

Topic: POWDERY MILDEW OF PEA

Subject: Botany

M.Sc. (Semester IV), Department of Botany

Course: MBOTEC- 1: Applied Microbiology and Plant Pathology

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POWDERY MILDEW OF PEA

Powdery mildew is a fungal disease of worldwide occurrence and affects a wide range of shrubs, trees, vines, flowers, vegetables, fruits, field crops, weeds and some garden ornamental plants. The disease is caused by many different species of fungi in order Erysiphales of genera *Erysiphe*, *Microsphaera*, *Phyllactinia*, *Podosphaera*, *Sphaerotheca*, *Uncinula* etc. Powdery mildew of Pea is prevalent all over the world including India. Compared to downy mildew it is considered more destructive because of its frequent occurrence covers larger host surface. The disease is worst in dry weathers while downy mildew flourishes in wet weather.

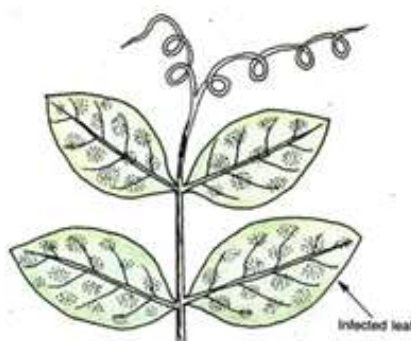


Figure-1 - powdery mildew symptoms

SYMPTOMS

- Disease appears in winter.
- Initial symptoms of disease is noticed on both leaf surfaces as white floury patches
- Later similar symptoms are noticed on other green parts like stem, tendrils and pods.
- Colour may later change to greyish brown.
- Being an ectoparasite only superficial mycelial growth is seen.
- Powdery mildew disease is of minor significance, despite chronic are seldom destructive.
- Histological changes include collapse of necrotic epidermal cells, or later collapse of tissue within is also seen.
- Physiological disruption may also occur: increased transpiration during night, Respiration increases while photosynthesis decreases.

CAUSAL ORGANISM

Three species of *Erysiphe*, namely *E.polygony*, *E.pisi*, *E.cichoracearum* are reported on peas. In India *E.polygony* is more prevalent. It is considered aggregate of several species.

Ainsworth 1973

Kingdom: Fungi
Division: Eumycota
Sub-division: Ascomycotina
Class : pyrenomycetes
Order: Erysiphales

Hawksworth et.al. (1995)

Kingdom: Fungi
Phylum: Ascomycota
Order: Erysiphales
Family: Erysiphaceae
Genera: *Erysiphe*

Family: Erysiphaceae Species : *polygoni*
 Genera: *Erysiphe*
 Species : *polygoni*

The pathogen is an obligate parasite. Mycelium is septate having dense spreading superficial hyphae. It does not penetrate the host except sac like haustoria for obtaining nutrition. From the superficial mycelium arises several erect and stout conidiophores which bear conidia/oidia in chain. Each conidium is cylindrical, unicelled and hyaline. Conidia mature from tip downwards in a basipetal manner and fall on plant parts and are also disseminated by wind. These fallen conidial mass gives a whitish floury appearance on infected surface (thus the name powdery mildew).

Later in season there is formation of globular cleistothecia (ascocarp) having thick peridium bearing mycelial appendages. These develop after sexual reproduction (which is usually rare). These usually develop in soil debris. Each cleistothecium bears 2-8 asci. Each ascus in turn bears 4-8 ascospores

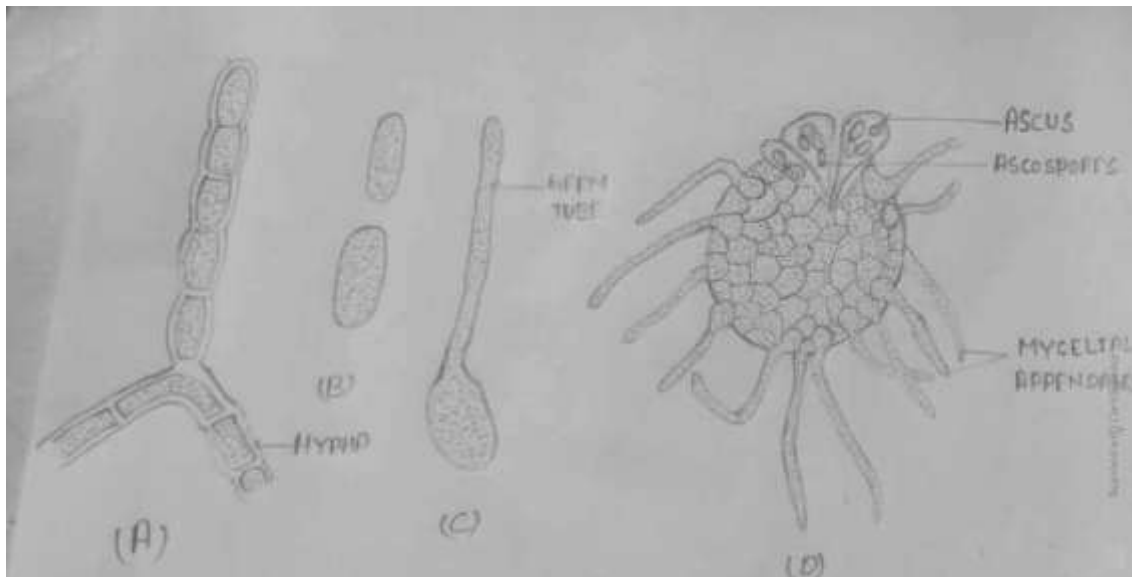


Fig.- 2 Erysiphe polygoni (A) conidiophore producing conidia, (B) conidia (C) germinating conidium, and (D) broken cleistothecium

DISEASE CYCLE

Disease is primarily soil born and secondarily air borne.

Primary infection- Cleistothecia are perennating structure in soil and form the means of primary infection. They can survive in soil till following crop season. Due to wall disintegration asci bearing ascospores are released in soil. They are brought to lower most leaves by different agencies and germination by germ tube causes primary infection and establishment on host.

Secondary infection - Conidia produced due to primary infection on the host are wind transmitted to healthy leaves and results in secondary infection on them during growing season. Many cycles of conidia are produced per season, in favourable environmental

conditions (dry weather).This results in several and severe infection on crop. Infection actually intensifies due to this secondary cycle.

Pre-disposing factors: Warm and dry weather conditions at temperature 24 degree to 32 degree is optimum.

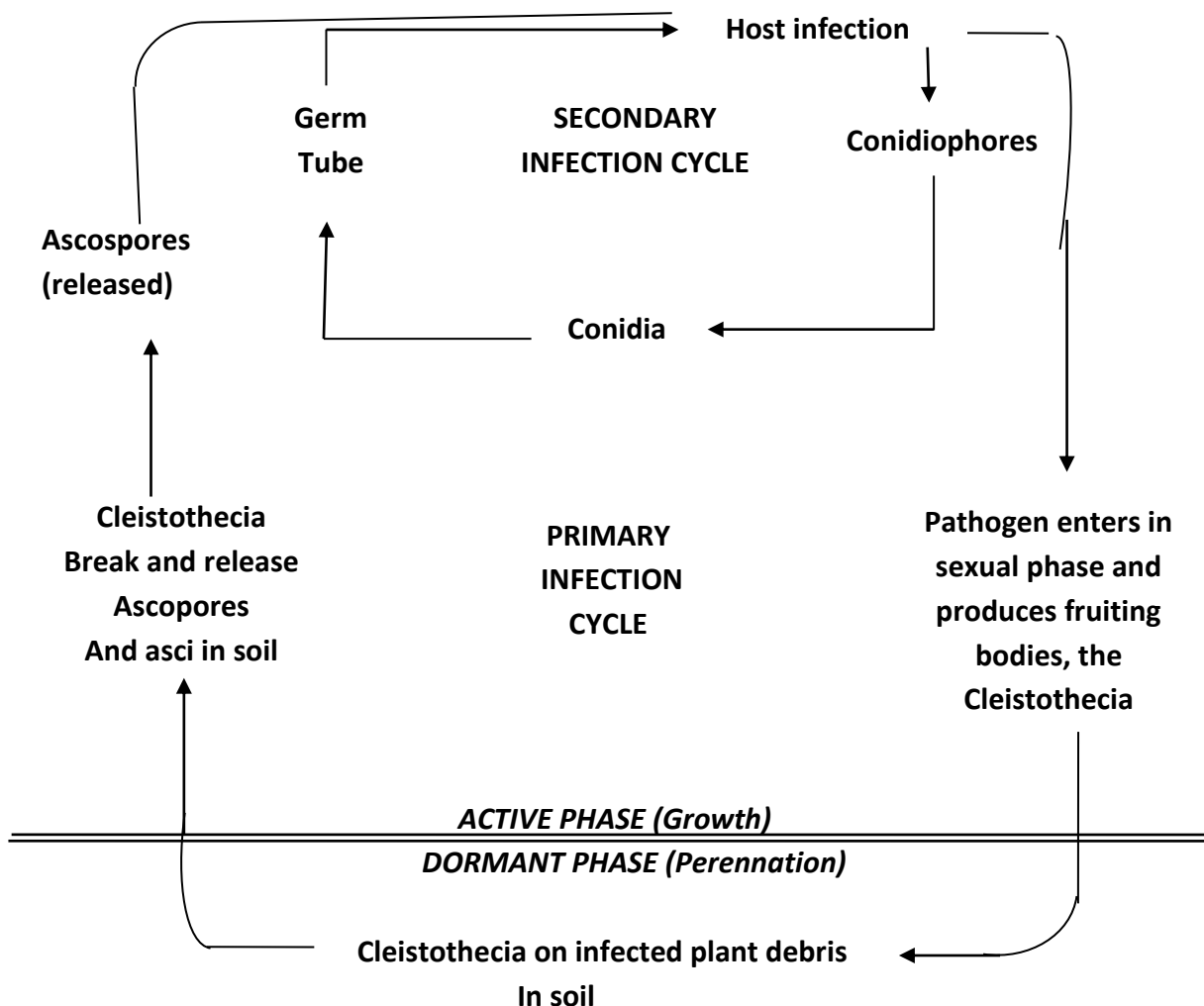


Fig - 3– Disease cycle of powdery mildew of peas

Control measures: Control measures:

- Field sanitation, destruction of diseased debris and crop rotation help in effective control of disease by destroying the cleistothecia if present in soil.
- Best protection is by fungicide foliage sprays. Sulphur fungicides are commonly recommended. Others viz: lime sulphur, Sultal, Karathane, Elasal, Bavistin, Morocide, etc are effective in disease control.
- Biocontrol measures are promoted.
- Resistant varieties like ---P185, P388, P6583, T10 T 638, DPS 3 etc. are more preferred.