وزارة التعليم العالي والبحث العلمي

جامعة الانبار / كلية الزراعة

قسم وقاية النبات

(امراض خضر - Vegetable diseases)

المرحلة الرابعة Fourth stage

قسم وقاية النبات Plant Protection Dept.

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جامعة الانبار / العراق 2022

crucifers family diseases

1- Downy Mildew

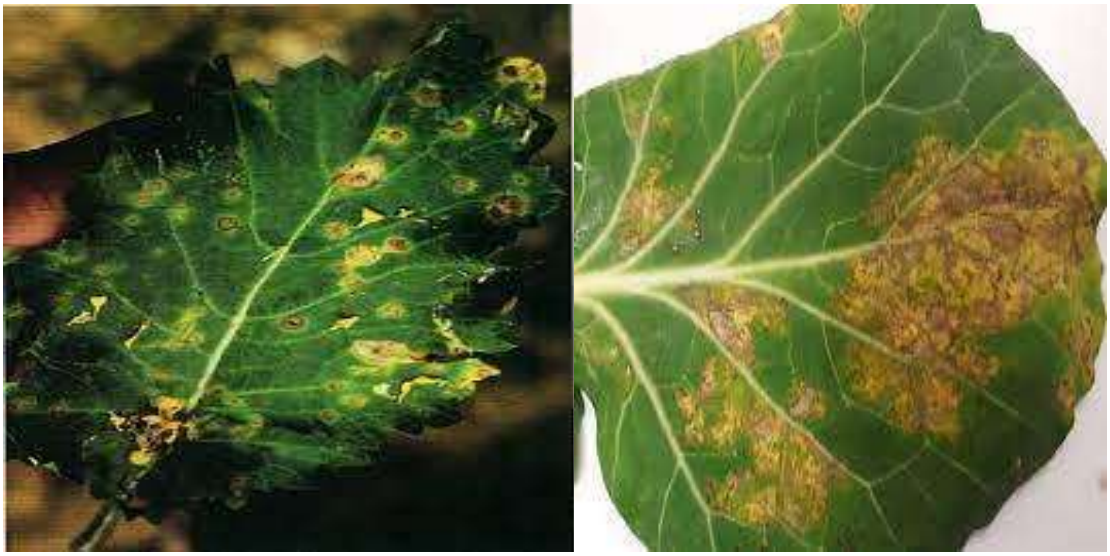
❖ Symptoms

1- Symptoms appear on the upper surface in the form of pale green or yellow spots that resemble mottles, gradually turning brown.

2- On the lower surface, these spots are offset by a violet-colored growth of sporangia and the sporangia of the fungus emerging from the stomata.

3- Low yellow spots appear on the leaves of the cauliflower, and the flower parts of the cauliflower are affected and become dark in color.

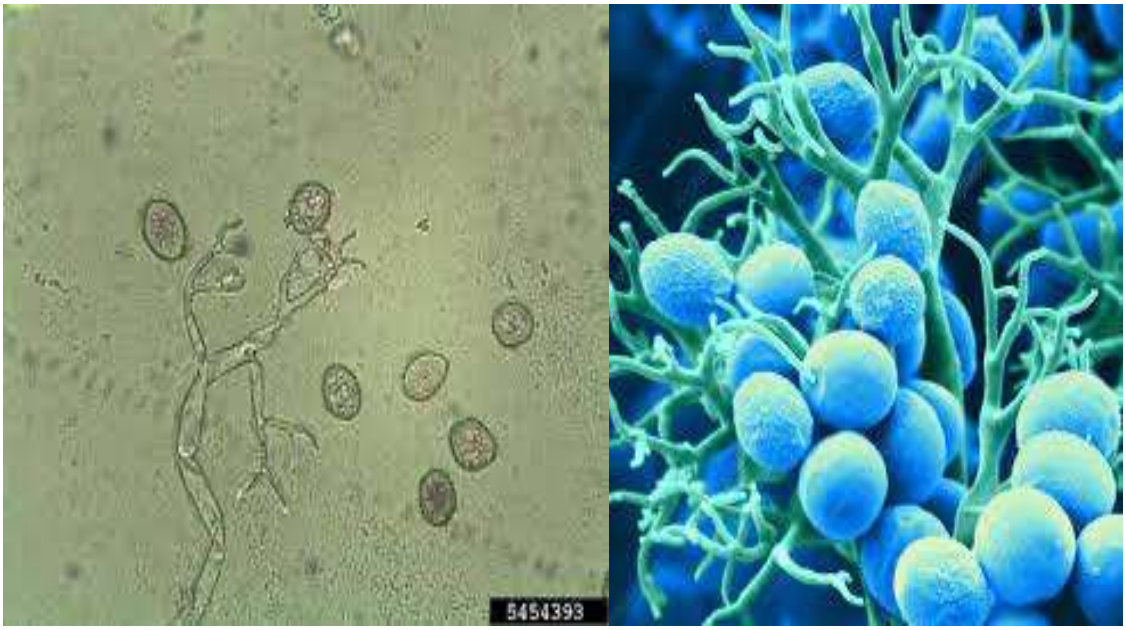
4- In the case of turnip and radish, the infection extends to the fatty roots and appears on them with irregular dark spots, and the coloration reaches the inside.



Symptoms downy mildew on crucifers

Pathogen:

Peronospora parasitica follows Oomycetes,



Peronospora parasitica

Cycle life

Conidiophore emerge from the stomata of the lower surface and are distinguished by their bilateral branching and their pointed, drooping end that bears the conidia. It sends small pipettes inside it, where it branches in its upper third in a middle branch between bilateral and unilateral branches. Pregnant women carry sporangia bags on pointed edges that spread by the wind, where they re-infestation during the growing season, by germination and the formation of swimming spores (indirect germination) that germinate and also penetrate the stomata. The right conditions were provided by high humidity and moderate temperature.

Control:

- ❖ Cultivation of resistant varieties, which is the best method of resistance.
- ❖ 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.
- ❖ Get rid of cucurbit bushes and plant residues and burn them.

2- Leaf spot of crucifers

Its prevalence and importance

Alternaria leaf spot is a common foliar disease of brassica crops caused by the fungal pathogen *Alternaria brassicicola*. The disease can be a problem for many brassica crops including. Even small infections can lead to an unmarketable crop. Severe foliar infections can lead to a reduction in yield due to leaf loss or reduction in weight.

Symptoms:

1- The first symptoms appear in the form of small dark or black sunken spots on the cotyledon leaves and the embryonic stem of the seedling

2- After the germination of the seed and the blackening extends to the bottom causing its death or poor growth.

3- The infection appears on adult plants on the large lower leaves in the form of round spots in which circular rings appear and become charcoal black.

4- As for cauliflower, the infection appears on the pink disc in the form of brown discoloration that starts from the edge of the disc and extends inward sometimes covering the entire disc.

5- As for turnip, the infection appears on the tuberous roots after storage if it is stored at a rather high temperature.

Black spots on Cauliflower

Alternaria leaf spot symptoms

Pathogen:

The disease is caused by the fungus ***Alternaria brassicicola***, which infects broccoli and cauliflower more than the body and radish, while the type ***A.brassicae***, on the contrary, infects turnip and radish more than broccoli and broccoli, and the specialized type is on radish ***A.raphani***

The first type: brassicicola, the conidia are small in size, darker in color, of **the second type**, Barssicae, and they do not have a pointed tip. They are carried in chains on the conidia stands, while the second type is large in size, with a broad base and a long pointed tip, bearing a single on the conidia stand. **The third type**, raphani, is closer in shape to the conidia. The second type, but there are blackboards in short chains and the blackboard has a short beak and this type is characterized by the formation of many round chlamydial boards of olive-brown color.

A microscopic view of the fungal pathogen *Alternaria brassicicola*

Cycle life:

1- The three types of fungus are seed-borne.

2- The mycelium is found in a complete form under the seed coat or as an external contaminant. When the infected seeds are planted, the fungus grows and causes infection of the cotyledons and stalks,

and the infection is transmitted to the large and weak lower leaves of adult plants.

3- It does not appear on the new terminal leaves, as it appears in the form of spots of dead tissue that becomes black as a result of the sprouting of the causative fungus.

4- The fungus returns to activity under conditions of high air humidity. The conidia are blown away by the wind and infect the fruits, where they penetrate the tubes of the fruit cover and infect the cover of the mature seed, where the fungus lies inside and outside.

5-It is also found in the remains of infected plants until the next season.

6- Conidia can germinate in a wide range of temperatures. The first type germinates from 10-40 degrees Celsius, the optimum degree is from 33-35 degrees Celsius, and the infection occurs in the season from 20-30 degrees Celsius and the optimum is from 25-30 degrees Celsius.

Control:

1- Usage certified seeds.
2- Treating the seeds with hot water at a temperature of 50 degrees Celsius for 30 minutes or treating them chemically with arasan or spurgeon at a rate of 5 g / kg of seed.
3- Cultivation of resistant varieties.
4- Spraying plants with Dithene M-45, starting from the onset of symptoms, at a rate of 2.5 g / liter of water.
5- Getting rid of the bush as well as burning the remains of cruciferous plants Regular watering to avoid cracking fruits.

3- Whit rust of cliucifers -6

Symptoms:

1- The infection appears on the leaves and stems in the form of small circular white or light yellow pustules that are slightly raised from the surface, which gave the disease this name.

2- When the pustules burst, it becomes a delicate flourish appearance, as this disease affects the flower parts, causing them to swell and deform, and the flowers become sterile and no seeds are formed in them.

Symptoms Whit rust of cliucifers

Pathogen:

Albugo candida

Following the Oomycetes, the fungi form two types of spores: asexual spores in sacs known as sporangia cysts, and sexual spores known as Oospore.

***Albugo candida*(sexual) Oospore** **Conidiophore**

Cycle life:

1- Infection occurs when the sporangia sacs germinate, which enters the stomata germination tubes and forms a mycelium between the cells of the cortex, which sends spherical pipettes by which it derives nourishment.

2- They are short scepter sporangiaphore carriers stacked side by side under the skin of the host and in a perpendicular position to it.

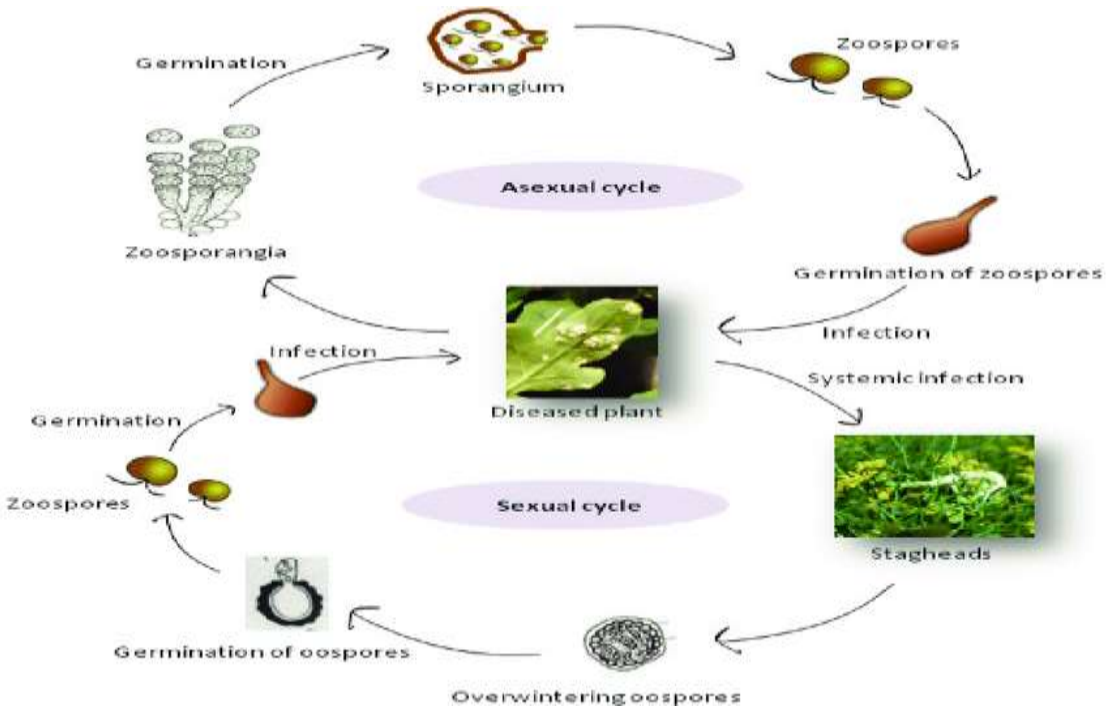
3- Sporrogenic cysts are colorless and spherical and result from the formation of a large number of sporangia cysts from the epidermis, putting pressure on the skin of the host.

4-It leads to its rupture and the spread of the bags in the air and their fall on other plants, causing a new infection, as the sporangia sac grows in the

presence of water droplets and a moderate temperature of 15-20 m. The cytoplasm is divided into 5-8 parts, with each part nucleus and cytoplasm.

5- Each of us turns into a zoospore with two approximately equal frills, one flagella and the other feathery. The ciliary spores move in water droplets for a period of 2-3 hours and transform and then form a germination tube that penetrates the host through the stomata, and the infection is repeated during the season.

6- At the end of the season, sexual reproduction takes place with the formation of a female organ Oogonium oval and male organ Antheridium stick shaped, each of them arises on the edges of some of the hyphae close to each other, where they stick to one side of the female organ and sends a fertilization tube that fertilizes the nucleus of the egg. In short, to produce ovules that withstand unsuitable environmental conditions and at the beginning of the season.



Cycle life *Albugo candida*

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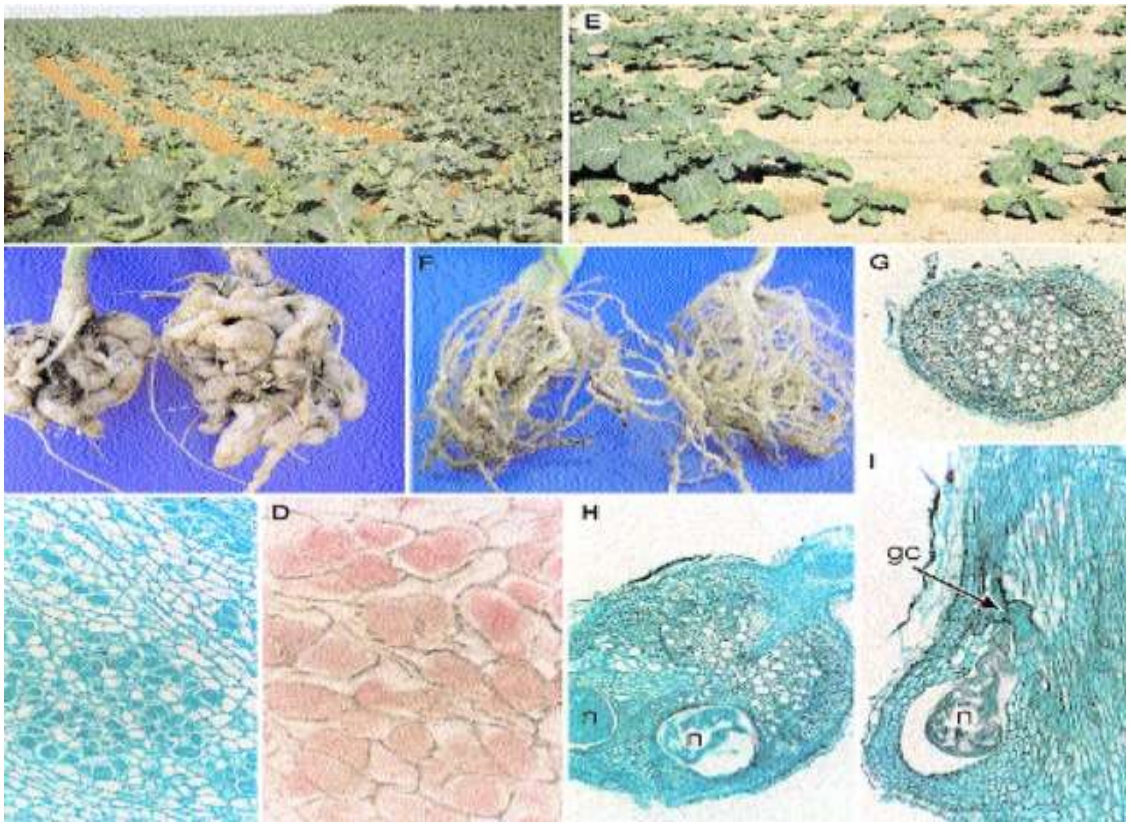
4- Glubroot of crucifer

Symptoms:

1- Initial symptoms of the disease The affected plants appear to have pale green or yellowish leaves. As the infection progresses, the symptoms of wilting appear, especially at midday on sunny and hot days, and disappear by nightfall.

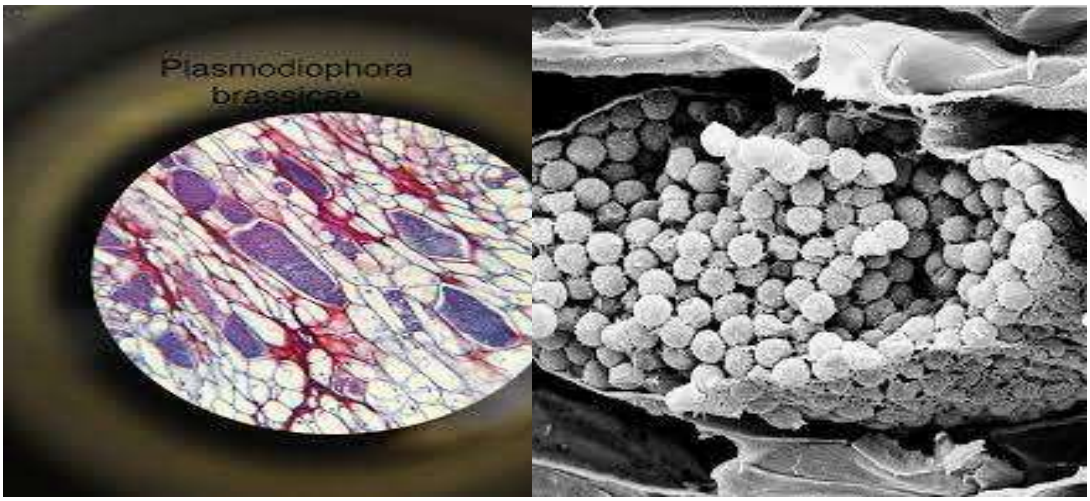
2- As for the distinctive symptoms, they appear in the form of tumors and swellings on the roots of the affected plant, which take different shapes and sizes, and the roots affected by large tumors decompose before the end of the season due to attack by bacteria and other throwing fungi.



Symptoms **Glubroot of crucifer**

Pathogen:

Pseudo-fungus ***Plasmodiophora brassiecae*** The body of the fungus is a Plasmodium that gives vesicles to ciliary spores or gives dormant spores that produce ciliary spores when germinated.



Plasmodiophora brassiecae

Cycle life:

1- The dormant spore in the soil germinates to give one ciliated spore with one flagella that penetrates the root hairs of the plant and turns inside the root cells into an amoebic body or plasmodium
2- After a few days, the plasmodium is divided into several sections, and each section turns into a sporangia containing 4-8 secondary ciliary spores.
3- These spores emerge to the outer center through the holes in the cell wall of the host, and some pairs of ciliary spores are determined with each other to form the zygote

4- The infection can regenerate and form a new plasmodium, as this body can directly penetrate the young tissues of the roots, while it cannot penetrate the old and woody tissues except through wounds. The plasmodium spreads to the cambium layer and outward towards the bark and inward towards the wood. An infected cell is five times the size of a healthy cell or more.

The ciliary spores of the fungus can germinate at temperatures between 16_28 m and the optimum temperature of 18-25_ m and with a soil moisture content of 50_97% and an optimal humidity of 75_90%. As for static spores, they do not germinate directly and can remain in the soil with the nappy on germination for 6_7 years. Finally, it must be noted that the fungus prefers soil Acidic.

Control:

1- Following an agricultural cycle in which cruciferous plants are not planted in polluted fields until at least five years have passed.
2- Ensure the safety of seedlings before planting.
3- Organizing irrigation operations and taking care of drainage in heavy soils.
4- Adjust the acidity of the soil as much as possible so that it becomes moderate or alkaline (PH7.2) by adding slaked lime
5- Sterilizing the nursery soil with one of the soil sterilizers such as chlorine, picrin and alternatives to methyl bromide.

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