Salahaddin University \Erbil
College of Agriculture
Plant protection Department
4th class

Field crop diseases\Practical

1st lab

Assist lecturer:
Nask SH. Salh
Email: nask.salh@su.edu.krd

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Wheat and barley diseases

Rust

Pathogen Biology

Rust fungi are obligate parasites. In nature, they require living host tissue for growth and reproduction; they cannot exist as saprophytes. In the absence of living host tissue, they survive as spores. In most rust fungi, only the telio spores are adapted to survive apart from a living host plant for more than a few months under field conditions.

1- Stem rust of wheat

DISEASE: Stem rust (black rust)

PATHOGEN: *Puccinia graminis* f. sp. *Tritici*

HOSTS: Wheat and barley, common barberry (and some additional *Berberis*)

Puccinia graminis

is heteroecious. This word describes rust fungi that require two unrelated host plants, such as wheat and barberry, to complete their life cycle.

***Puccinia graminis* is macrocyclic, producing all five spore stages**: -

-basidio spores

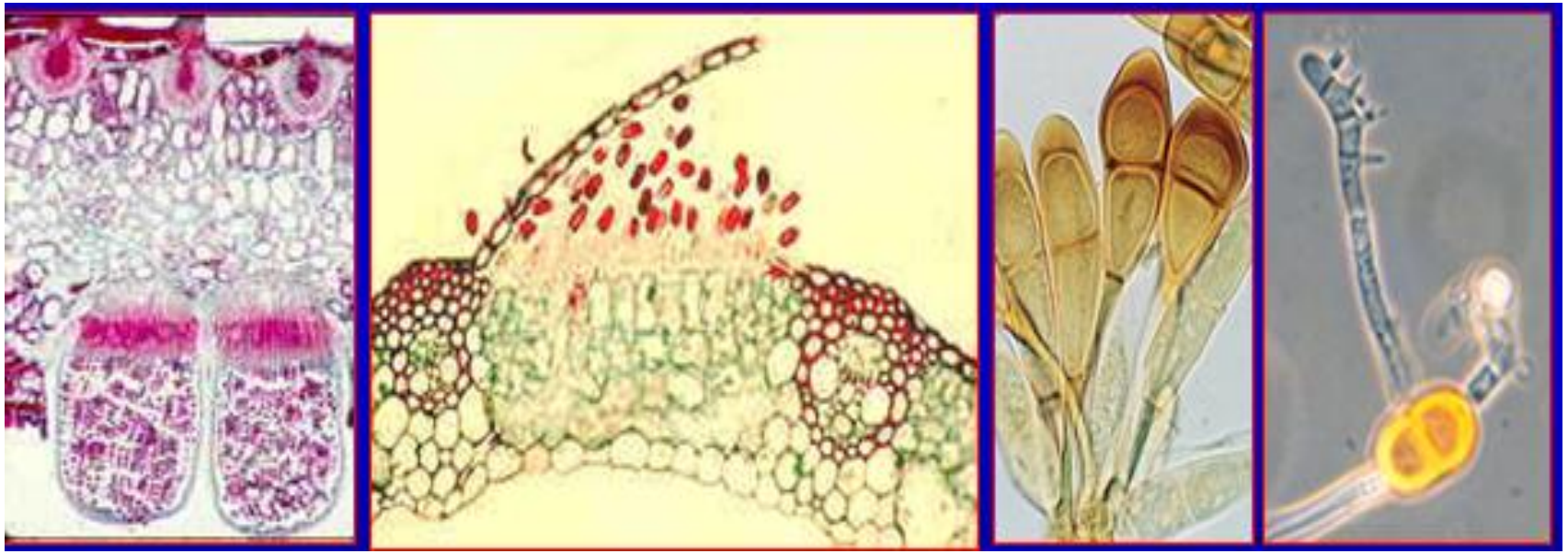
-pycnio spores

- aeciospores

-uredinio spores (uredospores)

-telio spores.

pycniospores



aeciospores

uredospores

teliospores.

basidiospores

Symptoms

Plants do not usually show obvious disease symptoms until 7 to 15 days after infection when the oval pustules (uredinia) of powdery, brick-red urediniospores break through the epidermis .

Microscopically, these red spores (uredinia) are covered with fine spines.

The pustules may be abundant and produced on both leaf surfaces and stems of hosts. Later in the season, pustules (telia) of black teliospores begin to appear.

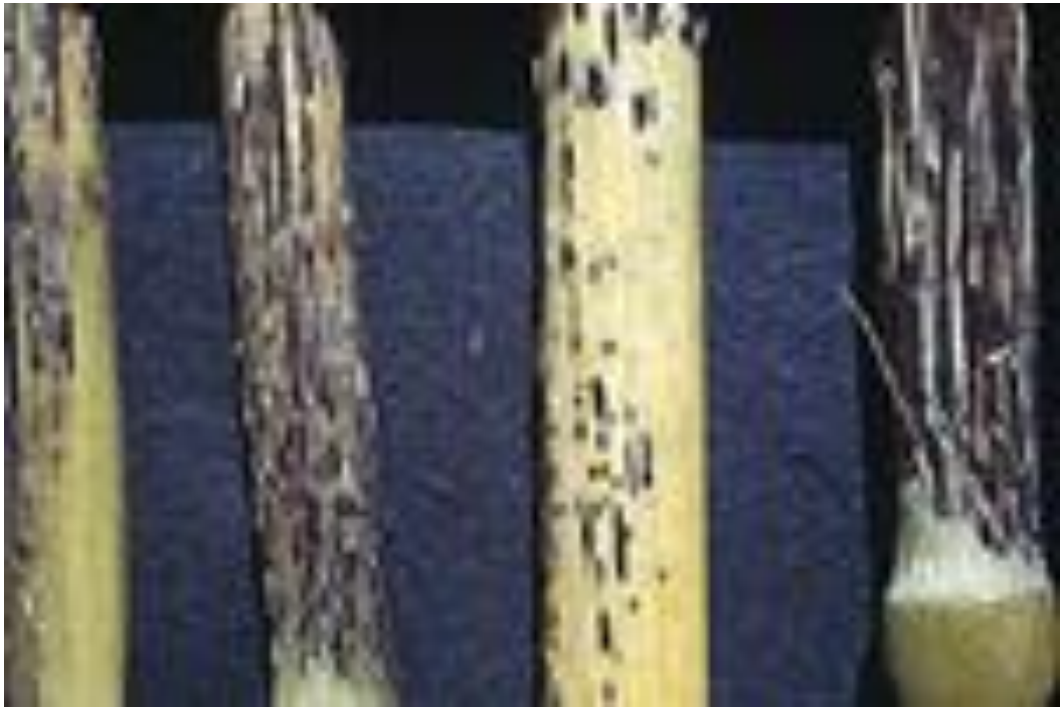
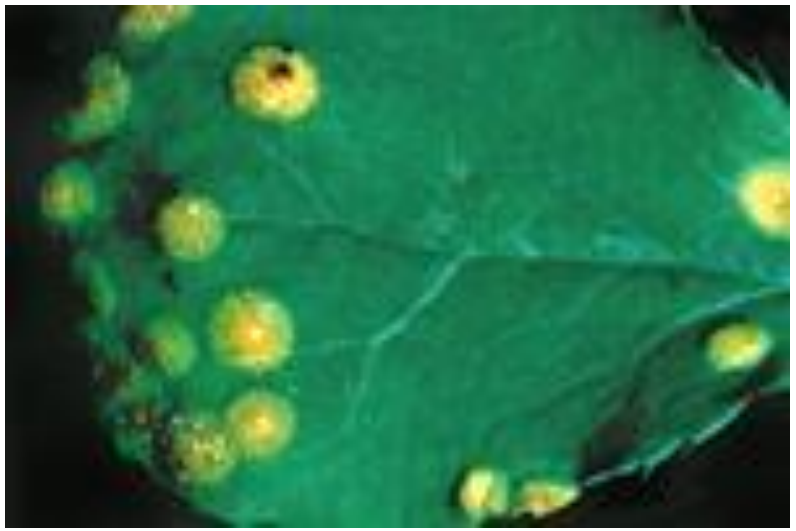


Figure 6

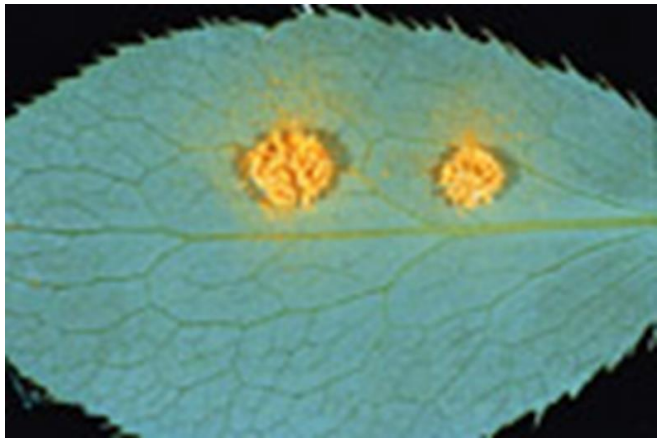
Microscopically, teliospores are two celled and thick walled .

In the spring, each teliospore germinates to produce thin-walled, colorless, haploid basidiospores Basidiospores infect the alternate hosts such as common barberry.

On barberry and other alternate hosts: Pycnia appear on barberry plants in the spring, usually in the upper leaf surfaces.



Five to 10 days later, cup-shaped structures filled with orange-yellow, powdery aeciospores break through the lower leaf surface The aecial cups are yellow and sometimes elongate to extend up to 5 mm from the leaf surface Microscopically, aeciospores have a slightly warty surface.



2-leaf rust

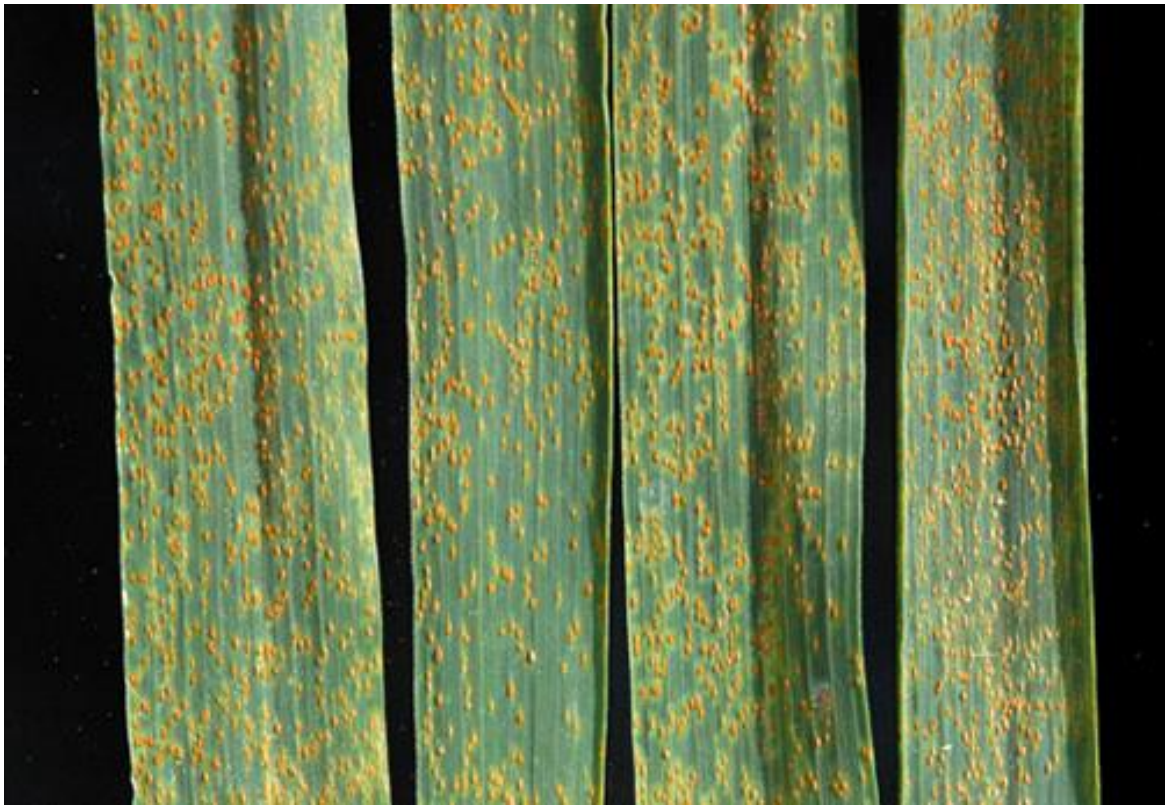
- **Disease name:** Leaf rust

  Pathogen name: *Puccinia triticinia*

  Host: wheat

  Leaf Rust: (*Puccinia hordei*)

  Host: barley



Symptoms:

1-Uredinia normally appear on the upper leaf surface, but with severe epidermis sheath infections can occur.

2-Uredinia are brown in color and generally circular in shape.

3- Stripe Rust

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Yellow Rust or Stripe Rust (Puccinia striiformis) pustules in a line on wheat leaf surface

Cause

Stripe rust is caused by *Puccinia striiformis*

Hosts

Wheat , barley and some perennial grasses may also become infected.

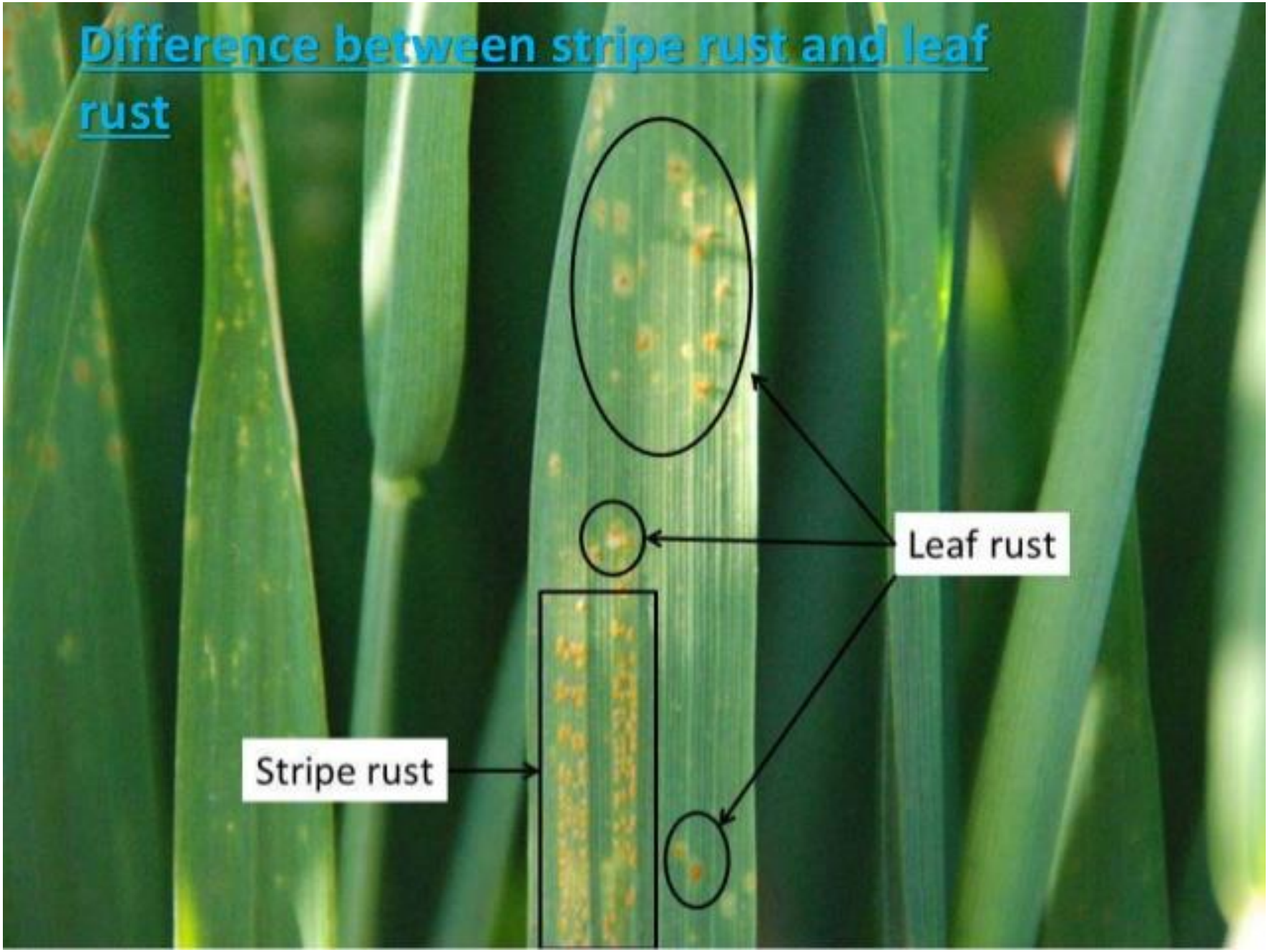
Symptoms

1- include yellow orange pustules oriented linearly between vascular bundles of leaves.

Stripe rust symptoms usually appear earlier in the season than other rusts because the fungus develops at lower temperatures than the other rust fungi.

As the plants mature, the pustules turn dark and shiny as teliospores are formed.

Stripe rust


Difference between stripe rust and leaf rust
Leaf rust
Stripe rust