A comparison between strains of *Sabouraudites langeroni* and *Microsporum audouini* (*)

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In 1950, Vanbreuseghem described a new species of dermatophyte, *Sabouraudites (Microsporum) langeroni* which he isolated from African cases of *Tinea capitis*. While admitting the similarities of this newly described species to *M. audouini*, he found that *S. langeroni* differs in the following respects: a) limited geographical distribution; b) pathogenicity for the guinea pig; c) pathogenicity for the glabrous skin in humans; and d) the macroscopic aspects of the culture.

In this present work, the results of in vitro and in vivo studies comparing strains of *S. langeroni* and *M. audouini* are presented.

Materials and methods.

Source of strains: Strains of *S. langeroni* had been recently isolated from cases of *Tinea capitis* from the former Belgian Congo (Rosenthal S. A. and Vanbreuseghem R., 1962). Strains of *M. audouini* were received from Miss D. Furnari, Skin and Cancer Unit of University Hospital, New York and from Miss N. Djawa, St. John's Hospital, London.

Gross and microscopic morphology: Strains were inoculated onto Sabouraud agar slants (neopeptone, 1 p. cent; glucose, 2 p. cent; agar, 2 p. cent and incubated at 25C. Microscopic and macroscopic examinations were made at weekly intervals for 4 weeks.

Slide cultures were made according to the method of Rivalier and Seydel as described by Langeron and Vanbreuseghem (1952), and stained after incubation at 25C for 1, 2 and 3 weeks.

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Growth on rice grains: The strains were inoculated onto sterile rice grains (Conant N. P. et al., 1952), incubated at 25°C and examined at weekly intervals for 4 weeks.

Inoculation of guinea pigs: Guinea pigs were inoculated with Sabouraud agar cultures of several strains of S. langeroni and M. audouini, using the method of Rivalier (1926) as described by Vanbreuseghem (1958). The animals were observed at weekly intervals for 4 weeks by Wood's light, culture and microscopic examination of hairs, before considered as not infected. Where infection occurred, the animals were followed for longer periods.

Nutritional studies: The details of the method used have been previously published (Rosenthal S. A. and Vanbreuseghem R., in press).

Results.

Macroscopic morphology: S. langeroni (11 strains): after 3 days of incubation the colonies were white and fluffy. On continued incubation they became flat and velvety. In 5 of the 11 strains there developed a deep tan color in the center of the colony while the others were cream colored. A light tan color was formed on the undersurface of all strains. M. audouini (9 strains): indistinguishable from S. langeroni, with 4 of the 9 strains developing the tan, central pigmentation.

Rate of Growth: The rate of growth of the 2 organisms is shown in the table. The data indicate that there is no significant difference in the rate of growth between S. langeroni and M. audouini.

<table>
<thead>
<tr>
<th>Days of incubation</th>
<th>S. langeroni (11 strains)</th>
<th>M. audouini (9 strains)</th>
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Microscopic examination of culture mounts and slide culture:

1. — Fuseaux: Fuseaux were never seen in the 8 strains of M. audouini examined and were seen only rarely with 5 of 11 strains of S. langeroni. In spite of many microscopic examinations, only 1 fuseau was seen with 4 of the strains and 2 fuseaux were seen with a fifth strain of S. langeroni. The fuseaux were of the microsporic type, about 60 × 10 micra in size, with 1-3 septa.

2. — Microconidia: S. langeroni: Microconidia were produced by all strains but never in abundance. They were most numerous
on slide cultures after 3 weeks of incubation. The microconidia were 3-5 micra in length and were pyriform. *M. audouini*: Microconidia were produced by all strains examined and were most numerous on slide cultures after 2 weeks of incubation. They were of the same size and morphology as the microconidia of *S. langeroni*, but were usually not so numerous.

3. — *Spirals and arthrospores*: Not observed with either *S. langeroni* or *M. audouini*.

4. — *Chlamydospores*: *S. langeroni*: seen in all strains, especially after 3-4 weeks of incubation. *M. audouini*: seen in all strains, especially after 3-4 weeks of incubation.

*Growth on rice grains*: Both species (*S. langeroni*, 11 strains; *M. audouini*, 9 strains) were similar in their growth pattern forming slight to moderate growth with a brownisch discoloration of the rice.

*Animal inoculations*: *S. langeroni*: 7 strains were used in attempts to infect guinea pigs. Of the 7 strains, 5 were pathogenic for guinea pigs as evidenced by clinical infection (scaling and crusting), development of fluorescence, positive microscopic examination and positive retroculture. The microscopic examination showed intrapilary filaments, with or without ectothrix arrangement of small spores. The infections started to heal spontaneously during the 7-8th week after exposure. *M. audouini*: Only 1 of 4 strains was pathogenic for guinea pigs. This strain produced only a very slight, transient infection in 1 of 2 inoculated animals, showing a single papule of short duration and minimal scaling during the third week after inoculation. Only 2 fluorescent hairs were seen during the fourth week of infection. These hairs showed intrapilary filaments but no ectothrix spores.

*Nutritional studies*: 9 strains of *S. langeroni* and 10 strains of *M. audouini* were completely autotrophic for vitamins, and all grew well on a medium containing NH₄ NO₃ as the sole nitrogen source.

**Discussion.**

The differences between the strains of *S. langeroni* and *M. audouini* appear to be of a quantitative, rather than a qualitative, nature. The colonies on Sabouraud agar are practically identical, although with *S. langeroni* a deeper brown surface pigmentation may appear earlier in more strains than with *M. audouini*. Fuseaux were rarely seen with our strains of *S. langeroni*, and never with
our strains of *M. audouini*. However, the production of fuseaux by
*M. audouini*, although not very common, has been observed on
several occasions (Hazen E. L., 1957, — Hare P. J., 1952, —
Lowenthal K., 1950). Microconidia were produced by both species,
usually in greater abundance by *S. langeroni* than by *M. audouini.*
No differences could be seen between these 2 groups of organisms
in nutritional studies.

By far the most striking difference between *S. langeroni* and
*M. audouini* is the relative ease with which guinea pigs can be
infected with the African strains, 5 or 7 strains infecting the
animals. *M. audouini*, however, in our hands, showed a poor patho-
genicity for the guinea pigs, only 1 of 4 strains producing a tran-
sient infection. This is in agreement with most published work,
although under some circumstances, infection with *M. audouini*
may occur in animals (Kaplan W. and Georg L. K., 1957).

Published reports of cutaneous lesions due to *M. audouini*,
though uncommon, are not unknown (Bereston E. L. and Robin-
The scarcity of such reports may represent only a lack of medical
interest. An examination of the clinic records at the Skin and
Cancer Unit, University Hospital, New York, for 1957 and 1958
indicate that of 300 cases of *Tinea capitis* due to *M. audouini* there
were skin lesions in 20 (less than 7 p. cent). The higher incidence
of skin lesions by *S. langeroni* reported by Vanbreuseghem (1950)
in Africa and the observations in New York of skin lesions due
to *M. audouini* may perhaps be explained by differences in types
of clothing worn, duration of the scalp lesions, hygienic differences,
etc.

Our results would appear to indicate that *S. langeroni* and
*M. audouini* are very similar in the characteristics studied. Unless
greater differences are found between these 2 organisms may be
with some new technique, *S. langeroni* may be considered as very
near of *M. audouini*. A distinction between the two fungi, although
difficult, may be useful from an epidemiological point of view.

Summary. — *A study of several characteristics of strains of
Sabouraudites langeroni and Microsporum audouini indicated that
these organisms are very similar, the greatest difference being a
greater pathogenicity for the guinea pig in the former.*

Résumé. — *L’étude de plusieurs caractères de souches de S. lan-
geroni et M. audouini a montré que ces organismes sont fort sem-
blables. La différence principale étant un pouvoir pathogène chez
le cobaye plus net pour S. langeroni.*
Samenvatting. — Onderzoek van verschillende eigenschappen van stammen van S. langeroni en M. audouini toonde aan dat deze schimmels zeer gelijkind zijn. Het bijzonderste onderscheid is een meer uitgesproken pathoegen vermogen voor de cavia van S. langeroni.


Resumen. — El estudio de varios caracteres de cepas de S. langeroni y M. audouini a mostrado que estos organismos son muy semejantes. La diferencia principal, radica en el diferente poder patógeno para el cobaya más ostensible para el S. langeroni.

REFERENCES.

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