

MASTIGOMYCOTINA

Synchytrium

Classification

Kingdom	Fungi
Division	Eumycota
Subdivision	Mastigomycotina
Class	Chtridiomycetes
Order	Synchtriales
Family	Synchytriaceae
Genus	<i>Synchytrium</i>

Synchytrium is represented by about 200 species reported from all over the world, occurs as parasite on aquatic alga, bryophytes, pteridophytes and flowering plants. The disease is characterised by cauliflower-like black warty growth on tubers, stolons and stem bases, so called '**black wart**' disease of potato. It is also vector of potato virus X (PVX) and potato mop top virus.

Thallus

The vegetative body of *Synchytrium* consists of minute endobiotic holocarpic

thallus, represented by naked uniflagellate zoospore with whiplash flagellum.

Reproduction

Synchytrium endobioticum reproduces both asexually and sexually. During reproduction, the entire thallus transforms into a reproductive unit i.e., holo-carpic.

Asexual Reproduction:

During favourable condition the minute naked uni-nucleate and uniflagellate zoospores are released from the resting sporangium. After coming in contact either with the potato 'eye' or stolon or young tuber they come to rest and withdraw their flagella. The content of the zoospore cyst enters into the host cell through the wall by minute pore in amoeboid movement, keeping the cyst membrane outside. The protoplast of zoospore, after entry in the host epidermal cell becomes spherical in shape. The infected host cell also enlarges in volume.

The host cell surrounding the infected cell becomes stimulated and starts swelling (hypertrophy) resulting into the formation of tumour or wart-like structure. The nucleus of summer spore then undergoes repeated mitotic divisions and forms about 32 nuclei. This multinucleate vesicle is known as **prosor**. The protoplast of the vesicle becomes cleaved into 4-9 segments, covered by thin hyaline wall. Each segment is known as **summer sporangium or zoosporangium**. The total aggregated structure of the zoosporangia is known as **Sorus**. The nuclei of each zoosporangium undergo repeated mitotic divisions and form generally 200 to 300 nuclei. The protoplast then divides into many uninucleate segments. The mature sporangium swells up by absorbing water and creates pressure on the host wall to burst. After bursting, the zoospores get released through a small slit on the sporangial wall. The zoospores are uninucleate and uniflagellate. They swim actively in water and infect again the new or same host.

Sexual Reproduction:

In unfavourable condition of winter the multinucleate segment of prosorus instead of behaving as zoosporangium behaves as gametangium which produces many gametes those are smaller in size than the zoospores. The

gametes coming from different gametangia of a same or different sorus may fuse, but not from same gametangia of a sorus (show physiological heterothallism). The planogametes after union form diploid biflagellate zygote. The planogametes are similar in size and shape therefore, copulation is isogamous. The zygote swims for sometime and encysts on the surface of the host epidermis and penetrates the host cell by a process similar to zoospore penetration. The surrounding host cell then undergoes hyperplasia i.e., repeated cell division. The infected cell is then buried into the deeper layer of host cells. The effect on the surrounding tissue varies between zoospore and zygote infection. Hypertrophy (i.e., enlargement of cells) takes place on zoospore infection, but the zygote infection causes Hyperplasia (i.e., repeated cell division). During this development, the zygote enlarges and behaves as **winter sporangium or resting sporangium**. The resting sporangium remains dormant throughout the winter season. The resting sporangia are released into the soil after decaying the host tissue and are capable to germinate within about two months. With the onset of favourable condition i.e., in spring season, the resting sporangium becomes active and its nucleus undergoes repeated nuclear division of which first one is meiotic, followed by

many mitotic divisions. The protoplast, along with a single nucleus, divides into many uni-nucleate segments. After absorbing water, the wall of resting sporangium bursts open and releases the zoospores. The zoospores are like the asexual zoospores, which on coming in contact with a suitable host cause infection and repeat the cycle again on host.

