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## U SPOMEN AKADEMIKA

## JOSIPA JEŽIĆA



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# DERMATOPHYTES AND KERATINOPHILOUS FUNGI ISOLATED FROM THE SOIL IN REGIONS OF ENDEMIC DERMATOPHYTOSES IN BOSNIA*

(Accepted by the Department of Medical Sciences at the Session on June 24. 1980 according to the reviews of Prof. dr J. A. Gaon and Prof. dr A. Nikulin.)

There are few reports from Yougoslavia on the dermatophytes reservoir in the soil (7, 9, 10, 11, 14, 15). One of the reasons could be the observation that anthropophilic dermatophytes causing endemic dermatophytoses, as welll as the zoophilic ones causing enzootics in animals, are so adapted to parasitized organisms that they are no more able to survive in unsterile soil, but are attacked and decomposed by micropopulation of the soil (5, 6, 8, 12, 13).

However, some of the dermatophytes from the transitory group (Ajello, 1953), e. g. T. mentagrophytes, are in some parts of the world very important as the agents of dermatophytoses in men and animals, and some others from the geophilic group are becaming more and more pathogenic *(M. grypseum, M. coockei, T. ajelloi)*, Georg (1956), Georg and al. (1959).

Therefore, it was decided to elucidate the situation of the dermatophytes from the soil in Bosnia and Herzegovina from the standpoint of coexisting endemic dermatophytoses, from the one side, and from the regions with enzootic cattle trichophytosis and latent infections in small rodents from the forest, from the other side. Investigated soil specimens came from house-yards in infected houses with anthropophilic dermatophytes in endemic regions, from cattle-sheds infected with trichophytoses and from the forest where small mammals were abundant and horses were used as working animals.

The *method* used was the hair-baiting method (Vanbreuseghem 1952), using as the baits sterilized horse's hairs. The size of incolutated soil,

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the methods of collecting specimens and the method of »culturing« were for all specimens the same. Usually the specimens were looked upon the dermatophytes within 3 weeks and then discarded if negative. The results do not mention isolated moulds.

A total of 1.347 soil specimens were examined.

## RESULTS AND DISCUSSION

The results are presented in the Table and it can be seen that there exist some differences in respect to the origin of different specimens.

Table

| Specis | Cattle-shed | forest | human habitations | total |
|---|---|---|---|---|
| Chrysosporium sp. | 93 (43,8%) | 137 (44,3%) | 254 (54,4%) | 384 (43,2%) |
| M. gypseum | 67 (31,6%) | 57 (18,4%) | 146 (31,2%) | 270 (30,4%) |
| T. ajelloi | 31 (14,6%) | 54 (17,5%) | 40 ( 8,6%) | 125 (14,1%) |
| T. terrestre | 18 ( 8,5%) | 51 (16,5%) | 20 ( 4,3%) | 89 (10 %) |
| T. mentagrophytes | 2 ( 0,9%) | 1 ( 0,3%) | 1 ( 0,1%) | 4 ( 0,4%) |
| M. coockei | 1 ( 0,5%) | 5 ( 1,6%) | 0 | 6 ( 0,7%) |
| Ct. serratus | 0 | 4 ( 1,3%) | 2 ( 0,4%) | 6 ( 0,7%) |
| T. vanbreuseghemi | 0 | 0 | 2 ( 0,4%) | 2 ( 0,2%) |
| Dicheterospora cal. | 0 | 0 | 2 ( 0,4%) | 2 ( 0,2%) |

It seems evident from the table that *Chrysosporium sp* (Chry. keratinophilum, Chry. tropicum, Chry. tuberculatum) are present in about the same frequency in all habitats. *M. gypseum* was not found with the same frequency: it seems that more enriched soil in the cattle-sheds and in human gardens has offered better conditions for this dermatophyte than soil in the forest. The situation is quite opposite for *T. ajelloi:* the difference between the number of isolations from cattle-sheds and forest's soil is not big, but it exists between those and the soil from human habitations. In the case of *T. terrestre* and *M. coockei* the highest number of isolations came from the forest's soil, presumably rich in some attractive organic constituent. As only Stefanović (1969) investigated the soil in some part of Yougoslavia (Serbia), her results could be compared with ours, but the differences are too great (M. gypseum 57%, Chr. keratinophilum 6,35%, M. fulvum 6,25%, T. ajelloi 3,9%, Arthr. quadrifidum 2,3%, T. evolceani 1,73% to make any real comparison.

*T. mentagrophytes,* isolated in a limited number of specimens from the soil, could hardly be compared with our previous isolates from the mice (Grin-Ožegović, 1960) with the positive 3% of investigated plucked mouse-hairs, but with the results of Janković and al. (1972, 1974) (3,7% of soil isolates). It is obvious and without any doubt, that T. mentagrophytes in our conutry is also connected with the small mammals, and these with the feed around the animals and people. Human habitations in our investigations means rural habitations with the garden all around the house or directly lying on the agricultural field.

As expected, there were not isolated in any soil specimen dermatophytes causing endemic dermatophytoses or cattle trichophytosis, which con-

firms the results of our previous investigations (1957, 1959, 1963) that the soil does not represent an important reservoir neither for endemic dermatophytoses nor for cattle-trichophytosis. In case of human infections the source of the infection should be looked in infected people, in for most cases in an infected family member (presumably mother or grand-mother), and in the case of cattle trichophytosis on the infected cattle, or rare by on infected hairs deposed on wooden parts in cattle-sheds not exposed the the antagonistic micropopulations from the soil.

There is a good correlation between the results of these investigations with our previos ones on the influence of the soil on dermatophytes (1963, 1964) that the soil with its micropopulation of antagonistic microbes acts antagonistically on the anthropophilic and some zoophilic dermatophytes, highly adapted to parasitized life on men and animals. From the conclusions elaborated, then there was proposed an evolutionary trend of development of dermatophytes (1957), according to which the transitory group could include same dermatophytes not highly adapted to parasitic life on men and animals, between them especially T. mentagrophytes. As for T. ajelloi, M. coockei and M. gypseum, it seems that they would become more and more pathogenic, as is already the case with. M. gypseum for animals in the United States (3). Till now, there has appeared no report of isolations of these dermatophytes either from the people or from the animals from our country. T. mentagrophytes (granular type) have some significance as the agent of epidemics in people and in animals in sporadic singular cases (dog, horse), or as epizootic in the rabbit.



## CONCLUSION

Isolated dermatophytes from the soil in Bosnia and Herzegovina do not represent mycoflora of anthropophilic dermatophytes causing endemic dermatophytoses. They are geophilic ones and dermatophytes from transitory group. Of these only T. mentagrophytes has some significance for men and animals.

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## DERMATOFITI I KERATINOFILNE GLJIVE IZOLIRANE IZ ZEMLJE U PODRUČJIMA ENDEMSKIH DERMATOFITIJA U BOSNI

### KRATAK SADRŽAJ

Autori su istraživali dermatofite i keratinofile (metoda dlake-mamca) u 1.347 uzorka zemlje iz Bosne i Hercegovine i tom prilikom uporedili rezul-

tate izoliranja prema porijeklu zemlje-uzorka (dvorišta kuća oboljelih ljudi, staje goveda bolesnih od trihofitije, šumsko zemljište).

Izolati prikazani na tabeli ukazuju na neke razlike u frekvenciji pojedinih izolata s obzirom na porijeklo uzorka. Ni u jednom slučaju nisu utvrđeni dermatofiti koji uzrokuju endemske dermatofitije (T. violaceum, T. tonsurans, T. schoenleini), kao ni uzročnik trihofitije goveda (T. verrucosum). U malom broju uzoraka izoliran je T. mentagrophytes. Geofilni dermatofiti *(M. gypseum, T. ajelloi. M. cockei)* često su izolirani, ali, za sada, nisu od većeg epidemiološkog i epizotiološkog značaja za dermatofitije ljudi i životinja.

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