2.1. Significance and overall aim

Pathogenic fungi has been fascinating research subjects and in the recent decades demand increasing attention as they remain agents of serious illness in diverse patient populations. In particular, opportunistic fungi such as *Cryptococcus neoformans* a unique fungal pathogen for its major virulence factors, command notice as the ranks of their immunocompromised victims grow. The emergence of *C. gattii* serotype B at southwestern British Columbia, Canada challenges the previously accepted ecology of this organism and dictates the need for investigation into more geographic areas.

In the changing scenario of increasing cases of HIV/AIDS, high-risk populations like patients undergoing prolonged corticosteroid treatment and those with malignancy etc. the detailed understanding of this infectious agent is likely to yield useful information, which would be applicable in early diagnosis, proper treatment and prevention. In this context to strengthen the understanding of this disease, the present research probes in the prevalence, ecological and epidemiology aspects pertinent to southern Karnataka region.

The overall aim is to carry out a mycological and ecological study using phenetic and molecular fingerprinting tools to investigate on the heterobasidiomycetous yeast *Cryptococcus neoformans* isolated from clinical cases and environmental sources from southern part of Karnataka state.
2.2. Specific research objectives

- Prevalence of Cryptococcosis among patients attending the tertiary care hospital.

- Ecological survey of Cryptococcus neoformans species complex from natural habitats.

- Phenotypic characterization and antifungal susceptibility testing of clinical and environmental isolates.

- Evaluate the synergistic activity of Xanthine and Hypoxanthine with Amphotericin B and Fluconazole against Cryptococcus neoformans using Caenorhabditis elegans model.

- Molecular epidemiology of clinical and environmental isolates by PCR-fingerprinting method, using microsatellite specific oligonucleotide (GACA)$_4$ as primer.

- Mating type allele analysis of clinical and environmental isolates.