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CHAPTER-18

OIE-Listed Diseases of Amphibians in 2021

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1. Infection with *Batrachochytrium dendrobatidis*:

Infection with *Batrachochytrium dendrobatidis* also known as Chytridiomycosis, is considered a major emerging infectious disease associated with worldwide amphibian population declines. *Batrachochytrium dendrobatidis* is a chytrid fungus with a broad host

range known to infect the skin of over three hundred different frog and salamander species to date (www.spatial-epidemiology.net/bd-maps). Chytridiomycosis causes death in susceptible amphibian species by disrupting normal skin function and mycotoxin production (Pressier, 2014). Unlike other vertebrates, amphibians' skin has important physiologic functions, including water absorption, osmoregulation, and respiration (in some species). *Batrachochytrium dendrobatidis* causes death to amphibians by disrupting electrolyte transport across the epidermis, which is critical for maintaining body homeostasis (Boddy, 2016).

Aetiology:

Batrachochytrium dendrobatidis is an aquatic fungus in the phylum Chytridiomycota. The spherical sporangia occur within superficial cells of amphibians' keratinised epidermis (Longcore *et al.*, 1999). The transmissible aquatic flagellated zoospore stage is released via discharge tubes into the environment and lives for about a day before encysting. The life cycle takes about 4-5 days at 23°C.

Clinical signs:

Hyperkeratosis and epidermal hyperplasia is the primary lesion in postmetamorphic amphibians. *Batrachochytrium dendrobatidis* thalli (fungal bodies discharged zoospores) are observed in skin cell (keratinocyte) cytoplasm and are most profuse in the keratinized

layers. In cases with secondary infection with bacterial, fungal or water moulds, epidermal changes like necrosis and ulceration are sometimes observed because of empty *Batrachochytrium dendrobatidis* thalli. The motile flagellate zoospores of *Batrachochytrium dendrobatidis* can penetrate the amphibian skin and form sporangia. The naked eye may not see colonisation, but sometimes skin lesions may appear, resulting in epidermal hyperplasia, hyperkeratosis and skin shedding.

Susceptible species:

Chytridiomycosis is the most significant disease that has caused the decline and extinction of several hundred amphibian species globally. The impact of *Batrachochytrium dendrobatidis* infection is not limited to wild amphibian populations, and the disease outbreaks are also observed in zoo, aquarium and laboratory amphibian collections. Chytrid *Batrachochytrium dendrobatidis* was reported in 1987 when the golden frog (*Atelopus zeteki*) was destroyed entirely in Costa Rica. First appeared in Australia in the 1970s and is now widespread (Murray *et al.*, 2010) around the world. This amphibian disease caused a severe decline of over 200 species and the extinction of many species. In Australia, it has caused the extinction of at least four species from Queensland: *Rheobatrachus silus* (Southern Gastric-brooding Frog, last seen 1981), *Taudactylus diurnus* (Southern Day Frog, 1979) *Rheobatrachus vitellinus* (Northern Gastric-brooding