**American Association of Zoo Veterinarians Infectious Disease Committee Manual 2013**

**FORMERLY IDENTIFIED AS and UNDER RE-CLASSIFICATION**

**CANV (Chrysosporium anamorph of Nannizziopsis vriesii)**

<table>
<thead>
<tr>
<th>Animal Group(s) Affected</th>
<th>Transmission</th>
<th>Clinical Signs</th>
<th>Severity</th>
<th>Treatment</th>
<th>Prevention and Control</th>
<th>Zoonotic</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reptiles</td>
<td>-Direct</td>
<td>Variable dermatitis; cellulitis may be present</td>
<td>Mild to severe but high mortality is possible</td>
<td>Itaconazole; voriconazole</td>
<td>Proper disinfection of housing areas; avoid contaminated fomites; prevent contact with infected animals</td>
<td>No direct transmission from animals reported but humans can be infected.</td>
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<td>-Indirect (via fomites)</td>
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**Fact Sheet compiled by:** E. Marie Rush  
**Sheet completed on:** 4 December 2010; updated 25 March 2013  
**Fact Sheet Reviewed by:** Byron de la Navarre, Jean Paré; Jenifer Chatfield; Joerg Mayer

**Susceptible animal groups:** Reptiles

**Causative organism:** Formerly, this grouping was *Chrysosporium* anamorph of *Nannizziopsis vriesii* (CANV) fungus. However, recent taxonomic publications have identified new epidemiological information about these fungi grouped under the CANV appellation. While *Nannizziopsis vriesii* does produce a *Chrysosporium* anamorph in culture, all CANV-like isolates differ so that an overarching CANV appellation needs be discouraged.

For example, the “CANV” isolates that caused fatal disease in tentacled snakes have been reclassified as two species of *Paranannizziopsis*, which has not been isolated from other reptile species. *Ophidiomyces* is a potent pathogen of snakes, but it has not been recovered from ill lizards or crocodiles so may not be a threat to these taxa.

**Zoonotic potential:** While it is not directly transmitted from animals to humans, infection has been reported in two human cases with pre-existing immunosuppression.

**Distribution:** Worldwide

**Incubation period:** 2-5 weeks

**Clinical signs:** Infection (also called “Yellow Fungus Disease”) is often through a breach in the skin and exacerbated by suboptimal husbandry. Slow progression occurs from dry, hyperkeratotic plaques or vesicles to exudative lesions with excessive crusting that may later darken and slough. Skin may have fissures or thickened areas and upon pressure or incision into these areas, exudate may be expelled. Cellulitis can present concurrently. In advanced disease, general debilitation of the animal may be noted as progression into deeper tissues – including muscle and bone – occurs. Hemogram and chemistry panels may be normal during this infection.

**Post mortem, gross, or histologic findings:** Initial hyphae proliferate in the epidermis (epidermal stratum corneum) with subsequently deeper invasion. Progression to liquefactive necrosis of the epidermis with or without granulomatous inflammation of the dermis over time is noted. Terminal chains of arthroconidia may be seen on hyphae. PAS stained sections of tissues will reveal hyphae in the keratin layer, epidermis, dermis and occasionally skeletal muscle layers (depending on severity of disease). Intralesional hyphae associate with a granulomatous myocarditis has also been reported.

**Diagnosis:** Clinical signs are suggestive. Fungal culture of the organism on Mycosel™ Agar with
incubation at 25-28°C, histopathology can be completed or fungus identified by PCR. PAS stained sections of tissues will reveal hyphae in the keratin layer, epidermis, dermis and occasionally skeletal muscle layers depending on severity of disease.

**Material required for laboratory analysis:** Frozen and formalin-fixed representative tissue samples from multiple organ systems (including skin, muscle, and bone) of necropsy specimens. Biopsies from live animals should be divided and submitted chilled for culture and fixed for histopathology.

**Relevant diagnostic laboratories:** Most diagnostic laboratories are capable of culturing of this organism. Pre-emptive contact with microbiologist prior to sample submission greatly increases the chance of diagnosis.

**Treatment:** Itraconazole and voriconazole can be used systemically. Terbinafine (10mg/kg PO SID x 7 days; pulse repeat Q3wk until one week past resolution of signs) pulsed with itraconazole or voriconazole.

Although topical disinfection of skin lesions with chlorhexidine solution may be helpful, alone it is not likely to be successful so combined approach is needed. Cutaneous lesions can be debrided aggressively along with topical antifungal and antibacterial dressings. Mycetomas should be considered for surgical excision in addition to systemic treatment. Prognosis for deeper structure involvement (e.g., bone) is guarded to poor.

**Prevention and control:** Optimization of husbandry conditions is critical for most reptiles to prevent disease. Housing areas should be thoroughly disinfected between individuals and any porous material from the enclosures should be discarded if unable to be sterilized or properly disinfected (i.e. substrate, drift wood furniture, etc). Proper quarantine measures for new animals should be followed. Separation of infected animals from healthy animals should be done until infection is completely cleared, based on biopsies and culture. Overall poor prognosis, general difficulty in clearing of infection, prolonged treatment period necessary for clearing of infection.

**Suggested disinfectant for housing facilities:** Chlorhexidine, bleach

**Notification:** None required

**Measures required under the Animal Disease Surveillance Plan:** None required

**Measures required for introducing animals to infected animal:** It is not recommended to introduce non-infected animals to infected animals until confirmation that infection is completely cleared based on culture of biopsy of the originally affected areas.

**Conditions for restoring disease-free status after an outbreak:** It must be assured no residual carrier animals in remaining group of animals.

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**References:**