

Necropsy report during massive deaths of *Telmatobius culeus* in April and May 2015 in Titicaca Lake

Animal information	
Species:	<i>Telmatobius culeus</i>
Number in group	32
Age	juvenile and adults
Sex	12 males, 15 females, 7 undetermined
Number of dead:	24
Number of sick:	8
Locality information	
Department	La Paz
Locality:	Pata Patani , Lake Titicaca
Coordinates	-16.310600° S and -68.677059° W
Altitude	3810
Collection date	23 April 2015
Report data and details	
Report date:	13 December 2015
Report responsible:	Arturo Munoz
Contact information	
Collector:	Edwin Conde
Responsible and contacts :	Arturo Muñoz Hyla_art@yahoo.com 591-71701676 0032485860742
Required analysis	
<i>Batrachochytrium dendrobatidis</i> 26 samples <i>Batrachochytrium salamandrivorans</i> 26 samples Ranavirus 29 samples Chlamydeales 29 samples Histology ecotoxicology	
History: (include clinical signs, significant lab results, etc.)	
<p>On April 23rd 32 frog samples were collected on the Bolivian side of Titicaca Lake in the locality of Pata Patani (-16.310600° S and -68.677059° W). Samples were fixed and stored in 94% alcohol and stored in Museo de Historia Natural Alcide d'Orbigny in Cochabamba, Bolivia.</p> <p>All of these frogs were found at the shore of the lake floating in the water close to emergent vegetation. These were the first collected specimens, collected exactly during the massive deaths. Some of the individuals were still alive but showed no response to stimulus.</p>	

No more data is available from the conditions of the individuals in the collecting area.

- **Skin:** The skin had a normal color and texture, no external lesions were observed. In some individuals (n=7) presence of ectoparasites (Leaches) were observed.
- **Eyes:** Normal and with no lesions
- **Primary incision:** Subcutaneous condition normal, fat content also normal, ventral and dorsal musculature without any sign of lesions or abnormalities
- **Body cavities:** Normal color and no sign of water loses.
- **Liver:** Color was normal, most of the samples present were normal size, some of them bigger than the normal size.
- **Heart:** Normal shape, size and color, no parasites present in the internal parts.
- **Genital system:** In adults the genital organs were well developed, from the examined females 40% had embryos.
- **Fat bodies:** fat body amounts were normal and in good conditions. Small fat bodies in two females with well-developed eggs.
- **Respiratory system:** Individuals had lungs of normal size and no abnormal colors or texture.
- **Gastrointestinal tract:** All the components of the gastrointestinal tract were normal compared to other healthy individuals. Stomach showed presence of endoparasites (Nematodes). Gut content in most of the species were normal, there was even the presence of different items such as snails and crustaceans.
- **Bones:** No fractures or abnormalities were found in the bones of the examined animals.
- **Analisis Results:**
 - Analysis from 29 specimens were as follow
 - Clamideaes- Negative
 - Ranavirus – 5 individuals positive (17.2%)
 - analysis from 26 specimens were as follow
 - *Batrachochytrium salamandrivorans* - Negative
 - *Batrachochytrium dendrobatidis* – 2 individuals positive (7.7%)

The histological analysis was not successful because the condition of the samples was not of high enough quality to be able to find patterns.

All these analyses were carried out in the Laboratory of Veterinary Bacteriology and Mycology at the Faculty of Veterinary Medicine, Ghent University.

Photos



Figure 1 Collecting site during massive deaths, Pata Patani, Lake Titicaca



Figure 2 Dead frogs found in Lake Titicaca (Foto: Edwin Conde)



Figure 3 Dead frogs found in Lake Titicaca (Foto: Edwin Conde)



Figure 4 Ventral and dorsal view from two collected individuals



Figure 5 Adult female with the different organs and the eggs almost ready to be laid



Figure 6 Carcass of an individual after a postmortem analysis and stored at the museum

Conclusion

Collected individuals seem to be in good conditions and no lesions both, external or internal were observed. Also, due to the conditions of the different organs and eggs founded in the females, it seems the frogs died in a short time, and the fat body content in most of the individuals shows that the individuals were eating normally, because we also found different items in the gut content.

We found Chytridium and Ranavirus in some of the samples, this cannot be the cause of the deaths at this scale and also so fast, but it is also one aspect that future research needs to take in account.

Probably the cause of the deaths was something in the environment that killed the frogs very quickly, and that needs to be studied. Some possible explanations may come from the water quality information, and other environmental events that occurred in the area days and months before the massive deaths (see water quality report).