Survival of *Neozygites* cf. *floridana* (Zygomycetes: Entomophthorales) in mummified cassava green mites and the viability of its primary conidia

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ABSTRACT

The survival of *Neozygites* cf. *floridana* (Weiser and Muma) as dry hyphal bodies in mummified cassava green mites, *Mononychellus tanajoa* (Bondar), at 5.0% RH in the dark was affected by storage temperature. Survival of the fungus in mummies kept at 24 ± 1.0°C could be demonstrated for 6–7 months. When stored at 4°C, the fungus sporulated from 90% of the mummies liberating an average of 186.9 primary conidia per mummy even after a storage period of 16 months, when the experiment was terminated. The temperature, humidity and light condition significantly affected the viability of primary conidia. The percent viability across all factors dropped from 98.4% after 0 h (beginning of the experiment) to 23.4% after a 1 h exposure to the conditions tested. Lower temperatures maintained higher viabilities with 86.3% of the conidia surviving after 18 h at 18°C, whereas almost all conidia died after 12 h at 33°C. Conidia survived less than 1 h when exposed to SDs (saturation deficit) of 2.0 mm Hg or higher at any tested temperature.

Key words: *Neozygites* cf. *floridana*, *Mononychellus tanajoa*, mummy, survival, primary conidia, germination, viability, temperature, humidity, saturation deficit, light condition.

INTRODUCTION

The transmission of a fungal pathogen to healthy hosts is one of the most critical processes in the life cycle of the pathogen. The rate of transmission, which is important in the initiation and duration of epizootics, is determined mainly by three factors: the host population, the pathogen population and the environment (Benz, 1987; Tanada and Watanabe, 1987).
Entomopathogenic fungi generally pass the period before epizootics either at low prevalence (enzootic) levels in the living hosts in the stage of hyphal bodies or as resting spores in dead hosts. The latter strategy aids the fungus in surviving through unfavourable seasons (Sawyer, 1931; Kenneth et al., 1972; Wilding, 1973; Nemoto and Aoki, 1975; Carner, 1976). Some fungi form conidia in young immature stages of their hosts and resting spores in older ones, which may be an attempt to increase survival (Wilding and Lauckner, 1974; Newman and Carner, 1975; Shimazu, 1979; Shimazu and Soper, 1986). Under favourable conditions, in particular a high relative humidity, hyphal bodies or resting spores may liberate primary conidia into the surrounding environment. Some time may invariably elapse before these conidia germinate. Primary conidia that do not germinate soon after being produced may have their viabilities reduced by the prevailing environmental conditions. Clerk and Madelin (1965) reported that the conidia of *Beauveria bassiana* (Balsomo) Vuillemin, *Paecilomyces farinosus* (Holm) Brown and Smith and *Metarhizium anisopliae* (Metchnikoff) Sorokin remained viable for longer periods when maintained at low temperatures, low relative humidities and in the dark. How environmental conditions affect the survival of *Neozygites cf. floridana* as hyphal bodies in mummified *Mononychellus tanajoa* and as primary conidia in the open environment is the subject of this study.

**MATERIALS AND METHODS**

Mummified adult female cassava green mites, *M. tanajoa* killed by *N. floridana* were collected in March 1992 during an epizootic in a cassava field in Piritiba, State of Bahia in north-eastern Brazil. The mummies were brushed onto a piece of dry cotton wool maintained a few centimetres from another piece of cotton wool partly soaked in 95% glycerol in plastic tubes (3 cm diameter × 5 cm high) with tightly fitting lids. The mummies were thus stored in a refrigerator (4°C) in the dark at approximately 5.0% relative humidity (RH).

**Survival of *N. floridana***

To test the effect of storage temperature on the survival of the fungus in these mummies, one tube was placed in a refrigerator maintained at 4°C and another placed on a bench at ambient room conditions of 24 ± 1.0°C. At 1 month intervals, ten mummies were retrieved from each tube and placed separately on microscope slides which were maintained at 23°C in the dark for 24 h on a water-soaked foam pad placed on the bottom of a