

Reptile and bird eggs: an introduction



**ASSIGN
BUSTER**

For a long time now scientist have been studying all types of reptiles since before man walked the earth. When comparing today's modern reptile eggs, and bird eggs we see many differences that are still being studied. Birds are almost found everywhere, while most reptile are only in specific location. They both lay eggs that are diverse internally and externally. We will look at different species of birds and reptiles to find out more about their extraordinary reproductive system and the eggs themselves.

Birds

- Feathered, winged egg laying vertebrates. (Irie, 2010)
- Approximately 10, 000 living species (Deeming, 2007)
- The only branch of dinosaurs to have survived the Cretaceous Paleogene extinction 65. 5 million years ago. (Dol'nik, 2001)
- Scientists theorize that birds evolved from dinosaurs. (Dol'nik, 2001)
- Archaeopteryx lithographica had two strong legs and walked as a bird does. Its skeleton was reptilian and had the feathers of a bird. (Dol'nik, 2001)
- There are two theories as to why feathers would have developed in the evolution of birds. One is that because the ancestors of birds where becoming warm blooded, they needed the insulation of feathers. Another is that they develop because of a need for flight and gliding. (Dol'nik, 2001)
- This capability to fly gave birds the competitive edge as they could travel over greater distances and areas seeking food. This also permitted them to live in places unreachable to other animals. (Deeming, 2007)

Bird Eggs

- Bird eggs are laid by females and incubated for a time that changes according to the species. (Deeming, D C; Birchard, G F 2007)
- A single bird hatches from each egg. (Deeming, D C; Birchard, G F 2007)
- Lay very typical amniote eggs with calcified shells. (Dove, 2012)
- Birds brood their eggs until hatching. Some bird species are naked and helpless at birth, and must be fed by their parents; these birds are called altricial. (Dove, 2012)
- Some birds lay eggs even when not fertilized (Deeming, 2007)
- Cormorant eggs are rough and chalky (Dove, 2012)
- Tinamou eggs are shiny (Nathan, 1999)
- Duck eggs are oily and waterproof (Nathan, 1999)
- Cassowary eggs are heavily pitted (Nathan, 1999)
- Tiny pores in a bird eggshell allow the embryo to breathe. (Irie, 2010)
- The majority bird eggs have an oval shape, with one end rounded and the other more pointed. (Deeming, 2007)
- The egg's wall is shapeable (Deeming, 2007)
- Numerous animals feed on eggs. (Dove, 2012)
- Humans have a long history of both eating wild bird eggs and raising birds for farmed eggs for consumption. (Dove, 2012)
- Brood parasitism occurs in birds when one species lays its eggs in the nest of another. In some cases, the host's eggs are removed or eaten by the female, or expelled by her chick. (Irie, 2010)

Reptiles

- Reptiles are members of the class Reptilia comprising the amniotes that are neither birds nor mammals. (Rafferty, 2012)
- The amniotes are the vertebrates with eggs featuring an amnion, a double membrane that allows the embryo to breathe effectively on land. (Dol'nik, 2001)
- Living reptiles are cold-blooded and bear scales. (Rafferty, 2012)
- Reptiles originated around 320-310 million years ago during the Carboniferous period, having evolved from highly developed reptile like amphibians that became gradually more adapted to life on dry land. (Dol'nik, 2001)
- There are many extinct groups, including dinosaurs, pterosaurs, and ichthyosaurs. (Dol'nik, 2001)
- There are 8, 240 species of reptiles in the world, inhabiting every continent except Antarctica. (shine, 1999)
- Lizards and snakes have a single sheet of overlapping scales. (Rafferty, 2012)
- Other reptiles grow plates. (Rafferty, 2012)
- The main purpose of the skin is to keep water in the animal's body. (Shine, 1999)
- Reptiles can go without water for long periods, and many species prosper in deserts. (Shine, 1999)
- Reptiles, like birds, have deliberate control over the muscles in their eyes, which determine their pupil size. They are able to constrict or dilate their pupils at will, not just in reaction to light. (Dove, 2012)

- The brain of a reptile is not over 1 percent of his body mass. Unlike amphibians, however, the reptilian brain has two hemispheres. (Nathan, 1999)
- The nervous systems of reptiles are adequately complex and similar to those of mammals. (Rafferty, 2012)

Reptile eggs

- The eggs laid by some reptiles even smaller, and those of insects and other invertebrates can be much smaller still. (Nathan, 1999)
- Chicken eggs have a hard shell while reptile eggs have a soft, leathery shell. (Qualls, 2002)
- Large macrolecithal eggs, develop independent of water. (Deeming, D C; Birchard, G F 2007)
- Like amphibians, amniotes are air-breathing vertebrates, but they have complex eggs including an amniotic membrane. (Qualls, 2002)
- Dinosaurs laid eggs, some of which have been preserved as petrified fossils. (Dol'nik, 2001)
- Macrolecithal eggs are found in reptiles (Deeming, 2007)
- Oviparity is typical of birds and reptiles. (Nathan, 1999)

Literature Review

Dove (2012). Consumption of bird eggs by invasive Burmese Pythons in Florida.

- Burmese Pythons have been reported to consume 25 species of adult birds in Everglades National Park, Florida but until now no records documented this species eating bird eggs.

Deeming, D C; Birchard, G F (2007). Allometry of egg and hatchling mass in birds and reptiles: roles of developmental maturity, eggshell structure and phylogeny.

- This article looks at a wide range of birds and reptiles using regression analysis, In birds, initial egg mass (IEM) at laying is the most important factor affecting phylogenetic relatedness. For all reptile species, IEM phylogenetic relatedness did not. This article also observed for the relationship between eggmass and incubation period.

Shine, R,(1999). Egg-laying reptiles in cold climates: determinants and consequences of nest temperatures in montane lizards.

- This article studies reptilian life-history and evolution. Many of these species avoid low incubation temperatures by selecting warm nest-sites, reptiles may adapt to low-temperature incubation rather than avoid it. *Bassiana* eggs tolerate higher temperatures than do *Nannoscincus* eggs, but do not develop as rapidly at low temperatures.

Dol'nik, (2001) Allometry of egg mass, clutch size and total clutch mass in dinosaurs: comparison with modern reptiles and birds.

- In this article the author presents for the first time empirical allometrical equations matching the mass of dinosaurs with the mass of their eggs, clutch size and its total mass. Contrast of these equations with those that were planned for modern taxa of reptiles and birds shows that dinosaurs can be characterized by intermediate value of allometry index.

Nathan, R, and Y. L. Werner (1999). Reptiles and breeding birds on Mt. Hermon: Patterns of altitudinal distribution and species richness

- This article reviews and analyzes the altitudinal distribution of reptiles and breeding birds on Mt. Hermon over the distance of 2814 m. Species diversity was larger in breeding birds than in reptiles, declining with rising altitude in both groups, but more sharply so in birds. The scientist explain that the generalization of vegetation arrangement with increasing altitude may explain this variation, because birds probably better use the three-dimensionality of densely-vegetated habitats that take over low elevations.

C. P. Qualls, R. M. Andrews (2002). Maternal body volume constrains water uptake by lizard eggs in utero

- In this article observations showed that some characteristic of retention in the oviductal environment restricts the amount of water eggs can absorb prior to oviposition. This paper presents proof, from two species of *Sceloporus* lizard, supporting the hypothesis that restricted space within the mother's body cavity physically constrains the ability of eggs to expand, and thereby their ability to absorb water. If such a constraint on water uptake is extensive, it can have significant implications for the understanding the costs of reproduction, and the determinants of reproductive output in squamate reptiles.

Anthony R. Rafferty and Richard D. Reina, (2012). Arrested embryonic development: a review of strategies to delay hatching in egg-laying reptiles.

- This article discusses arrested embryonic development connecting the down regulation or cessation of active cell division and metabolic activity, and the ability of an animal to arrest embryonic development results in temporal plasticity of the duration of embryonic period. Arrested embryonic development is a significant reproductive strategy for egg-laying animals that provide no parental care after oviposition.

Irie, Toshiaki, (2010). Retinoid storage in the egg of reptiles and birds

- In this article storage of retinal has been established in eggs from a variety of anamniotic vertebrates, but the retinoid-storage state in eggs of oviparous amniotic vertebrates (reptiles and birds) has not been clarified in detail. Scientist studied four reptilian and five avian species and established that retinal was commonly stored in their egg yolk. In addition, retinal was the major retinoid in reptilian eggs, with only low levels of retinol, while major amounts of retinol as well as retinal were stored in avian eggs. In equally reptilian and avian eggs, retinal was frequently bound to proteins, which were assumed to be homologous to the proteins that attach retinal in the eggs of anamniotic vertebrates.