

Death in the clouds: ranavirus associated mortality in assemblage of cloud forest amphibians in Nicaragua

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Abstract. Amphibian diseases are acknowledged as significant contributors to the decline and extinction of amphibian species. The main culprits currently considered are chytridiomycosis and Ranavirus. In Central America, highly endemic and geographical restricted terrestrial species may be at risk from these diseases. We collected 49 *Agalychnis callidryas* larvae, one *Lithobates ferrei* and five unidentified larvae on the Nicaraguan Island Ometepe, all deceased, and skin samples were taken. The presence of Ranavirus was determined using PCR. Ranavirus was found involved in 41 of 55 tadpoles. Forty-one *Agalychnis callidryas*, one *Lithobates ferrei* and another five unidentified anuran tadpoles.

Keywords. Anurans, mortality, Ranavirus, Nicaragua, Ometepe

Amphibians are declining in all continents where they occur due to several causes like habitat destruction, habitat degradation, pollutants, climate change and diseases (Stuart et al., 2008).

Besides chytridiomycosis caused by the fungal agents *Batrachochytrium dendrobatidis* (Voyles et al., 2009) and *R. salamandrivorus* (Martel et al., 2013), Ranaviruses globally contribute to amphibian declines (Müller et al., 2011; Robert and Chinchao, 2012; Brenes, 2013). Ranaviruses belong to the family Iridoviridae and have been recorded from Asia, Central-, South- and North America and Europe (Whitfield et al., 2007; Xu et al., 2010). Although all amphibian life stages can be affected, larvae appear to be most susceptible to the disease and mortality rates are often high (Green et al., 2002; Greer et al., 2005; Kirk et al., 2011; Miller et al., 2011).

Central America is one of the regions considered most struck by disease-driven amphibian declines, notably chytridiomycosis affecting mostly endemic high-ele-

vation species with a restricted range (Duellman, 1999; Savage, 2002; Lips et al., 2008). The volcanic islands in Lake Nicaragua contain complex high-elevation amphibian assemblages in a region where Ranavirus has not been recorded before. In this study we found ranavirus to be involved in a mortality event comprising several anuran species in the crater lake of volcano Maderas on Ometepe Island.

Ometepe (11°30'N, 85°35'W) is situated in Lake Nicaragua (8,264 km²) and is comprised out of two volcanoes (McKaye, 1995; Nimitz, 2008). Our survey was conducted on the Maderas volcano, the smallest one, with cloud forests on its upper slopes.

This survey was carried out in October 2011, coinciding with the rainy period. Surveys had a strong focus on locating and sampling anurans and their breeding waters. Since breeding animals and vocalizing males were found to be most active during the hours between sunset and midnight, surveys were carried out between these.

Death In The Clouds Ranavirus Associated Mortality In

RD Boyd



Death In The Clouds Ranavirus Associated Mortality In:

This book delves into Death In The Clouds Rانavirus Associated Mortality In. Death In The Clouds Rانavirus Associated Mortality In is a crucial topic that needs to be grasped by everyone, ranging from students and scholars to the general public. The book will furnish comprehensive and in-depth insights into Death In The Clouds Rانavirus Associated Mortality In, encompassing both the fundamentals and more intricate discussions.

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