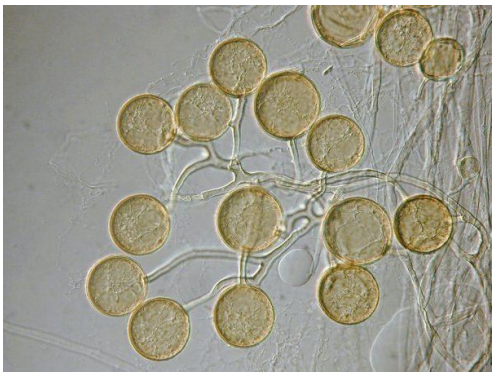
GLOMUS : STRUCTURE AND CHARACTERISTIC FEATURES

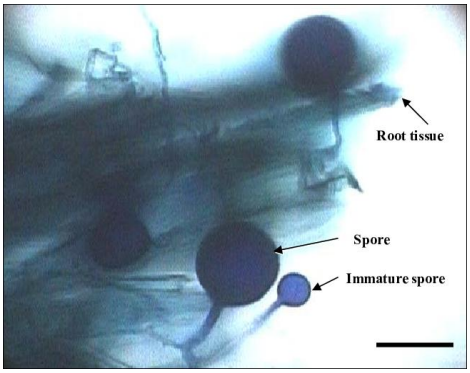
Glomus is the only genus in the family Glomeraceae, in the division Glomeromycota. As with other AM fungi, all *Glomus* species are thought to be obligate symbionts, dependent on their mycorrhizal association with plant roots to complete their life cycle. They cannot be cultured in the laboratory in the absence of a plant host. *Glomus* species are found in nearly all terrestrial habitats, including arable land, deserts, grasslands, tropical forests, and tundras.

Structure

Glomus is an obligate biotroph, meaning it requires a living photoautotropic host to complete their life cycle and produce the next generation of spores. They exist in the environment both as a spore and hyphae which can form dense networks called mycelium, though most of *Glomus* biomass occurs within roots of host plants. Thought to be chlamydospore, these spores can be produced either inside the host root or outside in the soil. The spores are able to germinate without a host plant. These spores are produced at the tip of the hyphae.



Glomus spores with mycelium



Spores formation

If the spore is not already in the root, a germination tube is formed which grows through the soil until it finds a host root. It penetrates the root and grows between root cells or it penetrates the cell wall and grows within root cells. Once it penetrates the root cells arbuscules are formed. The arbuscules are tree-shaped subcellular structures that form to connect plants to the hyphal network of the fungi. Arbuscules are formed within plant cell walls but are surrounded by an invaginated cell membrane, so remain within the apoplast. The fungus

may also form vesicles, swollen structures which are thought to function as food storage organs.

Characteristic features

Arbuscules are the main site for nutrient exchange between *Glomus* and its symbiotic plant partners. This network of hyphae is designed to increase the plants uptake of important nutrients such as phosphates and water. In exchange for the nutrients and water the plants supply the fungus with the carbohydrates it needs to survive.

Glomus is believed to exist in all terrestrial habitats colonized by vascular plants and may form an endosymbiotic relationship with 70-90% of extant vascular plants. Roots infected with them may protect the host plant from harmful soil borne pathogens, provided limiting nutrients, and increase overall fitness of the host. The Glomus-plant symbiosis plays an important role in the economic sectors involving the growth of plants such as agriculture, horticulture and forestry. Several species of *Glomus*, including *G. aggregatum*, are cultured and sold as mycorrhizal inoculant for agricultural soils. *Glomus aggregatum* is an arbuscular mycorrhizal fungus used as a soil inoculant in agriculture and horticulture.