

CC-4 (Unit-2).

## Chytridiomycetes:

### General characters:

- 1) vegetative body is coenocytic and thalloid, either globose or ovoid structure, either an elongated simple hypha or well developed mycelium.
- 2) cell wall is mainly made up of chitin and glucan.
- 3) Nuclear division is intranuclear and centric type.
- 4) members of this group produce motile cells at some stage of their life cycle.
- 5) motile cells (zoospores and gametes) possess single posteriorly placed, whiplash type of flagellum except a few poly flagellate cells.
- 6) sexual reproduction takes place by planogametes developed in gametangia. The fused gametes form zygote.

Synchytrium.

Unicellular endobiotic fungus.

Systematic position -

- Div - Eumycota
- Subdiv - Mastigomycotina.
- Class - Chytridiomycetes
- Order - Chytridiales
- Family - Synchytriaceae.
- Genus - Synchytrium.
- Species - S. endobioticum.

Synchytrium is known as chytrid. It is an endobiotic unicellular fungus. The fungus is an obligate plant parasite which causes black wart disease of potato.

Life history: K.M. Curtis first made classical studies of the life history of S. endobioticum. Life cycle of synchytrium consist of two phases. viz ->

- a) Asexual phase,
- b) sexual phase.

Asexual phase: It takes place generally during favourable condition and is completed in the following way ->

Infection -> Infection of the potato tuber in the soil takes place by uniflagellate haploid zoospore which are produced within resting sporangium. (The liberated ~~zo~~ uniflagellate zoospore with single posterior whiplash flagella swim in the film of water, come to rest on the epidermis of young host cell. Then it withdraw its flagella and germinate by putting forth a germ-tube called infection peg.) It pierces the cuticle and the wall of the epidermal cell of the tuber.

Plasmodium phase: After entering the epidermal host cell the multinucleate protoplast of the zoospore assume an amoeboid structure. The amoeboid spore then increases in size by absorbing food material from the surrounding host cell. The surrounding cell then starts dividing repeatedly followed by swelling resulting in the formation of a tumour. Then the parasite enlarges markedly, rounds off and form a double layered wall. This stage is called plasmodium stage.

iii) germination of sporozoans: The sporozoans germinate within the host cell. During germination the exospore of sporozoans ruptured and the endospore protrudes to form vesicle. The cytoplasm and nucleus pass into the vesicle. In the vesicle, nuclear division takes place and upto 9 multinucleate segments are formed which are covered by thin hyaline wall. The number of nuclei in each segment increases to as many as 300 resulting from repeated nuclear division. This stage is called sorus stage.

The entire protoplast in each segment divide into as many portions as there are nuclei. Each portion with its nucleus and cytoplasm develops into an a uniflagellate swarmer (zoospore). When water is abundant the swarmer behave as zoospore. The swarmer are cell free through one or two ruptured papillae which are develop into swarmer sporangium. The zoospore complete the asexual cycle and cause fresh infection on the host cell.

b) Sexual phase: During unfavourable condition sexual reproduction takes place in the following way →

i) formation of gamete → when water is less in the substratum the swarmer behave as gamete. The gametes are smaller in size than the zoospore. The gametes originating from the same gametangia fell to fuse with each other indicating heterothallic condition of the gametangia. Gametes are released from the gametangium through one or two ruptured papillae developed on each gametangium.

ii) Union of gamete → Gametic union takes place on the surface of the host or in a film of water. Karyogamy immediately follows plasmogamy resulting in the formation of zygote. The zygote sink to the bottom of the infected cell. Simultaneously the host tissue divide repeatedly as a result a pressure is develop resulting the infected cell being buried deeping in the host tissue.

iii) Germination of zygote → The zygote enlarges considerably developed a three layered thick wall and then comes to rest after the completion of resting period of the zygote nuclei

divides meiotically to form 4 haploid nuclei. This nuclei by repeated division produce several nuclei. Each of which being surrounded by cytoplasm develop into a zoospore. The thick wall of the zygote now ruptured due to imbibition of water the zoospore are set free. The zoospore again cause fresh infection on the host cell.

Economic importance: synchytrium causes black wart disease of potato. In this disease dark brown warty proliferation appear on the potato tuber. In heavily infected tuber considerable portion of this tissue are converted into warts and the potato tuber are destroyed.