

Phylum Chordata – Vertebrates

Reptilia

8000 species worldwide; 340 sp in US & Canada

reptiles include lizards, snakes, turtles, and are generally looked on as cold, creepy or scary creatures

over earth's history they have been an extremely diverse and successful group

even today they are a very successful group

they occupy a great variety of terrestrial habitats

in some habitats such as deserts they are the dominant vertebrate group

some have even returned to an aquatic lifestyle in oceans and freshwaters

reptiles were the 1st vertebrates no longer tied to water, even for reproduction

→ 1st truly terrestrial vertebrates

First Reptiles

310 MY ago, 50 MY after the appearance of the first amphibians, some amphibians developed the ability to lay eggs on land

→ the first reptiles

while amphibian adults can live on land

they must have water to reproduce

complete independence from water didn't occur until the evolution of a self contained egg capable of storing water (=cleidoic egg or **amniotic egg**)

the appearance of this new type of egg allowed the evolution of **reptiles, birds & mammals**

the earliest example of a true reptile was a lizard-like, partly aquatic animal

~1.5' long

probably ate mostly insects

→ shows characteristics of both groups

reptilian skeleton
still had lateral line system

probably didn't yet lay shelled eggs

by 225 (end of Permian) most amphibians of the time had become extinct

the amphibians were "quickly" replaced by a great diversification of reptiles

shortly after reptiles arose, they began diversifying onto land at time of:

variable climate; tending to get drier

diversification of plants including flowering plants created numerous habitats

increase in the number of insects and amphibians provided an ample food supply

largest living reptile:

eg. Komodo dragon (*Varanus komodensis*)

10 feet long; 300 lbs

eg. Australian saltwater crocodile

up to 28 feet long

eg. leatherback sea turtle

8 feet long; 1500 lbs

largest reptile ever:

eg. largest of all reptiles: *Diplodocus hallorum*, giant sauropod

120+ feet long (37 m); 30-80 tons

→ largest animal ever to have walked on land

smallest living reptile

Caribbean lizard <3/4ths of an inch nose - tip of tail

smallest snake – 4" thread snake from Barbados

reptiles were much more abundant and diverse
~160-100MY ago

= age of reptiles (Mesozoic)

lasted >165 M Y

Skin

a second major innovation of reptiles is a thick, tough, dry, waterproof skin

their skin consists of the same 2 basic layers of vertebrate skin: **epidermis** & **dermis**

→ but **epidermis** much thicker than amphibians

→ and contains lipids and waxy **keratin**

→ very effective water proofing

→ the skin of reptiles also contains **scales** but unlike fish scales:

reptile scales are in the **epidermis**,
not the **dermis**

****epidermal (not dermal) scales****

reptile scales ≠ fish scales
(epidermal) (dermal)

[scutes of turtles are modified scales]

also reptile scales are made of **keratin**, a
waxy protein, not enamel and dentin
as in some fish

(structures made completely of keratin are
often referred to as "**horny**")

reptiles scales are **homologous** to feathers
and fur of birds and mammals

some extinct forms (dinosaurs & relatives) had
primitive feathers or hair in addition to
scales

reptile skin provide excellent protection from drying,
abrasion, predators

outer layer of epidermis is **shed** periodically

some reptiles retained the ability to grow bony

dermal plates (equivalent to fish scales) under their scales producing large rigid scales

eg. turtles , alligators

thick dermis contains **chromatophores**

in some the chromatophores can rapidly change color for camouflage

eg. green anoles

eg. inland taipans, fierce snakes up to 10 ft long, can get darker in winter and lighter in summer

eg. australian copperhead can also change color

in some reptiles the thick keratinized (horny) skin has been modified into **claws**, **scutes** (large scales of turtles), **horns** and **rattles**

Skeleton & Support

new features appear in reptile skeleton:

fewer skull bones

teeth still simple and peg like but in more efficient and stronger jaws

→ more biting force

nasal cavity separated from mouth by shelf of

bone = **palate**

→ easier to breath while eating

limbs stronger, more flexible & closer to body

→ better designed for walking

toes with **claws**

Movement

more powerful muscles than amphibians

limbs are stronger and more flexible for walking

chameleons have opposable toes for arboreal life

millions of adhesive fibers on the feet of geckos are so effective for climbing that they allow the animals to hang from a ceiling by a single toe

one group of extinct reptiles were the second group of animals (and the first vertebrates) to be able to **fly**

some reptiles can glide:

eg. *Draco* = flying dragon

uses extended ribs

can glide up to 50'

eg. gliding gecko *Ptychocheilus* sp.

eg. some gliding snakes

some can fly up to 60 ft horizontally as they drop from trees

they can flatten their bodies and undulate to "catch a breeze"

most land reptiles can **burrow** into mud

eg. turtles and small lizards

most reptiles **swim** with ease

some groups of reptiles have lost their limbs and use their scales to grip the ground while rib muscles move them forward

Feeding and Digestion

most reptiles are **carnivores**

jaws are more efficient for crushing and gripping prey

(fish use "suction" for feeding; their jaws are not very muscular; amphibians can't "chew")

tongue is muscular and mobile

→ used to help catch prey

tongue never attached to front of mouth

in some tongue serves as touch receptor

most reptiles have **teeth**

crocodilian teeth are constantly replaced

in some reptiles (snakes & a few lizards) salivary glands are modified into **poison glands** to take down prey

eg. king cobras are one of the deadliest species of venomous snakes

one snake (the tiger keelback snake in Asia) is the only known vertebrate that sequesters toxins from its prey (frogs and toads)

it stores these toxins in glands behind its head

it uses these stored toxins to ward off prey

while having its own anticoagulant toxin to capture its own prey

some large snakes are ambush predators and kill their prey by suffocation

doesn't directly squeeze it to death

→ once wrapped around their prey, each time the prey the snake tightens its grip, until prey can no longer inhale

since meals tend to be scarce they gorge

eg. some adult pythons can swallow an adult pig whole

within days of a meal their organs enlarge by at least $1/3^{\text{rd}}$, some to double their size – greatly increasing their metabolism

the change in metabolic activity is greater than that of a racehorse going from rest full speed in a quarter mile race

after the meal is digested the organs shrink back to their fasting size.

again, teeth are not used for chewing

stomach often has pebbles to help grind food
(=**gastroliths**) → common find at dinosaur sites

liver and pancreas produce wide variety of digestive enzymes

Respiration

Reptiles never have gills

since skin is thick and dry most reptiles depend completely on **lungs** for gas exchange

lungs are more developed, more folding, more surface area

→ more efficient

air is sucked into lungs, not gulped as in fish and amphibians

can expand and contract the **rib cage** to inhale & exhale

some have fully developed ribcage and sternum to facilitate breathing through lungs

still relatively low breathing rate since still cold blooded

(1/10th that of birds and mammals of same size)

but most can't breath while running since any of same muscles are used for both purposes

a few (crocodilians) with muscular **diaphragm**

also a few reptiles can exchange gasses through skin
eg. sea snakes, soft shelled turtles

also, aquatic turtles can extract oxygen from water
they "breath" through their mouth and cloaca
(can pump water in and out, highly vascularized)

no vocal cords like amphibians

→ reptiles can only hiss

Circulation

like amphibians, most with **three chambered hearts**

with 2 **atria** & 1 **ventricle**

but partial septum separates the ventricle

→ slows mixing of oxygenated & unoxygenated blood

two separate **circuits** of bloodflow:

pulmonary and **systemic**

the respiratory & circulatory systems of reptiles provides more oxygen to tissues than that of amphibians

more efficient heart; higher blood pressure

but still less efficient than that of birds and mammals

crocodilians have **4 chambered heart** which completely separates the pulmonary and systemic circuits

similar to that of birds and mammals

overall, still low metabolic rate = cold blooded
($\sim 1/10^{\text{th}}$ rate of birds or mammals of same size)

some reptiles in past were warmblooded

Nervous System

more advanced than amphibians

cerebrum increased in size but no 'cortex'

→ allows more complex behaviors

cerebellum less important than in birds and mammals

eg. motor functions in many reptiles is at least partly controlled by **ganglia** along spinal cord

but still reptiles are not as dependent on their brain as mammals are

eg a turtle 'lived' 18 days after brain was removed

Senses

a. vision

is most important sense organ

eyes usually with 2 moveable eyelids

some with a 3rd → **nictitating membrane**

most reptiles are active during the day

→ have cones for good color vision

some have "third eye" **pineal eye** on top of head

→ detects light intensity and may control biological rhythms

vertical pupils in nocturnal snakes (and some mammals) are better for night time hunting, it also gives them a deeper field of view making it easier for them to sneak up on prey

b. smell & taste

also have well developed sense of **smell**

eg. crocodilians secrete a strong musk during mating season

→ **olfactory epithelium** in nasal cavity

Jakobson's organ assists in sense of smell/taste

pits located on roof of mouth in lizards and snakes

→ forked tongue of snakes flicked then touched to Jakobson's organ to follow chemical trails

c. heat sensors

some snakes have IR receptors

→ can see body heat from warm blooded prey

d. hearing

similar but better than in amphibians
contain inner and middle ears

→ external tympanum and columella (stapes)

in lizards the tympanum is recessed into a canal

some lack tympanum and use bone adjacent
to jaw to detect sound in ground, not air

Excretion & Salt/Water Balance

more efficient (metanephric) **kidneys**

amphibians excrete N wastes as ammonia

→ requires lots of water to dilute it

most reptiles (and birds) secrete **uric acid**,
not urea or ammonia

→ requires much less water

most excess water is reabsorbed by bladder

reptiles, birds, mammals that live near sea cannot get
rid of all salt via kidneys

most have evolved salt glands (independently)

eg. marine iguana

→ salt gland empties through nostrils

eg. sea turtles

→ salt gland in orbit of eyes

eg. sea snakes

→ salt glands are beneath tongue

Protection/Defense

many species are well camouflaged by the color of their skin

venomous snakes use their poisonous fangs for protection as well as for subduing prey

rattlesnakes advertise their presence with a threatening rattle

horned lizards can puff up their bodies causing its spiny scales to protrude making them hard to swallow

horned lizards can also aim and squirt a stream of blood up to 5' from the corners of their eyes

the blood contains foul-tasting chemicals that deter wolves, coyotes and domestic dogs

Reproduction

dioecious

but hard to tell male from female

a few have sex chromosomes:

in many the gene that controls gender depends on temperature during critical period of development

copulatory organs and internal fertilization first became the common practice in reptiles in the vertebrate line

all reptiles have **internal fertilization**

in order to enclose the embryo inside a thick waterproof protective covering, the egg must be fertilized before the "eggshell" encloses it

so they don't need water for reproduction

reptiles have 1 or 2 copulatory organs

some snakes and lizards have 1 penis

most snakes and lizards have 2 penises (=hemipenes)

→ use only 1 at a time; depending in which testis has more sperm

tauratauras lack any penis

→ press cloacas together

after copulation, sperm may remain in female for months or years before it is used to fertilize egg

a few reptiles are **parthenogenetic**

→ egg develops without fertilization

almost all reptiles go through early development within an **amniotic egg**

don't need water for development

(only found in reptiles, birds & mammals)

with protective **embryonic membranes** enclosing embryo

→ complete life support system

4 membranes: **amnion** → watery cushion

allantois → collects wastes

yolk sac → provides stored food

chorion → with allantois for respiration

embryo & membranes are enclosed within a porous **shell**

can be leathery or hard shell

most reptile eggs require 4 – 6 weeks for development before hatching

no reptiles pass through a free living larval stage

a few reptiles (some pit vipers) bear live young

one reptile, an african skink *Trachylepis ivensii* ,has a functioning **placenta**

a trait formerly only known for mammals

the embryos develop, attached by a **placenta** to the **oviducts** of the mother

few living reptiles show parental care

they generally lay a large clutch of eggs and then abandon the nest

there are some exceptions:

eg. some dinosaurs showed parental care

eg. crocodilians dig nest for 25-50 eggs & cover the eggs

hatchlings often chirp encouraging mom to uncover nest

she then picks them up and carries them to water

both mom and dad respond to distress calls

eg. a few turtle species show minimal parental care;

watching eggs for a few days and urinating on them if they get dry

or after hatching climbing on or swimming with mom (or any other female in the area)

many reptiles have well developed abilities to **regenerate** missing body parts

eg. green anoles can lose tail

eg. glass snake: when pursued can break off its tail with a sharp twist

the tail twitches and writhes to attract pursuer while glass snake escapes

Kinds of Reptiles

today only 4 groups of reptiles (3 major, 1 minor)

during mesozoic more than 12 major groups of reptiles emerged and diversified including **dinosaurs**, along with shark-like reptiles (ichthyosaurs), plesiosaurs and flying reptiles (pterosaurs)

→ lots of niches open (no birds or mammals yet)

Dinosaurs

~540 different species of dinosaurs have been described

2006 study concluded that at least 70% of dinosaur genera remain unknown

some estimate up to 900 species once existed

2007 a new kind of dinosaur that lived in excavated dens was discovered

ichthyosaurs, plesiosaurs and pterosaurs are technically NOT dinosaurs but other extinct groups of reptiles

the largest pterosaurs with wingspans of 30 feet, could fly 10,000 miles nonstop

dinosaurs generally lived in warmer even tropical parts of the world but fossils are also found much closer to poles

Cretaceous dinosaur fossils are being found further and further north and south.

eg. north slope,

eg. southern argentina and australia

→ cold winter nights would have lasted several months

→how? (1988)

dinosaurs share a group of unique features that set them apart from all other vertebrate groups:

- their generally large size may be due to their extremely efficient (birdlike) lungs with airsacs

- most with upright stance

→ legs positioned directly beneath body

similar to mammals and birds

not like amphibians and most living reptiles

- many dinosaurs were bipedal

- considerably stronger hinge joints at knee and ankle

same as in birds

much less flexibility than in mammals

- dinosaurs walked on their toes

like horses

- many or most dinosaurs were **warm blooded** (endothermic); body temp ~ same as mammals

today, only birds and mammals are warmblooded

- many had **feathers** &/or **fur** in addition to epidermal scales

feathers & fur have the same structure as reptile scales

→ all are essentially the same thing

- many showed considerable maternal care

most reptiles today have no care of young

were apparently competitively superior to mammals at the time since mammals remained small and inconspicuous until ALL dinosaurs disappeared

→ then mammal diversity exploded

dinosaurs and most of the diversity of reptiles disappeared ~65 MY ago

→ probably meteorite impact

cretaceous extinction may have been caused by a pulse of asteroids not just one, eg. Manson, Iowa crater 66MY old

also, extensive volcanic activity contributed to their extinction

today only 4 groups of reptiles (3 major, 1 minor)

1. **Turtles** (~300 species)

ancient group (only surviving anapsids)

appeared in U Triassic (200 MY ago)

very little change in body form over past 200 M years

the most distinctive feature of turtles is their shell

no other vertebrate has developed such a distinctive armor

dorsal **carapace** and ventral **plastron**

outer layer of **keratin**, inner layer of **bone**

→formed from fused vertebrae and covered with dermal bone=carapace & plastron of fused scales

in some turtles the plastron is **hinged** to further protect the animal from danger

the carapace & plastron are covered by large **scales (=scutes)** fused to the bone below

biologists use the number, size and color of specific scutes to identify turtle species

in some species the growth rings of a scute can
be used to assess an individual's general age

ribcage can't be used for breathing

turtles must pump air into lungs like
amphibians do

aquatic forms can breathe some through skin

turtles are generally slow moving grazers and
scavengers; or eat slow moving insects and
worms, etc

no teeth, instead rough horny plates

good sense of smell & color vision, poor hearing

low metabolism → live long >100 yrs

many turtles require 6-12 years to attain
maturity; some take 20 or more

internal fertilization

all turtles bury eggs in ground

nest temperature determines gender of hatchlings

no sex chromosomes

three kinds of turtles:

tortoises – terrestrial

terrapins – freshwater

turtles – marine

eg. sea turtles

have webbed feet

up to 6' long

migrate 1000's of miles

live, feed and grow in sargasso sea

may take 50 years to reach sexual maturity
(low metabolism – some live to 150 yrs old)

they then return to beach where they hatched
to lay eggs

(reverse of amphibians)

as soon as they hatch sea turtle swim across 100's of miles
of ocean

→ can detect earth's magnetic fields for navigation

eg. box turtle

shell has 2 hinges to close up from predators

omnivorous: fruits and berries

may live up to 100 years

25,000 box turtles/yr are exported to Europe
as pets

90% die in transit

eg. snapping turtle

common in ponds in eastern US

grow to 1 ft long

ferocious and short tempered

entirely carnivorous (fish, frogs, birds)

come ashore only to lay eggs

2. Lizards & Snakes (6000sp)

the largest and most diverse living group of reptiles

appeared in fossil record in Jurassic

evolutionarily are very similar
→ placed in same order

most successful group
→95% of all living reptiles

very effective jaws to capture prey
very flexible
eg. snake can swallow prey several times
its own diameter

the order is about evenly divided between lizard
and snake species

2a. Lizards

terrestrial, burrowing, aquatic, arboreal or aerial

many lizards show reduction or loss of limbs

some legless forms

eg. glass lizard

eg. worm lizard

very effective jaws to capture prey

cold blooded but can regulate temperature by behavior to maintain a fairly constant body temperature

- early morning basking in sun to absorb heat
- hot → turn face to sun to expose less area
- lift legs on hot substrate
- hottest part of day may retreat to burrows

the desert iguana prefers higher body temperatures and can tolerate 117° F

- lethal to all birds, mammals, most lizards

eg. Geckos

small, nocturnal

adhesive pads on feet → can walk upside down
common around houses in Austin

eg. Chameleons

catch insects with sticky tongue

eg. Iguanas

include skinks, monitors and komodo dragons
often brightly colored
some marine

- have salt glands to get rid of excess salt

2b. Snakes

while lizards are probably the most familiar and “typical” reptiles, snakes are often considered “strange” and even “evil” by many

for 1000’s of years, snakes were looked on as mysterious creatures, often with magical powers and were important in many religious practices

most are terrestrial, some are aquatic, some marine

most lizards have moveable eyelids;

snakes eyes are permanently covered with transparent layer; no moveable eyelids

body very similar to lizards except for legs

most snakes have lost all traces of appendages

some retain vestiges of pelvic girdle

we often think of the loss of legs as a disadvantage but it has actually improved their ability to move

locomotion is radically altered, very adaptable

scales grip the ground as they make eel-like movements

essentially walk on their ribs:

→ up to 300 ribs

each rib has separate muscles that control its movement

snakes can climb, leap, swim, stand erect and “run”

some species such as racers and coachwips can outpace humans even on difficult terrain

→ probably most unusual is side winding of some desert species

sidewinders have only 2 parts of body touching ground at any one time
→ essentially *walking* without legs

some snakes use color for **camouflage**

eg. inland taipans, fierce snakes up to 10 ft long, can get darker in winter and lighter in summer

eg. australian copperhead can also change color

no external ears or tympanic membrane

do have internal ears and can detect low sound vibrations and soil vibrations

most snakes depend mainly on chemical senses to detect prey (vomeronasal or Jacobson's organ)

use tongue as "smell" receptor

picks up chemicals with tongue

transfers tongue to Jakobson's organ in mouth

some snakes also have pit receptors along the jaw margins that detect IR radiation (heat)

they can detect any animal warmer than its surroundings (esp birds and mammals, but also other reptiles)

these receptors are the most sensitive heat receptors known in the animal kingdom

can detect differences of 0.001°C

snakes generally have only 1 functional lung that extends almost the whole length of the body

the other lung is greatly reduced

most rely on chemical senses to hunt

flexible jaws allow snakes to swallow prey several times their own diameter

snakes subdues prey by **suffocation**(constriction) or **venom**

eg. boas and pythons → wrap and suffocate

eg. **venom** = saliva with a mixture of digestive enzymes and protein fragments

→ kills and starts the digestive process

some of these venoms work on the nervous system to cause paralysis

while only 2 lizard species are venomous
(include Gila Monster)

→ many snakes are venomous

a. coral snakes (ELAPHIDAE)

most dangerous

Indian cobra kills 10,000/yr

spitting cobra can blind by spitting in eyes

Tx Coral Snake

small mouth, short fangs

b. black mamba

may be world's deadliest snake

one bite can kill a person within half hour

b. sea snakes (HYDROPHIIDAE)

are similar to cobras

most venomous of all snakes

→ 100 x's more toxic than that of any

other kind of snake

c. pit vipers

in US include rattlesnakes,
water moccasins, copperheads
fangs fold back when not in use
use pits to track warm blooded prey
→ as effective in dark as daylight

Reproduction

some snakes have elaborate mating rituals

eg. red-sided garter snake

when a female garter snake emerges from hibernation she releases a pheromone that attracts hundreds of male snakes

they rush to her to create a large squirming "mating ball"

mating of these snakes is a tourist attraction in Manitoba, Canada

most snakes lay eggs

but pit vipers bear live young

3. Crocodiles & Alligators

21 species

mostly unchanged for 200 MY

largest of the living reptiles

→ up to 6M (18')

large robust skull with massive jaws with powerful closing muscles

the group is unlike any other living reptile group

distant cousins of dinosaurs (diapsid like dinosaurs)

more closely related to birds than other living reptiles

→ have diaphragm for breathing

→ bird-like breathing mechanism with air sacs

→ have 4 chambered heart

→ only reptile group that can make vocal sounds

→ show parental care

two groups:

crocodiles → long slender snout; more aggressive

alligators → shorter, broad snouts; much less aggressive

crocodilians have scent glands and produce a strong musk during mating season

glands in mouth and throat with slit like opening to outside of neck

another pair within cloacal slit

the only living reptiles that can make vocal sounds

→ vocal sacs on each side of throat

→ bellowing mating calls

one of only a few reptile groups that show parental care

lays 20-50 eggs per nest

tends to and protects eggs & hatchlings

gender of offspring is temperature dependent

low nest temp → females

higher nest temp → males

4. Tuataras (O. Sphenodonta)

only ~50,000 individuals survive

2 living species (endangered)

found in New Zealand; heavily protected

resemble iguanas; ~ 16" long

live in burrows

features are similar to fossils 200MY old

retain the most primitive reptilian traits

well developed parietal eye with cornea, lens & retina

but buried beneath layer of skin

→ can only detect light intensity

complete palate (nasal cavities separate from mouth cavity)

teeth fused to jaw (not in sockets)

unlike most reptiles, tuataras remain quite active even at near freezing temperatures

live long lives; routinely to 100 yrs; some suggest they may live up to 200 yrs

don't reach sexual maturity until 15 or 20 yrs old

apparently can produce offspring after 100 yrs old

females require 2 or 3 years to grow a clutch of eggs internally; and then for another 7 or 8 months more after they are fertilized

after the female finally lays the eggs they remain in the ground for another year before hatching

Humans Impacts

1. Poisonous Snakebites

5 Million people are bitten by poisonous snakes each year

causes at least 100,000 deaths and up to 400,000 amputations/yr

esp India, Pakistan & Mideast

very few have access to adequate medical care and antivenoms are in very short supply

-2009, WHO declared snakebite a neglected disease

but in US the average American is more likely to be killed by another person than to be bitten by a venomous snake

8000 bitten/yr in US (~17,000 homicides)

99.8% chance of survival (~80 die/yr)

Travis county has 5 venomous snakes:

Texas Coral Snake

- small mouth short fangs; coral snakes are nocturnal; only bite under unusual circumstances; have up to 12 hours to get antivenom
(red touch yellow → kill a fellow
red touch black → friend of Jack)

Western Cottonmouth

- can bite underwater

Western Diamondback Rattlesnake

- responsible for more human deaths than any other N. Am. snake

Blacktail Rattlesnake

- rare

Brown Banded Copperhead

most are mistrustful of snakes in general because a *few* are dangerous

snakes are much more of a benefit than a threat

eg. keep rodent populations in check

humans are much more of a threat to reptiles than they are to us

More than 20% of the world's reptiles are now at risk of extinction

2. Medical Research

the regenerative abilities of reptiles is under study for possible clues to organ replacement in humans

3. Pharmaceuticals

eg. toxins from a Brazilian viper have provided the key ingredient in a class of drugs called "ACE inhibitors" used to lower blood pressure

eg. protein in black mamba venom is as effective as morphine in relieving pain without its side effects (now under development)

eg. protein found in Gila monster venom is used as treatment for type II diabetes

4. Farmed Reptiles – semi-domesticated

2.6 Million crocodiles are produced each year worldwide for food and hide

5. Reptiles as Food

eg. sea turtles
such as Kemp's Ridley sea turtle

eg. Kemp's Ridley sea turtle
1947: 40,000
1985: ~200
1994: 580

they like the same beaches we do

hunted for eggs and meat

→in Mexico armed troops must guard beaches during nesting season

also affected by pollution & fishing
→US now requires exclusion devices on shrimp nets

eg. Alligator meat comprises about 1/3rd of commercial harvests in US

eg. snakes

6. World Trade in Live Reptiles/ Pet Trade

Because reptiles are traded for such a wide variety of reasons, there are many hundreds of species in trade.

millions of live reptiles are sold each year for the pet trade.

eg. In 2001 the United States imported just under **2 million live reptiles.**

eg. The United States annually exports more than 8 million **red-eared slider turtles** (*Trachemys scripta elegans*), the world's most commonly traded live reptile.

eg. over 500,000 were **green iguanas** (*Iguana iguana*) from Central and South America.

eg. Other species commonly found in the pet trade include:

boa constrictor (*Boa constrictor*)

ball python (*Python regius*)

panther chameleon (*Chameleo pardalis*)

red-footed tortoises (*Geochelone carbonaria*)

reptiles are among the most inhumanely treated animals in the pet trade.

90% of wild-caught reptiles die in their first year of captivity because of physical trauma prior to purchase or because their owners cannot meet their complex dietary and habitat needs.

Because they are cheap and easily replaceable, dealers, captive breeders, and retailers factor huge mortality into their operating costs.

7. World Trade in Reptile Products

eg. **exotic skins trade.** reptile hides are used in the "luxury fashion" trade. PETA: virtually every store that sells exotic skins has some hand in their illicit trade

eg. alligators are bludgeoned to death with hammers and steel rods,

snakes and lizards are decapitated and skinned

pythons are studded (not killed) hoses are inserted into their mouths and they are pumped full of water to swell up to loosen their skin, then each snake's head is impaled on a hook and the animal is skinned alive

eg. curios and jewelry. In many parts of the world, "tortoise shell" curios and jewelry, which are actually made from the shells of hawksbill sea turtles, remain popular, as do leather items made from snakes, lizards, and crocodilians.

eg. Tortoises and turtles fetch high prices in Asian markets - especially in China - where their meat is eaten and their shells are used to make traditional medicines.

eg. American Alligator; brought back from near extinction \$30M hide business now

8. Herbal Medicine

tons of turtles are harvested because Chinese believe that eating turtles will lengthen lifespan

turtle blood is available at Walgreens in China

turtle heads are consumed for labor pains

powdered snake gall bladder is used as a cure for bronchitis

coin snakes are coiled up like a stack of coins with head on top

they are boiled into a thick black liquid that is sipped like tea for general health

lizards are taken to treat high blood pressure

9. Industrial Products

eg. Gecko Tape

eg. special 'hairs' on the feet of geckos give them the power to climb on walls and ceilings carrying up to 400 x's their own weight

tape that mimics the feet of geckos is now commercially available

10. Invasive Species

eg. brown tree snakes

bioinvader of islands (eg Hawaii)

→has wiped out numerous species of birds and mammals