A Survey of Tropical Freshwater Fishes
Fishes constitute slightly more than half of the total number (48,170) of living vertebrate species.

- 9,500--10,000 spp are primary freshwater fishes.
- ~3,600 spp inhabit tropical rivers of Africa and South America
- ~90 Families of tropical freshwater fishes
Osteoglossiformes: Bony Tongues

- **Osteoglossidea** = bony tongues (4G, 6 spp)
- **Notopteridae** = featherbacks (3G, 7 spp) + India, Not SA or Australia
- **Pantodontidae** = butterfly fish (1 sp) African endemic
- **Mormyridae** = elephant fishes (1G, 198 spp) African endemic
Chitala blanci

Arapaima gigas

Scleropages formosus

Campylomormyrus rhynchophorus

Pantodon buchholzi
Characiformes: Piranhas, tetras, and tigerfish oh my…

Diversity:
- 10-18 families
- 237 genera
- ~1500 spp.

Africa has only 3 lineages:
- Citharanidae (20G, 98 spp.) – food fish
- *Hepesteus odeo* (African pike)
- Alestiidae (18G, 109 spp.)
Serrasalmines: Piranhas and Pacus

- ~13 Genera
- ~40 spp
- Diverse feeding habits
  - fin biters (*Serrasalmus*)
  - fish scales (*Catoprion*)
  - fruits and seeds (*Pygopristus* and *Piaractus*) – seed dispersal !!!!
  - And of course people, right ?????
Pygocentrus natteri: Red piranha
Man-eater fact or fiction ????

**Facts:**

- Of 30, only 3 spp (all *Pygocentrus*) are “potentially” dangerous to humans
- No confirmed attacks, only harmless bites
- Do not eat whole fish, pieces of flesh and fins (tooth structure)
- Humans eat lots of piranhas, delicacy and food staple in SA
- Keen sense of smell, blood at 1-2 miles
- “health squad” = feed on carrion
- Fear stems from a visit to Brazil by T. Roosevelt ca. 1914
- Unpredictable, swim in schools (10-30), and fast swimmers- accidental attacks can be provoked = will bite you (maybe eat your arm)!!!!!

**Fiction:**
Trichomycteridae: parasitic catfishes

• ~36 Genera
• ~155 species
  • hematophagous, pierce skin or attack gills
  • attracted to nitrogenous wastes
  • The candiru (Vandellia) is known to attack mammals (humans)
    • enter urethra or anus, become lodged (spines)
    • mostly anecdotal, but now confirmed !!!!!!!
  • Natives have designed penis sheaths and G-strings to prevent attacks
Cichlidae

Diversity
Coloration
Body shape

SA

www.fishbase.org

SA

www.fishbase.org

SA

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Figure 29.3 Feeding mechanisms of “mbuni” cichlids from Lake Malawi, showing adaptive radiation from a generalized ancestor. (From Fryer and Iles 1972.)
Reptiles and Amphibians
• Herpetology is the field of study dedicated to Reptiles & Amphibians, which are polyphyletic
• Both reptiles and amphibians are ectotherms, which dictates their ecology, behavior, morphology and physiology.

Ectothermy is the regulation of body temperature externally, by either basking in the sun or lying on or under a warm substrate.
• There are approximately 4,600 amphibian species and 6,000 reptile species worldwide.

• Diversity of these groups are greatest in the Neotropics, except for Salamanders and some families of turtles.

• Herps occur throughout the world.

• Very few families of reptiles and amphibians are endemic to either the new world or old world tropics.
Amniota (reptiles, mammals, birds, dinosaurs, etc.)
  Diadectomorpha
  Solenodonsaurus
  Living Amphibians (frogs, salamanders, and caecilians)
    Lysorophia
    Microsauria
    Nectridea
    Aistopoda
    Adelosynidae
    Westlothiana
    Seymouriamorpha
    Embolomeri
    Gephyrostegidae
    Whatcheeria
    Temnospondyli
    Colosteidae
    Baphetidae
    Crassigyrinus
    Tulerpeton
    Hynerpeton
    Ichthyostega
    Acanthostega
    Ventastega
    Metaxynathus
    Elginerpeton
Anapsida

Reptilia

Synapsida (mammals and their extinct relatives)

Mesosauridae

Millerettidae

Acleistorhinus

Lanthanosuchidae

Macroleter

Nyctiphurietia

Pareiasauria

Procolphonoidea

? Testudines (turtles, tortoises and terrapins)

Captorhinidae

Protorothyrididae

Diapsida (lizards, crocodiles, birds, Sphenodon, and their extinct relatives)

Romeriida

Araeoscelidia

Coelurosaurus

Apsisaurus

? Heleosaurus

? Galesphyrus

? Heleosuchus

Younginiformes

Claudiosaurus

? Ichthyosaurus

? Sauropterygia

Sauria

Archosauroomorpha (crocodiles, birds, and their extinct relatives)

Lepidosaoomorpha (lizards, snakes, Sphenodon, and their extinct relatives)
Dendrobatids are generally small species, about 20 to 40 mm in snout-vent length. They are also mostly diurnal, and observed hopping on the forest floor by day. A few species are arboreal, or at least partly so. They range from Nicaragua to the Amazonian Bolivia, the Guianas, and SE Brazil.
The reproductive behaviors are diverse. In all species of dendrobatids for which data are known, the tadpoles are carried on the back of the adult. In some species it is the male; in others it is the female that carries the tadpoles. Generally the tadpoles are transported to a body of water.
Mimicry

• Visual mimicry often includes aposematic or warning coloration.
• Toxic species are often brightly colored and so are their mimics.
• Müllerian mimicry has led to avoidance of many non-toxic species by humans and potential predators.
Hyla ebraccata - non-toxic

Dendrobates leucomelas - dart poison frog - extremely toxic!
Most feared snakes (Viperidae)

- Suborder Serpentes
- Pit vipers - Pits refer to a pit located between the nostrils and eyes.
- All are venomous.
- Well known tropical genera are Bothrops & Lachesis.
Major venom components

- Enzymes
- Polypeptides
  - Coagulants
  - Anticoagulants
  - Antimicrobials
  - metal ions
Venom action and function

- Neurotoxic
- Cytotoxic
- Cytolytic
- Hemolytic
- Hemorrhagic
- Myotoxic
- Myolytic
- Dispersive

- Immobilization and death
- Digestion
  - Congestion
  - Thrombosis
  - Hemorrhage
  - Inflammation
  - Immunosuppression