


HISTÓRIA

ONLINE DISTANCE EDUCATION COURSE FOR PROFESSIONAL DEVELOPMENT
"Ranaviruses: Emerging Pathogens of Ectothermic Vertebrates" – March 30, 2016



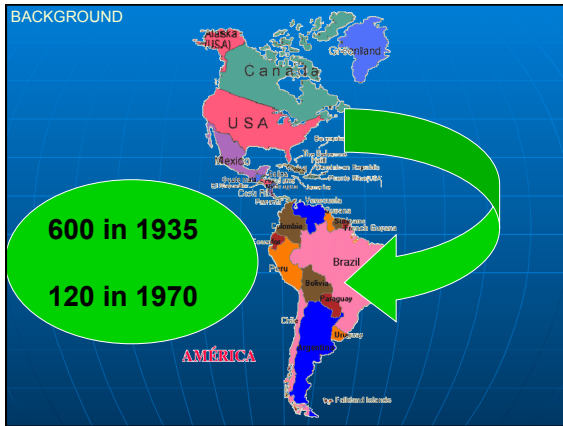
RANAVIRUS in Farmed frogs

Rolando Mazzoni
EMATER - FAPEG
BRAZIL

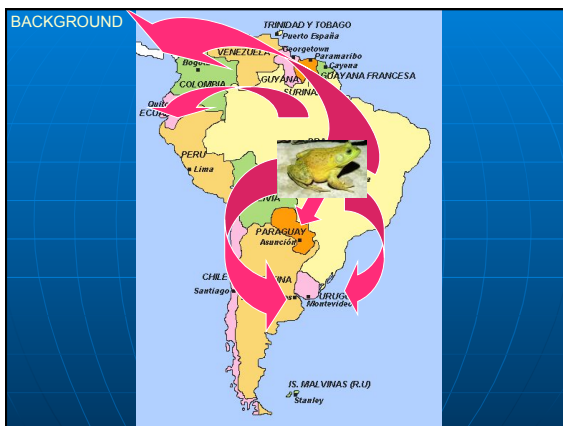




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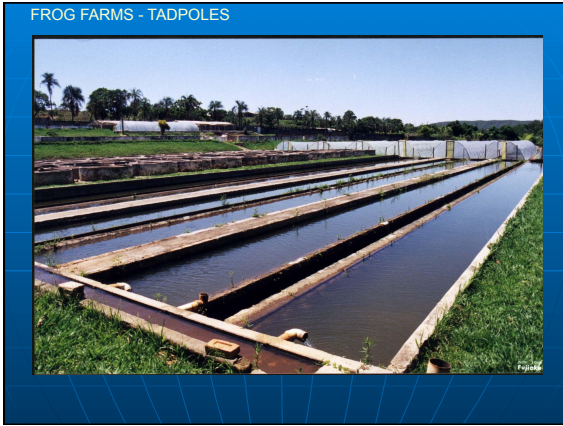
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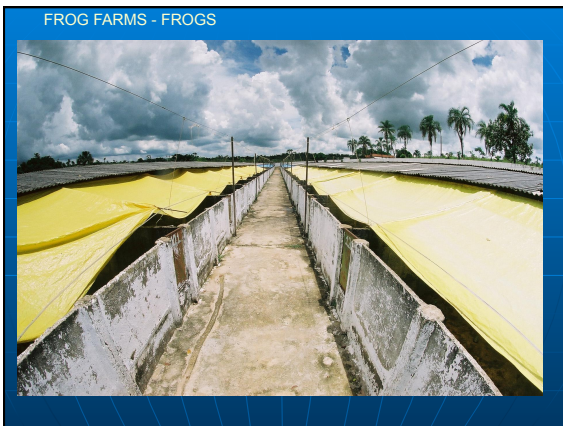




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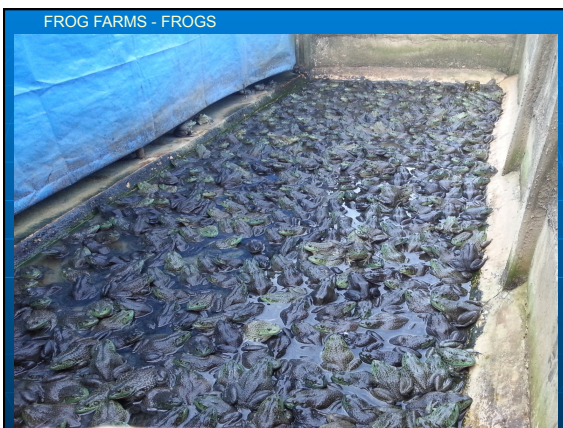




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BACKGROUND

FIELD FINDINGS

■ **TADPOLES:**

- HIGH MORTALITY (~ 100%)
- < 30 days
- ACUTE

SYNDROME # 1

- LOW MORTALITY
- EDEMA
- ULCERATIONS
- Pre-metamorphic
- CHRONIC

SYNDROME # 2

BACKGROUND

FIELD FINDINGS

■ **FROGS:**

- LOW MORTALITY
- EDEMA
- ULCERATIONS

SYNDROME # 3

- ABNORMAL POSTURES
- CHRONIC


SYNDROME # 4

DIAGNOSTIC

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DIAGNOSTIC

- Bullfrogs are TEV - FV3 carriers



PRESENCE ≠ DISEASE !!!!

WOLF et al., 1968; WILLIAMS et al., 2005; WHITTINGTON et al., 2010

**DETECTION
OF
RANAVIRUS
IS NOT
A
A
DIAGNOSTIC
OF
DISEASE**

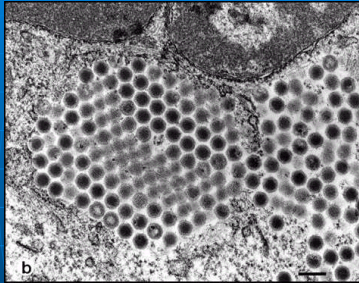
DIAGNOSTIC

TADPOLES

- Galli et al. 2006
- Virus detection in sick tadpoles
- PCR (MCP & IE - ICP 18)
 - High homology with FV3

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DIAGNOSTIC

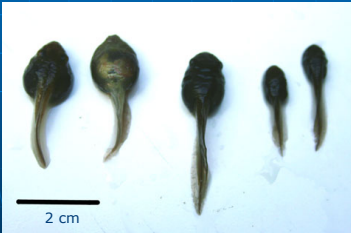


**Presence of
“FV3 like” viruses**

DIAGNOSTIC

CLINICAL SIGNS – Syndrome # 1

- **TADPOLES**
 - **EDEMA**
 - **ASCITIS**
 - **CACHEXIA**



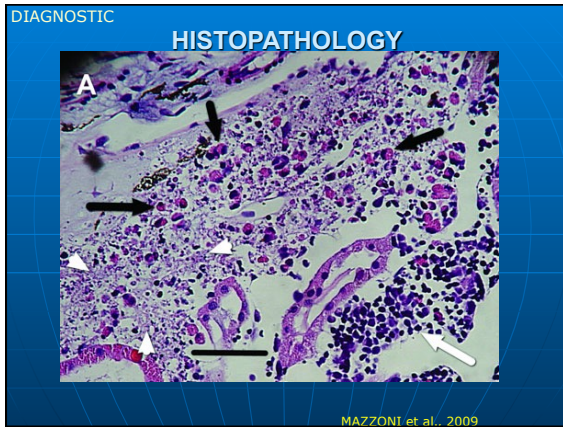
2 cm

DIAGNOSTIC

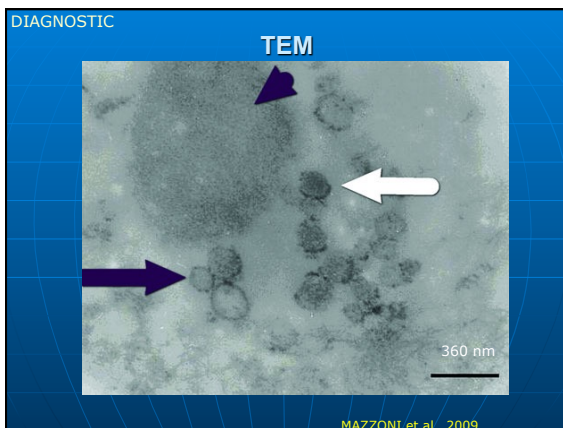
- **Virus isolation from sick tadpoles**
- **Confirmed by:**
 - **Histopathology**
 - **TEM**
 - **PCR & SEQUENCING**
(MCP, POL II, and IE -ICP 18)
- **High homology with FV3.**

Mazzoni et al., 2015

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DIAGNOSTIC

CLINICAL SIGNS – Syndrome # 2


- **TADPOLES**
 - **EDEMA**
 - **ASCITIS**
 - **SKIN ULCERS**

DIAGNOSTIC



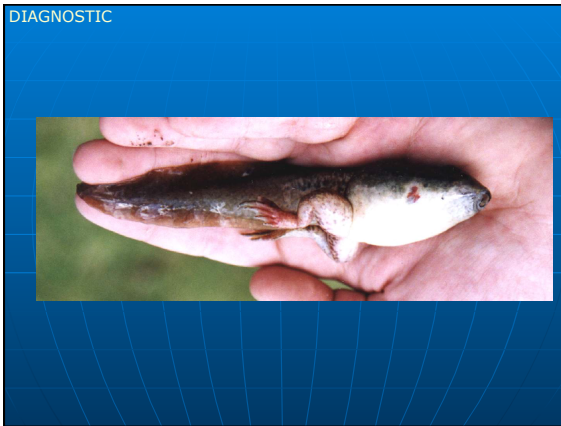
MAZZONI, 2000b

DIAGNOSTIC




MAZZONI, 2000b

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FROGS


Immune response in adult frogs



- CARRIERS
- Chronic Infections



FROGS



- Positive percentage (qPCR) for RVs in farmed bullfrogs

Farm	% positive
01 (40 samples)	15
02 (45 samples)	35
03 (150 samples)	100

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FROGS – Syndrome # 3

- Lethargy
- Edemas
- Ascites
- Hemorrhages
- Eosinophilia



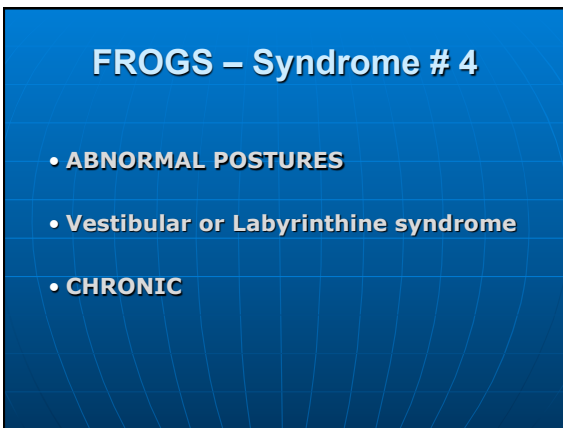
“RED LEG”

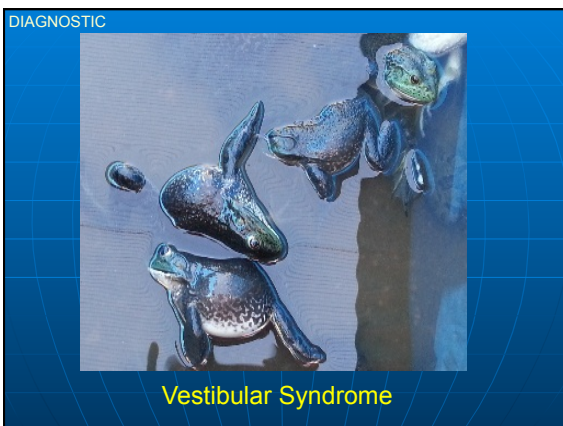


Ulcerative Syndrome

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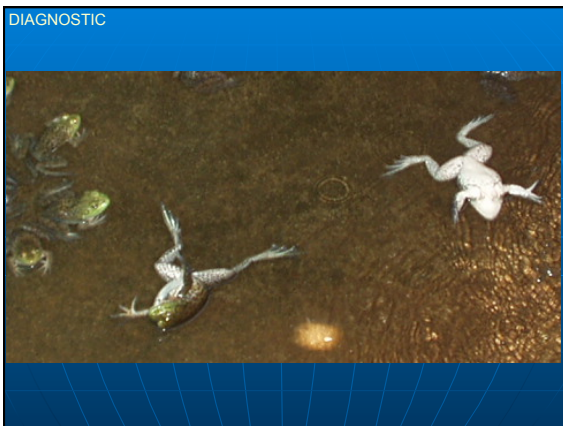




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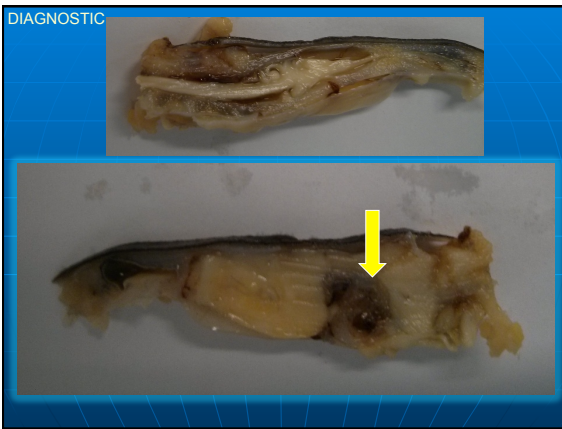


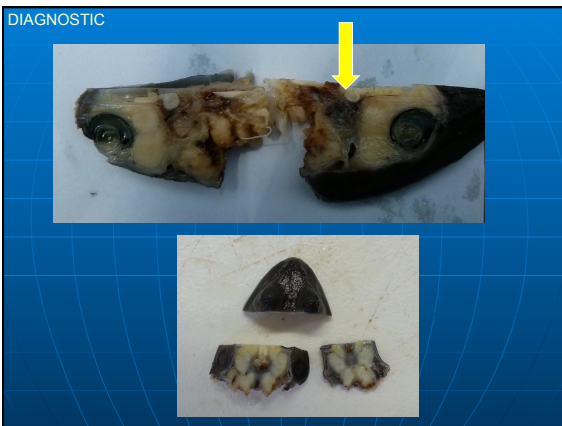




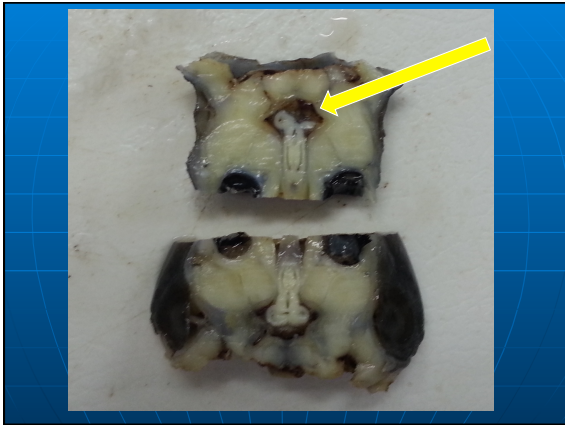
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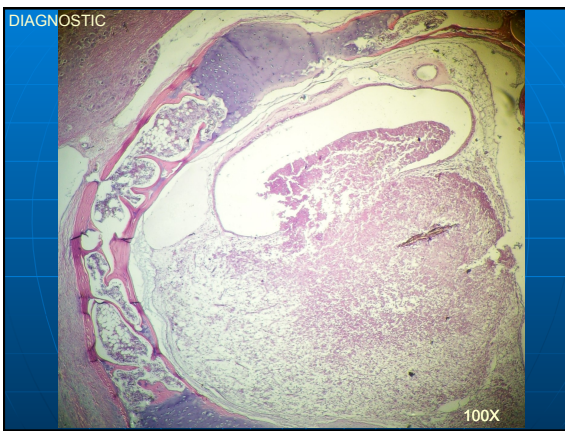


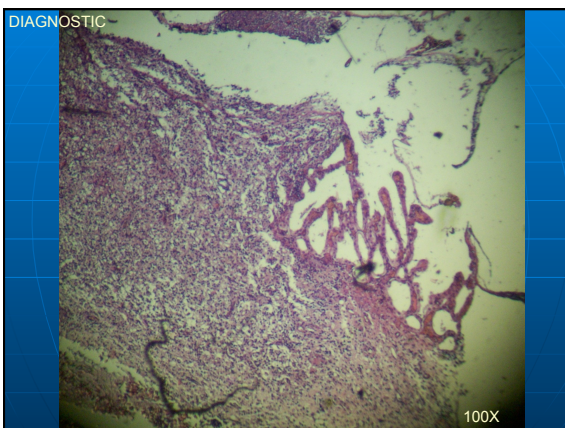




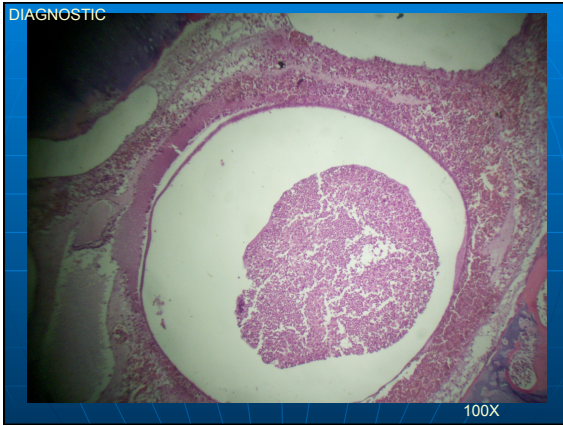
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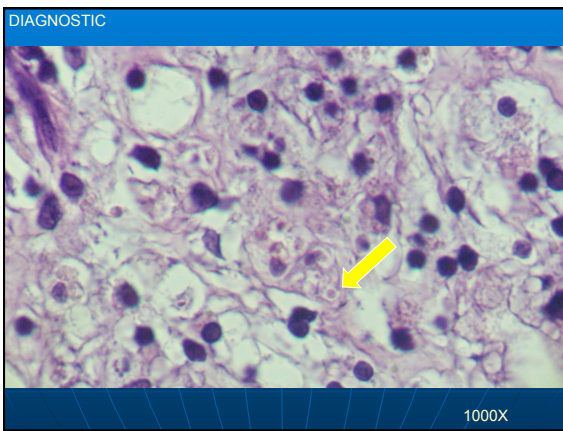


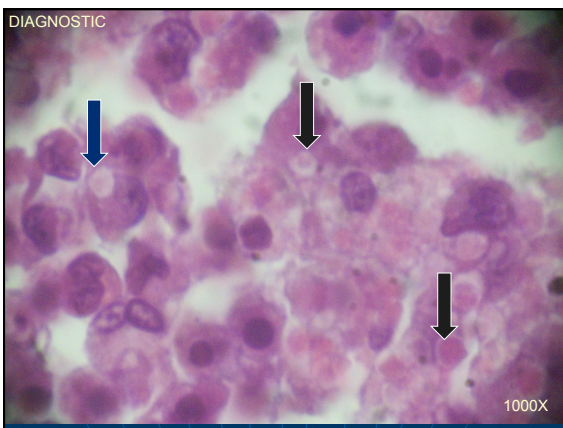




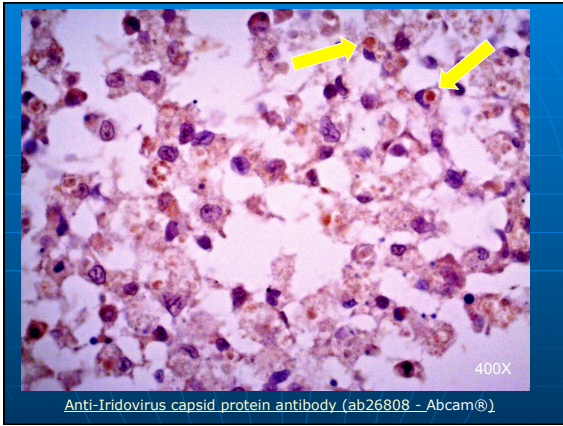
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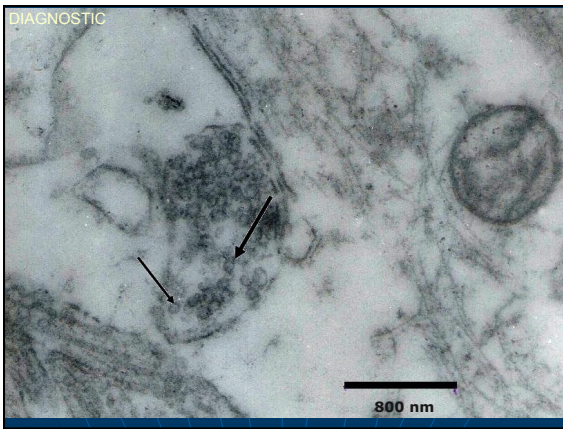


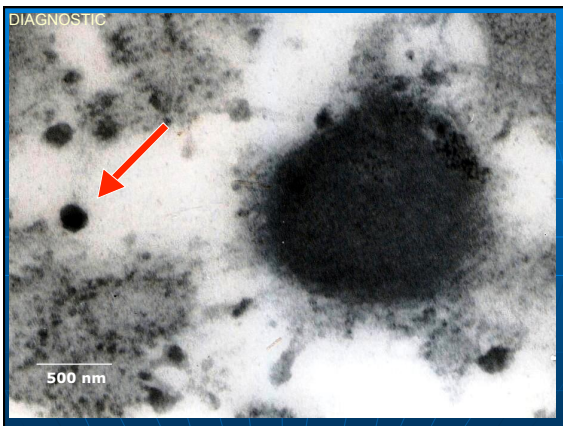




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CONCLUSIONS

High densities in Frog Farms

- Higher RVs presence in adults
- “Vestibular Syndrome”
 - < 10%




EMERGING QUESTIONS

- FV3 in American Bullfrogs
 - INTRODUCED
 - or
 - South-American Virus
- Frog farms shed virus to the environment?
- Pathogenic to other aquatic organisms?

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- **Ranavirus surveillance in Brazil:**
 - Farmed American bullfrogs
 - Surrounding areas
 - Other areas

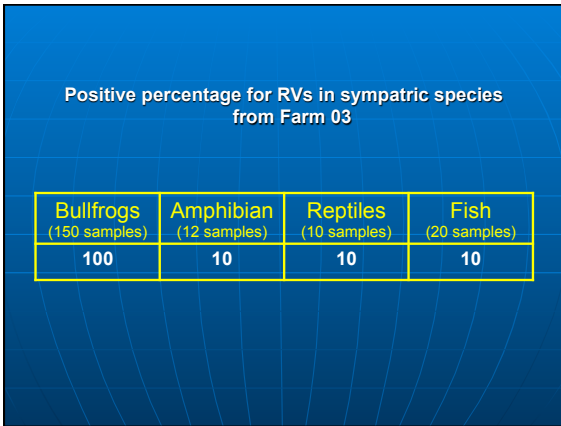


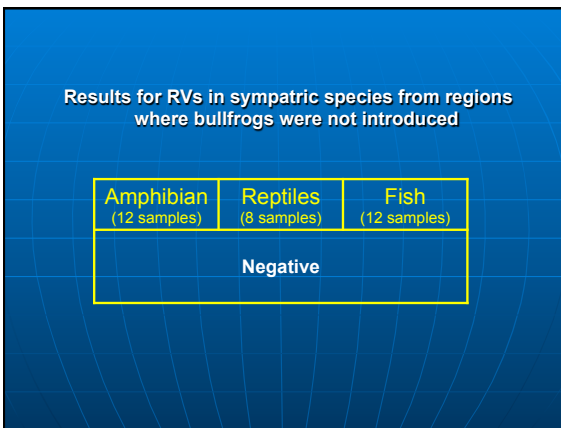
- **METHOD**
 - REAL TIME PCR
 - TARGET SEQUENCE = MCP

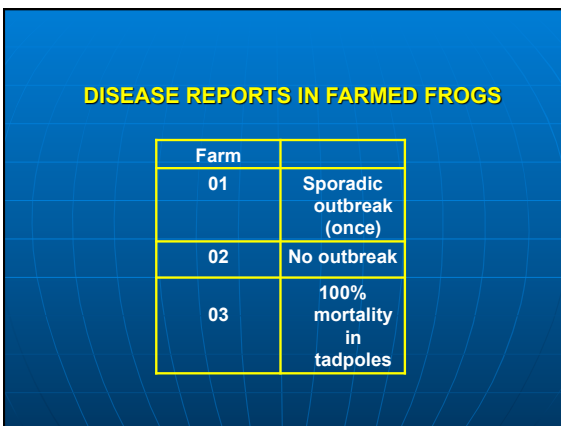
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RESULTS

DISEASE REPORTS IN OTHER SPECIES

NO MORTALITIES
OR
DISEASES
REGISTERED

CONCLUSIONS

- **Farmed Frogs**
 - High to moderate presence of RVs
 - High mortality in tadpoles
 - Related with high densities
- **Sympatric species**
 - Low detection
 - No disease reported
- **Other areas** = No detection

CONCLUSIONS

- **Ranavirus in Frog Farms**
 - Introduced with American bullfrogs
 - Contaminating sympatric species
- **Sympatric species**
 - No disease yet reported
 - Resistance/low susceptibility ?
 - Low strain virulence ?

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FUTURE RANAVIRUS RESEARCH DIRECTIONS

- Surveillance on the presence of ranavirus in:
 - Introduced farmed American bullfrogs
 - Areas where American bullfrogs were introduced
 - Other areas
 - Compare isolates
- Characterization of South American ranaviruses

THANKS !