Megan Charlton Conservation Biology Professor Stokes 20 March 2014

Leptodactylus laticeps

Name: Red Spotted Burrowing Frog (*Leptodactylus laticeps*) (also known as rana coralina, Carolline frog, and rana de los viscacheras)

Status: IUCN Categorization 2012: NT, near threatenedArgentina Categorization 2012: VU, vulnerable (Lavilla et al. 2000a)A possible cause for the discrepancy between the two categorizations of the species is adifference between the evaluations of geographic scale (Vaira et al. 2012).

Description: L. laticeps, depicted in Figure 1 below, is a 10-12 cm long frog and is considered

the most distinctive member of the *pentadactylus* (five-fingered) species group (Heyer 1979). The frog has red and black spots on a white-cream background. The snout vent length of the frog can range from 115- 125 mm, with no variation between male and female, but males phenotypically differ from females because they have black thorny



Figure 1: Picture of *L. laticeps* from the Tampas Lowry Park Zoo in Florida (*Tampa's Lowry Park Zoo*).

patches on their chest (Ziegler 2003). The red spots on its skin are proposed to be indicative of a toxin, which is likely due to the high content of histamine derivatives in its skin secretions provoking allergic reactions (Ziegler 2003). Though this claim is supported by a small amount of evidence, *L. laticeps* is thought to be aggressive and considered dangerous to its prey (Vaira et al. 2012). Figure 2 below depicts the species in an arched warning position responding to predators in the wild (Heyer 2006).



Figure 2: *L. laticeps* changing posture in response to disturbance, extending itself to warn predators of its noxious skin secretions (Heyer 2006).

# Ecology

### **Distribution:**

*L. laticeps* is native to Argentina, Bolivia, and Paraguay. *L. laticeps* is found the furthest south of any member of the pentadactylus group: the Gran Chaco and Santiago del Estero region of Argentina, as shown in Figure 3 below (Heyer 1979).



Figure 3: Map South America depicting distribution of *L. laticeps* in Argentina denoted by (x)'s. (Heyer 1979).



Figure 4: Highlights Paraguay in South America in the picture (left) and the locations where *L. laticeps* was found throughout Paraguay (right) (Ziegler 2003).

A more recent study by Thomas Ziegler in Paraguay on the species' feeding habits in 2001 produced the distribution of 18 specimens harvested for research in the three areas marked on the magnified view of the map above in Figure 4. In this study, the frogs were found at night occupying the forest habitat around a pond. Two of the specimens were found during the day hidden by firewood among other larger invertebrates such as scorpions and spiders. Unfortunately, the most current distribution information of *L. laticeps* throughout South America is not available. Heyer has documented it in Argentina in 1979, but recent information is limited to the study conducted by Ziegler. The species is known in Argentina to be rare and elusive, making it challenging for researchers to find and document it (Schaefer, pers. comm)

# Habitat & Food Sources:

L. laticeps has been found to occupy burrow holes created by social rodents, such as viscachas,

where they coexist with the

rodents (Ponssus 2006, Heyer 2006). This underground network also provides a convenient cover while calling their prey from the entrances of these burrows (Heyer

2006). *L laticeps* seems to prey on other smaller frogs, such as female



Figure 5: *L. bunfonis*, believed to be the prey of *L. laticeps* in the wild (Heyer 2006).

members of *L. bufonius* shown in Figure 5. It is hypothesized that *L. laticeps* uses an advertisement call consistent with aggressive mimicry, "where a predator deceives its victim by imitating something desirable" in order to draw in prey (Heyer 2006). In an extensive study conducted on 26 specimens of the species' food sources, it was found that other frogs (Anura) comprised of 10 and 2.6 percent of the prey items found in the stomach and gut, respectively (Ziegler 2003). These results are shown in Figures 6 and 7 below. Although frog remains were found in the stomach and gut of the specimens, there was also a wide range of other invertebrates consumed ranging from cockroaches to one rodent. The deduction from these findings is that *L. laticeps* is seemingly an "opportunistic predator", feeding on whatever comes along and not only a frog diet as suggested by Heyer in 2006 (Ziegler 2003).



Figure 6: Percentage of prey items found in the stomach of 26 specimens of L. laticeps (Ziegler 2003).



Figure 7: Percentage of prey items found in the gastro-intestinal tract of 26 specimens of *L. laticeps* (Ziegler 2003). It is also noted that *L. laticeps* consumed a number of potentially dangerous or venomous prey, such as tarantulas and wasps. This could mean that the frog has acquired the proper internal machinery to digest such dangerous prey like other members of the *Leptodactylus pentadactylus* genus have done (Ziegler, 2003).

# **Reproduction/Eggs:**

The reproductive characteristics of *L. laticeps* are still somewhat unknown, although it is known that the species breeds in temporary freshwater ponds (Vaira et al. 2012, IUCN 2013). There is only one article in which the reproductive tendencies of *L. laticeps* were explored in regards to

the mode of reproduction. Based on a study of one *L. laticeps* female from the wild, it was concluded that in a lifetime, she produced 4,256 mature eggs (Perotti 1997). Researchers hypothesize that *L. laticeps* lays terrestrial eggs in nests that are likely formed in freshwater ponds nearby their original habitat, but there is no evidence of this trend (Perotti 1997). In fact, there is no documentation on any research in which a tadpole, nest, or egg have been seen in the wild (Schaefer, pers. comm.).

# **Human Application:**

A skin secretion sample was taken from three members of *L. laticeps* at the Denver Zoo and analyzed in a study by Conlon and researchers. The hypothesis was that these skin secretions contain peptides that could be of importance in pharmaceutical developments. It was determined by the team upon peptide analysis that it cannot be used to treat Type 2 Diabetes, but to confirm or deny the possible other uses for this frog's skin secretions would require more extensive study.

**Population trends:** According to the IUCN redlist, the species population is decreasing, especially in Argentina where it is largely threatened by the pet trade. Of all the primary sources acquired, there was no evidence of *L. laticeps* being traded, but it is generally known by the communities. In fact, in 2008, the Defenders of Wildlife in Washington D.C. proposed to the U.S. Fish and Wildlife Services that *L. laticeps*, along with 12 other threatened amphibians non-native to the U.S., earn CITES (Convention on International Trade in Endangered Species of Wild Fauna and Flora) listing (Goyenechea 2008). The original list was 91 specimens long, but it was narrowed down to the species believed to be most threatened by international trade of any kind. (Goyenechea 2008).

**Threats:** Although habitat loss is a major threat to biodiversity of many species alive today, the biggest threat to the biodiversity of *L. laticeps* is over-harvesting for the international pet trade, which is especially true in the area of the Paraguayan Chaco (IUCN 2013). The people of Bolivia, Argentina, and Paraguay have low income, often times as little as 1200 euros per year, providing large incentive for the natives to seek out the species to sell (BBC 2007). The species is often sold for around \$300-\$600 euros (IUCN 2013). According to an ad on faunaclassifieds.com, the species was being sold for \$400 in 2007 by someone who claimed to have contacts with "South American suppliers" (Micah78).

#### **Conservation of the Species:**

According to the CITES website, *L. laticeps* is not currently listed in the CITES Appendix, but the UNEP-WCMC originally added the species to the list of species that must be monitored under the EU Wildlife Trade Regulations in 2009, where it has remained until today (*"Leptodactylus laticeps* Boulenger 1918."). There was no information found regarding enforcement of the species' listing from the UNEP-WCMC website.

There are five protected park areas that are highly likely to include populations of *L. laticeps*: Reserva Natural Formosa, Fort Hope Provincial Natural Park , Park Speaker and Provincial Natural Loro Parque Nacional Snowflake (Vaira et al. 2012). Although these areas may be protected to keep their potential habitat safe, since the species is already scarce and rare, it is unknown whether these protected areas actually have an effect on population size. Extensive research into the remaining members of *L. laticeps* is required to determine if these protected areas are having the intended effects, which is expensive and time-consuming (Vaira et al. 2012).

# **Conclusion:**

Due to the lack of documented scientific literature on *L. laticeps*, it is challenging to determine the most effective way to conserve this species. It is predicted that there are parks helping to protect the species, but we cannot be certain without in-depth field research. If there was more information on the reproductive patterns of *L. laticeps* it may be easier to implement conservation strategies, but unfortunately the lack of any concrete knowledge beyond the number of eggs an individual was found to contain is not enough. And although the pet trade is negatively affecting this species, there are trade regulations in place to protect over-harvesting (IUCN 2013). It has been challenging for researchers to find any members of the species since 2000 in Argentina (Schaefer, pers. comm.), but it is promising that 18 specimens were harvested from the wild in 2003 in Paraguay over a period of months (Ziegler 2003). This species is could potentially provide valuable peptide secretions that could be useful in pharmaceutical agents, but it may never be discovered if we cannot protect this species from extinction.

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# Appendix A

Source: Schaefer, pers. comm. Dr. Eduardo Schaefer. Works for Conicet: Consejo Nacional de

Investigaciones Científicas y Técnicas in Argentina. Email:

eclschaefer247@yahoo.com.ar. Email communication. 9 March 2014.

Edua to me	ardo Schaefer ⊜∵⊭	🐲 Mar 9 (11 days ago)	*		
Dear f	Megan,				
	unfortunately I have to tell you that what you found about L laticeps, together with the call description (Scott and Heyer,				
2006	2006) is all that is known about this species. The main problem we have to preserve this species is the most absolute lack of				
know	knowledge about its life. Tadpole, or a nest or egg were never seen by a specialist or someone who can document it. We study the				
anura	anuran fauna from the area since 1990 and could not see more than 15 specimens. Only one time in 2000 we found a few juveniles. In				
2006	2006 (Scott and Heyer, 2006) described the call, but nothing more I can tell you because nothing else is known about this beautiful				
frog. I	frog. I send attached some PDFs where you can find any information on the species, but not much more than what I mentioned before.				
Good	d luck with your report.				
Heres	Here we are working hard to find news about this frog. It is not easy. It is a very rare and elusive species.				
Excus	se my poor English. It's not my native language, but I hope you can une	derstand.			
Sincer	Sincerely yours				
Eduar	rdo				
Dr. B	Eduardo F. Schaefer				
CIC	- CONICET - CECOAL				
Herr	nandarias 945				
CP	3500				
Res	istencia-Chaco-Argentina				
Tel.	379454418				
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<u>http</u> El dia	a viernes, 7 de marzo de 2014 18:50, Megan Charlton < <u>megar</u>	nchartton032791@gmail.com> escribió:			



# **Appendix B**

Source: Micah78. "Leptodactylus laticeps, Red Spotted Burrowing Toad \$400."

FaunaClassifieds, 6 Jan 2007. Web. 18 March 2014.

<http://www.faunaclassifieds.com/forums/showthread.php?t=93574>



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D1-06-2007, 01:50 AM			# <u>1</u>
micah78	Leptodactylus laticeps, Red Spotted Burrowing Toad \$400		
	I recently had a breakthrough with one of my South Americ I can get a small number of Red Spotted Burrowing Toads f	an suppliers. or \$400 each.	
	I know that's a ridiculous price, but these dudes are rare!		
	I won't import unless I know I can sell them, so please let r interested when I get them.	me know if you	u'll be
	Shipping to anywhere in the States is no problem		
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	customizing to stop snakes.		
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