

68 65 77 (77)

J. Kwt. Med. Assoc., vol. 9 (1975)

EPIDEMIOLOGY OF DERMATOPHYTES IN KUWAIT

I. Incidence of dermatophytes in soil of school yards in Kuwait.

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Summary

25 Soil samples were collected from school yards in 15 districts in Kuwait. The samples were examined by hair-baiting technique after Vanbreuseghem (1952). Dermatophytes and other keratinophilic fungi were isolated from 22 samples collected from 14 districts. The most prevalent fungi isolated were *Trichophyton mentagrophytes*, *Chrysosporium pannorum*, *Microsporum gypseum*, *Alternaria* and *Cephalosporium*, in that order of frequency.

This work is a part of a study on the epidemiology of the dermatophytes in Kuwait.

For studying the epidemiology of dermatophytes, examination must extend to man, animals and the surrounding environment such as soil, air, insects etc. ...

In Egypt several studies were made in this direction. As regard soil, Refai and Rieth (1964) could isolate *Trichophyton mentagrophytes*, *Trichophyton quinckeanum*, *Microsporum gypseum*, *Microsporum cookei* and *Monosporium* species. Refai and El-Gothamy (1975) used pieces of nails for the isolation

of dermatophytes from the soil and reported the recovery of *Trichophyton mentagrophytes* from the sandy soil collected in Heliopolis.

Vanbreuseghem (1952) was the first to use the hair for the isolation of dermatophytes and dermatophyte-like fungi from the soil. This technique known as hair-baiting technique opened a new era in studying the epidemiology of dermatophytes.

Several dermatophytes were reported to be isolated from soil in different parts of the world. Not every ringworm fungus has been isolated from the soil, but the evidence points to the conclusion that all the common dermatophytes of animal and man have evolved from keratinophilic soil fungi (Ainsworth and Austwick, 1973). Recently there is a rising interest in ringworm and their causative dermatophytes in Kuwait. Selim and El-Shazli (1973), in their extensive study on tinea capitis in the kindergarten and primary schools reported an incidence of 1.16% with prevalence of *Microsporum Canis* and *Trichophyton mentagrophytes* as causative agents. This stimulated us to study the epidemiology of pathogenic dermatophytes in Kuwait. The study will cover fungi

causing tinea or ringworm in man and their distribution in the environment as soil, air, pathogenic fungi in association with insects and the role of insects as transmitters, fungi found in foods which may cause allergy or toxicoses in man and animals ... etc ... The present part of the study is concerned with the distribution of dermatophytes in the soil of the school yards.

Materials and Methods

25 samples of soil were collected from the yards of schools in 15 districts in Kuwait and were examined by the hair-baiting technique of Vanbreuseghem (1952).

The soil samples were distributed in Petri-dishes, moistened with water. Horse hairs were cut to short pieces, sterilised by the autoclave at 120°C and then few pieces of the hairs were distributed on the surface of the soil. The plates were then incubated at room temperature for one month. The fungi growing on the hairs were subcultured on Sabouraud agar plates and subjected to identification.

Results

Fungi could be isolated from 22 out of the 25 samples examined. *Trichophyton mentagrophytes* was isolated from 17 samples obtained from 9 districts, it was isolated alone from 5 samples obtained from Feiha, Kadesiya and Gahra. The remaining 12 samples gave mixed growth with other dermatophytes such as *Microsporum gypseum*, *Alternaria* and/or *Chrysosporium pannorum*. These associations were pre-

sent especially in the samples obtained from Fahaheel, Fentas, Abu-halifa, Sabahiya and Khaldiya. *Microsporum gypseum* was never isolated alone, it was recovered in association with other dermatophytes in 2 localities namely Fahaheel and Sabahiya. Other Keratinophilic fungi such as *Chrysosporium*, *Cephalosporium*, *Alternaria* or *Stemphylium* were recovered from the remaining samples (see table). Similarity of the isolated fungi were noted in samples collected from adjacent localities e.g. Fentas and Abu-Halif Feiha and Kadsiya.

Discussion

To our knowledge this is the first report on isolation of dermatophytes from soil in Kuwait. The recovery of *Trichophyton mentagrophytes*, *Microsporum gypseum* and other Keratinophilic fungi from the sandy soil is of interest especially under such condition of high temperature and relatively raised humidity in Kuwait. *Trichophyton mentagrophytes* is known to be pathogenic for man causing tinea and can affect all animals causing ringworm (Abdel-Fattah et al., 1969; El-Mazny et al., 1973; Abdallah, et al., 1971; Frair Bell, 1967; Ainsworth and Austwick, 1973). This dermatophyte has been isolated from soil in different countries (Lurie and Borok, 1955; Rodriguez, 1958; Rogers and Benekes, 1963; Reoux et al., 1965). It was also isolated in other Arabian countries such as Egypt (Refai and Reith, 1964; Refai and Miligy, 1968; Refai and El-Gothamy, 1975). In Kuwait, *Trichophyton mentagrophytes* occupied the second place

in the list of isolated dermatophytes from the clinical cases in kindergarten and primary schools in Selim and El-Shazli survey (1973).

Microsporum gypseum has been isolated from the soil all over the world and is considered as geophilic species. Although most of geophilic species are regarded as less pathogenic, yet *Microsporum gypseum* is known to affect man causing inflammatory type of tinea capitis; it can also affect animals causing ringworm especially in horses and small pets.

The fact that the soil samples examined were collected from yards of schools renders them as potential sources of infection for its children. The child, while playing with sands is liable to transmit the fungal elements to his head, which can penetrate through small abrasions in the scalp causing tinea capitis. Bensch and Gemeinhardt (1967) has reported a case of tinea capitis in a gardener, where *Microsporum gypseum* was isolated from the scalp lesion and the soil of the garden. Other danger is the infection of the nails during playing with sands harbouring such fungi. Amer (1974) in his extensive studies on onychia and paraonychia in Egypt, could isolate *Trichophyton mentagrophytes*, *Microsporum gypseum*, *Cephalosporium*, *Alternaria* and *Stemphylium* from clinical cases and could demonstrate the fungal elements in histological section of the nail and nail beds. In his cases 2 were farmers, one of them was harbouring *Trichophyton mentagrophytes*

in his nails and the other gave *Microsporum gypseum* on culture. He also observed that *Alternaria* and *Stemphylium*, beside causing discolouration of the nails (e.g. black nails), they were responsible for swelling and retraction of the posterior nail folds.

It is now apparent that soil is a potential reservoir for dermatophytes and it may act as dangerous source of infection to man especially to his skin and its appendages. This infection may be of occupational nature e.g. farmers, gardeners ... etc., or accidental especially in children.

The authors recommend the examination of further soil samples collected in other parts in Kuwait e.g. from gardens, streets, animal enclosures and farms, at the same time this should be conjoined with examination of man and animals in those areas yielding fungi for any infection especially of the skin and its appendages. This will be done in the outcoming parts of the study.

Acknowledgements

The authors would like to express their thanks to their colleagues, the whole staff of the school medical officers in the school health section of Kuwait for their cooperation in collecting the samples from the yards of the schools.

Thanks are also due to the Microbiology Department, Faculty of Veterinary Medicine, Cairo University in which all the laboratorial work has been done.

Isolated Fungi and their localities

District	No. of Samples with positive cultures	Fungus isolated
Feiha	2	Trichophyton mentagrophytes.
Kadesiya	1	Trichophyton mentagrophytes.
Jahra	2	Trichophyton mentagrophytes.
Omeriya	-	—————
Rahaheel	2	Trichophyton mentagrophytes + Microsporum gypseum + Alternaria + Chrysosporium pannorum.
Khaldiya	1	Trichophyton mentagrophytes + Alternaria.
Odeiliya	1	Chrysosporium pannorum.
Jabriya	1	Trichophyton terrestre.
Hawalli	1	Chrysosporium pannorum + Stemphylium
Al-Dasma	1	Chrysosporium pannorum.
Kifan	2	Trichophyton mentagrophytes + Chrysosporium pannorum.
Al-Rawda	1	Trichophyton terrestre.
Fentas	2	Trichophyton mentagrophytes + Chrysosporium pannorum + Cephalosporium.
Abu-Halifa	3	Trichophyton mentagrophytes + Chrysosporium pannorum + Cephalosporium.
Sabahiya	2	Trichophyton mentagrophytes + Microsporum gypseum.
Total 15	22	

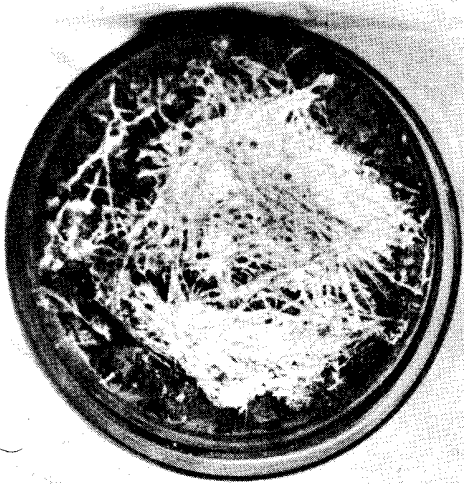


Fig. 1 - A soil sample from Kifan School yard showing growth of *Trichophyton mentagrophytes* on horse hairs.



Fig. 2 - A soil sample from Sabahia School yard showing growth of *Microsporum gypseum* on horse hair.



Fig. 3 - Macroconidia of *Microsporum gypseum* attached to a piece of hair.

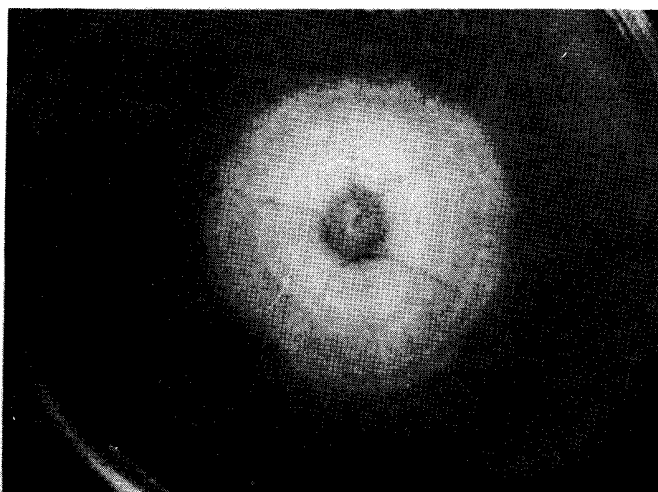


Fig. 4 - A colony of *microsporium gypseum* on Sabouraud and agar plate (subculture).

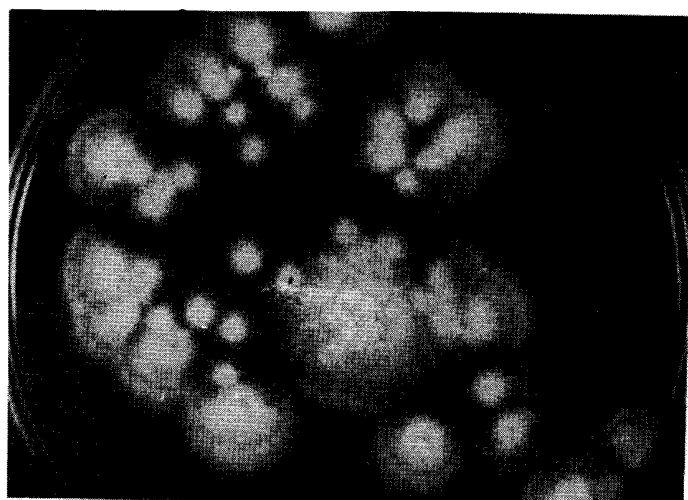


Fig. 5 - Colonies of *Trichophyton mentagrophytes* on Sabouraud agar plate (subculture).

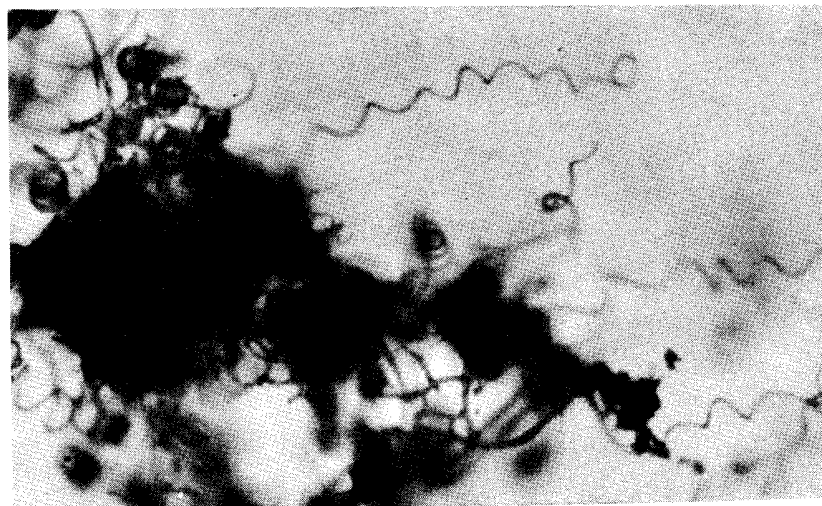


Fig. 6 - *Trichophyton mentagrophytes* showing the characteristic spirals.

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