

Division I: Myxomycota, Class: Plasmodiophoromycetes, Order: Plasmodiophorales

Key to divisions of Mycota

Plasmodium or pseudoplasmodium present - **Myxomycota**

Plasmodium or pseudoplasmodium absent,
Assimilative phase filamentous - **Eumycota**

Myxomycota

Class: Plasmodiophoromycetes

1. Plasmodiophorales

Plasmodiophoraceae *Plasmodiophora*, *Spongospora*, *Polymyxa*

Club root of cabbage caused by *Plasmodiophora brassicae*

Systematic position

Kingdom : Protista (Eukaryote)

Sub-kingdom : Mycota

Division : Myxomycota

Class : Plasmodiophoromycetes

Order : Plasmodiophorales

Family : Plasmodiophoraceae

Genus : *Plasmodiophora*

Species : *P. brassicae*

Symptoms

Enlargement of roots, club-shaped roots due to hyperplasia and hypertrophy, gradual and inconspicuous stunting, yellowing and wilting of plant.

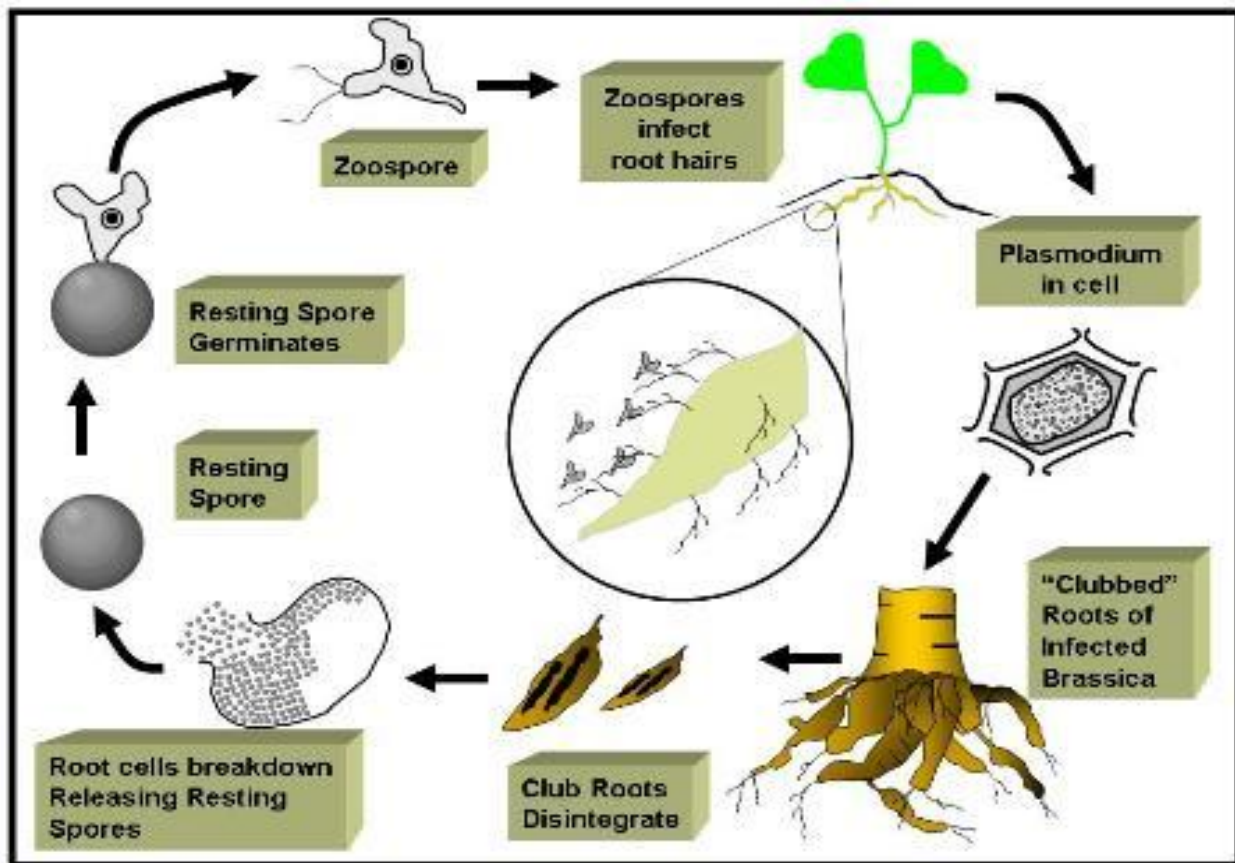
Pathogen

The thallus is a plasmodium (a naked mass of nucleated cytoplasm with amoeboid movement), which gives to zoosporangia or resting spore, which on germination produce zoospores. Resting spores are spherical with spiny walls. Zoospores are anteriorly biflagellate, heterokont (unequal in length) and uninucleate, both the flagella are of whiplash type.



Life cycle

Infection of the root hairs occurs during the seedling stage. Resting spores, which lie dormant in the soil up to several years, germinate and a circular pore is formed on its wall. An apically biflagellate zoospore comes out. Each resting spore produces single zoospore. The zoospore penetrates the root hair and develops into uninucleate primary plasmodium. The plasmodium cleaves into multinucleate portions. Each portion develops into a zoosporangium containing 4-8 zoospores. The zoospores are discharged outside the host through pores dissolved in the host cell wall. The zoospores fuse in pairs to produce zygotes. These zygotes with four flagella cause new infection and produce new plasmodium. This plasmodium penetrates the young root tissues directly or the older roots and underground stems through wounds. Thus the plasmodium spreads to cortical cells in cambium by direct penetration. When the plasmodium establishes in the host cells, they are stimulated to enlarge (hypertrophy) and divide abnormally (hyperplasia). The cells become larger (5 or more times). The plasmodium develops into large



number of resting spores inside the plant tissues, which are released into soil by disintegration of clubbed roots.



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