

teleutospore germinate on the soil or above the wheat plant. On germination each cell of the teleutospore give rise a short tube like structure known as promycelium. The diploid nucleus of the teleutospore migrate into the promycelium. And divide meiotically and forms four haploid nuclei which are separated from each other by the formation of a transverse septa.

3. Basidial Stage → As mention earlier each teleutospore forms four haploid nuclei and are separated by the partition wall or septa. Out of four nuclei each nuclei produced a single haploid Basidiospores of which two basidiospores are (+) strain and remaining two are (-) strain.

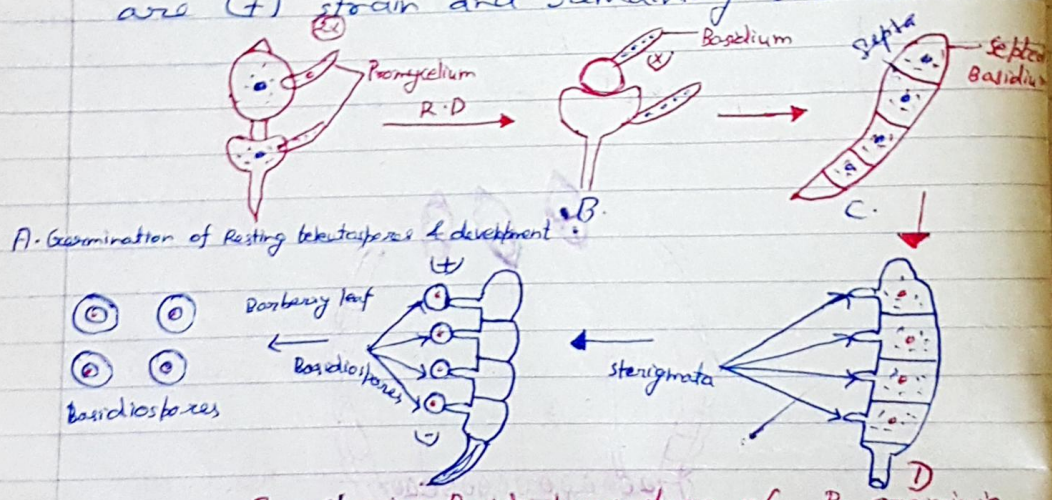


Fig - Showing Basidiospores stage of *P. graminis*

They are attached in each cell through sterigmata on maturation. Each basidiospores discharge explosively and dispersed by wind. Because basidiospores are unable to infect wheat plant or any members of this family. So they can infect and germinate on the alternate host that is Barberry plant.

Each basidiospore is uninucleate around double layered cell wall with full of cytoplasm and vacuole.

4. Pycnidial Stage (Spermatogonial stage) → The basidio-

-spores are carried to the barberry leaf by the wind. They are also infect on leaves, spines, flowers etc. But most frequently they infect only leaves. The basidiospore begins its germination on the leaf in presence of water. Each spore forms a germ tube and the each germ tube directly penetrates the epidermis through cuticle and after some time each germ tube elongated in size and develops uninucleate hyphae. After four to five days of the infection a single basidiospore forms a mass of mycelium which appears here and there on the upper epidermis. These are the spermatogonium or pycnidiospores. Each spermatogonium is oval, flask shaped, brown in colour and which open by a minute pore known as Ostiole. And each ostiole covered by sterile hyphae known as Paraphyses.

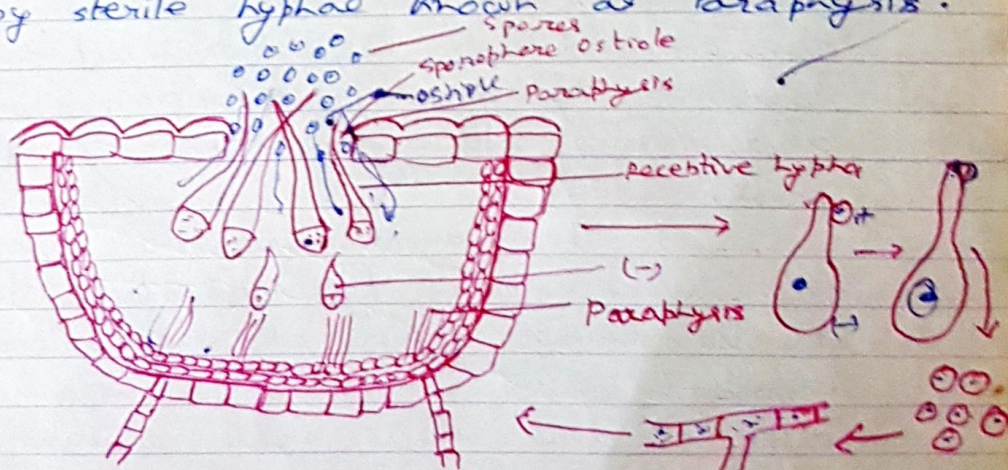


Fig - Showing Pycnidiospore of *P. graminis*
Each spermatogonium forms many uninucleate cells which are attached in sporophores. The tip of the

sporophore forms a chain of many small spores which is known as pyrenidiospore. Spermata. Each spermata is oval in shape, thin cell wall, a large haploid nucleus and a little cytoplasm. Some paraphyses of the asci swells and they come out from the ostiole. They are known as receptive hyphae. And the spores come out from the ostiole are either (+) strain or (-) strain.

5. Aecidial Stage (Aecidiospores) → The same mycelium which give rise to

to pyrenidiospore on the upper surface of the basal leaf which also give rise to small cup like structure on the lower surface of the leaf. They are known as protoaecidium which consist pseudoparaschymatous mass of cells. These proto-aecidial develops and forms dikaryotic hexagon cell of which some are (+) strain and some are (-) strain. Before formation of aecidiospore the two (+) and (-) strain cells fuse together through the receptive hyphae (Persoon 1933 and Butler 1938) These (+) strain cells or spermata are carried away by the insect to the receptive hyphae of (+) strain which fuse and forms dikaryotic hypha as dikaryotic phase.

The aecidiospores are separated from each other by intercalary sterile cell. It also forms chain of aecidiospore which alternating the sterile cell and is hexagonal. Lastly aecidial stage forms a cup like structure which is covered by a cell wall is known as peridium. After maturity peridium burst and each aecidiospore disperse.

by wind because they can not infect the barberry plant. So they again germinate in the alternate host that is wheat plant. So they are known as heteroecious ~~plant~~ ~~so they~~ fungus.

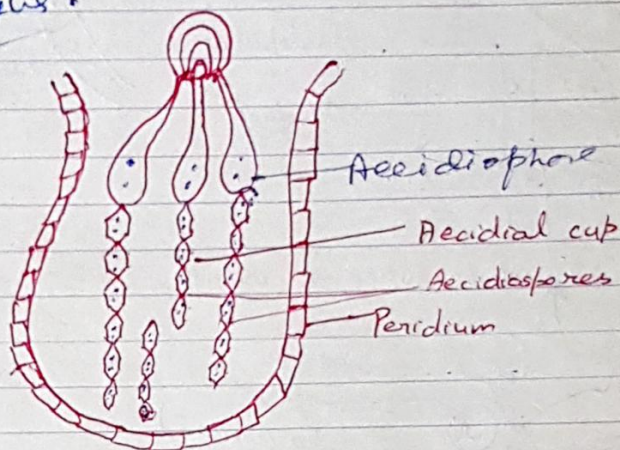


Fig - Aecidiospores of *P. graminis*

Control →

1. There should be complete destruction of barberry plant.
2. There should be proper drainage system in the ground.
3. Excessive use of Nitrogen manures being helpful in promoting the growth of rust fungi should be avoided.
4. Early maturity varieties of wheat should be preferred in cultivation.
5. Sowing of rust resistant varieties of seeds.
6. Spraying of sulfur dust from time to time in the standing crop field may control the rust disease.
7. Cultivation of wheat killy varieties may be stopped.
8. Crop rotation is useful for checking the disease.