



Mycologic Forum

Diversity and adaptation within the genus *Malassezia*: Bats already have their species[☆]



Diversidad y adaptación en el género *Malassezia*: los murciélagos ya tienen su especie

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The genus *Malassezia* is constituted by a monophyletic group of lipophilic basidiomycetous yeasts whose main habitat is the skin of human beings and many other animals.¹ The genus was created by Baillon in 1889, and comprised only two species for almost a century: the lipid-dependent species *Malassezia furfur*, typical of human skin, and the non-lipodependent species *Malassezia pachydermatis*, usually associated with animals. Currently, the genus includes 18 species, 17 of which are lipid-dependent.

In the speciation of some of these yeasts a process of adaptation to different animal species is clearly detected. For example, *Malassezia equina* is mainly isolated from horses and *Malassezia nana* from cats. It should be noted that most species of this genus have been isolated from mammals and only a few of them have been isolated from birds. Concerning the presence of these yeasts, and compared to mammals, far fewer studies have been carried out on birds. It is not surprising, anyway, that two of the last species described, *Malassezia brasiliensis* and *Malassezia psittaci*, have been isolated from birds, specifically from pet parrots in Brazil.² On the other hand, the vast majority of the species in this genus can grow at 37 °C, and very few do so at 40 °C. *Malassezia cuniculi*, a species that rabbits have on their skin, grows better at 37 °C and 40 °C than at 32 °C, the latter being the optimal temperature for the maintenance of *Malassezia* yeasts. This higher temperature may be explained by the fact that the normal body temperature of rabbits varies between 38.5 °C and 40 °C. On the contrary, low temperatures are not good



Fig. 1. *Malassezia vespertilionis* has the ability to grow at temperatures below 10 °C, similar to those found in caves where bats hibernate. Photo courtesy of Tim Krynak©.

for *Malassezia* yeasts since they lose viability, the reason why it is not recommended to maintain them at room temperature or at 4 °C.

An exception to this behavior has been found in the last species described in this genus that has been isolated from bats: *Malassezia vespertilionis*.³ Most bat species from which this yeast was isolated can hibernate up to 7 months a year (Fig. 1). In this state, the animals lower their basal temperature close to the 7–9 °C existing in the caves or any other habitat where they hibernate. For this reason, we are not surprised that this new species can grow slowly at 7 °C. In fact, its optimal growth temperature is 24 °C, lower than that of other *Malassezia* species. However, they can also grow at 40 °C, which is the body temperature that bats can reach when they are active.

Although we already know that *Malassezia* species are an important part of the mycobiome of some animals, including humans, their presence is unknown in most animal species. This suggests

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that the number of species in this genus could soon be easily expanded if mainly wild fauna is studied.

Conflict of interest

Author has no conflict of interest.

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