Case Report

Onychomycosis caused by an isolate conforming to the description of *Trichophyton raubitschekii*

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*Trichophyton raubitschekii* is currently regarded as a synonymous name betokening a variant form of *Trichophyton rubrum*. Nonetheless, isolates conforming to this morphotaxonomic concept have morphological, physiological and clinical features very different from those of typical *T. rubrum*. Isolates are mainly obtained from subjects originating from certain tropical and subtropical countries, and are mainly obtained from upper body skin infections, rarely from onychomycosis. In this paper the authors report the first known Italian case of onychomycosis caused by such an isolate. The patient, a male student from Cameroon, had a typical fingernail tinea unguium, without any other sign of skin or nail infection. ‘*T. raubitschekii*’ was identified on morphological and physiological grounds by the following features: velvety colony surface, brownish pigment, abundant macroconidia and microconidia, and positive urease activity. Such isolates may prove very difficult to identify correctly, especially in areas like Italy where *T. rubrum* is normally seen only as isolates presenting a strongly differing phenotype.

**Keywords** epidemiology, onychomycosis, taxonomy, *Trichophyton raubitschekii*

Introduction

*Trichophyton raubitschekii* was described as a species morphologically and physiologically distinct from the related *T. rubrum* by Kane *et al.* [1] in 1981. It was later shown to have strong statistical differences from typical *T. rubrum* in the spectrum of diseases it caused, in that it was associated strongly with tinea corporis and tinea cruris, only weakly with tinea pedis, and rarely with tinea unguium [2]. *T. rubrum*, by contrast, was mainly obtained from tinea pedis and tinea unguium. Up to now only 47 cases caused by isolates conforming to the description of *T. raubitschekii* have been reported in the literature [2–5] and although a definite worldwide profile of the epidemiological and clinical aspects of such isolates is still lacking, this dermatophyte seems to have a strong connection with patients who have resided in an Asian or African country. Onychomycosis caused by *T. raubitschekii*-like isolates has been reported in only three cases so far. In recent years, molecular studies have suggested that *T. raubitschekii* is genetically too close to *T. rubrum* to be maintained as a separate species; for example, it is identical in nuclear ribosomal internal transcribed spacer (ITS) sequence with *T. rubrum* [6,7]. Nonetheless, as ‘*T. raubitschekii*’ presents a very distinct laboratory identification profile and is connected with differing epidemiological data, there is clearly still value in reporting new clinical information about this phenotype. Indeed, the author who formally synonymized *T. raubitschekii* with *T. rubrum* after molecular study, has already done so in connection with a German case [5].

In the present paper, a case of thumbnail infection caused by an isolate conforming with *T. raubitschekii* is presented and the differential morphological and cultural aspects of this dermatophyte phenotype are briefly summarized.
Case report and mycology

A 22-year-old black male student from Cameroon presented to the outpatient service of Terni Dermatological Clinic, Terni, Italy, with a 2-year history of thumbnail alteration. The patient had attended the Perugia University School of Medicine for 4 years, but paid regular visits to Cameroon, where he served as a volunteer social worker in a hospital.

The right thumbnail was destroyed in its distal portion and the remaining nail plate had an irregularly cracked margin. The denuded nail bed showed mild erythema and fine scaling. A complete examination failed to reveal additional infected finger- or toenails or any other sign of disease affecting the skin or hair.

Microscopic examination of scales from the nail bed and nail plate clarified with 40% KOH revealed fungal hyphae. Culture test performed on Sabouraud dextrose agar with and without chloramphenicol and cycloheximide showed multiple velvety pinkish colonies.

Mycological evaluation of the isolate

After 10 days on Sabouraud dextrose agar at 25°C the isolate produced velvety to finely granular colonies with a diameter of about 20 mm. The upper surface of the colonies showed a central low, button-shaped, folded elevation and a faint pinkish colour (Fig. 1); the reverse was blood-red to brown (Fig. 2). Microscopically, the isolate was characterized by abundant cigar- to pencil-shaped macroconidia and club-like to pyriform microconidia (Fig. 3); rounded inflated cells were occasionally seen. Scanning electron microscope examination of the colonies clearly showed masses of cylindrical macroconidia as well as pedicellate microconidia produced along the hyphae (Fig. 4). Bromcresol purple, milk-solids yeast-extract agar showed restricted colonial growth without colour change of the indicator within 14 days. The urease test on Christensen urea broth was strongly positive after 5 days. Hair perforation was negative. These macroscopic and microscopic aspects of the isolate and its cultural behaviour allowed the identification of *T. raubitschekii*. R. Summerbell (of the Centraalbureau voor Schimmelcultures, Utrecht, The Netherlands) confirmed the identification and the culture was deposited as CBS 102856.

The patient was prescribed oral terbinafine 250 mg/day and ciclopiroxolamine nail lacquer for 8 weeks. A complete recovery was obtained in 3 months and no relapse was observed at follow-up after 6 and 12 months.
Discussion

The epidemiology and the clinical manifestations of dermatophyte infections in Europe have clearly changed over the last decade. After a relatively stable period of approximately 30 years, in which scalp infections caused by *Microsporum canis* and foot and nail infections by *T. rubrum* were the most frequent dermatophyoses, there are now numerous reports of infections caused by unusual or exotic species [8–10]. A large survey of tinea capitis conducted among 19 European countries [9] has shown a clear increase in cases caused by anthropophilic fungi such as *T. violaceum*, *T. soudanense*, *T. tonsurans* and *M. audouinii*, in particular among urban populations and in immigrants from Africa and the Caribbean. Now, an apparently more rare dermatophyte type is being introduced (i.e., isolates phenotypically corresponding to *T. raubitschekii*). The first case reported in Europe was recently reported from Germany [5]; the case presented in the present paper is the first report of nail mycosis caused by *T. raubitschekii* in Italy.

Of the 47 *T. raubitschekii* cases reported in the literature, 32 involved immigrants from or residents of subtropical and tropical areas such as China, Vietnam, central Africa, and Brazil. The most common clinical manifestation associated with this phenotype was tinea corporis, seen in 25 of the recorded cases. Similar clinical and epidemiological observations have emerged from the recently summarized Vietnam war-era experiences of Taplin [11], who found that ringworm in Vietnamese adults was nearly always caused by *T. raubitschekii*-like isolates producing a chronic, scaly, dry rash generally confined to the waist. A case of extensive tinea corporis in a Vietnamese immigrant is described in detail by Kane *et al.* [2]. In the laboratory, the most readily recognizable phenotypic characteristics distinctive of the *T. raubitschekii* phenotype are its velvety to granular surface, blood-red to brownish pigmentation of colonies, abundant formation of macroconidia, and positive urease test.

Until now *‘T. raubitschekii’* has been considered a rare dermatophyte variant, but some considerations suggest that this phenotype may have been underrecognized. First, the colonies may show a superficial resemblance to more common species such as *T. rubrum* and *T. mentagrophytes* or even to *T. violaceum* [12]. Also, some microbiological laboratories identify dermatophyte isolates on the basis of macro- and microscopic aspects of the colonies without performing specific test reactions such as the urease test. These practices, coupled with poor knowledge of the *T. raubitschekii* phenotype, can easily lead to misidentification. A better awareness of this phenotype can probably increase its correct recognition, adding epidemiological data of great importance to the understanding of the clinical relevance and geographic distribution of this form. It should be noted that an identification of such an isolate as *T. rubrum* is by no means wrong, but rather is deficient in failing to convey clinical and laboratory information that may be useful or epidemiologically interesting. The name *T. raubitschekii* cannot currently be used as a recognized species name, but correct laboratory reports can be issued making information about this phenotype accessible and allowing report recipients to do comprehensive Medline searching (e.g., by using wording such as ‘*T. rubrum*, Afro-asiatic variant previously known as *Trichophyton raubitschekii*’).

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References