

Characteristics of an imperfect fungus, *Microsporium nigricans* Yeeh sp. nov.

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불완전 진균 *Microsporium nigricans* Yeeh sp. nov. 의 특성

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An imperfect fungus recognized as a dermatophyte was isolated from soil samples and the macroscopic, microscopic and physiological characteristics were examined. From the comparisons of this isolate with the known species, the strain belonged to the genus *Microsporium*. She showed many different characteristics from the related species, including colony color and shape, or number in a cell of macrocondium. This isolate was considered to be a novel species in the genus *Microsporium*. Therefore the name was given to her as *Microsporium nigricans* Yeeh sp. nov. because of dark blackish color from the macroscopic observation.

The dermatophytes are keratinolytic fungi. It was known that these fungi invade and digest keratin in the skin, hair and nails. The symptoms occurring due to the infection of these fungi may range from manimal to severe. Among dermatophytes, approximately two dozen species of *Trichophyton* were recognized. And within the genus *Epidermophyton*, two species have been known such as *Epidermophyton floccosum* and *Epidermophyton stockdaleae*.

Of the more than dozen *Microsporium* species, the natural habitat of *Microsporium gypseum* was described as soil. But in the cases of *Microsporium audouinii* and *Microsporium canis*, the habitats were reported as human parasite, and parasite of cats and dogs, respectively. These two *Microsporium* species are fungi causing tinea capitis, or tinea corporis. Especially in *Microsporium* infections, it was well known that the presence of conidia outside the hair shaft was characteristic. Under

these backgrounds, the author isolated new *Microsporium* species different from the previously studied strains from soil samples, and now reports here some results experimented and observed for the identification of this strain.

MATERIALS AND METHODS

Isolation of fungi

Soil samples collected were added to the test tubes containing the physiological saline and streaked on Medium A as shown in Table I. The streaked dishes were incubated at 30°C and examined every 4 to 6 days. The isolated colony was transferred to Medium B for stock culture. When growth of the purified colony appeared on agar medium, the colony morphology was observed including colony texture and the production of pigments. And microscopic morphology was also observed including the diameter of hyphae and

Table 1. Composition of media for cultivation (pH 6.4)

Medium for isolation (Medium A)	
Dextrose	0.5 %
Peptone	0.1 %
K ₂ HPO ₄	0.05%
Agar	1.5 %
Medium for stock culture (Medium B)	
Dextrose	1.0 %
Malt extract	0.5 %
Peptone	0.1 %
K ₂ HPO ₄	0.05%
Agar	1.5 %

Table 2. Morphological characteristics of *Microsporium nigricans* Yeeh sp. nov.

Factor	Characteristic
Mycelium	With septum within hypae, mycelium is dark blackish gray color on malt agar
Hypae	diameter Ca. 5–10 μ m
	tuft Cotton wool-like
Conidiophore	Generally unbranched
	length Ca. 90–225 μ m
	diameter Ca. 50 μ m (base and middle)
Macroconidium	shape Some cucumber-shaped
	size Ca. 11.2–18.5 \times 17.8–42.5 μ m
	number Ca. 3–10 (on conidiophore)
Clamidoconidium	shape Some spherical grape-like
	size Ca. 15–35 μ m
Reproduction	May occur by germination of mycelial fragment, or by germination of macroconidium supported by conidiophore, a specialized hypae.

shape of macroconidia. In addition, works for the other cultural and biochemical properties were exerted.

Identification of fungi

For the identification of this fungus isolated,

Table 3. Cultural characteristics of *Microsporium nigricans* Yeeh sp. nov.

Medium	Characteristic
Koji extract agar	Good growth; colony dark blackish brown; formalin-odour
Malt extract agar	Good growth; colony dark blackish gray
Glucose-yeast extract-peptone agar	Good growth; colony dark blackish gray

Table 4. Physiological characteristics of *Microsporium nigricans* Yeeh sp. nov.

Test	Result
Growth on nutrient agar	Positive
Growth on MacConkey agar	Weakly positive
Voges-Proskauer test	Negative
Growth on Kligler's iron agar	Positive
Production of H ₂ S	Negative
Utilization of carbohydrate	Positive
Production of CO ₂ or H ₂	Negative
Litmus milk	Negative with reduction to a white leuco base
Liquefaction of gelatin (25°C)	Positive
Growth on citrate agar	Negative
Catalase	Positive
Oxidase	Negative
Decarboxylase	Positive
Phenylalanine deaminase	Negative
Urease	Negative
Oxygen requirement	Aerobic

the results of this strain were compared to those of reporters (Aly, 1978; Haley *et al.*, 1980; Rebell and Taplin, 1974; Udakawa *et al.*, 1977).

RESULTS AND DISCUSSION

Taxonomical characteristics of new species

The detailed taxonomical characteristics of this species were shown in Table 2, Table 3 and Table 4. Although some of morphological properties of this strain seemed to be slightly similar to those of *Microsporium gypseum* (Bodin) Guiart and Grigorakis, or *Microsporium nanum* Fuentes, but

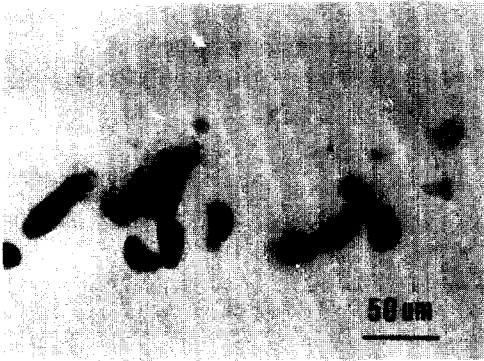


Fig. 1. Non-sexual reproduction of *Microsporium nigricans* Yeeh sp. nov. by germination of macroconidium.

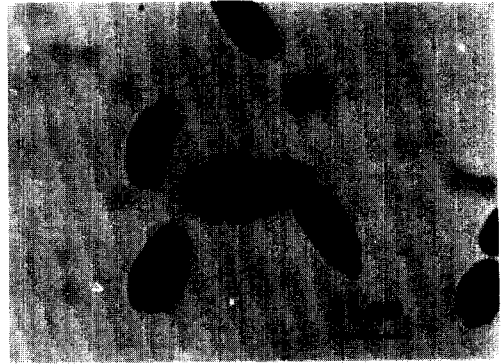


Fig. 4. Macroconidia separated from conidiophore of *Microsporium nigricans* Yeeh sp. nov. with septate shape.

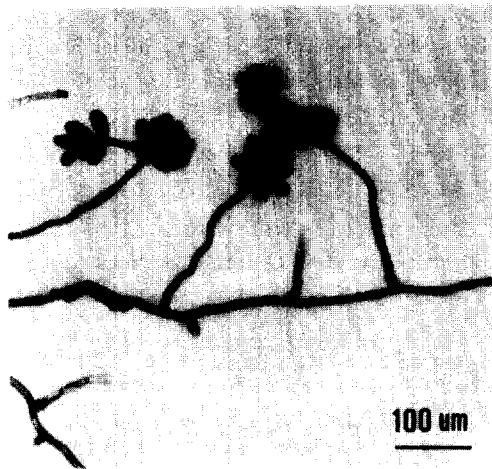


Fig. 2. Macroconidia of *Microsporium nigricans* Yeeh sp. nov. supported by conidiophore with septate mycelium for non-sexual reproduction.



Fig. 5. Vegetative mycelium of *Microsporium nigricans* Yeeh sp. nov.

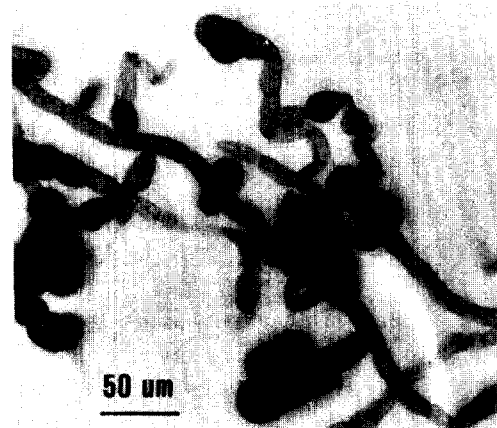


Fig. 3. The chains of clamyoconidium of *Microsporium nigricans* Yeeh sp. nov. formed by transformation of vegetative cells.



Fig. 6. The typical conidiophore of conidiogenous cells in *Microsporium nigricans* Yeeh sp. nov.

some significant differences were found in the macroscopic, microscopic and physiological characteristics. As the results of identification, this strain was regarded as a new species of the genus *Microsporium* and the author now proposes to name her *Microsporium nigricans* because she showed dark blackish color from the macroscopic observation (Fig. 1,2,3,4,5, and 6).

Description of *Microsporium nigricans* Yeeh sp. nov.

Growth on malt extract agar: Colony showing dark blackish gray color in surface appearance.

Growth on glucose-yeast extract-peptone agar:

Dark blackish gray colony in color.

Hypae: Cotton wool-like tuft with septum, ca. 5-10 um in diameter.

Reproduction: By germination of mycelial fragment, or by germination of macroconidium.

Growth on nutrient agar: Positive.

Growth on Mac Conkey agar: Weakly positive.

Liquefaction of gelatin at 25°C: Positive.

Growth on citrate agar: Negative.

Urease activity: Negative.

Nutritional requirements: Negative.

Type: *Microsporium nigricans* Yeeh sp. nov. was isolated in 1982 from soil in Pusan, Korea.

적 요

토양으로부터 dermatophyte로 인정되는 불완전 곰팡이를 분리한 후 그 형태학적 및 생리학적 특성등을 검토하여 이미 알려진 종과 비교한 결과 분리주는 *Microsporium* 속에 속하였으나 colony의 색깔, macroconidium의 형태 또는 세포수 등과 관련하여 관련종인 *Microsporium gypseum* 및 *Microsporium nanum*과 비교해서 육안적·현미경적인 다른 특징을 나타내었다. 이 분리주는 *Microsporium* 속의 아직 보고된 바 없는 새로운 종으로 사료되었으며 육안적으로 진한 흑색을 나타내었으므로 *Microsporium nigricans* Yeeh sp. nov.로 이름붙였다.

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