



Arizona's Raptor Experience, LLC

March 2018

~Newsletter~

Greetings from Chino Valley!

We hope you are well and looking forward to warmer weather, budding plants and the return of many birds to your yard. Just like with every other season, the onset of spring leads to new activity among the birds. Nesting season has already begun for some and others are busy searching for that perfect location to house and protect their eggs.

In New York where we are from, the earliest nesting bird is the Great-horned Owl which is already on eggs in January. If you've paid attention to the weather in the northeast this year, you know how hearty they must be – winter is in full swing in January and for months to come. Here in Arizona birds enjoy a much milder winter, especially the further south you go.

Even so, many birds have yet to begin nesting let alone laying eggs. One fascinating bird, the Phainopepla, sometimes called a Black Cardinal, apparently does begin to nest in January in southern AZ.

As we approach egg laying season, we thought it would be fun to focus this newsletter on eggs. We hope you enjoy it!



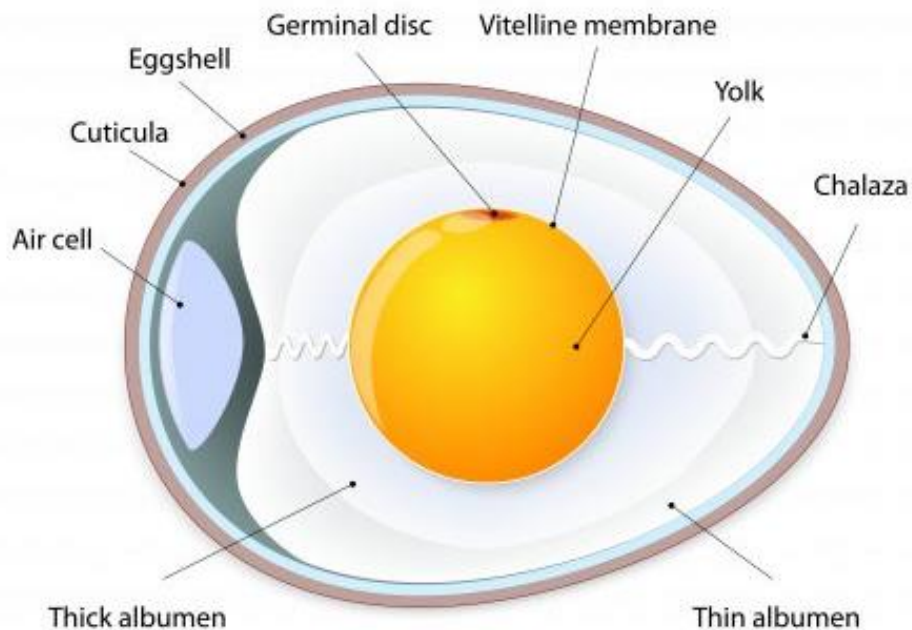
Barn Owl Eggs



The egg!

Birds are known as oviparous animals, which means they produce eggs that hatch *after* leaving the mother's body. This adaptation is likely related to the fact that most birds fly and therefore would have difficulty carrying the weight of developing embryos in their body. In addition, the design of the bird's reproductive tract and the egg shell itself would not allow for much gas exchange between the mother and the developing chick if inside the mother bird's body. Bird embryos are likely to get more oxygen and therefore develop into healthy chicks laying in the nest.

The egg shell actually has thousands of pores which allow for gas and moisture exchange. So what is on the *inside* of an egg?



Cuticula: a waxy membrane on the egg shell composed of fats and proteins with the primary function of preventing microbes from getting into the egg.

Germinal Disc: also called the blastoderm - a small spot on the surface of the yolk where the sperm enters the egg for fertilization. The embryo develops from this disc, and gradually sends blood vessels into the yolk to use it for nutrition as the embryo develops.

Chalaza - two twisted protein strips joining the yolk to the ends of the shell. They keep the yolk/germinal disc suspended and allow it to turn when the egg is rotated.

Albumen - egg white, or the protein contained in it.

Vitelline membrane - transparent casing that encloses the yolk of the egg and separates it from the albumen.

Yolk - the yellow internal part of a bird's egg, which is surrounded by the white, is rich in protein and fat, and nourishes the developing embryo.

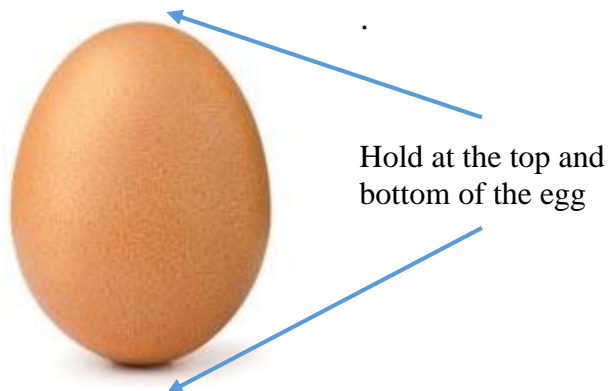
Air Cell - provides the chick with air when it is ready to start breathing on its own and hatch from the egg. As the chick starts breathing, there is a buildup of carbon dioxide in the egg, which prompts the chick to break through the egg to get fresh air.

The smallest bird in the world, the Bee Hummingbird, makes the smallest nest and produces the smallest egg of all living birds. The egg weighs in at about .05 ounces!

The Ostrich produces the largest egg of any living bird, which weighs in at about 3 pounds.

Egg shells are designed to protect the developing embryo inside when the weight of the parent bird is on the egg during incubation.

Try this experiment at home: hold the egg with your index finger on the top and your thumb on the bottom and squeeze. As hard as you can.



You will find that the egg does not break because you are adding pressure to the ends which are the strongest parts of the egg. Also, the shell itself is curved, which helps distribute pressure evenly over the shell rather than concentrating it at one point.

Nature's Way...

Interesting Characteristics and Behaviors Involving Eggs

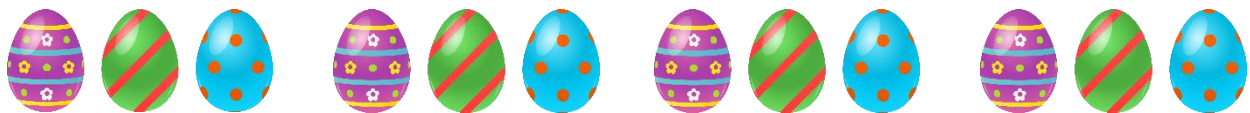
Eggs come in a wide variety of shapes, sizes, colors and patterns. Each of these things has adaptive value. For example, the colors and patterns on eggs often serve to camouflage the egg, especially when they are laid on the ground. These colors and patterns mimic those of their environment. Some of the best examples of this are Killdeer who lay their eggs in gravel and shorebirds who lay their eggs on the beach.

The colors and patterns on eggs are applied to the porous shell as the egg passes through the oviduct. Patterns are as individual as human fingerprints. This can aid colonial nesting birds in identifying their own eggs when returning to the colony.

Eggs laid in dark environments, like tree cavities, are often white. Because the eggs are hidden, the need to camouflage them doesn't exist. Other colors, like light blue, are thought to help reflect the potentially damaging rays of the sun.



Egg shape also serves a purpose. Falcon eggs laid on bare, exposed surfaces like cliff edges are rounded at the large end and pointed at the other. This allows them to rotate in a circle when disturbed rather than away from the nest and potentially off the cliff.



Birds cannot count and they stop laying eggs instinctually when the clutch is complete. The number of eggs produced can be influenced by several factors including food availability and the age of the female. Younger, less experienced females often lay fewer eggs. The female can be “tricked” into laying more eggs by removing one from the clutch; this is called double clutching. In addition, placement of an artificial egg in the nest can stimulate egg production – farmers do this to get their chickens laying!

In one study, a Northern Flicker was tricked into laying an additional egg each day by removing one per day from her clutch. In the study, she laid a total of 71 eggs in 73 days!

When it is time to incubate the eggs, most birds automatically shed breast feathers forming a brood patch to allow direct contact between the parent's skin and the eggs. Ducks and geese actually pluck these feathers and use them to line the nest. The outer feathers remain and cover this area when the bird is not incubating. In species where both parents incubate, they will both develop a brood patch.



Brood patch

When incubating the eggs, it is important to ensure that the eggs are heated evenly. To accomplish this, the parent bird rotates the eggs, giving each one equal time in the center of the clutch. The movement also keeps the embryo from sticking to the inside of the shell.

Shhh!



Please do not disturb.

The American Redstart turns its eggs every eight minutes during incubation. The Mallard Duck turns its eggs every hour.

Birds are most likely to abandon their nests when disturbed during egg laying and incubation. If you are lucky enough to find a bird's nest, stay away to let the bird's raise their young. Your scent near the nest can attract predators like raccoons!

A little insurance...

The goal of every animal is to pass on its genetic material. Birds will sometimes produce an egg and let someone else do the work of raising their offspring. ***Egg dumping*** is a behavior where the female will locate the nest of another pair of the **same species**, sneak in when they are away, and leave an egg behind to be raised by the neighbors! Tree swallows have been documented exhibiting this behavior.

Another similar behavior is called ***brood parasitism***. This is different from egg dumping, however, because the egg is left in the nest of a **different species** of bird. The foreign egg hatches earlier than the rest of the clutch and in some cases the young chick will actually push the other eggs out of the nest. The unknowing parents end up putting all of their effort into raising another bird's offspring. The Brown-headed Cowbird is an example of a bird that does not raise any of its own young.

Another strategy to ensure that at least some offspring survive is asynchronous hatching. In this scenario, the female begins incubation on the first egg that is laid. Chicks hatch on different days and are therefore different ages. If enough food is available, all ages of chicks can survive. If not, the youngest weakest die, while the parents focus on the survival of the older, stronger chicks. This behavior is seen in many owl species, like Barn Owls.

