



وزارة التعليم العالي والبحث العلمي

جامعة الانبار / كلية الزراعة

قسم وقاية النبات

## (امراض خضر - Vegetable diseases)



Fourth stage

المرحلة الرابعة

Plant Protection Dept.

قسم وقاية النبات

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## **Diseases of the cucurbit family**

### **1- Downy Mildew**

#### **Economic importance**

It is one of the obligatory, parasitic fungi specialized on its hosts and infects many plants, including vegetable crops, fruit crops and trees, and ornamental plants. It spreads quickly from infected fields under cool humid climate conditions, and the presence of free water on the surface of the leaves is necessary for spore germination and infection.

#### **Symptoms:**

Symptoms appear on the upper surface in the form of pale green or yellow spots resembling mottled gradually turning brown. These spots on the lower surface are offset by a violet-colored growth, which is sporangia and sporangia carriers of the fungus that emerge from the stomata.

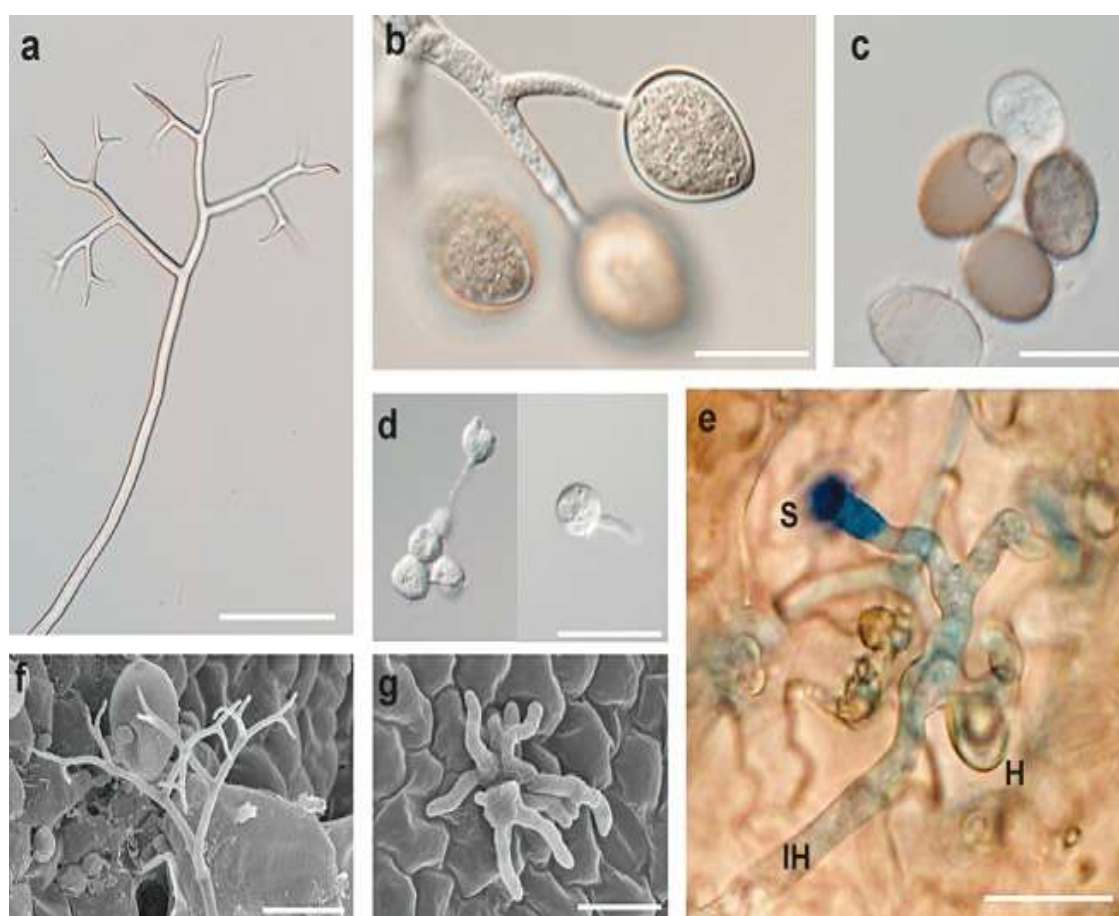
The leaves are affected, but the fruits are not affected. Symptoms appear on the lower leaves first as ribbed, pale green to yellow spots at first that resemble mottled. It turns brown, and is offset from the lower surface by a delicate violet-colored villous growth that appears when the air humidity is high. The spots may unite, causing the leaves to dry out, wilt and fall off



## Yellow angular lesions on a cucumber leaf.

### Pathogen:

The disease is caused by the Oomycete *Pseudoperonospora cubensis*. The spores of the upper third branch out in the middle between dichotomous and unilateral branches. The spores bear lemon-shaped sacs on almost pointed tips.

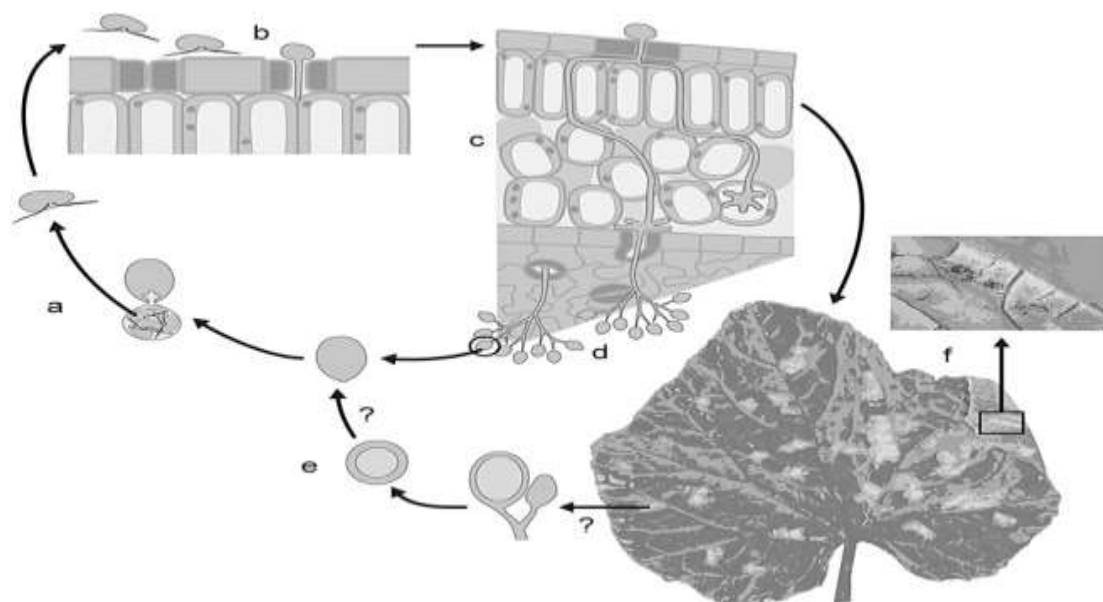


Morphology of *Pseudoperonospora cubensis*. (a) Sporangiphore (bar, 50  $\mu\text{m}$ ). (b) Sporangia attached to distal end of sporangiphores. (c) Sporangia germinating via cytoplasmic cleavage. (d) Left panel: zoospores. Right panel: encysted zoospore with germ tube. (e) Intercellular growth: H, haustorium; IH, intercellular hyphae; S, stomata. (f) Scanning electron micrograph of sporangiphore (bar, 20  $\mu\text{m}$ ). (g)

Scanning electron micrograph of multiple sporangiophores emerging through stomata (bar, 20  $\mu\text{m}$ ). Bars, 25  $\mu\text{m}$ , except where noted.

### Life cycle:

The fungus enters the plant through the stomata and grows between the cells and sends small pipettes inside them. The sporangia sporangia appear in groups from the stomata to the lower surface, where they branch out in the upper third, middle branching between bilateral and unilateral branching. The sporangia bears sporangia sacs on pointed ends that spread by the wind, as they re-infection during the growing season. And that by its germination and the formation of swimming spores (indirect germination) it germinates and also penetrates the stomata. The infection is repeated when the appropriate conditions of high humidity and moderate temperature of 15-20 C and at the end of the season rarely form Oospore.



Life cycle of *Pseudoperonospora cubensis*. (a) Aerially dispersed, lemon-shaped, grey-purple sporangia land on the leaf surface and germinate in free moisture to form biflagellate zoospores. (b) Zoospores swim to and encyst in stomata, and then

penetrate the leaf surface via a germ tube. (c) Hyphae colonize the mesophyll layer, establishing clavate-branched haustoria within plant cells. (d) The diurnal cycle triggers sporulation and up to six sporangiophores emerge through each stomate, bearing sporangia at their tips. Sporangia are dislodged from sporangiophores by changes in hydrostatic pressure and are picked up by wind currents that carry them to their next host. (e) Chlorotic, angular lesions bound by leaf veins are a symptom of *Ps. cubensis* infection visible on the adaxial leaf surface. On the lower leaf surface, sporulation is visible (inset). (f) The role of the sexual stage of *Ps. cubensis* is unknown.

### Control:

- 1- Cultivation of resistant varieties, which is the best method of resistance.
- 2- Spraying plants with Ridomil compound at a concentration of 1/2 g/gallon or mixed with Dithene M-22 at a concentration of 2.5 g/L.

## 2- Sclerotinia disease

### Symptoms:

The infection appears in the form of water spots that change color to brown near the base of the stem. The infection extends to include all the root system of the plant and causes rotting and extends upwards and reaches the bases and petioles of the leaf and causes yellowing and wilting of the leaves and their fall and the fruits are infected and soft rot appears on it starting from the top of the small fruit and extending towards the base. Thus, it pervades all parts of the fruit, and it falls down and forms on it abundant white, heavy growth, with black sclerotia appearing on it.





### **Symptoms infected Sclerotinia disease**

#### **Pathogen:**

*Sclerotinia sclerotiorum*

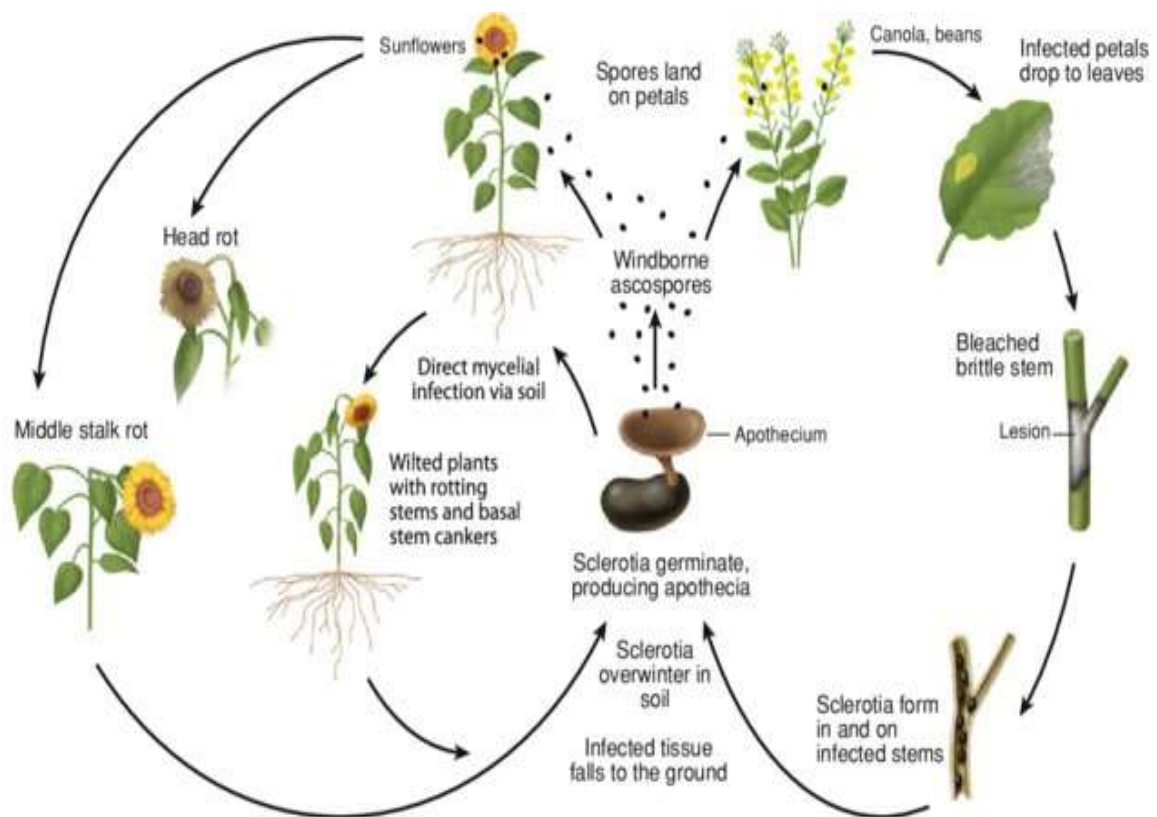
It follows the imperfect fungi



### ***Sclerotinia sclerotiorum***

#### **Life cycle:**

The fungus lies in the soil in the form of solid sclerotia and moves to the neighboring fields by many means such as agricultural tools, animals, irrigation water, etc. It germinates when the appropriate conditions of heat and moisture are available. The single sclerotia produces several fruits of stratified apothecia shape with a long neck bearing ascetic bags on the surface. They are stacked next to each other and spread the ascic boards on the surface of the soil and the wind helps to spread it. The ascic board grows on the surface of the plant and gives a germination tube that directly penetrates the skin of the host. The fungus secretes enzymes that cause the death of the plant cells before the fungus reaches the fungus, and the fungus gets its nourishment from the dead cells.



### Life cycle *Sclerotinia sclerotiorum*

#### Control

There is no effective way to combat this disease, but the severity of infection can be reduced by the following means:

- 1- Treating nursery soil and seeds used in agriculture with protective fungicides.
- 2- Improving drainage in the field with moderation in irrigation.
- 3- Get rid of the remains of infected plants and burn them after harvesting the crop.
- 4- Spraying plants in the field with benlite %1 as soon as symptoms appear.
- 5- Ensuring that the fruits or crop are free of infection before storage and after collection.

Cultivation of resistant varieties



## References

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