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Ecology of Histoplasma Casulatum var. Capsulatum

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Editorial

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Editorial

Ecology is defined as the study of an organism in relation to its environment. Most of the fungi such as *Aspergillus fumigatus, Blastomyces dermatitidis, Cryptococcus neoformans, Fusrium solani, Geotrichum candidum, Histoplasma capsulatum, Sprothrix schenckii* etc., have ecological association with environmental substrates. These mycotic agents are frequently recovered from the soil, avian droppings, bat guano, woods, litter, sewage, straw, vegetables, fruits and other plant materials. Among these saprophytic fungi, *Histoplasma capsulatum* is an important dimorphic fungus, which can cause life threatening disease in humans and in a wide variety of animals. The recorded history of histoplasmosis goes back to year 1905 when Samuel Taylor Darling, an American, for the first time observed round large bodies in mononuclear cells and also in tissues of spleen, liver, lungs and lymph glands of a 27-year- old Martinique Negro in Panama. He initially believed the organism as protozoa but later, he named it as *Histoplasma capsulate* (now *capsulatum*). In order to remember the contribution of the scientist, the infection was also known as "Darling's disease". The first case of histoplasmosis diagnosed at ante-mortem was reported by Katherine Dodd in 1929. The dimorphism in *H. capsulatum* was described in 1934 by de Monbreun. Later, in the year 1939, he detected the first case of *H. capsulatum* infection in dog. Panja and Sen diagnosed the first case of histoplasmosis in India from Calcutta in 1954. Histoplasmosis is endemic in American continent as reported from Argentina, Bolivia, Brazil, Chile, Colombia, Paraguay, Peru, Uruguay, USA and Venezuela. The high incidence of disease is recorded in the regions of Missouri, Ohio and Mississippi of USA. Sporadic cases are seen in more than 60 countries including Burma, Cambodia, Europe, India, and Thailand.

Since the first recognition of *Histoplasma capsulatum* in 1905 by Darling, three varieties of this dimorphic fungus are described. These are *H. capsulatum var. capsulatum* (American histoplasmosis), *H. capsulatum var. duboisii* (African histolasmosis, affects man and baboon) and *H. capsulatum var. farciminosum.* The later variety causes epizootic lymphangitis in animals mainly in equines. It is a major fungal disease of equines in Ethiopia. Among these varieties, *H.casulatum var. capsulatum*, commonly known as *H. capsulatum*, is global in distribution, and causes infections in humans as well as in many species of animals such as bat, bear, cat, cattle, dog, ferret, fox, horse, monkey, sheep etc. Among animals, the dog is frequently found infected with this saprobic fungus. The respiratory tract is the prime portal of entry of the fungus. The infection takes place by inhalation of infectious micro-conidia of *H. capsulatum*. The disease can occur in sporadic and epidemic form, and adult males are more affected than females. Certain occupational groups such as cavers, farmers, miners, gardeners, sweepers, construction workers, spelunkers, and military personnel's are at a greater risk of acquiring *H. caspulatum* infection. It is also known as "Cave disease" as many cases are recorded in persons who visited caves. High humidity provides an ideal nidus for *H. capsulatum* infection. Outbreaks and sporadic cases of histoplasmosis in rural areas are often associated with heavy exposure to saprobic reservoirs such as soil of bat caves, chicken coops and pigeon roosts. It has been estimated that over 40 million people in the United States have been infected with H. capsulation as indicated by histoplasmin skin test surveys, and approximately 500,000 new cases occur each year in America.

Emmons, an American Scientist, first time established in 1949 the fact that *H. capsulatum* exists and develops in soil as a saprobe. Later in 1958, he isolated *H. capsulatum* from bat guano, and elucidated the association of bats with histoplasmosis. *Histoplasma capsulatum* is a dimorphic fungus, which exists in two forms, namely the mycelia or mould form and yeast form. The environmental conditions affect the survival, growth and metamorphosis of *H. capsulatum*. The yeast phase is observed at 37°C in rich nutrient media like brain heart infusion with blood and in host's tissue where as mold form occurs at 25°C in environmental materials such as soil, bat excreta and avian droppings. The mycelia form of *H. capsulatum* can survive for 306 days at 25°C, where as yeast phase can remain viable for 100 days. In frozen tissues at - 40°C, the fungus may survive for 150 days. Soil enriched with nitrogen, phosphorus, organic matter and having good water holding capacity provide ecological niches, which favor the growth of *H. capsulatum* in environment.

The fungus is isolated from soil, bat guano, chicken feces, pigeon droppings, and excreta of other birds namely Brewer's black birds, grackles, oil birds, red winged black birds, and starlings. The soil samples from an abandoned silo associated with epidemic of human histoplasmosis were found positive for *H. capsulatum* during the succeeding 15 years. There are evidences to believe that humans and animals both acquire *H. capsulatum* infection from saprobic environments. The ecological observations are very important to frame strategies for the control of this dimorphic mycotic pathogen in the various habitats, which serve as point source of infection. It is emphasized that further work on the ecology of *H. capsulatum* in many endemic countries should be undertaken.

The author wishes to dedicate this communication to all the researchers, in particular to Dr. C.W. Emmons and Dr. A. Ajello both American Scientists, who worked in the field of histoplasmosis.