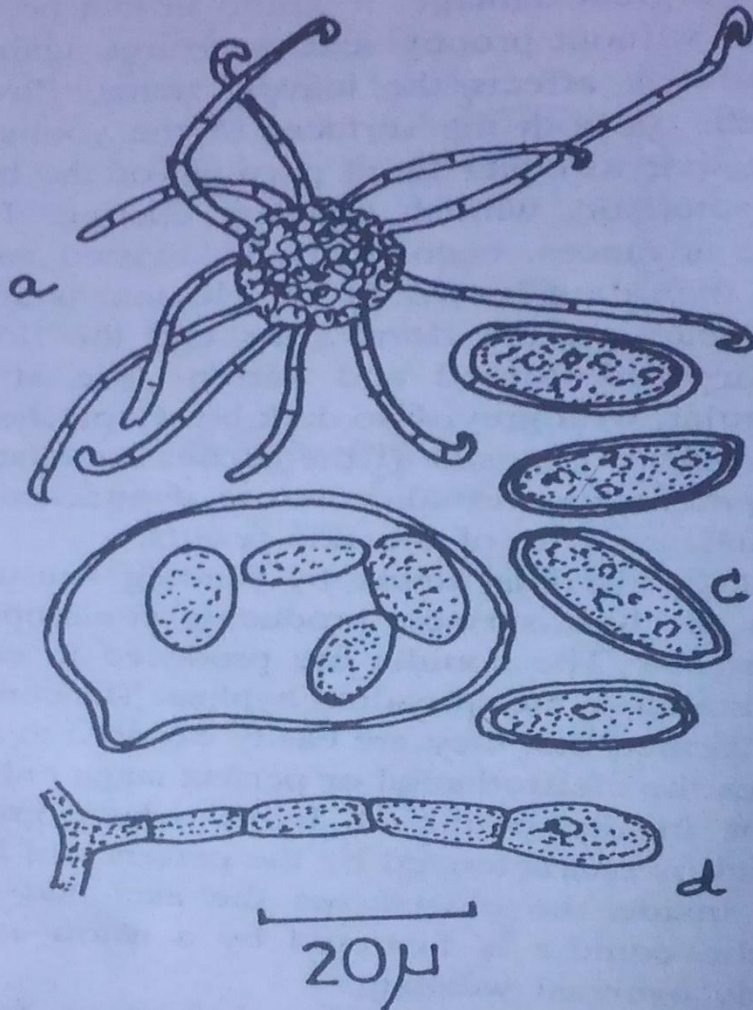
PATHOGEN

- The mycelium is ectophytic and produces bilobate or multilobate appressoria.
- The conidiophores are simple, multiseptate and erect bearing a chain of 3-4 conidia.
- Under Indian conditions, perfect stage of the fungus is not found.
- When the mating types are present cleistothecia can form on all infected tissues during later part of the growing season.
- The cleistothecium, which is characterized by the presence of long appendages ending in spirals, carries inside the closed sac the asci and ascospores.



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PATHOGEN

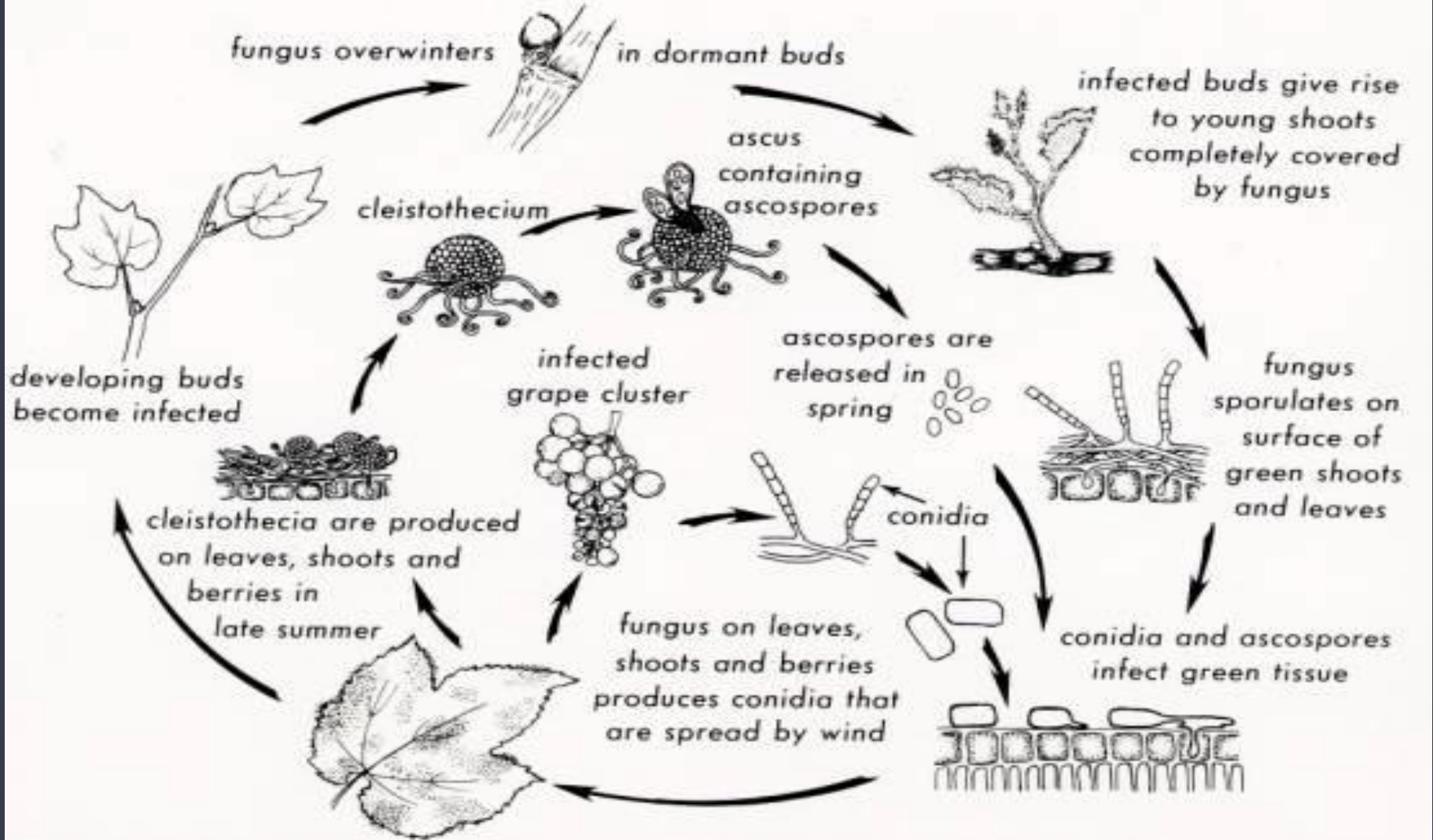


a. CLEISTOTH
ECIA
b. ASCUS
c. ASCOSPOR
E
d. CONIDIA



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LIFE CYCLE OF UNCINULA NECATOR





Cont....

MODE OF SPREAD AND SURVIVAL

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- Through dormant mycelium and conidia present in the infected shoots and buds.
- Through air-borne conidia.

FAVOURABLE CONDITIONS

- Warm and dry weather with sufficient humidity 57% above.
- Temperature in the range of 21-30°C fav. For disease development.



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MANAGEMENT

- Clean cultivation of vines or removal and destruction of all diseased parts.
- Dustings of vines with 300 mesh Sulphur (1st when new shoots are 2 weeks old, 2nd prior to blossoming, 3rd when the fruits are half ripe).
- Prophylactic spray with Bordeaux mixture 1% or Lime sulphur at dormant stage delays development of disease by decreasing initial inoculum.
- Spray wettable sulphur @0.3% or karathane or calixin @0.1%
- Morestan @0.03% sprayed at 4 days interval starting from last week of December to 1st week of March
- Grow resistant varieties like Red sultana, Skibba White, St.George etc.



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ANTHRACNOSE / BIRDS EYE DISEASE OF GRAPEVINE

CAUSAL ORGANISM:

Elsinoe ampelina

(I.S: *Gloeosporium ampelophagum* or *Sphaceloma ampelinum*)

- It is especially serious on new sprouts during rainy season.
- Among various foliar diseases of grapevine in India, anthracnose has longest spell spread over the period from June to October.



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SYMPTOMS

• Visible on leaves, stem, tendrils and berries.

• Young shoots and fruits are more susceptible than leaves.

- Circular, greyish black spots with yellow halo appear on leaves.
- Later the centre of the spot becomes grey, sunken and fall off resulting in a symptom called ‘shot hole’.
- Black, sunken lesions appear on young shoots.
- Cankeros lesions on older shoots. Girdling and death of shoots occur.
- Infection on the stalk of bunches and berries result in the shedding of bunches and berries respectively.
- Sunken spots with ashy grey centre and dark margin on fruits (**Birds eye symptom**). In warm and wet weather pinkish spore mass develop in the centre of the spots.
- Mummification and shedding of berries.



ANTHRACNOSE / BIRDS EYE DISEASE OF GRAPEVINE





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ETIOLOGY

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- Anamorph – *Gloeosporium ampelophagum*, produce hyaline, single celled conidia.
- Teleomorph - *Elsinoe ampelina*, Produces hyaline 4 celled ascospores.

Mode of spread and survival

- Survives as dormant mycelium in the infected stem-cankers.
- Secondary spread is by means of conidia formed in the leaf and other plant parts which are easily disseminated by wind and splashed rain.
- Continuous drizzle of rain for 2-3 days encourages the disease. No infection can take place in the absence of rain. Wind associated with warm atmosphere (temp.) and heavy rains favour the disease spread.