

# The Livebearers of Teuchitlán Springs Thru the Ages:

A Biological, Cultural, and Recreational History of  
*Ameca splendens*, *Skiffia francesae*, and *Zoogoneticus tequila*



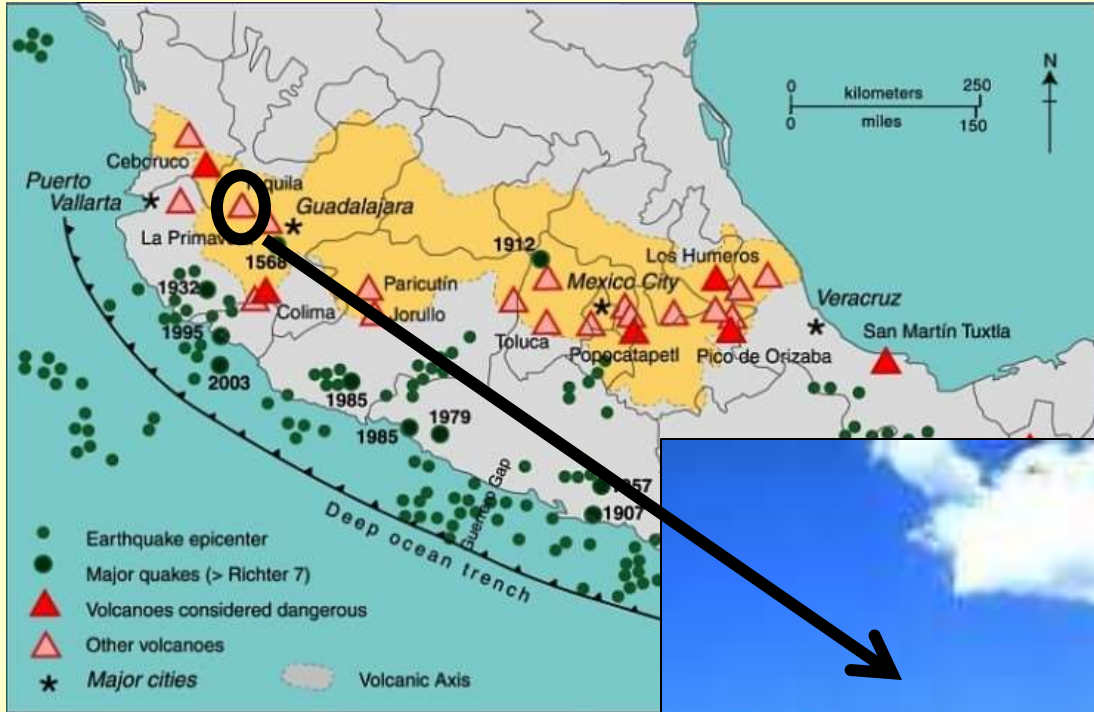
**John Lyons, Ph.D.**

**North American Goodeid Working Group  
University of Wisconsin Zoological Museum**

# Where Are We?



# We Begin 20 Million Years Ago...



Tequila Volcano



# Popocatepetl Volcano

March 2016



March 2013





**Manantial Teuchitlán = Teuchitlán Springs**  
**Slightly Thermal – 74-85°F**





**They give rise to the Río Teuchitlán;  
Headwaters of the Río Ameca**





**Perched above Teuchitlán Springs, in the shadow of the Tequila Volcano:  
Guachimontones (200 BCE - 900 CE)**





**Guachimontones (unrestored)**





**Guachimontones (restored)**



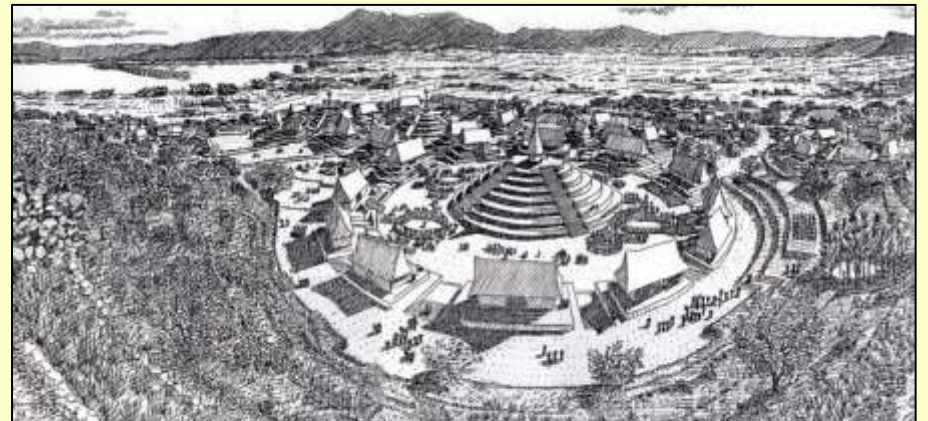
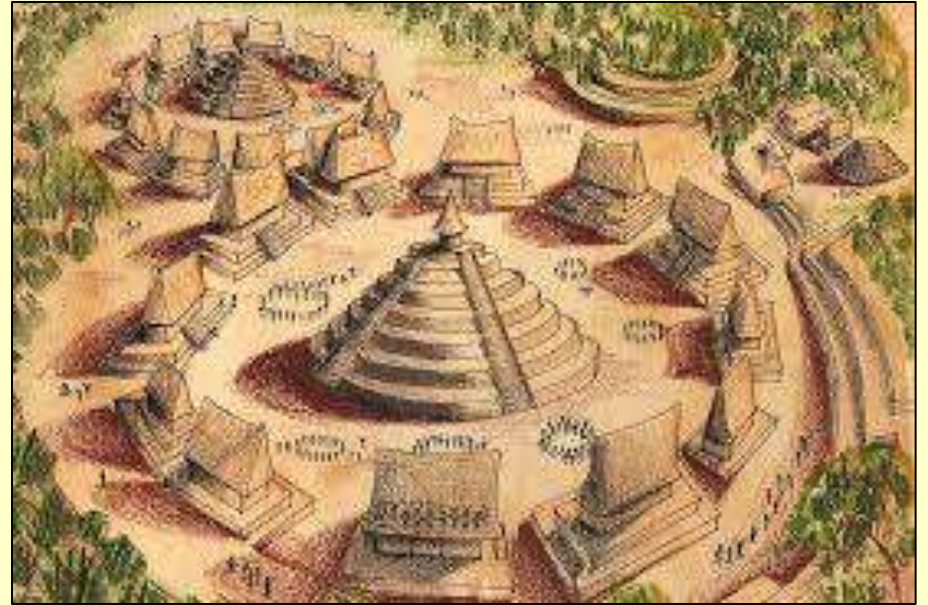


Figure 21. Teuchitlán, Jalisco. Reconstruction of the Guachimontón complex with central mound and circular platforms (after Beekman and Weigand 2000).

## Guachimontones (recreated)





***“Voladores”***





**Guachimontones 300 CE = 40,000 people**  
**Teuchitlán 2015 CE = 8,500 people**





**Teotihuacán, Valley of Mexico**  
**350 CE = 100,000 people (?)**





**Palenque, Chiapas  
600 CE = 50,000 people**





**Guachimontones**

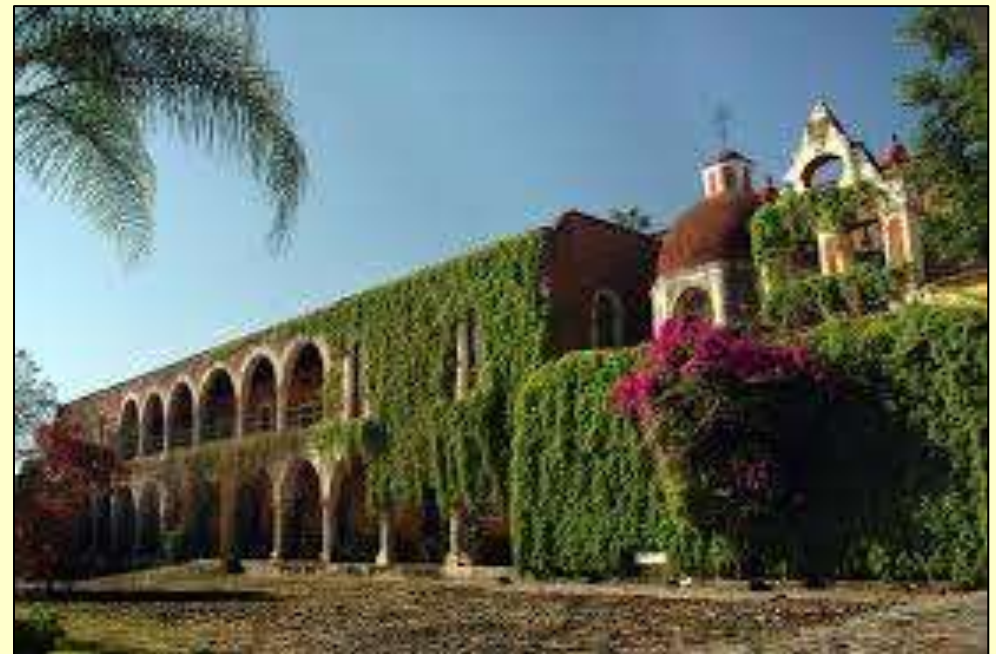




**Guachimontones ~900 CE - Collapse**



# Spanish Colonial Era - 1550-1910: Haciendas







**Blue Agave**

**Corn Field**



# *¡Tequila!*



# Tequila Production

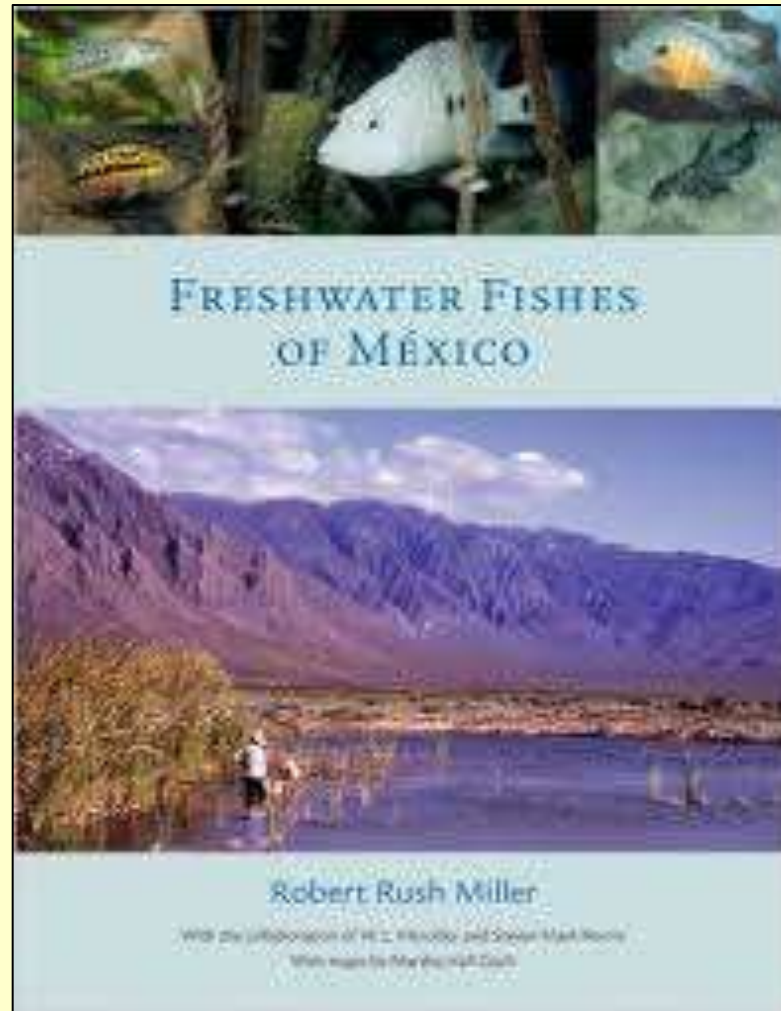




# Why is Teuchitlán of Interest to Aquarists?



# Dr. Robert R. Miller (1916-2003)



**Collected in Mexico from late 1940's until early 1980's**



# Miller first visited Teuchitlán in 1955....

## MINNOWS (Cyprinidae)

<i>Algansea amecae</i> *	104
<i>Notropis amecae</i> *	21
<i>Yuriria amatlana</i> *	2

## LIVEBEARERS (Poeciliidae)

<i>Poeciliopsis infans</i>	136
----------------------------	-----

## SPLITFINS (Goodeidae)

<i>Ameca splendens</i> *	200
<i>Goodea atripinnis</i>	89
<i>Skiffia francesae</i> *	57
<i>Xenotoca melanosoma</i>	72
<i>Zoogoneticus purepechus</i> *	45
<i>Zoogoneticus tequila</i> *	3

\* Unknown to science at the time



[In 1955] “It is heavily utilized for irrigation, drinking water, and washing with much pollution by man and livestock” but “Fishes were extraordinarily prolific...” (Miller and Fitzsimons 1971, p. 9)

# Miller and his students described at least 54 new species of Mexican fishes, including:



Miller, R. R. & J. M. Fitzsimons. 1971. *Ameca splendens*, a new genus and species of Goodeid fish from western Mexico, with remarks on the classification of the Goodeidae. *Copeia* 1971: 1-13.



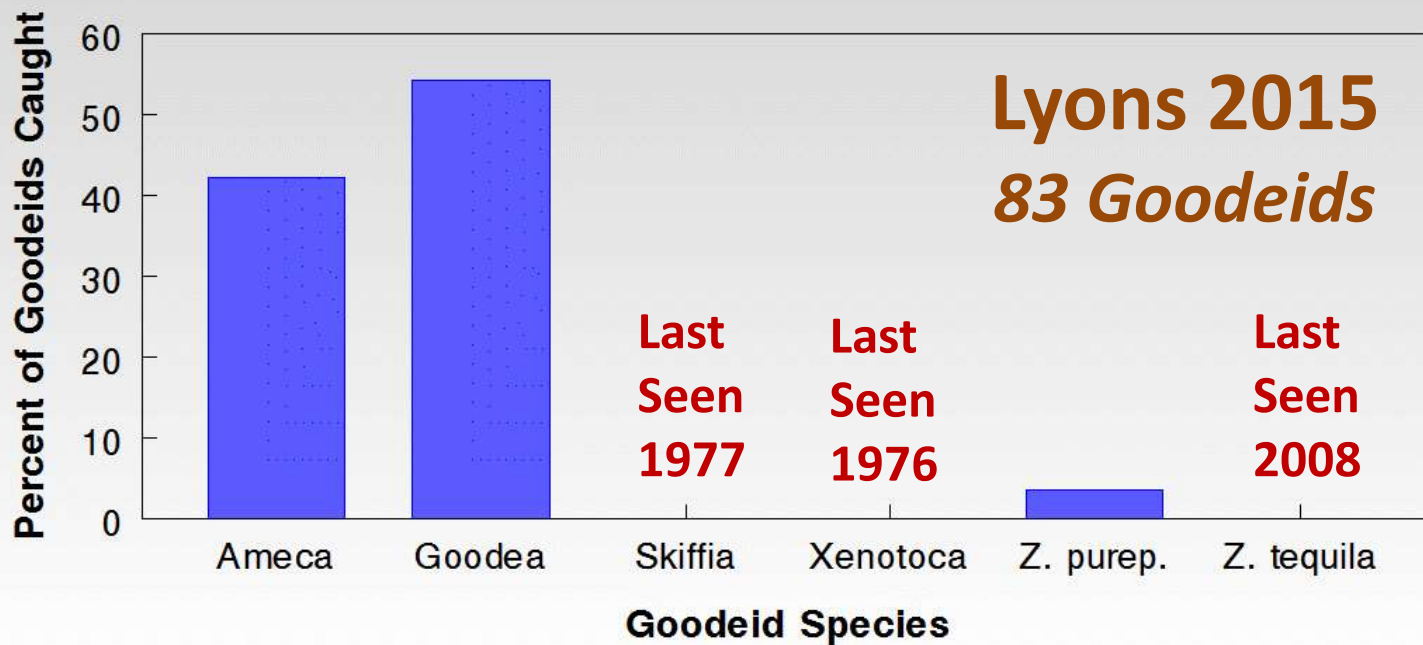
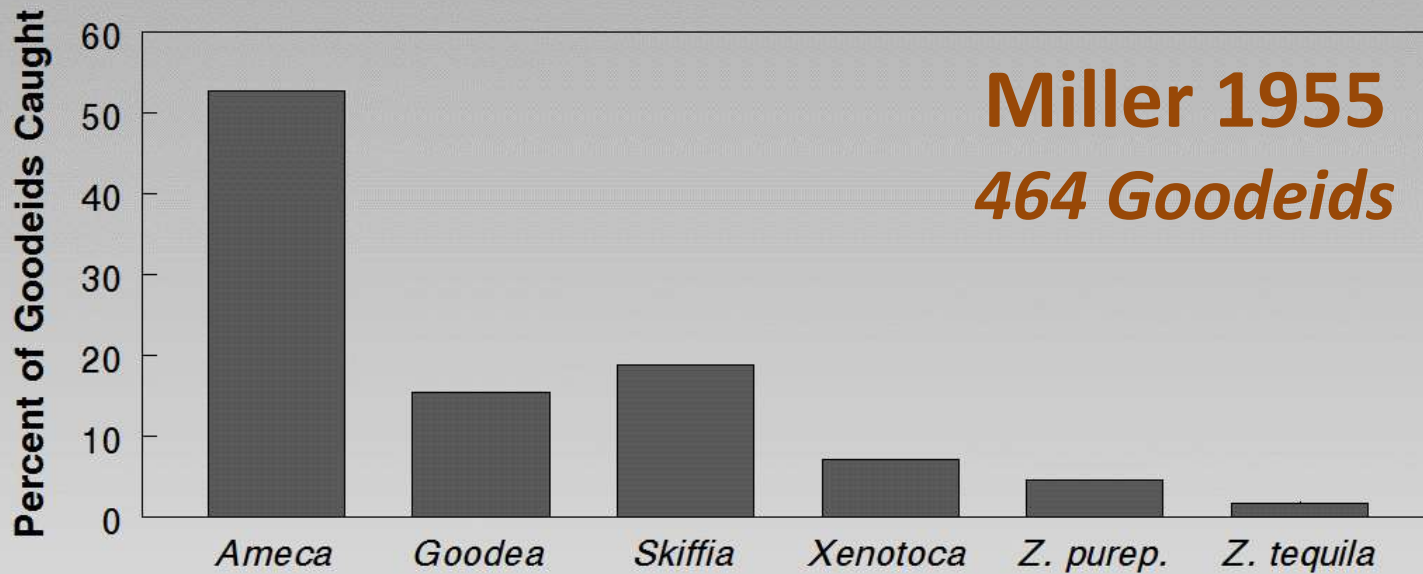
Kingston, D. I. 1978. *Skiffia francesae*, a new species of Goodeid fish from western Mexico. *Copeia* 1978: 503-508. (Kingston [maiden name Lyons, but no relation] was a Miller student and named the fish after Frances Miller, his wife.)



Webb, S. A. & R. R. Miller. 1998. *Zoogoneticus tequila*, a new Goodeid fish (Cyprinodontiformes) from the Ameca drainage of Mexico, and a rediagnosis of the genus. *Occasional Papers of the Museum of Zoology, University of Michigan*. 725:1-23. (Named after the volcano, not the liquor!)

But Miller noticed *Z. tequila* only after recognized by Derek Lambert







# The Bane of Teuchitlán Goodeids: Non-Native Species



**Tilapia (*Oreochromis* species)**



**Guppies and Mollies  
(*Poecilia* species)**



**Common carp (*Cyprinus carpio*)**

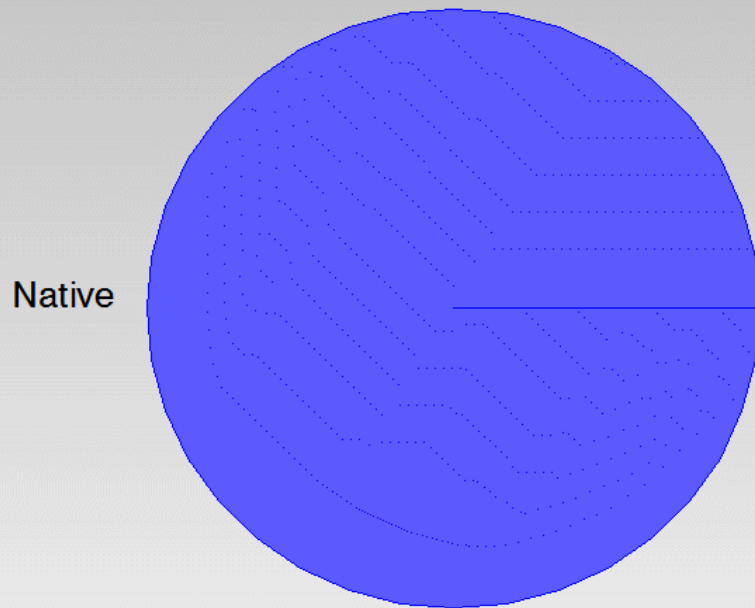


**Platyfish and Swordtails  
(*Xiphophorus* species)**



# No Non-Native Species until 1976

Now 85% of Fish, 64% of Species

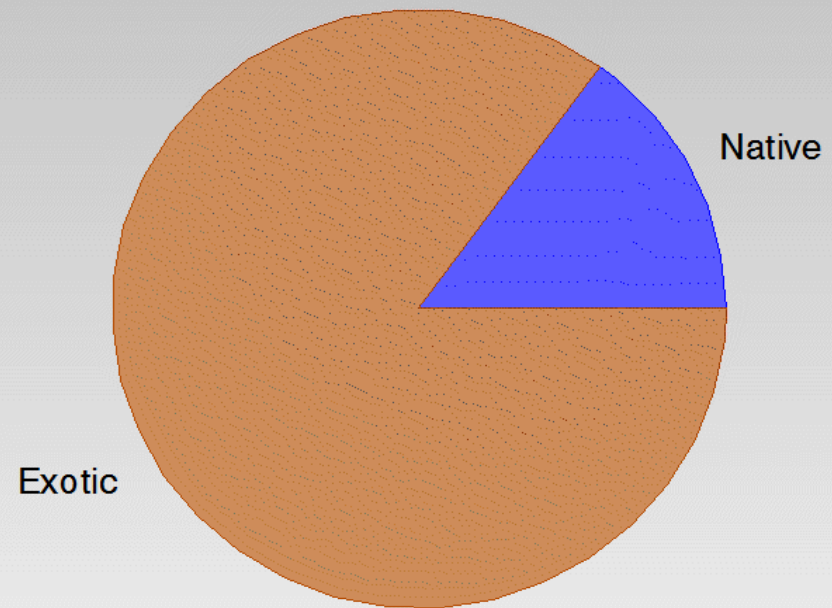


**Total Fish**

**1955-1975**

**11 Native Species**

**0 Non-Native**



**Total Fish**

**1995-2015**

**4 Native Species**

**7 Non-Native**

# *Skiffia francesae* and *Zoogoneticus tequila*

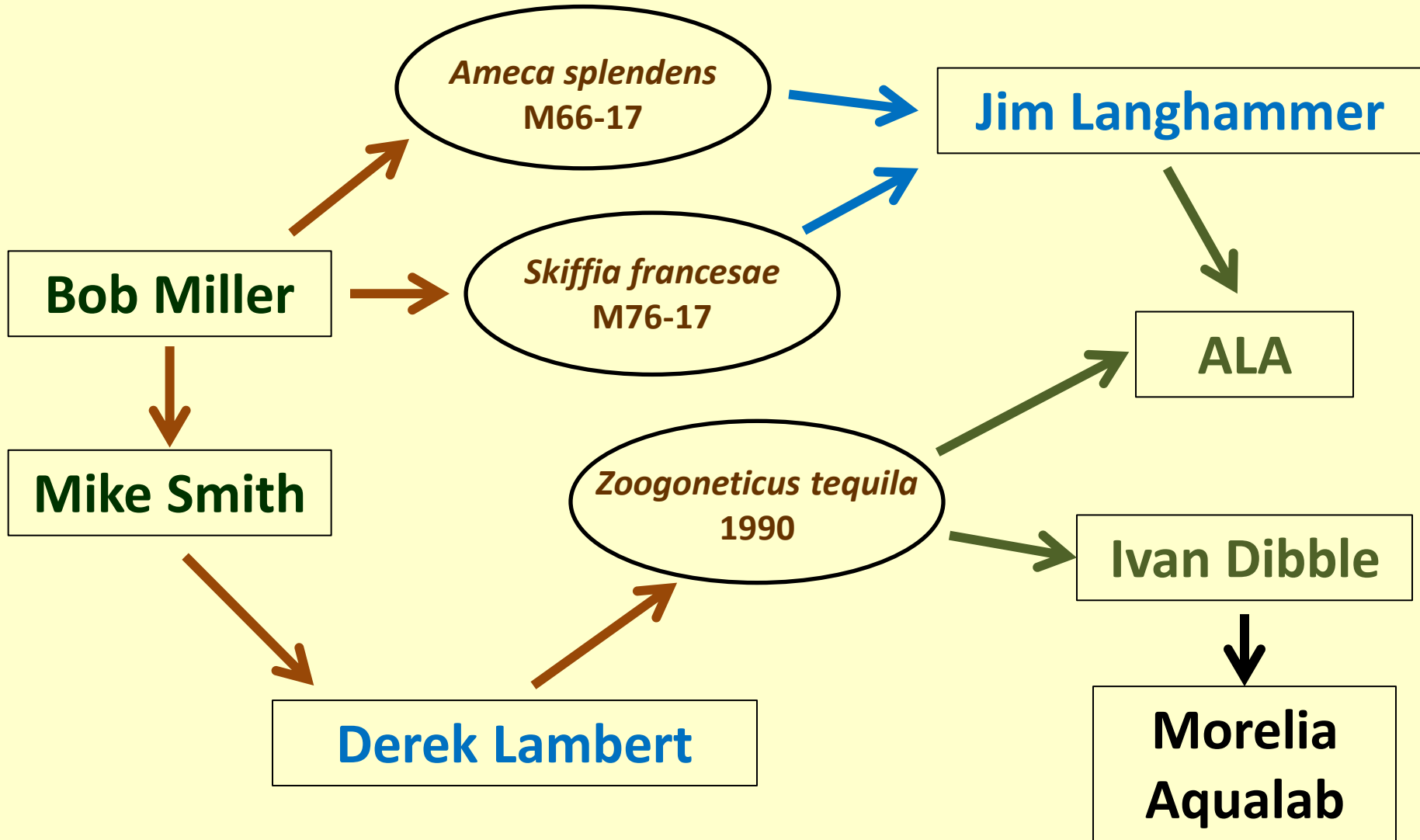
## **EXTINCT IN THE WILD**

### **Persist Only Because of a Few Dedicated Hobbyists**





# How *A. splendens*, *S. francesae*, & *Z. tequila* First Entered the Hobby



# Current (2014) Captive Status of...



*Ameca splendens*

27 NAGWG & affiliates; ~100 worldwide

*Most popular goodeid ?*



*Skiffia francesae*

17 NAGWG & affiliates; ~35 worldwide

*Top-ten most popular goodeid*



*Zoogoneticus tequila*

38 NAGWG & affiliates; ~75 worldwide

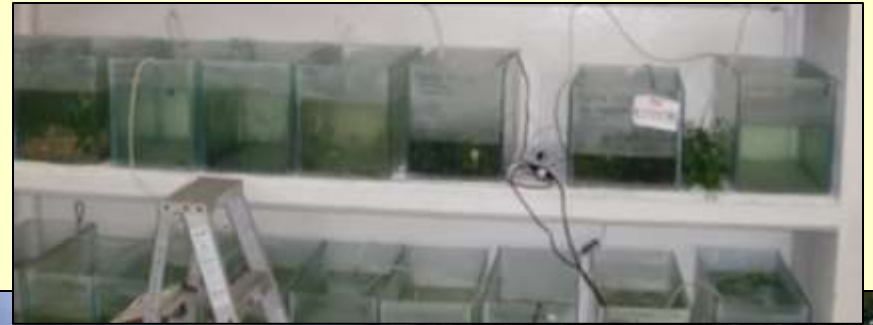
*Second or third most popular goodeid*



# The Future: *Zoogoneticus tequila* Re-Introduction



Former *Zoogoneticus tequila* habitat at Teuchitlán



*Zoogoneticus tequila* tanks & semi-wild acclimation ponds in Moreila

# But the Situation is Still Precarious

**Teuchitlán threatend; a single site always vulnerable to:**

- Groundwater pumping
- Toxic spill
- Disease epidemic
- New non-native introduction

***Zoogoneticus tequila* re-Introduction May Fail**

**The three species may go out of favor in the hobby**



# Need to continue to promote captive maintenance and support on the ground conservation



**Aqualab Goodeid Facility, Morelia**



*Ameca splendens*  
tank in my  
fish room



Property-owner sign at Teuchitlán:  
“We are protecting *Ameca splendens*,  
a fish endemic to Teuchitlán. We’d  
appreciate it if you did not wash  
yourself with soap and did not go  
fishing. Thanks.”

# Questions?



**Sunset over the Tequila Volcano & La Vega Reservoir, just downstream of Teuchitlán**