



Case report of a new pathogenic variant of *Aspergillus fumigatus* isolated from *Hipposideros cervinus* (Chiroptera: Hipposideridae) in Sarawak, Malaysia

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Zoospore fungi are currently receiving a lot of attention with regards to emerging infectious and wildlife diseases. Fungal infection has been reported in humans and domestic animals worldwide, mostly studied in clinical isolates (Alekseev 2003; Zdenek 2004). There are fewer reports concerning wildlife diseases, especially among insectivorous and frugivorous bats in Sarawak, in Malaysian Borneo.

Recently, Seelan et al. (2008) found six species of *Aspergillus* isolated from 13 individuals of both insectivorous and frugivorous bats. Out of 23 individual bats observed, 13 (56.5%) were identified as hosts for 17 fungus isolates, including *A. restrictus*, *A. fumigatus*, *A. clavatus*, *A. japonicus*, *A. niger* and *A. sydowii*. On physical examination of one insectivorous bat *Hipposideros cervinus* (Fawn Round Leaf Bat), it was noted that the bat had lesions near the ear openings, with a powdery surface on the skin parts. Scraping and swab samples from the lesion

were taken for further investigation and characterization. The swab from the infected area was cultured on Sabaroud's agar and incubated at 37°C. It was confirmed that the infection was due to *Aspergillus fumigatus*. The isolate (UNIMAS F009) is a thermophilic fungus with biochemical and morphological characteristics that differ from those reported by Raper & Fennell (1965, 1977), and Klich (2002). *A. fumigatus* (pathogenic and thermophilic) was the first record isolated from the chiropterans in Sarawak, Malaysian Borneo. Furthermore, this isolate was found to be a new variant of *A. fumigatus* because it could thrive from 25°C to 65°C, with an optimum temperature at 37°C, producing a pink soluble pigment under Czapek's media only. The macro and micro morphology of this isolate are described as Klich (2002).

Macromorphology: Colony diameter on Czapek's Yeast Extract agar (CYA) attaining about 30-55mm (7 days at 25°C); colony growth very slow; conidia on this media were greenish; mycelium white; exudates absent; reverse uncolored; soluble pigment absent; texture floccose; sparse sporulation. On malt extract agar (MEA), colony growth was about 50-60mm (7 days at 25°C); conidial color was grey green; reverse pink; texture as on CYA25. On Czapek's agar, the colony color was green with white mycelia growing in patches; colony sectors were dividing into three more variants from this isolate. A soluble pink pigment was present when the Cz plate was kept at 37°C. Colony growth on CYA37 was exceptionally rapid, sporulation was sparse; conidia color grayish-green. This isolate cannot grow at 5°C, and is able to grow up to 65°C.

Micromorphology: Conidial heads columnar; conidiophores uncolored, smooth-walled 350-600 x 6-10µm, pyriform to spatulate vesicles. Vesicles 10-25µm in diameter; uniseriate; phialides 5-7 x 2-3µm, all phialides parallel to each other and the conidiophore axis. Conidia globose to broadly ellipsoidal, smooth to finely roughened, 4-6µm in diameter (Figure 1).

Interspecific association

There are three color morphs of *H. cervinus*, i.e. dark grey, yellowish-brown and bright orange (Payne et al. 1985), which might relate to differences in the niches that various individuals occupy (M.T. Abdullah pers. comm.). The host is well distributed in Sarawak, roosts in caves in large colonies and feeds in the forest understorey (Hall et al. 2004; Payne et al. 1985). With the cave temperatures of about 25°C, dense cover and ambient forest temperature of about 27°C and humidity of >85%, the tropical rain forest in Sarawak provides a conducive environment for the growth of pathogenic fungi on wildlife. These conditions, combined with their roosting in large colonies in damp caves has resulted in bats becoming a favorable reservoir for different types of pathogenic mycoflora. Further work should be done to discover other potentially zoonotic mycoflora in wild mammals in Sarawak, Borneo.

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Image 1. (a) Colony growth of *A. fumigatus* (UNIMAS F009) on Czapek's after seven days at 37°C; (b) reverse plate; (c) uniseriate conidial head with thick conidiophore.

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