Biology and Medicine of the Bearded Dragon
(Pogona vitticeps)

Mark A. Mitchell DVM, MS, PhD
University of Illinois
College of Veterinary Medicine

Taxonomy

- Agamidae
  - Pogona
    - Storr (1982)
    - Central/Inland Dragon
      - Pogona vitticeps
    - Northwest Dragon
      - P. minor mitchelli
    - Nullarbor dragon
      - P. nullarbor
    - Western dwarf dragon
      - P. minor minor

Taxonomy

- Eastern dragon
  - P. barbata
- Kimberley dragon
  - P. microlepidota
- Black-soil plains dragon
  - P. henrylawsoni
**Biology**

- Diverse habitats
  - Temperate to tropical areas
  - Arid to semi-arid
  - Woodland, scrubland, grasslands

**Habitat**

- Variable habitats
  - Mallee
    - Scrubland
      - Eucalypt trees
      - Scattered grasses
      - Leans/detritus
    - Deserts
      - Sandy deserts
      - Scattered grasses
      - Stoney deserts
      - Stoney plains with scattered herbs
  - Grasslands
- Concepts should be used to develop vivariums

**Behavior**

- Ectothermic
- Terrestrial to semi-arboreal
- Diurnal
  - Bask early day
    - "sun-loving"
  - Dorsoventral compression
  - Brumation
    - Southern Australia
**Husbandry: Environment**

- Enclosure type and size
- Environmental temperature range
  - Day: 80-90°F
  - Bask: 95-100°F
  - Night: 70-80°F
- Radiant heat
- Photoperiod
  - 12:12
- UVB light?
- Humidity: 30-50%

**Husbandry: Environment**

- Substrate
  - Newspaper
  - New arrivals
  - Fecal exams
  - "Play sand"
    - Avoid commercial CaCO₃
  - River rock
  - Orchid Bark
  - Foreign body

**Diet**

- Omnivorous
  - Invertebrates
    - Commercial
    - Acheta domestica
    - Tenebrio molitor
    - Zophobas
  - Vivarium
    - Wild-caught
    - Firefly/Phosphor
    - Sunflower pyramis
    - Assorted bugs
  - Plant material
    - Greens
    - Barley
    - Romaine
  - Supplements
    - Commercial diets
    - Extruded pellets
  - Frequency of feeding
Common diseases

- Atadenovirus
- Coccidia and oxyurids
- Microsporidiosis
- Da Fungus
- Neoplasia

Adenovirus

- Atadenovirus
  - snakes, lizards, crocodilians
  - high morbidity and mortality
  - immunocompromised
- Transmission
  - Direct: fecal-oral
  - Indirect?

Adenovirus

- Clinical signs
  - Absent
    - may bias, crocs, monitors
  - Dragons
    - anemia, weight loss, regurgitation, limb paresis, diarrhea, opisthotonous
- Concurrent disease
  - dependovirus
  - coccidia
Adenovirus

Pathology
- Hepatomegaly
- Hepatic necrosis
- Hemorrhagic enteritis
- Necrotizing enteritis
- Basophilic intranuclear inclusions
  - Hepatocytes, renal and GI epithelial cells

Clinical Diagnosis
- Biopsy
  - Liver
  - Stomach
  - Esophagus
  - Kidney

Electron Microscopy
Real time PCR

- Bearded dragon atadenovirus
  - AAdV-1 (Wellehan)
  - Pilot population: 80% positive (Walden and Mitchell, 2009)
    - Poor agreement with EM

Atadenovirus

- Treatment
  - Supportive care
  - Antimicrobials
  - Anticoccidials
- Epidemiology unknown
  - Shedders?
  - Cull?
  - Well disseminated
  - 80% samples single population

Coccidia

- Coccidia
  - Isospora amphiboluri
  - Direct life cycle
    - epithelial surfaces of intestinal, biliary and renal systems
  - NOT self-limiting?
  - Clinical signs
    - juveniles: wasting, dehydration, poor doer
  - Eimeria sp.
    - Walden and Mitchell, 2009
Coccidia

- Diagnosis
  - Fecal float
  - Direct smear

- Value of each?

Cross-sectional study

- Walden and Mitchell, 2009
  - N=112, Adult dragons

- Results
  - Isospora: 22.2% (15.4-31.0)
  - Eimeria: 22.7% (14.6-30.0)
  - Oxyurids: 91.1% (85.8-96.4)

- Test characteristics
  - Float: sensitivity: 100%, specificity 93%
  - Direct: sensitivity: 76%, specificity 100%

Pathogenesis- *I. amphiboluri*
Coccidia

- Treatment
  - Juveniles
  - Necessary in adults?
  - Coccidiostatic drugs
    - Trimethoprim-sulfadiazinmethoxine
      - 30 mg/kg PO once,
      - then 15 mg/kg PO x 10 days (minimum)
        - recheck fecal
        - monitor hydration
        - Success?

- Treatment
  - Oregano
  - Pediococcus
    - No effect on coccidia
  - Ponazuril
    - 15-45 mg/kg SID x 21 d
      - All clear
      - No pathology
      - Treatment length needed?
      - Roadrunner pharmacy

Microsporidiosis

- Microsporidiosis
  - Obligate IC parasite
  - Life cycle
    - Injects sporoplasm into host cell
    - Merogenic phase: meronts
    - Sporogenic phase: meronts to sporonts
  - Parasite isolated from vertebrates
    - Common in HIV patients
    - Common in fish
      - *Plasmophora sp.*
Microsporidiosis

- Bearded dragons
- Pogona vitticeps
- Clinical signs
  - Unthriftiness
  - Weight loss
  - Acute death
- Histopathology
  - Basophilic intranuclear inclusion (H&E)
  - Hepatic and renal necrosis
  - Colonic, adrenal, ovaries
- Transmission?
  - Feces and urine?
  - Vertical?
- Treatment?
- Prevention?

Vertical Transmission

- Microsporidia in foci of granulomatous yolk sacculitis and placentitis
Chrysosporium Anamorph of Nanniopsis vriesii

Diagnostics

- Preliminary
  - KOH preparation
  - Cytology
    - Pyogranulomatous inflammation
  - CBC

- Biopsies
  - Anesthesia
    - Propofol
    - 0.04 mg/kg IV
    - Isoflurane
  - Sample submission
    - Histopathology
    - University of Texas-Fungus testing laboratory
      - PCR
      - Culture
Treatment

- Source
  - Soil?
  - Stress?
  - Environmental factors
    - Combination of factors plus stress?
    - Opportunistic vs. obligate

- Treatment
  - Itraconazole: 5-10 mg/kg SID
  - Voriconazole: 5 mg/kg-Safer