

Anthology : The Research
**Occurrence of Keratinophilic Fungi and
 Related Dermatophytes from Indoor Animal
 Habitats of Kanpur Zoological Park, Kanpur
 (India)**

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Abstract

Ninety soil samples were collected from different indoor animal habitats of Kanpur Zoological Park and were examined for the occurrence of keratinophilic fungi and related dermatophytes. From the positive 76 samples, total of 8 genera and 15 species were isolated. Total of 84.4% samples were found to be positive for Keratinophilic fungi and related Dermatophytes. Among these fungal species, *Chrysosporium keratinophilum* (26.67%) was the most dominant while *Microsporum gypseum* (18.87%) was the next most frequent species.

KeyWords: Keratinophilic fungi, Dermatophytes, Indoor Animal Habitats, Kanpur Zoological Park

Introduction

Keratinophilic fungi are the group of highly specialized fungi which have the ability to degrade hard keratin. They are capable of invading keratinized tissue of man and animals, some growing in the superficial layer and other invading more deeply. These genera include *Chrysosporium*, *Trichophyton*, *Epidermophyton*, *Microsporum*.

Keratin, the fibrous protein, is a cornfield part of the skin of vertebrates and includes hair, wool and related structures which differ from other proteins in their high cystine content. Keratin the structural component of the integument of most birds, mammals, and amphibians, occurs commonly in nature. In general, soil could be considered as a reservoir for human infection.

During the past years, many researchers reported about isolation of keratinophilic fungi around the world. Nowadays, most people spend their time with their children in parks and zoos for fun and are at a great risk by direct contact with soil and being exposed to keratinophilic fungi. Upto now, there were no data about keratinophilic fungi in indoor animal habitats of Kanpur Zoological Park. Thus the present study aimed to isolate and identify keratinophilic fungi and related dermatophytes from soils of the indoor animal habitats.

Material And Method

A total of 90 soil samples were collected from different animal habitats (Aviary, Serpentarium, Rabbit habitat, Guinea pig habitat, Nocturnal house) of Kanpur Zoological Park during 2017- 2018. The samples were collected from the superficial layer of the soil collected in sterile polythene bags brought to the laboratory and stored at room temperature. Keratinophilic fungi were isolated by Vanbreuseghem hair bait technique. Soil were placed in sterile petri dishes and moistened with sterile water and baited with sterile human hairs. The petri dishes were incubated at room temperature and examined after one week. After observing the growth, isolates were cultured on SDA medium at $28 \pm 2^\circ \text{C}$ for upto one week. When fungal colony was seen it was transferred to other dishes for purification. Then isolates were examined and identified

Result and Discussion

A total of 15 species of fungi were isolated from the different animal habitats of Kanpur Zoological park studies belonged to 8 genera (table 1). A total of 84.4% samples were found positive for keratinophilic fungi and related dermatophytes. *Chrysosporium* species are widely distributed in Aviary section. It was the most common genus recorded, being represented by five species, of which *Chrysosporium keratinophilum* (26.67%) was the most common species on the basis of occurrence, while *Microsporum gypseum* (18.87%) was next most frequent species isolated. Other isolated keratinophilic fungi were *C. merdarium* (15.55%), *C. tropicum* (12.22%), *C. georgii* (10%), *C. queenslandium* (4.44%), *M. nanum* (2.22%), *T. equinum* (1.11%), *T. kanei* (1.11%), *Epidermophyton floccosum* (6.67%), *Fusarium oxysporum* (4.44%), *Alternaria alternata* (5.56%), *Aspergillus niger* (3.33%), *A. flavus* (8.89%), *Bipolaris sp.* (2.22%).



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Source of soil samples	Aviary	Nocturnal House	Serpentarium	Rabbit Habitat	Guinea Pig Habitat	Total	% distribution
No. of samples examined	18	18	18	18	18	90	
No. of samples positive	18	14	13	16	15	76	
% distribution	100%	77.78%	72.22%	88.89%	83.33%	84.44%	
ISOLATED FUNGUS							
A. alternata	-	2	-	1	2	5	5.56
Aspergillus niger	-	-	2	1	-	3	3.33 2.22
Bipolaris sp.	1	-	-	-	1	2	10
C.georgii	2	-	1	4	2	9	26.6
C.keratinophilum	9	3	3	5	4	24	15.5
C. merdarium	5	2	-	4	3	14	4.44
C. queenslandium	-	1	-	2	1	4	12.2
C.tropicum	4	-	2	2	3	11	6.67
E. floccosum	2	-	1	2	1	6	4.44
F.oxysporum	1	1	-	1	1	4	18.89
M. gypseum	3	1	7	4	2	17	2.22
M. nannum	-	-	-	-	2	2	1.11
T.equinum	-	1	-	-	-	1	1.11
T. kanei	-	-	-	-	1	1	8.89
A. flavus	1	2	1	1	3	8	

-Indicates absence of fungi C. indicates Chrysosporium M. indicates Microsporium E. indicates Epidermophyton T. indicates Trichophyton

In our present study, maximum varieties of keratinophilic fungi were isolated from rabbit habitat and guinea pig habitat. These habitats are rich in keratin debris. C. keratinophilum were found to be most common keratinophilic fungi, isolated from Aviary section in large number while M. gypseum occurred mostly in Serpentarium. In this study, occurrence of keratinophilic fungi in Kanpur Zoological Park reveals that there is more risk of infection to visitors and animals. Therefore, zoo serve as a natural reservoir of keratinophilic fungi which have pathogenic potential to man and animals. However no more data have been found on the occurrence of these fungi in Kanpur Zoo so, our aim is to explore these pathogenic fungi and highlights the factors favoring their growth. The majority of dermatophytes can live saprophytically and every keratinophilic fungi can be considered as a potential pathogen (Rippon, 1982). Open play grounds and public parks are often invaded by many animals such as cows, bullocks, birds, dogs, pigs, cats, and rats. These visitors leave organic residue which probably contaminate the soil with propagules of fungal pathogen. Indoor animal habitats viz. farm houses and zoos, also harbour pathogenic Keratinophilic fungi by Dominick and Majchronic (1970). Therefore soil can become a potential source of infection for humans and animals. (Mantovani, 1978, Filipello,1986). The frequency of occurrence of dermatophytes in soil is affected by genomic and climatic factors and is also influenced by the frequency of the animals visiting these localities.

Aim of study

The present study was undertaken to find out the natural reservoir of keratinophilic fungi and highlight the factors favoring their growth.

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Conclusion

Our study results showed that many keratinophilic fungi isolated from kanpur zoo soils are important for public health and children are important group at a high risk of being exposed to these fungi.

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